



SLIGO
COUNTY COUNCIL
COMHAIRLE CHONTAE SHLIGIGH

Sligo County Council

Sligo Regional Sports Centre, Cleveragh, Sligo

Thermal Response Test (TRT) Procurement Scope



PEACEPLUS
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1. Background

Sligo County Council (SCC) is a partner in the SEUPB funded Gemini project (<https://geminigeothermal.com/sligo/>). As part of this project a Geothermal Heat Pump and associated geothermal collector, nominally comprised of 48 No. 200m closed loop boreholes, will be installed at the Sligo Regional Sports Centre (SRSC) to provide decarbonized heating and cooling to the building. To facilitate the final design of the geothermal systems Sligo County Council (SCC) now requires a suitably qualified geothermal contractor to undertake thermal response testing (TRT) at the Sligo Regional Sports Centre. The principal test borehole is to be a new 200 m grouted vertical borehole heat exchanger that is to be drilled and completed in a manner that facilitates not only the TRT test, but also allows the borehole to be part of the final geothermal collector. This borehole will also require a Distributed Temperature Sensor (DTS) fibre optic cable to be installed to the total depth of the borehole for the purposes of long-term temperature monitoring. It is intended that this cable will be supplied by Queens University Belfast (QUB) but the installation of the cable will be the responsibility of the successful tenderer.

There is also an existing 155 m grouted geothermal borehole on site with geothermal probes installed. SCC also requires a thermal response test to be undertaken on that existing borehole as part of this RFQ.

2. Objectives

- Obtain site-specific measured thermal parameters through a TRT to support geothermal heat pump collector design and verification.
- Install a distributed temperature sensing (DTS) cable in the new borehole to obtain monitoring data. Monitoring and data collection will be carried out by GEMINI project partners
- Complete the works and reporting in a safe and timely fashion to meet the wider September 2026 programme requirement.

3. Scope Summary

Item	Borehole / Element	Required Service
1	New 200 m TRT borehole	Drilling, completion, temperature profiling, TRT, interpretation and reporting.
2	Existing 155 m grouted geothermal borehole	Inspection, TRT, interpretation and reporting.
3	Fibre optic cable installation	Installation of a 200m DTS fibre-optic cable to be left permanently grouted into the new TRT borehole.

4. Applicable Standards and Guidance

SCC does not prescribe the detailed TRT procedure. Tenderers shall propose the test procedure, duration, heat input, flow requirements, data logging arrangements, interpretation method and reporting format. The proposal shall demonstrate compliance with relevant standards and shall clearly state how the selected procedure is appropriate for a 200m borehole and an existing 155m grouted borehole.

Standard / Guidance	Application to This RFQ
I.S. EN ISO 17628:2015	Geotechnical investigation and testing - geothermal testing - determination of thermal conductivity of soil and rock using a borehole heat exchanger.
EN 17522:2023	Design and construction of backfilled and grouted borehole heat exchangers. Relevant to borehole completion, grouting, integrity and monitoring provisions. Section 7.2.4 is relevant to TRT method.

Tenderers shall identify any additional manufacturer requirements, national guidance, European standards, professional guidance or industry best practice that they propose to follow.

5. Technical Scope of Works

5.1 Review of Existing Information

- Review proposed well design, associated geothermal feasibility study and all available information relating to the new 200m TRT borehole.
- Review installation and as-built records for the existing 155m geothermal borehole, where available.
- Review site access, services, electrical supply, water supply, working area and programme constraints.
- Identify suitable site for the drilling of the borehole in consultation with SCC
- Identify information gaps that may affect the TRT procedure, interpretation or uncertainty.
- Provide a method statement and risk assessment before mobilisation.
- Recommend and justify the detailed TRT procedure in accordance with applicable standards and good industry practice.

5.2 New 200m TRT Borehole

The new TRT borehole should be constructed in accordance with the following reference design basis (see below). If the tenderer wishes to deviate from the proposed design they may propose an alternative design, with justification, as part of the tender process. The tenderer shall ensure the borehole is suitable for both installation of a fibre optic cable for the DTS, thermal response testing of the completed grouted geothermal probe, and long-term use as part of the final geothermal collector to be installed at SRSC. Contractor to provide Waste Management Plan outlining how the TRT testing service minimises environmental impacts across energy use, materials, waste, and transport.

Design Element	Reference Requirement / Basis
Depth	200m
Probe type	Single or Double-U geothermal probe (ensure space allowance for DTS cable)
Probe pipework	40mm OD SDR11 PE100RC, unless otherwise approved by the Client
Borehole diameter	Approximately 152 mm, subject to drilling methodology and final completion
Backfill / grout	Thermally enhanced grout

Grout placement	Base-up grouting using sacrificial grout tube (injection from surface will not be acceptable)
Monitoring	Temperature profiling and TRT required; permanent DTS cable to be priced separately

Borehole Location

The final location of the borehole is to be agreed between the tenderer and Sligo County Council. The location should be chosen on the following basis:

- Minimise disruption to operation of SRSC
- Minimise necessity for enabling or preparatory work by SCC
- Be sufficiently proximal to building to facilitate housing of DTS monitor (alternatively external housing will have to be provided by Gemini partners if this is not feasible)
- Allow for integration into final geothermal collector.

Appendix A shows the general layout of SRSC location of underground services determined by GPR

Appendix B shows the proposed geothermal collector layout designed in the Sligo Regional Sports Centre Geothermal Installation Design & Costing study conducted by Geoserv Solutions.

Appendix C Site maps

Appendix D Proposed cabling route

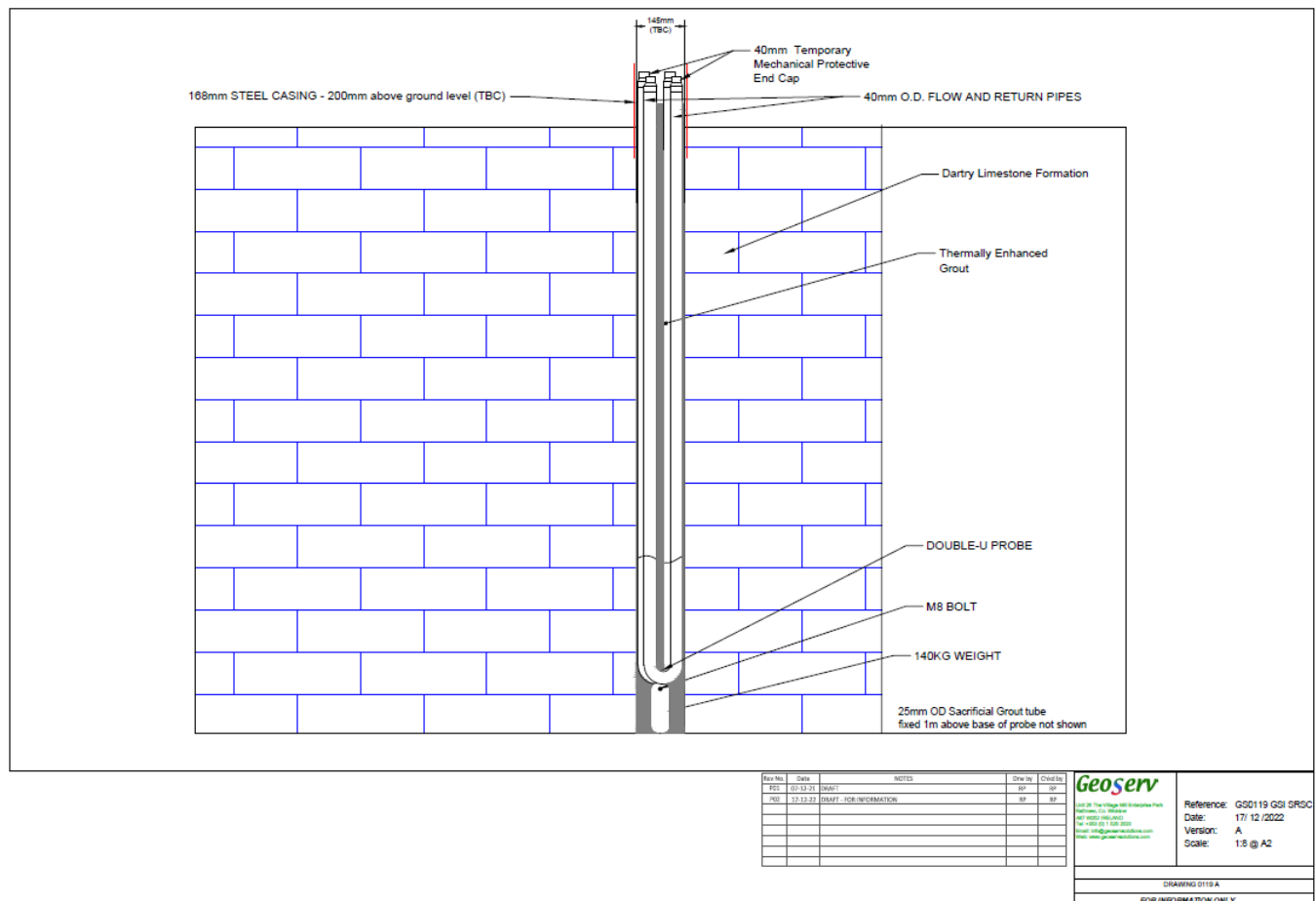


Figure 1. Proposed wellbore design for TRT test at SRSC (Geoserv, 2023)

Borehole Specification

Depending on space requirements to successfully install both DTS cable and geothermal probe(s) the tenderer may propose the use of a single or double geothermal probe comprising flow and return circuit(s) of D40mm SDR11 PE100RC pipe (any reduced wall thickness will not be acceptable). The well design for each of the boreholes is outlined in **Figure 1** taken from Sligo Regional Sports Centre Geothermal Installation Design & Costing study conducted by Geoserv Solutions.

The well design should be comprised of a cased upper section to stabilise the overburden above the bedrock using 168mm casing (or larger diameter) set into the top of the bedrock section below any weathered horizons. The estimated depth of this is c. 8m.bG.L, however this should be considered uncertain.

The drilling should be completed at a diameter no wider than 152mm open hole in the bedrock section of the Dartry Limestone Formation to a depth of 200m. The drilling shall allow for a minimum of 2m of additional depth to accommodate the installation of weight (minimum of 140kg required) for the installation of the single or double-U probe in the hole.

The probe shall be filled with water from the surface and circulated to remove any air from the pipework. The installation process shall ensure that the probe is installed slowly to the full depth of the borehole. Where the diameter of the hole permits (diameter greater than 147mm), spacers on the probe may be used to achieve an adequate shank spacing between the flow and return pipework and to promote contact of the pipe with the borehole wall.

The annular space in the geothermal borehole shall be backfilled with thermally enhanced grout as per the requirement of EN17522:2023. The grouting process shall ensure that the grout is mixed to the manufacturer's specifications to achieve a minimum thermal conductivity of 2 W/mK^{-1} . Grout injection shall be performed via a sacrificial grout tube using a paddle mixer and screw pump by injecting from the base of the borehole. The injection process will displace any groundwater present in the borehole and will remain continuous until such time that the grout overflows from the top of the steel casing. The geothermal probe shall remain capped throughout the grouting process and for the duration of the grout setting period to prevent any pipework collapse.

Geophysical Logging

Prior to the running of the geothermal probe(s) and grouting it is intended for a third-party contractor to perform downhole geophysical logging on the borehole. The time allowance for this operation is maximum of three days. The tenderer will be required to ensure the borehole is in an optimal state for logging, identify any locations in the borehole where there has been instability or increased risk of getting tools stuck, and assist/provide access for the geophysical logging company to run wireline into the borehole. A standby / logging rate should be provided to account for this.

TRT Requirements

- Confirm the installed loop is suitable for testing following completion and grout curing
- Flush, fill and purge the loop as required
- Undertake pressure, flow and circulation checks before TRT
- Record undisturbed or stabilised ground / loop temperature before heat injection
- Carry out TRT in accordance with the tenderer's proposed standard-compliant methodology
- Process and interpret the data to derive thermal conductivity, borehole thermal resistance and design-relevant parameters

5.3 Existing 155m Grouted Geothermal Borehole

The Contractor shall attempt to undertake a TRT on the existing 155m geothermal borehole installed on site.

- Inspect accessible borehole headworks, pipework and fittings
- Confirm connection arrangement and suitability for TRT

- Undertake pressure, flow and circulation checks
- Flush and purge the loop if required
- Record pre-test temperature conditions
- Undertake TRT using a method appropriate to the existing borehole condition and configuration
- Interpret the results and compare with the new 200m TRT borehole, where technically meaningful
- Identify limitations due to incomplete as-built information, age of installation, unknown grout condition or hydraulic constraints.

5.4 DTS Cable Installation

Tenderers shall provide a separate price for the installation of a 200m DTS fibre-optic cable to be left permanently grouted into the new 200m TRT borehole for long-term monitoring. This cable is to be provided by Queens University Belfast (QUB) and monitoring will be undertaken by GEMINI partners. In order to plan for the eventuality that QUB are unable to supply the cable in time for the operation the tenderer is to provide an additional cost item and timeline to supply a suitable DTS cable. In the case of the QUB supplied cable the tenderer will not be held liable for damage to, or performance of, the cable provided the installation is carried out according to the agreed installation plan. The scope for this component consists of:

- Proposing method for deploying the DTS cable alongside the single or double-U probe and grout tube
- Employing cable protection measures during probe installation and grouting
- Assisting in running cable from borehole to the surface termination arrangement / protective housing determined by QUB
- A shelter for the interrogator unit (either access to the plant room so that the unit can be installed there or alternatively a unit for a rack to house the unit outside the building; mains supply would be required for both)
- The armoured surface cable from the borehole to the interrogator would need to be trenched to the final location for the interrogator as well
- A man hole (approx. 1m3) at the well head to house the junction box. Attached is a photo of an example - this should also have a cover that's secured to keep it water tight.



- Testing before installation, after installation and after grouting (facilitate testing by QUB staff)
- Providing as-built record of cable depth and surface route to termination.

Additional Cost Item

- Supply of 250m of DTS-compatible fibre-optic cable suitable for permanent downhole installation (additional meterage is to allow for adequate overage to connect into secure housing for monitoring equipment)
- Identification of risks, limitations, warranties and maintenance requirements for cable

6. Tenderer-Designed TRT Methodology

Tenderers shall be responsible for recommending the TRT procedure. The RFQ requires tenderers to demonstrate that the proposed procedure is robust, repeatable, standard-compliant (ISO EN 17628:2015) and suitable for the borehole depths and site conditions.

7. Deliverables

Ref.	Deliverable	Description
D1	Method Statement	TRT methodology, standards, equipment, test duration, heat input, flow and interpretation approach
D2	Site Selection, Risk Assessment and Safety Plan	Identification with SCC of borehole location and development of any site-specific risk and safety plans
D3	Functional Borehole	Delivery of borehole to agreed depth and specification
D4	Pre-Test Inspection Record	Inspection, flushing, pressure and circulation records for both boreholes.
D5	Temperature Profile Data	Pre-test temperature profile or representative stabilised temperature data for both boreholes.
D6	Raw TRT Data	Complete time-series data in Excel or CSV format
D7	Processed TRT Data	Calculated heat input, mean fluid temperature, flow, pressure, stability checks and QA plots
D8	TRT Interpretation Report	Thermal conductivity, borehole thermal resistance, uncertainty and design implications
D9	Comparative Summary	Comparison between the 200m and 155m boreholes.
D10	DTS Installation Record	Cable specification, function checks using an interrogator supplied by QUB or Geological Survey Ireland, installation record, surface route as-built details
D11	Final Report Pack	Drilling records including lithology log, photographs where appropriate, field notes, water strikes or loss zones, and recommendations

8. Reporting Requirements

- Executive summary
- Description of the new 200m TRT borehole including lithological log
- Summary of existing information for 155m borehole

- Summary of standards, methodology and equipment used
- Pre-test temperature conditions and temperature profile results
- Hydraulic performance, flow stability and pressure observations
- Heat input stability and test quality assessment
- Thermal conductivity interpretation
- Borehole thermal resistance interpretation
- Uncertainty assessment and limitations
- Comparison between the 200m and 155m boreholes
- Implications for geothermal collector design
- Recommendations for future borehole array design or further testing based on drilling results
- Raw data and processed data

9. Programme Requirement

The works should be completed by September 2026. Tenderers shall confirm their availability and provide a realistic programme.

Programme Item	Tenderer to Provide
Mobilisation	Earliest available mobilisation date and required notice period
New 200m borehole TRT & DTS cable installation	Proposed date, duration and assumptions on grout curing and borehole availability
Existing 155m borehole TRT	Proposed date, duration and access requirements
Optional DTS cable supply	Indicative timeline for supply of 250m of DTS cable
Reporting	Time from site testing to issue of draft and final report
Critical path risks	Risks to completing by September 2026 and proposed mitigations

10. Tender Submission Requirements

Requirement	Information Required
Company experience	Relevant geothermal drilling, completion, grouting and testing experience
Probe installation experience	Evidence of geothermal probe installation, pressure testing, flushing, purging and grouting
TRT experience	Examples of completed TRT projects, including borehole depths, standards used and interpretation approach
Personnel	CVs or summaries for lead driller, wellsite geological supervisor and geothermal specialist completing TRT interpretation
Standards compliance	Statement of applicable standards and how they will be implemented
DTS cable installation capability	Separate statement of experience, proposed installation method and risk controls for DTS installation
Availability	Confirmation that works can be completed by September 2026
Equipment	TRT rig details, calibration status, sensors, flow meters, power supply and data logging arrangements

Health and safety	Safety statement, RAMS approach
Commercial submission	Fixed price, optional DTS cable installation prices, optional day rates, exclusions and assumptions

11. Evaluation Criteria

Criterion	Indicative Weighting
Relevant experience in drilling, completing, grouting and testing geothermal boreholes, including installation of temperature probes and thermally enhanced grout	30%
Quality and appropriateness of proposed TRT methodology, standards compliance and interpretation approach	20%
Ability to meet the September 2026 completion requirement, including mobilisation certainty and programme robustness	15%
Health, safety, environmental and quality arrangements	15%
Price	20%

12. Health, Safety and Environmental Requirements

- **Completed Form No. 3 C (iii) Pre-Qualification Questionnaire for Construction Work Contractors**
- Site-specific risk assessment and method statement
- Electrical safety controls for TRT equipment, generators and temporary power
- Controls for hot surfaces, hoses, trip hazards and pressurised systems
- Manual handling and lifting controls
- Safe management of water, glycol or other heat transfer fluids
- Spill prevention and environmental protection measures
- Safe Pass for personnel attending site
- Emergency response arrangements and site reinstatement procedures

13. Green Public Procurement

The Contractor shall minimise environmental impacts associated with drilling activities. The Contractor shall provide a Site Environmental Management Plan detailing measures for emissions reduction, fuel management, groundwater protection, waste minimisation, spill response and noise control. Drilling equipment shall comply with at least EU Stage V emissions standards. Environmental performance and carbon reduction measures will form part of tender evaluation

14. Insurances

The insurance cover outlined below needs only be in place at tender award, with insurance broker confirmation acceptable at tender.

Professional Indemnity Insurance complying with the conditions below:

Cover on Each And Every claim basis € 700,000 or sterling equivalent

Cover on an Annual Aggregate basis € 500,000 - €700,000 or sterling equivalent

Public Liability Insurance complying with the conditions below:

Minimum level of Public Liability Insurance required in respect of any one accident: € 2,600,000

Maximum level of excess for property only* for any one incident below which the Service Provider will bear the cost: € 10,000

With regard to Potential Grout Loss to the Dartry Limestone Aquifer the Tenderer must outline the cover they hold including confirmation of sudden and accidental pollution cover. This will be assessed as part of the Health, safety, environmental and quality arrangements Criterion.

Employer's Liability Insurance complying with the conditions below:

Minimum level of Employer's Liability Insurance required in respect of any one accident: € 13,000,000 or sterling equivalent (minimum £10m)

15. Pricing Schedule

Item	Description	Price Excl. VAT
1	Mobilisation and demobilization*	€
2	TRT on new 200m borehole	€
3	Borehole Preparation and TRT on existing 155m borehole	€
4	Data processing and interpretation, final TRT report and data pack including client review meeting	€
5	Install 200m of DTS cable in new TRT borehole	€
6	Optional Supply of 250m of DTS cable	€
7	Geophysical Logging /Standby Day rate	€
8	Day rates for additional site time, if required	€

Tenderers shall clearly state assumptions, exclusions, validity period and any circumstances that could alter the submitted price.

*All expenses / travel / accommodation to be included in fixed price submission

15. Acceptance Criteria

- TRT has been completed on both boreholes, unless access or integrity constraints prevent testing on 155m borehole and these constraints are fully documented and agreed with client

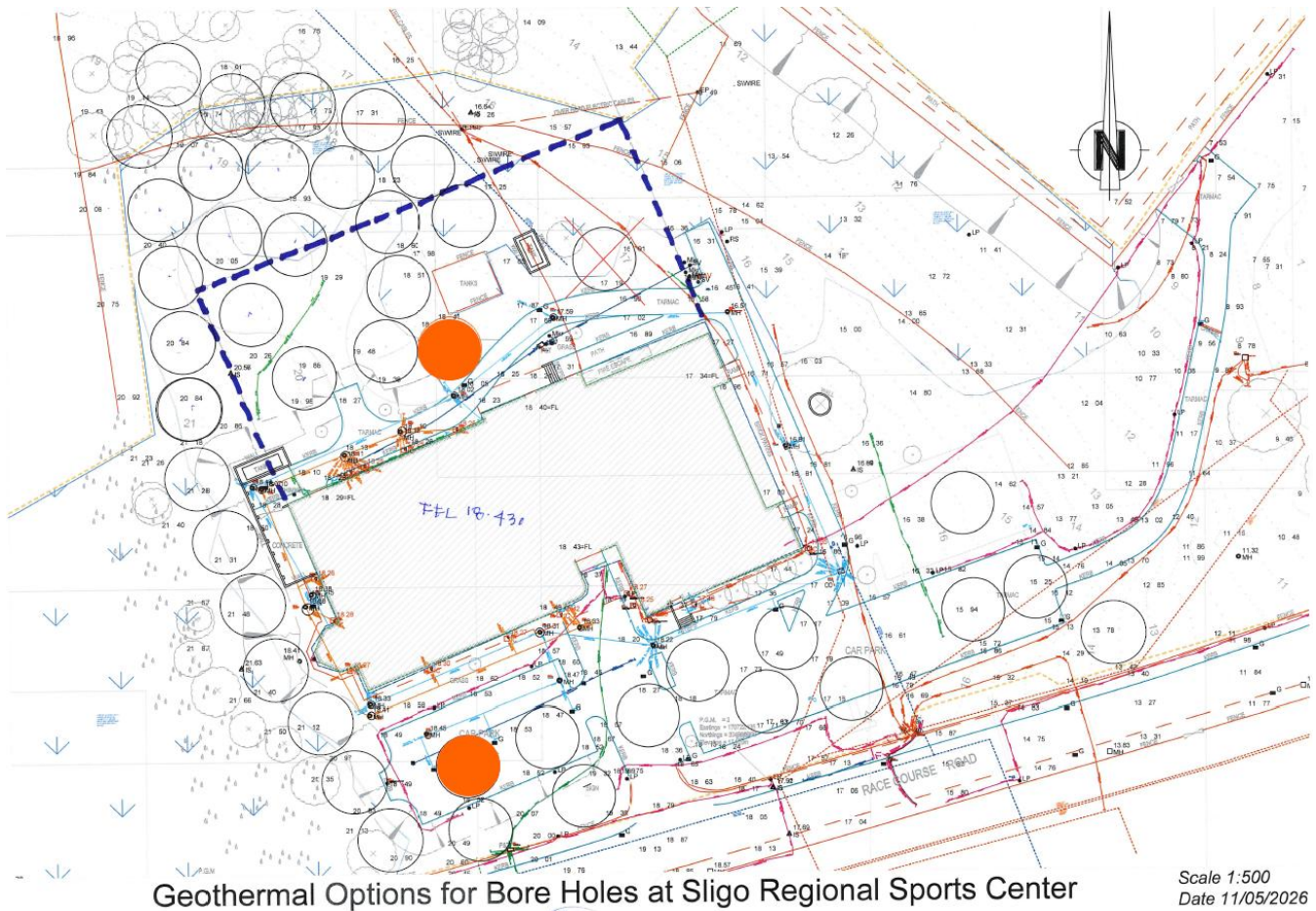
- All raw and processed data have been provided
- Thermal conductivity and borehole thermal resistance have been interpreted for each tested borehole
- Data quality, assumptions, limitations and uncertainty have been clearly stated
- The final TRT report has been submitted and accepted by the Client
- DTS cable has been installed, tested using QUB or GSI equipment, and documented

16. Notes for Tenderers

- Tenderers shall not rely on assumptions where information gaps can be resolved by clarification
- Any non-compliance with the reference design, standards or programme requirement shall be clearly identified and justified

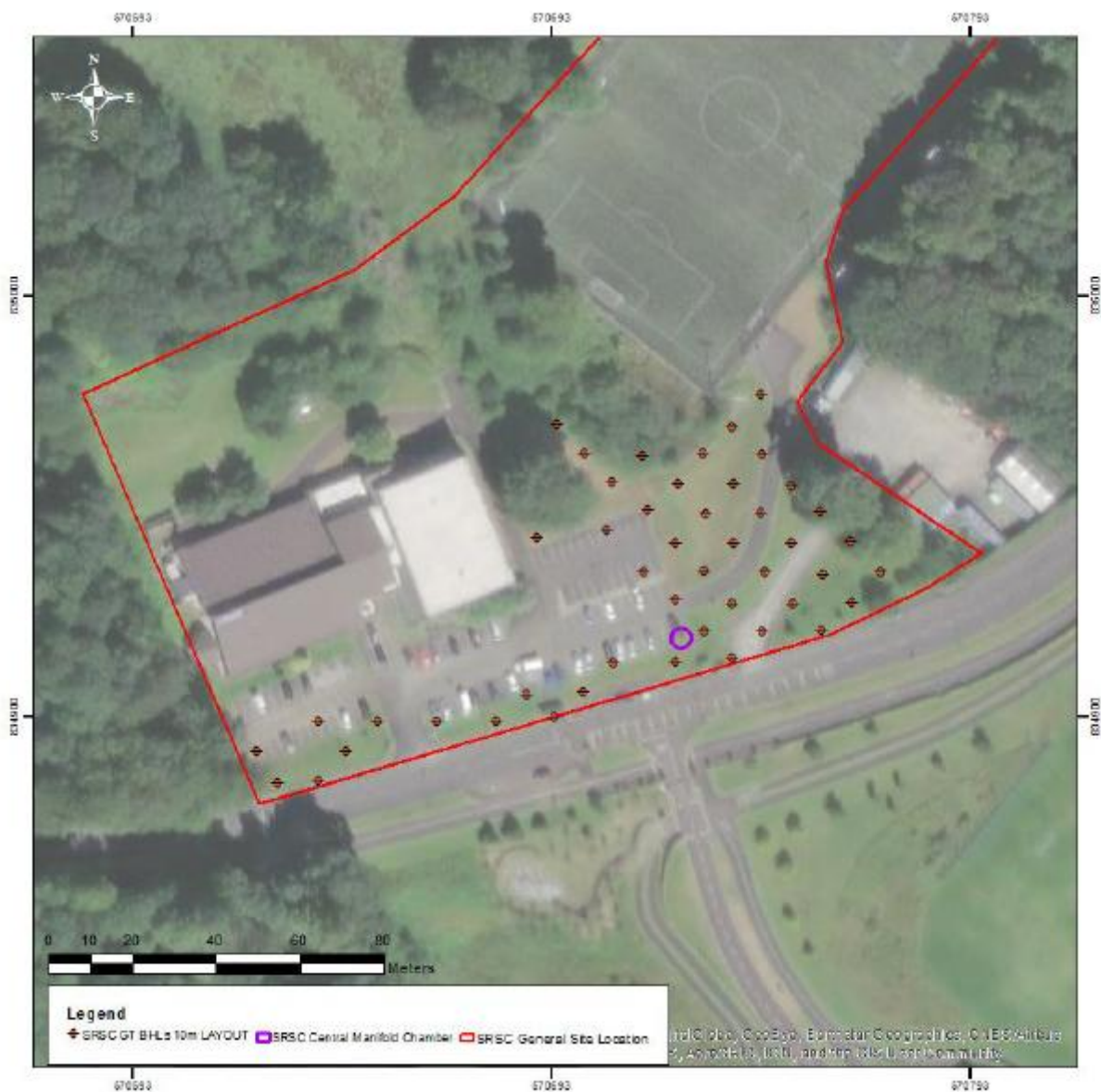
Appendix A.

Site map and GPR report that indicates general location options for new TRT borehole, preferred locations, and location of existing 155m borehole.



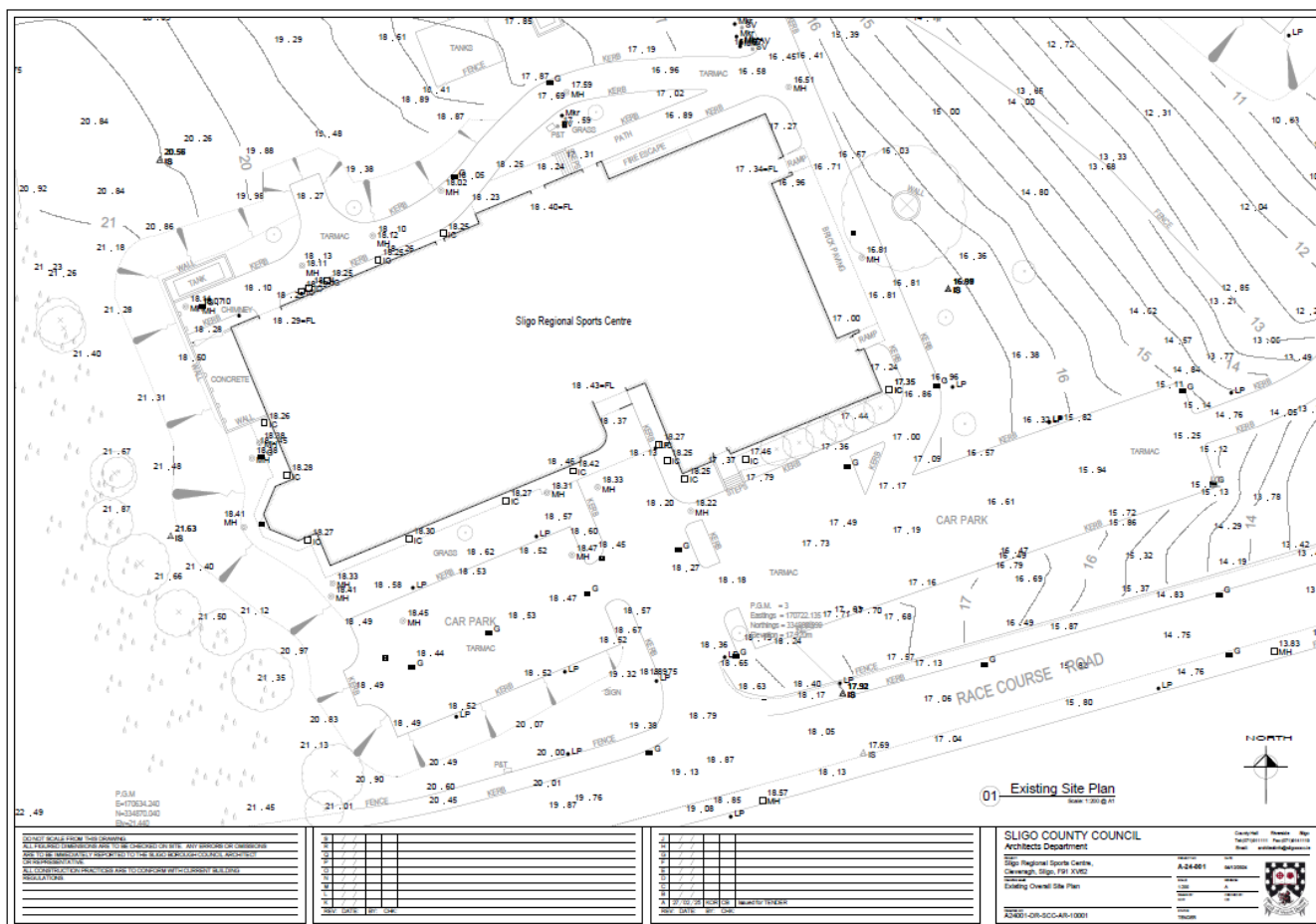
Appendix B

Initial design for 48 No. geothermal collector. Note area to Northwest of building will be considered for locations within final collector design



Geoserv, 2023

Appendix C



Appendix D

