**Specification - Heat network mapping and energy masterplanning study**

**Isles of Scilly**

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**Contact**

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# Introduction

The Council of the Isles of Scilly proposes an exploration of opportunities for a district heat network on St. Mary’s to facilitate the authority in generating income, supporting and growing businesses and ensuring a safe and clean environment and identify potential projects that could help to deliver our ambition to meet 40% of islands’ energy demand through renewable energy sources by 2025.

# 

# Tender Content

## Project Aims

**Mapping and Masterplanning Phase**

## Undertake an energy mapping and modelling study of the proposed area to identify potentially useful heating, cooling and power demand loads and potentially useful heat supply opportunities for the purposes of heat network scheme development .

## Use the outputs of energy mapping to inform the development of an energy master plan for the proposed area which identifies, evaluates and prioritises any potential heat network scheme opportunities.

## To assess local opportunities for deploying heat network, including sources of heat generation, and develop a strategy to create commercially and technical viable solutions in the boundary area including local residential opportunities.

## Priority should be given to study work and plan development on establishing a district heat network project for the area focusing on the Local Authority’s own income generation within the master planning exercise.

* 1. Consideration should also be given to the Local Authority owned or operated buildings within the study area to improve the tenants’ energy security and resilience against rising energy prices.

## Project Background

During the development of the Smart Islands Partnership (of which Council of the Isles of Scilly is a member) programme, a local Energy Infrastructure Plan (EIP) <http://committees.scilly.gov.uk/documents/s20103/IoS_Infrastructure%20Plan_FINAL_IoS.pdf> study was conducted to determine the potential for renewable energy generation on the islands. The EIP recommended that the Council investigate the potential for a small District Heat Network. The heat mapping exercise will enable us to build on this previous study and help us to develop project plans to contribute our objective to meet around 40% of the islands’ energy demand through renewable energy sources by 2025.

In preparation for this project a brief assessment of potential areas showing opportunities for heat demand and heat sources has been identified. This has shown a possible opportunity for a heat sources from a proposed Anaerobic Digestor and Gasifier plan, which is located in close proximity to social infrastructure buildings that are high heat demand users. Neighbouring these identified buildings is a proposed new housing development and slightly further away the main existing settlements of Hugh Town and Old Town and the Porthmellon industrial zone.

Many of the significant energy customers in the area presently use electric or imported bottled gas for their heating requirements and therefore have higher heating costs than mainland equivalents. Through this project we endeavour to identify a sustainable energy supply in order to give stability in energy costs using a heat distribution network for those tenants who can benefit to help develop the local economy.

The project also provides the opportunity to the Local Authority to enhance it’s reputation with the public and our partner organisations, allowing the Council to champion and encourage action by others in the community and our partners.

## Objectives

**Mapping and Masterplanning Phase**

## Meet any relevant objectives within the CIBSE/ADE[[1]](#footnote-1) Heat Networks Code of Practice relevant to this stage of work.

## Review the map area for the study, Appendix 1, and highlight any opportunities to extend the proposed heat network where this is appropriate and can potentially add value to the scheme

## Identify and categorise existing, heating, cooling and power demand loads potentially relevant to district heating, cooling and power scheme opportunities and represent with suitable geographic information system (GIS) mapping to clients requirements

## Identify and estimate key residential and non-residential development and model the associated heating, cooling and power demand loads and represent with suitable GIS mapping to clients requirements

## Determine the suitability of identified heating, cooling and power demands for district energy scheme development

## Determine and assess the full range of potentially relevant low and zero carbon district energy supply technologies (including private wire). Consider the Energy Infrastructure Plan in section 2 but don’t be limited by this. Due to the small scale of the islands we may need to consider multiple sources of generation and storage of heat and/or feedstocks for generation sources such as Anaerobic Digestion and Gasifer plant.

## Determine and assess potential energy centre locations and network routes

## Identify the key district heating, cooling, and private wire scheme options and undertake a high level economic assessment

## Look at how an heat network could help to balance the energy system on IoS avoiding net export or backfeeding Cornwall. Investigate the ability for an energy centre to take control of AD and Gasifier systems.

## Provide a comprehensive GIS representation of the heat mapping and masterplanning outputs to the Local Authority’s required format and capable of editing and analysis

## Identify key risks, constraints, benefits and opportunities presented by the recommended scheme(s) to the Local Authority and other key stakeholders including developers, land and building owners, and potential energy customers

## Identify next steps and implementation requirements for the recommended schemes

## Ensure the study takes account of and informs or forms part of any relevant strategic development masterplans of the Local Authority.

## Scope of Work

* 1. **Heat Mapping**

The scope of energy mapping work undertaken by the consultant shall reference any relevant development masterplans of the Local Authority. It shall meet all objectives and sub-objectives within the CIBSE/ADE *Heat Networks Code of Practice* relevant to this stage of work as well as the following specifications:

## Review and provide advice regarding the Local Authority’s area for the study to ensure it is appropriate and encompasses the range of geographic locations within and adjacent to the proposed study area of potential relevance to strategic district energy opportunities over the short- and long-term. This should encompass heating, cooling and power related supply and storage of energy that could interact with district energy opportunities.

## Identify, categorise and GIS map existing heating, cooling and power demand loads including daily, weekly, monthly, annual peak and baseload, half hourly, monthly and annual consumption figures for key non-residential and residential buildings in the area shown in Appendix 1. Identified heating, cooling and power demand should be modelled to account for planned or potentially likely energy efficiency improvements. These buildings should include but not be limited to:

* The Local Authority-owned/managed buildings e.g. industrial units, leisure centres managed by the Local Authority.
* Other public sector buildings e.g libraries, public music, arts and theatre venues, police and magistrates buildings, health buildings including NHS walk in centres, hospitals and GP practices, Government buildings such as Ministry of Defence (MOD), Department of Work and Pensions (DWP) Job Centres.
* Private sector buildings with potentially significant heating or cooling loads such as hotels, leisure centres, offices, retail centres, or telephone exchanges.
* Commercial undertakings with high heating or cooling demands such as manufacturing, greenhouse agriculture, garden centres, etc.
* Relevant private and social residential housing in the area, including the proposed new housing on the site of the old secondary school at Carn Thomas.

## Liaise with the Local Authority and utilise relevant development masterplans and planning documents to identify and inform estimates of residential and non-residential demand for significant potential future developments. Estimates should also include development densities, timeframes and phasing.

## Undertake heating, cooling and power demand energy modelling of identified development using appropriate industry benchmarks as identified in Section 2 of the CIBSE/ADE Heat Networks Code of Practice and in line with the nature and scale of envisaged development. This should provide estimates of projected heating, cooling and power demand loads as well as heat supply loads if relevant, including daily, monthly, annual peak and baseload, as well as monthly and annual consumption/production figures. The modelling should also take account of building regulations standards likely to be applicable for the various phases of development. Categorise and GIS map projected energy demand and supply loads.

## Opportunities for heat supply from existing installations shall include but not be limited to: sewage waste treatment plants, Energy from Waste (EfW) plants, industrial waste heat (IWH), spare heat export capacity from existing or new power stations (e.g. transformer cooling), boiler plant and district heating schemes.

## Heat supply mapping should also identify the potential opportunities in relation to geothermal and waste source heat supply including rivers, and the sea with appropriate reference to the BEIS water source heat map and area for the study.

## With reference to the Energy Infrastrucutre plan in Section 2, consideration should be made of the role of demand response in thermal energy generation and storage.

* 1. **Energy Master Planning**

The scope of energy masterplanning work undertaken by the consultant shall reference any relevant development masterplans of the Local Authority. It shall meet all objectives and sub-objectives within the CIBSE/ADE *Heat Networks Code of Practice* relevant to this stage of work as well as the following specifications:

**Technical assessment:**

## Investigate existing key utilities and other infrastructure as well as planned infrastructure upgrades of relevance to the evaluation and progression of district energy network opportunities for the proposed study area; determine whether these pose any potential significant technical or cost risks.

## Identify ALL potentially suitable clusters of heating, cooling and power demand as well as heat supply from existing buildings interacting with a heat network, envisaged new development and of relevance to district energy scheme opportunities for both high temperature and low temperature heat network solutions; this should include onsite and relevant adjacent off site locations.

## Undertake high-level energy and hydraulic modelling to identify the range of potential district energy network permutations and network routes taking account of the identified existing and future heating, cooling and power loads. Determine initial potential energy centre locations and network route options. Identify and account for key limiting constraints or opportunities in the initial determination of potential energy centre locations and network route options. This should include how the energy system would interact with generation and demand assets e.g. fibre links

## Determine the initial technical suitability of connection of existing buildings through either site-based visits and/or desk-based evaluation where information is available and identify the high-level technical requirements for both existing and the envisaged range of new development for the study area to enable connection to any potential district energy network. This should include temperatures and delta T (difference between flow and return temperatures), pressures and delta P (difference between flow and return pressures), flowrates and any relevant mechanical, electrical, controls and other requirements.

## Undertake initial assessment of heat supply opportunities including determining the technical suitability of connection of potential sources of heat, any key requirements and the cost implications on potential heat networks viability

## Using multi-criteria analysis, evaluate low carbon and renewable energy technology supply options for the identified initial and longer term district energy scheme opportunities. Such options and appraisal shall be in line with the relevant section 2 objectives and sub-objectives contained within the CIBSE/ADE Heat Networks Code of Practice and cover a range of technical, economic, sustainability, and environmental criteria. Technical supply options shall include, but not be limited to, sewage waste treatment plants, energy from waste (EfW), industrial waste heat, geothermal, solar thermal, gas combined heat and power (CHP), biomass/biofuel/biogas CHP, pumps (air source/ground source/water source), anaerobic digestion and biomass boilers.

## The multi- criteria analysis should apply key technical, financial, sustainability and environmental criteria consistently across identified technologies. Potential criteria could include:

* Technology suitability/risk
* Financial performance including key sensitivities
* Availability/risk/sustainability of fuel choice and supply
* Security of supply
* CO2 reduction potential
* Cost per tonne of CO2 saved for initial and full potential scheme
* Environmental impacts
* Development risk
* Timeframe for delivery
* Cost savings to Local Authority , customers and developers (based on quantum and type of new development)
* Potential investment leverage and grant funding opportunities including sensitivity analyses e.g. the impact of 10%, 20%, 30% etc funding
* Benefits/cost savings to Local Authority tenants.
* Local Authority income generation.

## Evaluation shall provide initial technology recommendations including a technology pathway and timeline to achieve zero carbon heat for identified potential projects as well as the requirements for thermal storage.

## Determine the high level potential for direct electricity supply to significant non-residential buildings via development of a ‘private- wire network’ in the case of potential CHP projects identified and identify the development benefits and increased network viability this may offer in comparison to the likely business as usual approach.

## Refine the overall district energy potential options in relation to the energy centre location, energy supply technologies, network routes, scale and phasing of schemes and use as the basis for determining high level cost estimates.

## Estimate high level project costs and the potential range of these costs for identified district heating opportunities for both initial and full project phases including an assessment of costing accuracy level.

**Economic Assessment:**

## The consultant must undertake an initial economic assessment of the identified technical project opportunities through the development of a high level financial model and on the basis of whole life costs.

## It shall identify which projects if any present a potentially investable proposition when compared to minimum threshold criteria across the range of private and public sector financing options open to a local authority, including grant funding.

## Basic economic assumptions to be used in the economic assessment should include but not be limited to:

* Benchmark energy tariffs used should be based on real data or where modelled, based on market realistic tariffs appropriate for the proposed customer types
* Projects will be assumed to deliver a minimum percentage saving (to be agreed with client) on annual variable cost of heat plus a saving on whole life costs of heat to be market realistic against a base case.
* Estimated operating and maintenance (O & M) costs should be included and business as usual (BAU) plant replacement costs identified and factored in buildings and developments envisaged to connect to the scheme
* The technical and economic assessments should cover any initial potential scheme based on existing buildings and early stage developments as well as intermediate and full future phase development scenarios for the site. This modelling should also account for a reasonable connection cost contribution as a proportion of the business as usual (BAU) energy development costs for the envisaged building types and floor areas.

**Project Prioritisation:**

## This stage will utilise the technical and financial outputs of the energy masterplanning study to prioritise projects potentially suitable to progress to subsequent detailed technical feasibility and financial modelling as part of a potential future study. It should further help to further confirm the nature, scale, costs, timeframe, phasing and location of proposed potential district energy scheme opportunities.

## Where a number of potential district energy schemes have been identified, or a number of phases to one core scheme, these should be prioritised according to Local Authority priorities or income generation, supporting and growing businesses and ensuring a safe and clean environment. This shall, where possible, include quantitative comparators to help the Local Authority clearly differentiate between potential project or phase options. This stage should identify, take account of and clearly present the key constraints, risks, benefits and opportunities presented by the potential scheme options to the Local Authority and other stakeholders including developers, building and land owners and potential energy customers.

## Example criteria which the appointed consultant is expected to refine/augment to capture the above requirements are listed below and shown in Table 1:

* 25 & 40 year NPV for initial projects
* 25 & 40 year NPV for intermediate additional phases and full phase projects (accounting for new development, timeframes, and potential interconnection scenarios)
* Is the project investable in terms of a minimum acceptable IRR For example public sector funded projects may require a minimum internal rate of return equivalent to the cost of Prudential Borrowing, circa 4.5% whereas private sector funded projects may require a minimum internal rate of return of circa 10-15% upwards depending on the source of finance.
* Estimated timeframe for delivery of the initial project and the future phased project
* Projected BAU development cost savings
* Projected energy cost savings for existing buildings
* Quantum of future development that could be connected to a heat network project
* Potential for leveraging other income e.g. Investment partners, Energy Companies Obligation (ECO), RIH and FiT.
* Numbers of residents that could benefit from lower energy costs and fuel poverty alleviation
* Projected whole life potential CO2 savings across initial and full phase scheme
* Key demand load risks and key supply load risks? (This will be affected by a range of factors including proportion of Council-controlled loads, building lifetimes, local issues such as existing stakeholder relationships etc)
* Overall risk rating (technical, financial, commercial, political, social) for the identified projects

## Determine the recommended district heating, cooling and private wire scheme options to progress for the study area with full supporting rationale. Recommendations should identify the nature, scale, costs, timeframe, phasing and location of potential schemes. They should also clearly explain the key risks and constraints issues in the Risks and Issues Registers. The potential benefits to the various stakeholders over the BAU development scenario should be clearly explained. This should also account for but not be limited to: avoided development costs, infrastructure upgrade costs, carbon reduction costs and allowable solutions.

## The next steps and implementation requirements for the recommended schemes should be presented including an estimate of costs for next steps. The optimum timeframe to undertake the next steps should be determined accounting for key Local Authority and stakeholder requirements in relation to existing buildings and envisaged new developments.

## Outputs

***Consultants should carefully note the following requirements and ensure they are fully addressed in tender responses:***

## All key project outputs will also be made available to DBEIS as part of the HNDU funding requirements. The consultant may be requested to provide specific key metrics in relation to the identified potential and recommended heat network scheme opportunities for the study area and for submission to DBEIS. This is expected to be based on the work undertaken to meet this tender specification and will therefore be expected to be delivered as part of any proposed tender cost.

## All reports must clearly explain the methodological approach taken with regards to clear critical considerations including objectives and programme requirements and must explicitly demonstrate how the aims, objectives, and specifications within the scope of work have been met.

## Reports must include full details of technical assessments, multi-criteria options analysis, financial appraisal and project prioritisation undertaken together with a clear presentation of all relevant assumptions and evaluation criteria that have been utilised

## All outcomes and recommendations must be robustly evidenced with full supporting rationale provided together with appropriate use of figures, diagrams, tables. All underlying financial models, data files, GIS outputs including ‘Shape’ files must be provided to the Local Authority, unlocked and for the Local Authority’s subsequent unlicensed use and submission to BEIS.

## Specific project outputs should include the following:

## GIS representation of the heat mapping and energy masterplanning outputs with all relevant GIS files to be made available to the Local Authority and DBEIS.

## A draft and final strategic energy masterplan report for the area that fully meets the aims, objectives, and scope of work requirements of this tender. This report should also be integrated into any relevant wider development masterplanning process of the Local Authority in relation to the study area and also providing the following:

* Comprehensive identification of all potentially feasible and viable heating, cooling, and power, district energy scheme opportunities within the area
* Key technical, cost, environmental, and other relevant details of proposed projects including benefits/opportunities/risks/and constraints to be considered as part of the project prioritisation process
* A full supporting narrative with detailed outcomes and key recommendations as to which heating, cooling and power network opportunities to progress to a future detailed techno-economic feasibility study and the reasons why
* Outline delivery programme of next steps for recommended project(s) and timeframe
* GIS mapping of energy masterplanning outputs including network route(s), energy centre locations, buildings connected, scheme phasing to full build out
* Risks and Issues Registers for the identified projects including potential customer risks
* A sustainable low carbon solution, which offers a high degree of security of supply and provides a significant net positive carbon benefit
* Future-proofing in relation to providing: a defined pathway to zero carbon heat if not part of the initial solution; space for additional plant for future expansion of network; a building design that allows for later plant replacement and fitting of new technology; sizing pipework to allow for future expansion of network. Thouht should be give to how the work may tie-in with future planning policy or other growth strategies on the islands in future
  + 1. **A populated HNDU Project Metrics Template** (see supplementary document file Appendix C - Heat Network Project Metric Template) for each heat network opportunity identified.

## Client expectations in relation to data, models and system files include:

## All data such as load profiles for each heat demand in electronic format (not PDF) and in a form whereby the assumptions by which they are derived can be understood

## Compatibility with existing software used by the Local Authority. E.g. GIS, energyPRO modelling software

## For any models used the Local Authority will expect a full explanation of the model. The Local Authority will require a full list of the inputs and assumptions for any modelling

## Maps should include copies of PDF and GIS files

## A demand and supply database should be developed in Excel.

## Tender and Project Timetable

6.1 Please refer to “16 ITT HNMMS 161125 Final” for details.

## Project Management requirements

## The Local Authority’s proposed project management structure and core team is the Strategic Development department.

## The consultant’s project management approach should be consistent with Prince 2 or other recognised project management methodology and be clearly detailed and presented together with all key roles, responsibilities, rates and hours allocated.

## A project highlight report, together with Risks and Issues Registers must be provided to the Local Authority at least monthly, a copy of which will also be provided to BEIS.

## The consultant’s approach to performance monitoring of the delivery of this scheme must be clearly presented within tender responses.

## The Local Authority will be the first point of contact for key potential private and public sector customers of the scheme. Any planned communication with potential customers should, in the first instance, be discussed and agreed with the Local Authority’s internal project manager.

## The minimum requirements for client-related meetings are as follows:

## Project inception meeting

## Client update meetings in person or by video conference (if agreed in advance with the Local Authority’s internal project manager) with the consultant’s key project team, on a monthly basis as a minimum

* + 1. Interim draft report

## Weekly updates by email

## Draft final report review meeting

## Additional requirements are as follows however consultants may wish to suggest combined or additional meetings as part of their proposed programme of work, such as:

## Site visits – 1 day

## Interim options review work shop – ½ day

## Final energy masterplanning presentation to Local Authority Project Board - ½ day

## Tender Evaluation Details

Total cost must not exceed £64,985.

The key criteria on which the tender will be assessed are as follows:

* 1. **Overall Evaluation Criteria:**

## Overall Price/Value for Money (30%)

* Full breakdown of your costs

## Quality (70%)

* Methodology and understanding of brief (40%)
* Project & Programme Management (20%)
* Experience and track record of delivering similar projects (15%)
  1. **Quality Criteria:**
     1. Methodology and understanding of brief (40%)
* Demonstrates a clear understanding of the Local Authority’s aims, objectives, and scope of study
* Provision of a detailed, robust and credible methodology to meet these requirements
* Proposed approach demonstrates an understanding of the Council’s specific local circumstances and background

## Project & Programme Management (20%)

* Provision of clear, robust, and credible proposals for the project management and quality assurance approach to be adopted including proposed response to dealing with Local Authority issues and concerns
* Provision of a credible and acceptable project programme and associated Gantt Chart
* Timescales for delivering the project
  + 1. Qualifications and experience of Staff assigned to the project (15%)

## Provision of robust, credible information demonstrating the qualifications and experience of the staff assigned to the project. Providers should note that staff identified within their submission will be expected to be the same as those that deliver the services post-award. Where staff changes are unavoidable the new staff members must have similar levels of qualification and experience and their commencement on the project will be subject to the permission of the Local Authority (which will not be unreasonably withheld)

Each of the above criteria will be scored against the following scoring system

|  |  |  |
| --- | --- | --- |
| **Judgement** | **Performance** | **Score** |
| Excellent | *Exceeds the requirement.*  *Exceptional demonstration by the Bidder of the relevant quality measures requiredset out in 8.2 above to provide the service.*  *Response identifies factors that will offer potential added value, with evidence to support the response.* | 80-100% |
| Good | *Satisfies the requirement with minor additional benefits.*  *Above average demonstration by the Bidder of the relevant quality measures requiredset out in 8.2 above to provide the service.*  *Response identifies factors that will offer potential added value, with evidence to support the response.* | 60-79% |
| Acceptable | *Satisfies the requirement.*  *Demonstration by the Bidder of the relevant quality measures required set out in 8.2 above to provide the service, with evidence to support the response.* | 50- 69% |
| Minor reservations | *Satisfies the requirement with minor reservations. Some minor reservations of the Bidder’s ability to provide the relevant quality measures set out in 8.2 above to provide the service, with little or no evidence to support the response.* | 30- 49% |
| Serious reservations | *Satisfies the requirement with major reservations.*  *Considerable reservations of the Bidder’s ability to provide the relevant quality measures set out in 8.2 above to provide the service, with little or no evidence to support the response.* | 20-29% |
| Unacceptable | *Does not meet the requirement.*  *Does not comply and/or insufficient information provided to demonstrate that the Bidder can provide the relevant quality measures set out in 8.2 above to provide the service required and has little or no evidence to support the response.* | 0 – 19% |

8.3 **Price Assessment**

Prices will be assessed using a mean weighted average formula in which the mean of all the prices submitted constitutes the point at 50% of the avialble score for this section is awarded i.e. 15%. Prices that are lower than the mean price will receive proportionately greter scores and prices higher than the mean proportionately lower marks. Full details of this methodology are included in section D of the ITT document accompanying this document.

**8.4 Overall Assessment:**

The Weighted Quality Score and the Weighted Price Score for each company/organisation tender will be added to produce a total score.  The scores for each company/organisation tender will be compared and the submitting company/organisation with the highest score offering the most economically advantageous bid will be recommended for acceptance. For example:

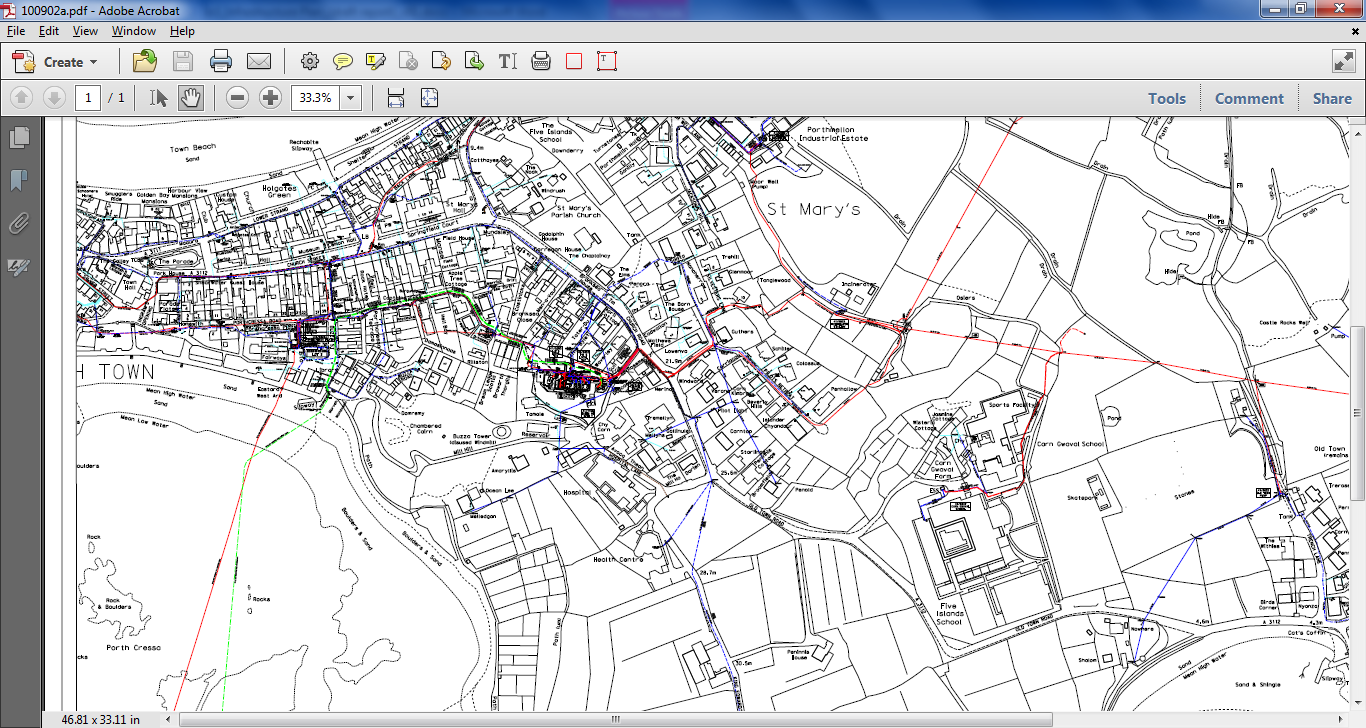
Submitting company/organisation A

Score – Quality element - 62.25

Score – Price element – 23.25

Combined Score – 85.5

Appendix 1: Potential infrastructure routes   
(Figure 6.4.2 from the EIP, map sourced from WPD map response team)



Key: Red Line = New sewerage pipeline from pumping station to new sewage treatment works and from bio-bubble to new works

Green Line = Existing 33 kV cable to existing power station and extension to suggested new power station location

Orange Line = Heat network from AD plant to school/swimming pool (option) and hospital

To sewage pumping house

Appendix 2 - Hyperlinks to background information

Energy Infrastructure Plan - <http://committees.scilly.gov.uk/documents/s20103/IoS_Infrastructure%20Plan_FINAL_IoS.pdf>

Island Futures Strategic Economic Plan - http://www.scilly.gov.uk/island-futures-strategic-economic-plan-isles-scilly

Island Futures Infrastructure Plan - <http://www.scilly.gov.uk/island-futures-infrastructure-plan>

Island Futures Key Actions - <http://www.scilly.gov.uk/island-futures-key-actions>

Island Futures Housing Growth Plan - <http://www.scilly.gov.uk/island-futures-housing-growth-plan>

1. [↑](#footnote-ref-1)