

Prefeasibility Study

Cloddach Bridge, Elgin

September 2023

CONTROL SHEET

CLIENT: The Moray Council
REPORT TITLE: Prefeasibility Study
PROJECT REFERENCE: 140163F – Cloddach Bridge, Elgin

Issue and Approval Schedule: 1

ISSUE 1	Name	Signature	Date
Draft			
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Revision Record:

Issue	Date	Status	Description	By	Chk	App
1	29/09/2023	Final	Minor clarifications	SS	EH	EH

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Executive Summary

Constructed in 1905, Cloddach Bridge carries a single carriageway road over the River Lossie to the south of Elgin. The bridge is in poor condition and following a number of structural surveys and a load assessment, the bridge was closed to vehicular traffic in February 2022.

Following a petition by local residents, this study was commissioned to review the requirements for the preparation of a full Business Case for the permanent replacement of Cloddach Bridge. This study describes a range of replacement and repair options that would permit the reopening of the bridge to all vehicular traffic up to and including 40 Tonnes. As a comparison, a baseline option that does not enable reopening the bridge to vehicular traffic has also been assessed:

Option 1	Baseline - Do Minimum - retain bridge for pedestrian and cyclist
Option 2	Repairs to the existing bridge
Option 3a	Prefabricated steel overbridge with demolition of the existing bridge
Option 3b	Prefabricated steel overbridge with retention of the existing bridge
Option 4a	New wider integral bridge structure
Option 4b	New minimum width integral bridge structure

High level cost estimates and risk assessments for each option have been undertaken. Risk assessments include an assessment of both reputational risk and cost/programme risk. These assessments indicate that the best option to take forward for further development would be a single lane, fully Eurocode compliant integral concrete structure. Costs have been estimated on a most likely basis, with a range included related to overall risk scores.

A review of the available traffic information has been undertaken and concludes that, although more information is required in order to fully quantify benefits, any of the proposed options would deliver a sufficient return in terms of journey time savings resulting in a positive Benefit Cost Ratio over a 60 year forecast period.

An estimated scope, fee and programme for the full business case has been developed and included in this study. In order to fully inform the full business case it is recommended that site surveys are undertaken and the development of a transport model is progressed. This should be undertaken alongside other site activities and reports including flood risk assessment, geotechnical investigation and preliminary ecological appraisal in order to further develop estimates of the likely costs of a replacement structure.

1 Introduction

1.1 Project Background and Site History

Cloddach Bridge is a three span structure carrying a single carriageway road over the River Lossie. The bridge is located on an unnamed road to the west of the B9010, south of Elgin.

Cloddach Bridge was constructed in 1905. The bridge comprises three simply supported spans of approximately 7m. Each span is formed from 7 No. steel beams at approximately 715mm centres. A concrete jack arched slab spans between the steel beams with a corrugated steel shuttering to the underside. The substructure includes mass concrete abutments and intermediate mass concrete piers. The carriageway is approximately 3.9m wide which restricts vehicular passage to a one direction at a time. There is no separate verge or demarcation for pedestrians over the existing structure.

Following a number of structural surveys and the completion of a load assessment, the bridge was closed to vehicular traffic in February 2022.

1.2 Brief

Following a petition by local residents, this study has been commissioned to review the requirements for a full Business Case to be prepared for the permanent replacement of Cloddach Bridge. This study considers the following;

- High level development of options available to re-open Cloddach Bridge to all vehicular traffic up to and including 40 Tonnes.
- Specification for site investigation and additional survey works required to inform the design of the replacement bridge.
- Estimated cost and time, including site investigation, for preparing a full business case for the replacement of Cloddach Bridge, based on The Green Book (2022) issued by HM Treasury.

2 Location Plans

2.1 Location Plan

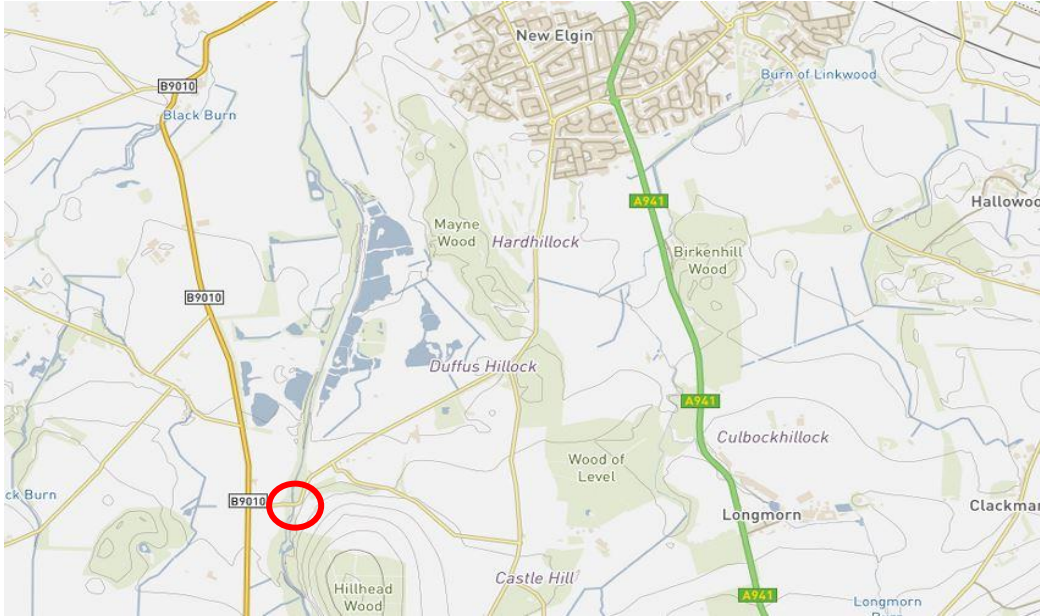


Figure 1: Bridge Location Plan

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Figure 2: Bridge Aerial View

3 Site Information

3.1 Site description

The bridge is approximately 300m east of the B9010 on the C2E road south of Elgin in Moray, Scotland. Record information available for the bridge is limited to previous inspection and assessment reports. No record drawings are available other than the drawings produced by Fairhurst as part of the Inspection for Assessment in 2022.

The road alignment is relatively flat and straight on approach to the structure from the west. To the east of the bridge the road level rises slowly and the road turns to the north with a left hand curve of approximately 40m radius. There are no available records suggesting that the road alignment in this area has contributed to historic accidents.

In order to progress any option to reopen the bridge, a full topographical survey will be required. An allowance for this has been included in the cost estimates presented in this study.

3.2 Existing utilities

A desk study of the potential utilities within the scheme extents using Line Search Before U Dig (LSBUD) identified the services listed in the table below.

Utilities within Scheme Extents are included in Table 3-1:

Utility	Location
Scottish Water	South Verge of Bridge
BT Openreach	Overhead line immediately to the north of the bridge

Table 3-1 Utility Information

To ensure that a robust allowance is included within the cost estimate, it has been assumed that these services would have to be relocated if the bridge is demolished.

3.3 Existing traffic

Traffic flow information in the form of a survey, undertaken from 30th November to 6th December 2020, has been supplied by Moray Council. Observations from the survey, carried out on the C2E between Cloddach Bridge and the B9010 / C2E junction, shown below in Figure 3, have been utilised to establish an estimate of annualised traffic flows of vehicle use of Cloddach Bridge, from when it was open to vehicle use (subject to a 3T weight restriction).

Establishing annual traffic flows was undertaken by establishing an average hour count for each peak time period (AM peak/Inter peak/PM peak) from the survey, then utilising conversion factors taken from the Moray Firth Transport Model to approximate annual traffic flows.

Using this approach it is estimated that approximately 250,000 vehicles used Cloddach bridge annually (2020).



Figure 3 Location of Traffic Survey

The bridge is currently available for use by pedestrian and cyclists. An edge protection system is in place, but in poor condition. This does not provide edge protection for vehicular, cycle, pedestrian nor equestrian traffic due to its condition and lack of compliance with design codes relating to strength, form and height.

The B9010 is not served by any public transport services and there are no public transport diversions affected by the closure of the bridge.

3.4 Current diversion

The bridge provides access to the B9010 north and southbound for residents in rural communities including Birnie, Thomshill, Glenlatterach and Bardon. While the bridge is closed, the alternative route for these residents includes travelling to the A941 to enter Elgin from the south and then taking the A96 west back to the B9010. It is estimated that this diversion adds up to 15 minutes onto journey times and has a length of approximately 6 miles.

Traffic from the B9010 northbound could also use the existing bridge as an alternative access to the South and East of Elgin, avoiding the town centre. The same possibility exists for traffic wishing to travel between South or East Elgin and the B9010 south towards Kellas.

3.5 Geotechnical Constraints

The 1:50,000 BGS mapping noted the superficial deposits at the site comprise Alluvium and River Terrace Deposits (Undifferentiated) Gravel, Sand, Silt and Clay and Glaciofluvial Ice Contact Deposits of Gravel, Sand and Silt. The BGS mapping shows there is no geological faulting located within the vicinity of the site.

A geotechnical investigation is required prior to any further design development of the scheme. A proposed specification and cost allowance for this activity is included in the estimates presented.

3.6 Ecological Constraints

No ecological information or reviews have yet been undertaken for this location. It is recommended that a Preliminary Ecological Appraisal is undertaken in order to determine constraints for both ground investigation and construction works. A preliminary ecological appraisal will include;

- Mapping of habitats on the site and immediate surrounds to a suggested minimum buffer of 50m upstream and downstream.
- A desk study undertaken with North East Scotland Biological Recording Center NES BReC to a search radius of 2km <https://nesbrec.org.uk/services/>
- An assessment of the site to support protected or notable species which will include a preliminary bat roost assessment (PBRA) of the Bridge Structure and any surrounding trees. The survey will also include a survey for Otter and Badger to a distance of 100m upstream and downstream of the bridge where access allows.

In order to obtain accurate habitat data and as much as possible in terms of good habitat and protected species data, surveying in September / October would be ideal. Bat surveys, if required, would need to be undertaken during spring.

It is possible that there are species present in the vicinity of the bridge that would result in seasonal constraints on any work in and around the watercourse. The result of the Preliminary Ecological Investigation would be used to better inform the construction programme.

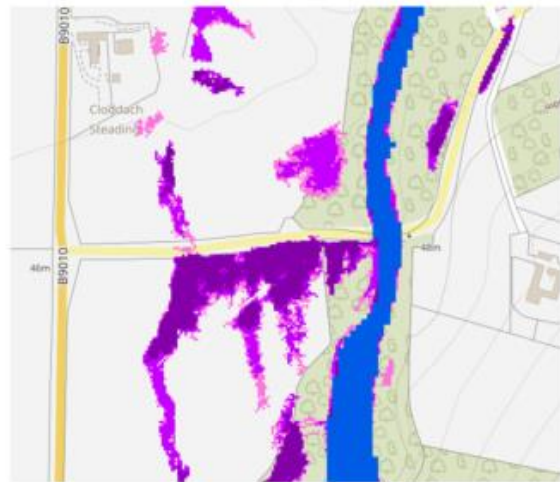
3.7 Flood Risk Constraints

Flood risk maps have been obtained from SEPA and are shown in in Figure 3 below. These plans indicate that the bridge and the area to the east as far as the B9010 is susceptible to flooding in a 1 in 200 year event. They also indicate that the area immediately adjacent to the bridge is subject to both river flooding and surface water flooding in the 1 in 10 year event.

The maps provided online by SEPA are indicative and it is not clear whether any account has been made for the existing structure. A full flood risk assessment, including topographical and bathymetric survey of the river both upstream and downstream of the bridge, would be required to establish the constraints.



Existing Bridge Location



High Risk (1 in 10 year) River and Surface Water Flooding



River Flooding
 High Likelihood
 Each year this area has a 10% chance of flooding.
 Medium Likelihood
 Each year this area has a 0.5% chance of flooding.

River Flooding - 1 in 200 and 1 in 10 year



Medium Risk Future Flooding (Refined Model)

Figure 4 SEPA Flood Risk Maps

3.8 Land Ownership

Assuming that any replacement structure is constructed on the same alignment as the existing bridge, land acquisition costs are not likely to form a significant as part of any construction works. For a widened structure some land acquisition may be required. District Valuer services should be used where required to establish land acquisition costs as part of the detailed design of any option.

For the purposes of this assessment it is assumed that the bridge would be closed to pedestrians and cyclists during any works and that any work compounds could be established within the highway boundary.

4 General Design Considerations

4.1 Health and Safety

A Principal Designer has not been appointed at this pre-construction stage. Nevertheless, the Construction Design and Management (CDM) Regulations 2015 apply to the project.

Health and safety risks have been considered during the production of this study, with each option being reviewed and assessed in terms of construction, maintenance, and demolition.

It is recommended for the next stage of the project that a Principal Designer be appointed to carry out the duties as set out in the Construction (Design and Management) Regulations 2015 including:

- Plan, manage, monitor, and coordinate health and safety in the pre-construction phase. In doing so the designer must take account of relevant information that might affect design work carried out both before and after the construction phase has started.
- Help and advise the client to bring together pre-construction information and provide the information designers and contractors need to carry out their duties.
- Work with any other designers on the project to eliminate foreseeable health and safety risks to anyone affected by the work and, where that is not possible, take steps to reduce or control those risks.
- Ensure that everyone involved in the pre-construction phase communicates and cooperates, coordinating their work wherever required.
- Upon commencement of the construction phase, liaise with the principal contractor, keeping them informed of any risks that need to be controlled.

4.2 Design Requirements

The proposed design will adhere to the Design Manual for Roads and Bridges (DMRB) by the Department for Transport. Key design requirements considered for this structure include the bridge having a design working life category 5, which results in a design working life of greater than or equal to 120 years, in accordance with CD 350, Table 7.1. A new or modified bridge should be designed where possible to resist the effects from both permanent and variable actions over a 120-year design life.

The current carriageway width is 3.9m with no separate verge or demarcation for pedestrians over the existing structure. Local guidance published by The Moray Council recommends a road width for rural single track roads of 3m, so the road width provided by any replacement structure must achieve a minimum of 3m. There is an opportunity to improve safety and provide future resilience by providing a bridge which supports two way running traffic and a footway. In order to establish the potential costs and benefits of these options, both single carriageway and two lane carriageway are considered options for this prefeasibility study.

Any option taken forward will be subject to Technical Approval Authority requirements as detailed in CG300.

4.3 Statutory Processes

The replacement of the bridge would not benefit from permitted development rights under the Town and Country Planning (General Permitted Development) (Scotland) Order 1992. Therefore, planning permission in accordance with the Town and Country Planning (Scotland) Act 1997 (as amended) will be required. A planning application will need to be submitted to the Local Planning Authority, which in this case is Moray Council.

Environmental deliverables (e.g. Phase 1 habitat survey) will be required for the validation of the application to Moray Council.

In addition to the planning application a Simple Licence may be required from SEPA. The proposed works are situated in close proximity to inland water and thus requires authorisation for both the restoration and enhancement works, including removal of structures and construction of a new bridge. It is recommended that confirmation is obtained via pre-application discussions, as it may be established that SEPA are content to control this activity through appropriate planning conditions.

4.4 Maintenance Requirements

Throughout the 120-year design life of the structure, routine inspections and maintenance activities will be required to keep the bridge structure and link road in a serviceable condition. Several maintenance activities may be required to be undertaken annually.

Depending on the type of replacement structure selected, maintenance activities could include repainting and/or renewal of bridge deck surfacing, waterproofing, bearings and bridge deck joints, all of which deteriorate over time.

Specific maintenance requirements for each option are included in the option appraisal section.

To allow for the detection of defects, inspections of the principal elements are recommended as in CS 450 as follows:

- General Inspection – every 2 years
- Principal Inspection – every 6 years

Operation and maintenance cost estimates have been included within the costing estimates.

4.5 Demolition

As discussed in the Inspection and Assessment Report issued in March 2022, demolition could either involve removal of the superstructure, or removal of both the substructure and superstructure. Limiting the demolition works to the superstructure minimises costs and programme duration. It also minimises works within the watercourse including associated licensing requirements from SEPA. However, leaving the existing piers in place would result in the Moray Council retaining liability for these elements. As the scour issues associated with the piers would remain, there is a potential that

the substructure could collapse and impact the watercourse, leading to exacerbation of local flooding.

Demolition of the bridge in the near future significantly reduces risk. It removes the asset from the Moray Council's list of liabilities but also allows for a planned demolition and diversion of services in a controlled way.

5 Options

Option 1 has been included for comparison purposes. This option does not permit the bridge to reopen to vehicular traffic:

Option 1 Baseline Do Minimum

Three further options have been developed to enable Cloddach Bridge to reopen to all vehicular traffic up to and including 40 Tonnes:

Option 2 Repairs to the existing bridge
 Option 3a New Overbridge including demolition of existing bridge
 Option 3b New Overbridge including retention of existing bridge
 Option 4a New integral bridge structure two lanes
 Option 4b New integral bridge structure single lane

5.1 Option 1 – Do Minimum

5.1.1 Description

This option allows the bridge to remain open for an additional period of time for use by pedestrians and cyclists only subject to ongoing inspections and monitoring.

Although this option does not allow the bridge to be reopened to traffic, it does however provides a baseline for comparison against all other options.

The likely risks associated with no action being undertaken have also been considered.

In March 2022, Fairhurst’s Inspection and Assessment Report discussed an ongoing inspection and monitoring programme and stated:

“Without further measures and subject to ongoing inspections, this could allow the bridge to be used by pedestrians and cyclists for a further 2 years to allow a scope and budget for demolition to be developed.”

This study is being compiled eighteen months into the two year period mentioned above.

5.1.2 Details

This option includes the following details, assumptions and exclusions:

- Installation of bollards and signage on the approach to the structure to prevent vehicle access.
- Road Order to legally ‘stop up’ the road.
- Scour survey required as soon as possible, the results of which may impact the ability to re-open the bridge for longer than the initial two year period.
- River bed training or repairs may be required following scour survey. Included as a risk cost.

- Liaison with SEPA including associated programme and costs will be required.
- Ongoing general inspections on a monthly basis and after heavy rainfall, to monitor the condition of the steelwork, scour and edge deterioration for up to ten years.
- Monitoring of the measured flange thicknesses every three months to ensure residual thickness does not reduce by more than 2mm.
- No allowance has been included for grit blasting, repainting or other refurbishment activities.
- No allowance has been included for re-assessment of the structure.
- It has been assumed that after ten years, the bridge will need to be permanently closed and demolished. Demolition costs including cost of legal 'stopping up' processes, the introduction of a turning head, signage and bollards have been included in the whole life costs.
- Whole of life costs include inspection and monitoring over the next 10 years

5.1.3 Risks

Appendix B contains a full risk assessment for this option. In this option, the bridge remains a liability without the benefits of reopening it to vehicular traffic. A key risk is therefore reputational damage due to protests relating to the bridge not being reopened to vehicular traffic.

Much of the risk associated with this option is as the result of failure of the structure and/or damage to the services potentially resulting in the emergency demolition of the bridge. In addition, the scour to the river bed and its impact on the stability of the substructure presents an unknown level of risk with potentially catastrophic consequences. A scour survey is recommended as soon as possible to understand more about the current situation. This in turn will inform the possibility of extending the initial two year period discussed above. It is likely that the scour survey will determine the need for scour protection, river re-training or underpinning works, all of which would significantly increase the option cost.

5.2 Option 2 - Repairs to the existing bridge

5.3.1 Description

This option combines repairs to and replacement of elements of the existing structure in order to re-open the bridge to all vehicular traffic up to and including 40 tonnes.

This is a complex process that will involve significant breaking out and careful refurbishment of existing elements in combination with the installation of replacement elements.

5.3.2 Details

This option includes the following details, assumptions and exclusions:

Items included in this option are:

- Bridge strengthening would allow the bridge to be used by normal traffic up to 40t, but not abnormal loads
- Topographical Survey
- A budget cost for extensive intrusive investigation works
- Preliminary Ecological Appraisal Flood Risk Assessment
- Scour survey required as soon as possible, the results of which may impact the final decision to adopt this option.
- River bed training or repairs, possibly underpinning, to existing substructure may be required following scour survey
- Extensive river bank protection.
- Due to significant work in the river, extensive liaison with SEPA will be required. Licensing requirements are likely to be highly restrictive.
- Ground Investigation and Reporting
- Development of strengthening scheme including cleaning, overplating or replacement and then painting of all steel beams.
- Breaking out and replacing poor quality concrete elements in substructure. Extensive repairs and or complete replacement may be required.
- Removal of concrete jack arches and replacement with new structural slab.
- Installation of a new vehicle, pedestrian, cyclist and equestrian compliant parapet.
- Residual design life following repair work approximately 50 years.
- Maintenance costs include repainting of the structure every 15 years.

5.3.3 Risks

The key risk relating to this option is the unknown condition of hidden elements of the structure. The extent to which they can be retained or strengthened is therefore also largely unknown. It is likely that very significant repairs will be required to extend the life of the structure using this method.

Considering the concrete elements of the sub structure, it is likely that breaking out activities will reveal areas of additional deterioration. In cases like this where the concrete quality is poor, the extent of breaking out can also be difficult to control on site. The full substructure may need reconstructed in situ.

There is also a similar risk with the superstructure. It is very likely that the majority of the girders will require over-plating or replacement. The repaired structure is likely to require load restrictions for abnormal load vehicles and there will be an ongoing durability risk related to any retained parts of the structure. In order to achieve a structure with a design life of up to 50 years the repairs are likely to require complete dismantling and reassembly of the bridge. This adds the complexity of ensuring the stability of the existing structural elements during the refurbishment works. This is likely to require extensive temporary works and highly constrained sequencing which in turn further increases costs.

In addition to the inherent risks associated with the poor condition of this structure, the scour to the river bed and its impact on the stability of the substructure presents an unknown level of risk with potentially catastrophic consequences. A scour survey is recommended as soon as possible to understand more about the current situation. This in turn will inform the ongoing scour related risk and retraining or repair work required which may be extensive.

Refer to Appendix B for a full risk assessment for this option.

5.3.5 Construction Works Programme

The construction programme for this option is likely to be the longest of any option considered. This is due to the piecemeal nature of the works, likely requirement to prop the bridge during works or impose extensive construction sequencing constraints in order to ensure stability, and the extent of works required in the river.

5.3 Option 3a Overbridge with Demolition of Existing

5.4.1 Description

This option comprises a prefabricated superstructure supported by the existing abutments. This requires the demolition of the existing superstructure and piers, modification of the existing abutment, but only minor changes to the existing road alignment. While this is likely to comply with road alignment standards, because this is a non-integral bridge it fails to meet current standards for maintainability and will attract a higher whole life cost.

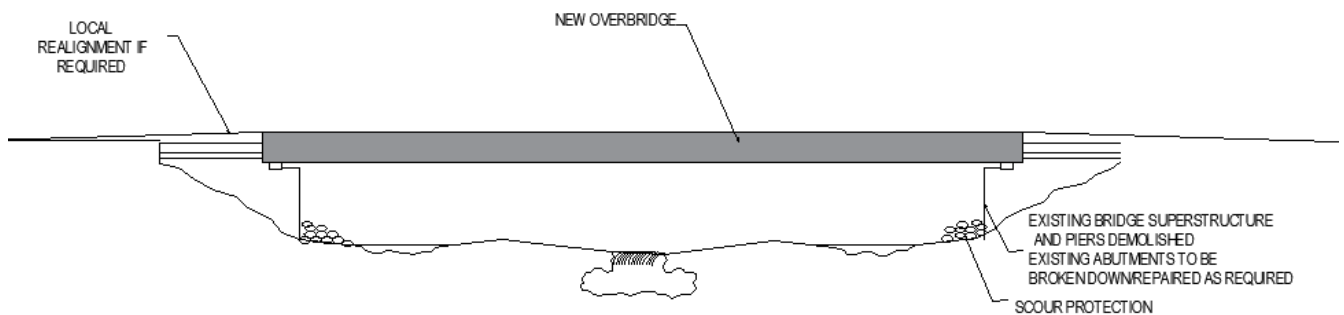


Figure 5 Option 3A Steel Overbridge with Demolition of Existing

5.4.2 Span arrangement

The overbridge will comprise a single span between the existing abutments. This will require significant repair works and/or modification to the existing abutments. Comparing this to option 4b where new abutments are built behind the existing abutments, this option will allow a shorter overbridge span with potentially reduced cost. It is worth noting that "off the shelf" prefabricated bridge decks tend to be modular units so there will be less flexibility with dimensions. For example, the units may only be available in spans to the nearest metre.

5.4.3 Material Type

In order to span the existing abutments, a steel beam bridge or through truss will be required. As the through truss will require more maintenance, a pre-fabricated steel beam bridge has been considered for this option. Concrete structures would only be considered for a full replacement structure.



Figure 6 Typical Jansen MultiGirder Bridge

5.4.4 Alignment

As this options assumes the demolition of the existing piers and superstructure, little modification to the vertical alignment of the road will be required.

5.4.5 Cross Section

The existing bridge comprises a carriageway of approximately 3.9m width which allows the passage of vehicles over the bridge in one direction at any one time. A prefabricated superstructure is available in a limited range of widths due to its modular form. A cross section of 5m, based on 2 x 2.5m sections has been chosen for the purposes of this option study. The cross section can be specified with surfacing and footway arrangement to suit requirements within the available width, but traffic will still be limited to one direction at a time.

5.4.6 Foundations

Ground investigations (GI) are required in order to design modifications to the existing abutments. The outline specification for GI is included in Appendix A.

5.4.7 Articulation

The new superstructure will be installed on permanent bearings forming a simply supported span.

5.4.8 Maintenance

Although the simply supported span has benefits in simplicity of construction, these benefits are potentially outweighed by additional maintenance costs including a requirement to repaint the structure every 15 years and replace bearing every 25 years throughout the 120 year design life for a new structure. Other assets that may need to be renewed over the design life of the structure include the surfacing, waterproofing and parapets. The costs associated with maintaining a bridge of this description are included in the cost estimate as part of the whole life cost.

This option involves the demolition of the existing piers and superstructure. Although there are capital costs associated with this, there are longer term benefits to ongoing inspection and maintenance costs. There are also benefits in making the overbridge easier to inspect and maintain and avoiding road realignment costs.

5.4.9 Details

This option includes the following details, assumptions and exclusions:

Items included in this option are:

- Bridge would be designed for normal traffic up to 40t
- Topographical Survey
- Minimal road realignment and earthworks.
- Extensive intrusive investigation works to abutments
- Preliminary Ecological Appraisal
- Flood Risk Assessment
- Scour survey
- River bed training or repairs, possibly underpinning, to existing substructure may be required following scour survey.
- Extensive river bank protection.
- Due to significant work in the river, extensive liaison with SEPA will be required. Licensing requirements are likely be highly restrictive.
- Ground Investigation and Reporting
- Demolition of existing superstructure and piers and associated service diversions and relocations.
- Maintenance costs include repainting every 15 years and bearing replacement every 30 years.

5.4.10 Risks

Refer to Appendix B for a full risk assessment for this option.

Re-using any part of the existing structure carries a risk relating the anticipated condition. In this case, there is a high cost and programme risk associated with the extent of works required to re-use the existing abutments.

5.4.12 Construction Works Programme

The construction programme for this option is likely to be the second shortest of options considered as although demolition and modification of the existing structure is required, the new bridge will arrive fully fabricated and just needs to be lifted or launched into place.

5.4 Option 3b New Overbridge with Existing Structure Retained

5.5.1 Description

This option comprises a prefabricated superstructure supported by a new substructure built behind the existing abutments. The full existing structure is retained, but demolition is likely to be required in the future.

This option requires more consideration of the existing alignment than others. Because the new structure is installed over the top of existing there could either be higher resulting realignment costs or a non-compliant ramp detail that will require speed limits.

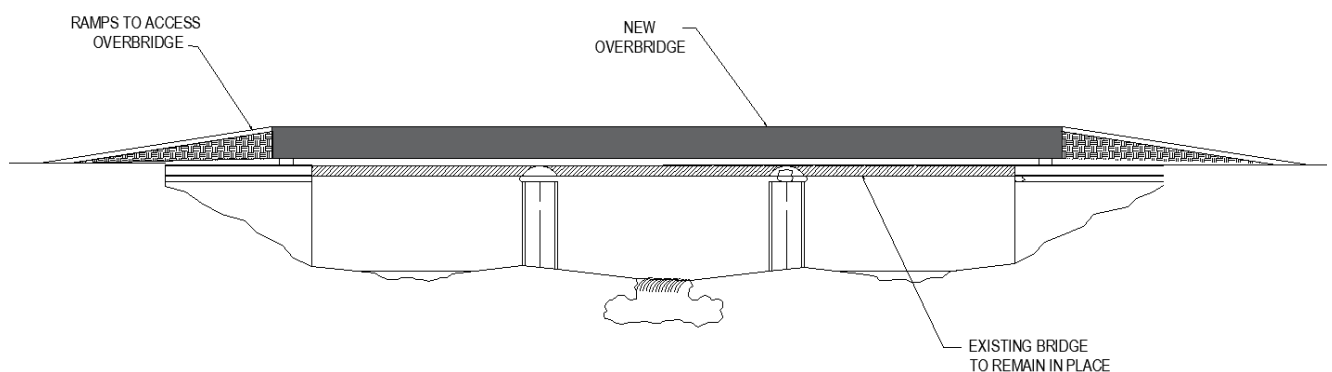


Figure 7: Option 3b Steel Overbridge with Retention of Existing Structure

5.5.2 Span arrangement

The overbridge spans over the top of existing abutments to rest on new supports. This will require vertical realignment of the road over the top of overbridge and associated earthworks and/or retaining structures.

5.5.3 Material Type

In order to span the full distance over the existing abutments, a steel beam bridge or through truss will be required. As the through truss will require more maintenance, a pre-fabricated steel beam bridge has been considered for this option. Structural forms including timber and fibre reinforced plastic are not generally suitable for this span range and have not been considered.

5.5.4 Alignment

Prefabricated steel bridge decks are available from a number of suppliers as an 'off the shelf' product that require bespoke foundations. In order to progress this solution, a topographical survey is required to determine the modifications required to the vertical alignment of the road to allow the carriageway to pass over the top of the existing structure. The road level would typically be in the order of 1.2m higher than existing. This level difference could be achieved in

the form of a ramp, or through more extensive realignment works. An allowance for new alignment and earthworks is included in the cost estimate for this option.

5.5.5 Cross Section

The existing bridge comprises a carriageway of approximately 3.9m width which allows the passage of vehicles over the bridge in one direction at any one time. A prefabricated superstructure is available in a limited range of widths due to its modular form. A cross section of 5m, based on 2 x 2.5m sections has been chosen for the purposes of this option study. The cross section can be specified with surfacing and footway arrangement to suit requirements within the available width, but traffic will still be limited to one direction at a time.

5.5.6 Foundations

Ground investigations (GI) are required in order to develop a suitable foundation arrangement for the bridge. The outline specification for GI is included in Appendix A. In order to provide a robust cost estimate, piled foundations have been assumed for this study.

5.5.7 Articulation

The new superstructure will be installed on permanent bearings forming a simply supported span.

5.5.8 Maintenance

Although the simply supported span has benefits in simplicity of construction, these benefits are potentially outweighed by additional maintenance costs including a requirement to repaint the structure every 15 years and replace bearing every 25 years throughout the 120 year design life for a new structure. Other assets that may need to be renewed over the design life of the structure include the surfacing, waterproofing and parapets. The costs associated with maintaining a bridge of this description are included in the cost estimate as part of the whole life cost.

Because the existing substructure is to be left in place it will require maintenance, inspection and potentially require repairs which would add to the total cost associated with this option.

5.5.9 Details

This option includes the following details, assumptions and exclusions:

Items included in this option are:

- Bridge would be designed for normal traffic up to 40t
- Topographical Survey
- Road realignment and earthworks.
- Preliminary Ecological Appraisal
- Flood Risk Assessment

- Scour survey
- River bed training or repairs, possibly underpinning, to existing substructure may be required following scour survey.
- Extensive river bank protection.
- Reduced amount of work in the river, so less liaison with SEPA required.
- Demolition and utility diversion work for services over bridge not required.
- Ground Investigation and Reporting -
- Maintenance costs include repainting every 15 years and bearing replacement every 30 years

5.5.10 Risks

Refer to Appendix B for a full risk assessment for this option.

While this option will be comparatively quick to construct, delaying the demolition of the existing structure and the associated utility diversions presents significant risk exposure. This is related to the ongoing deterioration of the existing structure and also the risk of scour damage to the foundations.

It has been assumed that the existing bridge will eventually need to be demolished and the utilities diverted onto the new structure. This is likely to be a more complicated operation as it will need to take place under the new structure.

Because the new structure is dropped in over the existing, the vertical road alignment over the bridge will need to be significantly adjusted. There is a risk that a non-standard vertical alignment will need to be adopted due to space constraints.

5.5.12 Construction Works Programme

The construction programme for this option is likely to be the shortest of options considered as the new bridge will arrive fully fabricated and just needs to be lifted or launched into place and minimal reliance is made on the existing structure.

5.5 Option 4a – New Wide Integral Structure

5.6.1 Description

This option considers the full demolition of the existing bridge and replacement with a new fully Eurocode compliant structure. The width of this structure option provides two traffic lanes plus a verge so provides a betterment on the existing bridge.

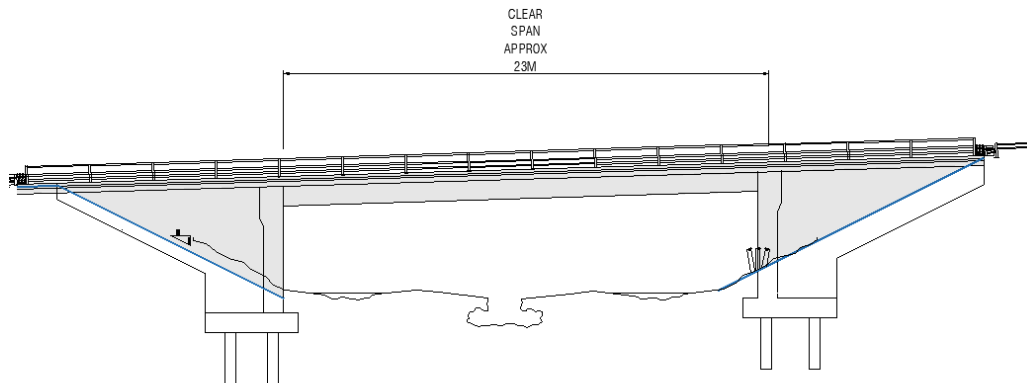


Figure 8 Elevation on Typical Integral Bridge Arrangement

5.6.2 Bridge location and span arrangement

Although there are several options for a new crossing location, it is likely that these would result in an increased span and significantly increased costs due to the required realignment of the carriageway. There would also be significant disadvantages from an ecological and environmental standpoint. A straighter alignment that eliminates the tight curve may provide benefits in terms of forward visibility and overall safety, but the lack of recorded accidents in this location means that that it is unlikely to provide value for money. This option therefore considers a new structure on the same alignment as the existing.

The new structure is a single span structure of approximately 23m. This reduces complications and risk associated with working in the watercourse. For this span range a suitable permanent replacement is an integral bridge. Integral bridges are generally required by current DMRB standards for smaller spans without a significant skew because the ongoing maintenance requirements are significantly less than a simply supported bridge on bearings. Because integral bridges do not have bearings, costs associated with bearing replacement are avoided. Joints between the superstructure and substructure are also avoided which should lead to a more durable structure overall.

5.6.3 Material Type

An integral bridge of this size can be formed with either steel beams or precast prestressed concrete beams each with a reinforced concrete deck slab. Simpler construction in reinforced concrete would not be feasible for this span range. It is not considered that the aesthetic

requirements for this bridge would be a priority, which increases the suitability of either a steel composite or prestressed concrete structure.

Steel composite bridge decks can have a slight advantage over prestressed concrete beams in terms of structural depth. In addition, their lower weight compared with concrete beams can lead to advantages in buildability through the use of a smaller crane for lifting. Traditional steel composite beams would require painting, typically every 15-20 years which can have a dramatic influence on whole life costs. Weathering steel can be used as an alternative where no painting is required. In weathering steel a stable patina develops forming a protective barrier to the steel underneath, resulting in a much lower corrosion rate compared to normal steel. Although there is no requirement to paint a weathering steel bridge, specific inspection monitoring points need to be agreed during the construction stage to ensure that the patina is developing as expected.

Prestressed concrete beams designed and manufactured in accordance with current standards should require no maintenance over the 120 year lifespan. There are a range of suppliers available and a range of standard beam types to ensure that a structurally efficient solution can be developed. For a span of this range a 'Y' beam would likely be the preferred choice.

For the purposes of this study, precast prestressed beams have been selected.

5.6.4 Cross Section

The existing bridge comprises a carriageway of approximately 3.9m width which allows passage of one vehicle over the bridge at any one time. For this option, it is proposed that the new bridge is wide enough to accommodate two traffic lanes plus a verge.

The bridge is likely to be used by cyclists and equestrians and therefore a parapet height of 1.8m above verge would be required for any compliant replacement structure. A separate verge area is of benefit as a refuge point for crossing pedestrians but will add to the cost.

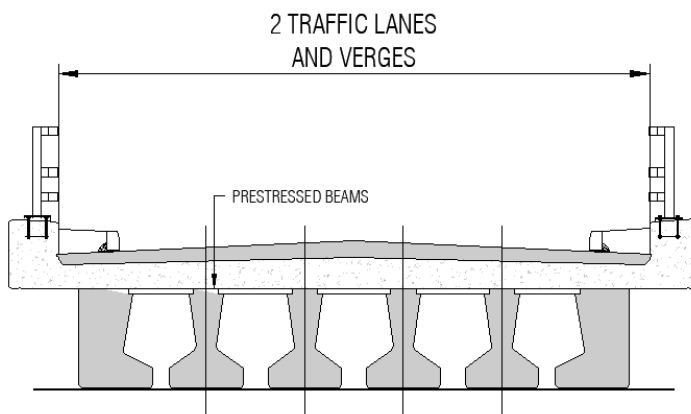


Figure 9 Wider Bridge Cross Section

5.6.5 Foundations

Ground investigations (GI) are required in order to develop a suitable foundation arrangement for the bridge. The outline specification for GI included in Appendix A. For the purposes of this study, piled foundations have been assumed.

5.6.6 Maintenance

A prestressed concrete beam bridge designed and manufactured in accordance with current standards should require no maintenance over a 120 year lifespan. A steel composite bridge from weathering steel would have slightly higher maintenance costs and a painted option would be significantly higher. The costs associated with maintaining a prestressed beam bridge of this description are included in the cost estimate as part of the whole life cost.

5.6.7 Details

In addition to the description sections above, this option includes the following details, assumptions and exclusions:

Items included in this option are:

- Bridge would be designed for normal traffic up to 40t plus any required abnormal loads
- Topographical Survey
- Road realignment and earthworks.
- Preliminary Ecological Appraisal
- Flood Risk Assessment
- Extensive river bank protection.
- Reduced amount of work in the river, so less liaison with SEPA required.
- Demolition and utility diversion work for services
- Ground Investigation and Reporting -
- Maintenance costs limited to inspections

5.6.8 Risks

The risk profile for this option is significantly lower than previous options discussed above. Moderate risks remain relating to risks common to any major contract in terms of weather delays, susceptibility to price rises and measures required for protected species. As these are all factors that can be managed through provisions in the construction contract, this option generally presents a lower risk profile to the Council.

Refer to Appendix B for a full risk assessment for this option.

5.6.1 Construction Works Programme

The construction programme for this option is likely to be one of the longer options. This is due to the increased size of the structure alongside demolition constraints associated with in channel river works. Full construction of new foundation and substructure will also increase time required to build this option.

5.6 Option 4b – New Integral Structure – Minimal Width

5.7.1 Description

This option considers the full demolition of the existing bridge and replacement with a new integral bridge structure. The width of this structure provides a single traffic lane plus a verge.

Much of the detail provided above for Option 4a applies to this option.

5.7.2 Cross Section

The existing bridge comprises a carriageway of approximately 3.9m width which allows passage of one vehicle over the bridge at any one time. For this option, it is proposed that the new bridge is wide enough to accommodate one traffic lanes plus a verge.

The bridge is likely to be used by cyclists and equestrians and therefore a parapet height of 1.8m above verge would be required for any compliant replacement structure. A separate verge area is of benefit as a refuge point for crossing pedestrians but will add to the cost.

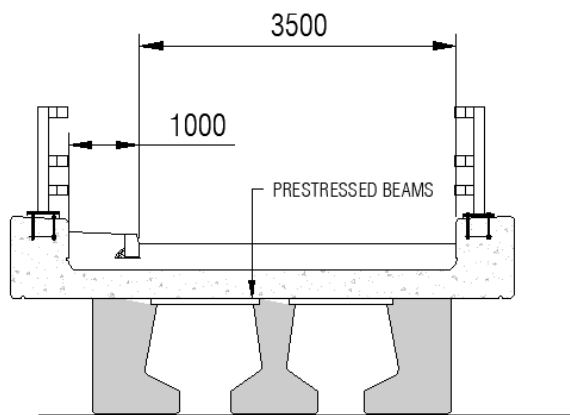


Figure 10 Typical Cross Section through 4b Prestressed Beam Bridge

5.7.3 Details

In addition to the description sections above and in Option 4a, this option includes the following details, assumptions and exclusions:

- Bridge would be designed for normal traffic up to 40t plus any required abnormal loads
- Topographical Survey
- Road realignment and earthworks.
- Preliminary Ecological Appraisal
- Flood Risk Assessment
- Extensive river bank protection.

- Reduced amount of work in the river, so less liaison with SEPA required.
- Demolition and utility diversion work for services
- Ground Investigation and Reporting -
- Maintenance costs limited to inspections

5.7.4 Risks

As with Option 4a, the risk profile for this option is significantly lower than previous options discussed above. Moderate risks remain relating to risks common to any major contract in terms of weather delays, susceptibility to price rises and measures required for protected species. As these are all factors that can be managed through provisions in the construction contract, this option generally presents a lower risk profile to the Council.

Refer to Appendix B for a full risk assessment for this option.

5.7.6 Programme

The construction programme for this option is likely to be one of the longer options, although will be shorter in duration than option 4a. This is due to demolition constraints associated with in channel river works and time required to install new foundation and substructures.

This option provides a fully compliant new structure that will minimise ongoing maintenance costs whilst providing a crossing that provides at least the same benefits as the existing bridge for traffic capacity. It is recommended that this option is considered for further development.

6 Risk

6.1 Introduction

A high level risk assessment has been developed for the key risks associated with each option. This has been developed in accordance with the guidance in the Scottish Government Risk Management Guide published in April 2021. Key risks are discussed in each option section and full risk matrices are included in Appendix B.

6.2 Risk Assessment

For each option discussed in this study the risks have been scored based on likelihood of occurrence and risk impact over 4 categories: financial, time, reputation and performance. The resulting risk ranking ranges from minor to significant.

It has not been possible to undertake a detailed quantitative risk assessment at this stage, but risk costs have been included in the cost estimates through a suggested range of uplifts to the basic estimates. These uplifts have been increased where greater cost risks have been recognised in the risk registers. While not quantifiable, reputational risks are also included in the analysis as these represent an important factor in decision making.

6.3 Summary of risk registers

Overall risk allowances for each option are summarised below:

	Option	Maximum reputational risk score	Maximum cost/prog risk score	Recommended cost range
1	Minimum	100	150	+100%, -10%
2	Repair Existing Structure	100	150	+100%, -10%
3a	Steel Overbridge/Reuse abutments. Demolish existing piers and superstructure	20	150	+100%, -10%
3b	Steel Overbridge with new abutments. Retain whole of existing structure beneath new structure	100	100	+100%, -10%
4a	New integral bridge – 2 lanes of traffic	10	50	+50%, -20%
4b	Minimum width integral bridge – 1 lane of traffic	20	50	+50%, -20%

Table 6-1 Summary of Risk Registers

6.4 Quantitative Risk

As part of the full business case, it is recommended that a cost quantified risk analysis is undertaken. An assessment of the minimum, most likely and maximum impact each risk could have will be agreed and converted into a cost range where possible. Some risks are not quantifiable, for example reputational risks. Once each risk has been assessed for each option, a quantitative risk allowance can be calculated and incorporated into the cost estimates.

It is also recommended that a s multi-party risk workshops is also undertaken as part of the full business case process.

7 Cost

7.1 Introduction

With reference to the Association for the Advancement of Cost Engineering (AACE) document 98R-18: “Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Road and Rail Transportation Infrastructure Industries”, this pre-feasibility stage of a project is categorised as a Class 5 estimate. The typical expected accuracy range for such cost estimates is -50% to +100%.

For options that comprise a complete replacement of the bridge, it is recommended that a range of -20% to +50% is applied to the cost estimate. As discussed above, due to the high number of unknowns relating to the condition of the existing structure it is recommended that for Options 1, 2 3a and 3b a range of -10% + 100% is applied to the cost estimates. Once more detailed cost estimates and fully quantified risk assessments have been completed, these ranges can be reduced. Cost estimates for each option are included in Appendix C.

7.2 Capital Cost

7.1.1 Pre-construction Costs

The pre-construction cost heading includes elements associated with the design and delivery of the scheme prior to any construction.

The preliminary and detailed costs account for a multi-disciplinary team to undertake the analysis, design and specification of the proposed bridge structure. This cost will include the production of the necessary deliverables to enable the procurement of a contractor to undertake the construction works.

To facilitate the detailed design of the proposed scheme, allowances have been included within each estimate for geotechnical and environmental surveys to take place during the preliminary design period.

As options are limited to replacement of the structure on the same alignment, no cost associated with land purchase have been included. Typical planning costs have been included.

7.1.2 Cost of Construction

The Direct Works element of the capital cost estimate has been produced based on the Method of Measurement for Highway Works (MMHW) and covers the elements of works from Series 0200 Site Clearance, to Series 3000 Landscape and Ecology

A Bill of Quantities (BoQ) was produced for the Direct Works, which covered each of the items identified as being required for the construction of the proposed bridge and east link road. Rates were then taken from Spons 2023, which accounted for the labour, plant and materials associated with each item on the Bill of Quantities to calculate an estimated Direct Works cost.

The Preliminaries, measured within Series 0100 in the MCHW, includes costs for project overheads and method related costs. The project overheads include allowances for the cost of site compounds, construction management on site, along with ancillary costs incurred during construction such as the testing of materials, site security, site transport and safety equipment. The method related costs include allowance for the transport/erection works required to construct the proposed bridge. An allowance of 25% of the total construction cost has been included for preliminaries for all options except Option 2. For Option 2 the temporary propping and increase work in the river channel is likely to both extend the programme and require increased temporary works. For this option the allowance has been increased to 60%.

7.1.3 Other Cost

To ensure that a robust allowance is included within the cost estimate, it was assumed that the water main and BT overhead line would have to be relocated at a budget cost of £100,000.

7.1.4 Optimism Bias

An allowance for optimism bias in line with recommendations in the HM Treasury Green Book has been provided within each of the capital cost estimates. Due to the early stage of the design, an allowance of 66% of the estimated base cost was provided and applied to each of the major cost headings.

7.1.5 Inflation

To present costs in real terms, the impact of inflation has been considered within the outputs included in this feasibility study. The estimates were produced at a 2023 price base, with a 3% annual rate of inflation assumed.

7.1.6 Cost Estimate Summary

Full cost estimates for each option are included in Appendix C. Overall budget capital costs including risks and 66% optimism bias for each option are summarised in Table 7-1.

7.3 Whole Life Cost (WLC)

A whole life cost analysis of the structure was carried out in accordance with CD 355 'Application of whole life costs for design and maintenance of highway structures'.

- The evaluation period is taken over 60 years as recommended in CD 355, rather than the entire expected life of the structure.
- The analysis evaluation period of 60 years was considered, with an inflation rate of 3.5% up to 30 years of service life and then 3% for the subsequent years of service. The costs have then been discounted in accordance with The Green Book.
- The maintenance cost associated with regular General and Principal Inspections at an interval of 2 and 6 years respectively according to CS 450 was applied to all options.
- Option 3a/3b – it is assumed that the maintenance cost for structural steel will require regular reapplying of a proprietary paint protective system with an interval of 15 years.

Option		Without 66% Optimism Bias			With 66% Optimism Bias		
		Lower Range	Likely Cost	Upper Range	Lower Range	Likely Cost	Upper Range
1	Do Minimum	£22,500	£25,000	£50,000	£37,350	£41,500	£83,000
2	Repair Existing Structure	£1,090,786	£1,211,984	£2,495,358	£1,810,704	£2,011,893	£3,957,387
3a	Overbridge/ Demolish	£1,122,911	£1,247,679	£2,495,358	£1,864,032	£2,071,147	£3,677,494
3b	Overbridge/ Retain	£940,614	£1,045,127	£2,090,254	£1,561,419	£1,734,911	£3,337,022
4a	New wider integral bridge	£1,129,254	£1,411,568	£2,117,352	£1,874,562	£2,343,203	£3,514,804
4b	Minimum width integral bridge	£921,566	£1,151,958	£1,727,937	£1,529,800	£1,912,250	£2,868,375

Table 7-1 Summary of Capital Costs

	Option	Whole Life Cost Estimate
1	Do Minimum (inc demolition in 10 years)	£747,078
2	Repair Existing Structure	£309,208
3a	Overbridge/Demolish	£279,208
3b	Overbridge/Retain	£309,208
4a	New wider integral bridge	£84,840
4b	Minimum width integral bridge	£84,840

Table 7-2 Summary of Whole Life Costs

8 Cost Benefit Analysis

8.1 Transport Analysis

A Transport Economic Efficiency (TEE) analysis covers the benefits ordinarily captured by standard cost-benefit analysis including: traffic volumes, journey times, driver frustration and travel time reliability.

Scottish Transport Appraisal Guidance (STAG) further details TEE analysis as a process that captures the main impacts of an option in terms of economic welfare, as represented by the main costs and benefits of users and operators of the transport system. These impacts are expressed in terms of monetary values, by Cost-Benefit Analysis (CBA), which are added together and discounted to produce a Net Present Value (NPV).

Based on the information provided, approximately 250,000 vehicles are estimated to have used Cloddach Bridge in 2020. A Department for Transport 'High' growth factor of was applied to the 2020 approximate annualised traffic flows to approximate future year traffic flows for 2031. This results in the prediction that traffic flows of over 280,000 vehicles could use Cloddach Bridge annually by 2031.

For a cost benefit analysis, traffic forecasts would include up to 15 years of traffic growth from year of opening in assessing benefits of a scheme, following that no growth in traffic would be used up to the horizon year (60 years beyond opening). However, current transport policy objectives, such as 20% reduction in car kilometres by 2030, should offer some mitigation.

Whilst there may be transport users whose travel patterns do not change but who enjoy time saving and/or other benefits, this study does not take these into account. The main benefits will be from diverting users, who switch from other routes because of changes in relative (generalised) costs.

It should be highlighted that the appropriateness of the supplied traffic flow information should be borne in mind, as the survey was undertaken during the COVID-19 pandemic, in the run up to Christmas, and is likely to be non-representative of neutral traffic conditions.

8.1.1 Traffic Routes & Distribution

In the absence of traffic surveys/modelling of the network, a desktop exercise was undertaken, utilising Google maps/directions, to establish details of traffic routing in scenarios where Cloddach Bridge remains closed (do-nothing / do-minimum) versus open (do-something). Edgar Road was used as a proxy origin/destination for Elgin, given its central location, employment/retail nature and proximity to local amenities and facilities (including primary and secondary schools). While the A941/Rashcrook Road junction was assumed as the origin/destination for journeys to / from the south, both of which would benefit from the re-opening of Cloddach Bridge.

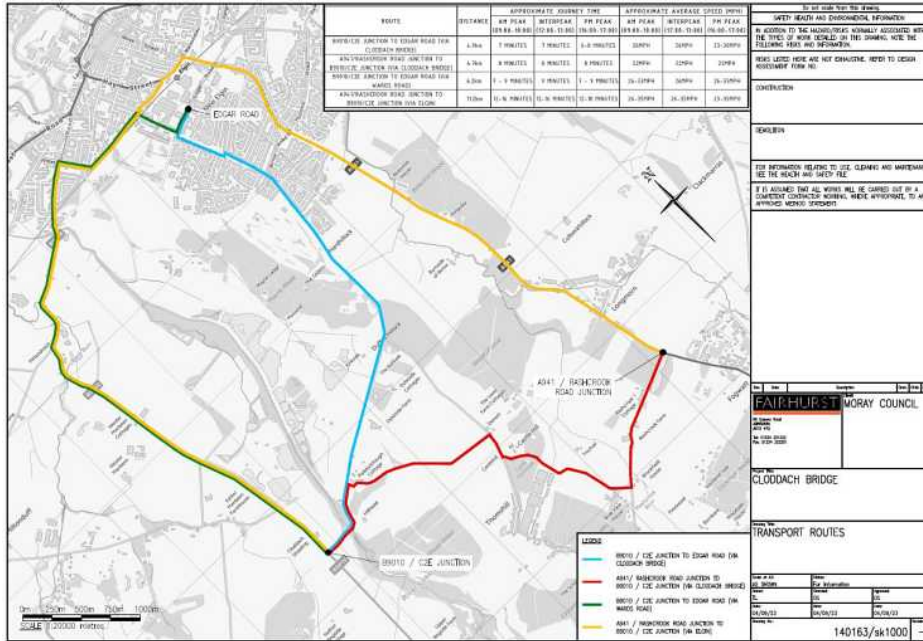


Figure 11 Traffic Routing Details

In the absence of traffic surveys of the surrounding road network, to estimate origins/destinations, traffic flow data, from 2019, was obtained from the Department for Transport for the A96 and A941. These flows were used as a proxy to estimate potential traffic distribution, shown below in Figure 12, and infer an eastbound traffic distribution of 88% to the A96 and 12% to the A941. This distribution was assumed to apply to westbound traffic in reverse, again, in the absence of traffic surveys of the local road network or any other relevant data.

DfT Traffic Flows A941 - (North St - Thornhill Rd junctions)			
2019 (Estimated)			
Northbound (westbound)	2695	Combined	5191
Southbound (eastbound)	2496		
DfT Traffic Flows A96 - East (Greyfriars St - Reiket Lane junctions)			
2019 (Estimated)			
Eastbound	11361	Combined	22549
Westbound	11188		
DfT Traffic Flows A96 - West (Morrison Rd - A941 junctions)			
2019 (Estimated)			
Eastbound	8045	Combined	16847
Westbound	8802		
Assumed traffic distribution (eastbound to bridge) to Elgin/A941 & (Westbound to B9010) B9010/C2E			
Total traffic	44587		
Northbound A96 (Elgin)	39396		0.88 %
Southbound A941	5191		0.12 %

Figure 12 Traffic distribution

8.1.2 Journey Times

In the absence of any traffic surveys/modelling, average journey times were estimated, utilising Google maps. Average journey times for the AM/Inter/PM peak periods were generated. Route distances were also established through use of Google maps in the absence of any alternative data.

To provide context, according to the Moray Council Active Travel Strategy, 2016-2021, 64.6% of all journeys within Moray are 5km or less. For the do-nothing scenario (bridge remains closed to traffic) represents at least a 6.5km additional journey distance for origins/destinations to the south and 1.3km additional journey distance for trips to/from Edgar Road, that are considered significant increases.

Annualised traffic flows for 2020 and 2031 were applied to the identified traffic routing options. This provides an estimate of vehicle kilometres travelled annually for each route. This methodology forecasts the distance travelled by vehicles increasing by up to 480,000km annually in 2020, due to Cloddach Bridge being closed. This increases to an additional approximate 546,000 km annually travelled by vehicles in the 2031 forecast.

8.1.3 Journey Time Savings

A high-level journey time savings assessment, utilising WebTag Data Book (May 2023 v1.21) values to monetise working time was undertaken for Option 4A. As the costliest option under consideration, this will act as a sense check for the potential for sufficient benefits to be derived to generate value for money of the other options being considered. Route average journey travel time differences between Cloddach Bridge remaining closed (do-nothing) versus being re-opened (do-something) were taken from the Google map journey time estimates.

This high-level journey time savings assessment has made use of several assumptions including:

- Use of average daily figure is robust for car mode, with business journey purpose proportion greater in the morning and midday periods;
- Traffic growth has only been applied until an opening year of 2025;
- NRTF low growth factor has been used, local growth is currently unknown;
- 12-hour traffic flows are derived from the available traffic count information;
- Journey time savings are based on 2023 estimates;
- No account of do nothing & do minimum costs nor future increases in journey times on alternative routes has been considered;
- Traffic annualising figure have been taken from the Transport User Benefit Appraisal (TUBA) manual and doesn't take account of any local factoring;
- Maintenance of existing road infrastructure cannot be estimated at this time.

The results of this high-level journey time savings comparison against the construction costs show a near 60 year pay-back period for the investment, which can be confirmed through a formal calculation of benefits to cost ratio.

8.2 Discussion of Benefits

A review of the available traffic survey information has been undertaken. While it is not possible to provide definitive cost benefit analysis at this stage, the presented high-level assessment would suggest that the closing of Cloddach Bridge affected a substantial number of vehicles, likely increasing year on year with background traffic growth. The assessment concludes that those previously observed using the bridge in 2020 are now travelling an additional annual travel distance of approximately 480,000km, with the average rerouting distance of around 1.92km per vehicle

When considering benefits in terms of saved travel time alone, if a replacement structure has a cost in the region of £2,800,000 (such as Option 4a), the benefits over 60 years would likely exceed the cost of construction for any replacement bridge option under consideration, as indicated by the high-level journey time savings assessment. The full potential users' benefits associated with the construction of a replacement bridge have not been fully investigated and does not include vehicle operation cost (VOC) benefits. Improved VOC would come from reduced fuel consumption levels associated with a reduced travel distance with a replacement bridge at Cloddach, likely reducing the time period for benefits to outweigh construction costs. Similarly, active travel benefits have not been investigated at this stage.

It is considered that the benefit to cost ratio for any of the options discussed is very likely to be favourable, with specific cost benefit calculations to be undertaken as part of the next stage of the project.

9 Recommendations

9.1 Business Case Development

In order to fully assess the benefits to the local community of opening the new bridge, it is recommended that a full business case is undertaken. This business case development should be undertaken in conjunction with the detailed surveys required in order to further develop the design. Undertaking these surveys will allow the risk of current unknown aspects to be more fully understood and quantified for the full business case.

9.2 Engineering Options

Option 1 could be a workable solution to extend the life of the bridge for pedestrians and cyclists if a scour survey is undertaken in near future and results support continued use.

There may be benefits to Option 2 in terms of re-use of materials, this option provides the lowest assurance for long term service life, along with the longest programme, highest risk of unknowns in breakout and repair of the existing structure. This option does not provide any benefits in improvement of the existing situation in terms of width or flood alleviation. It is therefore not recommended that this option is progressed.

As per option 2 benefits in terms of re-use of materials, option 3a provides the lowest assurance for long term service life, along with the longest programme, highest risk of unknowns in breakout and repair of the existing structure. This option does not provide any benefits in improvement of the existing situation in terms of width or flood alleviation. It is therefore not recommended that this option is progressed.

Option 3b appears to be attractive due to the short construction programme. However, as a non-integral structure this bridge form would require increased inspection and maintenance compared with other. The 'off the shelf' nature also means it is less flexible to project specific requirements including specific span and width requirements. Leaving the existing structure in place in the short/medium term also means it is retained as a liability and will require ongoing inspection before eventual demolition. Demolition will also be more complex due to the presence of the overbridge. It is therefore not recommended that this option is taken forward.

Although a fully compliant wider bridge option 4a is an attractive solution, however there is little evidence that this is required from a safety perspective. A minimum width bridge may be seen to better meet the balance of public need and capital cost to functionality.

Option 4b provides a fully compliant new structure that will minimise ongoing maintenance costs whilst providing a crossing that provides at least the same benefits as the existing bridge for traffic capacity. It is recommended that this option is considered for further development.

9.3 Transport Assessment and Modelling

The surrounding road network affected by the closure of Cloddach Bridge is not contained within the existing Moray Firth Traffic Model or Aberdeen Sub Area Model areas. In order to undertake

a formal benefit to cost ratio for all options under consideration, in accordance with STAG guidance associated with TEE analysis, it is recommended that the following work is undertaken as part of a full business case:

- Undertake a review to identify the location and number of required junction turning count and automatic traffic surveys to be carried out of the surrounding local/strategic road networks, including routing through Elgin, to suitably inform data entry to a traffic model;
- Identifying of Origin-Destination data to inform the traffic model of trip generation zones and likely redistribution of traffic under open versus closed Cloddach bridge options;
- Undertake contemporary journey time surveys to accurately determine alternative routing times;
- Calibration and validation of a traffic model;
- Use of the TUBA manual for calculating user benefits associated with the TEE analysis;
- Undertaking a Walking Cycling and Horse-riding assessment, in accordance with DMRB GG 142 'small highway scheme', to establish potential impacts on option selection and inform non-motorised user benefits and community accessibility impacts.
- The current Department for Transport (DfT) data workbook should be used to assign the traffic to appropriate classes and the costs used to quantify the associated benefits over the lifetime of the bridge.

This additional modelling and analysis will allow the quantification of benefits with enough confidence to develop a quantified benefit-cost ratio for the replacement of the bridge.

9.4 Site Investigations

The following surveys and investigations are recommended as part of the full business case:

- Topographical Survey
- Bathymetric/Flood Risk Survey
- Scour survey local to the bridge
- Preliminary Ecological Appraisal with further specific surveys as required.
- Geotechnical Investigation

9.5 Programme and Cost

9.4.1 Business Case Costs

Budget costs associated with the recommended surveys and traffic modelling for the completion of a full business case are included in Table 9-1. This includes all recommended surveys and the full scope of traffic modelling recommended in order to fully inform a business case.

Business Case Estimated Costs		Cost	Duration	Notes
Transport Surveys		£20,000	3 weeks	Should be undertaken during school term time and avoid extreme weather.
Transport Modelling and completion of quantitative Cost Benefit Analysis		£50,000	18 weeks	
Site Investigations: Budget Costs	Topographical Survey (including bathymetric/ flood survey scope)	£20,000	2 weeks	
	Geotechnical Investigation	£40,000	3 months	
	Geotechnical Reporting	£7,000	1 week	
	Flood Study	£15,000	4 weeks	
	Preliminary Ecological Assessment	£10,000	4 weeks	
Outline Bridge Design		£10,000	4 weeks	Update to cost estimates informed by other SI results
Business Case Compilation		£25,000	4 weeks	
TOTAL		£187,000		

Table 9-1 Summary of Business Case Costs

9.4.2 Business Case Programme

The lack of existing traffic information in this region of Moray means that extensive survey and modelling is likely to be required in order to fully inform the potential benefits of a bridge replacement and therefore the business case. This aspect of the business case is the principal factor in extending the programme duration. An estimated programme is illustrated in Figure 13.

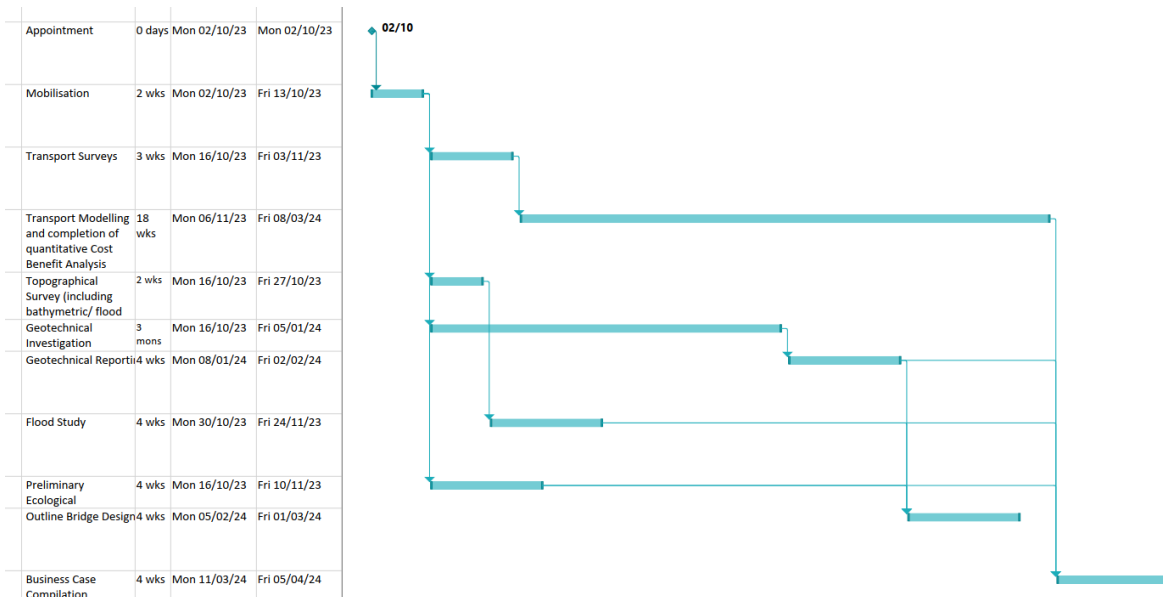


Figure 13 Estimated Business Case Programme

9.6 Conclusion

The study has examined various options available to reopen Cloddach Bridge to traffic. It is recommended that Option 4b is taken forward to full business case as the next stage of this project.

Appendix A – GI Specification

**GROUND INVESTIGATION AT
CLODDACH BRIDGE, ELGIN**

**SPECIFICATION &
BILL OF QUANTITIES**

Employers:

Moray Council

Council Office
High Street
Elgin
IV30 1BX

Engineer:

Fairhurst

Westerton of Craigie
Southampton Road
Dundee
DD4 7PN

**CONTRACT FOR GROUND INVESTIGATION AT
 CLODDACH BRIDGE, ELGIN**

**SPECIFICATION &
 BILL OF QUANTITIES (APPENDIX 1)**

Contract Document Ref: 140136 DOC 02						
		Name	Signature		Date	
Prepared by		Ross McIlrath	<i>R. McIlrath</i>		August 2023	
Reviewed by		Andrew Kram	<i>Andrew Kram</i>		August 2023	
Approved by		Andrew Kram	<i>Andrew Kram</i>		August 2023	
Revision Record	Rev.	Date	Status	Description	Signature	
	1				Prepared By	
					Checked	
					Approved	
	2				Prepared By	
					Checked	
					Approved	

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**SPECIFICATION &
PREAMBLE TO BILL OF QUANTITIES**

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SPECIFICATION

The Specification shall be **Specification for Ground Investigation** published by Thomas Telford Services Ltd in 1993, with information, amendments and additions as described in the Schedules.

Schedule 1.	Information
Schedule 2.	Exploratory holes
Schedule 3.	Engineer's facilities
Schedule 4.	Specification amendments, additions and deletions
Schedule 5.	Specification for further items of work (divided into Annexes A to I as required)

SCHEDULES

Schedule 1: Information

S1.1 Name of Contract

The Contract is to be called:

Ground Investigation at Cloddach Bridge, Elgin

The Client's name and address are:

Name (s): **Moray Council**

Address (s): *Council Office, High Street, Elgin IV30 1BX*

Access to the site should be arranged through:

Fairhurst, Westerton of Craigie, Southampton Road, Dundee, DD4 7PN

S1.2 Description of Site

The Cloddach Bridge is located at National Grid Reference NJ 20173 58396. The bridge is a single track road bridge (currently closed) located approximately 3km to the south-west of the town of Elgin and crossing the River Lossie Burn in an approximate East-west direction. A ground investigation Plan is presented **Drawing 140136/9000, Appendix 4.**

S1.3 Purpose of this Contract

This is seen as the 'Design' investigation under BS 5930:2015+A1:2020 and BS EN 1997-2:2007, consisting of boreholes and trial pits and insitu testing locations as exploratory positions. At locations of trial pits and boreholes, ground conditions through visual assessment and obtain bulk soil samples for laboratory testing and perform in-situ geotechnical testing and record groundwater strike levels in order to provide relevant data to inform the design foundations and earthworks of the proposed development.

S1.4 Scope of Investigation

The scope of this investigation is anticipated to be in two phases, as summarised below;

Phase 1 (Site Walkover & Ecology Consultation)

- Site walkover to assess safe access routes to proposed borehole and trial pit positions
- Consultation with Ecologist to approve temporary access works design and proposed fieldworks to be undertaken adjacent to the existing watercourse (River Lossie) and areas of existing Woodland.

Phase 2 (Main Ground Investigation Fieldworks)

- 4 no. Rotary Percussive Boreholes (BH01 – BH04) to 15.0mbgl including minimum 6.0m rock core should solid geology be encountered within scheduled drilling depth of 15.0m;
- 4 no. Trial Pts (TP01 – TP04) targeted to areas of river bank adjacent to exiting bridge foundation to confirm foundation strata.

Boreholes BH01 and BH04 will be followed by the installation of monitoring standpipes for Groundwater level monitoring purposes.

Phase 2 (Post Fieldwork Groundwater Level Monitoring)

- 4 no. Groundwater Level monitoring visits over a 1 month monitoring period at boreholes BH01 and BH04.

A Ground Investigation Plan is presented in **Drawing 140163/9001, Appendix 4.**

A groundwater monitoring method statement is presented in **Appendix 6.**

S1.5 Geology and ground conditions

Superficial Geology

The 1:50,000 BGS mapping noted the superficial deposits at the site comprise Alluvium and River Terrace Deposits (Undifferentiated) Gravel, Sand, Silt and Clay and Glaciofluvial Ice Contact Deposits of Gravel, Sand and Silt.

Solid Geology

The 1:50,000 BGS mapping noted the solid geology comprises the Spey Conglomerate Formation - Conglomerate. The BGS mapping shows there is no geological faulting located within the vicinity of the site.

S1.6 Schedule of drawing(s) and documents

Appendix 1

- 140163 DOC 01 Bill of Quantities Issue 1

Appendix 2

- Laboratory Limits of Detection (Soils, Leachate and Water)

Appendix 3

- 140163 DOC 03 CDM Design Assessment Form

Appendix 4

- 140163/9001 Ground Investigation Layout

Appendix 5

- Public Utilities
- Site Walkover Photographs

Appendix 6

- Groundwater Monitoring Methodology

S1.7 Particular Contract restrictions

Entry to the site will not be possible until specific method statements, risk assessment and copies of insurance documents are provided and approved.

S1.8 Particular general requirements (Section 3)

Work may take place on site between the hours of 8am and 6pm, Monday to Friday. Work outside these hours may take place only with the prior agreement of the Engineer (Clause 3.8).

All reinstatement shall be to the requirements of Clause 3.9.

The Contractor is responsible for providing their own supervision to ensure the requirements of the Specification are met (Clause 3.12).

The accuracies specified for setting out (Clause 3.14) and levelling (Clause 3.15) are appropriate.

There are special traffic management requirements with regard (Clause 3.22).

The Contractor is required to work to a Quality Management system established in accordance with BS 5750 (Clause 3.23). Details shall be provided prior to the commencement of work on site.

Drillers employed on the Contract shall be BDA accredited (or equivalent) or else the supervision requirements of Clause 3.24 (2) shall be followed.

S1.9 Particular borehole requirements (Section 4)

At ground level before boring commences, the initial casing diameter shall be sufficiently large to ensure that the borehole can be completed to its scheduled depth.

Backfilling of boreholes with soil arisings is not permitted (Clause 4.6), unless otherwise agreed with the Engineer. All boreholes shall be backfilled as instructed by the Engineer.

A borehole remaining open overnight shall be covered. Before the first sample of the new day is taken the boring shall be advanced for at least 0.3m.

S1.10 Particular pit and trench requirements (Section 6)

The Contractor will require excavating inspection pits of sufficient size for the location of underground services if it is believed they are necessary (Clause 6.1).

The use of mechanical plant is permitted (Clauses 6.2 and 6.3).

Trial pits and Observation pits shall have the minimum dimensions specified in Clause 6.4.

Pits and trenches shall be backfilled using excavation plant in the manner specified in Clause 6.7

Artificial lighting shall be used where necessary when taking photographs of pits and trenches (Clause 6.9).

S1.11 Particular sampling requirements (Section 7)

Special sampling required under Clause 7.7 is specified in Schedule 5, Annex A. Samples shall not be disposed of until 28 days after submission of the approved final report. The Engineer shall be given notice of at least 1 week before the disposal of samples. The notice shall be in writing (Clause 7.13).

Environmental sampling will not be required however any visual olfactory evidence of soil or groundwater contamination should be reported to the engineer and recorded in detail within the engineer's logs.

Geotechnical sampling will be required as well as laboratory analysis to assess the physical nature and geotechnical properties of the encountered materials. This will comprise;

- Bulk sampling at 1.0m intervals from all trial pit and borehole positions
- Large Bulk sampling at 1.0m intervals from all trial pits
- Undisturbed open tube (U100) samples in cohesive superficial deposits in each borehole location at alternating 1.5m intervals with SPT tests. First SPT test to be undertaken 1.20mbgl.

Open tube and piston samples are to have a 98mm internal diameter (Clause 7.3). Soil samples shall be at least 300mm long.

S1.12 Particular in situ testing requirements (Section 8)

The following in situ tests scheduled in Clause 8.3 shall be carried out:

- In-situ Hand Shear Vane testing at 1.00m intervals in cohesive deposits where encountered.

- In-situ SPT tests are to be undertaken at 1.50m intervals (commencing at 1.20mbgl) or alternating with U100 samples at 1.00m/1.50m intervals where appropriate in cohesive deposits in all boreholes.

S1.13 Particular instrumentation and monitoring requirements (Section 9)

- Groundwater level monitoring is required (2 visits over 1 month)
- Ground Gas/Vapour and groundwater sampling is not required, however, this will be reviewed following findings from the initial ground investigation works.

The Groundwater Level monitoring will be required in all boreholes (BH01 – BH04).

S1.14 Particular daily report requirements (Section 10)

- Daily Engineers logs must be sent to the engineer via e-mail or fax at the end of each drilling shift.
- Grid north may be taken as magnetic north (Clause 10.2).
- The Engineer should be contacted immediately following the completion of each trial pit.

S1.15 Particular laboratory testing requirements (Section 11)

For the chemical testing schedule

The Contractor is required to prepare a blank test schedule for both chemical and geotechnical testing (Clause 11.1), giving on one axis the following information:

- Borehole and Trial pit number
- sample number
- sample type
- sample depth

For the geochemical schedule on the other axis the following standard laboratory tests shall be listed

- Arsenic
- Cadmium
- Chromium
- Lead
- Mercury
- Selenium
- Copper
- Nickel
- Zinc
- Sulphate – water soluble, 2:1 extract
- pH value
- TPH
- PAH (USEPA 16 speciation)
- Asbestos Screen (identification)
- Asbestos Quantification

- Organic Matter

For the geotechnical schedule on the other axis the following standard laboratory tests shall be listed

- Moisture content
- Atterberg Limits
- Particular size distribution by Wet sieving
- Particular size distribution by pipette
- Specific gravity of soil particles
- Organic matter content
- California Bearing Ration (CBR): Recompacted
- Moisture Condition Value (MCV)
- Sulphate and pH of water sample
- Sulphate and pH of soil sample (with BRE 363 dependent option of water: soil extract)
- Small direct shear box (60mm x 60mm box) test (leave space for pressure range to be specified)
- Quick triaxial test on 100mm diameter specimen (leave space for cell pressure to be specified)
- Oedometer (leave space for pressure range to be specified)
- Natural Moisture Content of rock materials
- Bulk Density of rock by linear measurement
- Uniaxial Compressive Strength (UCS) test on rock
- Point Load Test (PLT) on rock
- Three blank columns for other tests

These draft schedules sheets are to be submitted to the Engineer with the preliminary logs, required under Clause 12.1.

There are no further requirements for rock tests (Clause 11.4). No laboratory testing is to be carried out on site (Clause 11.6). Special laboratory test requirements under Clause 11.7 are specified in Schedule 5, Annex C.

S1.16 Particular reporting requirements (Section 12)

The locations of the exploratory holes should be related to National Grid Coordinates (Clause 12.2.2).

Digital data are required (Clause 12.4 and Appendix III). In accordance with Clause All.4, preliminary digital data is to be issued to correspond with preliminary paper records.

An interpretative report is not required (Clauses 12.5 and 12.7). No additional information is required in the factual report (Clause 12.6). Where an interpretative report is required, it should include the information specified in Schedule 5, Annex I.

One fast-bound copy of the final factual report is required (Clause 12.8). In addition the Contractor shall provide one digital master of all pages and drawings in the Report. The copyright of the Report shall be deemed to be vested in the Employer.

S1.17 Particular requirements relating to potentially contaminated land

The investigation is over potentially contaminated made ground materials. Details concerning the suspected hazards are given below (Clause H.2.1)

The presence of contaminated made ground (visual and olfactory) must be reported to the engineer via telephone or e-mail when encountered or at the end of the excavation of that particular exploratory position.

The Contractor shall provide hygiene and decontamination facilities appropriate for a BDA **YELLOW** classified site to control the risks to health and safety of site operatives and site visitors (Clause H.2.2). These shall as a minimum include protective clothing and dust masks. The wheel wash can comprise a powered spray, with which all equipment leaving the potentially contaminated land shall be cleaned.

The Contractor must ensure that no vertical migration of contamination into the natural ground occurs during the drilling process.

All equipment shall be thoroughly cleaned before being used on site. Jet washing equipment shall be provided to wash down equipment and tools before starting each exploratory hole. At the instruction of the Engineer, it may be necessary to clean the equipment and tools between strata, specifically at the boundary between made ground and natural strata.

Full time attendance of an environmental scientist with a minimum of four years relevant experience shall be provided during all work in connection with the potentially contaminated land. The Contractor shall provide the Engineer with the CV of the proposed environmental scientist for approval before work commences on site.

Soil and water samples shall be taken by the environmental scientist. All sampling protocols, preservation techniques, sample containers and time to analysis shall comply with EN ISO 5667-3: 1996 BS 6069: Section 6.3: 1996, Guidance on the preservation and handling of samples.

Samples for organic testing shall be stored in borosilicate glass jars (Clause H.5.1). Samples for metals analysis shall be stored in plastic containers and shall be fixed on site where necessary. All testing shall be started within 48 hours of sampling.

Upon completion of each exploratory hole, the Contractor shall give the Engineer a schedule of samples taken. The Engineer will then specify which samples are to be analysed and which analyses are to be undertaken. The range of analyses anticipated is indicated below along with the required level of detection. Details of dependent options are given below.

The final results of the chemical analysis of samples shall be reported to the Engineer within fourteen days of sampling, in a draft report.

Schedule 2: Exploratory positions

Location	Item description	Scheduled Depth	Location
BH01 – BH04	Rotary Percussive Borehole	15.00mbgl (+ 6.00m rock core sample should solid geology be encountered within scheduled drilling depth)	140163/9001, Appendix 4
TP01 – TP04	Mechanically Excavated Trial Pits	4.00mbgl	

Schedule 3: Engineer's facilities

S3.1 Accommodation

Accommodation for the Engineer's Representative shall not be required.

S3.2 Furnishings

Not applicable.

S3.3 Services

Not applicable.

S3.4 Equipment

Not applicable.

S3.5 Transport

Not applicable.

S3.6 Protective clothing for Engineer

Not applicable.

Schedule 4: Specification amendments, additions and deletions

Clause 1.1

Add new paragraph:

"Where there is conflict between the information given in the Schedules and the Specification or standards referred to in the Specification, the requirements of the Schedule shall take precedence".

Clause 3.1

Add:

"If an equivalent standard is to be used, full details are to be provided to the Engineer at least 3 working days prior to the commencement of work on site".

Clause 3.10

Insert in line 2 after "reported".

"immediately and under no circumstances longer than 24 hours from the receipt of the complaint".

Clause 3.26

Add: new Clause 26 **Standing Time**

"The Engineer shall be notified immediately that standing time starts to be incurred. The duration of standing time shall be agreed with the Engineer."

Clause 12.4

Insert in line 2 after "Appendix III".

"if required in Schedule 1"

Clause 12.8

Add:

"The number of copies of the final factual report which are required are specified in Schedule 1".

Appendix I

AI.3 Pneumatic or Vibrating wire piezometers

"Pneumatic or vibrating wire piezometers may be installed in boreholes. Only proprietary products specifically designed as piezometers by the manufacturer shall be used. The method of installation shall follow that for standpipe piezometers, except where there is conflict with the manufacturer's recommendations in which case the manufacturer's recommendations shall be followed. The porous piezometer tip shall be maintained so as to be completely saturated when it is installed in the borehole. The operation of the piezometer shall be verified before installation (where possible) by measuring the water pressure it records as it is installed in the borehole."

"For vibrating wire piezometers, the Contractor shall record the atmospheric pressure at the time of the water pressure reading and shall correct his reading to allow for atmospheric pressure".

Schedule 5: Specification for further items of work

The following annexes are used:

Annex H : Ground investigation on potentially contaminated land

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PREAMBLE TO BILL OF QUANTITIES

BILL OF QUANTITIES FOR GROUND INVESTIGATION

Preamble

1. In this Bill of Quantities the sub-headings and item descriptions identify the work covered by the respective items. The text in bold italics is intended to identify amendments made to the standard preamble. The exact nature and extent of the work to be performed shall be ascertained by reference to the Conditions of Contract, the Specification and the Schedules and Appendices to the Specification, as appropriate. The rates and prices entered in the Bill of Quantities shall be deemed to be the full inclusive value of the work covered by the several items, including the following unless stated otherwise.
 - a) Supervision, labour and all costs in connection therewith.
 - b) The supply of materials, goods, storage, facilities and services, and all costs in connection therewith, including wastage and delivery to site.
 - c) Plant and all costs in connection therewith.
 - d) Fixing, erecting and installing or placing of materials and goods in position.
 - e) All temporary works.
 - f) All general obligations, requirements, liabilities and risks involved in the execution of the investigation as set forth or implied in the documents on which the tender is based.
 - g) Establishment charges, overheads and profit.
 - h) Bringing plant and sampling and in situ testing equipment to the site of each exploratory hole; erecting, dismantling and removing on completion.
 - i) Removal of all equipment and services from site on completion.
 - j) *Reinstatement.***
 - k) *Washing down of equipment as required to prevent cross contamination.***
 - l) *Protection of the ground to prevent contamination from arisings as required.***
2. All items not deleted from section A of the Bill of Quantities (General items and provisional sums) shall be priced and all items in subsequent sections against which quantities are entered shall be priced.
3. Where rates are not priced they shall have £0.00 placed against them.
4. Professional attendance associated with the description of cores and samples, ***the logging of pits and trenches*** and other duties as required by the Contract shall be included in the appropriate rates. When full time professional attendance on site is required in accordance with Clause 3.12 this shall be paid for under Appendix A of the Bill of Quantities.
5. The item for photograph shall allow for the standing time of associated plant, and supply of CD containing all digital photographs, prints and bound volume.
6. Rates for moving plant and equipment to the site of each exploratory hole shall allow for the formation of access routes, and making - good access routes and working areas on completion as required by the Contract.

7. The rates for moving rotary drilling plant to the site of each hole shall include for setting up over a previously formed borehole.
8. Payment for forming exploratory holes shall be based on:
 - a) full thickness of strata investigated and described in accordance with the Specification
 - b) depths measured from ground level
 - c) depth measured from original ground level where an inspection pit has been excavated.
 - d) that part of a drillhole below the bottom of a borehole where a drill hole has been ordered to continue from the bottom of a borehole
 - e) core recovery of at least 90% in any core run, unless the Engineer is satisfied it cannot be achieved
 - f) volume calculated as measured length x measured depth x specified width for trial and observation trenches.
9. Rates for forming exploratory holes shall allow for:
 - a) casing installation where necessary, and removal **and for any casing not recovered, including that necessary to prevent cross contamination as required**
 - b) dealing with surface water **and the formation of temporary grout plugs**
 - c) backfilling with arisings
 - d) supply of daily report and preliminary log
 - e) additional site supervision of non-accredited drillers
 - f) disposal off site of excavated material not required for reuse **but excluding material regarded as hazardous or special waste**
 - g) **washing down of equipment as specified**
 - h) **measures to prevent cross-contamination between strata.**
10. Standing time shall be measured as the duration of time for which plant, equipment and personnel are standing on the instruction of the Engineer or in accordance with the Contract. Standing time shall be paid for interruption of the formation of exploratory holes to record groundwater entry in accordance with Clause 9.1.1. The rates for standing time shall allow for:
 - a) plant equipment and personnel
 - b) consequential costs
 - c) changes in the programme of working
 - d) recording information and preparing daily report.
11. The rates for hourly provision of pitting and trenching crews and equipment at locations as directed by the Engineer shall allow for compliance with the requirements of the Contract, including preparation of records.
12. The rates for sampling and in situ testing shall allow for the standing time of associated plant. Where in situ testing is paid for on an hourly basis, the time measured shall be the actual time taken to carry out the test in accordance with the Engineer's instruction and/or the Specification but excluding the time taken to erect and dismantle test equipment where this is itemised separately.

13. The rates for installation of instruments shall allow for:
- a) clearing and keeping hole free of unwanted materials
 - b) all costs associated with equipment, installation, specified seals, surround, backfill materials excluding backfill below the instrument **and surface terminal (if appropriate)**
 - c) proving correct functioning
 - d) delays due to installation.
14. The rates for testing shall include for:
- a) the supply of a copy of the preliminary test results to the Engineer
 - b) the cost of moisture content or density determinations where they form part of the test
 - c) **the time of the personnel carrying out the test.**
15. The rates for recording of water level or gas measurement shall allow for notices of re-entry to the Engineer, owners or occupiers affected by the location or access route.
16. Appendix A to the Bill of Quantities (Rates for geotechnical and other personnel) shall be priced. The rates given will be used by the Engineer to make an initial estimate of costs where applicable of employing the Contractor's staff in accordance with Clause 3.13 of the Specification.
17. Items for the supply of the master and copies of the interpretative report shall exclude costs covered by Appendix A to the Bill of Quantities.

Units of measurement

18. The following abbreviations shall be used for the units of measurements:

Millimetres	:	mm
Metre	:	m
Kilometres	:	km
Square millimetres	:	mm ²
Square metre	:	m ²
Cubic metre	:	m ³
Square metre per day	:	m ² /day
Kilogramme	:	kg
Tonne	:	t
Sum	:	sum
Number	:	nr
Hour	:	h
Week	:	wk
Vehicle week	:	v.wk
Item	:	item
Day	:	day
Specimen day	:	sp.day

19. The rates for observation pits and trenches shall allow for all necessary shoring and shoring crew. For all hand-dug pits and trenches, the rates shall allow for working

within a properly shored excavation. The size of a hand-dug pit or trench shall be sufficient to allow the excavation to be progressed to its scheduled depth. The rates for all pits and trenches should allow for the excavator, driver and technical assistant to log the pit and trench, take samples and carry out tests, and any washing down of equipment between locations.

20. The rates for performing laboratory tests of long duration shall include for all costs incurred whilst working outside normal hours.
21. Quantities associated with Items A7 and A8 will be reimbursed at cost on production of receipts.
22. The rate for provision of an environmental scientist on site shall include provision of all equipment for taking of samples and for performing all the in situ testing and measurements specified. The rate shall be per 8-hour day.

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Appendix 1

Bill of Quantities

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engineering solutions, delivering results

Westerton of Craige
 Southampton Road, DUNDEE, DD4 7PN
 Tel: 01382 453300 Fax: 0844 381 4412

COST ESTIMATE

Project:	Cloddach Bridge, Elgin	Quote By:	
Client:	Moray Council	Date:	
Reference:	140163		
Scope:	Ground Investigation Works		

Item	Description	No.	Unit	Rate	Amount
A	General Items				
A1	Offices and stores for the Contractor/Engineer including set up of a compound and welfare facilities	1	sum		£ -
A2	Establish on site all plant, equipment and services including full time supervision by an engineering geologist	1	sum		£ -
A2.1	Vibration monitoring equipment to be utilised at locations specified by the engineer during all drilling works	Rate Only	sum		
A3	Establish the location and elevation of the ground at each exploratory hole (mAOD)	1	sum		£ -
A4	Facilities for the engineer	Rate Only	sum		
A5	One master copy of the fieldwork report	1	sum		£ -
A6	Additional copies of the fieldwork report	Rate Only	nr		
A7	Digital data (AGS format)	1	sum		£ -
A8	Mobilisation of site safety equipment (YELLOW)	1	sum		£ -
A9	Maintenance of onsite safety equipment	1	day		£ -
A10	Disposal offsite of arisings	Rate Only	sum		
A11	Provide facilities for decontamination of equipment/plant between borehole (YELLOW)	Rate Only	sum		
A12	Decontamination at the end of field work (YELLOW)	Rate Only	sum		
A13	PAS 128 Type C Survey (review proposed positions against current public utility plans and visible surface features and CAT scan positions prior to breaking ground)	1	Sum		£ -
A14	Formation of Access/Egress and Drive on / Drive off accessibility to proposed GI locations (TP01 - TP04) Including site visit to assess possible plant access routes - any temporary ramps/tracks required to gain access are to be reinstated following completion of works.	1	Sum		£ -
A15	Ecological Clerk of Works (ECoW). A suitably qualified specialist Ecology consultant requires to approve temporary access design for TP positions adjacent to the existing woodland & watercourse and investigation fieldworks adjacent to the woodland & watercourse	1	Sum		£ -
A16	Reinstatement of trial pit locations on like-for-like basis	Rate Only	sum		

Section A sub-total	£ -
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(carried to summary)



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COST ESTIMATE

Project:	Cloddach Bridge, Elgin	Quote By:	0
Client:	Moray Council	Date:	0
Reference:	140163		
Scope:	Ground Investigation Works		

Item	Description	No.	Unit	Rate	Amount
B	Light Hydraulic Percussive Boring				
B1	Move boring plant and equipment to the site of each exploratory hole and set up rig including excavation of hand dug pit to 1.20mbgl	Rate Only	nr		
B2	Extra over item B1 for setting up on a slope of gradient greater than 20%	Rate Only	nr		
B3	Break out surface obstruction where present at exploratory borehole	Rate Only	nr		
B4	Advance borehole from below concrete slab to 10m depth	Rate Only	m		
B5	As item B4 but between 10m and 20m depth	Rate Only	m		
B6	As item B4 but between 20m and 30m depth	Rate Only	m		
B7	As item B4 but between 30m and 40m depth	Rate Only	m		
B8	As item B4 but between 40m and 50m depth	Rate Only	m		
B9	Advance borehole through hard stratum or obstruction	Rate Only	hr		
B10	Backfill borehole with cement/bentonite grout	Rate Only	m		
B11	Standing time for borehole plant, equipment and crew	Rate Only	hr		
B12	Bring hand auger equipment to the position of each exploratory hole	Rate Only	nr		
B13	Bore with hand auger from existing ground level to 2m depth	Rate Only	m		
B14	As item B13 but between 2m and 4m depth	Rate Only	m		
B15	Standing time for hand auger equipment and crew	Rate Only	h		

Section B sub-total	£	-
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(carried to summary)



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COST ESTIMATE

Project:	Cloddach Bridge, Elgin	Quote By:	0
Client:	Moray Council	Date:	0
Reference:	140163		
Scope:	Ground Investigation Works		

Item	Description	No.	Unit	Rate	Amount
C	Rotary Boring				
C1	Move boring plant and equipment to the site of each exploratory hole and set up rig including excavation of hand dug pit to 1.20mbgl	4	nr		£ -
C2	Extra over item B1 for setting up on a slope of gradient greater than 20%	Rate Only	nr		
C3	Break out surface obstruction where present at exploratory borehole	Rate Only	nr		
C4	Advance borehole between GL and 10m depth (Dynamic Sampling)	40	m		£ -
C4.1	Advance borehole between GL and 10m depth (Air Flush Rotary Coring)	Rate Only	m		
C5	As item B4 but between 10m and 20m depth (Dynamic Sampling)	20	m		£ -
C5.1	As item B4 but between 10m and 20m depth (Air Flush Rotary Coring)	24	m		£ -
C6	As item B4 but between 20m and 30m depth	Rate Only	m		
C7	As item B4 but between 30m and 40m depth	Rate Only	m		
C8	As item B4 but between 40m and 50m depth	Rate Only	m		
C9	Advance borehole through hard stratum or obstruction	Rate Only	hr		
C10	Backfill borehole with cement/bentonite grout	2	nr		£ -
C11	Standing time for borehole plant, equipment and crew	Rate Only	hr		
C12	Bring hand auger equipment to the position of each exploratory hole	Rate Only	m		
C13	Bore with hand auger from existing ground level to 2m depth	Rate Only	m		
C14	As item C13 but between 2m and 4m depth	Rate Only	h		
C15	Standing time for hand auger equipment and crew	Rate Only	nr		
C16	Decommissioning of borehole monitoring well installations in accordance with SEPA Guidance. Date to be informed by the Engineer.	2	nr		£ -

Section C sub-total	£ -
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(carried to summary)



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COST ESTIMATE

Project:	Cloddach Bridge, Elgin	Quote By:	0
Client:	Moray Council	Date:	0
Reference:	140163		
Scope:	Ground Investigation Works		

Item	Description	No.	Unit	Rate	Amount
D	Pits and Trenches				
D1	Excavate inspection pit by hand to 1.20m depth	Rate Only	nr		
D2	Extra over item D1 for breaking out surface obstructions	Rate Only	nr		
D3	Move mechanical excavation equipment to the site of each trial pit and trial trench	4	nr		£ -
D4	Excavate trial pit between existing ground level and scheduled depth (4.0mbgl)	16	m		£ -
D5	Break out surface obstructions where present at exploratory trial pit / DCP test	Rate Only	m		
D10	Extra over item D4 for breaking out hard strata or surface obstructions	Rate Only	hr		
D11	Standing time for excavation plant, equipment and crew for machine dug pit or trench	Rate Only	h		

Section D sub-total	£ -
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(carried to summary)



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 Tel: 01382 453300 Fax: 0844 381 4412

COST ESTIMATE

Project:	Cloddach Bridge, Elgin	Quote By:	0
Client:	Moray Council	Date:	0
Reference:	140163		
Scope:	Ground Investigation Works		

Item	Description	No.	Unit	Rate	Amount
E	Sampling				
E1A	Small disturbed sample (environmental)	Rate Only	nr		
E1B	Small disturbed sample (geotechnical)- 1.0m intervals	30	nr		£ -
E2	Bulk disturbed sample- 1.0m intervals	30	nr		£ -
E3	Large bulk disturbed sample	Rate Only	nr		
E4	Open tube sample	Rate Only	nr		
E5	Piston sample	Rate Only	nr		
E6	Groundwater sample	Rate Only	nr		
E7	Gas sample	Rate Only	nr		
E8	Core sub sample	Rate Only	nr		

Section E sub-total	£ -
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COST ESTIMATE

Project:	Cloddach Bridge, Elgin	Quote By:	0
Client:	Moray Council	Date:	0
Reference:	140163		
Scope:	Ground Investigation Works		

Item	Description	No.	Unit	Rate	Amount
F	In-Situ Testing				
F1	Standard Penetration Test in all boreholes (1.5m intervals commencing at 1.2mbgl)	20	nr		£ -
F3	Plate Load Test (100kPa, 200kPa, 400kPa, 100kPa)	Rate Only	nr		
F4	California Bearing Ratio Test	Rate Only	nr		
F8	Hand Vane test where applicable in cohesive deposits in all trial pits	1	nr		£ -
F9	Continuous Dymanic Penetration Tests to 1.20m below topsoil and production of results (including topsoil thickness)	Rate Only	nr		
F10	Infiltration test as per BRE 365	Rate Only	nr		
F11	PID required for field screening of all environmental soil samples for duration of site works	Rate Only	nr		

Section F sub-total	£ -
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COST ESTIMATE

Project:	Cloddach Bridge, Elgin	Quote By:	0
Client:	Moray Council	Date:	0
Reference:	140163		
Scope:	Ground Investigation Works		

Item	Description	No.	Unit	Rate	Amount
G	Instrumentation and Monitoring				
G2	Standpipe (slotted)	20	m		£ -
G4	Standpipe (plain)	2	m		£ -
G5	Protective cover (flush)	2	nr		£ -
G6	Protective cover (raised)	Rate Only	nr		
G8	Reading of water level in standpipe, or standpipe piezometer during fieldwork period	2	nr		£ -
G10	Gas valve	2	nr		£ -

Section G sub-total	£ -
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 Tel: 01382 453300 Fax: 0844 381 4412

COST ESTIMATE

Project:	Cloddach Bridge, Elgin	Quote By:	0
Client:	Moray Council	Date:	0
Reference:	140163		
Scope:	Ground Investigation Works		

Item	Description	No.	Unit	Rate	Amount
H	GEOTECHNICAL LABORATORY TESTING				
H1.1	Moisture Content	6	nr		£ -
H1.2	Liquid Limit, Plastic Limit, Plasticity Index - 4 point	Rate Only	nr		
H1.3	Liquid Limit, Plastic Limit, Plasticity Index - 1 point	6	nr		£ -
H1.5	Density - linear measurement	Rate Only	nr		
H1.8	Particle Density (Gas Jar)	Rate Only	nr		
H1.9	Particle Size Distribution - wet sieving only	6	nr		£ -
H1.10	Particle Size Distribution - dry sieving	Rate Only	nr		
H1.11	Particle Size Distribution - sedimentation by pipette method	6	nr		£ -
H2.1	Organic Matter Content	Rate Only	nr		
H2.2	Mass Loss on Ignition	Rate Only	nr		
H2.3	Sulphate content of soil - acid extractable	Rate Only	nr		
H2.4	Water soluble sulphate content of soil	12	nr		£ -
H2.5	Sulphate content of groundwater	Rate Only	nr		
H2.8	Water soluble chloride content	Rate Only	nr		
H2.12	pH Value	12	nr		£ -
H3.1	Dry Density / moisture content relationship (2.5kg rammer)	Rate Only	nr		
H3.2	Dry Density / moisture content relationship (4.5kg rammer)	4	nr		£ -
H3.3	Dry Density / moisture content relationship (vibrating hammer)	Rate Only	nr		
H3.9	California Bearing Ratio (CBR) - re-compacted	Rate Only	nr		
H4.1	One dimensional consolidation (up to 5 days)	Rate Only	nr		
H4.2	One dimensional consolidation (additional day)	Rate Only	nr		
H6.2	Shear strength by hand vane	Rate Only	nr		
H6.14	Quick Undrained Tri-axial - Single	Rate Only	nr		
H6.15	Quick Undrained Tri-axial - Multi	Rate Only	nr		
H6.17	Quick Undrained - Set of 3 x 38mm	Rate Only	nr		
H6.18	Remoulding charge for preparation of tri-axial tests from disturbed samples	Rate Only	nr		
H6.8	60mm Shear Box Test - 3 stages	6	nr		£ -
H6.9	100mm Shear Box Test - 3 stages	Rate Only	nr		
H6.10	300mm Shear Box Test - 3 stages	Rate Only	nr		
H6.13	Undrained Tri-axial without pore water pressure measurement (multistage)	Rate Only	nr		
H3.6	Moisture Condition Value (MCV)	Rate Only	nr		
H3.7	Moisture Condition Value (MCV) / Moisture Content Relationship	Rate Only	nr		
H8.1	Natural water content of rock sample	Rate Only	nr		
H8.2	Density of rock sample by linear measurement	Rate Only	nr		

Cost Estimate Tender

H8.21	Determination of Point Load strength (PLT) of rock specimen - 3no determinations	24	nr		£	-
H8.14	Uniaxial Compressive Strength (UCS) of rock specimen	12	nr		£	-

Section H sub-total	£	-
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(carried to summary)

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COST ESTIMATE

Project:	Cloddach Bridge, Elgin	Quote By:	0
Client:	Moray Council	Date:	0
Reference:	140163		
Scope:	Ground Investigation Works		

Item	Description	No.	Unit	Rate	Amount
I	GEOCHEMICAL LABORATORY TESTING				
	Chemical Testing For Contaminated Ground				
I1	Arsenic - total	Rate Only	nr		
I2	Barium	Rate Only	nr		
I3	Beryllium	Rate Only	nr		
I4	Cadmium - total	Rate Only	nr		
I5	Chromium - total	Rate Only	nr		
I5B	Hexavelant Chromium - total	Rate Only	nr		
I6	Lead - total	Rate Only	nr		
I7	Mercury - total	Rate Only	nr		
I8	Selenium - total	Rate Only	nr		
I9	Boron - water soluble	Rate Only	nr		
I10	Copper - total	Rate Only	nr		
I11	Nickel - total	Rate Only	nr		
I12	Vanadium	Rate Only	nr		
I13	Zinc - total	Rate Only	nr		
I14	Cyanide - complex	Rate Only	nr		
I15	Cyanide - free	Rate Only	nr		
I16	Cyanide - total	Rate Only	nr		
I17	Phenols - total	Rate Only	nr		
I18	Nitrate	Rate Only	nr		
I19	Sulphate - water soluble, 2:1 extract	Rate Only	nr		
I20	Sulphide	Rate Only	nr		
I21	Sulphur	Rate Only	nr		
I22	Chloride	Rate Only	nr		
I23	pH Value	Rate Only	nr		
I24	Total Petroleum Hydrocarbons (screen)	Rate Only	nr		
I25	Total Petroleum Hydrocarbons (CWG suite)	Rate Only	nr		
I26	BTEX (including MTBE)	Rate Only	nr		
I27	PCB ICES 7	Rate Only	nr		
I27B	PCB WHO 12	Rate Only	nr		
I28	Speciated VOC`s	Rate Only	nr		
I29	Speciated SVOC`s	Rate Only	nr		
I30	Poly Aromatic Hydrocarbons (USEPA 16 Speciation)	Rate Only	nr		
I31	Diesel Range Organics (DRO)	Rate Only	nr		
I32	Gasoline Range Organics (GRO)	Rate Only	nr		
I33	Asbestos Screen (identification)	Rate Only	nr		
I33B	Asbestos Quantification	Rate Only	nr		
I34	Thiocyanate	Rate Only	nr		
I35	Organolead	Rate Only	nr		
I35B	Organochlorides	Rate Only	nr		
I35C	Metal Carboxylates	Rate Only	nr		

Cost Estimate Tender

I35D	Pytheroids	Rate Only	nr		
I36	Organotin	Rate Only	nr		
I37	TOC	Rate Only	nr		
I38	FOC	Rate Only	nr		
I39	Organic Matter Content	Rate Only	nr		
I40	UKWIR full expanded suite	Rate Only	nr		
I41	Fluorocarbons	Rate Only	nr		
Water Samples					
I39	Arsenic - total	Rate Only	nr		
I40	Barium	Rate Only	nr		
I41	Beryllium	Rate Only	nr		
I42	Cadmium - total	Rate Only	nr		
I43	Chromium - total	Rate Only	nr		
I44	Lead - total	Rate Only	nr		
I45	Mercury - total	Rate Only	nr		
I46	Selenium - total	Rate Only	nr		
I47	Nickel - total	Rate Only	nr		
I48	Vanadium	Rate Only	nr		
I49	Zinc - total	Rate Only	nr		
I50	Cyanide - complex	Rate Only	nr		
I51	Cyanide - free	Rate Only	nr		
I52	Cyanide - total	Rate Only	nr		
I53	Ammonia	Rate Only	nr		
I54	Biochemical Oxygen Demand	Rate Only	nr		
I55	Thiocyanate	Rate Only	nr		
I56	Redox potential	Rate Only	nr		
I57	Dissolved Oxygen	Rate Only	nr		
I58	Phenols - total	Rate Only	nr		
I59	Sulphate	Rate Only	nr		
I60	Sulphide	Rate Only	nr		
I61	Total TPH	Rate Only	nr		
I62	TPH (speciated aliphatic/aromatic)	Rate Only	nr		
I63	Diesel Range Organics (DRO)	Rate Only	nr		
I64	Gasoline Range Organics (GRO)	Rate Only	nr		
I65	pH Value	Rate Only	nr		
I66	Poly Aromatic Hydrocarbons (USEPA 16 speciation)	Rate Only	nr		
I67	BTEX	Rate Only	nr		
I68	PCB ICES 7	Rate Only	nr		
I68B	PCB WHO 12	Rate Only	nr		
I69	Total Hardness	Rate Only	nr		
I70	Total Organic Carbon	Rate Only	nr		
I71	Total Dissolved Solids (TDS)	Rate Only	nr		
I72	SVOC` s	Rate Only	nr		
I73	VOC` s	Rate Only	nr		
I74	PCB	Rate Only	nr		
I75	Dioxins and Furans	Rate Only	nr		
I76	Organolead	Rate Only	nr		
I77	Organotin	Rate Only	nr		
I78	Fluorocarbons	Rate Only	nr		
Leachability Testing					
I78	Preparation of each leachate sample	Rate Only	nr		
I79	Arsenic	Rate Only	nr		
I80	Cadmium	Rate Only	nr		
I81	Chromium	Rate Only	nr		
I82	Lead	Rate Only	nr		
I83	Mercury	Rate Only	nr		
I84	Selenium	Rate Only	nr		
I85	Copper	Rate Only	nr		
I86	Nickel	Rate Only	nr		

Cost Estimate Tender

I87	Zinc	Rate Only	nr		
I88	TPH	Rate Only	nr		
I89	TPH (CWG Suite)	Rate Only	nr		
I90	Cyanide - complex	Rate Only	nr		
I91	Cyanide - free	Rate Only	nr		
I92	Cyanide - total	Rate Only	nr		
I93	PCB ICES 7	Rate Only	nr		
I93A	PCB WHO 12	Rate Only	nr		
I94	Phenols	Rate Only	nr		
I95	Speciated Aromatic Hydrocarbons (USEPA 16)	Rate Only	nr		

Section I sub-total	£	-
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(carried to summary)

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COST ESTIMATE

Project:	Cloddach Bridge, Elgin	Quote By:	0
Client:	Moray Council	Date:	0
Reference:	140163		
Scope:	Ground Investigation Works		

Item	Description	No.	Unit	Rate	Amount
J	Ground Gas and Vapour Monitoring				
J1	Undertake gas and vapour visit to monitor 2 no. monitoring wells (BH01 - BH04) to steady state (minimum time period 10 minutes per borehole) in line with CIRIA C665 Guidance.	Rate Only	nr		

Section J sub-total	£	-
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COST ESTIMATE

Project:	Cloddach Bridge, Elgin	Quote By:	0
Client:	Moray Council	Date:	0
Reference:	140163		
Scope:	Ground Investigation Works		

Item	Description	No.	Unit	Rate	Amount
K	Water Monitoring				
K1	Undertake water probing with oil water interceptor probe and record level(s) at 2 no. monitoring wells (BH01 - BH04)	Rate Only	nr		
K2	Develop 2 no. monitoring wells using down the hole purge pump and collect purge water (purge min 3x well volume)	Rate Only	nr		
K3	Obtain representative water samples from 2 no. wells using a peristaltic pump and flow through cell at steady state	Rate Only	nr		
K4	Obtain representative free product samples using a peristaltic pump (if present) from 2 no. monitoring wells	Rate Only	nr		
K5	Disposal of purge water	Rate Only	sum		

Section J sub-total	£ -
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COST ESTIMATE

Project:	Cloddach Bridge, Elgin	Quote By:	0
Client:	Moray Council	Date:	0
Reference:	140163		
Scope:	Ground Investigation Works		

<u>SECTION</u>	<u>SUMMARY</u>	<u>AMOUNT</u>
A	GENERAL ITEMS	£ -
B	HYDRAULIC PERCUSSIVE BORING	£ -
C	ROTARY BORING	£ -
D	PITS AND TRENCHES	£ -
E	SAMPLING	£ -
F	IN-SITU TESTING	£ -
G	INSTRUMENTATION AND MONITORING	£ -
H	GEOTECHNICAL LABORATORY TESTING	£ -
I	GEOCHEMICAL LABORATORY TESTING	£ -
J	GROUND GAS AND VAPOUR MONITORING TO CIRIA C665	£ -
K	WATER MONITORING	£ -

<u>TOTAL ESTIMATE</u>	
£	-

Appendix 2

Laboratory Limits of Detection (Soils, Leachate and Water)

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	WAF Job Number : 07-38881				
	Matrix : Soil				
	Sample Reference	Method No	Units	LOD	Sample 1
	Sample Depth (m)				
	Date Sampled				
	Date Scheduled				
	Laboratory Reference No				
	Analysis				
METALS	METALS				
METALS	Aluminium	069S	mg/kg	10	
METALS	Antimony	069S TM	mg/kg	5	
METALS	Arsenic	069S TM	mg/kg	3	
METALS	Barium	069S TM	mg/kg	10	
METALS	Beryllium	069S TM	mg/kg	0.5	
METALS	Boron (W/S)	016S TM	mg/kg	0.5	
METALS	Cadmium	069S TM	mg/kg	0.5	
METALS	Calcium	069S	mg/kg	20	
METALS	Chromium	069S TM	mg/kg	10	
METALS	Chromium (Hexavalent)	007	mg/kg	5	
METALS	Cobalt	069S TM	mg/kg	2	
METALS	Copper	069S TM	mg/kg	5	
METALS	Iron	069S	mg/kg	200	
METALS	Lead	069S TM	mg/kg	10	
METALS	Lithium	069S	mg/kg	0.5	
METALS	Magnesium	069S TM	mg/kg	10	
METALS	Manganese	069S TM	mg/kg	20	
METALS	Mercury	069S TM	mg/kg	0.6	
METALS	Molybdenum	069S TM	mg/kg	6	
METALS	Nickel	069S TM	mg/kg	4	
METALS	Phosphorus	METS	mg/kg	2	
METALS	Potassium	069S	mg/kg	20	
METALS	Selenium	069S TM	mg/kg	2.5	
METALS	Sodium	069S	mg/kg	50	
METALS	Thallium	069S	mg/kg	2	
METALS	Titanium	069S	mg/kg	5	
METALS	Vanadium	069S TM	mg/kg	3	
METALS	Zinc	069S TM	mg/kg	10	
Inorganics	Inorganics				
Inorganics	Free Cyanide	061S TM	mg/kg	1	
Inorganics	Total Cyanide	061S TM	mg/kg	1	
Inorganics	Thiocyanate as SCN	061S TM	mg/kg	5	
Inorganics	pH	084S TM	pH Units	1	
Inorganics	Organic Matter (BS1377)	026 ^I	%	0.1	
Inorganics	Organic Carbon	092 TM	%	0.1	
Inorganics	Carbonate Content as CaCO3	023	%	1	
Inorganics	Sulphate (Total Acid Soluble) as SO4	025a TM	mg/kg	200	
Inorganics	Acid Soluble Sulphide	008 TM	mg/kg	10	
Inorganics	W/S Sulphate as SO4	073S TM	g/l	0.02	
STANDARD	Asbestos (Screen)	001a			
Inorganics	W/S Chloride	073S TM	mg/kg	10	
Inorganics	W/S Bromide	073S	mg/kg	1	
Inorganics	W/S Fluoride	073S	mg/kg	1	

Inorganics	W/S Nitrite as N	073S	mg/kg	1	
Inorganics	W/S Nitrate as N	073S ^I	mg/kg	2.2	
Inorganics	Total Nitrogen	BS3882	%	0.1	
Inorganics	Kjeldahl Nitrogen	BS3882	%	0.1	
Inorganics	Exchangeable Ammonium as N	018 ^{IM}	mg/kg	40	
Inorganics	Extractable Phosphate	MAFF/ADAS	mg/l	10	
Inorganics	Elemental Sulphur	032 ^{IM}	mg/kg	100	
Inorganics	Loss on Ignition (450°C)	019 ^{IM}	%	1	
STANDARD	Moisture Content (Wet Weight)		%	0.1	
STANDARD	Density	DEN	g/cm3		
CWG SUITE	** CWG SUITE **				
CWG SUITE	Aliphatic C5-C6	CWGS	mg/kg	0.01	
CWG SUITE	Aliphatic >C6-C8	CWGS	mg/kg	0.01	
CWG SUITE	Aliphatic >C8-C10	CWGS	mg/kg	0.01	
CWG SUITE	Aliphatic >C10-C12	CWGS	mg/kg	0.01	
CWG SUITE	Aliphatic >C12-C16	CWGS ^I	mg/kg	5	
CWG SUITE	Aliphatic >C16-C21	CWGS ^I	mg/kg	5	
CWG SUITE	Aliphatic >C21-C35	CWGS ^I	mg/kg	5	
CWG SUITE	Total Aliphatics (C5-C35)	CWGS	mg/kg	5	
CWG SUITE	Aromatic C6-C7	CWGS	mg/kg	0.01	
CWG SUITE	Aromatic >C7-C8	CWGS	mg/kg	0.01	
CWG SUITE	Aromatic >C8-C10	CWGS	mg/kg	0.01	
CWG SUITE	Aromatic >C10-C12	CWGS	mg/kg	0.01	
CWG SUITE	Aromatic >C12-C16	CWGS ^I	mg/kg	5	
CWG SUITE	Aromatic >C16-C21	CWGS ^I	mg/kg	5	
CWG SUITE	Aromatic >C21-C35	CWGS ^I	mg/kg	5	
CWG SUITE	Total Aromatics (C5-C35)	CWGS	mg/kg	5	
CWG SUITE	Volatile Hydrocarbons (C5-C12)	CWGS	mg/kg	0.01	
CWG SUITE	Extractable Hydrocarbons (C12-C35)	CWGS	mg/kg	5	
CWG SUITE	Total Hydrocarbons (C5-C35)	CWGS	mg/kg	5	
CWG SUITE	MTBE	CWGS ^{IM}	mg/kg	0.01	
CWG SUITE	Benzene	CWGS ^{IM}	mg/kg	0.01	
CWG SUITE	Toluene	CWGS ^{IM}	mg/kg	0.01	
CWG SUITE	Ethylbenzene	CWGS ^{IM}	mg/kg	0.01	
CWG SUITE	m,p-Xylenes	CWGS ^{IM}	mg/kg	0.01	
CWG SUITE	o-Xylene	CWGS ^{IM}	mg/kg	0.01	
CWG SUITE	1,3,5-Trimethylbenzene	CWGS ^{IM}	mg/kg	0.01	
CWG SUITE	1,2,4-Trimethylbenzene	CWGS ^{IM}	mg/kg	0.01	
VPH/BTEX SUITE	** VPH/BTEX SUITE **				
VPH/BTEX SUITE	MTBE	068S ^{IM}	mg/kg	0.01	
VPH/BTEX SUITE	Benzene	068S ^{IM}	mg/kg	0.01	
VPH/BTEX SUITE	Toluene	068S ^{IM}	mg/kg	0.01	
VPH/BTEX SUITE	Ethylbenzene	068S ^{IM}	mg/kg	0.01	
VPH/BTEX SUITE	m,p-Xylenes	068S ^{IM}	mg/kg	0.01	
VPH/BTEX SUITE	o-Xylene	068S ^{IM}	mg/kg	0.01	
VPH/BTEX SUITE	1,3,5-Trimethylbenzene	068S ^{IM}	mg/kg	0.01	
VPH/BTEX SUITE	1,2,4-Trimethylbenzene	068S ^{IM}	mg/kg	0.01	
VPH/BTEX SUITE	VPH Compounds (C5-C10)	068S ^{IM}	mg/kg	0.01	
VPH/BTEX SUITE	VPH Compounds (C10-C12)	068S	mg/kg	0.01	
VPH/BTEX SUITE	VPH Compounds (C5-C12)	068S	mg/kg	0.01	
PAH SUITE	** PAH SUITE **				
PAH SUITE	Naphthalene	022S ^{IM}	mg/kg	0.1	
PAH SUITE	Acenaphthylene	022S ^{IM}	mg/kg	0.1	
PAH SUITE	Acenaphthene	022S ^{IM}	mg/kg	0.1	
PAH SUITE	Fluorene	022S ^{IM}	mg/kg	0.1	

PAH SUITE	Phenanthrene	022S TM	mg/kg	0.1	
PAH SUITE	Anthracene	022S TM	mg/kg	0.1	
PAH SUITE	Fluoranthene	022S TM	mg/kg	0.1	
PAH SUITE	Pyrene	022S TM	mg/kg	0.1	
PAH SUITE	Benzo(a)anthracene	022S TM	mg/kg	0.1	
PAH SUITE	Chrysene	022S TM	mg/kg	0.1	
PAH SUITE	Benzo(b)fluoranthene	022S TM	mg/kg	0.1	
PAH SUITE	Benzo(k)fluoranthene	022S TM	mg/kg	0.1	
PAH SUITE	Benzo(a)pyrene	022S TM	mg/kg	0.1	
PAH SUITE	Indeno(1,2,3-cd)pyrene	022S TM	mg/kg	0.1	
PAH SUITE	Dibenzo(a,h)anthracene	022S TM	mg/kg	0.1	
PAH SUITE	Benzo(g,h,i)perylene	022S TM	mg/kg	0.1	
PAH SUITE	PAH (Sum of EPA 16)	022S ^I	mg/kg	1.6	
PCB SUITE	** PCB SUITE **				
PCB SUITE	PCB Congener 28	039S TM	mg/kg	0.002	
PCB SUITE	PCB Congener 52	039S TM	mg/kg	0.002	
PCB SUITE	PCB Congener 101	039S TM	mg/kg	0.002	
PCB SUITE	PCB Congener 118	039S TM	mg/kg	0.002	
PCB SUITE	PCB Congener 138	039S TM	mg/kg	0.002	
PCB SUITE	PCB Congener 153	039S TM	mg/kg	0.002	
PCB SUITE	PCB Congener 180	039S TM	mg/kg	0.002	
PCB SUITE	PCB's (Sum of ICES Congeners)	039S ^I	mg/kg	0.002	
PHENOLS SUITE	** PHENOLS SUITE **				
PHENOLS SUITE	Phenol	020S TM	mg/kg	0.1	
PHENOLS SUITE	Phenol	020S TM	mg/kg	0.02	
PHENOLS SUITE	Cresols	020S TM	mg/kg	0.02	
PHENOLS SUITE	Xylenols & Ethyl Phenols	020S TM	mg/kg	0.02	
PHENOLS SUITE	Propyl or Trimethyl Phenols	020S TM	mg/kg	0.02	
PHENOLS SUITE	Butyl Phenols	020S TM	mg/kg	0.02	
PHENOLS SUITE	Phenols (Speciated Groups Sum)	020S ^I	mg/kg	0.02	
PHENOLS SUITE	Total Monohydric Phenols	020S ^I	mg/kg	1	
SVOC SUITE	** SVOC SUITE **				
SVOC SUITE	Naphthalene	053S TM	ug/kg	150	
SVOC SUITE	2-Chloronaphthalene	053S ^I	ug/kg	150	
SVOC SUITE	Acenaphthylene	053S ^I	ug/kg	150	
SVOC SUITE	Acenaphthene	053S ^I	ug/kg	150	
SVOC SUITE	Fluorene	053S ^I	ug/kg	150	
SVOC SUITE	Phenanthrene	053S ^I	ug/kg	150	
SVOC SUITE	Anthracene	053S ^I	ug/kg	150	
SVOC SUITE	Fluoranthene	053S ^I	ug/kg	150	
SVOC SUITE	Pyrene	053S TM	ug/kg	150	
SVOC SUITE	Benz(a)anthracene	053S ^I	ug/kg	150	
SVOC SUITE	Chrysene	053S ^I	ug/kg	150	
SVOC SUITE	Benzo(b)fluoranthene	053S ^I	ug/kg	150	
SVOC SUITE	Benzo(k)fluoranthene	053S ^I	ug/kg	150	
SVOC SUITE	Benzo(a)pyrene	053S ^I	ug/kg	150	
SVOC SUITE	Dibenzo(a,h)anthracene	053S TM	ug/kg	150	
SVOC SUITE	Indeno(1,2,3-cd)pyrene	053S ^I	ug/kg	150	
SVOC SUITE	Benzo(g,h,i)perylene	053S ^I	ug/kg	150	
SVOC SUITE	Phenol	053S ^I	ug/kg	150	
SVOC SUITE	2-Chlorophenol	053S TM	ug/kg	150	
SVOC SUITE	2-Methylphenol	053S ^I	ug/kg	200	
SVOC SUITE	4-Methylphenol	053S TM	ug/kg	200	
SVOC SUITE	2-Nitrophenol	053S ^I	ug/kg	300	
SVOC SUITE	2,4-Dimethylphenol	053S TM	ug/kg	250	

SVOC SUITE	2,4-Dichlorophenol	053S TM	ug/kg	200	
SVOC SUITE	2,6-Dichlorophenol	053S TM	ug/kg	200	
SVOC SUITE	4-Chloro-3-methyl phenol	053S TM	ug/kg	150	
SVOC SUITE	2,4,6-Trichlorophenol	053S ^I	ug/kg	150	
SVOC SUITE	2,4,5-Trichlorophenol	053S TM	ug/kg	200	
SVOC SUITE	4-Nitrophenol	053S	ug/kg	300	
SVOC SUITE	2,3,4,6-Tetrachlorophenol	053S	ug/kg	250	
SVOC SUITE	Pentachlorophenol	053S	ug/kg	250	
SVOC SUITE	Dimethyl Phthalate	053S TM	ug/kg	200	
SVOC SUITE	Diethyl Phthalate	053S ^I	ug/kg	200	
SVOC SUITE	Di-n-butyl phthalate	053S ^I	ug/kg	150	
SVOC SUITE	Butyl benzyl phthalate	053S TM	ug/kg	150	
SVOC SUITE	Bis(2-chloroethyl)ether	053S TM	ug/kg	150	
SVOC SUITE	Bis(2-chloroisopropyl)ether	053S ^I	ug/kg	200	
SVOC SUITE	4-Chlorophenyl phenyl ether	053S ^I	ug/kg	150	
SVOC SUITE	Bromo phenyl phenyl ether	053S TM	ug/kg	200	
SVOC SUITE	1,3-Dichlorobenzene	053S TM	ug/kg	200	
SVOC SUITE	1,2-Dichlorobenzene	053S TM	ug/kg	150	
SVOC SUITE	1,4-Dichlorobenzene	053S ^I	ug/kg	200	
SVOC SUITE	Nitrobenzene	053S TM	ug/kg	150	
SVOC SUITE	1,2,4-Trichlorobenzene	053S TM	ug/kg	200	
SVOC SUITE	2,6-Dinitrotoluene	053S	ug/kg	200	
SVOC SUITE	2,4-Dinitrotoluene	053S	ug/kg	200	
SVOC SUITE	Azobenzene	053S ^I	ug/kg	200	
SVOC SUITE	Hexachlorobenzene	053S TM	ug/kg	200	
SVOC SUITE	Hexachloroethane	053S ^I	ug/kg	150	
SVOC SUITE	n-Nitro-n-propyl-1-propanamine	053S ^I	ug/kg	200	
SVOC SUITE	Isophorone	053S TM	ug/kg	200	
SVOC SUITE	Bis(2-chloroethoxy)methane	053S ^I	ug/kg	150	
SVOC SUITE	Hexachlorobutadiene	053S TM	ug/kg	150	
SVOC SUITE	Anthraquinone	053S	ug/kg	150	
SVOC SUITE	Aniline	053S	ug/kg	150	
SVOC SUITE	Di-n-octyl phthalate	053S	ug/kg	150	
SVOC SUITE	Hexachlorocyclopentadiene	053S	ug/kg	300	
SVOC SUITE	2-Methylnaphthalene	053S ^I	ug/kg	150	
SVOC SUITE	2-nitroaniline	053S ^I	ug/kg	250	
SVOC SUITE	3-nitroaniline	053S	ug/kg	200	
SVOC SUITE	4-Chloroaniline	053S	ug/kg	200	
SVOC SUITE	4-nitroaniline	053S	ug/kg	250	
SVOC SUITE	Bis (2-ethylhexyl) phthalate	053S	ug/kg	300	
SVOC SUITE	Carbazole	053S ^I	ug/kg	100	
SVOC SUITE	Dibenzofuran	053S TM	ug/kg	150	
SVOC SUITE	Biphenyl	053S	ug/kg	150	
VOC SUITE	** VOC SUITE **				
VOC SUITE	Dichlorodifluoromethane	071S TM	ug/kg	25	
VOC SUITE	Chloromethane	071S TM	ug/kg	25	
VOC SUITE	Vinyl Chloride	071S	ug/kg	25	
VOC SUITE	Bromomethane	071S ^I	ug/kg	25	
VOC SUITE	Chloroethane	071S TM	ug/kg	25	
VOC SUITE	Trichlorofluoromethane	071S TM	ug/kg	25	
VOC SUITE	1,1-Dichloroethene	071S	ug/kg	25	
VOC SUITE	112-Trichloro-122-Trifluoroethane	071S ^I	ug/kg	25	
VOC SUITE	Dichloromethane	071S	ug/kg	50	
VOC SUITE	Carbon Disulfide	071S TM	ug/kg	25	
VOC SUITE	Trans-1,2 Dichloroethene	071S	ug/kg	25	

VOC SUITE	MTBE	071S	ug/kg	25	
VOC SUITE	1,1 -Dichloroethane	071S	ug/kg	25	
VOC SUITE	Cis-1,2 Dichloroethene	071S TM	ug/kg	25	
VOC SUITE	Bromochloromethane	071S TM	ug/kg	25	
VOC SUITE	Chloroform	071S TM	ug/kg	25	
VOC SUITE	2,2-Dichloropropane	071S TM	ug/kg	25	
VOC SUITE	1,1,1-Trichloroethane	071S	ug/kg	25	
VOC SUITE	1,2-Dichloroethane	071S	ug/kg	25	
VOC SUITE	1,1-Dichloropropene	071S TM	ug/kg	25	
VOC SUITE	Benzene	071S	ug/kg	25	
VOC SUITE	Carbon Tetrachloride	071S TM	ug/kg	25	
VOC SUITE	Dibromomethane	071S TM	ug/kg	25	
VOC SUITE	1,2-Dichloropropane	071S TM	ug/kg	25	
VOC SUITE	Trichloroethene	071S TM	ug/kg	25	
VOC SUITE	Bromodichloromethane	071S TM	ug/kg	25	
VOC SUITE	Cis-1,3 Dichloropropene	071S TM	ug/kg	25	
VOC SUITE	Trans-1,3 Dichloropropene	071S TM	ug/kg	25	
VOC SUITE	1,1,2-Trichloroethane	071S TM	ug/kg	25	
VOC SUITE	Toluene	071S	ug/kg	25	
VOC SUITE	1,3 -Dichloropropane	071S TM	ug/kg	25	
VOC SUITE	Dibromochloromethane	071S TM	ug/kg	25	
VOC SUITE	1,2-Dibromoethane	071S TM	ug/kg	25	
VOC SUITE	Tetrachloroethene	071S	ug/kg	25	
VOC SUITE	1,1,1,2-Tetrachloroethane	071S	ug/kg	25	
VOC SUITE	Chlorobenzene	071S TM	ug/kg	25	
VOC SUITE	Ethyl Benzene	071S	ug/kg	25	
VOC SUITE	m,p-Xylenes	071S	ug/kg	50	
VOC SUITE	Bromoform	071S TM	ug/kg	25	
VOC SUITE	Styrene	071S TM	ug/kg	25	
VOC SUITE	o-Xylene	071S	ug/kg	25	
VOC SUITE	1,1,2,2 Tetrachloroethane	071S	ug/kg	25	
VOC SUITE	1,2,3-Trichloropropane	071S TM	ug/kg	25	
VOC SUITE	Isopropylbenzene	071S TM	ug/kg	25	
VOC SUITE	Bromobenzene	071S TM	ug/kg	25	
VOC SUITE	n-propylbenzene	071S TM	ug/kg	25	
VOC SUITE	2-Chlorotoluene	071S TM	ug/kg	25	
VOC SUITE	4-Chlorotoluene	071S TM	ug/kg	25	
VOC SUITE	1,3,5 Trimethylbenzene	071S	ug/kg	25	
VOC SUITE	tert-butylbenzene	071S TM	ug/kg	25	
VOC SUITE	1,2,4 Trimethylbenzene	071S	ug/kg	25	
VOC SUITE	sec-butylbenzene	071S TM	ug/kg	25	
VOC SUITE	1,3 Dichlorobenzene	071S	ug/kg	25	
VOC SUITE	1,4 Dichlorobenzene	071S	ug/kg	25	
VOC SUITE	4-Isopropyltoluene	071S TM	ug/kg	25	
VOC SUITE	1,2 Dichlorobenzene	071S	ug/kg	25	
VOC SUITE	n-butylbenzene	071S	ug/kg	25	
VOC SUITE	1,2,4-Trichlorobenzene	071S	ug/kg	25	
VOC SUITE	Tetra Methyl Lead	071S	ug/kg	20	
VOC SUITE	Tetra Ethyl Lead	071S	ug/kg	20	
VOC SUITE	1,2-Dibromo-3-Chloropropane	071S	ug/kg	25	
VOC SUITE	Hexachlorobutadiene	071S	ug/kg	50	
VOC SUITE	Acetone	071S	mg/kg	0.2	
VOC SUITE	1,2,3-Trichlorobenzene	071S	ug/kg	25	
ORGANOTIN SUITE	** Organotin Suite **				
ORGANOTIN SUITE	DiButylTin	083 TM	mg/kg	0.1	

ORGANOTIN SUITE	TriButylTin	083 TM	mg/kg	0.1	
ORGANOTIN SUITE	TetraButylTin	083 TM	mg/kg	0.1	
ORGANOTIN SUITE	TriPhenylTin	083 TM	mg/kg	0.1	
OCL SUITE	** Organochlorine Pesticide Suite **				
OCL SUITE	Aldrin	076S ^I	mg/kg	0.1	
OCL SUITE	Triadimefon	076S ^I	mg/kg	0.1	
OCL SUITE	Isodrin	076S ^I	mg/kg	0.1	
OCL SUITE	Pendimethalin	076S ^I	mg/kg	0.1	
OCL SUITE	Cis-Heptachlor Epoxide	076S ^I	mg/kg	0.1	
OCL SUITE	gamma-Chlordane (trans)	076S ^I	mg/kg	0.1	
OCL SUITE	o,p-DDE	076S ^I	mg/kg	0.1	
OCL SUITE	alpha-Endosulphan	076S ^I	mg/kg	0.1	
OCL SUITE	alpha-Chlordane (cis)	076S ^I	mg/kg	0.1	
OCL SUITE	p,p-DDE	076S ^I	mg/kg	0.1	
OCL SUITE	Dieldrin	076S ^I	mg/kg	0.1	
OCL SUITE	o,p-TDE	076S ^I	mg/kg	0.1	
OCL SUITE	Endrin	076S ^I	mg/kg	0.1	
OCL SUITE	beta-Endosulphan	076S	mg/kg	0.1	
OCL SUITE	Iprodione	076S	mg/kg	0.1	
OCL SUITE	p,p-TDE	076S ^I	mg/kg	0.1	
OCL SUITE	o,p-DDT	076S ^I	mg/kg	0.1	
OCL SUITE	Propiconazole I	076S	mg/kg	0.1	
OCL SUITE	Endosulphan sulphate	076S ^I	mg/kg	0.1	
OCL SUITE	p,p-DDT	076S ^I	mg/kg	0.1	
OCL SUITE	Propiconazole II	076S	mg/kg	0.1	
OCL SUITE	o,p-Methoxychlor	076S ^I	mg/kg	0.1	
OCL SUITE	Fluroxypyr	076S ^I	mg/kg	0.1	
OCL SUITE	p,p-Methoxychlor	076S ^I	mg/kg	0.1	
OCL SUITE	Permethrin I	076S	mg/kg	0.1	
OCL SUITE	Permethrin II	076S ^I	mg/kg	0.1	
TRIAZINE SUITE	** Triazine Herbicide Suite **				
TRIAZINE SUITE	Atraton	075S	mg/kg	0.1	
TRIAZINE SUITE	Simazine	075S ^I	mg/kg	0.1	
TRIAZINE SUITE	Prometon	075S	mg/kg	0.1	
TRIAZINE SUITE	Atrazine	075S ^I	mg/kg	0.1	
TRIAZINE SUITE	Propazine	075S ^I	mg/kg	0.1	
TRIAZINE SUITE	Terbutylazine	075S ^I	mg/kg	0.1	
TRIAZINE SUITE	Simetryn	075S ^I	mg/kg	0.1	
TRIAZINE SUITE	Ametryn	075S ^I	mg/kg	0.1	
TRIAZINE SUITE	Prometryn	075S ^I	mg/kg	0.1	
TRIAZINE SUITE	Terbutryn	075S ^I	mg/kg	0.1	
OPP SUITE	** Organophosphorus Pesticide Suite **				
OPP SUITE	Dichlorvos	077S ^I	mg/kg	0.1	
OPP SUITE	Mevinphos	077S	mg/kg	0.1	
OPP SUITE	Methacriphos	077S ^I	mg/kg	0.1	
OPP SUITE	Heptenophos	077S ^I	mg/kg	0.1	
OPP SUITE	Tributylphosphate	077S ^I	mg/kg	0.1	
OPP SUITE	Sulfotep	077S ^I	mg/kg	0.1	
OPP SUITE	Phorate	077S ^I	mg/kg	0.1	
OPP SUITE	Dimethoate	077S	mg/kg	0.1	
OPP SUITE	Propetamphos	077S ^I	mg/kg	0.1	
OPP SUITE	Fonofos	077S ^I	mg/kg	0.1	
OPP SUITE	Diazinon	077S ^I	mg/kg	0.1	
OPP SUITE	Phosphamidon I	077S	mg/kg	0.1	
OPP SUITE	Disulfoton	077S ^I	mg/kg	0.1	

OPP SUITE	Phosphamidon II	077S	mg/kg	0.1	
OPP SUITE	Chlorpyrifos-methyl	077S ^I	mg/kg	0.1	
OPP SUITE	Methyl-Parathion	077S ^I	mg/kg	0.1	
OPP SUITE	Fenitrothion	077S	mg/kg	0.1	
OPP SUITE	Pirimiphos-methyl	077S ^I	mg/kg	0.1	
OPP SUITE	Malathion	077S ^I	mg/kg	0.1	
OPP SUITE	Fenthion	077S ^I	mg/kg	0.1	
OPP SUITE	Chlorpyrifos	077S ^I	mg/kg	0.1	
OPP SUITE	Parathion	077S ^I	mg/kg	0.1	
OPP SUITE	Chlorfenvinphos	077S ^I	mg/kg	0.1	
OPP SUITE	Ethion	077S ^I	mg/kg	0.1	
OPP SUITE	Triazophos	077S	mg/kg	0.1	
OPP SUITE	Carbophenothion	077S ^I	mg/kg	0.1	
OPP SUITE	Triphenylphosphate	077S ^I	mg/kg	0.1	
OPP SUITE	Phosmet	077S ^I	mg/kg	0.1	
OPP SUITE	EPN	077S ^I	mg/kg	0.1	
OPP SUITE	Phosalone	077S ^I	mg/kg	0.1	
OPP SUITE	Azinphos-methyl	077S	mg/kg	0.1	
OPP SUITE	Azinphos-ethyl	077S	mg/kg	0.1	
OPP SUITE	Coumaphos	077S ^I	mg/kg	0.1	
CARB & URON SUITE	** Carbamates & Uron Herbicide Suite **				
CARB & URON SUITE	Carbenazim	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Carbetamide	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Bromacil	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Cyanazine	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Methabenzthiazuron	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Carbaryl	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Propham	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Methiocarb	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Monuron	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Pirimicarb	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Isoproturon	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Chlortoluron	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Monolinuron	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Diuron	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Linuron	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Chlorbufam	079S ^I	mg/kg	0.1	
CARB & URON SUITE	Chlorpropham	079S ^I	mg/kg	0.1	
ACID HERB SUITE	** Phenoxy Acid Herbicide Suite **				
ACID HERB SUITE	Clopyralid	082S ^I	mg/kg	0.15	
ACID HERB SUITE	Picloram	082S ^I	mg/kg	0.1	
ACID HERB SUITE	2,3,6-TBA	082S ^I	mg/kg	0.1	
ACID HERB SUITE	Dicamba	082S ^I	mg/kg	0.1	
ACID HERB SUITE	Benazolin	082S ^I	mg/kg	0.1	
ACID HERB SUITE	4-CPA	082S ^I	mg/kg	0.1	
ACID HERB SUITE	Bentazone	082S ^I	mg/kg	0.1	
ACID HERB SUITE	2,4-D	082S ^I	mg/kg	0.1	
ACID HERB SUITE	MCPA	082S ^I	mg/kg	0.1	
ACID HERB SUITE	Bromoxynil	082S ^I	mg/kg	0.1	
ACID HERB SUITE	Triclopyr	082S ^I	mg/kg	0.1	
ACID HERB SUITE	2,4,5-T	082S ^I	mg/kg	0.1	
ACID HERB SUITE	Dichloroprop	082S ^I	mg/kg	0.1	
ACID HERB SUITE	Mecoprop	082S ^I	mg/kg	0.1	
ACID HERB SUITE	Ioxynil	082S ^I	mg/kg	0.1	
ACID HERB SUITE	Flamprop	082S ^I	mg/kg	0.1	

ACID HERB SUITE	Fenoprop	082S ^I	mg/kg	0.1	
ACID HERB SUITE	2,4-DB	082S ^I	mg/kg	0.1	
ACID HERB SUITE	MCPB	082S ^I	mg/kg	0.1	
ACID HERB SUITE	Diclofop	082S ^I	mg/kg	0.1	
ACID HERB SUITE	Pentachlorophenol	082S ^I	mg/kg	0.1	
ACID HERB SUITE	Flamprop-Isopropyl	082S ^I	mg/kg	0.15	
PYRETHROID SUITE	** Pyrethroid Suite **				
PYRETHROID SUITE	Permethrin	PEST	mg/kg	0.1	
PYRETHROID SUITE	Cyhalothrin	PEST	mg/kg	0.1	
PYRETHROID SUITE	Cyfluthrin	PEST	mg/kg	0.1	
PYRETHROID SUITE	Cypermethrin	PEST	mg/kg	0.1	
PYRETHROID SUITE	Fenvalerate	PEST	mg/kg	0.1	
PYRETHROID SUITE	Deltamethrin	PEST	mg/kg	0.1	

DRAFT

	WAF Job Number : 07-38881				
	Matrix : Leachate				
	Sample Reference	Method No	Units	LOD	Sample 1
	Sample Depth (m)				
	Date Sampled				
	Date Scheduled				
	Laboratory Reference No				
	Analysis				
Metals	Metals				
Metals	Aluminium	080L ⁻¹	mg/l	0.005	
Metals	Antimony	080L ⁻¹	mg/l	0.001	
Metals	Arsenic (Dissolved)	080L ⁻¹	mg/l	0.005	
Metals	Barium (Dissolved)	080L ⁻¹	mg/l	0.005	
Metals	Beryllium (Dissolved)	080L ⁻¹	mg/l	0.001	
Metals	Boron	080L ⁻¹	mg/l	0.005	
Metals	Cadmium (Dissolved)	080L ⁻¹	mg/l	0.001	
Metals	Calcium	062L ⁻¹	mg/l	0.5	
Metals	Chromium (Dissolved)	080L ⁻¹	mg/l	0.005	
Metals	Chromium (hexavalent)	007	mg/l	0.01	
Metals	Cobalt	080L ⁻¹	mg/l	0.001	
Metals	Copper (Dissolved)	080L ⁻¹	mg/l	0.005	
Metals	Iron	080L ⁻¹	mg/l	0.02	
Metals	Lead (Dissolved)	080L ⁻¹	mg/l	0.005	
Metals	Lithium	016L	mg/l	0.005	
Metals	Magnesium	062L ⁻¹	mg/l	0.1	
Metals	Manganese	080L ⁻¹	mg/l	0.005	
Metals	Mercury (Dissolved)	080L ⁻¹	mg/l	0.00005	
Metals	Molybdenum	080L ⁻¹	mg/l	0.005	
Metals	Nickel (Dissolved)	080L ⁻¹	mg/l	0.005	
Inorganics	Orthophosphate as P	087L ⁻¹	mg/l	0.05	
Metals	Potassium	062L ⁻¹	mg/l	0.5	
Metals	Selenium (Dissolved)	080L ⁻¹	mg/l	0.005	
Metals	Sodium	062L ⁻¹	mg/l	0.5	
Metals	Thallium	080L ⁻¹	mg/l	0.005	
Metals	Titanium	METS	mg/l	0.02	
Metals	Vanadium (Dissolved)	080L ⁻¹	mg/l	0.005	
Metals	Zinc (Dissolved)	080L ⁻¹	mg/l	0.005	
Inorganics	Inorganics				
Inorganics	Free Cyanide	061L ⁻¹	mg/l	0.02	
Inorganics	Total Cyanide	061L ⁻¹	mg/l	0.02	
Inorganics	Thiocyanate as SCN	061L ⁻¹	mg/l	0.15	
Inorganics	Carbonate Alkalinity as CaCO ₃	096L ⁻¹	mg/l	20	
Inorganics	Total Organic Carbon	010L ⁻¹	mg/l	1	
Inorganics	Sulphide	055L ⁻¹	mg/l	0.05	
Inorganics	Sulphate as SO ₄	086L ⁻¹	mg/l	10	
Inorganics	Chloride	086L ⁻¹	mg/l	10	
Inorganics	Bromide	086L ⁻¹	mg/l	0.5	
Inorganics	Fluoride	086L ⁻¹	mg/l	0.1	
Inorganics	Nitrite as N	086L ⁻¹	mg/l	0.03	
Inorganics	Nitrate as NO ₃	086L ⁻¹	mg/l	2.2	
Inorganics	Kjeldahl Nitrogen	BS3882K	mg/l	5	
Inorganics	Ammoniacal Nitrogen as NH ₄	057L ⁻¹	mg/l	0.065	
Inorganics	Ammoniacal Nitrogen as N	057L ⁻¹	mg/l	0.05	

Inorganics	pH			
CWG SUITE	** CWG SUITE **			
CWG SUITE	Aliphatic C5-C6	CWGL	mg/l	0.01
CWG SUITE	Aliphatic >C6-C8	CWGL	mg/l	0.01
CWG SUITE	Aliphatic >C8-C10	CWGL	mg/l	0.01
CWG SUITE	Aliphatic >C10-C12	CWGL	mg/l	0.01
CWG SUITE	Aliphatic >C12-C16	CWGL	mg/l	0.01
CWG SUITE	Aliphatic >C16-C21	CWGL	mg/l	0.01
CWG SUITE	Aliphatic >C21-C35	CWGL	mg/l	0.01
CWG SUITE	Total Aliphatics (C5-C35)	CWGL	mg/l	0.01
CWG SUITE	Aromatic C6-C7	CWGL	mg/l	0.01
CWG SUITE	Aromatic >C7-C8	CWGL	mg/l	0.01
CWG SUITE	Aromatic >C8-C10	CWGL	mg/l	0.01
CWG SUITE	Aromatic >C10-C12	CWGL	mg/l	0.01
CWG SUITE	Aromatic >C12-C16	CWGL	mg/l	0.01
CWG SUITE	Aromatic >C16-C21	CWGL	mg/l	0.01
CWG SUITE	Aromatic >C21-C35	CWGL	mg/l	0.01
CWG SUITE	Total Aromatics (C5-C35)	CWGL	mg/l	0.01
CWG SUITE	Volatile Hydrocarbons (C5-C12)	CWGL	mg/l	0.01
CWG SUITE	Extractable Hydrocarbons (C12-C35)	CWGL	mg/l	0.01
CWG SUITE	Total Hydrocarbons (C5-C35)	CWGL	mg/l	0.01
CWG SUITE	MTBE	CWGL	mg/l	0.01
CWG SUITE	Benzene	CWGL	mg/l	0.01
CWG SUITE	Toluene	CWGL	mg/l	0.01
CWG SUITE	Ethylbenzene	CWGL	mg/l	0.01
CWG SUITE	m,p-Xylenes	CWGL	mg/l	0.01
CWG SUITE	o-Xylene	CWGL	mg/l	0.01
CWG SUITE	1,3,5-Trimethylbenzene	CWGL	mg/l	0.01
CWG SUITE	1,2,4-Trimethylbenzene	CWGL	mg/l	0.01
VPH/BTEX SUITE	** VPH/BTEX SUITE **			
VPH/BTEX SUITE	MTBE	068L	mg/l	0.005
VPH/BTEX SUITE	Benzene	068L	mg/l	0.005
VPH/BTEX SUITE	Toluene	068L	mg/l	0.005
VPH/BTEX SUITE	Ethylbenzene	068L	mg/l	0.005
VPH/BTEX SUITE	m,p-Xylenes	068L	mg/l	0.005
VPH/BTEX SUITE	o-Xylene	068L	mg/l	0.005
VPH/BTEX SUITE	1,3,5-Trimethylbenzene	068L	mg/l	0.005
VPH/BTEX SUITE	1,2,4-Trimethylbenzene	068L	mg/l	0.005
VPH/BTEX SUITE	VPH Compounds (C5-C10)	068L	mg/l	0.01
VPH/BTEX SUITE	VPH Compounds (C10-C12)	068L	mg/l	0.01
VPH/BTEX SUITE	VPH Compounds (C5-C12)	068L	mg/l	0.01
PAH SUITE	** PAH SUITE **			
PAH SUITE	Naphthalene	022L [±]	mg/l	0.0001
PAH SUITE	Acenaphthylene	022L [±]	mg/l	0.0001
PAH SUITE	Acenaphthene	022L [±]	mg/l	0.0001
PAH SUITE	Fluorene	022L [±]	mg/l	0.0001
PAH SUITE	Phenanthrene	022L [±]	mg/l	0.0001
PAH SUITE	Anthracene	022L [±]	mg/l	0.0001
PAH SUITE	Fluoranthene	022L [±]	mg/l	0.0001
PAH SUITE	Pyrene	022L [±]	mg/l	0.0001
PAH SUITE	Benzo(a)anthracene	022L [±]	mg/l	0.0001
PAH SUITE	Chrysene	022L [±]	mg/l	0.0001
PAH SUITE	Benzo(b)fluoranthene	022L [±]	mg/l	0.0001
PAH SUITE	Benzo(k)fluoranthene	022L [±]	mg/l	0.0001
PAH SUITE	Benzo(a)pyrene	022L [±]	mg/l	0.0001
PAH SUITE	Indeno(1,2,3-cd)pyrene	022L [±]	mg/l	0.0001

PAH SUITE	Dibenzo(a,h)anthracene	022L [±]	mg/l	0.0001
PAH SUITE	Benzo(g,h,i)perylene	022L [±]	mg/l	0.0001
PAH SUITE	PAH (Sum of EPA 16)	022L [±]	mg/l	0.0001
PHENOLS SUITE	** PHENOLS SUITE **			
PHENOLS SUITE	Phenol	020L [±]	mg/l	0.01
PHENOLS SUITE	Phenol	020L [±]	mg/l	0.0005
PHENOLS SUITE	Cresols	020L [±]	mg/l	0.0005
PHENOLS SUITE	Xylenols & Ethyl Phenols	020L [±]	mg/l	0.0005
PHENOLS SUITE	Naphthols	020L [±]	mg/l	0.0005
PHENOLS SUITE	Propyl or Trimethyl Phenols	020L [±]	mg/l	0.0005
PHENOLS SUITE	Butyl Phenols	020L [±]	mg/l	0.0005
PHENOLS SUITE	Phenols (Speciated Groups Sum)	020L [±]	mg/l	0.0005
PHENOLS SUITE	Total Monohydric Phenols	020L [±]	mg/l	0.01
SVOC SUITE	** SVOC SUITE **			
SVOC SUITE	Naphthalene	053L [±]	ug/l	20
SVOC SUITE	2-Chloronaphthalene	053L [±]	ug/l	20
SVOC SUITE	Acenaphthylene	053L [±]	ug/l	20
SVOC SUITE	Acenaphthene	053L [±]	ug/l	20
SVOC SUITE	Fluorene	053L [±]	ug/l	20
SVOC SUITE	Phenanthrene	053L [±]	ug/l	20
SVOC SUITE	Anthracene	053L [±]	ug/l	20
SVOC SUITE	Fluoranthene	053L [±]	ug/l	20
SVOC SUITE	Pyrene	053L [±]	ug/l	20
SVOC SUITE	Benz(a)anthracene	053L [±]	ug/l	20
SVOC SUITE	Chrysene	053L [±]	ug/l	20
SVOC SUITE	Benzo(b)fluoranthene	053L [±]	ug/l	25
SVOC SUITE	Benzo(k)fluoranthene	053L [±]	ug/l	20
SVOC SUITE	Benzo(a)pyrene	053L [±]	ug/l	25
SVOC SUITE	Dibenzo(a,h)anthracene	053L [±]	ug/l	40
SVOC SUITE	Indeno(1,2,3-cd)pyrene	053L [±]	ug/l	40
SVOC SUITE	Benzo(g,h,i)perylene	053L [±]	ug/l	40
SVOC SUITE	Phenol	053L [±]	ug/l	20
SVOC SUITE	2-Chlorophenol	053L [±]	ug/l	20
SVOC SUITE	2-Methylphenol	053L [±]	ug/l	20
SVOC SUITE	4-Methylphenol	053L [±]	ug/l	20
SVOC SUITE	2-Nitrophenol	053L [±]	ug/l	20
SVOC SUITE	2,4-Dimethylphenol	053L [±]	ug/l	20
SVOC SUITE	2,4-Dichlorophenol	053L [±]	ug/l	20
SVOC SUITE	2,6-Dichlorophenol	053L [±]	ug/l	20
SVOC SUITE	4-Chloro-3-methyl phenol	053L [±]	ug/l	20
SVOC SUITE	2,4,6-Trichlorophenol	053L [±]	ug/l	20
SVOC SUITE	2,4,5-Trichlorophenol	053L [±]	ug/l	20
SVOC SUITE	4-Nitrophenol	053L [±]	ug/l	50
SVOC SUITE	2,3,4,6-Tetrachlorophenol	053L [±]	ug/l	30
SVOC SUITE	Pentachlorophenol	053L [±]	ug/l	60
SVOC SUITE	Dimethyl Phthalate	053L [±]	ug/l	20
SVOC SUITE	Diethyl Phthalate	053L [±]	ug/l	30
SVOC SUITE	Di-n-butyl phthalate	053L [±]	ug/l	30
SVOC SUITE	Butyl benzyl phthalate	053L [±]	ug/l	60
SVOC SUITE	Bis(2-chloroethyl)ether	053L [±]	ug/l	15
SVOC SUITE	Bis(2-chloroisopropyl)ether	053L [±]	ug/l	10
SVOC SUITE	4-Chlorophenyl phenyl ether	053L [±]	ug/l	15
SVOC SUITE	Bromo phenyl phenyl ether	053L [±]	ug/l	30
SVOC SUITE	1,3-Dichlorobenzene	053L [±]	ug/l	15
SVOC SUITE	1,2-Dichlorobenzene	053L [±]	ug/l	10
SVOC SUITE	1,4-Dichlorobenzene	053L [±]	ug/l	10

SVOC SUITE	Nitrobenzene	053L [±]	ug/l	20
SVOC SUITE	1,2,4-Trichlorobenzene	053L [±]	ug/l	10
SVOC SUITE	2,6-Dinitrotoluene	053L [±]	ug/l	30
SVOC SUITE	2,4-Dinitrotoluene	053L [±]	ug/l	20
SVOC SUITE	Azobenzene	053L [±]	ug/l	30
SVOC SUITE	Hexachlorobenzene	053L [±]	ug/l	20
SVOC SUITE	Hexachloroethane	053L [±]	ug/l	40
SVOC SUITE	n-Nitro-n-propyl-1-propanamine	053L [±]	ug/l	15
SVOC SUITE	Isophorone	053L [±]	ug/l	20
SVOC SUITE	Bis(2-chloroethoxy)methane	053L [±]	ug/l	15
SVOC SUITE	Hexachlorobutadiene	053L [±]	ug/l	10
SVOC SUITE	Anthraquinone	053L	ug/l	30
SVOC SUITE	Hexachlorocyclopentadiene	053L	ug/l	50
SVOC SUITE	2-Methylnaphthalene	053L	ug/l	50
SVOC SUITE	2-nitroaniline	053L	ug/l	50
SVOC SUITE	3-nitroaniline	053L	ug/l	50
SVOC SUITE	4-Chloroaniline	053L [±]	ug/l	50
SVOC SUITE	4-nitroaniline	053L	ug/l	50
SVOC SUITE	Bis (2-ethylhexyl) phthalate	053L	ug/l	50
SVOC SUITE	Carbazole	053L	ug/l	50
SVOC SUITE	Dibenzofuran	053L	ug/l	50
SVOC SUITE	Di-n-octyl phthalate	053L	ug/l	50
SVOC SUITE	Aniline	053L [±]	ug/l	40
SVOC SUITE	Biphenyl	053L	ug/l	40
VOC SUITE	** VOC SUITE **			
VOC SUITE	Vinyl Chloride	040L	mg/l	0.01
VOC SUITE	Chloroethane	040L	mg/l	0.001
VOC SUITE	Trichlorofluoromethane	040L	mg/l	0.001
VOC SUITE	1,1-Dichloroethene	040L	mg/l	0.001
VOC SUITE	112-Trichloro-122-Trifluoroethane	040L	mg/l	0.025
VOC SUITE	Dichloromethane	040L	mg/l	0.05
VOC SUITE	Trans-1,2 Dichloroethene	040L	mg/l	0.001
VOC SUITE	MTBE	040L	mg/l	0.001
VOC SUITE	1,1 -Dichloroethane	040L	mg/l	0.001
VOC SUITE	Cis-1,2 Dichloroethene	040L	mg/l	0.001
VOC SUITE	Chloroform	040L	mg/l	0.001
VOC SUITE	1,1,1-Trichloroethane	040L	mg/l	0.001
VOC SUITE	1,2-Dichloroethane	040L	mg/l	0.001
VOC SUITE	Benzene	040L	mg/l	0.001
VOC SUITE	Carbon Tetrachloride	040L	mg/l	0.001
VOC SUITE	Trichloroethene	040L	mg/l	0.001
VOC SUITE	Bromodichloromethane	040L	mg/l	0.001
VOC SUITE	Cis-1,3 Dichloropropene	040L	mg/l	0.001
VOC SUITE	Trans-1,3 Dichloropropene	040L	mg/l	0.001
VOC SUITE	1,1,2-Trichloroethane	040L	mg/l	0.001
VOC SUITE	Toluene	040L	mg/l	0.001
VOC SUITE	Dibromochloromethane	040L	mg/l	0.001
VOC SUITE	Tetrachloroethene	040L	mg/l	0.001
VOC SUITE	Chlorobenzene	040L	mg/l	0.001
VOC SUITE	Ethyl Benzene	040L	mg/l	0.001
VOC SUITE	m,p-Xylenes	040L	mg/l	0.001
VOC SUITE	Bromoform	040L	mg/l	0.001
VOC SUITE	o-Xylene	040L	mg/l	0.001
VOC SUITE	1,1,1,2,2 Tetrachloroethane	040L	mg/l	0.001
VOC SUITE	1,3,5 Trimethylbenzene	040L	mg/l	0.001
VOC SUITE	1,2,4 Trimethylbenzene	040L	mg/l	0.001

VOC SUITE	1,3 Dichlorobenzene	040L	mg/l	0.001
VOC SUITE	1,4 Dichlorobenzene	040L	mg/l	0.001
VOC SUITE	1,2 Dichlorobenzene	040L	mg/l	0.001
VOC SUITE	Tetra Ethyl Lead	040L	mg/l	0.001
VOC SUITE	Acetone	040L	mg/l	0.1
VOC SUITE	Tetra Methyl Lead	040L	mg/l	0.001
ORGANOTIN SUITE	** VOC SUITE **			
ORGANOTIN SUITE	DiButylTin	TINL	ug/l	0.02
ORGANOTIN SUITE	TriButylTin	TINL	ug/l	0.02
ORGANOTIN SUITE	TetraButylTin	TINL	ug/l	0.02
ORGANOTIN SUITE	TriPhenylTin	TINL	ug/l	0.02
OCP SUITE	** Organochlorine Pesticide Suite **			
OCP SUITE	Pentachloroethane	076L	ug/l	0.1
OCP SUITE	Hexachloroethane	076L	ug/l	0.1
OCP SUITE	1,3,5-trichlorobenzene	076L	ug/l	0.1
OCP SUITE	1,2,4-trichlorobenzene	076L	ug/l	0.1
OCP SUITE	1,2,3-trichlorobenzene	076L	ug/l	0.1
OCP SUITE	Hexachlorobutadiene	076L	ug/l	0.1
OCP SUITE	1,2,4,5-tetrachlorobenzene	076L	ug/l	0.1
OCP SUITE	Dichlobenil	076L	ug/l	0.1
OCP SUITE	Pentachlorobenzene	076L	ug/l	0.1
OCP SUITE	Tecnazene	076L	ug/l	0.1
OCP SUITE	Trifluralin	076L	ug/l	0.1
OCP SUITE	alpha-HCH	076L	ug/l	0.1
OCP SUITE	Hexachlorobenzene	076L	ug/l	0.1
OCP SUITE	beta-HCH	076L	ug/l	0.1
OCP SUITE	gamma-HCH (lindane)	076L	ug/l	0.1
OCP SUITE	Quintozene	076L	ug/l	0.1
OCP SUITE	Propyzamide	076L	ug/l	0.1
OCP SUITE	delta-HCH	076L	ug/l	0.1
OCP SUITE	Chlorothalonil	076L	ug/l	0.1
OCP SUITE	Triallate	076L	ug/l	0.1
OCP SUITE	Heptachlor	076L	ug/l	0.1
OCP SUITE	Aldrin	076L	ug/l	0.1
OCP SUITE	Triadimefon	076L	ug/l	0.1
OCP SUITE	Isodrin	076L	ug/l	0.1
OCP SUITE	Pendimethalin	076L	ug/l	0.1
OCP SUITE	Cis-Heptachlor Epoxide	076L	ug/l	0.1
OCP SUITE	gamma-Chlordane (trans)	076L	ug/l	0.1
OCP SUITE	o,p-DDE	076L	ug/l	0.1
OCP SUITE	alpha-Endosulphan	076L	ug/l	0.1
OCP SUITE	alpha-Chlordane (cis)	076L	ug/l	0.1
OCP SUITE	p,p-DDE	076L	ug/l	0.1
OCP SUITE	Dieldrin	076L	ug/l	0.1
OCP SUITE	o,p-TDE	076L	ug/l	0.1
OCP SUITE	Endrin	076L	ug/l	0.1
OCP SUITE	beta-Endosulphan	076L	ug/l	0.1
OCP SUITE	Iprodione	076L	ug/l	0.1
OCP SUITE	p,p-TDE	076L	ug/l	0.1
OCP SUITE	o,p-DDT	076L	ug/l	0.1
OCP SUITE	Propiconazole I	076L	ug/l	0.1
OCP SUITE	Endosulphan sulphate	076L	ug/l	0.1
OCP SUITE	p,p-DDT	076L	ug/l	0.1
OCP SUITE	Propiconazole II	076L	ug/l	0.1
OCP SUITE	o,p-Methoxychlor	076L	ug/l	0.1
OCP SUITE	Fluroxypyr	076L	ug/l	0.1

OCP SUITE	p,p-Methoxychlor	076L	ug/l	0.1
OCP SUITE	Permethrin I	076L	ug/l	0.1
OCP SUITE	Permethrin II	076L	ug/l	0.1
TRIAZINE SUITE	** Triazine Herbicide Suite **			
TRIAZINE SUITE	Atraton	075L	ug/l	0.1
TRIAZINE SUITE	Simazine	075L	ug/l	0.1
TRIAZINE SUITE	Prometon	075L	ug/l	0.1
TRIAZINE SUITE	Atrazine	075L	ug/l	0.1
TRIAZINE SUITE	Propazine	075L	ug/l	0.1
TRIAZINE SUITE	Terbutylazine	075L	ug/l	0.1
TRIAZINE SUITE	Simetryn	075L	ug/l	0.1
TRIAZINE SUITE	Ametryn	075L	ug/l	0.1
TRIAZINE SUITE	Prometryn	075L	ug/l	0.1
TRIAZINE SUITE	Terbutryn	075L	ug/l	0.1
OPP SUITE	** Organophosphorus Pesticide Suite **			
OPP SUITE	Dichlorvos	077L	ug/l	0.1
OPP SUITE	Mevinphos	077L	ug/l	0.1
OPP SUITE	Methacriphos	077L	ug/l	0.1
OPP SUITE	Heptenophos	077L	ug/l	0.1
OPP SUITE	Tributylphosphate	077L	ug/l	0.1
OPP SUITE	Sulfotep	077L	ug/l	0.1
OPP SUITE	Phorate	077L	ug/l	0.1
OPP SUITE	Dimethoate	077L	ug/l	0.1
OPP SUITE	Propetamphos	077L	ug/l	0.1
OPP SUITE	Fonofos	077L	ug/l	0.1
OPP SUITE	Diazinon	077L	ug/l	0.1
OPP SUITE	Phosphamidon I	077L	ug/l	0.1
OPP SUITE	Disulfoton	077L	ug/l	0.1
OPP SUITE	Phosphamidon II	077L	ug/l	0.1
OPP SUITE	Chlorpyriphos-methyl	077L	ug/l	0.1
OPP SUITE	Methyl-Parathion	077L	ug/l	0.1
OPP SUITE	Fenitrothion	077L	ug/l	0.1
OPP SUITE	Pirimiphos-methyl	077L	ug/l	0.1
OPP SUITE	Malathion	077L	ug/l	0.1
OPP SUITE	Fenthion	077L	ug/l	0.1
OPP SUITE	Chlorpyriphos	077L	ug/l	0.1
OPP SUITE	Parathion	077L	ug/l	0.1
OPP SUITE	Chlorfenvinphos	077L	ug/l	0.1
OPP SUITE	Ethion	077L	ug/l	0.1
OPP SUITE	Triazophos	077L	ug/l	0.1
OPP SUITE	Carbophenothion	077L	ug/l	0.1
OPP SUITE	Triphenylphosphate	077L	ug/l	0.1
OPP SUITE	Phosmet	077L	ug/l	0.1
OPP SUITE	EPN	077L	ug/l	0.1
OPP SUITE	Phosalone	077L	ug/l	0.1
OPP SUITE	Azinphos-methyl	077L	ug/l	0.1
OPP SUITE	Azinphos-ethyl	077L	ug/l	0.1
OPP SUITE	Coumaphos	077L	ug/l	0.1
CARB & URON SUITE	** Carbamates & Uron Herbicide Suite **			
CARB & URON SUITE	Carbenazim	079L [±]	ug/l	0.1
CARB & URON SUITE	Carbetamide	079L [±]	ug/l	0.1
CARB & URON SUITE	Bromacil	079L [±]	ug/l	0.1
CARB & URON SUITE	Cyanazine	079L [±]	ug/l	0.1
CARB & URON SUITE	Methabenzthiazuron	079L [±]	ug/l	0.1
CARB & URON SUITE	Carbaryl	079L [±]	ug/l	0.1
CARB & URON SUITE	Propham	079L [±]	ug/l	0.1

CARB & URON SUITE	Methiocarb	079L [±]	ug/l	0.1
CARB & URON SUITE	Monuron	079L [±]	ug/l	0.1
CARB & URON SUITE	Pirimicarb	079L [±]	ug/l	0.1
CARB & URON SUITE	Isoproturon	079L [±]	ug/l	0.1
CARB & URON SUITE	Chlortoluron	079L [±]	ug/l	0.1
CARB & URON SUITE	Monolinuron	079L [±]	ug/l	0.1
CARB & URON SUITE	Diuron	079L [±]	ug/l	0.1
CARB & URON SUITE	Linuron	079L [±]	ug/l	0.1
CARB & URON SUITE	Chlorbufam	079L [±]	ug/l	0.1
CARB & URON SUITE	Chlorpropham	079L [±]	ug/l	0.1
ACID HERB SUITE	** Phenoxy Acid Herbicide Suite**			
ACID HERB SUITE	2,3,6-TBA	082L [±]	ug/l	0.1
ACID HERB SUITE	Dicamba	082L [±]	ug/l	0.1
ACID HERB SUITE	Benazolin	082L [±]	ug/l	0.1
ACID HERB SUITE	4-CPA	082L [±]	ug/l	0.1
ACID HERB SUITE	Bentazone	082L [±]	ug/l	0.1
ACID HERB SUITE	2,4-D	082L [±]	ug/l	0.1
ACID HERB SUITE	MCPA	082L [±]	ug/l	0.1
ACID HERB SUITE	Bromoxynil	082L [±]	ug/l	0.1
ACID HERB SUITE	Triclopyr	082L [±]	ug/l	0.1
ACID HERB SUITE	2,4,5-T	082L [±]	ug/l	0.1
ACID HERB SUITE	Dichloroprop	082L [±]	ug/l	0.1
ACID HERB SUITE	Mecoprop	082L [±]	ug/l	0.1
ACID HERB SUITE	Ioxynil	082L [±]	ug/l	0.1
ACID HERB SUITE	Flamprop	082L [±]	ug/l	0.1
ACID HERB SUITE	Fenoprop	082L [±]	ug/l	0.1
ACID HERB SUITE	2,4-DB	082L [±]	ug/l	0.1
ACID HERB SUITE	MCPB	082L [±]	ug/l	0.1
ACID HERB SUITE	Diclofop	082L [±]	ug/l	0.1
ACID HERB SUITE	Pentachlorophenol	082L	ug/l	0.1
ACID HERB SUITE	Flamprop-Isopropyl	082L [±]	ug/l	0.2
PYRETHROID SUITE	** Pyrethroid Suite**			
PYRETHROID SUITE	Permethrin	PEST	ug/l	0.1
PYRETHROID SUITE	Cyhalothrin	PEST	ug/l	0.1
PYRETHROID SUITE	Cyfluthrin	PEST	ug/l	0.1
PYRETHROID SUITE	Cypermethrin	PEST	ug/l	0.1
PYRETHROID SUITE	Fenvalerate	PEST	ug/l	0.1
PYRETHROID SUITE	Deltamethrin	PEST	ug/l	0.1

	WAF Job Number : 07-38881			
	Matrix : Water			
	Sample Reference	Method No	Units	LOD
	Sample Depth (m)			
	Date Sampled			
	Date Scheduled			
	Laboratory Reference No			
	Analysis			
METALS	METALS			
METALS	Aluminium	080W [±]	mg/l	0.005
METALS	Antimony	080W [±]	mg/l	0.001
METALS	Arsenic (Dissolved)	080W [±]	mg/l	0.005
METALS	Barium (Dissolved)	080W [±]	mg/l	0.005
METALS	Beryllium (Dissolved)	080W [±]	mg/l	0.001
METALS	Boron (Dissolved)	080W [±]	mg/l	0.005
METALS	Cadmium (Dissolved)	080W [±]	mg/l	0.001
METALS	Calcium	062W [±]	mg/l	0.5
METALS	Chromium (Dissolved)	080W [±]	mg/l	0.005
METALS	Chromium (hexavalent)	007	mg/l	0.01
METALS	Cobalt	080W [±]	mg/l	0.001
METALS	Copper (Dissolved)	080W [±]	mg/l	0.005
METALS	Iron	080W [±]	mg/l	0.02
METALS	Lead (Dissolved)	080W [±]	mg/l	0.005
METALS	Lithium	016W	mg/l	0.005
METALS	Magnesium	062W [±]	mg/l	0.1
METALS	Manganese	080W [±]	mg/l	0.005
METALS	Mercury (Dissolved)	080W [±]	mg/l	0.0001
METALS	Molybdenum	080W [±]	mg/l	0.005
METALS	Nickel (Dissolved)	080W [±]	mg/l	0.005
METALS	Phosphorus (Dissolved)	METS	mg/l	0.05
METALS	Potassium	062W [±]	mg/l	0.5
METALS	Selenium (Dissolved)	080W [±]	mg/l	0.005
METALS	Sodium	062W [±]	mg/l	0.5
METALS	Thallium	080W [±]	mg/l	0.005
METALS	Titanium	METS	mg/l	0.02
METALS	Vanadium (Dissolved)	080W [±]	mg/l	0.005
METALS	Zinc (Dissolved)	080W [±]	mg/l	0.005
Inorganics	Inorganics			
Inorganics	Free Cyanide	061W [±]	mg/l	0.02
Inorganics	Total Cyanide	061W [±]	mg/l	0.02
Inorganics	Thiocyanate as SCN	061W [±]	mg/l	0.15
Inorganics	Carbonate Alkalinity as CaCO3	096W [±]	mg/l	20
Inorganics	pH	084W [±]	pH Units	1
Inorganics	Total Organic Carbon	010W [±]	mg/l	1
Inorganics	Sulphur (Total)	METS	mg/l	1
Inorganics	Sulphate as SO4	086W [±]	mg/l	10
Inorganics	Chloride	086W [±]	mg/l	10
Inorganics	Bromide	086W [±]	mg/l	0.5
Inorganics	Fluoride	086W [±]	mg/l	0.1

Inorganics	Nitrite as N	086W [±]	mg/l	0.03
Inorganics	Nitrate as NO3	086W [±]	mg/l	2.2
Inorganics	Kjeldahl Nitrogen	BS3882K	mg/l	5
Inorganics	Ammoniacal Nitrogen as N	057W [±]	mg/l	0.05
Inorganics	Ammoniacal Nitrogen as NH4	057W [±]	mg/l	0.065
Inorganics	Sulphide	055W [±]	mg/l	0.05
CWG SUITE	** CWG SUITE **			
CWG SUITE	Aliphatic C5-C6	CWGW	mg/l	0.01
CWG SUITE	Aliphatic >C6-C8	CWGW	mg/l	0.01
CWG SUITE	Aliphatic >C8-C10	CWGW	mg/l	0.01
CWG SUITE	Aliphatic >C10-C12	CWGW	mg/l	0.01
CWG SUITE	Aliphatic >C12-C16	CWGW	mg/l	0.01
CWG SUITE	Aliphatic >C16-C21	CWGW	mg/l	0.01
CWG SUITE	Aliphatic >C21-C35	CWGW	mg/l	0.01
CWG SUITE	Total Aliphatics (C5-C35)	CWGW	mg/l	0.01
CWG SUITE	Aromatic C6-C7	CWGW	mg/l	0.01
CWG SUITE	Aromatic >C7-C8	CWGW	mg/l	0.01
CWG SUITE	Aromatic >C8-C10	CWGW	mg/l	0.01
CWG SUITE	Aromatic >C10-C12	CWGW	mg/l	0.01
CWG SUITE	Aromatic >C12-C16	CWGW	mg/l	0.01
CWG SUITE	Aromatic >C16-C21	CWGW	mg/l	0.01
CWG SUITE	Aromatic >C21-C35	CWGW	mg/l	0.01
CWG SUITE	Total Aromatics (C5-C35)	CWGW	mg/l	0.01
CWG SUITE	Volatile Hydrocarbons (C5-C12)	CWGW	mg/l	0.01
CWG SUITE	Extractable Hydrocarbons (C12-C35)	CWGW	mg/l	0.01
CWG SUITE	Total Hydrocarbons (C5-C35)	CWGW	mg/l	0.01
CWG SUITE	MTBE	CWGW [±]	mg/l	0.005
CWG SUITE	Benzene	CWGW [±]	mg/l	0.005
CWG SUITE	Toluene	CWGW [±]	mg/l	0.005
CWG SUITE	Ethylbenzene	CWGW [±]	mg/l	0.005
CWG SUITE	m,p-Xylenes	CWGW [±]	mg/l	0.005
CWG SUITE	o-Xylene	CWGW [±]	mg/l	0.005
CWG SUITE	1,3,5-Trimethylbenzene	CWGW [±]	mg/l	0.005
CWG SUITE	1,2,4-Trimethylbenzene	CWGW [±]	mg/l	0.005
VPH/BTEX SUITE	** VPH/BTEX SUITE **			
VPH/BTEX SUITE	MTBE	068W [±]	mg/l	0.005
VPH/BTEX SUITE	Benzene	068W [±]	mg/l	0.005
VPH/BTEX SUITE	Toluene	068W [±]	mg/l	0.005
VPH/BTEX SUITE	Ethylbenzene	068W [±]	mg/l	0.005
VPH/BTEX SUITE	m,p-Xylenes	068W [±]	mg/l	0.005
VPH/BTEX SUITE	o-Xylene	068W [±]	mg/l	0.005
VPH/BTEX SUITE	1,3,5-Trimethylbenzene	068W [±]	mg/l	0.005
VPH/BTEX SUITE	1,2,4-Trimethylbenzene	068W [±]	mg/l	0.005
VPH/BTEX SUITE	VPH Compounds (C5-C10)	068W [±]	mg/l	0.01
VPH/BTEX SUITE	VPH Compounds (C10-C12)	068W	mg/l	0.01
VPH/BTEX SUITE	VPH Compounds (C5-C12)	068W	mg/l	0.01
PAH SUITE	** PAH SUITE **			
PAH SUITE	Naphthalene	022W [±]	mg/l	0.0001
PAH SUITE	Acenaphthylene	022W [±]	mg/l	0.0001
PAH SUITE	Acenaphthene	022W [±]	mg/l	0.0001
PAH SUITE	Fluorene	022W [±]	mg/l	0.0001
PAH SUITE	Phenanthrene	022W [±]	mg/l	0.0001

PAH SUITE	Anthracene	022W [±]	mg/l	0.0001
PAH SUITE	Fluoranthene	022W [±]	mg/l	0.0001
PAH SUITE	Pyrene	022W [±]	mg/l	0.0001
PAH SUITE	Benzo(a)anthracene	022W [±]	mg/l	0.0001
PAH SUITE	Chrysene	022W [±]	mg/l	0.0001
PAH SUITE	Benzo(b)fluoranthene	022W [±]	mg/l	0.0001
PAH SUITE	Benzo(k)fluoranthene	022W [±]	mg/l	0.0001
PAH SUITE	Benzo(a)pyrene	022W [±]	mg/l	0.0001
PAH SUITE	Indeno(1,2,3-cd)pyrene	022W [±]	mg/l	0.0001
PAH SUITE	Dibenzo(a,h)anthracene	022W [±]	mg/l	0.0001
PAH SUITE	Benzo(g,h,i)perylene	022W [±]	mg/l	0.0001
PAH SUITE	PAH (Sum of EPA 16)	022W [±]	mg/l	0.0001
PCB SUITE	** PCB SUITE **			
PCB SUITE	PCB Congener 28	039W [±]	mg/l	0.005
PCB SUITE	PCB Congener 52	039W [±]	mg/l	0.006
PCB SUITE	PCB Congener 101	039W [±]	mg/l	0.006
PCB SUITE	PCB Congener 118	039W [±]	mg/l	0.007
PCB SUITE	PCB Congener 138	039W [±]	mg/l	0.006
PCB SUITE	PCB Congener 153	039W [±]	mg/l	0.007
PCB SUITE	PCB Congener 180	039W [±]	mg/l	0.006
PCB SUITE	PCB's (Sum of ICES Congeners)	039W [±]	mg/l	0.005
PHENOLS SUITE	** PHENOLS SUITE **			
PHENOLS SUITE	Phenol	020W [±]	mg/l	0.01
PHENOLS SUITE	Phenol	020W [±]	mg/l	0.0005
PHENOLS SUITE	Cresols	020W [±]	mg/l	0.0005
PHENOLS SUITE	Xylenols & Ethyl Phenols	020W [±]	mg/l	0.0005
PHENOLS SUITE	Naphthols	020W [±]	mg/l	0.0005
PHENOLS SUITE	Propyl or Trimethyl Phenols	020W [±]	mg/l	0.0005
PHENOLS SUITE	Butyl Phenols	020W [±]	mg/l	0.0005
PHENOLS SUITE	Phenols (Speciated Groups Sum)	020W [±]	mg/l	0.0005
PHENOLS SUITE	Total Monohydric Phenols	020W [±]	mg/l	0.01
SVOC SUITE	** SVOC SUITE **			
SVOC SUITE	Naphthalene	053W [±]	ug/l	20
SVOC SUITE	2-Chloronaphthalene	053W [±]	ug/l	20
SVOC SUITE	Acenaphthylene	053W [±]	ug/l	20
SVOC SUITE	Acenaphthene	053W [±]	ug/l	20
SVOC SUITE	Fluorene	053W [±]	ug/l	20
SVOC SUITE	Phenanthrene	053W [±]	ug/l	20
SVOC SUITE	Anthracene	053W [±]	ug/l	20
SVOC SUITE	Fluoranthene	053W [±]	ug/l	20
SVOC SUITE	Pyrene	053W [±]	ug/l	20
SVOC SUITE	Benz(a)anthracene	053W [±]	ug/l	20
SVOC SUITE	Chrysene	053W [±]	ug/l	20
SVOC SUITE	Benzo(b)fluoranthene	053W [±]	ug/l	25
SVOC SUITE	Benzo(k)fluoranthene	053W [±]	ug/l	20
SVOC SUITE	Benzo(a)pyrene	053W [±]	ug/l	25
SVOC SUITE	Dibenzo(a,h)anthracene	053W [±]	ug/l	40
SVOC SUITE	Indeno(1,2,3-cd)pyrene	053W [±]	ug/l	40
SVOC SUITE	Benzo(g,h,i)perylene	053W [±]	ug/l	40
SVOC SUITE	Phenol	053W [±]	ug/l	20
SVOC SUITE	2-Chlorophenol	053W [±]	ug/l	20
SVOC SUITE	2-Methylphenol	053W [±]	ug/l	20

SVOC SUITE	4-Methylphenol	053W [±]	ug/l	20
SVOC SUITE	2-Nitrophenol	053W	ug/l	20
SVOC SUITE	2,4-Dimethylphenol	053W [±]	ug/l	20
SVOC SUITE	2,4-Dichlorophenol	053W [±]	ug/l	20
SVOC SUITE	2,6-Dichlorophenol	053W [±]	ug/l	20
SVOC SUITE	4-Chloro-3-methyl phenol	053W [±]	ug/l	20
SVOC SUITE	2,4,6-Trichlorophenol	053W [±]	ug/l	20
SVOC SUITE	2,4,5-Trichlorophenol	053W [±]	ug/l	20
SVOC SUITE	4-Nitrophenol	053W	ug/l	50
SVOC SUITE	2,3,4,6-Tetrachlorophenol	053W	ug/l	30
SVOC SUITE	Pentachlorophenol	053W	ug/l	60
SVOC SUITE	Dimethyl Phthalate	053W [±]	ug/l	20
SVOC SUITE	Diethyl Phthalate	053W [±]	ug/l	30
SVOC SUITE	Di-n-butyl phthalate	053W [±]	ug/l	30
SVOC SUITE	Butyl benzyl phthalate	053W [±]	ug/l	60
SVOC SUITE	Bis(2-chloroethyl)ether	053W [±]	ug/l	15
SVOC SUITE	Bis(2-chloroisopropyl)ether	053W [±]	ug/l	10
SVOC SUITE	4-Chlorophenyl phenyl ether	053W [±]	ug/l	15
SVOC SUITE	Bromo phenyl phenyl ether	053W [±]	ug/l	30
SVOC SUITE	1,3-Dichlorobenzene	053W [±]	ug/l	15
SVOC SUITE	1,2-Dichlorobenzene	053W [±]	ug/l	10
SVOC SUITE	1,4-Dichlorobenzene	053W [±]	ug/l	10
SVOC SUITE	Nitrobenzene	053W [±]	ug/l	20
SVOC SUITE	1,2,4-Trichlorobenzene	053W [±]	ug/l	10
SVOC SUITE	2,6-Dinitrotoluene	053W [±]	ug/l	30
SVOC SUITE	2,4-Dinitrotoluene	053W [±]	ug/l	20
SVOC SUITE	Azobenzene	053W [±]	ug/l	30
SVOC SUITE	Hexachlorobenzene	053W [±]	ug/l	20
SVOC SUITE	Hexachloroethane	053W [±]	ug/l	40
SVOC SUITE	n-Nitro-n-propyl-1-propanamine	053W [±]	ug/l	15
SVOC SUITE	Isophorone	053W [±]	ug/l	20
SVOC SUITE	Bis(2-chloroethoxy)methane	053W [±]	ug/l	15
SVOC SUITE	Hexachlorobutadiene	053W [±]	ug/l	10
SVOC SUITE	Anthraquinone	053W	ug/l	30
SVOC SUITE	Aniline	053W	ug/l	40
SVOC SUITE	Hexachlorocyclopentadiene	053W	ug/l	50
SVOC SUITE	2-Methylnaphthalene	053W	ug/l	50
SVOC SUITE	2-nitroaniline	053W	ug/l	50
SVOC SUITE	3-nitroaniline	053W	ug/l	50
SVOC SUITE	4-Chloroaniline	053W [±]	ug/l	50
SVOC SUITE	4-nitroaniline	053W	ug/l	50
SVOC SUITE	Bis (2-ethylhexyl) phthalate	053W	ug/l	50
SVOC SUITE	Carbazole	053W	ug/l	50
SVOC SUITE	Dibenzofuran	053W	ug/l	50
SVOC SUITE	Biphenyl	053W	ug/l	40
VOC SUITE	** VOC SUITE **			
VOC SUITE	Vinyl Chloride	040W [±]	mg/l	0.01
VOC SUITE	Chloroethane	040W [±]	mg/l	0.001
VOC SUITE	Trichlorofluoromethane	040W [±]	mg/l	0.001
VOC SUITE	1,1-Dichloroethene	040W	mg/l	0.001
VOC SUITE	112-Trichloro-122-Trifluoroethane	040W [±]	mg/l	0.025
VOC SUITE	Dichloromethane	040W [±]	mg/l	0.05

VOC SUITE	Trans-1,2 Dichloroethene	040W [±]	mg/l	0.001
VOC SUITE	MTBE	040W [±]	mg/l	0.001
VOC SUITE	1,1 -Dichloroethane	040W [±]	mg/l	0.001
VOC SUITE	Cis-1,2 Dichloroethene	040W [±]	mg/l	0.001
VOC SUITE	Chloroform	040W [±]	mg/l	0.001
VOC SUITE	1,1,1-Trichloroethane	040W [±]	mg/l	0.001
VOC SUITE	1,2-Dichloroethane	040W [±]	mg/l	0.001
VOC SUITE	Benzene	040W [±]	mg/l	0.001
VOC SUITE	Carbon Tetrachloride	040W [±]	mg/l	0.001
VOC SUITE	Trichloroethene	040W [±]	mg/l	0.001
VOC SUITE	Bromodichloromethane	040W [±]	mg/l	0.001
VOC SUITE	Cis-1,3 Dichloropropene	040W [±]	mg/l	0.001
VOC SUITE	Trans-1,3 Dichloropropene	040W [±]	mg/l	0.001
VOC SUITE	1,1,2-Trichloroethane	040W [±]	mg/l	0.001
VOC SUITE	Toluene	040W [±]	mg/l	0.001
VOC SUITE	Dibromochloromethane	040W [±]	mg/l	0.001
VOC SUITE	Tetrachloroethene	040W [±]	mg/l	0.001
VOC SUITE	Chlorobenzene	040W [±]	mg/l	0.001
VOC SUITE	Ethyl Benzene	040W [±]	mg/l	0.001
VOC SUITE	m,p-Xylenes	040W [±]	mg/l	0.001
VOC SUITE	Bromoform	040W [±]	mg/l	0.001
VOC SUITE	o-Xylene	040W [±]	mg/l	0.001
VOC SUITE	1,1,2,2 Tetrachloroethane	040W	mg/l	0.001
VOC SUITE	1,3,5 Trimethylbenzene	040W [±]	mg/l	0.001
VOC SUITE	1,2,4 Trimethylbenzene	040W [±]	mg/l	0.001
VOC SUITE	1,3 Dichlorobenzene	040W [±]	mg/l	0.001
VOC SUITE	1,4 Dichlorobenzene	040W [±]	mg/l	0.001
VOC SUITE	1,2 Dichlorobenzene	040W [±]	mg/l	0.001
VOC SUITE	Tetra Methyl Lead	040W	mg/l	0.001
VOC SUITE	Tetra Ethyl Lead	040W	mg/l	0.001
VOC SUITE	Acetone	040W	mg/l	0.1
ORGANOTIN SUITE	** Organotin Suite **			
ORGANOTIN SUITE	DiButylTin	TINW	ug/l	0.02
ORGANOTIN SUITE	TriButylTin	TINW	ug/l	0.02
ORGANOTIN SUITE	TetraButylTin	TINW	ug/l	0.02
ORGANOTIN SUITE	TriPhenylTin	TINW	ug/l	0.02
OCP SUITE	** Organochlorine Pesticide Suite **			
OCP SUITE	alpha-Endosulphan	076W	ug/l	0.1
OCP SUITE	alpha-Chlordane (cis)	076W	ug/l	0.1
OCP SUITE	p,p-DDE	076W	ug/l	0.1
OCP SUITE	Dieldrin	076W	ug/l	0.1
OCP SUITE	o,p-TDE	076W	ug/l	0.1
OCP SUITE	Endrin	076W	ug/l	0.1
OCP SUITE	beta-Endosulphan	076W	ug/l	0.1
OCP SUITE	Iprodione	076W	ug/l	0.1
OCP SUITE	p,p-TDE	076W	ug/l	0.1
OCP SUITE	o,p-DDT	076W	ug/l	0.1
OCP SUITE	Propiconazole I	076W	ug/l	0.1
OCP SUITE	Endosulphan sulphate	076W	ug/l	0.1
OCP SUITE	p,p-DDT	076W	ug/l	0.1
OCP SUITE	Propiconazole II	076W	ug/l	0.1
OCP SUITE	o,p-Methoxychlor	076W	ug/l	0.1

OCP SUITE	Fluroxypyr	076W	ug/l	0.1
OCP SUITE	p,p-Methoxychlor	076W	ug/l	0.1
OCP SUITE	Permethrin I	076W	ug/l	0.1
OCP SUITE	Permethrin II	076W	ug/l	0.1
TRIAZINE SUITE	** Triazine Herbicide Suite **			
TRIAZINE SUITE	Atraton	075W	ug/l	0.1
TRIAZINE SUITE	Simazine	075W	ug/l	0.1
TRIAZINE SUITE	Prometon	075W	ug/l	0.1
TRIAZINE SUITE	Atrazine	075W	ug/l	0.1
TRIAZINE SUITE	Propazine	075W	ug/l	0.1
TRIAZINE SUITE	Terbutylazine	075W	ug/l	0.1
TRIAZINE SUITE	Simetryn	075W	ug/l	0.1
TRIAZINE SUITE	Ametryn	075W	ug/l	0.1
TRIAZINE SUITE	Prometryn	075W	ug/l	0.1
TRIAZINE SUITE	Terbutryn	075W	ug/l	0.1
OPP SUITE	** Organophosphorus Pesticide Suite**			
OPP SUITE	Dichlorvos	077W	ug/l	0.1
OPP SUITE	Mevinphos	077W	ug/l	0.1
OPP SUITE	Methacriphos	077W	ug/l	0.1
OPP SUITE	Heptenophos	077W	ug/l	0.1
OPP SUITE	Tributylphosphate	077W	ug/l	0.1
OPP SUITE	Sulfotep	077W	ug/l	0.1
OPP SUITE	Phorate	077W	ug/l	0.1
OPP SUITE	Dimethoate	077W	ug/l	0.1
OPP SUITE	Propetamphos	077W	ug/l	0.1
OPP SUITE	Fonofos	077W	ug/l	0.1
OPP SUITE	Diazinon	077W	ug/l	0.1
OPP SUITE	Phosphamidon I	077W	ug/l	0.1
OPP SUITE	Disulfoton	077W	ug/l	0.1
OPP SUITE	Phosphamidon II	077W	ug/l	0.1
OPP SUITE	Chlorpyriphos-methyl	077W	ug/l	0.1
OPP SUITE	Methyl-Parathion	077W	ug/l	0.1
OPP SUITE	Fenitrothion	077W	ug/l	0.1
OPP SUITE	Pirimiphos-methyl	077W	ug/l	0.1
OPP SUITE	Malathion	077W	ug/l	0.1
OPP SUITE	Fenthion	077W	ug/l	0.1
OPP SUITE	Chlorpyriphos	077W	ug/l	0.1
OPP SUITE	Parathion	077W	ug/l	0.1
OPP SUITE	Chlorfenvinphos	077W	ug/l	0.1
OPP SUITE	Ethion	077W	ug/l	0.1
OPP SUITE	Triazophos	077W	ug/l	0.1
OPP SUITE	Carbophenothion	077W	ug/l	0.1
OPP SUITE	Triphenylphosphate	077W	ug/l	0.1
OPP SUITE	Phosmet	077W	ug/l	0.1
OPP SUITE	EPN	077W	ug/l	0.1
OPP SUITE	Phosalone	077W	ug/l	0.1
OPP SUITE	Azinphos-methyl	077W	ug/l	0.1
OPP SUITE	Azinphos-ethyl	077W	ug/l	0.1
OPP SUITE	Coumaphos	077W	ug/l	0.1
CARB & URON SUITE	** Carbamates & Uron Herbicide Suite**			
CARB & URON SUITE	Carbenazim	079W ²	ug/l	0.1
CARB & URON SUITE	Carbetamide	079W ²	ug/l	0.1

CARB & URON SUITE	Bromacil	079W [±]	ug/l	0.1
CARB & URON SUITE	Cyanazine	079W [±]	ug/l	0.1
CARB & URON SUITE	Methabenzthiazuron	079W [±]	ug/l	0.1
CARB & URON SUITE	Carbaryl	079W [±]	ug/l	0.1
CARB & URON SUITE	Propham	079W [±]	ug/l	0.1
CARB & URON SUITE	Methiocarb	079W [±]	ug/l	0.1
CARB & URON SUITE	Monuron	079W [±]	ug/l	0.1
CARB & URON SUITE	Pirimicarb	079W [±]	ug/l	0.1
CARB & URON SUITE	Isoproturon	079W [±]	ug/l	0.1
CARB & URON SUITE	Chlortoluron	079W [±]	ug/l	0.1
CARB & URON SUITE	Monolinuron	079W [±]	ug/l	0.1
CARB & URON SUITE	Diuron	079W [±]	ug/l	0.1
CARB & URON SUITE	Linuron	079W [±]	ug/l	0.1
CARB & URON SUITE	Chlorbufam	079W [±]	ug/l	0.1
CARB & URON SUITE	Chlorpropham	079W [±]	ug/l	0.1
ACID HERB SUITE	** Phenoxy Acid Herbicide Suite**			
ACID HERB SUITE	2,3,6-TBA	082W [±]	ug/l	0.1
ACID HERB SUITE	Dicamba	082W [±]	ug/l	0.1
ACID HERB SUITE	Benazolin	082W [±]	ug/l	0.1
ACID HERB SUITE	4-CPA	082W [±]	ug/l	0.1
ACID HERB SUITE	Bentazone	082W [±]	ug/l	0.1
ACID HERB SUITE	2,4-D	082W [±]	ug/l	0.1
ACID HERB SUITE	MCPA	082W [±]	ug/l	0.1
ACID HERB SUITE	Bromoxynil	082W [±]	ug/l	0.3
ACID HERB SUITE	Triclopyr	082W [±]	ug/l	0.1
ACID HERB SUITE	2,4,5-T	082W [±]	ug/l	0.1
ACID HERB SUITE	Dichloroprop	082W [±]	ug/l	0.1
ACID HERB SUITE	Mecoprop	082W	ug/l	0.1
ACID HERB SUITE	Ioxynil	082W [±]	ug/l	0.1
ACID HERB SUITE	Flamprop	082W [±]	ug/l	0.1
ACID HERB SUITE	Fenoprop	082W [±]	ug/l	0.1
ACID HERB SUITE	2,4-DB	082W [±]	ug/l	0.1
ACID HERB SUITE	MCPB	082W	ug/l	0.1
ACID HERB SUITE	Diclofop	082W [±]	ug/l	0.1
ACID HERB SUITE	Pentachlorophenol	082W	ug/l	0.1
ACID HERB SUITE	Flamprop-Isopropyl	082W [±]	ug/l	0.1
PYRETHROID SUITE	** Pyrethroid Suite**			
PYRETHROID SUITE	Permethrin	PEST	ug/l	0.1
PYRETHROID SUITE	Cyhalothrin	PEST	ug/l	0.1
PYRETHROID SUITE	Cyfluthrin	PEST	ug/l	0.1
PYRETHROID SUITE	Cypermethrin	PEST	ug/l	0.1
PYRETHROID SUITE	Fenvalerate	PEST	ug/l	0.1
PYRETHROID SUITE	Deltamethrin	PEST	ug/l	0.1

Appendix 3

CDM Design Assessment

DRAFT

DESIGN ASSESSMENT FORM

FAIRHURST

Project: GROUND INVESTIGATION AT CLODDACH BRIDGE, ELGIN	Job No.	140163
	Document Number	140163 DOC 03
	Prepared by/Date	RM 15/08/23
	Checked by/Date	AK 15/08/23
	Approved by/Date	AK 15/08/23

Fairhurst Scope of Works

Design and nominate approximate locations for excavation of Trial Pits and drilling of boreholes for geotechnical purposes to assess the ground conditions and engineering characteristics of the underlying materials through in-situ SPT testing, geotechnical soil and rock core sampling and laboratory testing and follow up Groundwater level monitoring works. The ground investigation has been designed in accordance with BS EN 1997-2:2007.

Design Philosophy

The investigation works are being undertaken as part of the proposed new River Lossie Road Bridge Crossing at the existing Cloddach Bridge, Elgin. The proposed new road bridge crossing development is anticipated to conform to Geotechnical Category 2 in accordance with BS EN 1997-1:2004+A1:2013.

Ground Investigation Scope

The Geotechnical ground investigation has been designed in accordance with BS EN 1997-2:2007 (*Eurocode 7 – Part 2*), BS5930:2015+A1:2020 (*Code of Practice for Ground Investigations*) and BS 8004:2015 (*Code of Practice for Foundations*). The borehole and trial pit positions will provide the geotechnical information required for proposed development of the site. The ground investigation layout is presented in **Drawing 140163/9001** and in summary comprises the following:

- 4 no. Rotary Percussive boreholes (BH01 – BH04) to approximately 15.0mbgl to obtain samples of superficial deposits and obtain 6.0m of rock core (if Solid Geology is present within the scheduled drilling depth)
- 4 no. Mechanically Excavated Trial Pits (TP01 – TP04) to approximately 4.0mbgl
- 4 no post fieldwork groundwater level monitoring visits

It should be noted that the monitoring programme may be altered subject to the initial findings of the intrusive investigation fieldworks and/or the findings of the initial monitoring visits. Following the completion of all monitoring works, all boreholes require being backfilled and decommissioned in accordance with SEPA Guidance document '*SEPA Good Practice for Decommissioning Redundant Boreholes*'. The date of commencement of these works is to be confirmed by Fairhurst.

Rev	Date	Description	By	Checked	Approved

DESIGN ASSESSMENT FORM

FAIRHURST

Potential Hazards	May Be Present	Key Significant* Hazards to be Addressed	Notes
Client operations			<ol style="list-style-type: none"> Identify all potential hazards by highlighting in the "may be present" column. Filter the potential hazards to identify the Key Significant Hazards* for this project and this site. Carry forward Key Significant Hazards to next page for further assessment. <p>Significant Hazards are those hazards which:-</p> <ul style="list-style-type: none"> would not be reasonably foreseen by a competent contractor are unusual are difficult to manage
Adjacent activities			
Restricted site (ecology)	✓	✓	
Traffic	✓	✓	
Interface with public			
Near to highways			
Near to railways			
Near to waterways	✓	✓	
Tidal working			
Ground instability	✓	✓	
Contamination			
Excavations	✓		
Groundwater			
Inundation			
Sewage			
Fuel tanks			
Services	✓	✓	
Overhead cables	✓	✓	
Demolition			
Unstable structures			
Explosives			
Bird droppings			
Dust			
Hazardous materials			
Radiation			
Hot working			
Confined spaces			
Working at height			
Manual handling			
Lifting operations			
Vibration			
Noise			
Other (state)			

DESIGN ASSESSMENT FORM

Stage:-		Sheet No.
Hazard	Action by Designer	Residual Hazard
Restricted Site (Ecology)	1. To eliminate hazard	Restricted Site (Ecology)
	2.To reduce risk Ecological constraints may exist at the site due to existing woodland and watercourse (River Lossie) close to the proposed areas of investigation. An ecological survey of the site requires to be undertaken by a suitably qualified and experienced ecologist. The contractor must undertake all temporary access works and ground investigation fieldworks in accordance with the ecologists requirements.	
Ground Instability	1. To eliminate hazard	Ground Instability
	2.To reduce risk A temporary access track is likely to be required to access the proposed trial pit locations on the river bank (subject to confirmation from contractor pre-tender submission site walkover). Cognisance must be taken of potential slope instability and ground instability (slope failure) when undertaking temporary access works and investigation excavations works in close proximity to existing slopes and waterways.	
Traffic	1. To eliminate hazard	Traffic
	2.To reduce risk The Cloddach Bridge is currently closed to traffic. All positions are located off the road line and due to the bridge being closed traffic is not anticipated on the adjacent roadway	
Working Near to Waterways	1. To eliminate hazard	Working Near to Waterways
	2.To reduce risk 4 trial pits are located on the river banks adjacent to the watercourse. All tendering contractors must visit site to assess access and the risks of working near the watercourse and are provide safe methods of access and working and appropriate PPE to mitigate these risks.	

DESIGN ASSESSMENT FORM

Services (including overhead services)	1. To eliminate hazard	Services
	2. To reduce risk All investigation positions have been located a safe distance from the location of public utilities as shown on the providers plans. The contractor requires to undertake PAS128 Type C survey (review proposed positons against current public utility plans and visible surface features and CAT scan positions prior to breaking ground). All boreholes are to be commenced with a 1.20m deep hand excavated pit.	

POST CONSTRUCTION INFORMATION

Project:	Job No.	
	Document Number	
	Prepared by/Date	
	Checked by/Date	
	Approved by/Date	

Fairhurst Scope of Works

Design Philosophy & Significant Residual Hazards

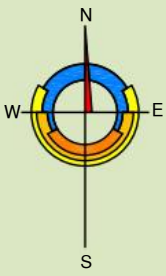
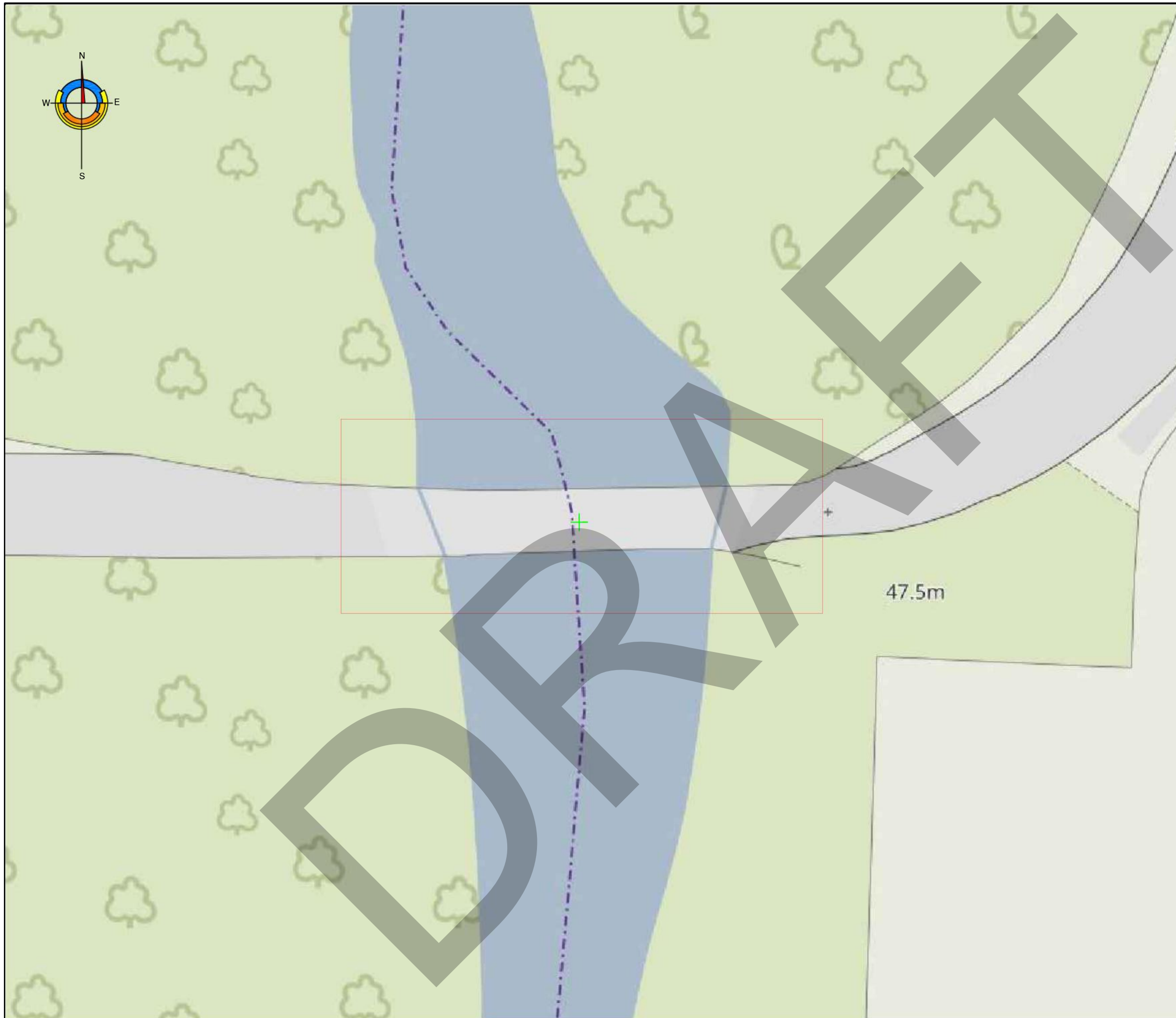
Rev	Date	Description	By	Checked	Approved

Appendix 4

Drawings

140136/9000	Site Location
140136/9001	Ground Investigation Layout

DRAFT



Do not scale from this drawing.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.

RISKS LISTED HERE ARE NOT EXHAUSTIVE. REFER TO DESIGN ASSESSMENT FORM NO.

CONSTRUCTION

DEMOLITION

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

LEGEND

- APPROXIMATE SITE BOUNDARY
- + SITE CENTERED AT NGR:
NJ 20173 58396

Rev.	Date	Description	Drwn.	Chkd.	Appd.

FAIRHURST

Westerton of Craigie
Southampton Road
DUNDEE
DD4 7PN

Tel: 01382 453 300
Fax: 0844 381 4412

Client:

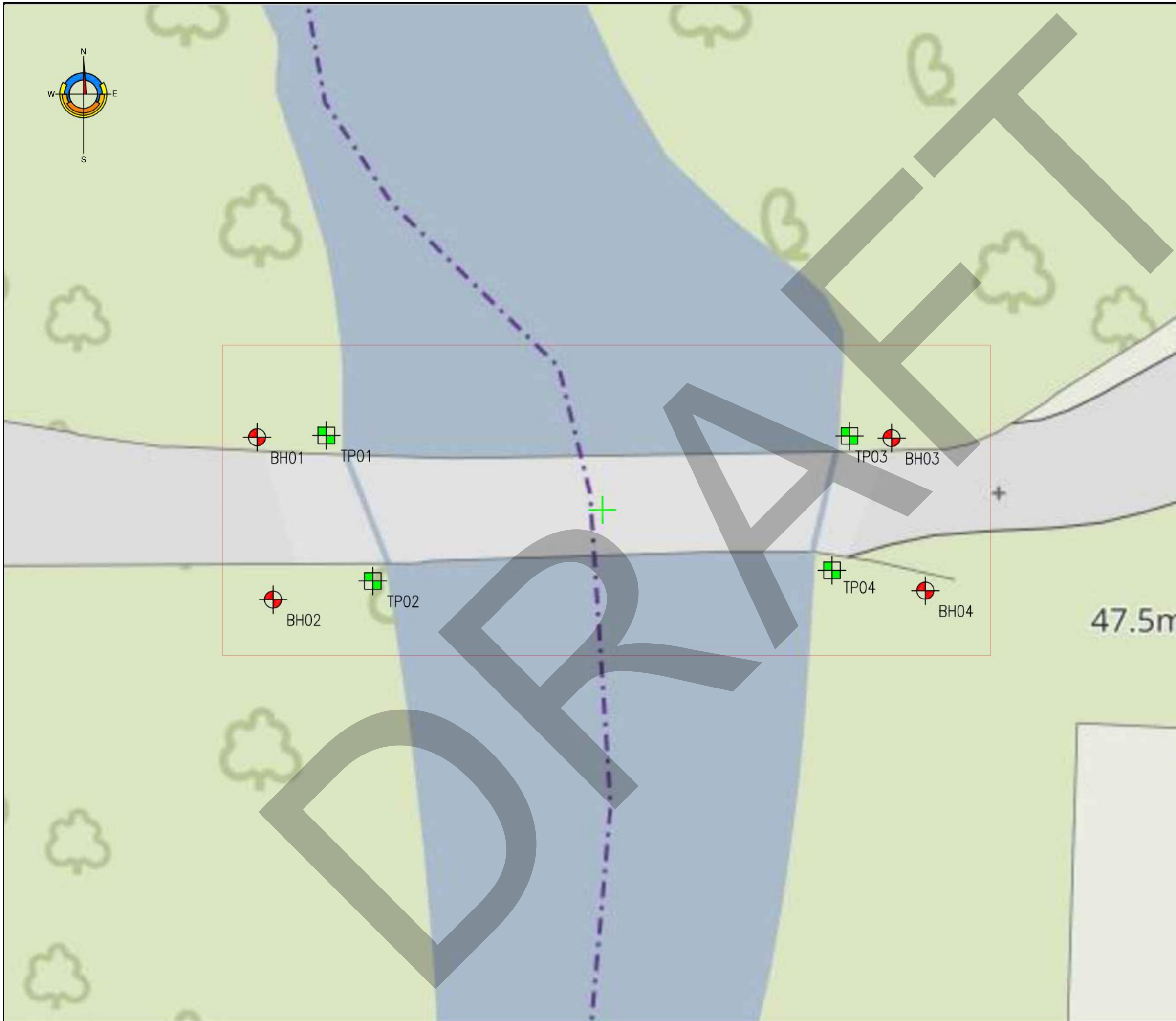


Project Title:
**CLODDACH BRIDGE
ELGIN**

Drawing Title:
SITE LOCATION PLAN

Scale of A3: 1:500	Status: For Information	
Drawn: RM	Checked: AK	Approved: AK
Date: 14/08/23	Date: 15/08/23	Date: 15/08/23

Drawing No.: **140163/9000** Revision: **—**



Do not scale from this drawing.

SAFETY HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARD/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING RISKS AND INFORMATION.

RISKS LISTED HERE ARE NOT EXHAUSTIVE. REFER TO DESIGN ASSESSMENT FORM NO. 140163 DOC 03

CONSTRUCTION / GROUND INVESTIGATION:

- TRAFFIC
- LIVE SERVICES
- WORKING NEAR WATERCOURSE
- EXCAVATIONS

DEMOLITION

FOR INFORMATION RELATING TO USE, CLEANING AND MAINTENANCE SEE THE HEALTH AND SAFETY FILE

IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.

LEGEND

- APPROXIMATE SITE BOUNDARY
- + SITE CENTERED AT NGR:
NJ 20173 58396

GROUND INVESTIGATION

LEGEND

- ⊗ ROTARY PERCUSSIVE BOREHOLE TO 15.0mbgl INCLUDING MINIMUM 6.0m ROCK CORE
- ⊕ TRIAL PIT TO 4.0mbgl OR REFUSAL

Rev.	Date	Description	Dwn.	Chkd.	Appd.

FAIRHURST

Westerton of Craige
Southampton Road
DUNDEE
DD4 7PN

Tel: 01382 453 300
Fax: 0844 381 4412

Client:



MORAY
COUNCIL

Project Title:
**CLODDACH BRIDGE
ELGIN**

Drawing Title:
GROUND INVESTIGATION LAYOUT

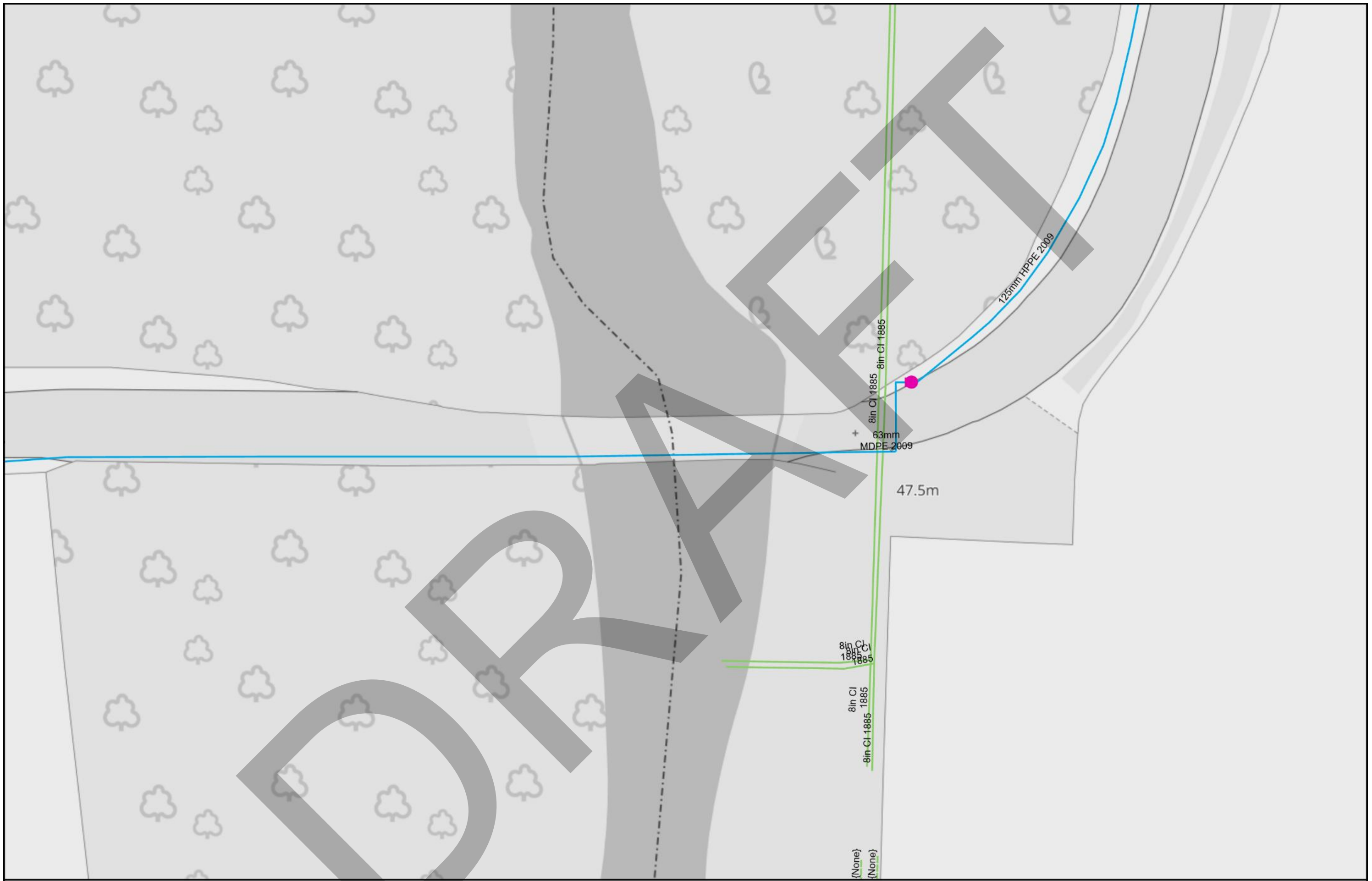
Scale at A3: NTS	Status: For Information	
Drawn: RM	Checked: AK	Approved: AK
Date: 14/08/23	Date: 15/08/23	Date: 15/08/23

Drawing No.: **140163/9001** Revision: **—**

Appendix 5

Public Utilities and Site Walkover Photographs

DRAFT



Warning! Damaging a large diameter trunk main (12"/300mm and above) can result in loss of life and major water supply and water quality problems. If you're planning any extension work in the vicinity of any large diameter mains shown on our maps, you must contact Scottish Water to arrange a site visit 08000 778 778 WELL IN ADVANCE OF THE WORKS

Plotted By: gavin.park@fairhurst.co.uk

The representation of physical assets and the boundaries of areas in which Scottish Water and others have an interest does not necessarily imply their true positions. For further details contact the appropriate District office.

Date: 15/08/2023

Cloddach Bridge

SCALE: 1:331

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The Bridge
6 Buchanan Gate
Stepps
Glasgow
G33 6FB

Trusted to serve Scotland

Tel No: 08000 778 778



SGN
Your gas. Our network.

Contact Us

SGN Safety Admin Team:
0800 912 1722
Email:
plantlocation@sgn.co.uk

Date Requested: 15/08/2023
Job Reference: 30514901
Site Location: 320171 858394
Requested by: Mr Shaun Craig
Your Scheme/Reference: 140163

Scale: 1:1000 (When plotted at A3)

This plan shows the location of those pipes owned by Scotia Gas Networks (SGN) by virtue of being a licensed Gas Transporter (GT). Gas pipes owned by other GTs or third parties may also be present in this area but are not shown on this plan. Information with regard to such pipes should be obtained from the relevant owners. No warranties are given with regard to the accuracy of the information shown on this plan. Service pipes, valves, siphons, sub-connections etc. are not shown but their presence should be anticipated. You should be aware that a small percentage of our pipes/assets may be undergoing review and will temporarily be highlighted in yellow. If your proposed works are close to one of these pipes, you should contact the SGN Safety Admin Team on 0800 912 1722 for advice. No liability of any kind whatsoever is accepted by SGN or its agents, servants or sub-contractors for any error or omission contained herein. Safe digging practices, in accordance with HS (G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that plant location information is provided to all persons (whether direct labour or sub-contractors) working for you on or near gas apparatus. Information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

Report damage immediately – KEEP EVERYONE AWAY FROM THE AREA
0800 111 999

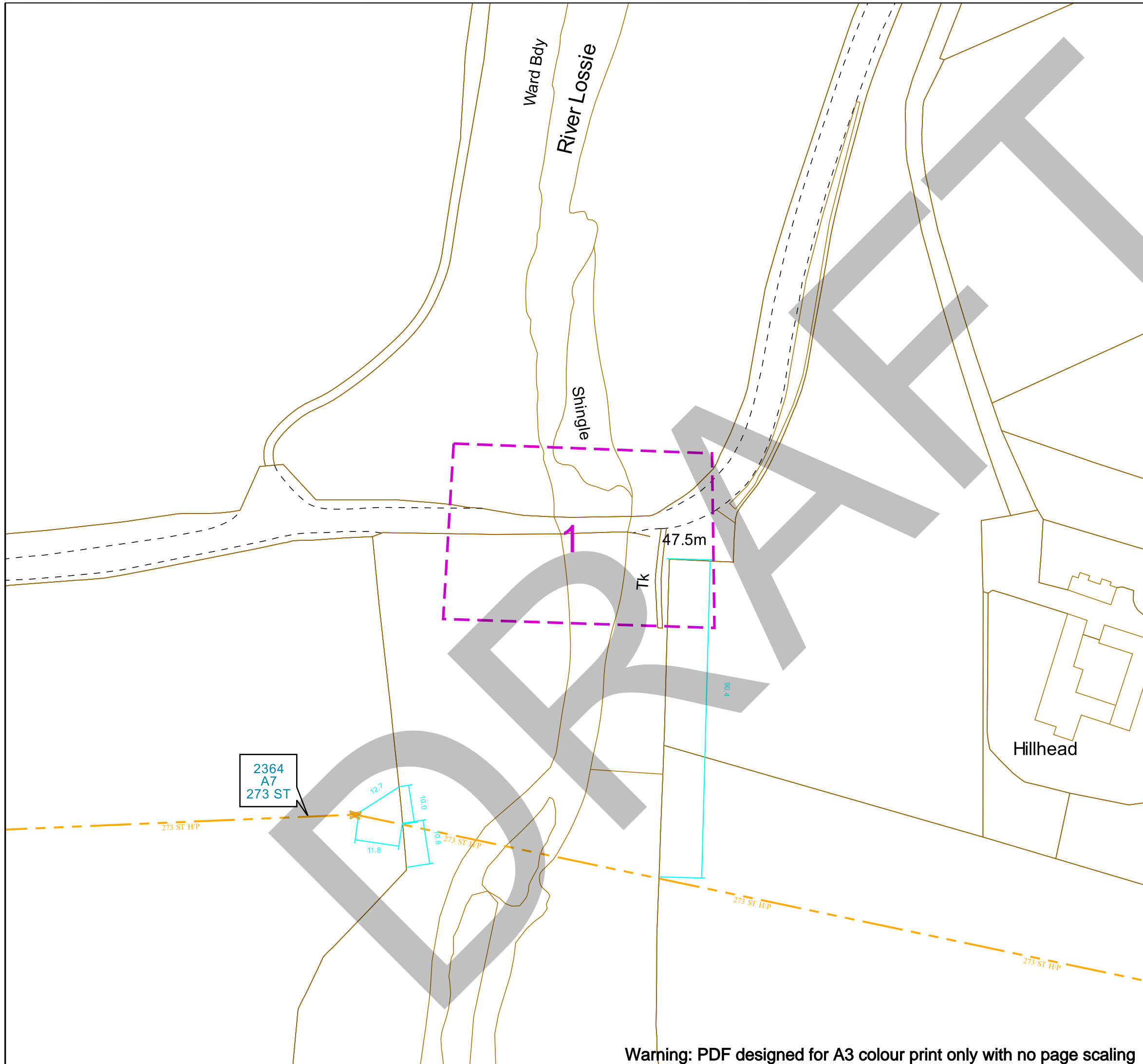
Low Pressure Mains	
Medium Pressure Mains	
Intermediate Pressure Mains	
High Pressure Mains	
LAs	
GTs	
SSSIs	

Some Examples Of Plant Items
Valve Syphon Depth of Cover Diameter Change Material Change

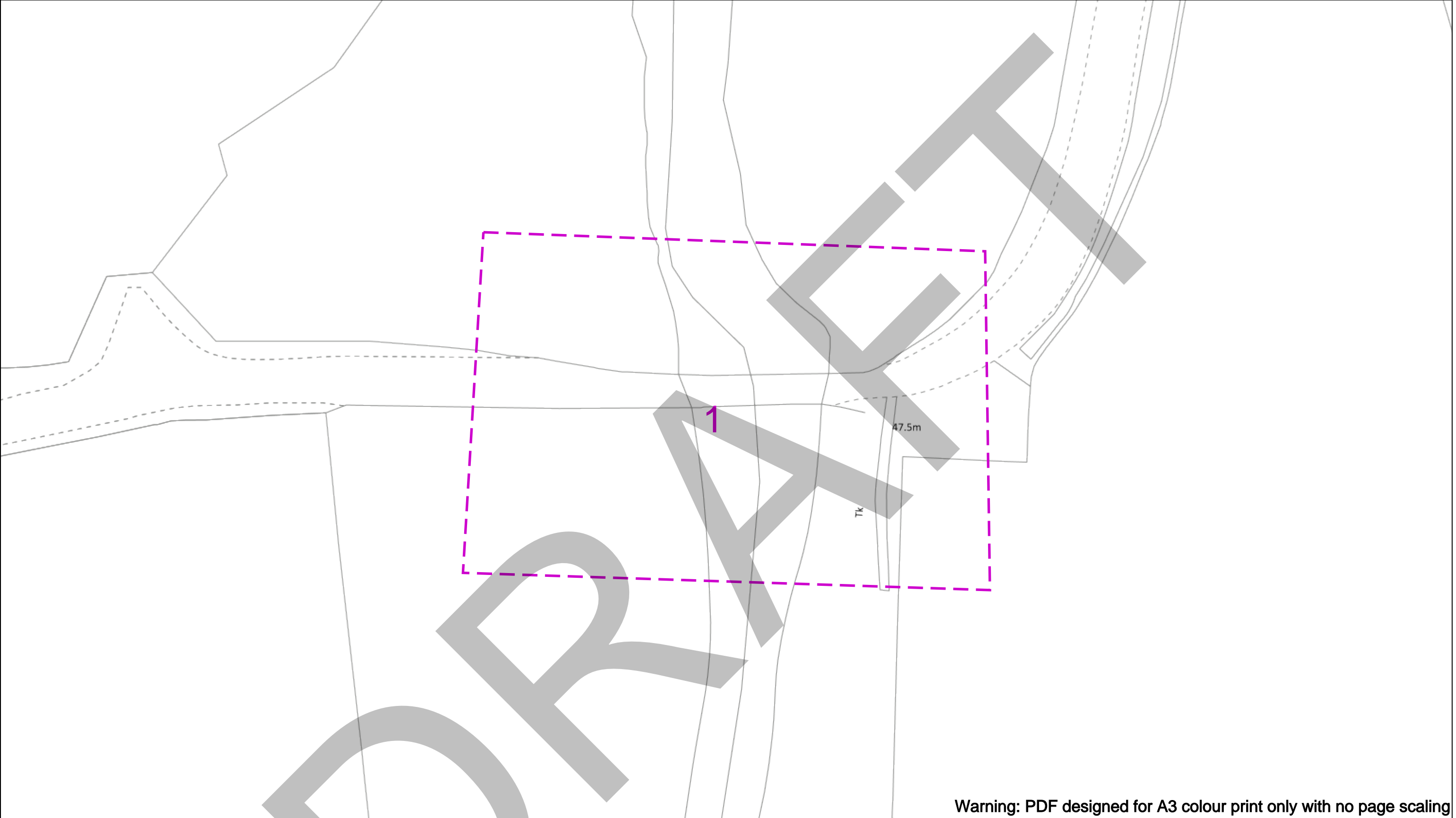
Digsite: Line: Area:



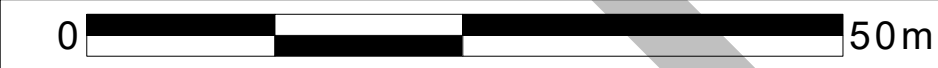
This plan is reproduced from or based on the OS map by Scotia Gas Networks plc, with the sanction of the controller of HM Stationery Office. Crown Copyright Reserved. Southern Gas – 100044373 and Scotland Gas – 100044366.



Warning: PDF designed for A3 colour print only with no page scaling



Warning: PDF designed for A3 colour print only with no page scaling



Dig Sites Area: [dashed box] Line: [dashed line]



Date Requested: 15/08/2023
 Job Reference: 30514901
 Site Location: 320171 858394
 Requested by:
 Mr Shaun Craig
 Your Scheme/Reference: 140163

WARNING
 There may have been subsequent alteration to the surface levels. Trial holes must be undertaken to determine position and depths of cables. HS (G) 47 Booklet from the Health and Safety Executive – Avoiding Danger from Buried Cables – should be consulted before commencing excavation work.
WHEN WORKING IN THE VICINITY OF OVERHEAD LINES THE HEALTH AND SAFETY GUIDANCE NOTES GS6 SHOULD BE CONSULTED (AVAILABLE FROM THE HSE WEBSITE)

Voltages (V)				
LV (Low Voltage) and Services	Up to 1,000V			
HV (High Voltage)	Over 1,000V to 11,000V			
EHV (Extra High Voltage)	22,000V to 132,000V			
Transmission	275,000V and 400,000V			
NORMAL DEPTH TO THE TOP OF THE CABLE WHEN LAID				
	Services	LV	HV	EHV
Footpath/Unmade	0.45m	0.45m	0.6m	0.8m
Road Crossing	0.6m	0.6m	0.75m	0.9m
Agricultural	1m	1m	1m	1.1m

Legend

- Service Cable
- LV Mains
- 2 – 3.3kV
- 6.6kV
- 11kV
- 22kV
- 33kV
- 66kV
- 132kV
- 275kV
- 400kV
- Fibre Optic
- Pilot Cable

Distribution Structures (Electric)

- Pole, Existing Location
- Pole Structure, Existing Location - Single
- Pole Structure, Existing Location - H
- Duct Route
- Cross Section Route

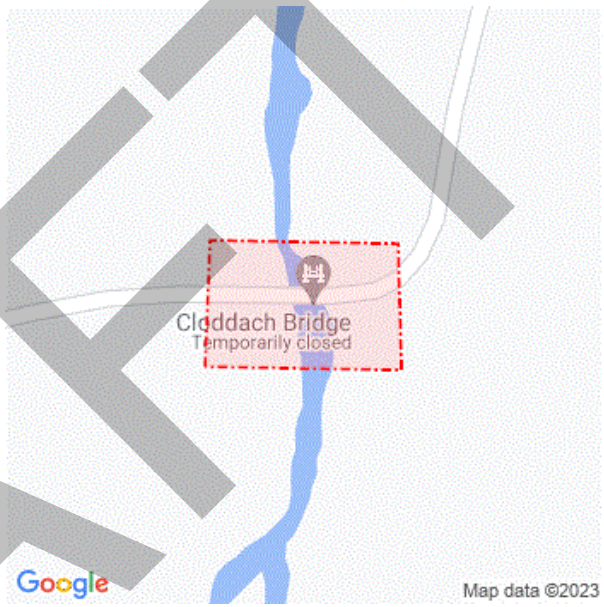
Southern Electric Power Distribution plc
 Registered Office: No.1 Forbury Place
 43 Forbury Road Reading RG1 3JH
 Registered In England & Wales No.04094290

If you're unsure & need to seek advice before commencing excavations please contact:
 General Enquiries: 0800 048 3516

Subject to revision – Master held by SSEN Asset Data Team:
Asset.Data@sse.com
 01256 337 294

Scale: 1:500 (When plotted at A3)

Enquirer			
Name	Mr Shaun Craig	Phone	01382453300
Company	Fairhurst	Mobile	Not Supplied
Address	Westerton of Craigie, Southampton Road Dundee Tayside DD4 7PN		
Email	shaun.craig@fairhurst.co.uk		

Enquiry Details		Site Map	
Enquiry type	Initial Enquiry	 <p style="text-align: center;">Cloddach Bridge Temporarily closed</p> <p style="text-align: right;">Map data ©2023</p>	
Work category	Excavations Non Utility		
Work type	Multiple excavations site (deeper than 1.5m)		
Work type buffer*	50 metres		
Start date	16/08/2023		
End date	16/08/2023		
Scheme/Reference	140163		
Search location	XY= 320173, 858396		
Confirmed location	320171 858394		
Site size	3422 metres square		
Site Contact Name	Not Supplied		
Site Phone No.	Not Supplied		
Description of Works			<p>Please note that the above map only displays the location of the proposed work site and will not display any of the Members' pipes and cables. It is imperative that this area accurately reflects the proposed work site.</p>
<p>* The WORK TYPE BUFFER is a distance added to your search area based on the Work type you have chosen.</p>			

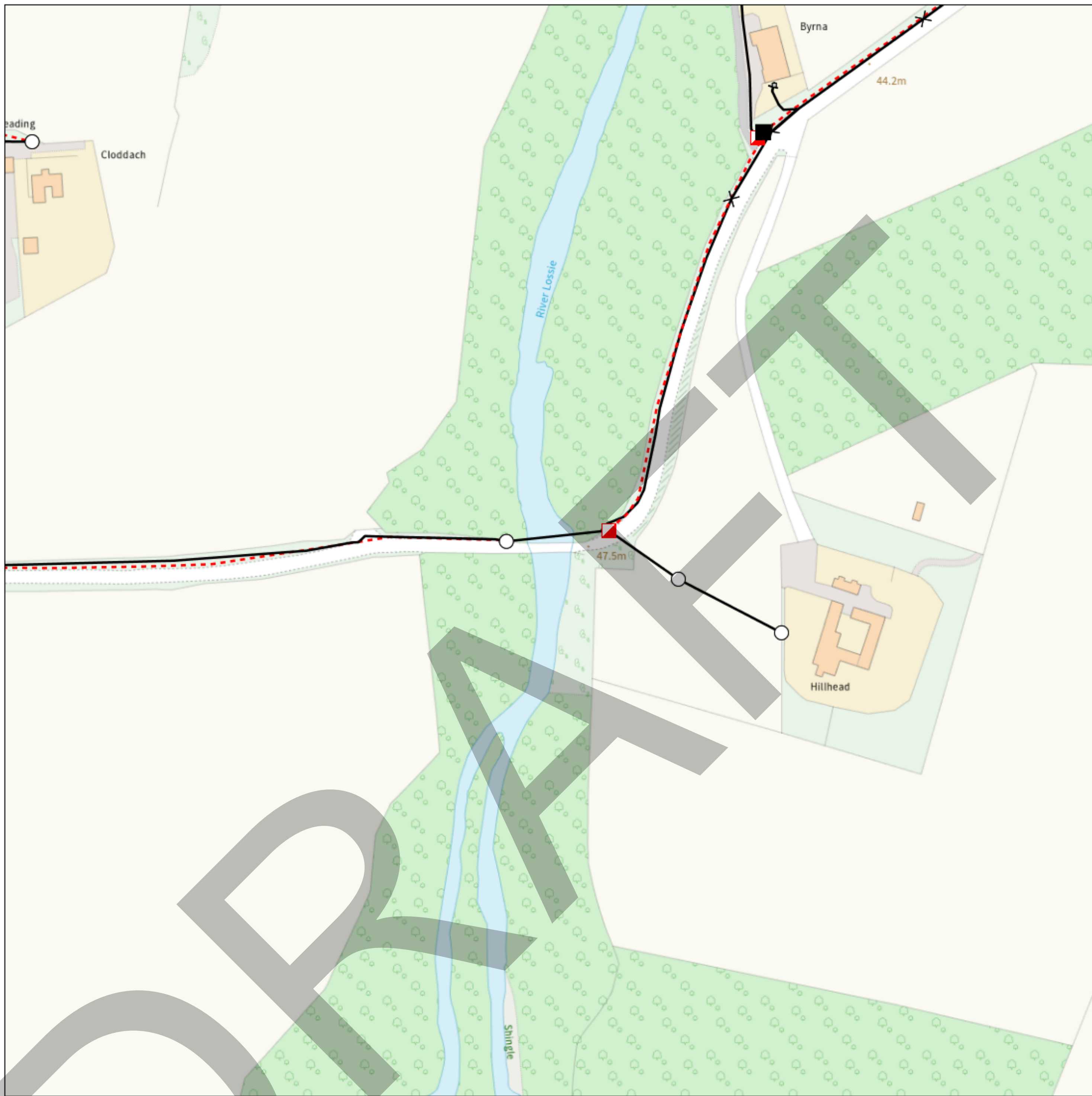
Affected LSBUD members (LSBUD Members who have assets registered on LSBUD within the vicinity of your search area.)			
Asset Owner	Phone/Email	Emergency Only	Status
Scottish and Southern Electricity Networks	08000483516	08000727282	Await response
SGN	08009121722	0800111999	Await response

Status explanation

Await Response means that the asset owner will contact you. This is typically by sending the plan response but they may ask for further information before being able to do so, particularly if any payments or authorisations are required.

Email Additional Info means that the asset owner needs further information about your works to assess your enquiry before providing a response. Please provide any details you have available including plans, method statements etc. if available.

Maps by email Plant Information Reply



IMPORTANT WARNING

Information regarding the location of BT apparatus is given for your assistance and is intended for general guidance only. No guarantee is given of its accuracy. It should not be relied upon in the event of excavations or other works being made near to BT apparatus which may exist at various depths and may deviate from the marked route.



openreach

CLICK BEFORE YOU DIG

FOR PROFESSIONAL FREE ON SITE ASSISTANCE PRIOR TO COMMENCEMENT OF EXCAVATION WORKS INCLUDING LOCATE AND MARKING SERVICE

email cbyd@openreach.co.uk

ADVANCE NOTICE REQUIRED
(Office hours: Monday - Friday 08.00 to 17.00)
www.openreach.co.uk/cbyd

Accidents happen

If you do damage any Openreach equipment please let us know by calling 0800 023 2023 (opt 1 + opt 1) and we can get it fixed ASAP

KEY TO BT SYMBOLS		Change Of State	+	Hatchings	
	<i>Planned</i>	<i>Live</i>	×	Built	
PCP			▲	Planned	
Pole			■	Inferred	
Box			Ⓚ	Duct	
Manhole			Other proposed plant is shown using dashed lines. BT Symbols not listed above may be disregarded. Existing BT Plant may not be recorded. Information valid at time of preparation. Maps are only valid for 90 days after the date of publication.		
Cabinet					
	<i>Pending Add</i>	<i>In Place</i>	<i>Pending Remove</i>	<i>Not In Use</i>	
Power Cable					
Power Duct				N/A	

Reproduced from the Ordnance Survey map by BT by permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office
(C) Crown Copyright British Telecommunications plc 100028040

BT Ref : UIQ11455F
Map Reference : (centre) NJ2017358396
Easting/Northing : (centre) 320173,858396
Issued : 15/08/2023 11:45:30

WARNING: IF PLANNED WORKS FALL INSIDE HATCHED AREA IT IS ESSENTIAL BEFORE PROCEEDING THAT YOU CONTACT THE NATIONAL NOTICE HANDLING CENTRE. PLEASE SEND E-MAIL TO: nnhc@openreach.co.uk

Important notices

It is very important that you correctly understand what the service does and the procedures in order for you to work safely. Please refer to the LSBUD Support Page (www.lsbud.co.uk/lineasearchbeforeudig-support) for further guidance.

This information includes how to provide additional information to the LSBUD Members who request it to provide a response to your enquiry.

Validity and search criteria. The results of this enquiry are based on the confirmed information you entered and are valid only as at the date and time of the enquiry. It is your responsibility to ensure that the Enquiry Details are correct, and LineasearchbeforeUdig (LSBUD) accepts no responsibility for any errors or omissions in the Enquiry Details or any consequences thereof. LSBUD Members update their asset information on a regular basis so you are advised to consider this when undertaking any works. It is your responsibility to choose the period of time after which you need to resubmit any enquiry but the maximum time (after which your enquiry will no longer be dealt with by the LSBUD Helpdesk and LSBUD Members) is 28 days. If any details of the enquiry change, particularly including, but not limited to, the location of the work, then a further enquiry must be made.

Terms and Conditions. Please note that this enquiry is subject always to our standard terms and conditions available at www.lsbud.co.uk ("Terms of Use") and the disclaimer at the end of this document. Please note that in the event of any conflict or ambiguity between the terms of this Enquiry Confirmation and the Terms of Use, the Terms of Use shall take precedence.

List of not affected LSBUD members

(LSBUD Members who do not have assets registered on the LSBUD service within the vicinity of your search area.)

Angus Energy	AWE Pipeline	B & D Energy Limited
Balfour Beatty Investments Limited	BOC Limited (A Member of the Linde Group)	Box Broadband
BP Exploration Operating Company Limited	BPA	Cadent Gas
Cambridgeshire County Council Climate Change and Energy Services	CATS Pipeline c/o Wood Group PSN	Cemex
Centrica Storage Ltd	CNG Services Ltd	Concept Solutions People Ltd
ConocoPhillips (UK) Teesside Operator Ltd	D.S.Smith	Diamond Transmission Corporation
DIO (MOD Abandoned Pipelines)	DIO (MOD Live Pipelines)	E.ON UK CHP Limited
EDF Energy Renewables Ltd	EirGrid	Eleclink Limited
Electricity North West Limited	Energy Assets Networks	ENI & Himor c/o Penspen Ltd
EnQuest NNS Limited	EP Langage Limited	ESB CCGT Power station (Carrington Gas Pipeline)
ESP Utilities Group	ESSAR	Esso Petroleum Company Limited
euNetworks Fiber UK Ltd	EXA Infrastructure	Exolum Pipeline System
Fulcrum Electricity Assets Limited	Fulcrum Pipelines Limited	Gamma
Gas Networks Ireland (UK)	Gateshead Energy Company	Gigaclear Ltd
Harbour Energy	Heathrow Airport LTD	Humbly Grove Energy
IGas Energy	INEOS FPS Pipelines	INEOS Manufacturing (Scotland and TSEP)
INOVYN ChlorVinyls Limited	INOVYN Enterprises Limited	Intergen (Coryton Energy or Spalding Energy)
Jurassic Fibre Ltd	Kensa Utilities	Last Mile
Mainline Pipelines Limited	Manchester Jetline Limited	Manx Cable Company
Marchwood Power Ltd (Gas Pipeline)	Melbourn Solar Limited	Moray East Offshore Windfarm
MUA Group Limited	National Gas Transmission	National Grid Electricity Distribution
National Grid Electricity Transmission	Neos Networks	Northern Gas Networks Limited
Northumbrian Water Group	NPower CHP Pipelines	NTT Global Data Centers EMEA UK Ltd
NYnet Ltd	Ogi	Oikos Storage Limited
Ørsted	Palm Paper Ltd	Perenco UK Limited (Purbeck Southampton Pipeline)
Petroineos	Phillips 66	Portsmouth Water
Premier Transmission Ltd (SNIP)	Redundant Pipelines - LPDA	RWE - Great Yarmouth Pipeline (Bacton to Great Yarmouth Power Station)
RWEnpower (Little Barford and South Haven)	SABIC UK Petrochemicals	SAS Utility Services Ltd
Scottish Power Generation	Seabank Power Ltd	SES Water
Shell	Shell NOP	SP Energy Networks
Squire Energy Networks	SSE Generation Ltd	SSE Transmission

SSE Utility Solutions Limited	Storengy	Tata Communications (c/o JSM Construction Ltd)
Total Colnbrook Pipelines	Total Finaline Pipelines	Transmission Capital
UK Power Networks	Uniper UK Ltd	University of Cambridge Granta Backbone Network
Vattenfall	Veolia ES SELCHP Limited	Veolia ES Sheffield Ltd
Voneus Limited	VPI Power Limited	Wales and West Utilities
West of Duddon Sands Transmission Ltd	Westminster City Council	Zayo Group UK Ltd c/o JSM Group Ltd

Non-LSBUD members (Asset owners not registered on LSBUD)

(The following Non-LSBUD Members may have assets in your search area. It is **YOUR RESPONSIBILITY** to contact them before proceeding.

Please be aware this list is not exhaustive and it is your responsibility to identify and contact all asset owners within your search area.)

Asset Owner	Preferred contact method	Phone	Status
BT	https://www.swns.bt.com/pls/mbe/welcome.home	08000232023	Not Notified
CityFibre	asset.team@cityfibre.com	033 3150 7282	Not Notified
Colt	plantenquiries@catelecomuk.com	01227768427	Not Notified
Equans	nrswa.uk@equans.com	0800 130 3600	Not Notified
GTC	https://pe.gtc-uk.co.uk/PlantEnqMembership	01359240363	Not Notified
Lumen Technologies	plantenquiries@ocugroup.com	02087314613	Not Notified
Mobile Broadband Network Limited	mbnl.plant.enquiries@turntown.com	01212 621 100	Not Notified
Moray Council	road.maint@moray.gov.uk		Not Notified
Scottish Water	https://www.scottishwater.co.uk/help-and-resources/contact-us	08000778778	Not Notified
Utility assets Ltd	assetrecords@utilityassets.co.uk		Not Notified
Verizon Business	osp-team@uk.verizonbusiness.com	01293611736	Not Notified
Virgin Media	http://www.digdat.co.uk	08708883116	Not Notified
Vodafone	osm.enquiries@atkinsglobal.com	01454662881	Not Notified

Disclaimer

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The results of this Enquiry are personal to the Enquirer and shall not be shared with or relied upon by any other party. The asset information on which the Enquiry results are based has been provided by LSBUD Members, therefore LSBUD will provide no guarantee that such information is accurate or reliable nor does it monitor such asset information for accuracy and reliability going forward. There may also be asset owners which do not participate in the enquiry service operated by LSBUD, including but not exclusively those set out above. Therefore, LSBUD cannot make any representation or give any guarantee or warranty as to the completeness of the information contained in the enquiry results or accept any responsibility for the accuracy of the mapping images used. LSBUD and its employees, agents and consultants accept no liability (save that nothing in this Enquiry Confirmation excludes or limits our liability for death or personal injury arising from our negligence, or our fraud or fraudulent misrepresentation, or any other liability that cannot be excluded or limited by English law) arising in respect thereof or in any other way for errors or omissions including responsibility to any person by reason of negligence.

Appendix 6

Groundwater Monitoring Methodology

DRAFT

Groundwater/LNAPL Level Monitoring Methodology

Introduction

This document defines how the measuring of groundwater/hydrocarbon level within monitoring boreholes is to be undertaken. The following document is split into three major sections:-

1. Level monitoring methodology
2. Health and Safety
3. Data Management

Close adherence of which, should ensure quality data is gathered.

Due to the potential presence of Light Non Aqueous Phase Liquids on the groundwater monitoring boreholes at the site, it is imperative that the following procedure is adhered to. This will allow an accurate representation of any LNAPL plume.

1. Level Monitoring Methodology

PRELIMINARY CHECKS:

1. Ensure the dual phase dip meter unit is fully operational (by means of the manufacturers recommended field test (record the results)), fully charged and does not require servicing. Check all parts for signs of wear and tear and general cleanliness.
2. Obtain borehole logs, installation details, latest site plan (with borehole numbers) and any previous monitoring data.
3. Ensure that access has been arranged with the site operator/owner.
4. Complete Health and Safety Risk Assessment for site.
5. Record antecedent weather conditions leading up to the monitoring visit.
6. During transportation, ensure that the monitoring equipment unit is not stored near any potential sources of contamination.
7. Prior to undertaking the monitoring. A simple inspection of the installation should be undertaken to note any quality issues and the status of the headworks also make note of the weather conditions (including air temperature) and any activities that are being undertaken prior to and during the monitoring. A note should be made of any maintenance that the installation requires.

MONITORING OF LNAPL/Water Level

1. Obtain Proforma for recording results.
2. Record the dip meter number/serial number and ensure that the unit passed the relevant preliminary checks.
3. Confirm monitoring location with use of the latest edition of the site plan or the on site indication given by the nomenclature on the bung or monitoring well cover.
4. Perform thorough cleansing of all equipment to be introduced into the well (inclusive of the tape section of the dip meter) with a suitable COSHH assessed cleaning solution and rinse (ensuring that rinse water is collected).
5. Carefully introduce the probe into the borehole and measure for the presence of LNAPL in accordance with the manufacturer (of the interface probe) guidelines. Record the levels of LNAPL relative to ground level (if the cover is upstanding, take the measurement from the ground level).
6. Repeat the LNAPL process for the water level ensuring that there is consistency in the level reading.

7. Due to the dip meter having a limit of detection, the presence (or not) of LNAPL must be confirmed using a suitable (LNAPL/Water) bailer. The thickness, colour and consistency of the LNAPL (if recovered) must be recorded. Waste materials should be stored as per section 2.0 of this document.
8. Repeat for All Boreholes on site.

2. Health and Safety

The monitoring program should be covered by a health and safety plan identifying:

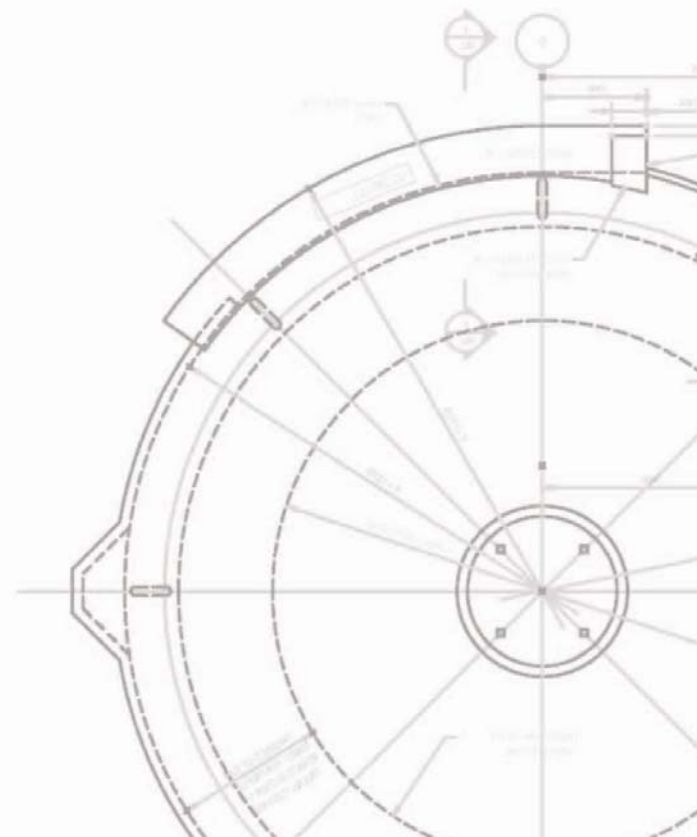
- The hazards likely to be encountered on site (physical and chemical)
- The means that they can be avoided
- The action to be taken in case of health and safety incident

Personal protective equipment should be used during the monitoring activities. The type of protective equipment and its constituent materials should be selected based upon the anticipated risk on site and the nature of the contaminants that are likely to be encountered.

Waste materials generated at monitoring locations (water and oil generated from bailing, wipes, rinsate water, cleaning solution, gloves, bailers etc) should be segregated into non hazardous waste and potentially hazardous waste and stored in suitable labelled waste containers. The waste should be classified, carried by licensed carrier and disposed of by a suitably licensed contractor at a suitably licensed facility.

3. Data Management

On completion of the monitoring visit all data recorded and the comments (inclusive of the results of the preliminary checks) should be placed electronically within the proforma monitoring sheet and e-mailed/sent to the Project Leader for Quality Assurance checking and subsequently reported to the Consulting Engineer ASAP. The data should be stored and if required included in the factual reporting for the site.



Appendix B – Risk Matrices

Cloddach Bridge Risk Categorisation and Scoring			
Risk Likelihood Scoring			
	Likelihood	Frequency	Probability
1 Rare	1-5% (Very Low)	Not expected to occur for years	Occur in exceptional circumstances
2 Unlikely	6-25% (Low)	Expected to occur at least annually	Unlikely to occur
3 Possible	26-50% (Medium)	Expected to occur at least monthly	Reasonable chance of occurring
4 Likely	51-75% (High)	Expected to occur at least weekly	The event will occur in most circumstances
5 Almost certain	Greater than 75% (Very High)	Expected to occur at least daily	Most likely to occur than not

Risk Impact Scoring				
	Financial	Time	Reputation	Performance
50 Significant (Catastrophic)	Approx. 5%+ cost increase	A twelve month plus increase in project end date timescales	Widespread negative news profile and / or third party action or intervention Sustained headline news Some national coverage	Major failure to achieve key programme/project objectives
25 Major	Approx. 3 - 5% cost increase	A nine to twelve month increase in project end date timescales	High news profile and / or high embarrassment Widespread local news	Significant impact on the delivery of key programme/project objectives
10 Moderate	Approx. 1-3% cost increase	A six to nine month increase in project end date timescales	Moderate but limited public embarrassment and/ or moderate news profile Some local news	Moderate shortfalls in achieving key programme/project objectives
5 Minor	Approx.: 0.3-1% cost increase	A three to six month increase in project end date timescales	Low impact and / or low news profile Minor local media coverage	Minor shortfalls in achieving key programme/project objectives
1 Insignificant	Approx. 0.3% cost increase	A one to three month increase in project end date timescales	No impact of significance on reputation Minimal media coverage	Minimal impact on achieving key programme/project objectives

Risk Matrix					
LIKELIHOOD	1 Rare	2 Unlikely	3 Possible	4 Likely	5 Almost certain
IMPACT	1-5%	6-25%	26-50%	51-75%	(>75%)
1 Insignificant	1 (Minor)	2 (Minor)	3 (Minor)	4 (Moderate)	5 (Moderate)
5 Minor	5 (Minor)	10 (Moderate)	15 (Moderate)	20 (Moderate)	25 (Moderate)
10 Moderate	10 (Minor)	20 (Moderate)	30 (Moderate)	40 (Moderate)	50 (Major)
25 Major	25 (Moderate)	50 (Major)	75 (Major)	100 Significant (Catastrophic)	125 Significant (Catastrophic)
50 Significant (Catastrophic)	50 (Moderate)	100 (Major)	150 Significant (Catastrophic)	200 Significant (Catastrophic)	250 Significant (Catastrophic)

Risk Severity Rating		
Score	Risk	Action
1 - 5	Minor	Managed through normal control measures
6 - 30	Moderate	Review control measures
40 - 75	Major	Treatment plans to be developed, implemented and monitored
80 - 250	Catastrophic	Immediate action required. Treatment plans to be developed, implemented and monitored.

Cloddach Bridge Risk Register			Option 1 - Do Minimum										
Risk No	Risk Type	Risk Description	Controls	Likelihood 1-5	Cost Impact 1-5	Time Impact 1-5	Reputation Impact 1-5	Performance Impact 1-5	Risk Rating Cost	Risk Rating Time	Risk Rating Reputation	Risk Rating Performance	Overall Risk Ranking
Opt 1-1	Reputation/Cost	<p>IF no action is taken to repair the bridge</p> <p>THEN avoidable damage to utility services occurs</p> <p>RESULTING IN reputational damage and costs</p>	Regular inspections in place	2	50	1	25	10	100	2	50	20	100
Opt 1-2	Reputation	<p>IF there is inadequate engagement with general stakeholders and the public</p> <p>THEN there is a threat that the general stakeholders and public are more inclined to make complaints about bridge being closed to vehicular traffic and/or bridge ultimately being demolished</p> <p>RESULTING IN reputational damage</p>	Stakeholder Engagement Plan and Communications Strategy to be developed.	4	5	5	25	10	20	20	100	40	100
Opt 1-3	Reputation/Cost	<p>IF scour survey is not undertaken to better understand the risk to the substructure</p> <p>THEN structure could collapse due to scour damage</p> <p>RESULTING IN reputational damage, cost for emergency removal of structure</p>	Scour survey recommended	2	50	5	25	25	100	10	50	50	100
Opt 1-4	Cost	<p>IF scour survey indicates river training works or underpinning repairs are required</p> <p>THEN work will need to be undertaken to keep bridge open to cyclists and pedestrians</p> <p>RESULTING IN additional cost</p>	Scour survey recommended	3	50	5	10	10	150	15	30	30	150
Opt 1-5	Reputation	<p>IF there is a combination of human error, organisational failures, planning failures, and/or lack of compliance with Health and Safety or environmental legislation</p> <p>THEN avoidable environmental or health and safety incidents occur</p> <p>RESULTING IN reputational damage</p>	Regular inspections in place	2	5	1	5	5	10	2	10	10	10
Opt 1-6	Financial/ Time	<p>IF Unknown services are identified during demolition</p> <p>THEN Construction productivity reduced while affected services are relocated or design amended</p> <p>RESULTING IN Increased costs and delay to completion</p>	Initial utility search has identified BT and Scottish Water assets only in vicinity of bridge.	2	50	5	5	5	100	10	10	10	100

Cloddach Bridge Risk Register				Option 2 - Repair Existing Bridge										
Risk No	Risk Type	Risk Description	Controls	Likelihood 1-5	Cost Impact 1-5	Time Impact 1-5	Reputation Impact 1-5	Performance Impact 1-5	Risk Rating Cost	Risk Rating Time	Risk Rating Reputation	Risk Rating Performance	Overall Risk Ranking	
Opt 2-1	Reputation/Cost	IF condition of bridge is worse than anticipated THEN extent of repair will increase RESULTING IN increased costs and programme delay	Early investigation work to establish likely extent of works.	3	50	10	5	5	150	30	15	15	150	
Opt 2-2	Reputation/Cost	IF scour survey is not undertaken to better understand the risk to the substructure THEN structure could collapse due to scour damage RESULTING IN reputational damage, cost for emergency removal of structure	Scour survey recommended	2	50	5	25	25	100	10	50	50	100	
Opt 2-3	Cost	IF scour survey indicates river training works or underpinning repairs are required THEN work will need to be undertaken to keep bridge open to cyclists and pedestrians RESULTING IN additional cost	Scour survey recommended	3	50	5	10	10	150	15	30	30	150	
Opt 2-4	Reputation	IF there is inadequate engagement with general stakeholders and the public THEN there is a threat that the general stakeholders and public are more inclined to make complaints RESULTING IN reputational damage	Stakeholder Engagement Plan and Communications Strategy to be developed.	2	5	5	10	10	10	10	20	20	20	
Opt 2-5	Financial	IF delays occur prior to or during Contract Award THEN additional inflationary cost increases may occur RESULTING IN an increased final tender costs being received	Ensure that appropriate risk allowance is considered. Undertake an inflation assessment.	4	10	5	10	5	40	20	40	20	40	
Opt 2-6	Financial/ Time	IF landowner negotiations are more protracted than anticipated THEN Legal and compensation costs are likely to increase RESULTING IN increased cost and delay	Early and ongoing communication with landowners	2	1	1	5	1	2	2	10	2	10	
Opt 2-7	Reputation	IF there is a combination of human error, organisational failures, planning failures, and/or lack of compliance with Health and Safety or environmental legislation THEN avoidable environmental or health and safety incidents occur RESULTING IN reputational damage	Include requirements in Contract documents, e.g. qualifications, experience, duration of on site presence, etc. Agree suitable site supervision arrangements.	2	5	1	5	5	10	2	10	10	10	
Opt 2-8	Financial/ Time	IF extreme weather events occur (flash flooding/prolonged or extreme winter events), possibly linked to climate change, beyond the historical average, which impact construction activity THEN critical path programme delays may occur RESULTING IN delay to completion of the package and increased cost	Programme construction to minimise risk. Residual risk that weather events occur that limit all site activity.	3	5	1	5	1	15	3	15	3	15	
Opt 2-9	Financial	IF cost rates are different that those used for cost estimates THEN cost estimates to change RESULTING IN change in overall cost	Ensure adequate checks and reviews are undertaken. Where insufficient information is available, ensure that appropriate risk allowance is considered.	4	5	1	10	5	20	4	40	20	40	
Opt 2-10	Financial	IF Actual quantities change from those used for cost estimates THEN cost estimates change RESULTING IN increased cost	Ensure adequate checks and reviews are undertaken. Where insufficient information is available, ensure that appropriate risk allowance is considered.	1	25	1	5	1	25	1	5	1	25	
Opt 2-11	Financial	IF protected species are identified THEN Additional mitigation required RESULTING IN Increased costs to overall contract	Environmental and ecological surveys to maintain baseline dataset of protected species. Surveys will identify any species movement in advance of works and provide an opportunity to develop mitigation prior to commencement of works.	5	10	1	1	1	50	5	5	5	50	
Opt 2-12	Financial	IF Uncharted archaeology found THEN additional mitigation and surveying required RESULTING IN programme delay and cost increase	Hold archaeological consultations prior to works commencing. Trial trenching to be considered before main works construction. Options considered use same/similar footprint to existing bridge so risk is considered to be low.	1	5	5	5	1	5	5	5	1	5	
Opt 2-13	Financial	IF land made available is insufficient for works compounds and lay down areas THEN additional land and planning applications may be required RESULTING IN Increased costs for additional land	Allow sufficient land available within LMA for work compounds and stockpiles	1	5	1	1	1	5	1	1	1	5	
Opt 2-14	Financial	IF utilities cannot be left in place during repair works THEN additional works required for diversions RESULTING IN increase utilities costs associated with BT OpenReach and Scottish Water	Early liaison with utilities. Early investigation work to structure to determine likely extent of works.	3	10	1	1	1	30	3	3	3	30	
Opt 2-15	Financial	IF utility temporary diversion scope more onerous than anticipated THEN additional works required for the diversion RESULTING IN increase utilities costs associated with BT OpenReach and Scottish Water	Early liaison with utilities.	5	1	1	1	1	5	5	5	5	5	
Opt 2-16	Financial/ Time	IF Unknown services are identified during construction that are affected by the Works THEN Construction productivity reduced while affected services are relocated or design amended RESULTING IN Increased costs and delay to completion	Consultation with Statutory Undertakers during design process to identify any additional utilities.	2	5	10	5	5	10	20	10	10	20	

Cloddach Bridge Risk Register				Option 3a - Steel overbridge Re-use existing abutments Existing superstructure and piers demolished										
Risk No	Risk Type	Risk Description	Controls	Likelihood 1-5	Cost Impact 1-5	Time Impact 1-5	Reputation Impact 1-5	Performance Impact 1-5	Risk Rating Cost	Risk Rating Time	Risk Rating Reputation	Risk Rating Performance	Overall Risk Ranking	
Opt 3a-1	Reputation/Cost	IF condition of bridge is worse than anticipated THEN extent of repairs to abutments will increase RESULTING IN increased costs and programme delay	Early investigation work to establish likely extent of works.	3	50	5	5	5	150	15	15	15	150	
Opt 3a-2	Reputation	IF there is inadequate engagement with general stakeholders and the public THEN there is a threat that the general stakeholders and public are more inclined to make complaints RESULTING IN reputational damage	Stakeholder Engagement Plan and Communications Strategy to be developed.	2	5	5	10	10	10	10	20	20	20	
Opt 3a-3	Financial	IF delays occur prior to or during Contract Award THEN additional inflationary cost increases may occur RESULTING IN an increased final tender costs being received	Ensure that appropriate risk allowance is considered. Undertake an inflation assessment.	4	10	5	10	5	40	20	40	20	40	
Opt 3a-4	Financial	IF landowner negotiations are more protracted than anticipated THEN Legal and compensation costs are likely to increase RESULTING IN increased cost and delay	Early and ongoing communication with landowners	2	1	1	5	1	2	2	10	2	10	
Opt 3a-5	Reputation	IF there is a combination of human error, organisational failures, planning failures, and/or lack of compliance with Health and Safety or environmental legislation THEN avoidable environmental or health and safety incidents occur RESULTING IN reputational damage	Include requirements in Contract documents, e.g. qualifications, experience, duration of on site presence, etc. Agree suitable site supervision arrangements.	2	5	1	5	5	10	2	10	10	10	
Opt 3a-6	Financial/ Time	IF extreme weather events occur (flash flooding/prolonged or extreme winter events), possibly linked to climate change, beyond the historical average, which impact construction activity THEN critical path programme delays may occur RESULTING IN delay to completion of the package and increased cost	Programme construction to minimise risk. Residual risk that weather events occur that limit all site activity.	3	5	1	5	1	15	3	15	3	15	
Opt 3a-7	Financial	IF cost rates are different that those used for cost estimates THEN cost estimates to change RESULTING IN change in overall cost	Ensure adequate checks and reviews are undertaken. Where insufficient information is available, ensure that appropriate risk allowance is considered.	4	5	1	10	5	20	4	40	20	40	
Opt 3a-8	Financial	IF Actual quantities change from those used for cost estimates THEN cost estimates change RESULTING IN increased cost	Ensure adequate checks and reviews are undertaken. Where insufficient information is available, ensure that appropriate risk allowance is considered.	1	25	1	5	1	25	1	5	1	25	
Opt 3a-9	Financial	IF protected species are identified THEN Additional mitigation required RESULTING IN Increased costs to overall contract	Environmental and ecological surveys to maintain baseline dataset of protected species. Surveys will identify any species movement in advance of works and provide an opportunity to develop mitigation prior to commencement of works.	5	10	1	1	1	50	5	5	5	50	
Opt 3a-10	Financial	IF Uncharted archaeology found THEN additional mitigation and surveying required RESULTING IN programme delay and cost increase	Hold archaeological consultations prior to works commencing. Trial trenching to be considered before main works construction. Options considered use same/similar footprint to existing bridge so risk is considered to be low.	1	1	5	5	1	1	5	5	1	5	
Opt 3a-11	Financial	IF land made available is insufficient for works compounds and lay down areas THEN additional land and planning applications may be required RESULTING IN Increased costs for additional land	Allow sufficient land available within LMA for work compounds and stockpiles	1	5	1	1	1	5	1	1	1	5	
Opt 3a-12	Financial	IF utility temporary diversion scope more onerous than anticipated THEN additional works required for the diversion RESULTING IN increase utilities costs associated with BT OpenReach and Scottish Water	Early liaison with utilities.	5	1	1	1	1	5	5	5	5	5	
Opt 3a-13	Financial/ Time	IF Unknown services are identified during construction that are affected by the Works THEN Construction productivity reduced while affected services are relocated or design amended RESULTING IN Increased costs and delay to completion	Consultation with Statutory Undertakers during design process to identify any additional utilities.	2	5	10	5	5	10	20	10	10	20	

Cloddach Bridge Risk Register			Option 3b - Steel overbridge New piled abutments behind existing Existing structure retained beneath														
Risk No	Risk Type	Risk Description	Controls	Likelihood 1-5	Cost Impact 1-5	Time Impact 1-5	Reputation Impact 1-5	Performance Impact 1-5	Risk Rating Cost	Risk Rating Time	Risk Rating Reputation	Risk Rating Performance	Overall Risk Ranking				
Opt 3b-1	Reputation/Cost	IF scour survey is not undertaken to better understand the risk to the substructure of the existing structure retained beneath the new structure THEN old structure could collapse due to scour damage RESULTING IN reputational damage, cost for emergency removal of structure and utility diversions/repairs	Scour survey recommended	2	50	5	25	25	100	10	50	50	100				
Opt 3b-2	Reputation/Cost	IF condition of existing structure not monitored once new bridge constructed THEN avoidable damage to utility services occurs RESULTING IN reputational damage and costs	Regular inspections recommended	2	1	1	25	10	2	2	50	20	50				
Opt 3b-3	Reputation/Cost	IF vertical realignment over existing bridge cannot be achieved to standards THEN avoidable damage or safety incidents occur RESULTING IN reputational damage and costs	Ramps with speed restrictions or significant realignment required	4	1	1	25	1	4	4	100	4	100				
Opt 3b-4	Financial	IF delays occur prior to or during Contract Award THEN additional inflationary cost increases may occur RESULTING IN an increased final tender costs being received	Ensure that appropriate risk allowance is considered. Undertake an inflation assessment.	4	10	5	10	5	40	20	40	20	40				
Opt 3b-5	Financial	IF landowner negotiations are more protracted than anticipated THEN Legal and compensation costs are likely to increase RESULTING IN increased cost and delay	Early and ongoing communication with landowners	2	1	1	5	1	2	2	10	2	10				
Opt 3b-6	Reputation	IF there is a combination of human error, organisational failures, planning failures, and/or lack of compliance with Health and Safety or environmental legislation THEN avoidable environmental or health and safety incidents occur RESULTING IN reputational damage	Include requirements in Contract documents, e.g. qualifications, experience, duration of on site presence, etc. Agree suitable site supervision arrangements.	2	5	1	5	5	10	2	10	10	10				
Opt 3b-7	Financial/ Time	IF extreme weather events occur (flash flooding/prolonged or extreme winter events), possibly linked to climate change, beyond the historical average, which impact construction activity THEN critical path programme delays may occur RESULTING IN delay to completion of the package and increased cost	Programme construction to minimise risk. Residual risk that weather events occur that limit all site activity.	3	5	1	5	1	15	3	15	3	15				
Opt 3b-8	Financial	IF cost rates are different that those used for cost estimates THEN cost estimates to change RESULTING IN change in overall cost	Ensure adequate checks and reviews are undertaken. Where insufficient information is available, ensure that appropriate risk allowance is considered.	4	5	1	10	5	20	4	40	20	40				
Opt 3b-9	Financial	IF Actual quantities change from those used for cost estimates THEN cost estimates change RESULTING IN increased cost	Ensure adequate checks and reviews are undertaken. Where insufficient information is available, ensure that appropriate risk allowance is considered.	1	25	1	5	1	25	1	5	1	25				
Opt 3b-10	Financial	IF protected species are identified THEN Additional mitigation required RESULTING IN Increased costs to overall contract	Environmental and ecological surveys to maintain baseline dataset of protected species. Surveys will identify any species movement in advance of works and provide an opportunity to develop mitigation prior to commencement of works.	5	10	1	1	1	50	5	5	5	50				
Opt 3b-11	Financial	IF Uncharted archaeology found THEN additional mitigation and surveying required RESULTING IN programme delay and cost increase	Hold archaeological consultations prior to works commencing. Trial trenching to be considered before main works construction. Options considered use same/similar footprint to existing bridge so risk is considered to be low.	1	1	5	5	1	1	5	5	1	5				
Opt 3b-12	Financial	IF land made available is insufficient for works compounds and lay down areas THEN additional land and planning applications may be required RESULTING IN Increased costs for additional land	Allow sufficient land available within LMA for work compounds and stockpiles	1	5	1	1	1	5	1	1	1	5				
Opt 3b-13	Financial	IF utility temporary diversion scope more onerous than anticipated THEN additional works required for the diversion RESULTING IN increase utilities costs associated with BT OpenReach and Scottish Water	Early liaison with utilities.	5	1	1	1	1	5	5	5	5	5				
Opt 3b-14	Financial/ Time	IF Unknown services are identified during construction that are affected by the Works THEN Construction productivity reduced while affected services are relocated or design amended RESULTING IN Increased costs and delay to completion	Consultation with Statutory Undertakers during design process to identify any additional utilities.	2	5	10	5	5	10	20	10	10	20				

Cloddach Bridge Risk Register			Option 4a - New integral bridge - 2 traffic lanes											
Risk No	Risk Type	Risk Description	Controls	Likelihood 1-5	Cost Impact 1-5	Time Impact 1-5	Reputation Impact 1-5	Performance Impact 1-5	Risk Rating Cost	Risk Rating Time	Risk Rating Reputation	Risk Rating Performance	Overall Risk Ranking	
Opt 4a-1	Financial	IF delays occur prior to or during Contract Award THEN additional inflationary cost increases may occur RESULTING IN an increased final tender costs being received	Ensure that appropriate risk allowance is considered. Undertake an inflation assessment.	4	10	5	10	5	40	20	40	20	40	
Opt 4a-2	Financial	IF landowner negotiations are more protracted than anticipated THEN Legal and compensation costs are likely to increase RESULTING IN increased cost and delay	Early and ongoing communication with landowners	2	1	1	5	1	2	2	10	2	10	
Opt 4a-3	Reputation	IF there is a combination of human error, organisational failures, planning failures, and/or lack of compliance with Health and Safety or environmental legislation THEN avoidable environmental or health and safety incidents occur RESULTING IN reputational damage	Include requirements in Contract documents, e.g. qualifications, experience, duration of on site presence, etc. Agree suitable site supervision arrangements.	2	5	1	5	5	10	2	10	10	10	
Opt 4a-4	Financial/ Time	IF extreme weather events occur (flash flooding/prolonged or extreme winter events), possibly linked to climate change, beyond the historical average, which impact construction activity THEN critical path programme delays may occur RESULTING IN delay to completion of the package and increased cost	Programme construction to minimise risk. Residual risk that weather events occur that limit all site activity.	3	5	1	5	1	15	3	15	3	15	
Opt 4a-5	Financial	IF cost rates are different that those used for cost estimates THEN cost estimates to change RESULTING IN change in overall cost	Ensure adequate checks and reviews are undertaken. Where insufficient information is available, ensure that appropriate risk allowance is considered.	4	5	1	10	5	20	4	40	20	40	
Opt 4a-6	Financial	IF Actual quantities change from those used for cost estimates THEN cost estimates change RESULTING IN increased cost	Ensure adequate checks and reviews are undertaken. Where insufficient information is available, ensure that appropriate risk allowance is considered.	1	25	1	5	1	25	1	5	1	25	
Opt 4a-7	Financial	IF protected species are identified THEN Additional mitigation required RESULTING IN Increased costs to overall contract	Environmental and ecological surveys to maintain baseline dataset of protected species. Surveys will identify any species movement in advance of works and provide an opportunity to develop mitigation prior to commencement of works.	5	10	1	1	1	50	5	5	5	50	
Opt 4a-8	Financial	IF Uncharted archaeology found THEN additional mitigation and surveying required RESULTING IN programme delay and cost increase	Hold archaeological consultations prior to works commencing. Trial trenching to be considered before main works construction. Options considered use same/similar footprint to existing bridge so risk is considered to be low.	1	1	5	5	1	1	5	5	1	5	
Opt 4a-9	Financial	IF land made available is insufficient for works compounds and lay down areas THEN additional land and planning applications may be required RESULTING IN Increased costs for additional land	Allow sufficient land available within LMA for work compounds and stockpiles	1	5	1	1	1	5	1	1	1	5	
Opt 4a-10	Financial	IF utility temporary diversion scope more onerous than anticipated THEN additional works required for the diversion RESULTING IN increase utilities costs associated with BT OpenReach and Scottish Water	Early liaison with utilities.	5	1	1	1	1	5	5	5	5	5	
Opt 4a-11	Financial/ Time	IF Unknown services are identified during construction that are affected by the Works THEN Construction productivity reduced while affected services are relocated or design amended RESULTING IN Increased costs and delay to completion	Consultation with Statutory Undertakers during design process to identify any additional utilities.	2	5	10	5	5	10	20	10	10	20	

Cloddach Bridge Risk Register			Option 4b - New integral bridge - single traffic lane											
Risk No	Risk Type	Risk Description	Controls	Likelihood 1-5	Cost Impact 1-5	Time Impact 1-5	Reputation Impact 1-5	Performance Impact 1-5	Risk Rating Cost	Risk Rating Time	Risk Rating Reputation	Risk Rating Performance	Overall Risk Ranking	
Opt 4b-1	Financial	IF delays occur prior to or during Contract Award THEN additional inflationary cost increases may occur RESULTING IN an increased final tender costs being received	Ensure that appropriate risk allowance is considered. Undertake an inflation assessment.	4	10	5	10	5	40	20	40	20	40	
Opt 4b-2	Financial	IF landowner negotiations are more protracted than anticipated THEN Legal and compensation costs are likely to increase RESULTING IN increased cost and delay	Early and ongoing communication with landowners	2	1	1	5	1	2	2	10	2	10	
Opt 4b-3	Reputation	IF there is a combination of human error, organisational failures, planning failures, and/or lack of compliance with Health and Safety or environmental legislation THEN avoidable environmental or health and safety incidents occur RESULTING IN reputational damage	Include requirements in Contract documents, e.g. qualifications, experience, duration of on site presence, etc. Agree suitable site supervision arrangements.	2	5	1	5	5	10	2	10	10	10	
Opt 4b-4	Financial/ Time	IF extreme weather events occur (flash flooding/prolonged or extreme winter events), possibly linked to climate change, beyond the historical average, which impact construction activity THEN critical path programme delays may occur RESULTING IN delay to completion of the package and increased cost	Programme construction to minimise risk. Residual risk that weather events occur that limit all site activity.	3	5	1	5	1	15	3	15	3	15	
Opt 4b-5	Financial	IF cost rates are different that those used for cost estimates THEN cost estimates to change RESULTING IN change in overall cost	Ensure adequate checks and reviews are undertaken. Where insufficient information is available, ensure that appropriate risk allowance is considered.	4	5	1	10	5	20	4	40	20	40	
Opt 4b-6	Financial	IF Actual quantities change from those used for cost estimates THEN cost estimates change RESULTING IN increased cost	Ensure adequate checks and reviews are undertaken. Where insufficient information is available, ensure that appropriate risk allowance is considered.	1	25	1	5	1	25	1	5	1	25	
Opt 4b-7	Financial	IF protected species are identified THEN Additional mitigation required RESULTING IN Increased costs to overall contract	Environmental and ecological surveys to maintain baseline dataset of protected species. Surveys will identify any species movement in advance of works and provide an opportunity to develop mitigation prior to commencement of works.	5	10	1	1	1	50	5	5	5	50	
Opt 4b-8	Financial	IF Uncharted archaeology found THEN additional mitigation and surveying required RESULTING IN programme delay and cost increase	Hold archaeological consultations prior to works commencing. Trial trenching to be considered before main works construction. Options considered use same/similar footprint to existing bridge so risk is considered to be low.	1	1	5	5	1	1	5	5	1	5	
Opt 4b-9	Financial	IF land made available is insufficient for works compounds and lay down areas THEN additional land and planning applications may be required RESULTING IN Increased costs for additional land	Allow sufficient land available within LMA for work compounds and stockpiles	1	5	1	1	1	5	1	1	1	5	
Opt 4b-10	Financial	IF utility temporary diversion scope more onerous than anticipated THEN additional works required for the diversion RESULTING IN increase utilities costs associated with BT OpenReach and Scottish Water	Early liaison with utilities.	5	1	1	1	1	5	5	5	5	5	
Opt 4b-11	Financial/ Time	IF Unknown services are identified during construction that are affected by the Works THEN Construction productivity reduced while affected services are relocated or design amended RESULTING IN Increased costs and delay to completion	Consultation with Statutory Undertakers during design process to identify any additional utilities.	2	5	10	5	5	10	20	10	10	20	

Appendix C – Cost Estimates

CLODDACH BRIDGE COST ESTIMATE SUMMARY

CAPITAL COST ESTIMATE SUMMARY - NO OPTIMISM BIAS	OPTION 1	OPTION 2	OPTION 3A	OPTION 3B	OPTION 4A	OPTION 4B
Topographical Survey	£5,000	£20,000	£20,000	£20,000	£20,000	£20,000
Geotechnical Investigation		-	£40,000	£40,000	£40,000	£40,000
Flood Study		£15,000	£15,000	£15,000	£15,000	£15,000
Scour Survey	£20,000					
Ecology		£20,000	£10,000	£10,000	£10,000	£10,000
Planning		-	£15,000	£15,000	£15,000	£15,000
Statutory Undertakers (Budget)		£100,000	£100,000	-	£100,000	£100,000
Detailed Design Fees (Budget)		£40,000	£25,000	£25,000	£60,000	£60,000
Contract/Procurement		£20,000	£20,000	£20,000	£20,000	£20,000
Construction Cost		£946,984	£515,679	£413,127	£1,081,568	£821,958
Site Supervision		£50,000	£20,000	£20,000	£50,000	£50,000
Overbridge Cost			£467,000	£467,000		

TOTAL Estimate	£25,000	£1,211,984	£1,247,679	£1,045,127	£1,411,568	£1,151,958
	-10%	-10%	-10%	-10%	-20%	-20%
TOTAL Low Estimate	£22,500	£1,090,786	£1,122,911	£940,614	£1,129,254	£921,566
	+100%	+100%	+100%	+100%	+50%	+50%
TOTAL High Estimate	£50,000	£2,423,968	£2,495,358	£2,090,254	£2,117,352	£1,727,937

Project: 140163F - Cloddach Bridge Replacement	Ref: -
Structure: Option 2 - Repair/Strengthen	Job No: 140163F
	Date: 15/09/2023
Made by: Ioannis Fotiadis	Checked by: MW
	Sheet No:

Capital Works Summary

Capital Works	MCHW Series	Initial Cost	
Preliminaries	100	£ 378,794	60.0%
Site Clearance	200	£ 48,252	
Road Restraint Systems (Vehicle and Pedestrian)	400	£ 23,645	
Drainage and Service Ducts	500	£ 10,083	100.0%
Earthworks	600	£ 53,381	100.0%
Pavements	700	£ -	100.0%
Kerbs, Footways and Paved Areas	1100	£ 18,337	100.0%
Traffic Signs and Road Markings	1200	£ -	0.0%
Piling and Embedded Retaining Walls	1600	£ -	
Structural Concrete	1700	£ 274,945	
Steelwork for Structures	1800	£ 166,791	
Protection of Steelwork Against Corrosion	1900	£ 23,823	
Waterproofing	2000	£ 12,066	
Additional Quantifiable Costs (e.g. utilities diversions)	-		

TOTAL FOR ALL SERIES

£ 1,010,116

Project: 140163F - Cloddach Bridge Replacement	Ref: -
Structure: Option 3a - Overbridge Demolish	Job No: 140163F
	Date: 15/09/2023
Made by: M. Walejewska	Checked by: IF
	Sheet No:

Capital Works Summary

Capital Works	MCHW Series	Initial Cost	
Preliminaries	100	£ 103,136	25.0%
Site Clearance	200	£ 56,359	
Road Restraint Systems (Vehicle and Pedestrian)	400	£ -	
Drainage and Service Ducts	500	£ 9,828	100.0%
Earthworks	600	£ 13,636	100.0%
Pavements	700	£ 10,468	100.0%
Kerbs, Footways and Paved Areas	1100	£ -	100.0%
Traffic Signs and Road Markings	1200	£ -	0.0%
Piling and Embedded Retaining Walls	1600	£ 161,512	
Structural Concrete	1700	£ 160,740	
Steelwork for Structures	1800	£ -	
Protection of Steelwork Against Corrosion	1900		
Waterproofing	2000	£ -	

TOTAL FOR ALL SERIES **£ 515,679**

Project: 140163F - Cloddach Bridge Replacement	Ref: -
Structure: Option 3b Overbridge Retain	Job No: 140163F
	Date: 15/09/2023
Made by: M. Walejewska	Checked by: IF
	Sheet No:

Capital Works Summary

Capital Works	MCHW Series	Initial Cost	
Preliminaries	100	£ 152,783	25.0%
Site Clearance	200	£ 17,487	
Road Restraint Systems (Vehicle and Pedestrian)	400	£ -	
Drainage and Service Ducts	500	£ 26,332	100.0%
Earthworks	600	£ 298,810	100.0%
Pavements	700	£ 10,468	100.0%
Kerbs, Footways and Paved Areas	1100	£ -	100.0%
Traffic Signs and Road Markings	1200	£ -	0.0%
Piling and Embedded Retaining Walls	1600	£ 161,512	
Structural Concrete	1700	£ 61,076	
Steelwork for Structures	1800	£ -	
Protection of Steelwork Against Corrosion	1900	£ -	
Waterproofing	2000	£ 35,449	

TOTAL FOR ALL SERIES

£ 763,917

Project: 140163F - Cloddach Bridge Replacement	Ref: -
Structure: Option 4a - Integral Prestressed Beam Bridge	Job No: 140163F
	Date: 15/09/2023
Made by: M. Walejewska	Checked by: IF
	Sheet No:

Capital Works Summary

Capital Works	MCHW Series	Initial Cost	
Preliminaries	100	£ 216,314	25.0%
Site Clearance	200	£ 56,359	
Road Restraint Systems (Vehicle and Pedestrian)	400	£ 30,999	
Drainage and Service Ducts	500	£ 26,332	100.0%
Earthworks	600	£ 147,313	100.0%
Pavements	700	£ 10,468	100.0%
Kerbs, Footways and Paved Areas	1100	£ 16,183	100.0%
Traffic Signs and Road Markings	1200	£ -	0.0%
Piling and Embedded Retaining Walls	1600	£ 161,512	
Structural Concrete	1700	£ 380,639	
Steelwork for Structures	1800	£ -	
Protection of Steelwork Against Corrosion	1900		
Waterproofing	2000	£ 35,449	

TOTAL FOR ALL SERIES

£ 1,081,568

Project: 140163F - Cloddach Bridge Replacement	Ref: -
Structure: Option 4b- Integral Prestressed Beam Bridge	Job No: 140163F
	Date: 15/09/2023
Made by: M. Walejewska	Checked by: IF
	Sheet No:

Capital Works Summary

Capital Works	MCHW Series	Initial Cost	
Preliminaries	100	£ 164,392	25.0%
Site Clearance	200	£ 56,359	
Road Restraint Systems (Vehicle and Pedestrian)	400	£ 30,999	
Drainage and Service Ducts	500	£ 26,332	100.0%
Earthworks	600	£ 82,173	100.0%
Pavements	700	£ 10,468	100.0%
Kerbs, Footways and Paved Areas	1100	£ 8,091	100.0%
Traffic Signs and Road Markings	1200	£ -	0.0%
Piling and Embedded Retaining Walls	1600	£ 113,962	
Structural Concrete	1700	£ 296,058	
Steelwork for Structures	1800	£ -	
Protection of Steelwork Against Corrosion	1900	£ -	
Waterproofing	2000	£ 33,123	

TOTAL FOR ALL SERIES

£ 821,958

To: Ellen Halkon
Coy: Fairhurst Engineering
Tel: 07818 536062
Email: ellen.halkon@fairhurst.co.uk
From: Andrew Wilson
Date: 21st August 2023
Our Ref: JBUK3266

Ref: Cloddach Bridge

We refer to your enquiry for the above and have pleasure in attaching a quotation as requested.



The above image is an example of a JSB Girder bridge and not necessarily the same specification as the quotation. For illustrative purposes only.

A site visit must be carried out by Janson Bridging.

Assumptions have been made as to access to site and crane radius.

Loading details to be confirmed by Fairhurst.

Regards

By e-mail

Andrew Wilson

Company overview:

- ◆ Founded in Holland in 1972, The Janson Bridging Group are the largest modular bridge manufacturing and building company in continental Europe and the largest bridge rental company in the world bringing this specialist knowledge to work with clients to provide safe, cost effective solutions.
- ◆ The Janson Group has over 25,000 tonnes of equipment in the rental fleet We continue to invest to grow with our clients providing market leading products and service to our customers.
- ◆ Janson Bridging (UK) serve the UK market from our base in Nottinghamshire using our specialist engineering and site teams to work collaboratively with our clients to focus on effective solutions using off site fabrication as far as possible to reduce programme times.
- ◆ We grow through enduring relationships with our customers and a passion for innovation that drives safety and efficiency into our own and our client's performance.



Capability:

- ◆ Janson design, supply and install bridges in the UK and throughout the world, we bring this experience to our client's teams. Focused on off-site fabrication to minimise installation times.
- ◆ Working with pre-designed systems from stock or creating bespoke solutions Janson deliver projects ranging from single short span crossings to complex multi span and multi structure solutions providing the right solution for every project.
- ◆ Janson innovation and range now extends to FRP bridge solutions, ro-ro's, lift bridges and ferries.



Culture:

- ◆ Janson believe that the best solutions result from collaboration. We are at our best when working closely with our clients to fully understand the requirement and tailor a solution using our experience, product range and agility to produce safe, economic least intrusive solutions.
- ◆ We continue to invest in our future through innovation and developing our people to provide class leading products and services to our customers.



Rental Products:

- ◆ JSK – Simple to install Beam Bridge solution for single of spans up to 21m, unlimited road widths possible. Supplied to site complete with anti-skid surfacing and parapets. Suitable for multi span applications. Full Eurocode loading capability.
- ◆ JSB – Beam Bridge solution for single spans of up to 40m unlimited road widths possible. Minimal assembly on site minimises risk and programme time. Suitable for multi span applications. Full Eurocode loading capability.
- ◆ JPB – Panel bridge solution. Single spans of up to 80m, single and two-lane road widths. Assembled on site, can be launched or lifted into position to suit site restrictions. Provided with anti-skid surfacing. Suitable for multi-span applications.
- ◆ JFB – Panel footbridge solution. Single spans of up to 60m, 2.5m walkway. Standard stair solutions available

Quotation:

24m x 5m JSB



The supply of a 24m span JSB (Girder) Bridge with a 5m width c/w an anti-skid deck surface and vehicle parapets. Bridge to be configured as per your requirements

◆ Sales Price	£ 400,000.00
◆ Delivery and Pre-assembly (During normal working hours)	£ 30,500.00
◆ Install (Including Cranes)	£ 16,500.00
◆ Design	£ 20,000.00
◆ Total Sales Price (including installation)	£ 467,000.00

Optional Extras:

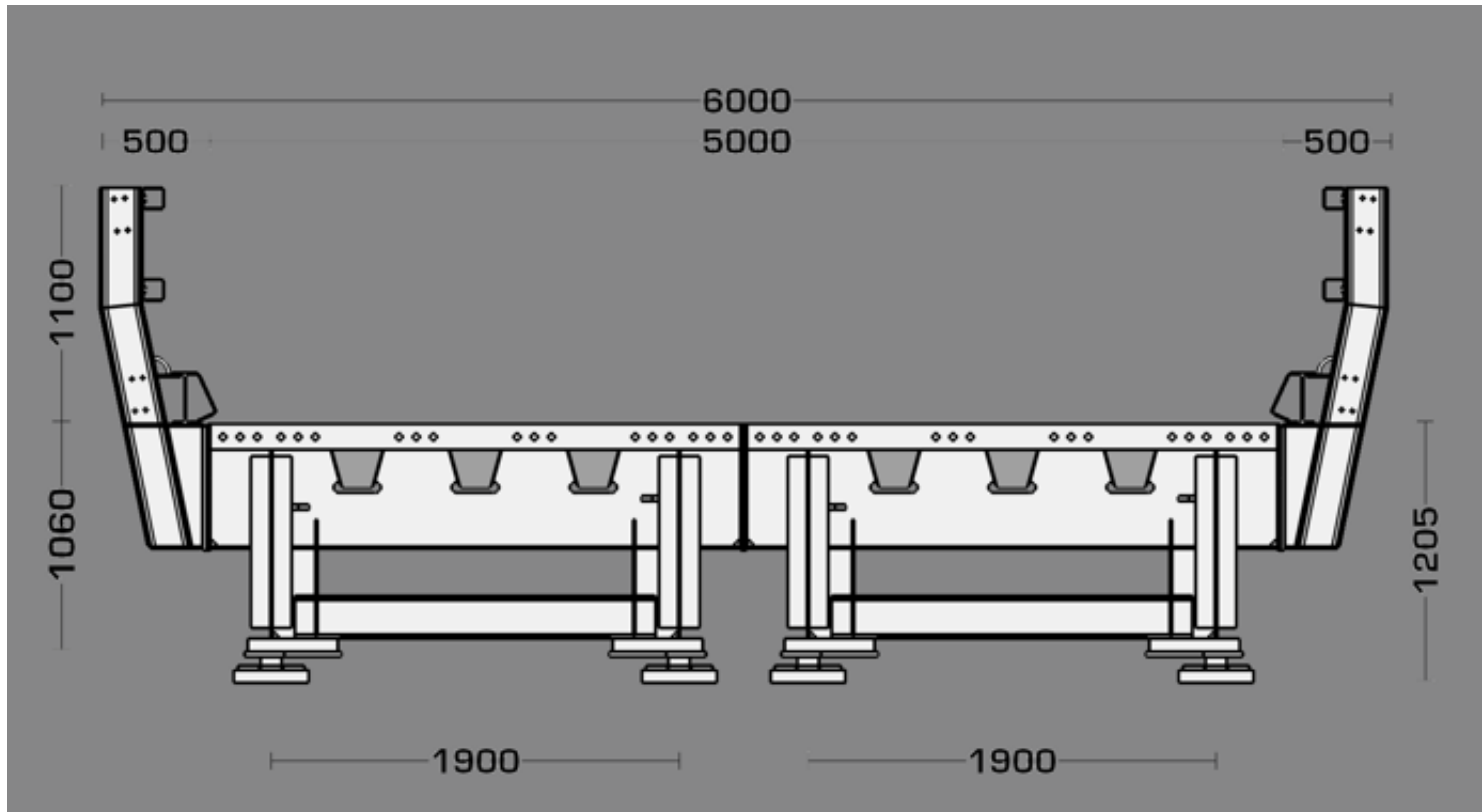
◆ Inspections (Recommended every 12 months)	£ 1,000.00 per bridge
◆ Additional Engineering.....	£ 75.00 per hour

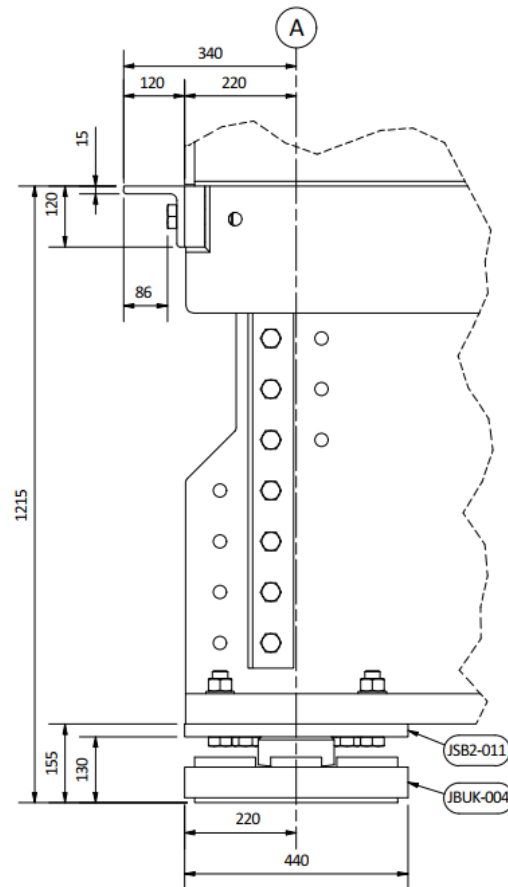
Notes:

- A. This quotation is valid for a period of 7 days from the date of issue due to the volatility in the global steel market and is subject to the availability of the specified equipment at the time of order. Janson Bridging reserves the right to raise the quotation to the customer in the event of significant price increases. Delivery times are indicative and can never be regarded as a strict deadline. Janson Bridging can't be held accountable for exceeding a delivery time beyond our control.
- B. The quoted figures exclude VAT
- C. Janson Bridging (UK) Terms and Conditions of business apply.
- D. Payment terms are 30 days from invoice
- E. Delivery – Approx. 30 weeks from order (subject to availability at time of placing order)

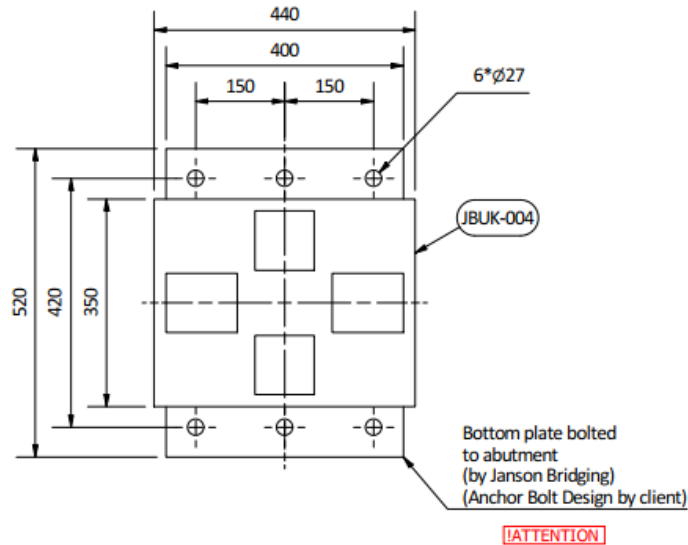
Configuration of 24m JSB

We have based our assumptions using the following

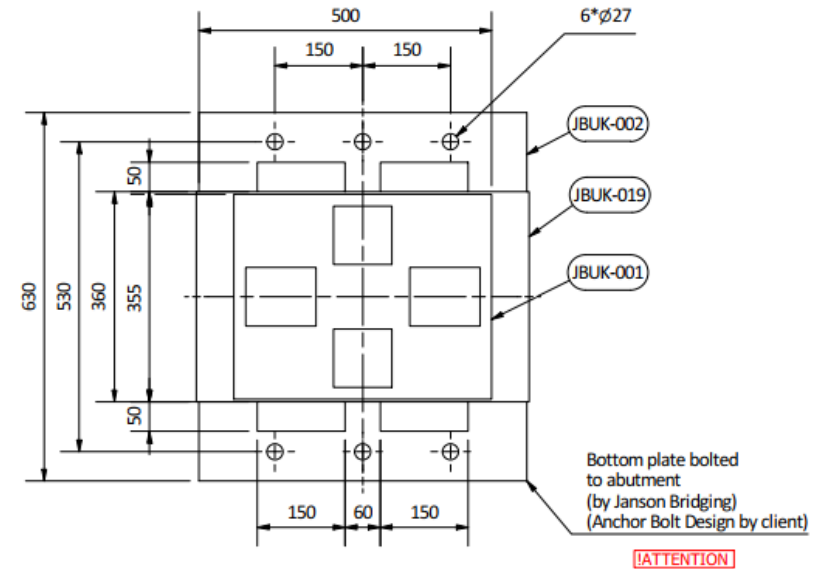




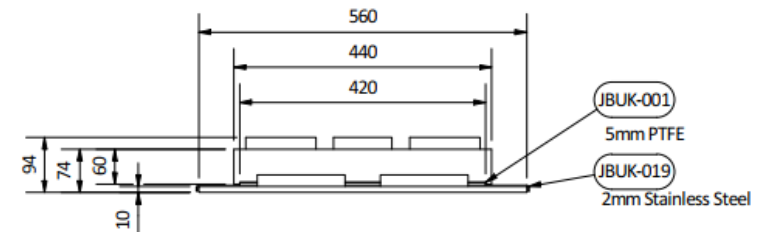
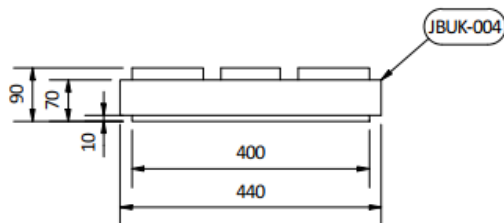
Detail 1, End of bridge Axis A
Scale 1 : 10

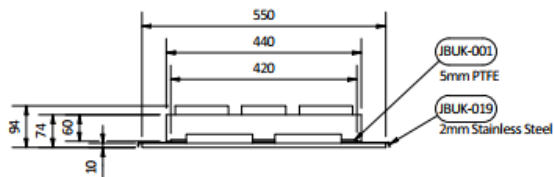
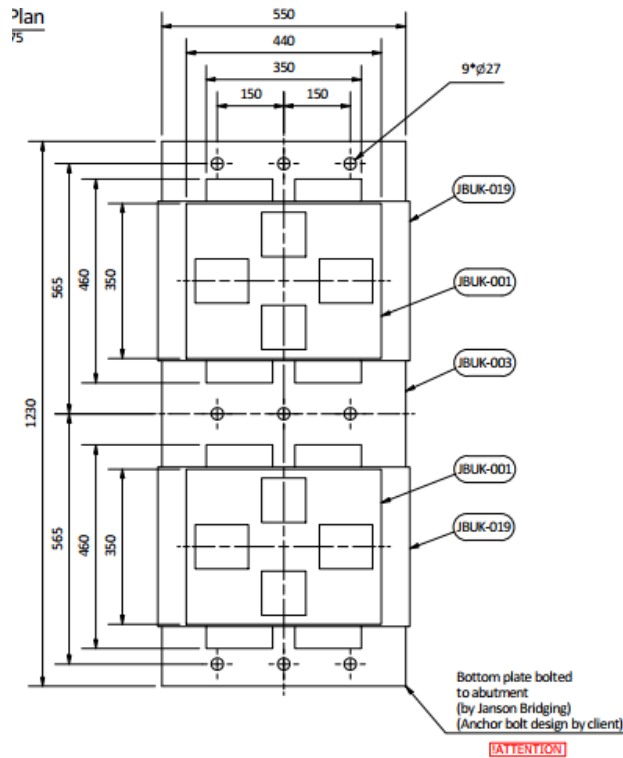


Detail 2, Typical Fixed Bearing
Scale 1 : 10

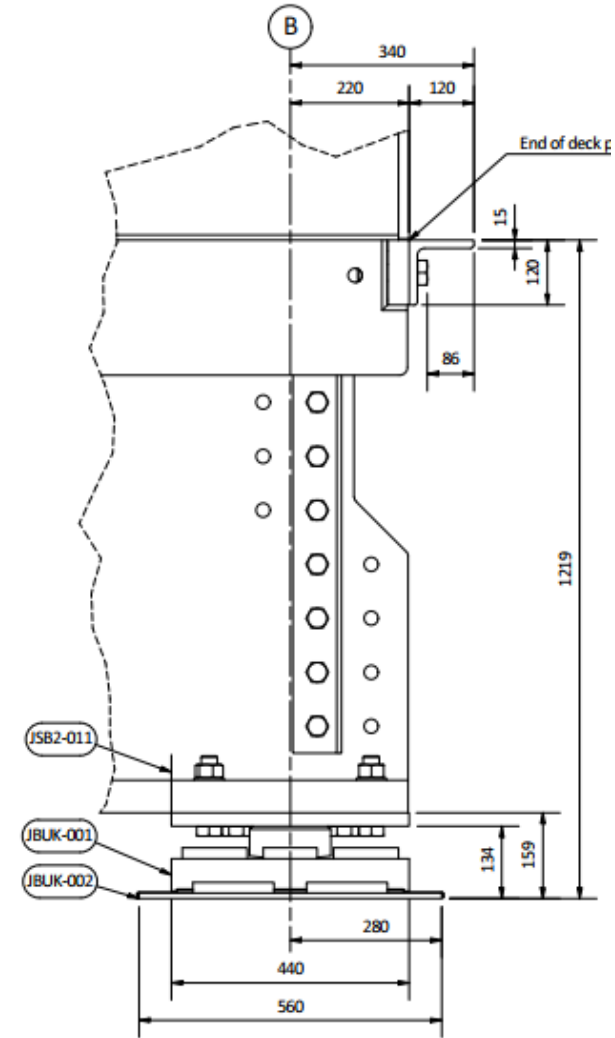


Detail 3, Typical Single Sliding Bearing
Scale 1 : 10





Detail 4, Typical Double Sliding Bearing
Scale 1 : 10



Detail 5, End of bridge Axis B
Scale 1 : 10

Scheme Specific Assumptions & Limitations:

1. This quotation is subject to the availability of equipment at the time of order.
2. Hire charges commence on arrival of the equipment on site and cease on final removal. The hire period will be the time between these dates or the minimum period stated in the quotation whichever is the greater.
3. The installation date for the bridge is to be agreed at the time of order. A minimum of 8 weeks written notice is required for dismantling.
4. In the event that installation is delayed Janson will reserve the bridge free of charge for 2 weeks after which Janson reserve the right to recover the costs associated with storage and loss of opportunity for the period of delay.
5. The quotation includes an internal (CAT 2) design check. Should an external design check be required additional charges will be incurred.
6. Janson Bridging do not accept the withholding of retention monies.
7. Janson Bridging will accept liability for liquidated damages and consequential loss provided that our liability is limited, in total to 5% of our contract value.
8. The hirer is to insure the equipment whilst in use. Handover for insurance purposes is on completion of installation and ceases on commencement of dismantling.
9. Variations to our works will be valued at cost +20% for overhead and profit.
10. This offer does not include for the provision of a Performance Bond or Parent Company Guarantee.
11. In preparation of this quotation Janson Bridging have not included any provision for any weather delay risk associated with the use of mobile cranes. Should additional costs be incurred due to weather delays they will be passed, in full to our client.
12. Craneage as follows:
250 tonne capacity crane for 1 day to lift the bridge at 19m radius
13. Our Insurances are as follows:
 - a. PL is £5m
 - b. EL is £10m
14. Should a sale and buy option be chosen it is offered subject to the following conditions:
 - i. The bridge must be sold back to Janson Bridging, sale to others is not permitted.
 - ii. Prior to dismantling the bridge will be jointly inspected by yourselves & Janson, any damaged equipment will be excluded from the buy back and the sum reduced.
 - iii. The bridge may not be moved from its position for re use.
 - iv. The bridge cannot be re-hired or sold by yourselves.

Facilities & Attendances by Others:

The following are assumed to be provided by others without charge to Janson to facilitate the installation and removal of the bridge.

1. The design and construction of suitable foundations and ballast walls and approaches including the design and installation and removal of holding down bolts. Shims and grout for bearings and seating strips as required dependant on the bridge type.
2. The design, supply, installation and removal of any side screens, panelling and mesh if required. The design, supply, installation and removal of any services or service supports.
3. Assuming the roles of Principle Contractor and Principle Designer for the works in respect of the CDM regulations.
4. The provision of welfare facilities within a reasonable distance of the work site.
5. The identification, diversion, removal, isolation or protection of any over or underground services to facilitate the safe installation & removal of the bridge.
6. Safe routes of access and egress for delivery and collection vehicles and suitable area(s) of hard standing for Janson's exclusive use for the delivery, assembly, installation and removal of our equipment including loads from crane outrigger loadings.
7. The arrangement of any road, rail or river closures together with any traffic or pedestrian management necessary for the safe installation & removal of the bridge.
8. The provision of a manned safety boat or other suitable means of rescue if required.
9. The provision of background (safety) lighting should night work be included in the quotation.
10. Setting out attendance for the bridge and any associated crane positions.
11. Safe & suitable access to bearing and seating strip positions for personnel.
12. The design and provision of suitable protection to the anti-skid surfacing should tracked machines cross the bridge.