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Avison Young

On behalf of
University of St Andrews

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GUARDBRIDGE RESERVOIR DECOMMISSIONING ENVIRONMENTAL IMPACT REPORT

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1. INTRODUCTION

1.1 Background

Ramboll UK Limited (Ramboll) has been appointed by Avison Young on behalf of the University of St. Andrews (the Client) to submit an application for a Marine License under the Marine (Scotland) Act 2010 associated with the decommissioning of a redundant reservoir located in Guardbridge, Fife.

The reservoir historically fed the former paper mill in Guardbridge, located approximately 250 m to the south east and has been out of use for a number of years. The paper mill is undergoing a phase of redevelopment by the Client. Given that the disused reservoir represents an ongoing liability to the Client, it is proposed that the structure is decommissioned.

It is understood from discussions with Marine Scotland – Licensing Operations Team (MS-LOT)¹ that a Marine License is required since there are aspects of the decommissioning project that will occur in, on or over the Marine Environment.

This Environmental Impact Report (EIR) provides supporting information to the Marine License Application. It is expected that the EIR is read in conjunction with the Marine License Application.

The location of the works is shown on Figure 1 within Appendix 1.

1.2 Objectives

The objective of this report is:

- To provide an assessment of the potential environmental impacts that the construction works (i.e. decommissioning of the reservoir and associated infrastructure) may have, including interference with other users of the sea, as required by the Marine License Application for Construction Projects.

1.3 Scope of works

The scope of works undertaken to achieve the objective as stated above comprised:

- Liaison with stakeholders including NatureScot, Marine Scotland and the Scottish Environment Protection Agency (SEPA).
- Consideration of Scotland's National Marine Plan with respect to the proposed licensable activity;
- Review of publicly available resources and relevant existing environmental information to confirm the environmental setting and sensitivity of the site;
- Review of documents pertaining to the methodologies proposed for decommissioning of the reservoir and associated infrastructure, in order to identify potential environmental impacts associated with the works; and
- Development of mitigation measures to address identified potential environmental impacts.

1.4 Scope Limitations

It should be noted that the majority of the decommissioning works will be undertaken above the level of Mean High Water Springs (MHWS) and therefore are not a licensable activity. This report relates to the licensable works, however reference is made to the wider project tasks where relevant (e.g. in the consideration and development of mitigation measures).

¹ Email correspondence received from Marine Scotland – Licensing Operations Team (LOT) on 8th September 2020.

1.5 General Limitations and Reliance

This report has been prepared by Ramboll UK Limited ("Ramboll") exclusively for the intended use by the University of St Andrews c/o Avison Young (the "client") in accordance with the agreement (proposal reference number 1620010004_01), dated 3rd June 2020 between Ramboll and the client defining, among others, the purpose, the scope and the terms and conditions for the services. No other warranty, expressed or implied, is made as to the professional advice included in this report or in respect of any matters outside the agreed scope of the services or the purpose for which the report and the associated agreed scope were intended or any other services provided by Ramboll.

In preparation of the report and performance of any other services, Ramboll has relied upon publicly available information, information provided by the client and information provided by third parties. Accordingly, the conclusions in this report are valid only to the extent that the information provided to Ramboll was accurate, complete and available to Ramboll within the reporting schedule.

Ramboll's services are not intended as legal advice, nor an exhaustive review of site conditions and/or compliance. This report and accompanying documents are initial and intended solely for the use and benefit of the client for this purpose only and may not be used by or disclosed to, in whole or in part, any other person without the express written consent of Ramboll. Ramboll neither owes nor accepts any duty to any third party, unless formally agreed by Ramboll through that party entering into, at Ramboll's sole discretion, a written reliance agreement.

Unless otherwise stated in this report, the scope of services, assessment and conclusions made assume that the site will continue to be used for its current purpose and end-use without significant changes either on-site or off-site.

Unless stated otherwise, the geological information provided is for general environmental interpretation and should not be used for geotechnical and/or design purposes.

2. SITE LAYOUT AND DECOMMISSIONING WORKS

2.1 Site Setting and Layout

The site is located to the north west of the village of Guardbridge in Fife and comprises three distinct areas as follows:

- The reservoir, centred approximately at grid reference NO447199
- The pipe bridge, centred approximately at grid reference NO446200
- The settlement pond, centred approximately at grid reference NO446207

The Motray Water flows from the north of the settlement pond in an overall south easterly direction, beneath the pipe bridge, and around the northern and eastern sides of the reservoir towards its confluence with the Eden Estuary. The settlement pond is located within the grounds of Milton Farm and forms part of the mill lade.

The Motray Water is tidally influenced from its confluence with the Eden Estuary to the Normal Tidal Limit (NTL), located approximately 115 m downstream of Toll Road at grid reference NO444204. Section 21 of the Marine (Scotland) Act 2010 states that it is a licensable marine activity to “*construct, alter or improve any works within the Scottish marine area either – (a) in or over the sea, of (b) on or under the seabed.*”² As such, there are elements of the project that will require a Marine Construction License.

The location of the site, including the extent of the licensable work, is shown on Figure 1 in Appendix 1.

2.2 Proposed Decommissioning Works

The proposed decommissioning works will involve the following:

- sediment removal from the reservoir, breach of the reservoir embankment and associated reprofiling;
- demolition of a pipe bridge over the Motray Water; and
- infilling of the upstream settlement pond.

2.2.1 Reservoir

A summary of the activities required to decommission the reservoir and whether these will take place in the marine environment is presented in Table 2.1 below:

Table 2.1: Reservoir Decommissioning Activities		
Activity	Activity subject to marine licensing?	Additional Comments
Excavation of sediment from base of the reservoir	No	Material from the base will be excavated prior to breach of the reservoir.
Excavation of reservoir embankment material	No	Material to be removed is located on the internal face of the reservoir. This is anticipated to comprise brick and ‘puddle clay’. This will be undertaken prior to breach of the reservoir.

² <https://www.legislation.gov.uk/asp/2010/5/part/4/crossheading/licensable-marine-activities> (Accessed 8th February 2021)

Table 2.1: Reservoir Decommissioning Activities		
		Excavated materials will be stored for reuse (infilling of the settlement pond and bridge abutment voids).
Breach of reservoir and installation of breached slope surface protection	Yes	<p>The extent of the reservoir breach is shown on <i>Drawing No. UOSA-ACM-DM-XX-DR-CE-050025 and UOSA-ACM-DM-XX-DR-CE-010030</i>, included in Appendix 2.</p> <p>Excavated materials will be stored for reuse (infilling of the settlement pond and bridge abutment voids).</p> <p>Embankment protection/hardening materials (Geoweb, soil and turf) will be installed on the excavated surface of the embankment.</p>
Regrade existing embankment upstream face (i.e. internal face of the reservoir)	No	<p>The regrading works relate to the internal face of the reservoir only and will be undertaken prior to breach of the reservoir.</p> <p><i>Refer to Drawing No. UOSA-ACM-DM-XX-DR-CE-050025 included in Appendix 2.</i></p>
Infill the overflows	No	<p>The west overflow is 1.43 m in length and 450 mm diameter.</p> <p>The east overflow is 1.38 m in length and 305 mm diameter.</p> <p>Both overflows are formed from concrete, with brick head walls and concrete pipes.</p> <p>Imported rockfill will be used as infill.</p> <p>Infilling to be done on completion of embankment breach and reprofiling.</p> <p><i>Refer to Drawing No. UOSA-ACM-DM-XX-DR-CE-050025 included in Appendix 2.</i></p>
Infill the bottom outlet structures	No	<p>Located in the south corner of the reservoir, one was used for supply, one was used for scour.</p> <p>Imported rockfill will be used as infill.</p> <p><i>Refer to Drawing No. UOSA-ACM-DM-XX-DR-CE-050025 included in Appendix 2.</i></p>
Removal and reinstatement of existing fencing	No	<p>Preparatory construction works.</p> <p>Potential environmental impacts with this activity will be considered in the Pollution Prevention Plan (refer to Section 6 of this report) and mitigation measures implemented.</p>
Removal of existing bridge at the outlet structure	No	Located above the outlet on the internal part of the reservoir.

As shown in Table 2.1 there is one activity in this area which will involve works extending below the level of MHWS: Breach of the reservoir. The remainder of the activities will take place outside of the marine environment but will be subject to environmental mitigation measures to minimise the potential for pollution to the marine environment.

The draft methodology for the works that will be undertaken to decommission the reservoir is detailed further in Section 6, and in Appendix 3.

2.2.2 Pipe Bridge

A summary of the activities required to decommission the pipe bridge and whether these will take place in the marine environment is presented in Table 2.2 below:

Table 2.2: Pipe Bridge Decommissioning Activities		
Activity	Undertaken within the marine environment?	Additional Comments
Cut, remove and cap remaining pipework	Yes	Pipework and fittings are located on the bridge which extends over the Motray Water which is tidally influenced at this location.
Removal of existing bridge and bridge abutments	Yes	Bridge components include decking, metal beams and two abutments.
Riverbank reprofiling	Yes	Local reprofiling to be carried out once pipe, bridge and abutments have been removed to ensure no voids remain. This may extend below the level of MHWS.

All of the activities to be undertaken associated with the decommissioning with the pipe bridge occur over or under the level of MWHS.

The methodology for removal of the pipe bridge is detailed further in Section 6, and in Appendix 3.

2.2.3 Decommissioning and Infilling of Settlement Pond

The settlement pond adjoins the mill lade which is upstream of the NTL and therefore not tidally influenced. The settlement pond is not located within the marine environment and therefore infilling of the structure is not a licensable activity.

The potential for the activities at this location to impact the environment, including the downstream marine environment, will be considered in the Pollution Prevention Plan (PPP) (as presented in Section 7 of this report) and appropriate mitigation measures implemented.

3. SCOTLAND'S NATIONAL MARINE PLAN

Scotland's National Marine Plan³ (the Plan) covers the management of Scottish inshore and offshore waters and was prepared in accordance with EU Directive 2014/89/EU which came into force in July 2014. The Directive introduces a framework for maritime spatial planning and aims to promote the sustainable development of marine areas and the sustainable use of marine resources.

The Plan specifies a collection of General Policies which apply across existing and future development and use of the marine environment. The policies apply to decision making in the marine environment and these policies have been considered with respect to the Marine License Application for the decommissioning of the redundant reservoir and associated infrastructure at Guardbridge. The following policies in particular are considered, and referred to, in subsequent sections of this report:

GEN 3 Social Benefit: Sustainable Development and use which provides social benefits is encouraged when consistent with the objectives and policies of the plan.

GEN 7 Landscape/seascape: Marine planners and decision makers should ensure that development and use of the marine environment take seascape, landscape and visual impacts into account.

GEN 9 Natural heritage: Development and use of the marine environment must:

- (a) Comply with legal requirements for protected areas and protected species.
- (b) Not result in significant impact on the national status of Priority Marine Features.
- (c) Protect and, where appropriate, enhance the health of the marine area.

GEN 12 Water quality and resource: Developments and activities should not result in a deterioration of the quality of waters to which the Water Framework Directive, Marine Strategy Framework Directive or other related Directives apply.

GEN 13 Noise: Development and use of the marine environment should avoid significant adverse effects of man-made noise and vibration, especially on species sensitive to such effects.

³ <https://www.gov.scot/publications/scotlands-national-marine-plan/> (accessed 8th February 2021)

4. STAKEHOLDER CONSULTATION

Ramboll consulted Marine Scotland, NatureScot (formerly Scottish Natural Heritage (SNH)) and SEPA, when the project was under consideration by the Client in 2017, prior to the decommissioning design being progressed. Therefore Ramboll's discussions with the regulators were high level and sought to identify whether the regulators could foresee any potential issues with the general proposals for decommissioning the reservoir as further detailed below.

4.1.1 Initial Consultation with Marine Scotland

Ramboll has had a number of discussions with Marine Scotland relating to various aspects of work that we are undertaking on behalf of the Client in relation to redevelopment of the former Paper Mill site. Ramboll discussed the reservoir decommissioning specifically with Marine Scotland in February 2017. That discussion concluded that there is no current standard approach for this specific type of project, therefore, Marine Scotland required to see the draft detailed design for the reservoir decommissioning in order to enable it to confirm whether a Marine Licence is required for the works. This was supplied by Ramboll in September 2020 and Marine Scotland confirmed by email that a license would be required on the basis that the decommissioning will involve works below and over the area of Mean High Water Springs (MHWS).

4.1.2 Initial Consultation with NatureScot

Ramboll spoke with Gavin Johnson of NatureScot (then Scottish Natural heritage [SNH]) in February 2017. Gavin Johnson was NatureScot's lead officer for the Eden Estuary.

Ramboll outlined the Client's plans for opening up the reservoir, effectively resulting in the area of the reservoir connecting with the adjacent Motray Water and creating a lagoon type environment. SNH agreed in principle, seeing this as a potential for habitat creation which is likely to result in an extension of the habitat currently provided by the Motray Water immediately adjacent to the reservoir.

The following key points for consideration were identified:

- A full Habitat Regulations Assessment of impacts on the SPA/SAC would be required but NatureScot considered, dependent upon the design of the decommissioning methodology, that the impacts would likely be beneficial rather than detrimental; and
- Effective management of the dam by the former Paper Mill is key to managing ecological risk. Without removing the dam, creation of the lagoon will not succeed which would likely cause NatureScot to oppose the plans.

In conclusion, NatureScot considers the idea of decommissioning the reservoir, resulting in the creation of a lagoon type environment, to be a good prospect, however further consultation with NatureScot will be required as the decommissioning design and methodology is developed and before it is finalised. That consultation would require undertaking of an HRA. The HRA is appended to this Environmental Impact Report as Appendix 4.

4.1.3 Initial Consultation with SEPA

Ramboll spoke with Steve Archibald, SEPA officer for Fife in February 2017. SEPA advised that as the site is within an area of intertidal waters (i.e. the watercourse is below mean high water springs (MHWS)), it is Marine Scotland rather than SEPA that would regulate the decommissioning of the reservoir. This means that the works would not be covered by the Water Environment (Controlled Activities) (Scotland) Regulations (CAR) 2011 regulations and no further liaison with SEPA is required in this regard.

5. ENVIRONMENTAL SETTING

Desk based research was carried out in order to establish the potential for environmental impacts arising as a result of the decommissioning of the redundant reservoir and associated infrastructure, and to assess the sensitivity and vulnerability of the site's setting with respect to receptors such as surface water, groundwater, human health and ecologically designated areas.

Information was obtained from a number of sources including:

- examination of published geological and hydrogeological maps produced by the British Geological Survey (BGS) and associated sheet memoirs (where available);
- regulatory authority and stakeholder websites including those belonging to Scottish Environment Protection Agency (SEPA), Marine Scotland and NatureScot; and
- review of relevant existing environmental reports undertaken in association with the project (e.g. ecological surveys).

5.1 Geology

5.1.1 Areas beneath MHWS

According to the BGS onshore Geoindex viewer⁴, the natural superficial deposits beneath and in the immediate vicinity of the tidally influenced section of the Motray Water comprise Marine Beach Deposits, described as consisting of gravel (shingle), sand, silt and clay.

The underlying bedrock is shown to comprise the Devonian aged Glenvale Sandstone Formation consisting of sandstones with bands of siltstone and pebbles of mudstone.

5.1.2 Area outwith the area of MHWS

The superficial deposits beneath the mill lade, located in the grounds of Milton Farm, are shown to comprise Raised Marine Deposits, likely to consist of gravel, sand, silt and clay, possibly containing organic debris (e.g. shells and plant remains).

This area is located beyond the area of MHWS. The bedrock beneath this area comprises the Scone Sandstone Formation, described as cross-bedded sandstones with subsidiary siltstone, mudstone, conglomerate, sparse andesitic lava flows and some calcareous beds with concretionary limestones.

One historical borehole record, located approximately 300 m to the south east of the reservoir (within the former Guardbridge Paper Mill), recorded boulder clay (Glacial Till) to a depth of approximately 11 m below ground level (m bgl) which was underlain by pink, purple and red sandstones.

5.2 Hydrogeology

The BGS Onshore Geoindex shows the bedrock aquifer (i.e. the Glenvale Sandstone Formation) beneath the reservoir and Motray Water to be a highly productive aquifer. The Scone Sandstone Formation (upstream of MHWS, beneath the mill lade) is shown to be a moderately productive aquifer.

According to SEPA's online water environment hub⁵, the Tentsmuir Coastal Groundwater underlies the reservoir and the Motray Water (and surrounding area). This groundwater body is classified by SEPA as having an overall status of Poor under the Water Framework Directive classification scheme, based on data from 2014. The Poor status reflects Poor water quality (as a

⁴ <https://mapapps2.bgs.ac.uk/geoindex/home.html> (accessed 8th February 2021)

⁵ <https://www.sepa.org.uk/data-visualisation/water-environment-hub/> (accessed 8th February 2021)

result of rural diffuse pollution sources) but Good flow and levels. No significant improvement is projected for 2021 or by 2027.

Licensed groundwater abstractions in Scotland in excess of 10 m³/day are regulated by SEPA under the Water Environment (Controlled Activities) (Scotland) Regulations (CAR) 2011, however details are not publicly available. SEPA's Compliance Assessment Report interactive map shows a number of CAR Licenses for agricultural purposes within a 2 km radius of the Motray Water and reservoir, which could relate to either groundwater or surface water abstractions. The closest is located at Milton Farm, approximately 575 m north west of the reservoir.

5.3 Hydrology

The Motray Water is part of the Eden Estuary transitional water body which has been classified by SEPA as having an overall status of Good under the Water Framework Directive classification scheme. This combines Good water quality with Good freedom from invasive species and High physical condition.

The section of the Motray Water that is further upstream is not classified by SEPA. This area is beyond the section that is tidally influenced.

Licensed surface water abstractions in Scotland in excess of 10 m³/day are regulated by SEPA under the Water Environment (Controlled Activities) (Scotland) Regulations (CAR) 2011, however details are not publicly available. SEPA's Compliance Assessment Report interactive map shows a number of CAR Licenses for agricultural purposes within a 2 km radius of the Motray Water and reservoir, which could relate to either groundwater or surface water abstractions. The closest is located at Milton Farm, approximately 575 m north west of the reservoir.

SEPA flood maps⁶ show that the Motray has a high risk of flooding from coastal waters where the watercourse is tidal and a high risk of flooding from rivers beyond the tidal limit and within the extent of the reservoir.

Following decommissioning of the reservoir and breaching of the embankment it is expected that water from the Motray Water would flow into the decommissioned structure at high tide, and that water levels would reduce at low tide.

5.4 Ecology

The North Motray Water is designated⁷ as a Special Protection Area (SPA), a Site of Special Scientific Interest (SSSI) and a Ramsar site. The Motray Water flows towards the Eden Estuary which shares the aforementioned designations and is part of the Firth of Tay and Eden Estuary Special Area of Conservation (SAC). All of these designations related to the presence of wintering birds as well as habitats. The extent of the ecological designations is shown on Figure 2 in Appendix 1.

GEN 9 (Natural heritage) of the National Marine Plan is considered to be of particular importance with respect to the decommissioning of the reservoir and associated infrastructure given the International and National designations associated with the Motray Water and Firth of Tay and Eden Estuary. The decommissioning of the reservoir would result in the creation of a new wetland area that would improve the potential foraging and refuging resource for the birds using the SPA. GEN 3 (Social benefit) is also considered relevant in the context of the creation of additional habitat for wintering birds.

The project team is aware of the legal requirements to protect the Motray Water (and by extension, the Eden Estuary) throughout the decommissioning works and to ensure that the

⁶ <http://map.sepa.org.uk/floodmap/map.htm> (accessed 19th March 2021)

⁷ <https://magic.defra.gov.uk/magicmap.aspx> (accessed 19th March 2021)

project does not result in any significant adverse impacts. Mitigation measures to be implemented throughout the decommissioning works are detailed in Section 7 herein, and details relating to the presence of migrating and nesting birds and potential removal of vegetation is discussed below.

5.4.1 Migratory Birds

The presence of migrating (wintering) birds in the Eden Estuary and Motray Water has been identified as a constraint to the proposed decommissioning of the reservoir and associated infrastructure and it is expected that the work will require to be undertaken outside of the migrating bird season. The construction works will require to be carried out between the end of the spring migration period (considered to be the beginning of May) and the end of September to mitigate potential impacts to these ecological receptors.

The works will be undertaken over a period of 11 weeks (including mobilisation and demobilisation) as shown on the indicative schedule of work (included in Appendix 3). Specific dates for each task remain to be confirmed, however the anticipated timescales for completion of each task is provided. The programme will be such that construction works taking place over and below the level of MHWS (anticipated to take in the region of four weeks to complete) would be completed by 30th September 2021.

5.4.2 Breeding birds

It is acknowledged that the proposed decommissioning works will take place during the nesting bird season. Preparatory works required to provide access to the areas of work below MHWS may include the clearance of vegetation. When such works are intended within the nesting bird season, an ecologist will carry out nesting bird surveys prior to the removal of such scrub/vegetation for each phase of works undertaken. Should nesting birds be identified, the ecologist will advise on mitigation measures to be put in place prior to works commencing.

5.5 Shellfish Harvesting Areas

SEPA's Water Environment Hub⁸ indicates that there are no Shellfish Harvesting Areas within 2 km of the site.

5.6 Coastal and Marine Archaeology

The Historic Scotland Designations Map⁹ indicates that the site is not located within a Historic Marine Protected Area (MPA).

5.7 Visual Impact

The proposed repairs relate to the decommissioning of a redundant reservoir and associated infrastructure, rather than construction of a new structure. Permanent alterations comprise a small section of the reservoir that will be breached and removal of redundant pipework and an associated derelict bridge over the Motray Water. None of the works are considered to visually impact the landscape or seascape, i.e. no construction that will result in structures impacting the landscape/seascape is taking place. This complies with GEN 7 (Landscape/ seascape) of the National Marine Plan.

⁸ <https://www.sepa.org.uk/data-visualisation/water-environment-hub/> (accessed 8th January 2021)

⁹ <http://historicscotland.maps.arcgis.com/apps/Viewer/index.html?appid=18d2608ac1284066ba3927312710d16d> (accessed 8th February 2021)

5.8 Noise

The proposed methodologies for the repair works will not result in the production of low to mid frequency (10 Hz to 10kHz) noise. This complies with GEN 13 (Noise) of the National Marine Plan.

5.9 Environmental Sensitivity and Vulnerability

In consideration of the environmental factors discussed above, the location of the decommissioning works is considered to be a highly sensitive and vulnerable area with respect to surface water and ecological receptors. The Motray Water is part of the Firth of Tay and Eden Estuary which is a transitional water body located immediately adjacent to the site. The Motray Water section of the Estuary is designated as a SPA, a SSSI and a Ramsar site. The Firth of Tay and Eden Estuary Special Area of Conservation (SAC) is located approximately 420 m downstream. Since the embankment breach and removal of the pipe bridge abutments will extend below the level of MHWS, these works are considered to take place in the marine environment. It will be necessary for compliance with best practice construction techniques and implementation of mitigation measures in order to address the potential environmental impacts that could arise as a result of the decommissioning activities. This complies with GEN 9 (Natural Heritage) and GEN 12 (Water Quality and Resource) of the National Marine Plan. The techniques and mitigation measures are discussed in detail in Section 7.

6. METHODOLOGY AND MATERIALS

At the time of reporting, the Principal Contractor that will undertake the works remains to be formally appointed. Draft Method Statements for the distinct work areas were prepared by tendering parties. A copy of the intended methodology, referencing the tender specification prepared by Aecom, is included within Appendix 3.

The final program of works will be confirmed once the Principal Contractor has been appointed. The indicative schedule of works is included in Appendix 3 and takes into account the phases of work that are not subject to Marine Scotland licensing. It is expected that the licensable works (highlighted in yellow on the indicative timeline) will take approximately five weeks¹⁰.

6.1 Deposits and Removals Associated with the Reservoir Decommissioning Project

The Marine License Application requires an indication of the quantities of materials that will be removed and deposited below the level of Mean High Water Springs (MHWS). Estimated quantities of the materials¹¹ are provided below:

6.1.1 Materials to be removed permanently from below MHWS (and over MHWS with respect to the pipe bridge):

- Approximately one tonne of timber to be removed from pipe bridge.
- 1 No. 12 inch diameter pipe and 1 No. 14 inch diameter pipe (currently located on the pipe bridge). Total length of each pipe is 18 m.
- 2 No. 18 m long beams of the pipe bridge (total volume of beams is 2.16m³)
- 2 No. existing masonry bridge abutments (total volume of masonry is 40 m³)
- Approximately 12 tonnes of 'puddle clay' from the reservoir breach area.

6.1.2 Materials to be placed permanently below MHWS:

- 12 tonnes of site-won soil (from embankment reprofiling and breach) to infill the voids created by removal of the pipe bridge abutments.
- 600 m² of Geoweb (slope protection geotextile, refer to Appendix 3 for further details) will be placed on the north and south faces of the reservoir embankment breach.
- 153 tonnes topsoil will be placed over the top of the Geoweb on the reservoir embankment breach
- 600 m² Greenfix type 75c turf will be placed on the finished north batter of the reservoir embankment and south face of the reservoir

6.1.3 Temporary Deposits

- 2. No. bog mats to be placed adjacent to the bank of the Motray Water to create a working platform around the bridge abutments.
- 1 no. silt screen will be placed in the Motray Water immediately downstream of the pipe bridge work area.
- 1 No. 8 tonne boat skip will be placed in the Motray Water at the work area of the pipe bridge during removal of the bridge abutments.

¹⁰ The dates provided on the timeline were provisional at the tender stage and are no longer applicable however the anticipated duration of each task has not altered.

¹¹ This relates to the activities taking place below the level of MHWS only, therefore quantities relating to the works at the settlement pond and within the unbreached reservoir are not included.

7. POTENTIAL ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES

The Firth of Tay and Eden Estuary is designated as an SPA, a SSSI and a Ramsar site. The Firth of Tay and Eden Estuary Special Area of Conservation (SAC) is located approximately 420 m downstream (to the south east). The Motray Water is considered to be the most sensitive receptor with regards to the decommissioning of the reservoir and associated infrastructure, however there is also potential for impact to the Eden Estuary should the proposed works not be mitigated effectively.

Table 6.1 overleaf presents the identified potential environmental impacts associated with the decommissioning of the reservoir and associated infrastructure, and the mitigation measures that will be implemented by the contractor to minimise the potential for adverse impacts to the Motray Water and, by extension, the Eden Estuary located further downstream.

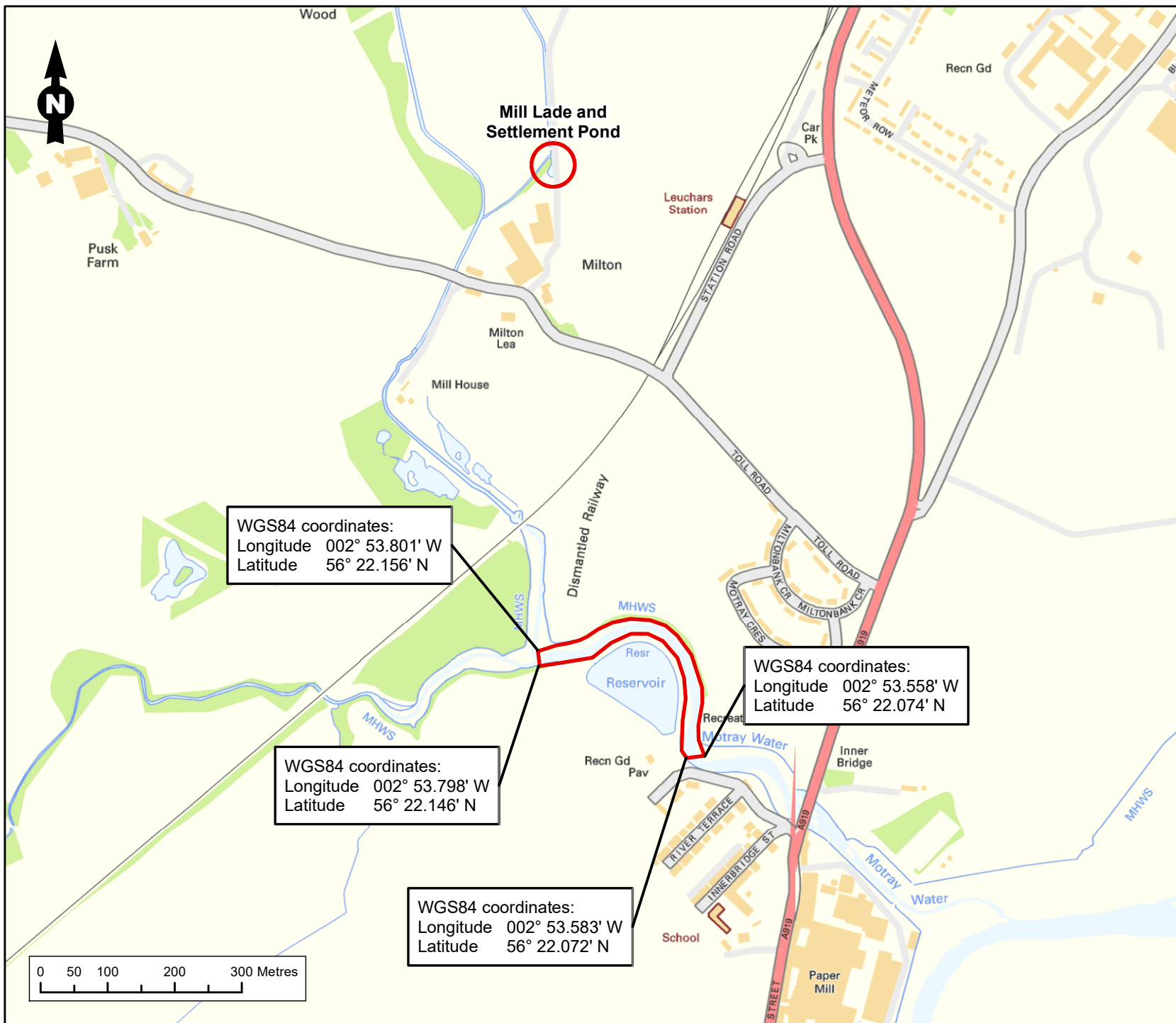
Table 5.1 Mitigation Measures

Activity	Identified Environmental Risks	Environmental Protection Measures
<p>Removal of pipe bridge and abutments</p> <p>Infilling of pipe bridge abutment voids</p>	<p>Potential release of silt laden water to the Motray Water.</p> <p>Accidental spillage of bridge/abutment construction materials into watercourse during removal/soil during infilling.</p> <p>Potential leakage of fuel/lubricating oil associated with plant undertaking the works.</p>	<p>Works to be carried out in accordance with PPG 5 Works and maintenance in or near water.</p> <p>Mitigation measures to control silt will be implemented prior to works commencing such as installation of silt screens to prevent discharge to the Motray Water. Measures to be checked regularly by a designated Responsible Person to ensure efficacy.</p> <p>All plant will carry a spill kit.</p> <p>Placement of oil booms downstream of work areas to intercept hydrocarbons in the event that these are accidentally released.</p> <p>Care will be taken during removal and placement of materials to minimise the potential for spillages into the Motray Water.</p> <p>All site staff will receive tool box talk relating to silt mitigation measures, pollution prevention and incident response.</p>
Breach of reservoir embankment	<p>Potential for accidental release of excavated materials (soils) to the Motray Water.</p> <p>Potential accidental release of materials to be placed to form the embankment breach.</p> <p>Potential leakage of fuel/lubricating oil associated with plant undertaking the works.</p>	<p>Works to be carried out in accordance with PPG 5 Works and maintenance in or near water.</p> <p>Tide times will be considered when planning works at the breach area, particularly those below the level of MHWS.</p> <p>Mitigation measures to control silt will be implemented prior to works commencing such as installation of silt screens to prevent discharge to the Motray Water. Measures to be checked regularly by a designated Responsible Person to ensure efficacy.</p> <p>Care will be taken to ensure that materials removed as part of the breach (rock and soil), or placed in the newly formed breach area (e.g. Geomat/turf) do not fall into the Motray Water. In the event that waste/material is released into the Motray Water it must be recovered safely and disposed of appropriately.</p> <p>Placement of oil booms downstream of work areas to intercept hydrocarbons in the event that these are accidentally released.</p> <p>All site staff will receive tool box talk relating to silt mitigation measures, pollution prevention and incident response.</p>
Decommissioning activities within the reservoir outwith	<p>Potential release of silt to the Motray Water during excavation/short-term stockpiling prior to removal.</p>	<p>Works to be carried out in accordance with PPG 5 Works and maintenance in or near water.</p> <p>Reservoir to be drained prior to commencing works. Valve will be closed on incoming tides and open on falling tides. In general, works will take into account the rising and falling tides and working patterns will be adapted as necessary.</p>

Activity	Identified Environmental Risks	Environmental Protection Measures
<p>the marine environment</p> <ul style="list-style-type: none"> Excavation of existing sediment Reprofiling of the internal reservoir face 	<p>Potential for accidental release of fuel from plant working in/near the reservoir.</p> <p>Potential disturbance to wintering birds using the reservoir.</p>	<p>Silt containment measures to be implemented prior to commencement of works within the reservoir.</p> <p>All plant will carry a spill kit.</p> <p>Plant and equipment will not be refuelled within 10 m of a surface water course or drain.</p> <p>Any stationary plant that will be left on the work site overnight will be subject to a visual inspection at the end of the working day to ensure that there are no visible leaks of oil or fuel.</p> <p>All site staff will receive a tool box talk relating to fuel storage, handling and use of spill kits.</p> <p>All spillages of fuel will be reported in the site daily diary, along with actions taken.</p> <p>Plant that is designed to be static (e.g. generators) will have integrated secondary containment with capacity for 110% of the associated fuel tank.</p> <p>No plant or equipment will be washed in/over the reservoir. All washing should be carried out in a manner that enables full control of the wash-down water/run-off and must not enter the Motray Water.</p> <p>No works will be undertaken during the wintering bird season (October to April) to avoid the potential for disturbance to wintering birds.</p>
<p>Decommissioning activities at the settlement pond beyond the tidal limit of the Motray Water (i.e. outwith the marine environment).</p>	<p>Potential release of silt to the mill lade and Motray Water during decommissioning or subsequent infilling.</p>	<p>Works to be carried out in accordance with PPG 5 Works and maintenance in or near water.</p> <p>Mitigation measures to control silt to be implemented and maintained for the duration of the works (e.g. silt fencing).</p> <p>Placement of oil booms downstream of work areas to intercept hydrocarbons in the event that these are accidentally released.</p>
<p>Storage of fuel or oils and use/refuelling of plant</p>	<p>Potential impact on the Firth of Tay and Eden Estuary as a result of leaks or spills entering drains, percolation through unsurfaced ground or direct surface water runoff.</p>	<p>All fuel will be stored in integrally bunded containers that are compliant with applicable legislation and Pollution Prevention Guidelines. Within the lockable lid of the integral fuel tank a spill kit will be available.</p> <p>All oil storage will be in accordance with the Water Environment (Oil Storage) (Scotland) Regulations 2006 with appropriate bunding and spill/leak containment.</p> <p>Fuel tanks and oil storage will be positioned at a safe distance away from the routes of site traffic to avoid accidental collision.</p> <p>Fuel tanks and oil storage will be positioned on hardstanding surfaces where possible.</p> <p>Fuel tanks, oil storage and hazardous materials will not be positioned within 10 m of the Motray Water.</p> <p>All plant will carry a spill kit.</p>

Activity	Identified Environmental Risks	Environmental Protection Measures
		<p>Plant and equipment will not be refuelled within 10 m of a surface water course or drain.</p> <p>Site drainage entry points (e.g. surface drains and manholes) will be appropriately covered to ensure prevention of fluid entry and damage during plant crossings.</p> <p>Any stationary plant that will be left on the work site overnight will be subject to a visual inspection at the end of the working day to ensure that there are no visible leaks of oil or fuel.</p> <p>All site staff will receive a tool box talk relating to fuel storage, handling and use of spill kits.</p> <p>All spillages of fuel will be reported in the site daily diary, along with actions taken.</p> <p>Plant that is designed to be static (e.g. generators) will have integrated secondary containment with capacity for 110% of the associated fuel tank.</p> <p>No plant or equipment will be washed in/over the Motray Water. All washing should be carried out in a manner that enables full control of the wash-down water/run-off and must not enter the Motray Water.</p>
Waste storage and management	<p>Nuisance impacts to local residents as a result of incorrect disposal of waste and general poor housekeeping.</p> <p>Potential impacts to the Motray Water as a result of incorrect storage and disposal of wastes, and general poor housekeeping.</p>	<p>All waste disposal will be in accordance with applicable legislation.</p> <p>Waste stored in the designated storage areas will be in covered secure skips or containers appropriate to the waste type.</p> <p>Waste containers will be located at least 10 m away from surface drains and the Motray Water.</p>
Delivery of material to site Uplift of materials/wastes	<p>Generation of dust during dry conditions.</p> <p>Potential impact to water environment due to runoff from stockpiled material.</p> <p>General nuisance as a result of dust/sediment on road.</p>	<p>Designated laydown areas to be implemented for the storage of materials to be used during the works that are a minimum of 10 m from drains, the reservoir and the Motray Water.</p> <p>Vehicle access routes to be established and communicated with drivers and site personnel. Speed limit of 10 mph to be maintained for site vehicles.</p> <p>Vehicle marshals will be used when delivery vehicles access and manoeuvre within the site.</p> <p>Road sweepers will be available for use as required.</p>
Removal of vegetation / scrub from embankment (e.g. at pipe bridge abutments and reservoir breach)	<p>Potential disturbance to wintering birds</p> <p>Potential disturbance to nesting birds.</p>	<p>No works will be undertaken during the wintering bird season (October to April).</p> <p>Any clearance of vegetation or scrub that is undertaken during the nesting bird season will not commence until an ecologist has surveyed the relevant area for the presence of nesting birds 24 hours prior to removal.</p>

APPENDIX 1 FIGURES



Legend

Site Extent Boundaries

WGS coordinates are in Degrees and Minutes and are to three decimal places. No rounding of coordinates has taken place.

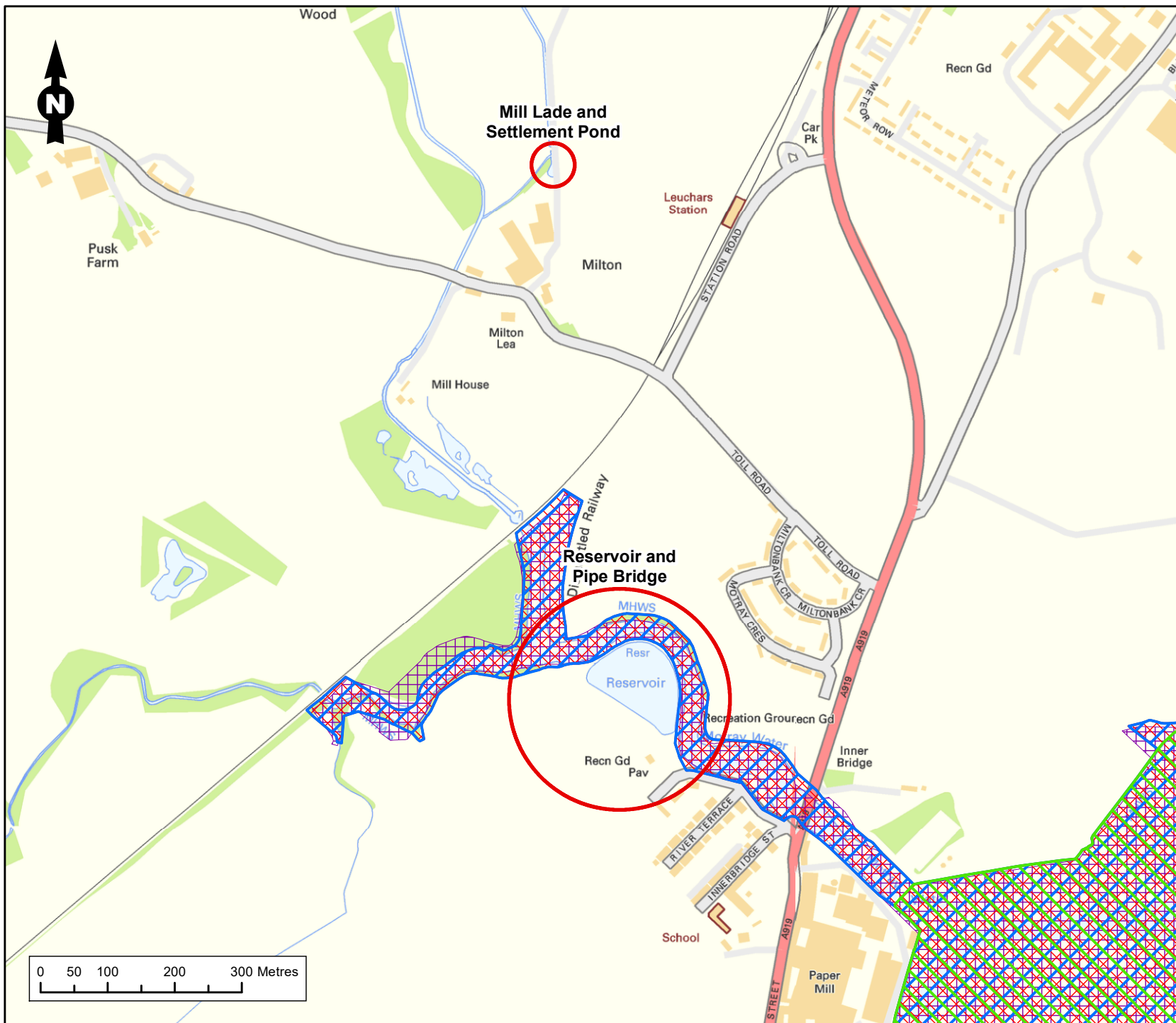
Figure Title
Extent of Licensable Activities

Project Name
Guardbridge Reservoir
Decommissioning Marine
License Application

Project Number 1620010004	Figure No. 1
Date April 2021	Prepared By CF
Scale 1:8,000 @A4	Issue 1

Client
University of St Andrews
c/o Avison Young

RAMBOLL



Legend

- Site Extent Boundaries
- Special Area of Conservation
- Special Protection Area
- Site of Special Scientific Interest
- RAMSAR

Figure Title

Extent of Ecologically Designated Sites

Project Name

Guardbridge Reservoir
Decommissioning Marine
License Application

Project Number

1620010004

Figure No.

2

Date

April 2021

Prepared By

CF

Scale

1:8,000 @A4

Issue

1

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University of St Andrews
c/o Avison Young

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APPENDIX 2

DESIGN SPECIFICATION AND DRAWINGS

Guardbridge Reservoir Discontinuance

Works Information & Specifications

University of St Andrews

Project reference: Guardbridge Reservoir Discontinuance

8th April 2020

Quality information

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1. Specification for the Works

1.1 Works Information

The Works shall be carried out in accordance with the Civil Engineering Specification for the Water Industry (7th edition), published by the UK Water Industry Research Ltd in March 2011, augmented by the Supplementary Clauses.

In so far as any Supplementary Clauses may conflict or be inconsistent with any provision of the above Specification, the supplementary clause shall always prevail. In so far as any Specification Clauses may conflict or be inconsistent with any provision of the Particular Specification given hereinafter, the Particular Specification shall prevail.

1.1.1 Purpose of the Works

A legacy reservoir belonging to the University of St Andrews, which was previously used to supply water to a paper mill in Guardbridge is no longer required. The Works under this Contract are associated with discontinuing the reservoir and ultimately removing it from any obligations under the Reservoirs (Scotland) Act 2011. To achieve this the embankment will be breached, an upstream settlement tank infilled, and a pipe bridge and all its components demolished and removed from site.

1.1.2 Scope of Works

The scope of Works under this Contract includes, but is not limited to the following:

- Breach of Reservoir, including:
 - Excavation of the dam embankment material;
 - Installation of breached slope surface protection;
 - Regrading of the existing embankment upstream face;
 - Removal and reinstatement of existing fence;
 - Infilling of the overflows and bottom outlet structures;
- Pipe Bridge Removal, including:
 - Removal and disposal of existing bridge and bridge abutments;
 - Cutting, removing and capping remaining pipes;
- Settlement Tank Infilling, including:
 - Infilling of the tank with granular and compacted fill;
 - Installation of the new DN150 HDPE seepage collection pipe;
 - Installation of mass concrete cut-off wall;
 - Removal and disposal of existing GMS walkway and flow control penstock;
 - Removal and disposal of existing fence and replacement with a new fence;
 - Removal and disposal of existing valve brickhouse.

1.2 Site Information

1.2.1 Location of the Site

The Site is located approximately 1.5 km north west of the centre of Guardbridge as shown in Figure 1-1.

The Ordnance Survey Grid Reference for the centre of the dam is NO447199.

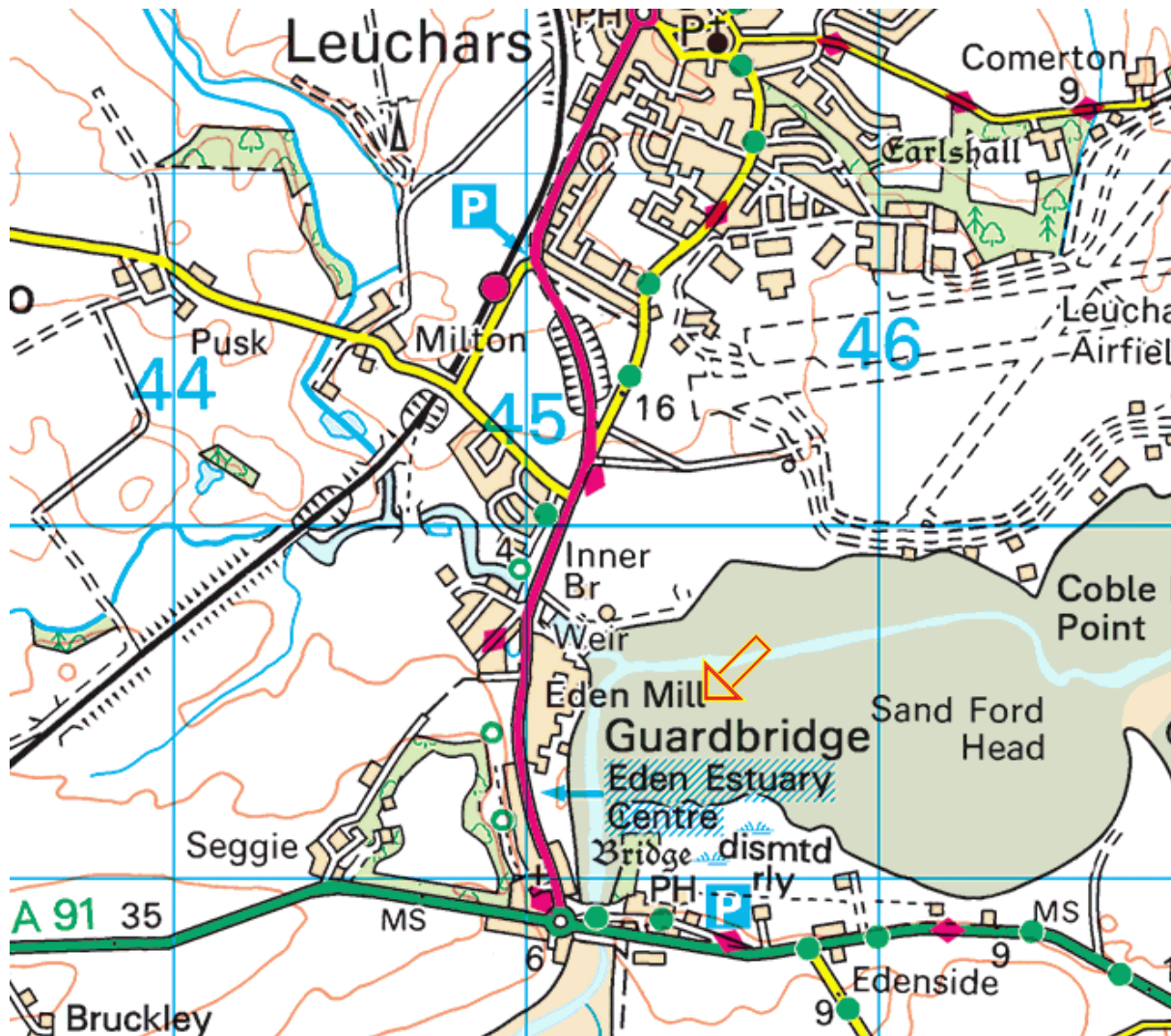


Figure 1-1: Site Location Plan

Figure 1-1 is reproduced from the Ordnance Survey Map with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office, © Crown Copyright.

1.2.2 Existing Site Conditions

1.2.2.1 Reservoir

Embankment

The reservoir is located on the banks of Motray Water, a river that runs along the downstream toe of the embankment. The reservoir is accessed from the south east via a surfaced road called River Terrace, which runs through a housing estate and connects to the A919 in Guardbridge.

The reservoir is impounded by an earthen embankment approximately 270m in length that is circular in shape. The maximum embankment height is 3.7m and its crest is at an elevation 99.6 m AOD.

A site investigation report dated January 1971 described the embankment material as:

“...very soft to soft sandy clayey silt with traces of vegetable matter and occasional peat, to depths between 16ft to 20ft below crest level. A few feet of firm to stiff silty sandy clay was identified beneath the topsoil in some boreholes, overlying the sandy clayey silt. Also, a 1.5ft to 3.5ft layer of sand was encountered at between 10.5ft to 8ft below crest level...”

The upstream face of the embankment is typically at a slope of 1V in 2H but there are areas where repairs or modifications have taken place and the slope is nominally steeper.



Figure 1-2: View of Reservoir from the north-west corner

Overflows and Outlets

The reservoir embankment has two overflows (an eastern and a western overflow) which convey flows into Motray Water.

- The west overflow is set with a sill level of 98.98 m AOD and a sill length of 1.43m feeding a Ø450mm pipe laid through the embankment.
- The east overflow is set with a sill level of 99.00 m AOD and a sill length of 1.38m feeding a Ø305mm pipe laid through the embankment.

Both overflows are formed from concrete, with brick head walls and concrete pipes.



Figure 1-3: Photograph showing Overflow and Bottom Outlet

There are two outlets in south-east corner of the reservoir – one for supply, one for scour.

A steel platform extends approximately 5.0m into the reservoir above the outlet as shown in Figure 1-3.

- A valve controlling the Ø455mm supply outlet is located approximately 10m from the edge of the outlet structure (behind an existing timber shed).
- A valve controlling the scour outlet is located near the centre of the embankment.

1.2.2.2 Pipe Bridge

The pipe bridge consists of 2 (two) No. metal beams which are supported by masonry abutments either side of Motray Water. There is no safe access over this bridge with the existing timber deck in a poor condition. The 2 (two) No. existing pipes run in between the metal beams located beneath the bridge decking.

Access to the bridge is via an unformed track from the reservoir to the right or southern bank of Motray Water as shown on the Drawings.

1.2.2.3 Settlement Tank and Mill Lade

Settlement tank

The settlement tank is approximately 1.10m deep with a 0.70m deep sump at the location of the existing outlets and constructed from concrete. There is a total of 3 (three) No. outlet pipes in the settlement tank as shown on the Drawings these are:

- One 12" (305 mm) Ø pipe (which feeds the existing downstream reservoir);
- One 14" (357 mm) Ø pipe (which feeds the existing downstream reservoir); and
- One 350mm Ø scour (used to lower the water level in the tank).

A recent survey of the settlement tank undertaken by Aspect Surveys in January 2020 identified only a thin layer of sediment to be overlying a concrete base slab.



Figure 1-4: Settlement tank (looking at the outlet pipes)

There is a brick valve house incorporated into the settlement tank and a security fence around the perimeter of the valve house and tank to prevent public access.

Mill Lade

The settlement tank is fed by flows from Motray Water via a Mill Lade. Figure 1-5 shows the current arrangement of the inlet works to the settlement tank with flows controlled via an existing penstock arrangement which is accessed using a metal walkway.



Figure 1-5: Mill Lade (upstream of settlement tank)

1.2.3 Brief Description of the Scope of Works

1.2.3.1 Reservoir

Embankment Breach

The embankment is to be breached at the south-east corner of the reservoir to the lines and levels shown on the Drawings. The materials excavated as part of the embankment breach Works shall be stockpiled for reuse. Embankment protection/hardening materials shall be installed on the excavated surface of the embankment.

Upstream slope reprofiling

The upstream slopes of the embankment shall be reprofiled as shown on the Drawings. Reprofiling Works shall be carried out to the extents shown on the Drawings to ensure a slope no steeper than 1V:3H is achieved.

The existing fence along the crest of the embankment shall be removed and reinstated as shown on the Drawings following completion of the embankment reprofiling Works.

Overflows and outlets abandonment

On completion of all works associated with the embankment breach and reprofiling of the existing upstream slope the two overflows (east and west) and the two outlets (south) shall be infilled with rockfill as shown on the Drawings.

1.2.3.2 Pipe Bridge Removal

All existing pipe bridge components, including the decking, metal beams, the two abutments, pipework, fittings and the like are to be demolished and removed from site. The remaining sections of open-ended pipework shall be cut flush with the existing ground (or locally buried) and capped.



Figure 1-6: Pipe Bridge Abutment and Metal Beams (view from right bank)

1.2.3.3 Settlement Tank and Mill Lade

Settlement tank

The following Works are required to decommission the settlement tank:

- The brick valve house shall be demolished, and all materials disposed of to an approved/licensed off-site facility;
- All spindles, grates and screens shall be removed and disposed of to an approved off-site disposal facility;
- 2 (two) No. supply pipes at the south wall shall be fully sealed and plugged with concrete;
- A new 150mm dia. HDPE solid pipe to be installed in the 350mm dia. scour outlet culvert at the bottom of the west wall and surrounded with concrete;
- A new 2m long 150mm dia. slotted HDPE pipe connected to the solid HDPE pipe and a geotextile “sock” installed on the slotted pipe.

The tank shall be infilled to the levels shown on the drawings. Geotextile shall be laid on top of rockfill and a layer of compacted fill installed placed above it. It is expected that material won from the embankment breach may be used as compacted fill.

The existing metal post and barbed wire fence surrounding the tank shall be removed and replaced with a new metal post and chain link fence along the same alignment as shown on the Drawings.

Mill Lade

The inlet to the settlement tank is to be sealed as shown on the Drawings and the existing penstock and metal walkway and all their associated components removed and disposed of to an approved offsite facility.

The inlet to the tank is to be sealed with a mass concrete cut-off wall tied into the existing inlet walls and the area downstream infilled with compacted fill.

1.2.4 Topographic Land Survey

A topographical survey of the site is available, which covers the area of the dam and the area local to the downstream face. This information has been incorporated into the Drawings.

1.2.5 Lands Made Available, Access and Working Areas

The extent of the land associated with the reservoir and access route to it shall be confirmed between the *Contractor* and the University of St Andrews prior to commencing works on site.

The *Contractor* is free to use the areas allocated as deemed fit to enable the Works and must ensure that they remain uncontaminated and are properly reinstated at completion.

The Works should always be planned to minimise vehicular movement around the Works and temporary protection measures shall be adopted where necessary to prevent damage.

Any damage caused due to temporary access shall be reinstated by the *Contractor* at the end of the works.

1.2.6 Utilities & Structures

No existing plans or Drawings of the site are available that show the presence of any services. The *Contractor* shall carry out a 'Dial Before You Dig' enquiry prior to commencing works on site to satisfy themselves that no utilities are present prior to commencing any excavations.

1.2.7 Environment

1.2.7.1 Site of Special Scientific Interest (SSSI)

The downstream slope and toe of the reservoir embankment are located within an area designated as a SSSI. The *Contractor* shall be responsible for obtaining all necessary permits and approvals for undertaking work in this area.

1.2.8 Security

The reservoir area is closed off to the general public with access to it through a locked gate, this is also the same for the area of the settlement tank. The pipe bridge and mill lade are not secured and the public has open access to these areas. The security of the *Contractor's* compound, and site areas adopted for the Works will be wholly the *Contractor's* responsibility throughout the Contract.

1.2.9 Safety In Design

Designer risks and residual hazards have been considered by the Engineer, and the following items have been identified:

- Pollution – Drawing down the reservoir has the potential to cause pollution downstream. It is unknown how much silt there may be released from the reservoir and therefore any mitigating measures have to be in place. A Construction Method Statement shall be provided by the *Contractor* and agreed with the Employer, as a minimum it is expected that the Contractor shall adhere to the measures outlined in Clause 1.4.6.
- Falls from height and/or into water – The dam's upstream face is steep, hence there is a risk of falling from height or into the reservoir.

- Flooding of the works - Ongoing possibility of high rainfall runoff into the reservoir during the works, with the potential for the auxiliary overflow to overtop, which may flood the works.
- Risk of excavation collapse during construction, worker entrapment, containment, flooding, tipping machinery. The *Contractor* will be required to ensure excavations are supported.

1.3 General and Preliminaries

1.3.1 Works Sequencing Requirements

The *Contractor* shall sequence the Works such that:

- flows are fully diverted away from the settlement before all Works at the site progress;
- the settlement tank is drawn down using the 350 mm pipe that discharges into the adjacent watercourse before all valves in the tank are closed;
- the inlet valves for the 12" and 14" pipes in the reservoir are opened to allow any water in the pipes to be fully discharged into the reservoir.
- the outlet valves in the reservoir are left open for the duration of the Works and kept free from debris (and sediment) until all Works in the reservoir are complete and then they are to be infilled with rockfill.

The *Contractor* shall fully understand this requirement and schedule their Works accordingly.

1.3.2 Contractor Management and Personnel

The *Contractor* shall provide competent and experienced key personnel to manage and supervise all aspects of the Works including; construction, environmental, materials, quality, resources, community, risk and safety, in accordance with the Contract.

The *Contractor* shall ensure that any key personnel nominated in the tender remain working on the project for length of time indicated for the duration of the Contract (unless otherwise agreed in writing).

Failure to meet minimum management and supervision requirements on site may result in a stoppage of the Works until restored to the satisfaction of the *Supervisor*. The *Contractor* shall be responsible for all costs associated stoppage of the Works until restored.

1.3.3 Construction Work Plan

A minimum of 30 days prior to the commencement of work, the *Contractor* shall develop and submit the Construction Work Plan for review and approval by the University of St Andrews Project Manager.

A minimum of 14 days prior to bringing materials to site, the *Contractor* shall submit all required Quality Control (QC) and Quality Assurance (QA) documentation for review and approval by the University of St Andrews Project Manager. Any material brought to site that is not accompanied by the required QC/QA documentation will be rejected.

1.3.4 Hold Points and Witness Points

1.3.4.1 Hold Point

A Hold Point is a position in the progress of the Works, beyond which further work shall not proceed without mandatory verification by the *Supervisor*.

Hold Points shall include those specified in the Technical Specifications and shall apply to ensure compliance with the intent of the designs and with all specified requirements, and to ensure that critical and/or irreversible activities are not constructed incorrectly.

Hold Points shall apply prior to commencement of designated work lots or work items.

To obtain authorisation to proceed, the *Contractor* shall ensure that all work lots or work items affected by the lot or item in question are conforming. Hold points are identified in Technical Specifications.

The *Contractor* shall provide a minimum of 48 hours' notice of Hold Point inspections. Where required, the *Supervisor* shall respond to any request for acceptance to proceed within 24 hours.

1.3.4.2 Witness Point

A Witness Point is a position in the progress of the Works, where the *Contractor* must notify the *Supervisor* prior to proceeding and the option for attendance for witnessing of inspection and test may be exercised. If any do not attend, then work may nevertheless proceed, unless otherwise instructed.

Witness Points shall apply to verify compliance of the constructed work with the approved design drawings. Witness points are identified in the specifications for the works.

The *Contractor* shall provide a minimum of 48 hours' notice of Witness Point inspections. Where required, the *Supervisor* shall respond to any request for acceptance to proceed within 24 hours.

1.3.5 Legislation, regulation, fees and guidance

Unless specified or agreed otherwise, all equipment, design, installation and site works shall comply with the most recent revisions and amendments of British Standards.

Ensure that all equipment and materials supplied are in complete accordance with the requirements of all relevant authorities.

The flood storage reservoir is a controlled reservoir in terms of the Reservoirs (Scotland) Act 2011, until the point at which it has been fully breached with supervision of construction by the Construction Engineer appointed by the University of St Andrews in terms of the Act.

The *Contractor* shall perform the duties of the *Principal Contractor* as defined in the Health and Safety Executive, Construction (Design and Management) Regulations 2015.

1.4 Temporary Works

1.4.1 Scope

This Section specifies the requirements for temporary works required to execute the Works, including but not limited to, the following:

- Water Management;
- Support to structures;
- Dewatering During Construction;
- Reservoir Control;
- Cofferdams;
- Temporary Drainage Works;
- Sediment & Erosion Control
- Access Tracks; and
- Stockpile Areas.
- The *Contractor* shall ensure there is a Temporary Works Co-ordinator and *Supervisor* to manage the temporary works.

1.4.2 Water Management

1.4.2.1 Reservoir Control

All Works in the reservoir shall be carried out with the water fully drained. The *Contractor* shall ensure that all inlet valves are closed, and that no flows are being conveyed into the reservoir.

In order to draw the water in the reservoir down, and keep it down, the outlets are to be left fully open and kept clear of debris until all works to breach the embankment and flatten the upstream and downstream slopes to the line and levels shown on the Drawings have been completed.

1.4.2.2 Settlement Tank

All Works in the settlement tank and inlet channel shall be carried out with the water fully drained. Flows into the settlement tank shall be diverted while the mass concrete wall is being constructed.

In order to draw the water in the settlement tank down, and keep it down, the outlet that discharges directly into the adjacent watercourse (ensuring no pollution to the receiving watercourse) as shown on the Drawings shall be left fully open until the new drainage pipe has been installed.

1.4.3 Dewatering During Construction

The *Contractor* shall be responsible for providing dewatering systems and construction of flood protection works. In this regard, the *Contractor* shall provide and maintain all necessary diversion flumes, drains, pumps, cofferdams, banks or other temporary diversion and protective works as deemed necessary.

The *Contractor* shall furnish, install, maintain and operate all necessary pumping, required for:

- dewatering the various parts of the Works and temporary Works; and
- maintaining the Works free from water as required for constructing each part of the Works.

All temporary diversion and protective works installed by the *Contractor* shall be removed upon completion of the Works, as approved by the *Supervisor*. Upon removal of the temporary diversion and protective works, the *Contractor* shall rehabilitate the area to give a sightly appearance, so as not to interfere in any way with the operation or usefulness of the Works and in a manner satisfactory to the *Supervisor*.

The *Contractor* shall repair, at the *Contractor's* own expense, any damage sustained to any part of the Works caused by or related to the ingress of water (including both rainfall and seepage) into the work area, failure to keep the work areas dewatered or failure of any part of the protective works.

1.4.4 Cofferdams

The *Contractor* may construct a cofferdam downstream of the dam to enable the Works to be undertaken if a significant flood event that could flood the area downstream were to occur.

The *Contractor* shall be responsible for the design, construction and removal of any cofferdams used to facilitate the construction of the Works.

The proposed design of the cofferdam, which must include details about height, extent and type of cofferdam, shall be submitted to the *Supervisor* for review and approval.

1.4.5 Temporary Drainage Works

The *Contractor* shall provide for the safe discharge of seepage, drainage and storm water at all times during the construction works and for the effective de-watering of excavations. This dewatering shall maintain the foundations, excavation areas and other parts of the Works free from water as required for constructing each part of the Works, shall ensure the stability of excavations during construction, and prevent migration of materials within embankments.

The *Contractor* shall provide and maintain slopes, crowns and drains on any excavations and embankments to ensure satisfactory drainage. Filling, paving, structures and services, shall be placed or constructed as applicable and on ground from which surface water has been removed. Freshly constructed Work shall be protected from water damage. Dispose, without nuisance or damage to adjacent works and/or property or water courses, all water removed from the Works. Where water is diverted from the Site it shall be confined to existing drainage paths.

Before obstructing any waterway, channel, culvert or pipe, the *Contractor* shall make provision for temporary diversion of flow as agreed with the *Supervisor*. The *Contractor* shall at all times be

responsible for management of water inside the reservoir, and any temporary works, clean up, or restitution of works resulting from inundation of the Works.

The *Contractor* shall provide adequate drainage around the whole site, including the access and the site offices road, permanent and temporary stockpiles, to ensure that any disruption to the Works due to adverse weather conditions is minimised.

Where groundwater or seepage is encountered, the *Contractor* shall notify the *Supervisor* and any action to be undertaken shall, unless otherwise specified, be submitted to the *Supervisor* for review and approval.

The bottom of any excavation which has been disturbed by the action of water or any construction activity such that it does not meet the requirements of this Specification shall be rectified by the *Contractor*.

1.4.6 Sediment & Erosion Control

The *Contractor* shall plan and carry out the Work to avoid erosion, contamination and sedimentation of the site and surrounding areas, and prevent the discharge of water containing polluted matter or visible suspended materials off the Site. All works are to be conducted in accordance with the *Contractor's* Environmental Management Plan.

After each rain, inspect, clean and repair if required, temporary erosion and sediment control works. Remove temporary erosion control measures when they are no longer required.

1.4.7 Access Tracks & Haul Roads

The *Contractor* shall be responsible for constructing access tracks and haul roads to facilitate the Works and to the temporary stockpile locations. The *Contractor* shall obtain the *Supervisor's* approval before constructing any temporary access tracks.

The *Contractor* shall be responsible for the supply and installation of all appropriate traffic warning signage on the public roads in accordance with the requirements of the local roads authority.

The *Contractor* shall water and maintain all access tracks and haul roads for the duration of the Works.

The *Contractor* shall remove any temporary access tracks and haul roads at the end of the Works and shall rehabilitate the affected areas to the approval of the *Supervisor*. The cost of construction, maintenance and removal of the *Contractor's* temporary access tracks is deemed to be included in the price tendered in the Contract.

1.4.8 Stockpiling Areas

The *Contractor* shall be responsible for the preparation and construction of temporary stockpiles in designated areas agreed with the University of St Andrews only.

The *Contractor* shall be responsible for clearing, grubbing, removing the topsoil and establishing all sediment and erosion control devices within the designated stockpile area prior to the placement of any material in the stockpile area. The *Contractor* will also be responsible for the rehabilitation of the stockpile areas upon completion of the Works, to the satisfaction of the *Supervisor*.

1.5 Civil Works

1.5.1 Referenced Documents

Wherever applicable, all Civil Works carried out shall comply in all aspects (i.e. construction, testing and performance) with the latest relevant British (BS), European (EN), and International (ISO) Standards, and the following in particular:

- Civil Engineering Specification for the Water Industry (CESWI), 7th Edition.

1.5.2 Selective Demolition

The *Contractor* shall carefully demolish several existing structures at the site as shown on the Drawings.

1.5.2.1 Guardbridge Reservoir

At the location of the reservoir the *Contractor* shall demolish and remove:

- the existing bridge at the outlet structure to control the outlet valve (once all other Works in the reservoir have been completed); and
- the existing fence around the perimeter of the reservoir.

ITEMS TO BE RETAINED: The existing fence around the reservoir is to be retained and replaced once the embankment reprofiling Works have been completed.

REMOVAL OF DEBRIS: The *Contractor* shall remove and dispose of off-site, the existing bridge and all its associated components to an approved offsite facility.

1.5.2.2 Pipe Bridge

At the location of the pipe bridge the *Contractor* shall carefully demolish and remove:

- the existing bridge and its associated components;
- the two bridge abutments; and
- the existing 12" and 14" pipework between the two bridge abutments.

ITEMS TO BE RETAINED: There are no items to be retained by the University of St Andrews. All demolition debris relating to the removal of the pipe bridge shall remain the property of the Contractor.

REMOVAL OF DEBRIS: The *Contractor* shall remove and dispose of off-site, the existing pipe bridge and all its associated components to an approved offsite facility.

1.5.2.3 Settlement Tank and Mill Lade

At the location of the settlement tank and mill lade the *Contractor* shall demolish and remove:

- the existing brick valve house at the settlement tank;
- all existing valves and spindles in the settlement tank;
- the existing metal walkway downstream of the penstock in the mill lade/settlement tank inlet; and
- the existing chainmail fence around the perimeter of the settlement tank.

ITEMS TO BE RETAINED: There are no items to be retained by the University of St Andrews. All demolition debris shall remain the property of the Contractor.

REMOVAL OF DEBRIS: The *Contractor* shall remove and dispose of off-site, all demolition debris from the settlement tank and mill lade.

1.5.3 Clearing Grubbing and Stripping

1.5.3.1 Scope

This scope provides for all clearing, grubbing and stripping associated with the Works including but not limited to the following:

- Where required along the access road to the site;
- Stockpile and Laydown Areas; and
- All other areas nominated on the Drawings.

1.5.3.2 Work Operations

Work operations that have been identified as part of this Clause include the following:

- Flora and fauna management;
- Mulching of all suitable green waste, transport, storage and reuse on site;

- Removing stumps and roots greater than 15 mm diameter (including any subsequent regrowth), to a depth not less than 800 mm below ground surface (**HOLD POINT**), and reinstatement to surrounding ground level with approved material.
- Disposing cleared, grubbed and stripped materials to an approved location off site
- Removing topsoil and other vegetative matter from the ground surface (including any subsequent regrowth), screening, transport and storage for reuse on site
- Removing rocks and artificial obstructions > 75 mm from the ground surface prior to stripping
- Disposing unsuitable stripped materials to approved location off site

Protection of flora and fauna will be required in accordance with contractual requirements, legislated requirements and the *Contractor's* EMP (Environmental Management Plan). The *Contractor* shall submit their clearing, grubbing and stripping plan in conjunction with the EMP for approval by the *Supervisor* prior to commencing the Works, this will form a **HOLD POINT**.

1.5.3.3 Construction Procedure

The *Contractor* shall develop and submit a Construction Procedure for Clearing, Grubbing and Stripping for approval prior to commencement.

Procedure for Clearing, Grubbing and Stripping shall form a **HOLD POINT**.

1.5.3.4 Clearing and Grubbing

Clearing and grubbing operations shall be carried out in the following areas, as relevant:

- Areas as specified by the Drawings
- All other areas where general earthworks are to be constructed and for a distance not greater than 5m outside the lines of the works

1.5.3.5 Stripping and Stockpiling of Topsoil

- Strip the Topsoil to a depth just sufficient to include the root zone (nominally 150 mm, but will vary) to remove all organic matter to the satisfaction of the *Supervisor*.
- All Topsoil removed shall be placed in stockpiles and maintained to trimmed levels (grade to fall/drain) and shape with batters not exceeding slopes of 1V:2H up to a maximum height of 1.5m.
- Stockpiles of stripped Topsoil shall be sited so as not to impede other works or access. The locations for stockpiling Topsoil within the designated stockpile areas shown on the Drawings shall be agreed and approved with the University of St Andrews prior to starting Works.
- Topsoil stockpiles are to be clearly labelled and separated from backfill material. Stockpiles of different materials are to be placed a minimum of 3.0 m apart to prevent cross contamination.
- Because Topsoil will be reused in the works, it shall be screened of all rocks and debris larger than 25 mm in size.

1.5.3.6 Witness and Hold Points

- Prestart Checks – WITNESS POINTS
- Submission of Environmental Management Plan (EMP) for approval by *Supervisor* – HOLD POINT
- Approval of Construction Procedure for Clearing, Grubbing and Stripping for approval by *Supervisor* – HOLD POINT
- Inspection of extent of tree rootball and roots removal – HOLD POINT.
- Approval of final stripped surface by the *Supervisor* – HOLD POINT
- Erosion and Sediment Control – WITNESS POINT.
- Agreement and Approval of Stockpile locations – HOLD POINT

1.5.4 Excavation

1.5.4.1 Scope

This scope provides for all excavations associated with the Works including but not limited to the following:

- Excavation through the embankment; and
- Any additional excavation required to complete the Works.

1.5.4.2 Works Operations

Excavations include the following Works operations:

- Preparatory works
- Existing services location and management
- Dewatering, as required
- Excavating, loading and hauling loosened material for disposal offsite
- The treatment of acid sulphate soils, as required
- Protection and support of excavation, as required
- Foundation preparation and inspection
- Management of material for future use including selection and processing
- Unloading hauled material for disposal offsite
- Processing or blending of excavated materials to meet the requirements of this Specification for reuse

Any other operations necessary to complete the works in accordance with this specification including ground support

1.5.4.3 General

The *Contractor* shall conduct the operations so that areas outside the limits of the excavation are not disturbed.

Batters and inverts of excavated surfaces shall be free of loose material and shall be trimmed neatly to the specified shapes. Any over excavation past the design surface that has not been directed, shall be filled with suitable material at the *Supervisors* discretion in accordance with this Specification, at the *Contractors* expense.

The *Contractor* shall prepare an Excavation and Materials Management Plan for the Works. The *Contractor's* excavation, material management operations, shall be planned in a manner that yields the maximum amount of materials suitable for use in the permanent works. The *Contractor* shall conduct testing ahead of excavation, stockpiling and placement operations to determine whether the materials to be excavated will be suitable to be reused for the relevant zones in the permanent works.

All excavated surfaces shall be protected from erosion through suitable methods such as geofabric overlay, polymer binder and/or regular wetting.

The alignment and dimensions of the foundation excavations may be subject to changes by the *Supervisor* to adapt to the foundation conditions revealed by the excavation. The *Supervisor* may direct additional excavation to reach acceptable foundation conditions.

The extent of additional excavation beyond the excavation lines shown on the Drawings can only be quantified once the foundation conditions are revealed, and any additional excavation is therefore considered provisional.

1.5.4.4 Available Information

The following geological information and records are available for information purposes to assist with assessment of excavation condition:

- George Wimpey & Co Limited 1971, Factual Ground Investigation Report, Raw Water Reservoir Guardbridge, January 1971;

Excavation Permit

The *Contractor* is to ensure that an excavation permit is in place prior to commencement of excavation activities. This will form a **HOLD POINT**.

The excavation permit is to detail the excavation; location, method, services identified, special provisions and authorization to proceed.

Variations to Excavated Surfaces

Any and all over-excavation performed by the *Contractor* for any purpose or reason, except as may be directed by the *Supervisor*, shall be at the expense of the *Contractor*. All such over-excavation shall be backfilled with approved material, as directed, and the cost of furnishing and placing this backfill shall be at the expense of the *Contractor*.

If the *Supervisor* directs flattening/steepening or changing of slope profiles of excavated slopes to maintain stability or for any other reason, the additional cost of such direction shall be paid as special excavation, under a provisional item. This will form a **HOLD POINT**.

Any surface excavation performed at the option of the *Contractor* to secure access to required work, or for disposal of material excavated, or for any other purpose, shall be kept within limits approved by the *Supervisor* and shall be at the expense of the *Contractor*.

Potentially Contaminated Materials

Where material is suspected of being contaminated, work shall stop at the site of the contamination and the *Supervisor* informed immediately.

Specific testing of the material once removed from its in-situ state may be required by the *Supervisor* to confirm the nature and type of contamination. Contaminated materials shall be disposed of to an approved offsite facility.

This will be carried out at the tendered rates for potentially contaminated soil, which may include RIFA infested materials, asbestos or acid sulphate soils. The *Contractor* is to ensure adequate space is available for any treatment that may be required on potential acid sulphate soils or actual acid sulphate soils.

Contaminated material will be deemed not suitable for use in the permanent works, unless otherwise directed by the *Supervisor*.

Protection and Support of Excavations

The *Contractor* has the sole responsibility to prevent damage to excavated surfaces exposed and to provide any ground support necessary to ensure excavation slopes shown on the drawings are stable during construction of the works.

The cost of furnishings and protection works and installing supports and associated accessories shall be included in the rates tendered.

1.5.4.5 Excavation and Materials Management Plan

The *Contractor* shall submit an Excavation and Materials Management Plan following contract award, at least 14 days prior to excavation Works commencing on site, for endorsement by the *Supervisor*. This will comprise a **HOLD POINT**.

The Management Plan shall include locations of expected on and off-site material sources; location of access tracks, haul roads, stockpiles and conditioning areas on site; excavation extents, sequence and volumes; materials acceptance and testing requirements, materials conditioning and management methodologies.

1.5.4.6 Care and Diversion of Site Water

The *Contractor* shall design, construct and maintain all temporary diversions and all protective works which are necessary for the prevention of surface erosion caused by rainfall and run-off affecting the works area. The *Contractor* shall not interfere with the natural flow of rivers or streams without prior approval of the *Supervisor* and the relevant authorities. Diversion and protective works include but are not limited to bulkhead, cofferdams, contour banks, levee banks, channels, flumes, conduits, drains, pumps and settling ponds. Unless otherwise approved, the location of these works shall not encroach on any area required for the Works.

The *Contractor* shall be responsible for and shall repair or reinstate at their own expense any damage to foundations, excavated slopes or any other parts of the Works caused by the failure of the diversion and protective works and/or surface water control and dewatering installations constructed in accordance with the requirements of this Clause.

On completion of the works all diversion, seepage and erosion control works shall be removed and disposed of and all Temporary Works shall be levelled in an approved manner to provide an aesthetically pleasing appearance.

1.5.4.7 Excavation of Embankment

Excavations through the embankment shall be carried out to the lines and levels shown on the Drawings.

Care shall be taken during the excavation of the embankment footprint to separate and stockpile the excavated material for reuse.

All material generated from the excavations necessary for the Works shall be transported to and temporarily stockpiled at the designated stockpile locations.

The *Contractor* shall maintain stockpiles to trimmed levels (grade to fall/drain) and shape with batters not exceeding slopes of 1V:2H up to a maximum height of 2m or otherwise approved by the *Supervisor*.

All material softened due to surface runoff or ponded water, damaged because of machinery operations or for any other reason shall be excavated from the embankment foundation. The *Contractor* shall excavate such areas at their own expense to expose acceptable foundation material to the satisfaction of the *Supervisor*.

Any holes and localised depressions in excavated areas shall be filled to the level of the surrounding foundation surface using the same material and placement as that specified for the works immediately above the foundation, or using material as directed by the *Supervisor*.

Areas where sinkholes have occurred shall be excavated back to intact material consistent with the general excavation in that area before backfilling. Areas requiring treatment and the depth of treatment will be as approved by the *Supervisor*.

1.5.4.8 Stockpiling and Reuse

All suitable material from excavations shall be reused after stockpiling, conditioning, mixing and treatment or stockpiled in such a manner to allow future recovery for use in the permanent construction works.

Conditioning, mixing and treatment shall be carried out sufficiently far in advance of placement operations to ensure uniformity of material when placed. The *Contractor* shall carry out testing of suitable material, taking into account possible breakdown or moisture loss, during placement.

Berms and catch drains shall be provided as appropriate. Stockpiles of moisture-conditioned material shall be maintained in an acceptable condition using seal rolling or other techniques. Material, which has dried out or has become saturated because of water runoff or ponding shall be removed from the stockpile and reconditioned. It shall not be classified as unsuitable.

1.5.4.9 Witness and Hold Points

- Prestart Checks – WITNESS POINT

- Excavation Permit – HOLD POINT
- Variations to excavated surfaces – HOLD POINT
- Approval of Excavation and Materials Management Plan – HOLD POINT
- Unsuitable material rectification – HOLD POINT
- Further works as directed by *Supervisor* – HOLD POINT.
- Should groundwater pressures measured dictate, or excessive groundwater inflows occur, or other evidence of slope instability be observed, the works are to be stopped and the *Supervisor* advised immediately – HOLD POINT

1.5.5 Earthworks

1.5.5.1 Scope

This scope provides for all earthworks associated with the Works including but not limited to the following:

- Infilling overflow and outlet structures with rockfill; and
- Infilling of Settlement Tank with compacted fill;
- Reprofiling upstream slope of the embankment; and
- Topsoil and grassing and associated works.

1.5.5.2 Work Operations

Earthworks construction includes the following work operations:

- Sourcing materials
- Stockpiling, processing and conditioning
- Haulage and transportation of materials
- Foundation preparation
- Surface preparation
- Placing and compaction
- QA/QC testing
- Topsoil and grass seeding
- Finishing

1.5.5.3 Construction

A minimum of 14 days prior to the works commencing on site the *Contractor* shall develop and submit their Construction Procedure for Embankment and Structural Fill Construction for review and approval prior to commencement.

Approval of the Construction Procedures prior to the commencement of the any Works shall form a **HOLD POINT**.

In the event of rainfall and at the close of work each evening, the *Contractor* shall ensure:

- compaction of all surfaces has been completed or in the event of stoppage for rain at least 'seal rolled'

1.5.5.4 Embankment Reprofiling

The existing (upstream slope) internal face of the reservoir embankment is to be reprofiled to achieve a slope no steeper than 1V:3H as shown on the Drawings. The existing upstream slope is believed to have a single layer of bricks overlying a layer of puddle clay as shown on the Drawings. The Contractor shall strip any bricks identified on the upstream slope of the pond and stockpile them for

re-use. To achieve the desired slope gradient the Contractor may cut into the existing upstream slope and crest of the reservoir as shown on the Drawings. Earthfill as defined in this specification shall be placed and compacted to flatten the lower part of the slope as shown on the Drawings. It is expected that the material won from cutting into the upstream slope and crest of the reservoir as shown on the Drawings shall be used to flatten the lower part of the slope. The Contractor must cut and push material down the slope when undertaking the embankment reprofiling Works ensuring that no other personnel or machinery are at the toe of the upstream slope while the works progress.

1.5.5.5 Riverbank Reprofiling

The existing bridge abutments are to be demolished and all associated materials disposed of at an approved offsite facility. On removal of the existing bridge abutments the existing 12" and 14" pipes shall be capped and the Contractor shall locally reprofile the existing riverbank either side of Motray Water. This shall be done to ensure that no void is left in the ground either side of the river following the removal of the two bridge abutments. Any voids in the ground shall be infilled using compacted Earthfill as defined in this Specification.

1.5.5.6 Sourcing of Materials

The Contractor shall be responsible for ensuring that all materials meet the soundness, uniformity, durability and grading requirements provided in the specification for the particular material and is available in sufficient quantities.

The Supervisor's approval of proposed materials sources will form a **HOLD POINT**. The approval by the Supervisor of any material source for delivery to site shall not negate the Contractor's ongoing responsibility to ensure that it remains within the requirements of this Specification. If, in the opinion of the Supervisor the material being delivered to site does not appear to comply with the requirements of this Specification they may at their discretion request additional testing be carried out.

1.5.5.7 Material Requirements

Earthfill Material

It is expected that material excavated from the embankment can be used as Compacted Fill to infill the settlement tank and for reprofiling the existing upstream embankment in the reservoir as shown on the Drawings, providing it complies with the requirements of this Specification.

Earthfill materials Any materials shall consist of a well-graded mixture of soil, with a maximum particle size of 75mm and a minimum fines content of 25%.

Earthfill material, when placed, compacted and tested in accordance with BS 1377 shall meet the requirements listed in Table 1-1.

Table 1-1 Earthfill Material Requirements

Description	Conformance Criteria
Particle Size	75mm (Max)
Liquid Limit	65% (Max) – Above A-Line
Plasticity Index	15% (Min) – Above A-Line
% Passing 63 µm Sieve	25% (Min)

Soil particles shall be of size less than 75 mm prior to compaction, unless the Contractor can demonstrate that larger particles can be broken down under compaction. Particles that will not break down under compaction shall be removed from the Works and stockpiled.

Rockfill

In the areas nominated on the Drawings the Contractor shall place Rockfill that meets the gradation requirements listed in Table 1-2.

Table 1-2: Rockfill Grading Requirement

Geometric Mean Rock Size (mm)	Fine Limit	Coarse Limit
350	100	70
300	70	50
200	50	35
100	35	10
75	10	2

The rockfill material shall be a sound and durable aggregate with the properties outlined in Table 1-3 in accordance with BS EN 12620 (2013).

Table 1-3: Rockfill Properties

Property	Criterion
Maximum Los Angeles value, max. % loss after 1000 revolutions	35
Magnesium Sulphate Soundness, max. % loss (by mass)	18 (5 cycles)

1.5.5.8 Material Placement Requirements

Earthfill

Moisture Content

The Optimum Moisture Content (OMC) of the material is defined as the moisture content that is required to produce the maximum dry density when compacted in accordance with BS 1377- Part 4.

The *Contractor* shall moisture condition the earthfill material such that each layer shall have a uniform moisture content throughout the entire layer, both during and after compaction, and shall be within the following moisture content range:

- OMC minus 2% to OMC plus 2%.

Placement

Earthfill shall be placed and spread in continuous horizontal layers each lift shall not be more than 200 mm in thickness after being compacted.

Compaction

The *Contractor* shall place fill to the dimensions, levels, grades and cross sections as shown on the Drawings.

The *Contractor* shall compact earthfill to a minimum of 95% of the Maximum Dry Density (MDD) of the material, in accordance with BS 1377:1990 – Part 4, across the full depth of the layer.

Rockfill

Rockfill material shall be placed and compacted to the dimensions, levels, grades and cross-sections shown on the Drawings. Rockfill material shall be placed in a moist condition, and in such a way as to avoid segregation of materials and to ensure an even distribution and gradation.

Rockfill shall be placed and spread in continuous, approximately horizontal layers for the full width of the Zone in loose layer thicknesses not exceeding 400 mm.

1.5.5.9 Special Compaction

Special compaction will be required when placing materials in confined areas, such as in the settlement tank.

For all material types, placement adjacent to new concrete structures (such as the new mass concrete wall located in the mill lade) shall not commence until the concrete has cured for a minimum of 14 days

or has achieved a compressive strength of 20 MPa. The finished concrete surface shall be moistened prior to placement of fill against them.

The weight and size of equipment used for compacting materials shall be restricted to avoid any damage to concrete structures in particular the settlement tank.

The compaction equipment restrictions shall be as shown in Table 1-4.

Table 1-4: Special Compaction Requirements

Vertical and Horizontal	
Within 1.5 m of the structure	Within 3.0 m of the structure
Walk behind compaction equipment	8 passes of a vibrating roller with maximum mass 3 tonne (static)
Maximum Loose Layer Thickness	
150 mm	200 mm

1.5.5.10 Material Testing Requirements

The *Contractor* shall carry out testing at a frequency which is sufficient to ensure that the materials and Work supplied under the Contract comply with the specified requirements, but which is not less than that shown below in Table 1-5.

Table 1-5: Testing Summary

Material	Material Property	Test	Frequency of Testing
Earthfill	Standard Compaction Method	BS 1377:1990 – Part 4, 2.5 kg rammer method	1 test per 100m ³ of material placed or minimum 2 tests per lot.
	Moisture Content Variation	BS 1377:1990 – Part 4	
	Field Wet Density	BS 1377: 1990 – Part 9	
	Particle Size Distribution	BS 1377: 1990 – Part 2	Minimum 3 tests per source for approval
	Plasticity Index		
	Liquid Limit		
Rockfill	Particle Size Distribution	BS 1377:1990 – Part 2	Minimum 3 tests per source for approval
	Magnesium Sulphate Soundness	BS EN 12620 (2013)	
	Wet / Dry Strength		
	LA Abrasion		

1.5.5.11 Witness and Hold Points

- Prestart Checks – WITNESS POINT
- Approval of construction procedure – HOLD POINT
- Approval of Rockfill material sources – HOLD POINT
- Approval of Rockfill material compaction methodologies – HOLD POINT

1.5.6 Embankment Hardening

The *Contractor* shall supply and install the embankment hardening material to the size, thickness, and limits as shown on the Drawings. The *Contractor* shall verify all dimensions, lengths and the like prior to procuring, and installing the embankment hardening material. The nominal thickness of the material will be 100mm.

1.5.6.1 Embankment Hardening Material Requirements

The embankment hardening material shall be Geoweb, GW30V, or approved equivalent placed on a Greenfix Type 75C turf reinforcement mat or approved equivalent.

The Geoweb is to be anchored in place using 500mm long, 12mm diameter galvanised steel ATRA Anchors complete with ATRA Stake Clips as shown on the Drawings.

1.5.6.2 Surface Preparation

The *Contractor* shall strip the Topsoil and grass from the crest of the embankment in areas where embankment hardening materials are to be placed, to a minimum depth of 150mm.

Prior to placement of the Geoweb layer the *Contractor* shall inspect the crest and batters to ensure that no roots or sharp objects are protruding from the embankment.

1.5.6.3 Application of Embankment Hardening Material

The *Contractor* is to install the embankment hardening materials in accordance with the manufacturer's installation documents and specifications ensuring that they work from the crest down. The *Contractor* is to supply their methodology for the installation of the Geoweb to the *Supervisor* for approval.

The ATRA Anchors are to be installed as shown the drawings.

1.5.6.4 Infill Materials

The Geoweb is to be in-filled with Topsoil as directed on the Drawings. The *Contractor* is to limit the drop-height of infill materials to 1 m. The infill for the Geoweb is to be placed from the crest of the slope to the toe. The *Contractor* is to ensure that controlled overfilling of cells is completed to allow for consolidation and compaction of the infill. The infill materials shall be flush with the upper surface of the cells at the completion of the installation unless otherwise shown on the drawings.

1.5.7 Drainage Pipework

The *Contractor* shall supply and install the seepage collection pipework in the settlement tank as shown on the Drawings. The seepage collection pipework shall be DN150 (plain and perforated), RD150X6PE/1 Rigidrain® HDPE pipe as manufactured by Polypipe (or approved equivalent).

The perforations of the slotted pipe shall be a maximum of 3 mm wide.

The pipe fittings shall be suitable for use in perforated and plain corrugated drain pipe.

The *Contractor* shall install the seepage collection pipework in accordance with the manufacturer's recommendations. Immediately before each pipe is laid it shall be inspected for any damage.

The *Contractor* shall ensure that the pipework remains clear of debris or any other substances including concrete.

1.5.8 Topsoil and Grassing

Requirements

Topsoil shall be reclaimed from the topsoil stockpile(s), screened as necessary, loaded, transported, dumped, spread, moisture conditioned and compacted on all disturbed areas.

Topsoil shall be fertile, friable soil containing organic matter which is reasonably free from subsoil, refuse, tree roots larger than 15 mm in diameter and 300 mm in length, noxious weeds, clay lumps and stones larger than 25 mm diameter.

The *Contractor* shall manage available quantities of Topsoil to meet placement requirements. Unless otherwise approved in writing by the *Supervisor*, topsoil shall not be imported from off-site sources.

Placement

Topsoil shall be placed with care in the areas shown on the Drawings.

Topsoil shall be spread evenly and lightly compacted to achieve the design minimum compacted thickness measured normal to the slope.

Hydroseeding

All areas in which topsoil has been placed shall be hydroseeded.

The *Contractor* shall supply all personnel, equipment and materials for the preparation of the freshly placed topsoil and the placement of the hydroseed on the topsoil.

The grass mix to be used for hydroseeding shall be in accordance with the ratios in Table 1-6, this shall form a **HOLD POINT**. Any re-seeding shall have a lime and fertilizer applied.

Table 1-6: Topsoil Requirements

Grass Species	% by Weight
Agrostis castellana	5
Festuca ruba ruba	65
Festuca ovina	20
Festuca ruba commutata ¹	10

The grass mix, contained within the hydroseeding application, shall be applied at a minimum rate of 35g/m². The *Contractor* shall include a fertiliser within the hydroseeding application, with a mixture rate as per the supplier's recommendations.

All areas to be hydroseeded with approved grass mix and binder mix to achieve dense grass swath. Hydroseeding shall be of the highest quality industry standards and undertaken by an approved and experienced hydroseeding *Contractor*. All hydroseeding areas shall have an even cover and be free from any bare patches.

The *Contractor* shall clean over-sprayed hydroseeding from all poles, pavements, furniture and posts immediately after hydroseeding. Final approval of the hydroseeding Works after placement shall form a **WITNESS POINT**.

The *Contractor* shall protect newly sown areas against trespass and traffic until grass is well established, with star pickets or timber stakes and barrier tape.

1.5.8.1 Witness and Hold Points

- Approval of Grass Mix – HOLD POINT
- Approval of hydroseeding after placement – WITNESS POINT
- Maintenance period end – HOLD POINT

1.6 Concrete Works

The *Contractor* shall supply all personnel, equipment and materials for the supply of concrete and construction of the concrete structures that constitute the Works.

This scope provides for all concrete associated with the Works including but not limited to the following (refer to section 1.6.4 below):

- new mass concrete wall; and
- concrete for plugging existing culverts in settlement tank.

1.6.1 Work Operations

This specification applies to all operations associated with general concrete works, including:

- Preparation of existing concrete surfaces;
- Construction of formwork;
- Placement of reinforcement;
- Installation of embedded items;
- Concrete mix design trials;
- Supply, handling, placement, compaction, curing and protection of concrete;
- Concrete finishes;
- Repair of concrete defects; and
- Sampling, testing, reporting and compliance with specified properties of plastic and hardened concrete.

1.6.2 Standards and References

Wherever applicable, all Civil Works carried out shall comply in all aspects (i.e. construction, testing and performance) with the latest relevant British (BS), European (EN), and International (ISO) Standards, and the following in particular:

- Civil Engineering Specification for the Water Industry (CESWI), 7th Edition.

1.6.3 Submittals

A minimum of 14 days prior to commencing with concrete works, the *Contractor* shall submit their procedures for the concrete construction process.

The *Contractor* shall submit details of the proposed mix design(s) a minimum of 14 days prior to delivering any concrete to the site.

1.6.4 Concrete Requirements

Unless otherwise specified or shown on the Drawings, the concrete shall be as summarised in Table 1-7.

Table 1-7: Concrete Requirements

Concrete Requirement		Concrete Mix
Class and Grade		C28/35
Exposure Class		XF4
Design Chemical Class		DC-2z
Location		Mass Concrete Wall, and concrete plugs
Materials and Mix	Cement Type	All in BS8500-Table A6
	Minimum Cement Content (kg/m ³)	340
	Maximum Cement Content (kg/m ³)	380
	Maximum Water Content Ratio	0.50

	Concrete Requirement	Concrete Mix
	Maximum Aggregate Size (mm)	20
	Aggregate Type	Freeze Thaw Resisting Aggregates
Strength	Min. Compressive Strength Class (28 days) or designation from durability aspects only (MPa)	28
Other	Placing Temperature (°C)	5-20
	Recommended Consistency	S3
	Nominal Slump (mm)	80

1.6.5 Batch Plant

Concrete shall be supplied from a commercial batching and mixing plant located off-site. The *Contractor* shall provide details of such off-site plant for the *Supervisor's* review and approval.

1.6.6 Placement Constraints

Concrete shall not be placed when the shade temperature is below 5°C or above 20°C. During placement, the concrete shall be protected against the harmful effects of exposure to sunlight, wind and rain.

1.6.7 Foundations

The surfaces upon or against which concrete is to be placed shall be free of standing water, mud, debris, oils, objectionable coatings and fragments. Where shown on the Drawings, or directed by the *Supervisor*, the foundations shall be cleaned with air and/or water jets.

The surfaces of absorptive foundations against which concrete is to be placed shall be moistened thoroughly so that moisture will not be drawn from the freshly placed concrete.

Where concrete is to be placed against existing concrete, the existing concrete shall be scabbled to expose the aggregates. The receiving concrete surfaces shall be kept moist for at least 72 hours prior to placing fresh concrete, and a wet-to-dry epoxy agent shall be applied.

1.6.8 Formwork

Formwork, including all temporary supporting structures and precast members, shall comply with the requirements of BS 8500-1:2006, and shall be of a type and be positioned such that the specified shape, lines, dimensions, texture and finish of the concrete are achieved. Formwork shall be erected sufficiently tight to prevent loss of mortar from the concrete.

All surfaces of forms and embedded materials that have become encrusted with dried mortar or grout from concrete previously placed shall be cleaned of all such mortar or grout before the adjacent concrete is placed.

The *Contractor* shall form 25 mm chamfers on all exposed concrete, unless noted otherwise on the Drawings.

1.6.9 Concrete Placement

The *Contractor* shall use pneumatic and pumping, or other methods, for conveying and placing concrete. The method of placement shall be agreed with the *Supervisor* at least 24 hours prior to the concrete placement.

Concrete shall not be placed under water, nor shall concrete be dropped from a height greater than 1.5m. Methods used to place concrete shall be such as not to permit or cause segregation. Where concrete is conveyed by chute, the equipment shall be of such size, slope and type as to ensure the continuous flow of concrete without segregation of materials.

Concrete shall not be placed until the *Supervisor* has inspected the reinforcing and formwork. The *Contractor* shall give the *Supervisor* at minimum of 72 hours advance notice of intention to place concrete. Notice of the *Contractor's* intention to place concrete and the inspection of reinforcement and formwork by the *Supervisor* constitutes a **HOLD POINT**.

Concrete shall be delivered to site for use within 90 minutes of commencement of mixing at the plant (as evidenced by concrete batch ticket). Concrete which has developed its initial set, or which has not been placed in the forms and consolidated within 20 minutes after discharge from the agitator shall not be used.

Concrete shall be placed in generally horizontal layers in one continuous operation.

1.6.10 Consolidation

During the placing operation, concrete shall be consolidated to ensure that the finished concrete is dense, and that it has a uniform surface finish. Immersion type concrete vibrators operated in strict accordance with the manufacturer's recommendations shall be used to consolidate concrete.

The duration of vibration shall be sufficient to accomplish satisfactory consolidation, as evidenced by the cessation of large air bubbles rising to the concrete surface. The duration of vibration shall be limited or discontinued in order to limit segregation or the formation of laitance.

Contact of the vibrating head with surfaces of the forms and reinforcement shall be avoided. During consolidation, neither reinforcement nor formwork shall be displaced. Care shall be taken to fill every part of the forms with concrete including the complete surrounding of the reinforcement, to work aggregate back from form surfaces and faces, and to eliminate voids.

The *Contractor* shall provide a minimum of one stand-by vibrator, demonstrably in good working order, of similar compacting capacity to those proposed for use.

1.6.11 Curing and Protection

All concrete surfaces shall be cured by water curing, or curing compound, in accordance with the requirements of this Clause.

The unformed top surfaces of walls shall be moistened by covering with water-saturated material or by other effective means as soon as the concrete has hardened sufficiently to prevent damage by water. The surfaces shall be kept completely and continuously moist, prior to and during form removal, by water applied on the unformed top surfaces and allowed to pass down between the forms and the formed concrete faces.

When frosts or freezing temperatures are likely, special precautions shall be taken to maintain the concrete temperature at the surface of the setting concrete above 5°C. Concrete cured with water shall be kept continuously (not periodically) wet for at least 7 days immediately following placement of the concrete, or until covered with fresh concrete.

Where the use of a curing compound is proposed by the *Contractor*, submit details of the proposed curing compound to the *Supervisor* for review a minimum of 14 days prior to its use. The submittal shall be accompanied by test certificates to show that the curing compound will give satisfactory results for the proposed application. Only wax based curing compounds with minimum solids content of 30% shall be used.

1.6.12 Finished Surfaces

Exposed surfaces shall be true and free from depressions or projections. Rough or porous areas and holes shall be filled with mortar. Bolts, wires and other items passing through the concrete to hold the forms shall be cut off or set back 25 mm below the surface and the resultant holes filled with mortar.

Unless otherwise shown on the Drawings or specified, the surface finish of all formed concrete shall be F2 as defined by CESWI.

1.6.13 Defects

Concrete not placed and completed in accordance with this Specification, or which is damaged, shall be removed and replaced by the Contractor, unless otherwise approved by the *Supervisor*. The Contractor shall correct all imperfections on the concrete surfaces as necessary to produce surfaces that conform to the requirements of the Specification.

Concrete repair shall only be performed where the *Supervisor* has approved repair as the disposition for nonconforming concrete.

Advise the *Supervisor* as to when repair of concrete will be performed. Unless the *Supervisor* in each specific case waives inspection, repair of concrete shall be performed only in the presence of the *Supervisor*.

The *Supervisor* shall inspect all concrete repairs.

1.6.14 Anchor Bars General

An anchor bar is defined as a steel reinforcement bar inserted centrally into a predrilled hole in rock or concrete and epoxied into place. The construction of the anchor bars involves:

- supply and installation of anchor bars;
- drilling of holes for the anchor bars; and
- supply and installation of epoxy resin in the anchor bar hole.

1.6.14.1 Drilling

Drilling of holes for anchor bars shall be in the locations shown on the Drawings. The drill hole diameter shall be:

- at least the diameter shown on the Drawings for anchor bars installed using cement grout; and in accordance with the grout manufacturer's instructions for anchor bars installed using epoxy grout.

Before drilling, break the concrete within the footprint back to expose the existing reinforcing steel if present, otherwise expose the aggregate. Locate the anchor bar holes to miss the existing reinforcing if present.

1.6.15 Reinforcing Steel

Reinforcement steel for anchor bars shall consist of Grade 500A, B or C deformed ribbed steel reinforcing bars to BS 4449:2005. The bars shall be detailed as shown on the Drawings.

1.6.16 Installation

All drilling records shall be available for inspection by the *Supervisor* prior to inserting the anchor bar. All anchor bar holes shall be cleaned out prior to inspection.

The anchor bars shall be inserted and grouted on the same day as the completion of drilling the hole. Anchor bars shall be grouted into a centralised position within the drilled hole with epoxy.

Epoxy shall be placed in the drill hole prior to inserting the anchor bar.

1.6.17 Epoxy

Epoxy for anchor bars shall be HIT-RE 500 as manufactured by Hilti (or an approved equivalent).

Epoxy shall be mixed, prepared and installed in accordance with the Manufacturer's instructions.

Details of the proposed epoxy, if other than specified above, shall be submitted to the *Supervisor* for review.

1.6.18 Tolerances

Concrete structures shall be constructed to the lines, levels and dimensions shown on the Drawings or as otherwise specified.

1.6.19 Sampling and Testing

The frequency of sampling and testing of concrete for slump, strength and air entrainment shall be as follows:

- Slump: Every load delivered to site
- Strength and Air Entrainment: Every load delivered to site

A sample for strength testing comprises three standard cylinder specimens. Unless otherwise directed or approved, for each strength sample, one cylinder shall be tested at 7 days and the other two at 28 days.

The *Contractor* shall supply the certified results of the testing to the *Supervisor* within 2 days of testing.

1.6.20 Witness and Hold Points

- Approval of Construction Procedure for Concrete Works – HOLD POINT
- Formwork design and installation – HOLD POINT
- Foundation inspection – HOLD POINT
- 48 hour notice given prior to any concrete pour to the *Supervisor* – HOLD POINT
- Reinforcement inspection – HOLD POINT
- Concrete placement – WITNESS POINT
- Concrete curing – WITNESS POINT

1.7 Fencing

1.7.1 Scope of Works

This Clause covers the requirements for the construction of a new chain link fence around the settlement tank as shown on the Drawings. Items covered in this Clause include the supply and erection of a new:

- 1.2m high chain link security fence around the settlement tank

1.7.2 General

The Contractor shall conduct operations so as to maintain site safety and security. Where practicable existing fences shall not be removed until the new fencing has been erected.

All materials shall be supplied by the Contractor and shall meet the requirements of BS 1722-1:2019 Specification for chain link fences and conform with the following clauses.

1.7.2.1 Tubular Steel Posts, Rails and Stays

Tubular steel posts, rails and stays shall be of commercial quality hot dipped galvanised steel pipe, free from distortion and with the galvanising intact.

Posts shall be properly adapted, before galvanising, to provide means for attaching the fencing to the posts in a manner that will not damage the posts or fencing material, and shall be fitted with watertight galvanised tops.

1.7.2.2 Chainlink and Barbed Wire

All chain link fencing shall be “Heavy Duty” wire diameter.

Unless otherwise stated, all chain link shall be galvanised coated.

1.7.2.3 Wire

Wire shall be galvanised, conform to the appropriate British Standards, and be of the gauge and type specified in BS 1722-1 for a 1.20m high chain link fence.

1.7.2.4 Gates

Gates shall be good commercial quality of the type and dimensions specified in BS 1722-1 for a 1.20m high chain link fence.

1.7.2.5 Miscellaneous Materials

All ferrous bolts, nuts, ties, staples and fittings for fences and gates shall be galvanised and of commercial quality and design.

Concrete, where required for fence post concrete footings shall be grade ST2 in accordance with this Specification.

1.7.3 Construction

1.7.3.1 General

Fences shall be constructed true to the lines pegged on the ground. All logs, stumps, saplings and undergrowth within 1 m of the fence line, and all trees which will interfere with proper construction of the fence shall be removed and disposed of by the Contractor at an approved off-site disposal facility. Any high points which interfere with the placing of wire or wire netting shall be cut down to provide the clearance shown on the detailed Drawings, and any low spots shall be filled.

Fences shall be constructed in accordance with the Drawings. All posts shall be set in line so that the tops bone uniformly without sudden dips or irregularities.

Unless otherwise specified, surplus earth from holes and trimming shall be spread within the road reserve and the area shall be left clean and tidy on completion of the work.

1.7.3.2 Chain Link Fences

Posts shall be set in concrete footings of the dimensions shown on the Drawings and in accordance with the requirements in BS 1722-1 for a 1.20m high chain link fence, with the top of the concrete crowned to shed water. End, corner and gate posts shall be braced as shown on the Drawings.

Chain link shall be tightened and securely fastened to posts and line wires on the side shown on the Drawings. Fastening to end, corner and gate posts shall be by lacing through each outer mesh with 2.5 mm diameter galvanised tie wire. Chain wire shall be fastened to line posts and line wires with 2.5 mm diameter galvanised tie wire or clips. The fastenings shall be spaced at not more than 400 mm intervals on line posts and at not more than 500 mm intervals on line wires.

1.7.3.3 Gates

The Contractor shall install a gate of the type and size specified in BS1722-1:2019 for 1.20 m high chain link fence. Gate posts shall be of the dimensions specified in BS1722-1:2019 and be firmly set into the ground to the depth specified. Each post shall be fitted with a strut as shown on the Drawings. Tubular metal posts shall be set in concrete as detailed.

The gate shall be hung with hinges securely attached to the gate posts. Each gate shall be fitted with a catch.

1.7.3.4 Junctions

Existing cross fences shall be connected to the new fences. Corner posts with braces for every direction of strain shall be placed at the junction with existing fences. The wire in existing fences shall be strained and securely fastened to the posts.

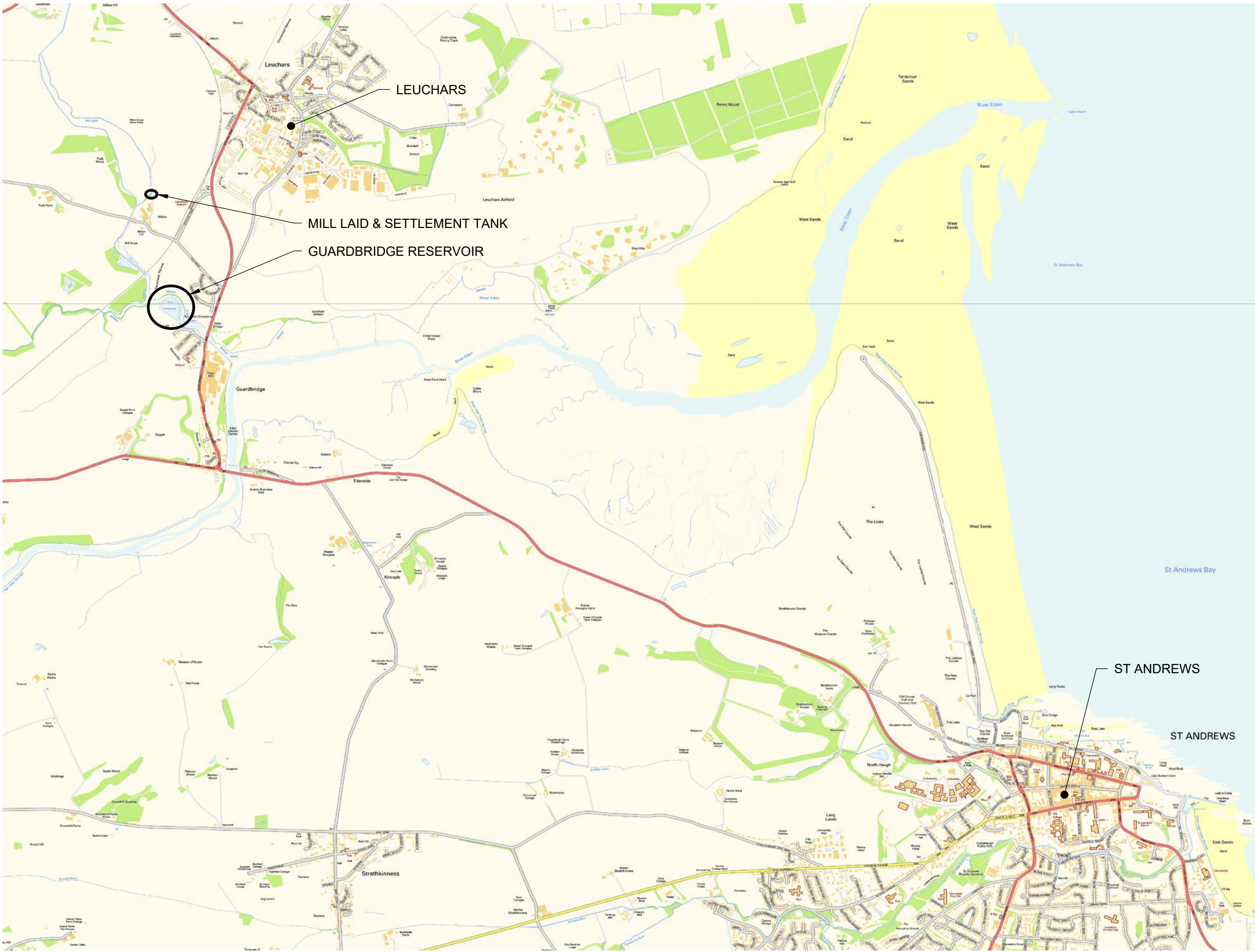
1.7.4 Removal, Reinstallation or Disposal of Existing Fences

The existing fence and gates around the settlement pond shall be removed and disposed of to an approved offsite disposal facility.

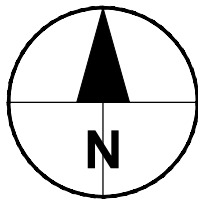
1.8 Mechanical Works

The *Contractor* shall supply all personnel, equipment and materials for the butt welding of end caps for sealing the cut sections of 12" and 14" pipe located at the bridge crossing.

The existing 12" and 14" sections of pipe beneath the existing pipe bridge are to be removed and their ends cut back so that with the application of the Butt Welded EQ Caps supplied by Pipefit or an approved equivalent, the pipes are flush with the existing ground at a location to be agreed with the Supervisor. The Contractor shall reprofile the existing ground as required to ensure that any voids left by the removal of the existing bridge abutments and capping of the existing pipes ties in with the existing profile of the riverbank. The Contractor shall achieve this by placing compacted earthfill in accordance with Clause 1.5.5 of this Specification.



LOCATION PLAN
Scale 1:25,000



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PROJECT NUMBER

60614119/M001

SHEET TITLE

GUARDBRIDGE RESERVOIR
LOCATION PLAN & DRAWING LIST

SHEET NUMBER

UOSA-ACM-DM-XX-DR-CE-010010

DRAWING LIST

DRAWING No.	TITLE
UOSA-ACM-DM-XX-DR-CE-010010	GUARDBRIDGE RESERVOIR, LOCATION PLAN & DRAWING LIST
UOSA-ACM-DM-XX-DR-CE-010020	GUARDBRIDGE RESERVOIR, GENERAL ARRANGEMENT PLAN
UOSA-ACM-DM-XX-DR-CE-010021	GUARDBRIDGE RESERVOIR, EXISTING PIPE BRIDGE ARRANGEMENT
UOSA-ACM-DM-XX-DR-CE-010022	GUARDBRIDGE RESERVOIR, EXISTING SETTLEMENT TANK ARRANGEMENT
UOSA-ACM-DM-XX-DR-CE-050025	GUARDBRIDGE RESERVOIR, REGRADING OF INTERNAL FACE OF EMBANKMENT DETAILS
UOSA-ACM-DM-XX-DR-CE-010029	GUARDBRIDGE RESERVOIR, EMBANKMENT REGRADING DETAILS, SHEET 1 OF 2
UOSA-ACM-DM-XX-DR-CE-010030	GUARDBRIDGE RESERVOIR, EMBANKMENT REGRADING DETAILS, SHEET 2 OF 2
UOSA-ACM-DM-XX-DR-CE-010031	GUARDBRIDGE RESERVOIR, PIPE BRIDGE WORKS
UOSA-ACM-DM-XX-DR-CE-010032	GUARDBRIDGE RESERVOIR, SETTLEMENT TANK WORKS
UOSA-ACM-DM-XX-DR-CE-010033	GUARDBRIDGE RESERVOIR, SETTLEMENT TANK SECTIONS
UOSA-ACM-DM-XX-DR-CE-050045	GUARDBRIDGE RESERVOIR, CHAINLINK FENCING DETAILS

**SAFETY HEALTH AND ENVIRONMENT
INFORMATION**

In addition to the hazards/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 CDM Risk Assessment Register No.
PROJ-XX-XX-HS-ZZ-000000

CONSTRUCTION

C1. WORKING NEAR/IN WATER - TIDAL ESTUARY
C2. DIFFICULT ACCESS TO PIPE BRIDGE
C3. POLLUTION OF WATERCOURSES

OPERATIONS

O1. NO UNUSUAL RISKS

MAINTENANCE

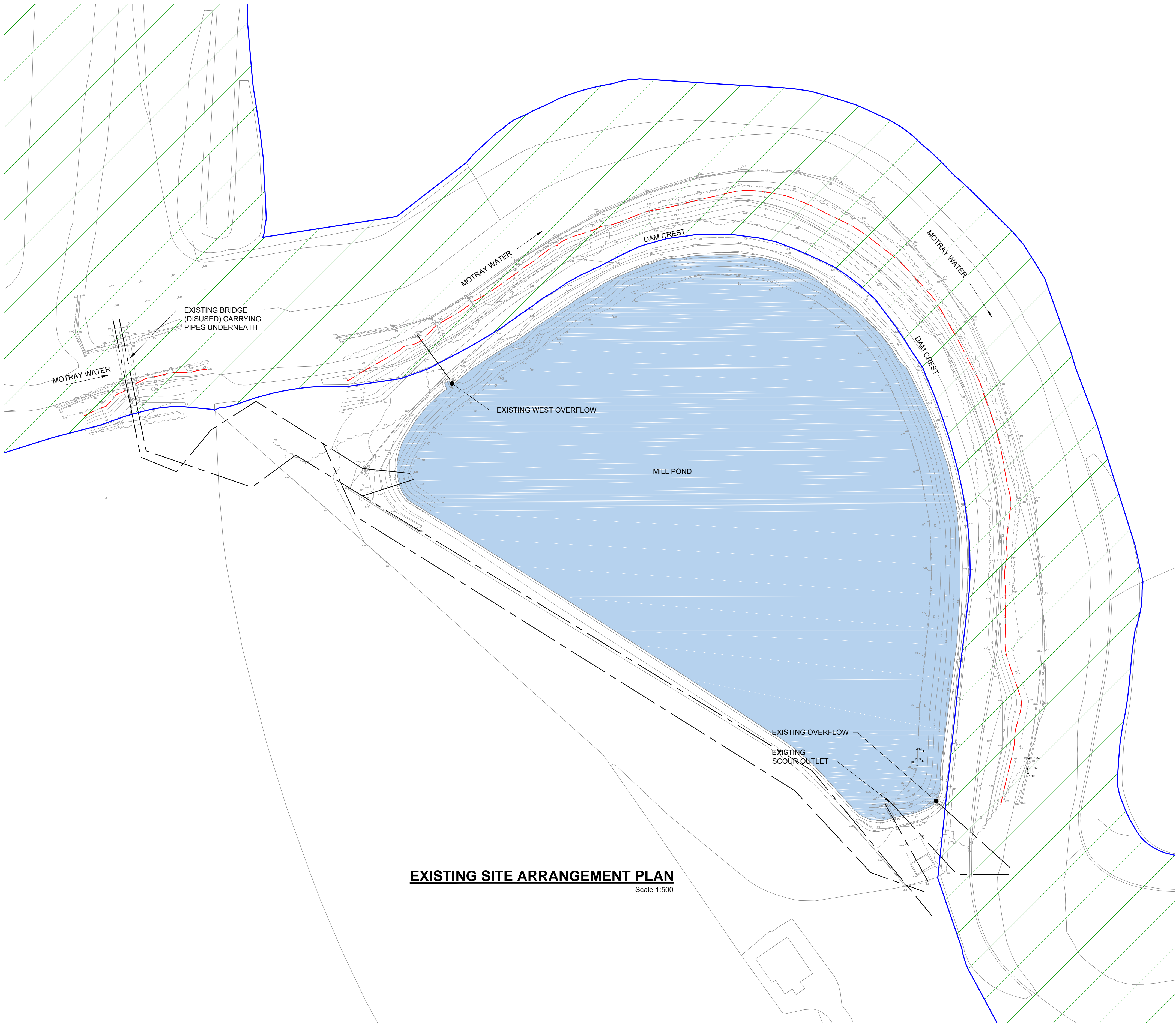
M1. NO UNUSUAL RISKS

DEMOLITION

D1. WORKING NEAR/IN WATER - TIDAL ESTUARY
D2. POLLUTION OF WATERCOURSES

It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement.

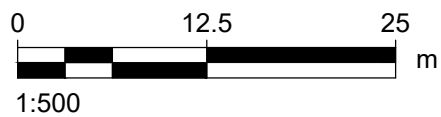
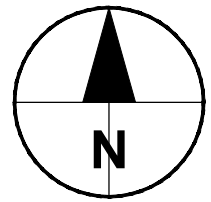
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Checked: RK
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EXISTING SITE ARRANGEMENT PLAN
Scale 1:500

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SAFETY HEALTH AND ENVIRONMENT INFORMATION	
In addition to the hazards/risks normally associated with the types of work detailed on this drawing, note the following risks and information.	
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CONSTRUCTION C1. WORKING NEAR/IN WATER - TIDAL ESTUARY C2. DIFFICULT ACCESS TO PIPE BRIDGE C3. POLLUTION OF WATERCOURSES	
OPERATIONS O1. NO UNUSUAL RISKS	
MAINTENANCE M1. NO UNUSUAL RISKS	
DEMOLITION D1. WORKING NEAR/IN WATER - TIDAL ESTUARY D2. POLLUTION OF WATERCOURSES	
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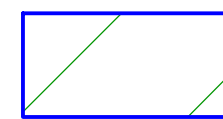
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EDEN ESTUARY SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI) - REFER TO WORKS PACKAGE INFORMATION FOR DETAILS



MEAN HIGH WATER SPRINGS (MHWS) LEVEL SHOWN ON THESE DRAWINGS HAS BEEN INTERPRETED FROM AVAILABLE ORDNANCE SURVEY (OS) DATA. THE APPROXIMATE LEVEL INTERPRETED FROM THE OS DATA IS 3.0 m ±0.5m.

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KEY PLAN

PROJECT NUMBER

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SHEET TITLE

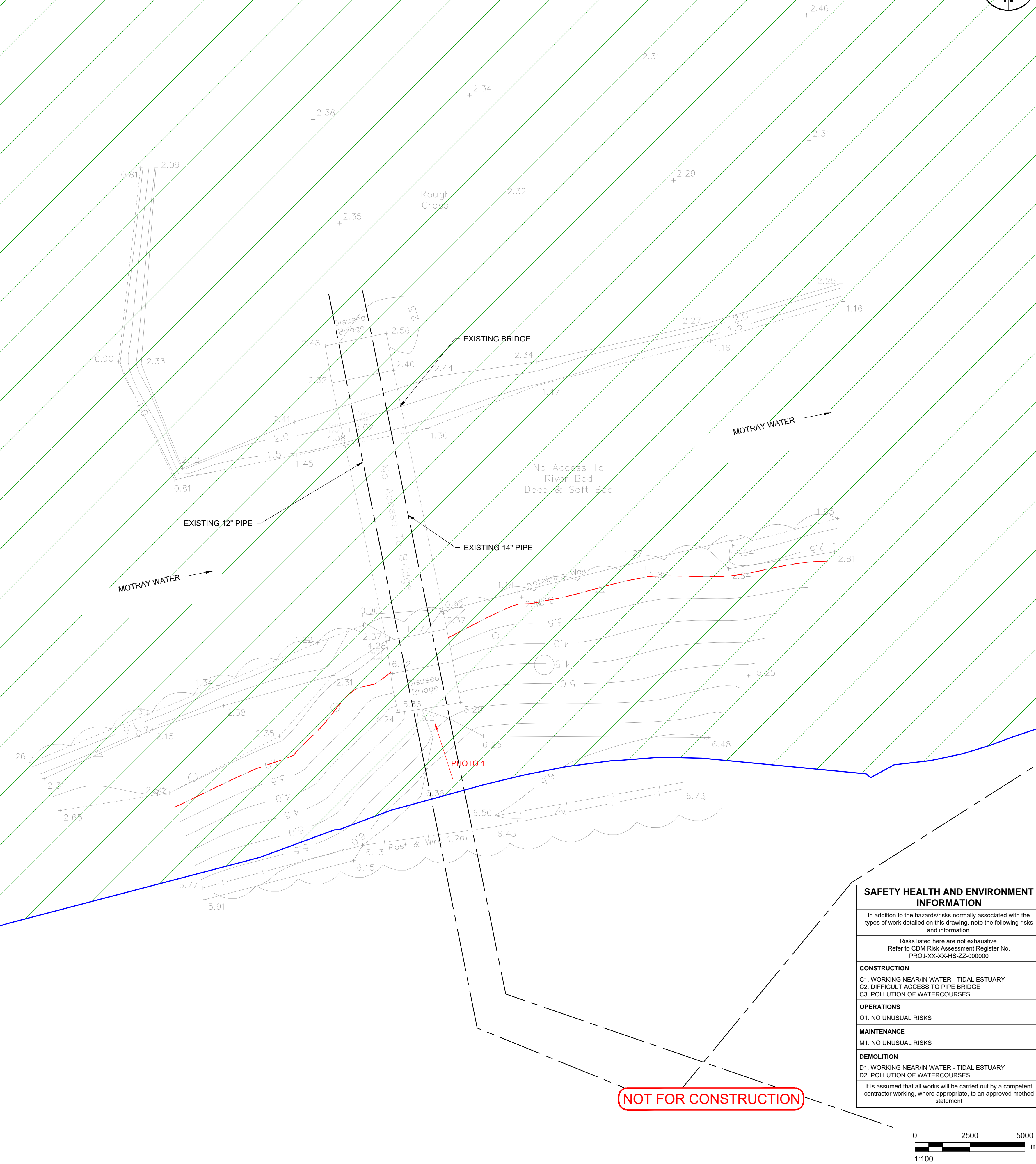
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GENERAL ARRANGEMENT PLAN**

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UOSA-ACM-DM-XX-DR-CE-010020



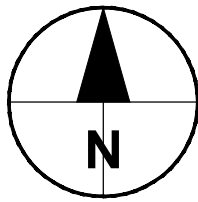
PHOTO 1 - PIPE BRIDGE



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KEY PLAN

PROJECT NUMBER

60614119/M001

SHEET TITLE

**GUARDBRIDGE RESERVOIR
EXISTING SETTLEMENT TANK
ARRANGEMENT**

SHEET NUMBER

UOSA-ACM-DM-XX-DR-CE-010022



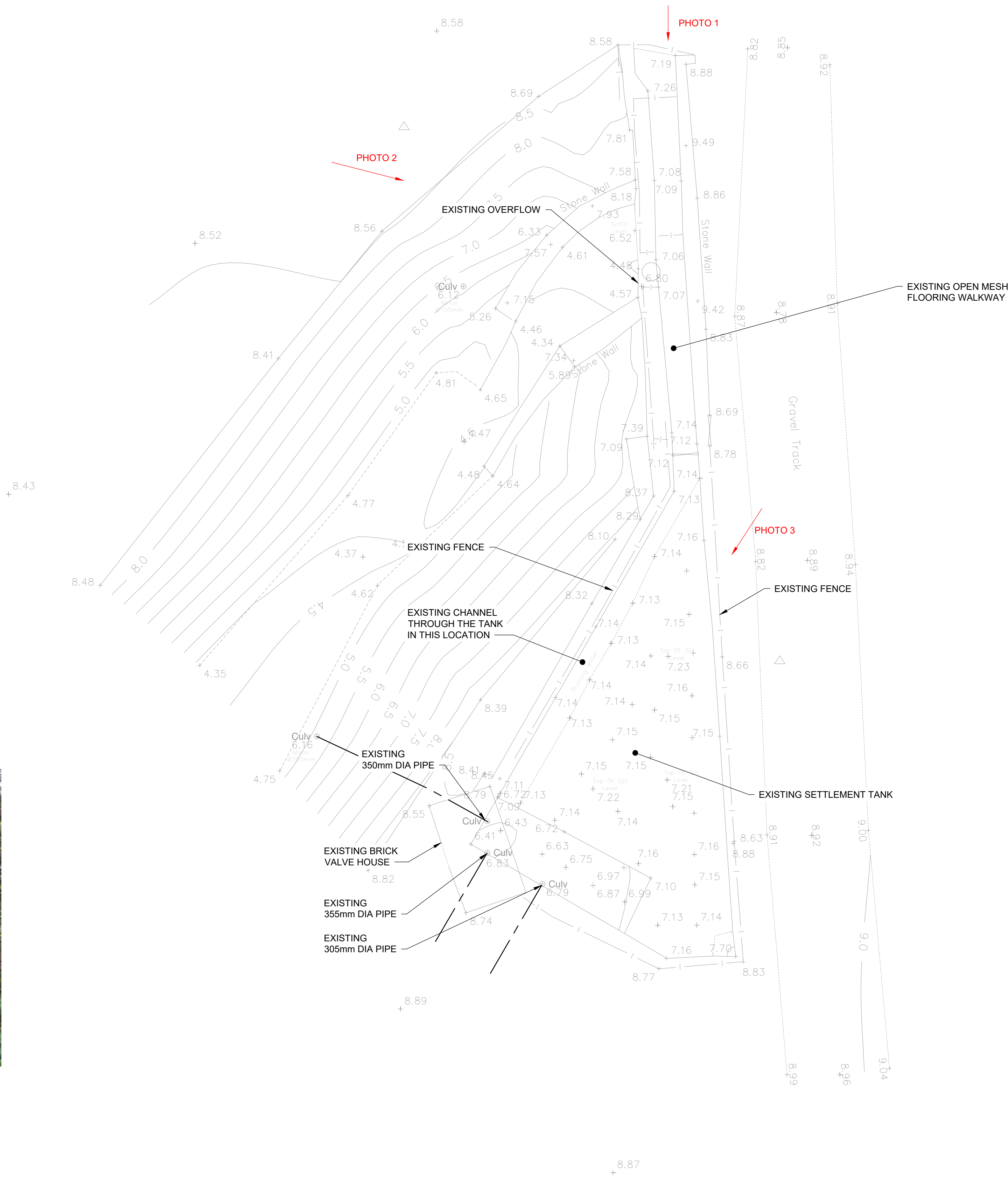
PHOTO 1 - MILL LADE WALKWAY



PHOTO 2 - MILL LADE SIDE OVERFLOW

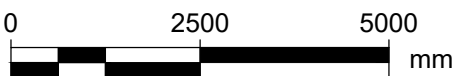


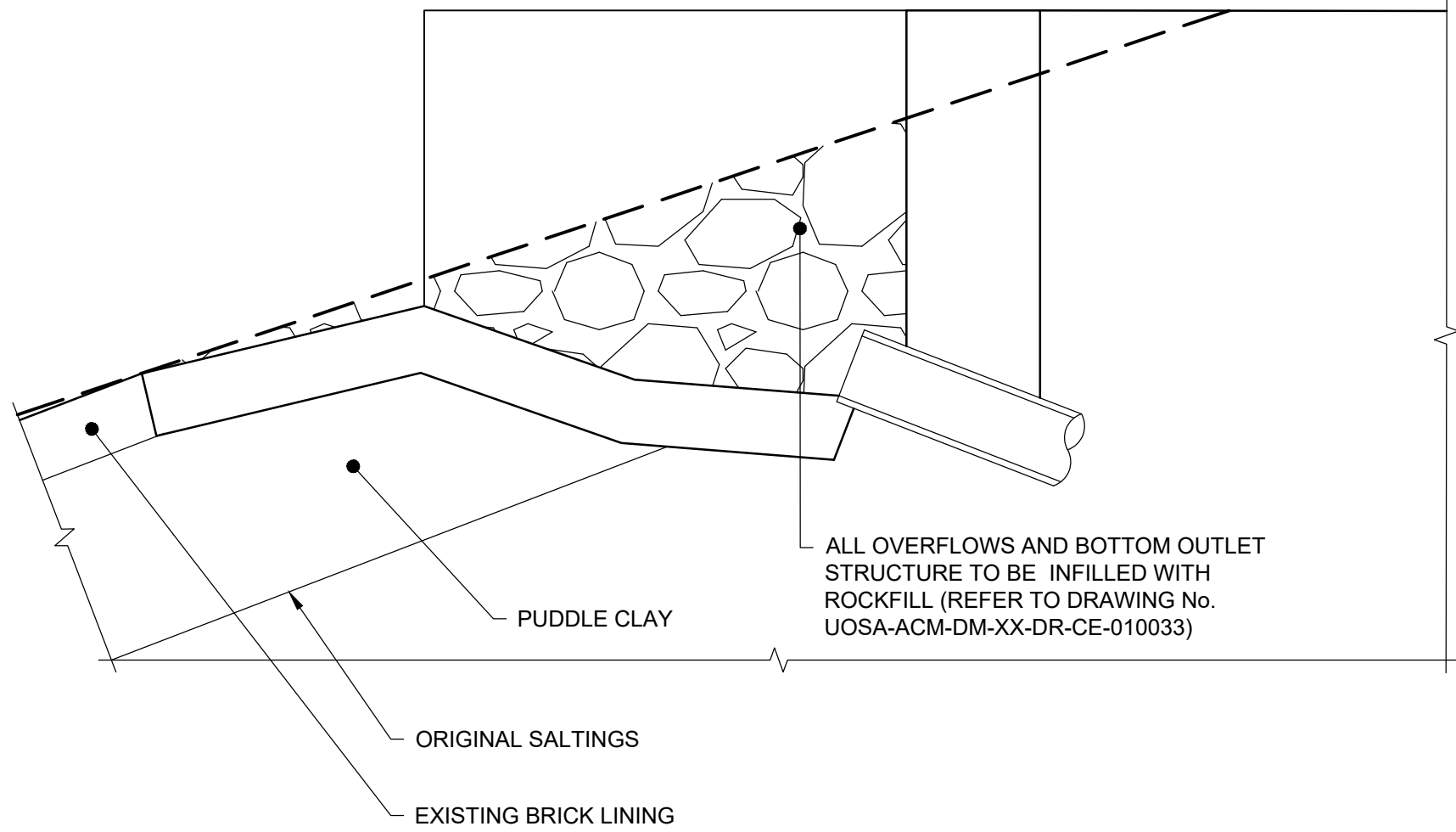
PHOTO 3 - EXISTING VALVE HOUSE



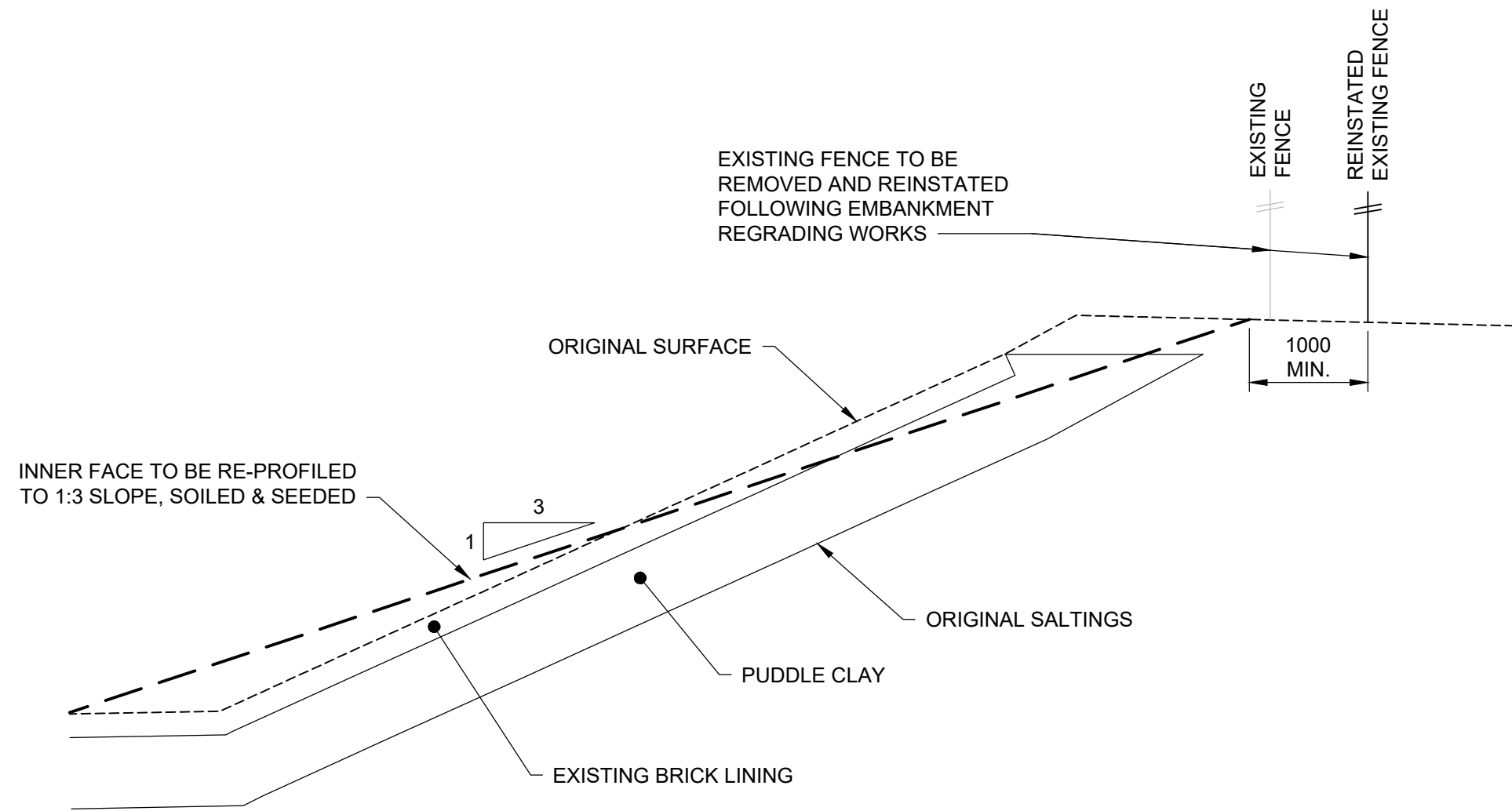
NOT FOR CONSTRUCTION

SAFETY HEALTH AND ENVIRONMENT INFORMATION
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CONSTRUCTION C1. WORKING NEAR/IN WATER - TIDAL ESTUARY C2. DIFFICULT ACCESS TO PIPE BRIDGE C3. POLLUTION OF WATERCOURSES
OPERATIONS O1. NO UNUSUAL RISKS
MAINTENANCE M1. NO UNUSUAL RISKS
DEMOLITION D1. WORKING NEAR/IN WATER - TIDAL ESTUARY D2. POLLUTION OF WATERCOURSES
It is assumed that all works will be carried out by a competent contractor working, where appropriate, to an approved method statement

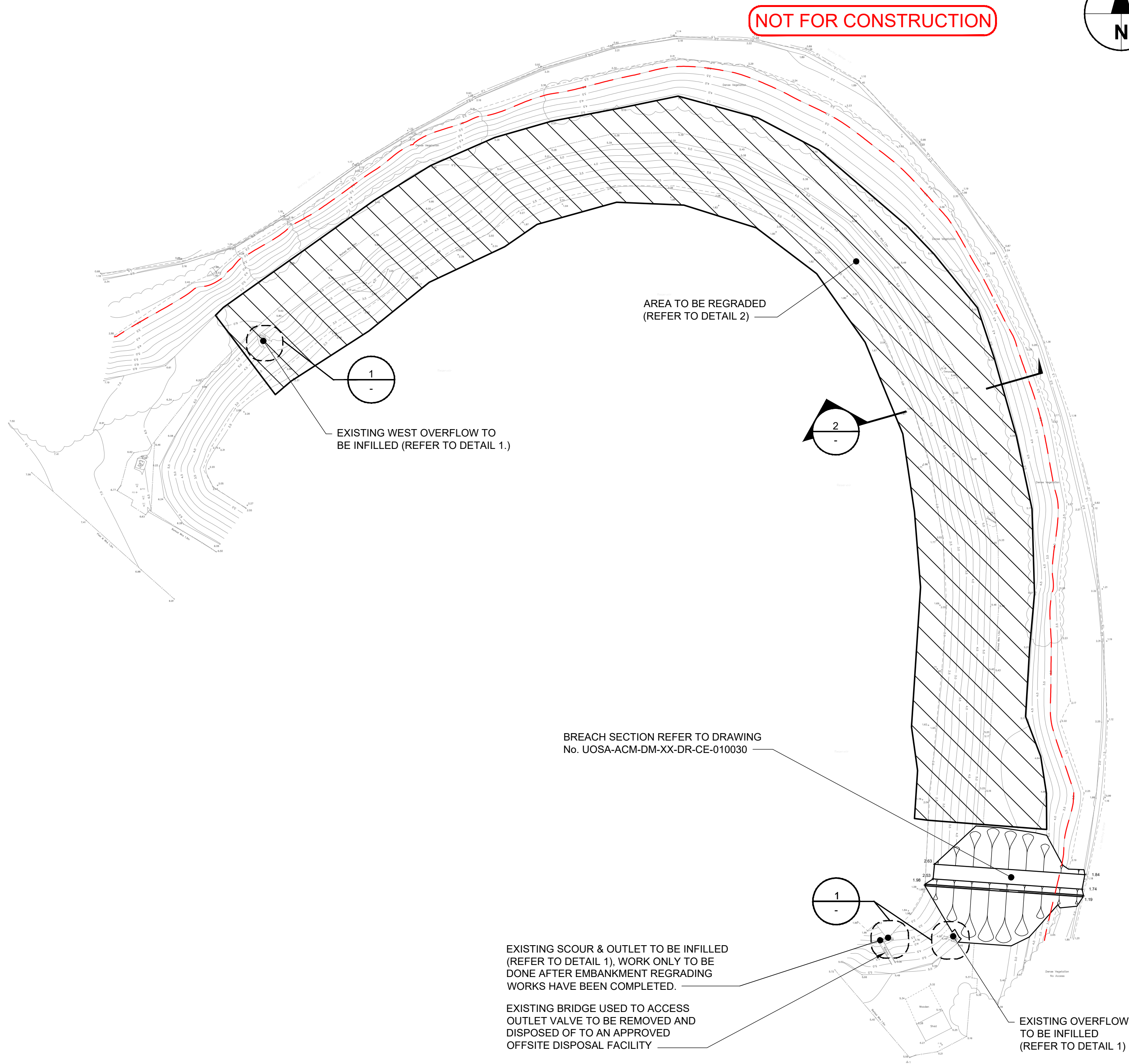




1 | OVERFLOW INFILL DETAIL
Scale 1:20

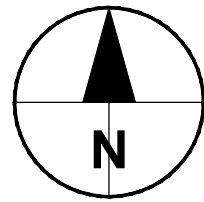
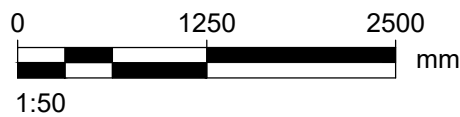


2 | TYPICAL EMBANKMENT REGRADING DETAIL
010010 Scale 1:50



MILL POND INNERFACE REGRADING PLAN
Scale 1:500

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OPERATIONS O1. NO UNUSUAL RISKS		
MAINTENANCE M1. NO UNUSUAL RISKS		
DEMOLITION D1. WORKING NEAR/IN WATER - TIDAL ESTUARY D2. POLLUTION OF WATERCOURSES		
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PROJECT

**GUARDBRIDGE
RESERVOIR
DISCONTINUANCE**

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www.aecom.com

NOTES

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4. IT IS ASSUMED THAT ALL WORKS WILL BE CARRIED OUT BY A COMPETENT CONTRACTOR WORKING, WHERE APPROPRIATE, TO AN APPROVED METHOD STATEMENT.
5. RESERVOIR TO BE FULLY EMPTIED PRIOR TO STARTING WORKS.
6. SCOUR AND OUTLET VALVES TO BE LEFT OPEN DURING WORKS AND THEIR CHAMBERS INFILLED ONLY AFTER EMBANKMENT REGRADING WORKS HAVE BEEN COMPLETED
7. SILT FENCES OR GRAVEL SAUSAGES TO BE USED AS REQUIRED TO PREVENT LOSS OF SEDIMENT FROM THE RESERVOIR DURING THE WORKS.

LEGEND

- AREA OF EMBANKMENT TO BE REGRADED
- MEAN HIGH WATER SPRINGS (MHWS) LEVEL SHOWN ON THESE DRAWINGS HAS BEEN INTERPRETED FROM AVAILABLE ORDNANCE SURVEY (OS) DATA. THE APPROXIMATE LEVEL INTERPRETED FROM THE OS DATA IS 3.0 m ±0.5m.

ISSUE/REVISION

C	28/08/2020	TENDER UPDATE
B	07/04/2020	ISSUED FOR TENDER
A	28/02/2020	ISSUED FOR COMMENTS
I/R	DATE	DESCRIPTION

ISSUE PURPOSE / SUITABILITY

FOR TENDER

KEY PLAN

PROJECT NUMBER

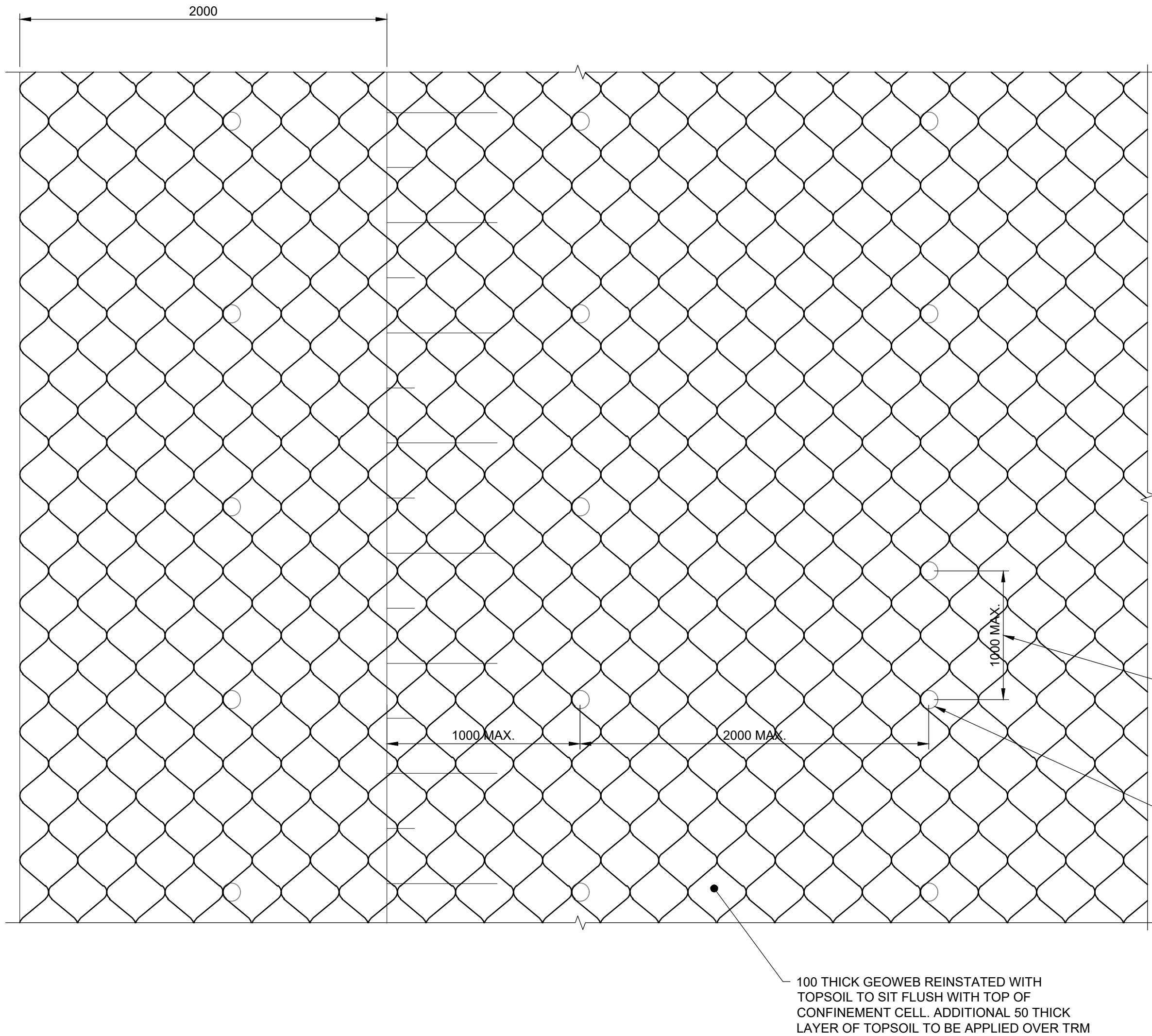
60614119/M001

SHEET TITLE

**GUARDBRIDGE RESERVOIR
REGRADING OF INTERNAL
FACE OF EMBANKMENT DETAILS**

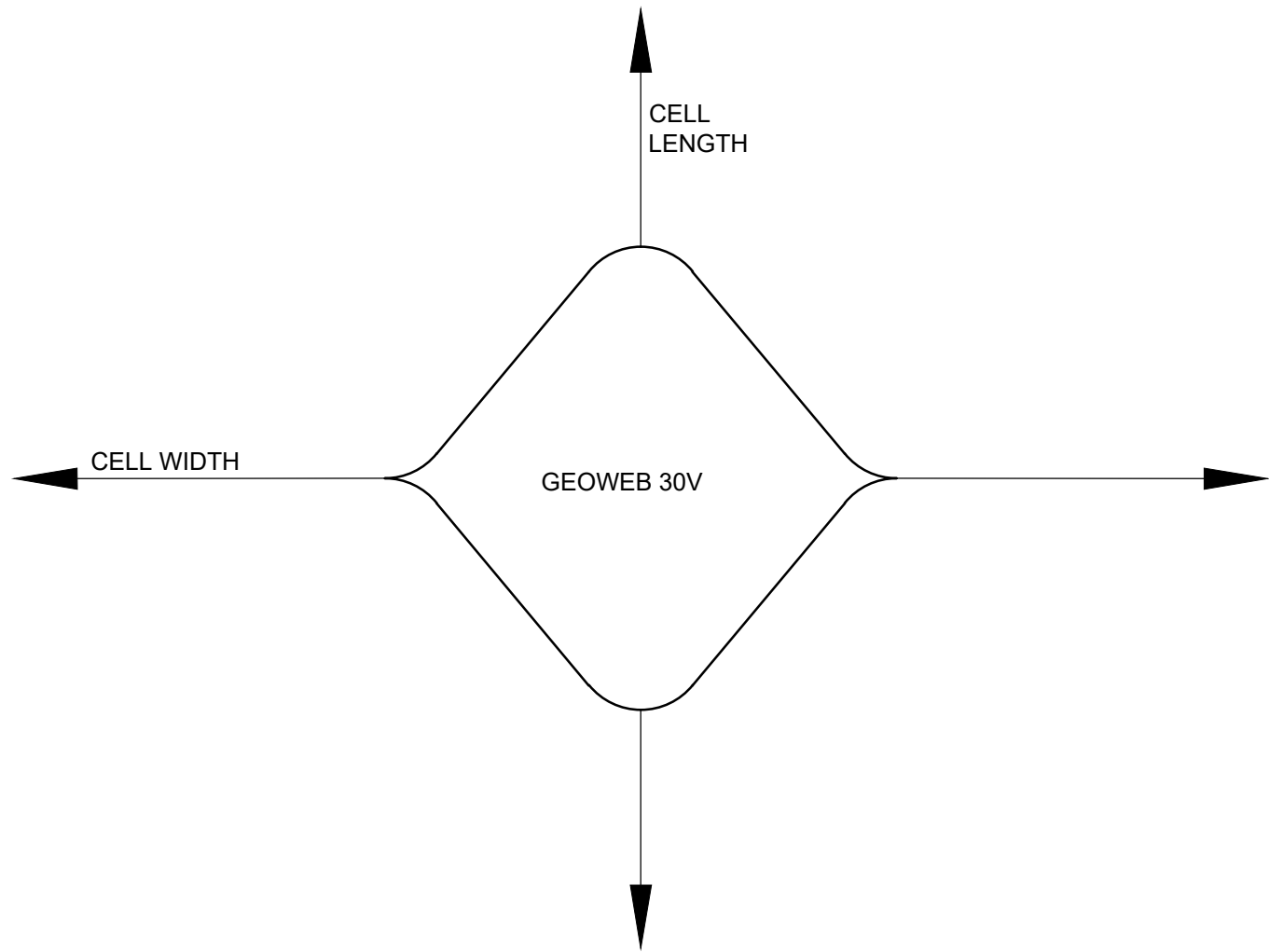
SHEET NUMBER

UOSA-ACM-DM-XX-DR-CE-050025



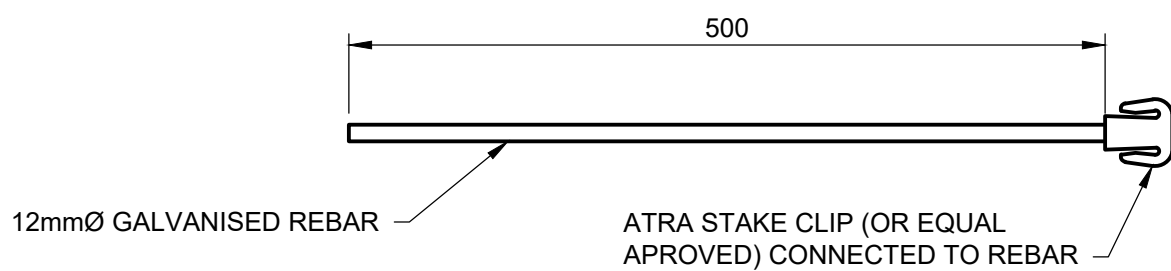
1 | GEOWEB SHEET TYPICAL LAYOUT PLAN

Scale NTS



2 | GW30 SINGLE CELL DETAIL

Scale NTS

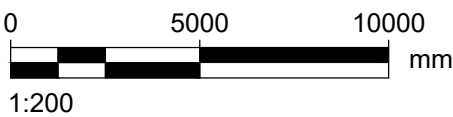


3 | TYPICAL ANCHOR DETAIL

Scale 1:5

NOT FOR CONSTRUCTION

SAFETY HEALTH AND ENVIRONMENT INFORMATION	
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MAINTENANCE M1. NO UNUSUAL RISKS	
DEMOLITION D1. WORKING NEAR/IN WATER - TIDAL ESTUARY D2. POLLUTION OF WATERCOURSES	
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PROJECT

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LEGEND

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A	28/02/2020	ISSUED FOR COMMENTS
I/R	DATE	DESCRIPTION

ISSUE PURPOSE / SUITABILITY

FOR TENDER

KEY PLAN

PROJECT NUMBER

60614119/M001

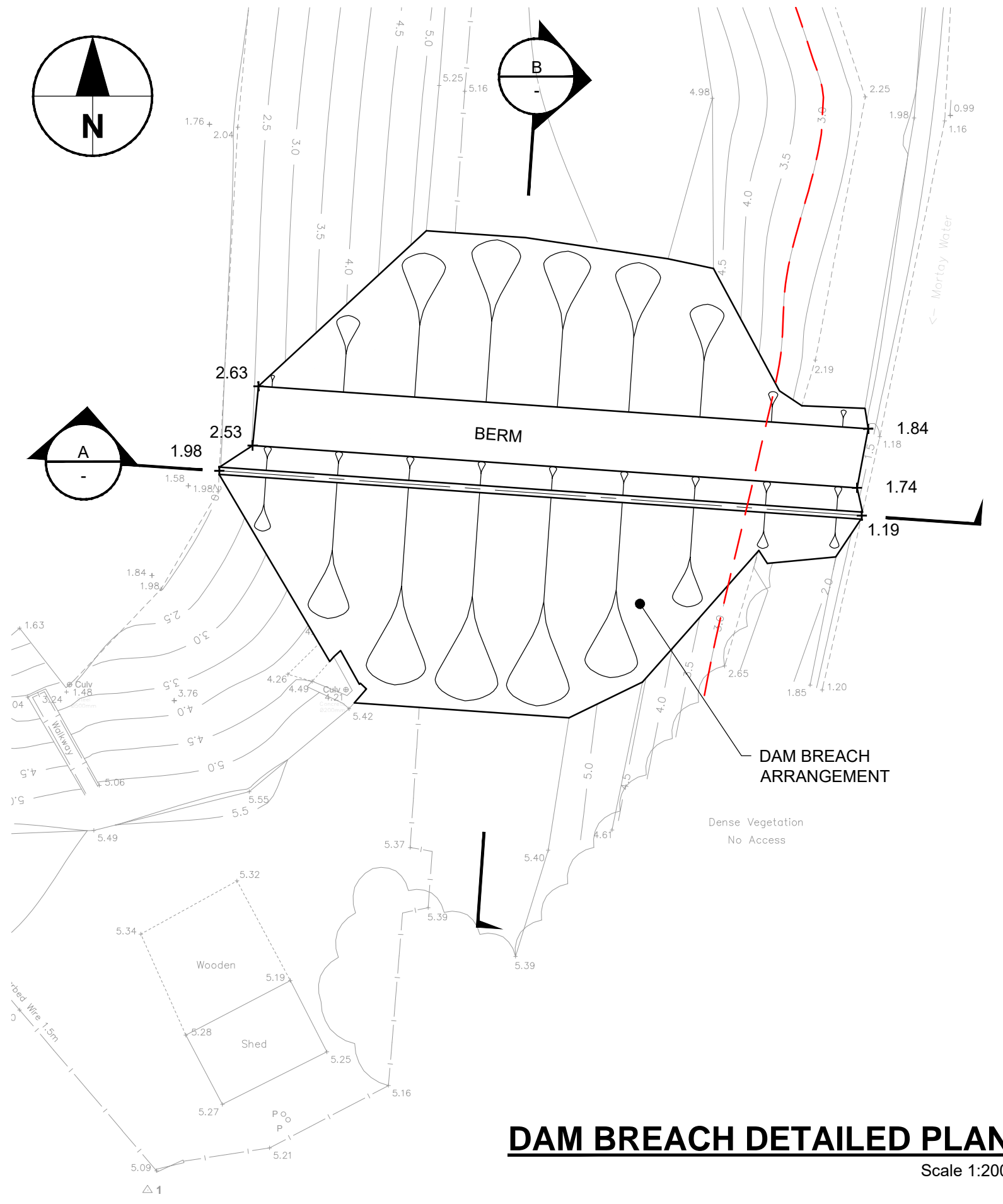
SHEET TITLE

GUARDBRIDGE RESERVOIR
EMBANKMENT REGRADING
DETAILS
SHEET 1 OF 2

SHEET NUMBER

UOSA-ACM-DM-XX-DR-CE-010029

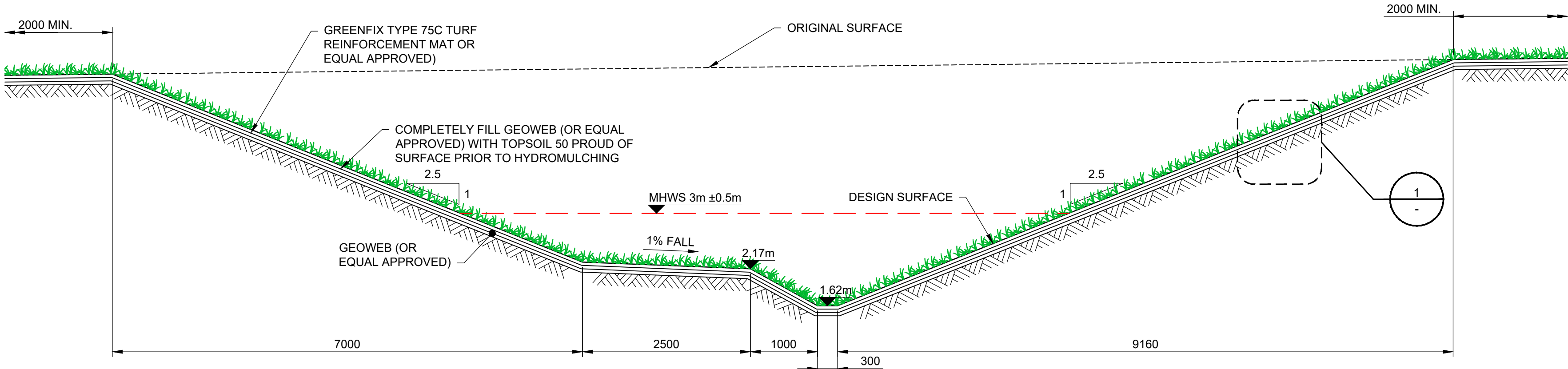
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Drawn: DRD
Approved: SCL
Checked: RK
Designer: TM
Project Management Initials: Revision:
Last saved by: DOIGD(2020-08-28) Last Plotted: 2020-08-28
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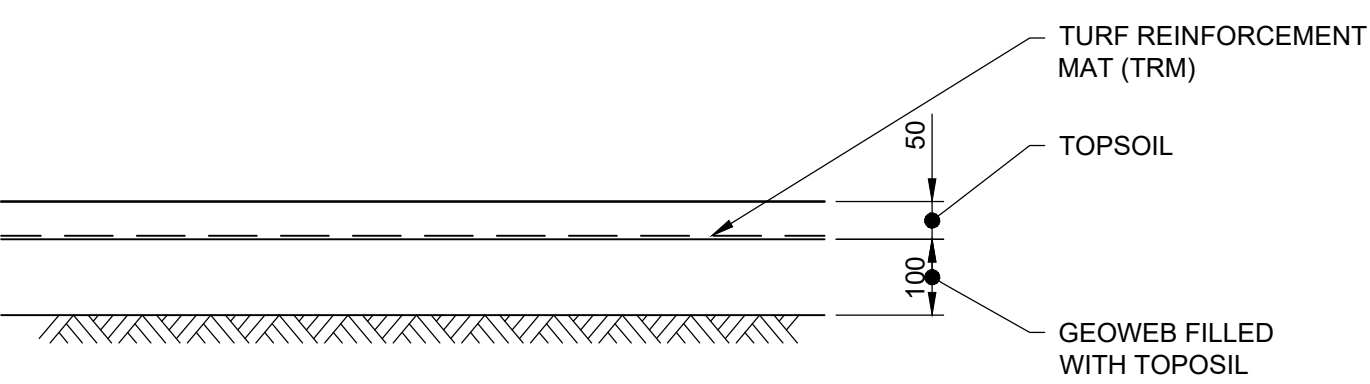
DAM BREACH DETAILED PLAN
Scale 1:200

ALL STRIPPED TOPSOIL AND EXCAVATED EMBANKMENT MATERIALS TO BE STOCKPILED SEPARATELY IN DESIGNATED STOCKPILE AREA FOR REUSE IN THE WORKS

NOT FOR CONSTRUCTION

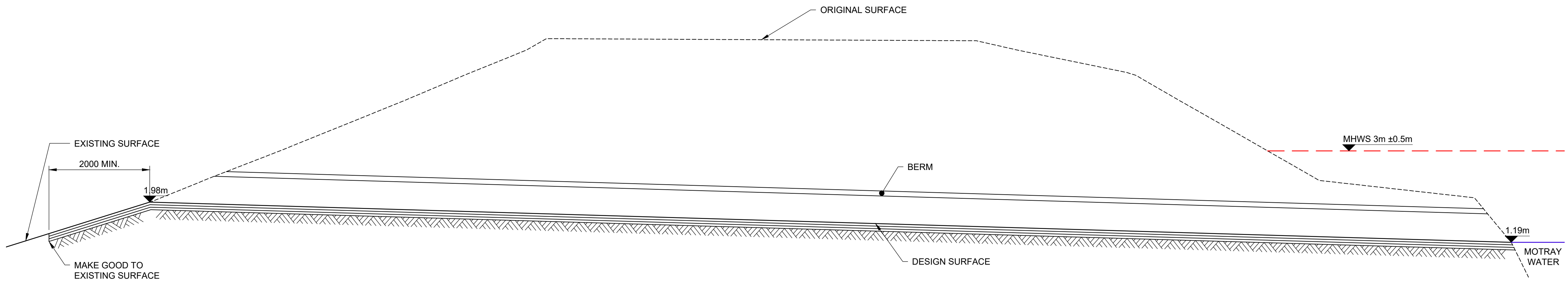


CROSS SECTION
Scale 1:50

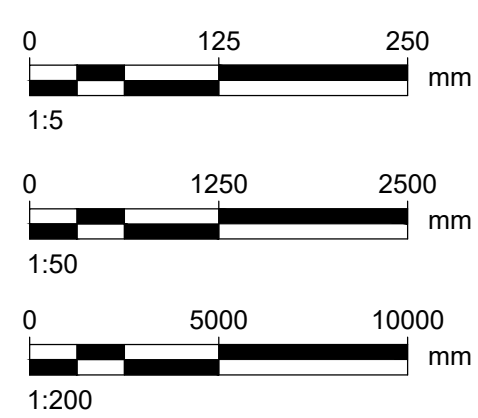


SLOPE PROTECTION DETAIL
Scale 1:10

SAFETY HEALTH AND ENVIRONMENT INFORMATION	
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LONG SECTION
Scale 1:50



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ISSUE PURPOSE / SUITABILITY

FOR TENDER

KEY PLAN

PROJECT NUMBER

60614119/M001

SHEET TITLE

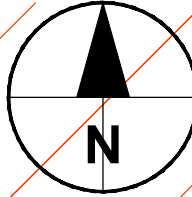
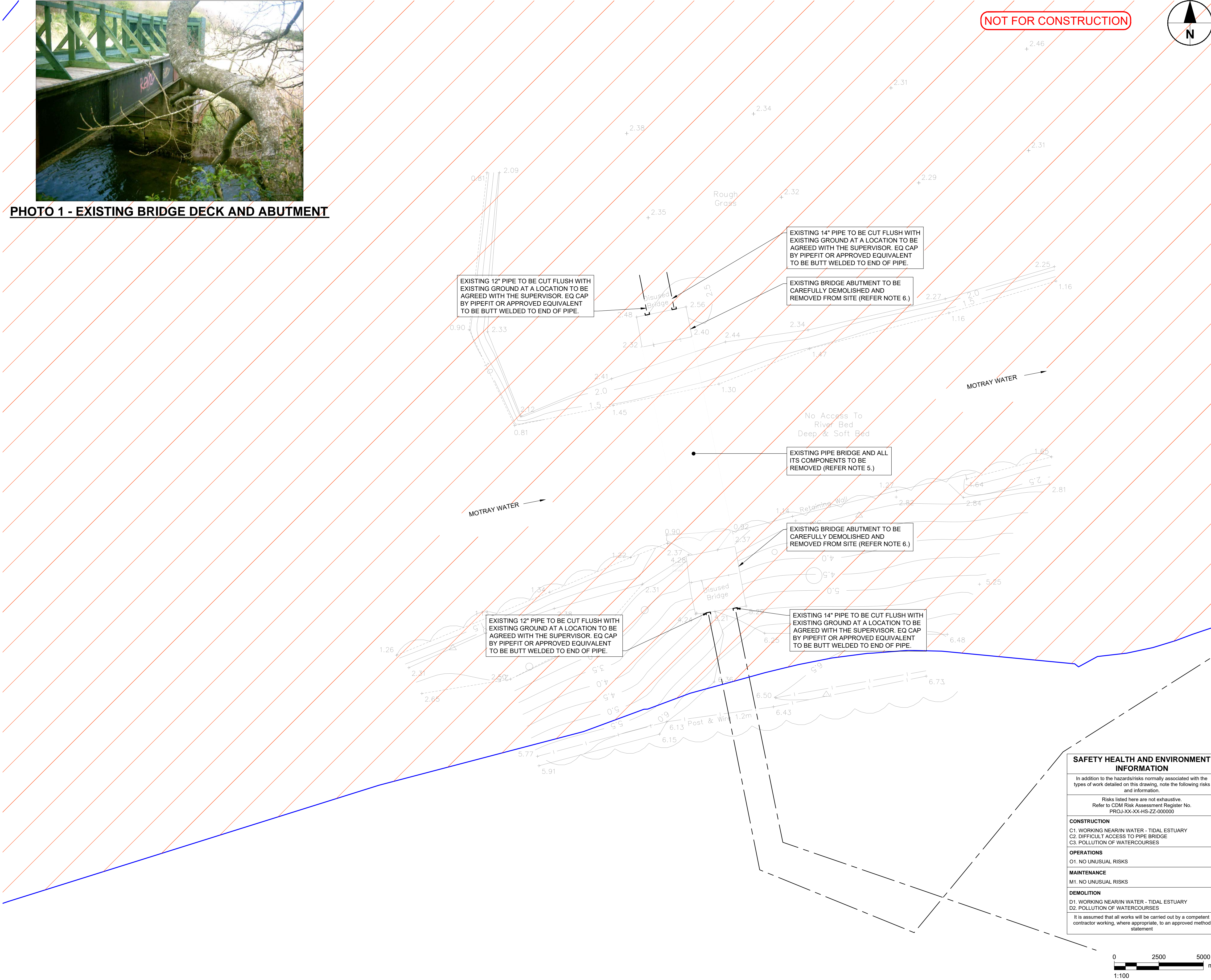
GUARDBRIDGE RESERVOIR
EMBANKMENT REGRADING
DETAILS
SHEET 2 OF 2

SHEET NUMBER

UOSA-ACM-DM-XX-DR-CE-010030



PHOTO 1 - EXISTING BRIDGE DECK AND ABUTMENT

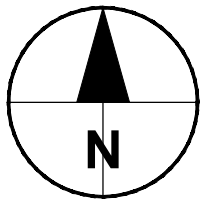


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- ALL EXISTING BRIDGE COMPONENTS, PIPEWORK AND FITTINGS TO BE REMOVED AND DISPOSED OF TO AN APPROVED OFF-SITE DISPOSAL FACILITY.
- ONCE THE EXISTING BRIDGE ABUTMENTS HAVE BEEN REMOVED THE CONTRACTOR IS TO LOCALLY REPROFILE THE GROUND TO TIE INTO THE EXISTING RIVER BANK.

	EDEN ESTUARY SITE OF SPECIAL SCIENTIFIC INTEREST (SSSI) - REFER TO WORKS PACKAGE INFORMATION FOR DETAILS
--	--

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NOT FOR CONSTRUCTION



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- FLOWS INTO THE SETTLEMENT TANK ARE TO BE DIVERTED PRIOR TO STARTING WORKS. NO SPINDLES, SCREENS OR VALVES TO BE REMOVED UNTIL FLOWS HAVE BEEN DIVERTED.
- SETTLEMENT TANK TO BE INFILLED WITH COMPACTED FILL IN ACCORDANCE WITH THE SPECIFICATION FOR THE WORKS.
- VALVE HOUSE IS APPROXIMATELY 2.0m IN HEIGHT.

LEGEND

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ISSUE PURPOSE / SUITABILITY

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KEY PLAN

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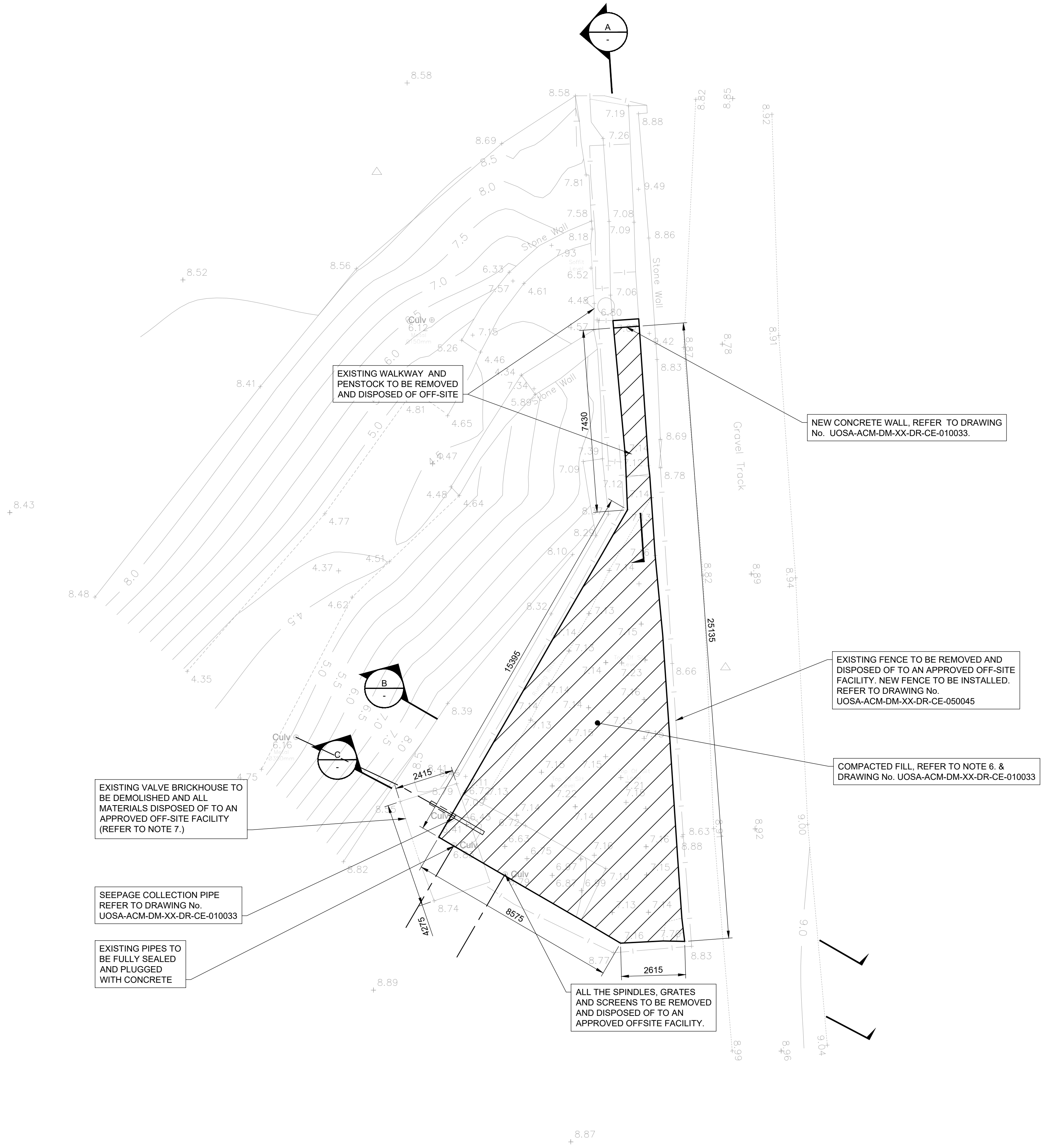
60614119/M001

SHEET TITLE

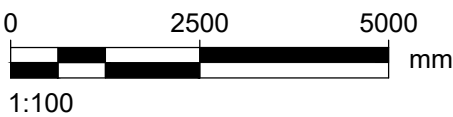
GUARDBRIDGE RESERVOIR
SETTLEMENT TANK WORKS

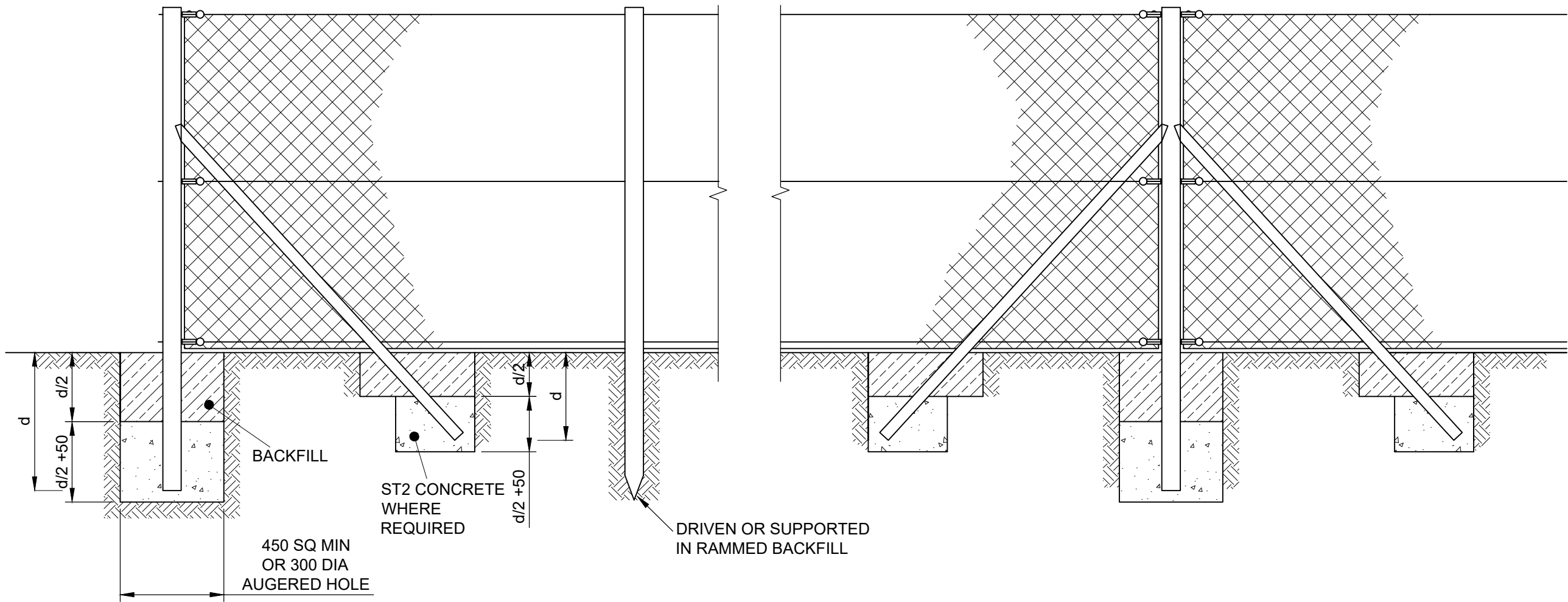
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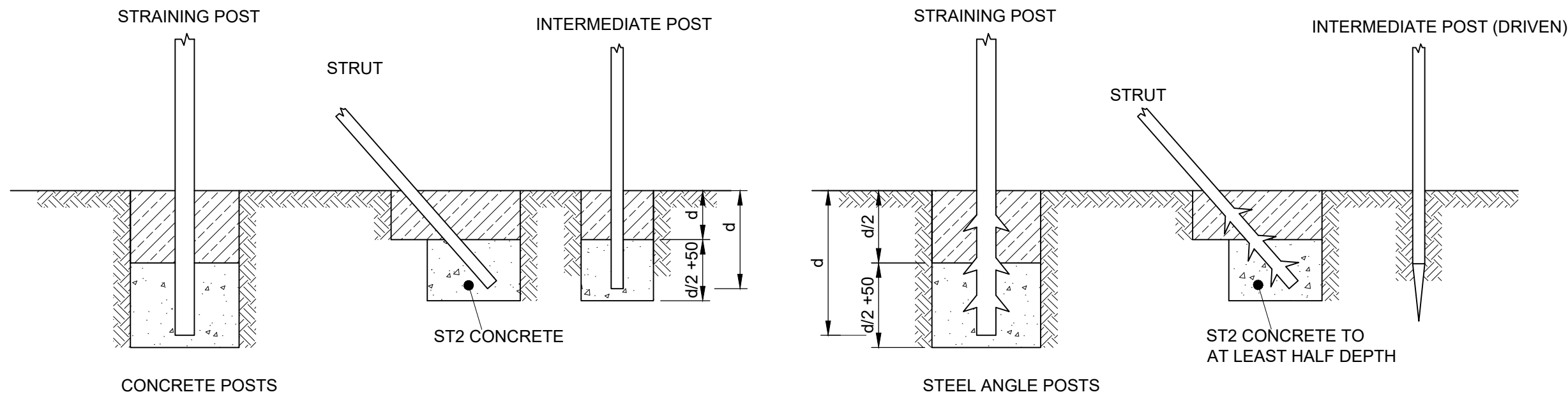


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1 | **DETAIL FOR TIMBER POSTS**
Scale NTS



1 | **VARIATIONS FOR POSTS OF MATERIALS OTHER THAN TIMBER**
Scale NTS

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- BS 1722 PART 1 APPLIES UNLESS OTHERWISE STATED.
- DIMENSIONS OF FOUNDATION, TYPE AND SIZE OF POSTS, STRUTS MESH, ETC. SHALL BE TAKEN FROM BS 1722 PART 1 APPROPRIATE TO THE HEIGHT
- PLASTIC COATING SHALL COMPLY WITH BS 1722: PART 16 & BS EN 10244-2
- PLASTIC COATING MATERIAL SHALL NOT BE ACCEPTABLE WHERE SERIOUS DAMAGE HAS OCCURED TO THE COATING BEFORE OR DURING ERECTION. MINOR DEFECTS MUST BE SPRAYED WITH AN APPROVED PLASTIC PAINT WITHIN 24 HOURS OF ERECTION.
- ALL TIMBER SHALL COMPLY WITH BS 3470
- WHERE A FENCE FORMS A BOUNDARY BETWEEN THE HIGHWAY AND PRIVATE PROPERTY THE WIRE SHALL BE FIXED TO THE HIGHWAY SIDE.
- TIMBER POSTS AND STRUTS MAY BE SUPPORTED IN RAMMED BACKFILL.

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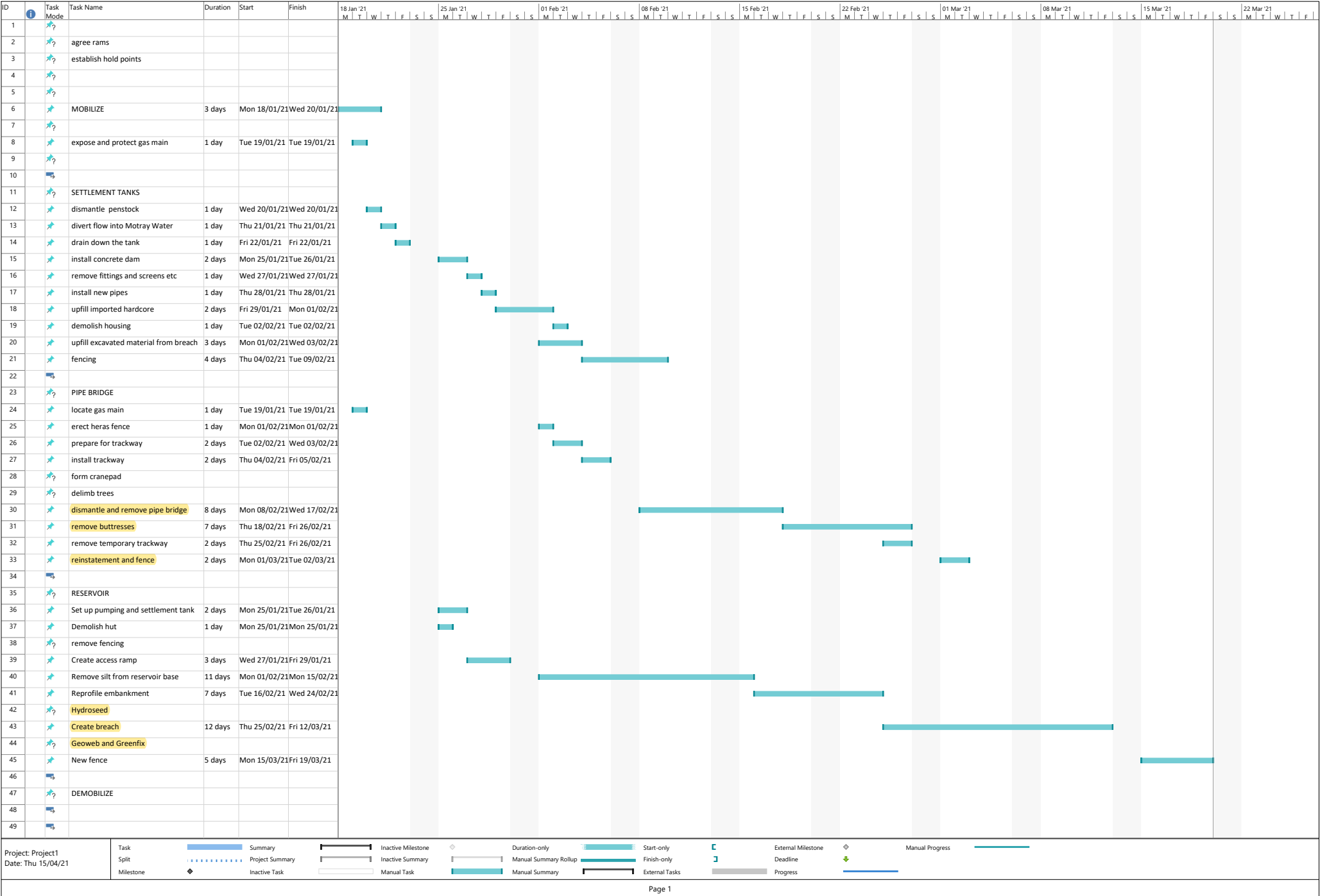
60614119/M001

GUARDBRIDGE RESERVOIR
CHAINLINK FENCING DETAILS

UOSA-ACM-DM-XX-DR-CE-050045

APPENDIX 3

DRAFT METHOD STATEMENT AND INDICATIVE TIMESCALES



THOMAS MENZIES (BUILDERS) LTD: Guardbridge Reservoir Discontinuance Method statement

SECTION 1 METHOD STATEMENT

OVERVIEW: AS 1.3.1

SETTLEMENT TANKS

Squad: 13t excavator, Foreman and two operatives

Approach Landowner/Farmer at Milton Farm to advise of impending access to the works through his yard

Strive to establish a good working relationship – we shall hire vector unit from him

Erect all warning signs on road and on hardcore path adjacent to the works used by walkers

Services check

Take down existing fence approx. 25m length along the roadside. Leave posts in for attaching temporary Heras panels to, but still allowing excavator access between posts

Set up silt containment system at the settlement tank and reservoir using proprietary silt fences to prevent any silt escaping into the Motray Water at the outlet in the reservoir during the initial works. This will be carried out prior to any works commencing.

At present, the majority of the inlet channel flow runs into the culvert, however a residual amount has formed its own channel in the west side of the settlements tanks as shown on drawing 10022.

We will remove the penstock system from the metal platform. Once we have removed the higher level of penstock, we will then remove the metal gantry, and install a low-level working platform to allow full removal of penstock.

Once penstock has been fully removed, we will then sand bag the inlet channel to the settlement tank, to divert all flow of water directly into the Motray Water. We will form a full diversion with plywood sheeting and seal so no water can ingress into the settlement tank down the channel.

Once the channel has been fully sealed, we will let the settlement tank totally drain by gravity, until no more water can escape the settlement tank sump. At this point we will deploy a Vector tanker and remove any water or silt residue remaining in the sump. Once this operation is complete, back fill operations can commence.

The 2 outlet pipes will now be plugged and sealed, and the new pipe and silt sock detail will be installed. Close attention will be paid to the weather in case of heavy rain fall and silt prevention measures will remain in place until infill of tank is complete.

Infilling will disturb all residual silt (expected to be no more than a thinnish film per documents). We shall carefully scrape this silt/sludge in base of settlement tank prior to placing of first layer of stone. Silt sludge will be taken off site.

Fill with imported rockfill and compact accordingly and then infill to final level with reused material from the reservoir breach. This will be carried out to suit programming.

On completion, remove the valve housing and remaining fence.

Erect new fence

PIPE BRIDGE

This Method Statement is dependent on free access to the corner of the Farmers field adjacent to the Pipe Bridge as identified at the site meeting.

ACCESS

Call out Scottish Gas representative to clearly identify line and depth of existing main and confirm our protective measures are compliant. Confirm status of all other utilities.

Access to the Pipe Bridge will be achieved by the use of Davis Trackway DTH Panel System Aluminium Trackway installed 6m wide over 230m designed to take the load of a rubber tyred 60T GTW crane capable of lifting 160t. See attached specification sheet for Trackway. We shall double up the trackway layer to allow safe crossing of the gas main, and also double up at the far end adjacent to the pipe bridge, where we shall install a crane pad formed from this trackway measuring approx. 20m x 20m.

The line of the access road will require to be agreed with St Andrews University prior to laying.

Heras panels will be set out over 230m of access road one side only and at the crane pad

We shall prepare the final agreed route of the access using 15t excavator to remove any scrub or uneven ground.

Using proprietary trackway limits any excavation works and consequent environmental damage.

DEMOLITION

Demolition of the existing Pipe Bridge will be carried out by our Subcontractor George Beattie & Sons Ltd, Kilsyth, a long-established demolition company with extensive experience and proven track record in this type of work. Please see attached their full RAMS.

A 2m high double clipped Heras fence will be erected around the entire site boundary and will be lined with standard statutory demolition warning notices.

Welfare facilities complying with schedule 2 of the CDM regulations 2015 L153 guidance and muster point will be located will be provided onsite.

The works will be carried out in accordance with the following: BS6187:2011, HSE guidance note GS29, Parts 1-4, CIRCA 532 best practice guidelines 8 SEPA "engineering in the water" best practice guidelines, The Building Operations (Scotland) Regulations 1976, Health & Safety at Work Act 1974, Control of Pollution Act 1989, The Management of Health & Safety at Work Regulations 2006, The Provision and Use of Work Equipment Regulations 1992, The Personal Protective Equipment at Work Regulations 1992, The Manual Handling Regulations 1992, BS EN 12811:2003 Temporary Works Equipment –Scaffolds, BS EN 362:2004 Personal Protective equipment against falls from height, Safety Helmets to BS EN 397 and eye protection to BS EN 166 to be worn at all times, All demolition activities will fully comply with the Construction (Design & Management) Regulations 2015, Requirements of Zero Waste Scotland.

We shall prior to commencement ensure that all necessary permits and approvals are in place. The breaking out of materials will be carried out in accordance with current safety legislation and no sections of downtakings will be left in an unsafe condition. Downtakings will be removed on an ongoing basis and not be left to build up. At the end of each working shift the site shall be left in a

safe, secure and orderly condition with a security guard on site to prevent potential security risks, theft and vandalism.

Indicative Sequence of works:

Set up welfare facilities independent of those at the reservoir

Specialist trained operatives will access bridge with MEWP located adjacent to bridge and carry out soft strip of all timber material and place into its relevant 40yrd skip to be taken off site to licensed recycling facilities.

Operatives working from MEWP with use of reciprocating saws will trim back over sailing branches over bridge to allow access for crane.

A 160t mobile crane will be guided onto site by banksman then locate and setup as per lift plan to be furnished prior to commencement.

With bridge structure exposed operatives working off MEWP will attach working tackle to 1no beam and take strain.

Operatives will then proceed to hot cut the beam to release it at each buttress. With beam free, crane will lift, slew round and lower to transport as per lift plan.

These steps will be repeated to remove the second beam.

With both beams removed, the crane will lift 2no bog mats and place at adjacent river bank to create a working platform around bridge abutment as per lift plan.

A Husqvarna DXR300 remote controlled demolition robot with hammer and bucket attachment will then be lifted by the crane and lowered to bog mats as per lift plan.

A silt screen will be installed into Motray Water along with any necessary precautions, such as downstream oil booms, to satisfy Ramboll criteria.

Plant nappies and spill kit will be on site and used in accordance with the regulations.

Crane will lift a boat skip and lower to outside edge of bridge abutment

DXR300 with hammer attachment will proceed to break out abutment in a top down manner to below ground level and load into boat skip.

With abutment removed DXR 300, hammer, bucket and bog mats will be lifted and lowered to lay down area.

Crane will then proceed to lower boat skip to second buttress.

DXR 300 will proceed to break out second abutment to below ground level and load into boat skip

With both abutments removed boat skip will be loaded with site derived topsoil and tipped into abutment areas and raked in.

All arisings will be loaded into 20yrd skips from the boat skips and taken off site to licensed recycling facilities

Generic methods

Hot cutting: Setup up oxy propane burning gear

Initiate fire protocols for hot working, i.e. Fire point/fire watcher/ extinguishers to hand

Hot cut rivet bolts of the panel to be removed

During hot cutting fire overalls, full face visor, gauntlets to be worn.

RESERVOIR

We have visited the site on several occasions and witnessed varying depths of water in the reservoir. This does not appear to be drain quickly.

Set up compound including office, welfare hut, steel boxes all c/w generator

Obtain Tide Timetables

Confirm tidal heights of Motray Water

Erect Heras fencing across the site entrance approx. 60m

Locate and expose gas main to identify line and level and set up full protection in association with and on approval by Scottish Gas. This will be heavily trafficked by 8-wheel lorries/10t Dumpers/ tracked dumper during removal off site of surplus silt from base of the reservoir. (and also surplus from embankment breach).

We have included for covering the existing gas main with 300mm Type 1 and then laying Ekki Bog Mats over the Type 1 across the width of any proposed vehicle. These temporary Works will NOT be covered by a design certificate. We allow removal of all temporary protection on completion. We shall forward a sketch of the final agreed crossing point detail, complete with signage, physical demarcation using Heras Panels etc.

Close all inlet valves to ensure no incoming flows after ensuring these pipes from the Settlement tank are fully drained.

Fully drain the reservoir by drawing down through existing outlets which, per the document, shall be kept fully open for the job duration and kept clear of any silt build up until all earthworks/reprofiling completed. We consider these valves should be closed on an incoming tide and opened on a falling tide.

Take down fence and remove off site over length of reprofiling approx. 230m

Cut a temporary ramp down into the reservoir at the location of the permanent breach to allow excavator/lorry movement requirements and top with imported hardcore. Whilst forming the access ramp, we will also create the north face of the breach to line and level, and use all excavated material to infill the final level of the settlement tank.

We have probed the existing silt where possible and we measured it in a range between 150 and 350mm, giving an average of 250mm to be removed. Excavator will enter reservoir base from the access ramp, and will commence casting sediment into temporary bunds to drain this material. This also allows access for plant/lorries to travel on the hard base to remove the silt. We will not be disturbing any silt near or around the outlet at this point, this area will be kept under observation during works to monitor the ingress of water during high tides. Once we fully understand the ingress

of tide, this area will have silt removed after an outgoing tide. Silt containment measures, in the form of proprietary silt fences, will be installed at the commencement of the works and remain in place during all works and will be supplemented if the need arises. Once silt has been bunded over a sufficient area, removal will commence. We will be loading silt directly onto trucks in base of reservoir and disposing off site as INERT material using 8wh lorries driving up the temporary access ramp. Vehicle marshals will be in attendance at all times and road sweeper will be deployed when necessary.

During the silt removal operation, we will be simultaneously starting the regrading of the embankment. Our Engineer will clearly profile the embankment and regrading will be on going with 2 number 22t excavators, initially both on cut and fill operations, each excavator being assisted by banksmen. After a large area is graded to client's satisfaction, we will compact the embankment by hydraulic compaction equipment attached to the excavator.

Hydro seeding will then be carried over the regraded embankment.

On removal of the silt we shall reprofile the temporary access ramp into the final permanent breach profile with subsequent installation of the Geoweb, Turfmat and **IMPORTED** topsoil.

Forming Embankment Breach

The embankment breach will fully commence when most of works are finished on the regrading of the embankments of the reservoir. Profiles will be set up prior to works, and tidal conditions closely monitored, the north face will be excavated fully first and the geo mat placed and pinned in accordance with manufacturers specifications. Backfilling of geo mat will be carried out by excavator sprinkling 150mm imported top soil into the geo web and then this material will be spread manually and compacted.

Greenfix type 75c will then be laid out on finished north batter down to first bench level, during this operation a section of the breach at the Motray Water side will be left high to prevent any high tide breaching and entering the reservoir.

Excavation on the south side of breach will commence after close attention has been paid to tide heights before the final section of the breach is removed, the same procedure for geo web, top soil and green fix will be repeated on south face all be it working from the bottom to the top.

The Greenfix turf will be laid along the base of the inlet channel in the direction of any flows of water.

Any surplus material will be hauled to the settlement tank to top of final levels.

Seed mix is Type 1C per attached

Infill the outlets

Remove the existing bridge at the outlet structure

Demolish hut

Reinstate the fencing

HEALTH AND SAFETY HAZARDS – DEALING WITH THE PUBLIC

Settlement tanks

Milton Farm has to remain open as it is a working farm, a residence, and also provides access to the motocross track. All vehicles entering this area will be do so with a Vehicle Marshall in attendance. Advance warning signs will be placed either side of the working area on the approach to the settlement tanks as the Mill Lade is not secure. Signs will also be placed on the Toll Road.

Reservoir

This area is closed off to the Public and access is through a locked gate

Pipe Bridge Access

The public has open access to this area. We shall erect Heras across the entrance to the reservoir and also approx. 250m along the boundary fence adjacent to the access path to the pipe bridge. Appropriate signage at the entrance to the reservoir and at both ends of pipe bridge access paths

1.2.5 LAND MADE AVAILABLE, ACCESS AND WORKING AREAS

Price based on access to the field at pipe bridge to install crane pad for crane and welfare.

1.2.6 UTILITIES

As no existing plans or drawings are available, we shall contact all Utilities prior to commencement eg Dial before you Dig

1.2.7 WORKING IN AREAS OF SSSI/SPA/SAC

We shall obtain all necessary permits and approvals for undertaking this work

1.3.5 ACTING AS PRINCIPAL CONTRACTOR

Appoint a TW Co-Ordinator if required

All our Staff and Foremen are TWS certificated

PROPOSED MANAGEMENT STRUCTURE AND CVs

The Management Structure for this contract will be as follows, bottom up:

The Site Foreman will be full time on site and deal with day to day working operations; carry out supervision of all labour and plant; Site Inductions, Tool Box Talks and Permits to Work; timeous ordering of materials; developing and following RAMS; reporting to Project Supervisor

The Project Supervisor will be full time on site (or as required): implementing programme and critical tasks; identifying HOLD and WITNESS POINTS; managing and monitoring quality and performance levels; liaising with Client Project Team and attending meetings; monitoring H&S and Environmental issues; document control; all written correspondence with Client; completion of all site-based documentation; reporting to Contracts Manager

The Plant/Environmental Manager will be heavily involved during the majority of the works and will be on site on a daily basis to carry out a morning visit; reporting to Contracts Manager

The Contract/Health & Safety Manager will develop the Construction Phase H&S Plan and will oversee all contract progress ensuring labour and plant resources match programme; ensure all

procedures are carried out in accordance with our ISO Quality and Environmental Management Systems; reporting directly to Managing Director

The Managing Director holds weekly Contracts meetings with Contracts and Plant Manager and is updated on all progress, contract, site, H&S, Environmental and management issues for all ongoing contracts.

All the above personnel are members of the H&S Committee which convenes every three months.

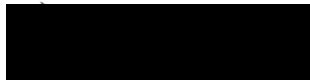

SECTION 2 PROGRAMME AND PHASING

Please see attached Draft programme. The critical aspect of the works is sealing the flows from the Settlement Tanks. This then opens up the other two parts of the works. Potential problems are the weather, the tidal effect on Motray Water, the condition and final volume of the silt and dependency on agreement of access to the Pipe bridge crane pad location in the farmer's field.

* * * * *

Method Statement

Project Information			
Project Title	Motray water pipe bridge		
Project Number	D1062		
Start Date	tbc	Duration	
Number of people on site	5	Number of Contractors on site	
Client	Menzies		
Project Manager	Brian Henderson		
Contact email	brian.henderson@tmenzies.co.uk		

Title	Name	Signature
Written by:	M Beattie	
Approved By:	A Beattie	

Document History		
Version	Date	Comments
001	30/09/20	Initial Issue



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1. Introduction
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12. Emergency Arrangements
13. Contractor Monitoring/Compliance
14. Risk Assessments/CoSHH Assessments
15. Briefing Record

NB: No amendments will be made to this document unless carried out by an authorised signatory.

1. Introduction

This method statement has been prepared to describe the demolition of building located at:

The site is location address:

Guard Bridge Reservoir

Existing pipe bridge

Guardbridge

St Andrews

KY16 0XB

The works are to be carried out by:-

George Beattie & Sons Ltd

Auchinvole Castle

Kilsyth

Glasgow

G65 0SA

Te [REDACTED]

Site Hours:- 0800am – 1700 Monday to Friday 0800-1300 Saturday No Sunday working

2. Scope of Works

- Removal of 2no beams
- Demolition of bridge abutments

3. Enabling Works

This method statement is to be read in conjunction with Risk Assessments

Site Handover documentation will be provided by the client.

A trained CCDO supervisor shall be on site for the duration of the works

Ensure all services are disconnected prior to commencement and copies to be provided to GBS before demolition can commence.

All working personnel entering the area will receive a site induction prior to entry.

All operatives will be trained and competent for the works being undertaken. Copies of training records will be issued.

All tools will be inspected before use to ensure they are in good condition to carry out the works any that show signs of wear will be replaced or repaired depending on their condition.

Power will be available from Diesel generators located onsite

All personnel entering the area shall be wearing ppe of minimum:

- - Safety helmets to BS EN 397,
- - High visibility waistcoats to BS EN ISO 20471 Class 2.
- - Safety boots with steel insole and toecap to BS EN ISO 20345.
- - Disposable respirators to BS EN 149.FFP1S as appropriate [SEP]
- - Eye protection to BS EN 166. [SEP]

- - Ear protection - muffs to BS EN 352-1, plugs to BS EN 352-2 as appropriate. [L] [SEP]
- - Hand protection - to BS EN 388, 407, 420 or 511 as appropriate. [L] [SEP]

4. Method of Works

2 Outline Description of Site & Property:

- 2.2 The pipe bridge to be demolished consists of 2 steel beams and concrete abutments and been defined in the contract documents and drawings. Any difference between drawings and actual site conditions will be reported to the contract administrator
- 2.3 The site is located over top of Guardbridge reservoir

3 Site establishment

- 2.1 The Client will send out all appropriate authorities statutory notices to determine the status of all services in the structures to be demolished and the information provided to George Beattie & Sons (GBS) along with disconnection certificates.
- 3.2 On arrival to site, a 2m high double clipped heras fence (or equivalent) will be erected around the entire site boundary . The fence will be lined with standard statutory demolition warning notices.
- 3.3 A excluded non hard hat compound in which the welfare facilities complying with schedule 2 of the CDM regulations 2015 L153 guidance and muster point will be located will be provided onsite by Menzies.

4 General:

- 4.2 All demolition will comply with this method statement, other documents, and drawings.
- 4.3 GBS acknowledges its responsibility for temporary works, maintenance of existing services (where appropriate), safety and complying with the requirements of various authorities.
- 4.4 GBS will carry out the works in accordance with BS6187:2011 subject to any alterations, modifications & additions.
- 4.5 The works will be carried out in accordance with the following:

- 5 BS6187:2011
- 6 HSE guidance note GS29, Parts 1-4
- 7 CIRCA 532 best practice guidelines
- 8 SEPA "engineering in the water" best practice guidelines
- 9 The Building Operations (Scotland) Regulations 1976
- 10 Health & Safety at Work Act 1974
- 11 Control of Pollution Act 1989
- 12 The Management of Health & Safety at Work Regulations 2006
- 13 The Provision and Use of Work Equipment Regulations 1992
- 14 The Personal Protective Equipment at Work Regulations 1992
- 15 The Manual Handling Regulations 1992
- 16 All asbestos operations shall comply with current asbestos regulations for the handling and removal of asbestos (all as issued by the Health & safety Executive)
- 17 BS EN 12811:2003 Temporary Works Equipment –Scaffolds
- 18 BS EN 362:2004 Personal Protective equipment against falls from height.
- 19 Safety Helmets to BS EN 397 and eye protection to BS EN 166 to be worn at all times
 - 19.2 All incoming services to be disconnected/re routed prior to demolition.
 - 19.3 Premises to be inspected for the existence of toxic substances and findings reported.
 - 19.4 All demolition activities will fully comply with the Construction (Design & Management) Regulations 2015
 - 19.5 Requirements of Zero waste Scotland
 - 19.6 Prior to commencement of the works GBS will inspect the site and familiarise itself with its current condition.

- 19.7 Shall prior to commencement ensure that all necessary permits and approvals are in place.
- 19.8 Any underground voids not noted on the drawings found during the works will be reported to the engineer.
- 19.9 The breaking out of materials will be carried out in accordance with current safety legislation and no sections of duntakings will be left in an unsafe condition.
- 19.10 The Burning of site materials is not permitted on site.
- 19.11 Duntakings will be removed on an ongoing basis and not be left to build up on areas of the building causing under force which may cause the structure to collapse uncontrollably.
- 19.12 At the end of each working shift the site shall be left in a safe, secure and orderly condition with a security guard and/or cameras on site to prevent potential security risks, theft and vandalism by menzies

20 Indicative Sequence of works:

- 20.2 Menzies will install an aluminium track access road and crane pad to allow 160t crane to access site.
- 20.3 Specialist trained operatives will Access bridge with mewp located adjacent to bridge and carry out soft strip of all timber material and place into its relevant 40yrd skip to be taken off site to licenced recycling facilities.
- 20.4 Operatives working from mewp with use of recip saws will trim back over sailing branches over bridge to allow access for crane.
- 20.5A 160t mobile crane will be guided onto site by banksman then locate and setup as per lift plan.
- 20.6 With bridge structure exposed operatives working off mewp will attach working tackle to 1no beam and take strain.
- 20.7 Operatives will then proceed to hot cut the beam to release it at each buttress. With beam free crane will lift it slew round and lower to transport as per lift plan.
- 20.8 Steps 20.6-20.7 will be repeated to remove the second beam.
- 20.9 With both beams removed crane will lift 2no bog mats and place at adjacent river bank to create a working platform around bridge abutment as per lift plan.
- 20.10 A dxr300, hammer and bucket attachment will then be lifted by the crane and lowered to bog mats as per lift plan.
- 20.11 A silt screen will be installed into river
- 20.12 Crane will lift boat skip and lower to outside edge of bridge abutment
- 20.13 Dxr with hammer attachment will proceed to break out abutment in a top down manner to below ground level and load into boat skip.
- 20.14 With abutment removed dxr, hammer, bucket and bog mats will be lifted and lowered to lay down area.
- 20.15 Crane will then proceed to lower boat skip to second buttress.
- 20.16 Dxr will proceed to break out second abutment to below ground level and load into boat skip
- 20.17 With both abutments removed boat skip will be loaded with top soil and tipped into abutment areas and raked in.
- 20.18 All arisings will be loaded into 20yrd skips from the boat skips and taken off site to licenced recycling facilities

Generic methods

Hot cutting

- 20.19 Setup up oxy propane burning gear.
- 20.20 Initiate fire protocols for hot working, i.e. Fire point/fire watcher/ extinguishers to hand
- 20.21 Hot cut rivet bolts of the panel to be removed.
- 20.22 During hot cutting fire overalls, full face visor, gauntlets to be worn.

IF IN DOUBT STOP! AND ASK

6. Hazards & Controls

Hazard	Present	Controls	In Place
Asbestos/MMMF		<ul style="list-style-type: none"> Asbestos Survey Correct removal process Training and competence 	
Access/Egress	X	<ul style="list-style-type: none"> Routes to be kept clear of all obstructions Access platforms provided and inspected. 	
Slips, Trips, Falls	X	<ul style="list-style-type: none"> Regular Housekeeping Identification and marking of STF hazards that cannot be removed. 	
Falling/Flying Objects	x	<ul style="list-style-type: none"> Demolition/Drop Zones Observation by spotters 	
Falls From Height	x	<ul style="list-style-type: none"> Use of collective measures Use of fall arrest equipment 	
Chemicals/Harmful Substances	x	<ul style="list-style-type: none"> CoSHH Assessments Safer alternatives Correct handling Personal Protective Equipment 	
Heat/Fire/Explosion		<ul style="list-style-type: none"> Hot work permits Fire watchers Readily available fire media 	
Asphyxiation/Drowning		<ul style="list-style-type: none"> Use of SCBA Use of PFD Spotters/rescue plan etc. 	
Struck by moving object/vehicles	x	<ul style="list-style-type: none"> Vehicle/Pedestrian separation Crane exclusion zones Use of banksman 	
Contact with stationary object	x	<ul style="list-style-type: none"> Good observation Use of spotters Personal Protective Equipment 	
Overturning/Collapsing	x	<ul style="list-style-type: none"> Information, training & instruction. Lift plans Structural report 	
Manual Handling	X	<ul style="list-style-type: none"> Information, training & instruction. Mechanical handling Equipment Personal Protective Equipment Manual Handling Assessment 	
Stored Energy or Insecure load		<ul style="list-style-type: none"> Information, training & instruction. Vehicles loaded correctly 	
Hazards caused by others work		<ul style="list-style-type: none"> Regular communication with project teams. Use of Two Way Radio Communication Equipment 	

	Vermin (rats/pigeons)	X	<ul style="list-style-type: none"> • Pest Control • Approved Guano Removal Methods • Use of Personal Protective Equipment 	
	Ecological hazards (bats, badgers, knotweed)		<ul style="list-style-type: none"> • Ecological Surveys • Ecological License • Supervision of works by licensed Eco workers 	
	Dust/Fumes	X	<ul style="list-style-type: none"> • Dust suppression • Use of Personal Protective Equipment. 	
	Noise	X	<ul style="list-style-type: none"> • Approved working hours • Noise Exclusion Zones • Use of Personal Protective Equipment. • Health Surveillance • Information, training & instruction. 	
	Vibration	x	<ul style="list-style-type: none"> • HAV Assessments • Information, training & instruction. • Structural Reports & Assessments. • Use of Modern Equipment and Techniques. 	
	Live Services	x	<ul style="list-style-type: none"> • Disconnection Certificates. • Identification of live services. • Permits To Work. 	
	Radiation (ionizing and non ionizing)		<ul style="list-style-type: none"> • Radiological Protection Plan • Exposure Monitoring • Information, training & instruction. • Health Surveillance 	
	Contamination	x	<ul style="list-style-type: none"> • Reports & Surveys • Information, training & instruction. • Use of Personal Protective Equipment. 	
	Poor Lighting/visibility	X	<ul style="list-style-type: none"> • Access Routes Well lit • Use of Task Lighting • Regular Weather monitoring and Pre Planning • Information, training & instruction. 	
	Temperature Extremes (Hot or Cold)	X	<ul style="list-style-type: none"> • Regular Weather monitoring and Pre Planning • Information, training & instruction. • Use of Personal Protective Equipment. • Hot/Cold Weather working Plan 	
	Adverse Weather (Wind, Rain, Snow)		<ul style="list-style-type: none"> • Regular Weather monitoring and Pre Planning • Information, training & instruction. • Hot/Cold Weather working Plan 	

Pinch/Trapping Points	x	<ul style="list-style-type: none"> Correct Use of Hand tools Use of Mechanical Tools Where Possible Fixed/Interlocked Guards 	
Atmosphere (oxygen deficient/enrichment, Gases)		<ul style="list-style-type: none"> Atmospheric Monitoring Use of Gas Monitoring Information, training & instruction. 	
Lack of Communication	X	<ul style="list-style-type: none"> Regular communication with project teams. Use of Two Way Radio Communication Equipment. 	
Lifting Operations	x	<ul style="list-style-type: none"> Lift Plans. Adequate and Sufficient Lifting equipment. Statutory Inspections. Rescue Plans. Lifting Checklists Two Way Radio Communications Use of Slings/Banksman Lift Supervisors 	









7. Permits & Assessments






Permits Required	Yes	No	Assessments	Yes	No
Hot works	x		COSHH	x	
Crane check list	x		Noise		x
Excavation		X	Manual handling		x
Confined space entry		X	Service Isolations	X	
Riser shafts		X	Rescue Plan		X

Further Control Measures / Security Requirements.

As stated above, due to the highly dangerous nature of the works being carried out on the sites, no personnel are to enter any buildings or areas without express permission from the supervisor in charge of the works.




8. Personal Protective Equipment Required (General)

							
Hard Hat (EN 397)	Hearing (EN 352-1)	Light Eye (EN 166)	High Vis (EN 471)	Hand (EN 388)	Overalls (EN 340)	Foot (EN 341-1)	Dust/Half (EN149)
X	X	X	X	X	X	X	X

Personal Protective Equipment Required (Specialist)				
				
RPE (EN 136)	Face (EN 166A)	Fall Arrest (EN 361)	Goggles (EN 166)	(EN 2014 & GORT)
		x		

9. Monitoring Requirements			
Noise	Periodic	Dust	Daily Visual
Vibration	periodic	Asbestos	none
Monitoring Provided By:	Site Supervisor		

10. Resources			
Contracts Manager: A Beattie		Site Supervisor: x1	
Plant Operator/s: x2		Labour: x3	
Equipment To Be Used	Type & Number	Equipment To Be Used	Type & Number
Heras Fencing/Site Hoarding	Various	miscellaneous	2x bog mats, silt screen
Welfare Unit	1x	Cranage/Lifting Equipment	160T Crane, 1x chains, boat skip
Waste Skips/Asbestos Skip (lockable)	Various	Burning gear	1x oxy/propane burning gear
Decontamination/Shower Unit (DCU)	n/a	Material Conveyor	n/a
Task Lighting	Various	Mobile Crusher/Screeners	n/a
Fire Fighting Equipment	X3 min	Demolition Spec Excavator	Dxr300
Dust Boss/Dust Suppression	n/a	Double Skin Fuel Cube	1x900l
Cable Avoidance Tool (CAT)	n/a	Demolition Attachments	Hydraulic hammer, Bucket
Signal Generator (GENNY)	80kva genny	Fire Fighting Equipment Required & Amount	
Emergency Spill Kits	1x	Water Paper, wood etc. Not Electrical	1x
Hand Tools	Recip saw, pinch bar	Foam Flammable liquids	1x
Fixed Scaffolding	n/a	CO2 Flammable liquids/Electrical equipment	
Mobile Tower Scaffolding	n/a	Dry Powder Combustible Materials, Liquids, Gases, metals, electrical equipment	1x
MEWP Scissor Lift	n/a	Wet Chemical Combustible materials, high temperatures	
MEWP Cherry Picker	1x cherry picker	Fire Alarm/Air Horns	1x

11. Training & Supervision					
Training Certificates Required					
	Yes	No		Yes	No
Scaffold		X	PASMA		X
Forklift		X	Banksman		X
Bobcat		X	Abrasive Wheels		X
Burning	x		Asbestos CAT B		x
CCDO/CPCS/CSCS	X		Face Fit Certificate	x	
IPAF	x		Others (Please detail below)		
Others (Please state):					
12. Emergency Arrangements Details					
 <p>Fire/Evacuation</p>		<ul style="list-style-type: none"> Immediately cease all operations and make site safe. Switch off all plant and electrical equipment. All personnel to proceed to the site muster point Note: If Asbestos removal work is taking place, Asbestos contaminated workers must report to a separate 'dirty' muster point. The Principal/Main Contractor nominated person will carry out a roll call to confirm all men are present or if a person or persons are missing. If a person is not accounted for the Emergency services team will be summoned and they will affect a search and rescue. 			
 <p>First Aid</p>		<ul style="list-style-type: none"> Summon/Report to first aider for treatment. (Site Supervisor) If first aider cannot treat injury, transport casualty to nearest minor injury unit or A&E If injury is serious and casualty cannot be moved/stabilised call 999 and request ambulance. Complete necessary incident/accident documentation 			
 <p>Environmental Incident</p>		<ul style="list-style-type: none"> Ensure you are wearing correct PPE for hazards Immediately protect any local water courses/drains Deploy emergency spill kit Contact head office for more guidance 			
Other					

13. Contractor Monitoring & Compliance	
Who is accountable for monitoring compliance with the method statement?	Site Supervisor

14. Specific Risk Assessments (to be issued with this MS)	
Number	Title
1	Lifting Operations
05	Working at height
06	Cutting steel with oxy-propane
08	Wagon movements
10	Demolition with hand tools
13	Supervising site works
15	Breaking concrete using dxr with hydraulic breaker
17	Plant movement onsite
18	Using mechanical or electrical hand tools
30	Fire onsite
32	Using MEWPS
33	Dxr demolition
35	Working near water
38	Lifting operations with boat skips
43	Manual handling
50	Slips trips and falls
55	Covid-19
56	Using recip saw
COSHH Assessment Index (Stored within COSHH Folder)	
Operation / Process / Substance	
petrol	
Hydraulic oil	
grease	

15. Briefing Record

PRE DEMOLITION / DISMANTLING BRIEFING SESSION

The objectives of the pre demolition / dismantling briefing session are:

1. To familiarise all operatives with the method statements and risk assessments
2. To ensure full understanding of the conditions by all concerned
3. To address any safety concerns before progressing with the demolition

ALL OPERATIVES LISTED BELOW HAVE READ AND UNDERSTAND THE CONTENT OF THE METHOD STATEMENT, RISK ASSESSMENTS AND HEALTH AND SAFETY PROCEDURE.

NAME	SIGNATURE	DATE



DOWN TO EXPERIENCE...

Location/Area	Motray- water pipe bridge
Method Statement Name	D1062
Method Statement No	rev 1
RA written by	M Beattie
RA approved by	A Beattie
Date approved	01/10/2020



DOWN TO EXPERIENCE...

Hazard/Risk Assessment												
Operation/Task: Lifting Operations						RA Number 1			Sheet		1 of 2	
						MS Name D1062						
Location/Area: Motray- water pipe bridge						MS No rev 1			RA Written by M Beattie			
						Name of person completing Assessment						
Item	Activity	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility	
			S	L	RR		S	L	RR			
1	Lifting operations using cranes											
		Failure of lifting equipment	4	3	12	*Check all cranes and lifting test certificates are in date. *Visual inspection of equipment prior to any lifting operations. *Check driver's are qualified prior to commencing	4	1	4	Lifting Supervisor, Slingers/ Sannaller	Site Manager	
		Injury from falling equipment and materials	4	4	16	*All slinging and signalling under control of appointed slingers/sannaller *Keep work area clear & establish exclusion zones. *Brief everyone involved in lift on risks *Establish means of signalling between crane op. & slingers/sannaller *Use tag lines as appropriate *Hard hats, LEP, Overalls, high visibility clothing, gloves and safety footwear to be worn at all times.	4	2	8	AP, Lifting Supervisor, Slingers/ Sannaller	Site Manager	
KEY												
Severity		Likelihood		Risk Rating		Catastrophic	Extremely Harmful	Harmful	Slightly Harmful			
4	Very severe	4	Very high	13-16	Intolerable	Very likely	16	12	8	4		
3	Severe	3	High	8-12	Substantial	Likely	12	9	6	3		
2	Minor	2	Moderate	5-7	Moderate	Unlikely	8	6	4	2		
1	Negligible	1	Low	1-4	Tolerable	Highly unlikely	1	3	2	1		
Approved by: A Beattie Signature: _____ Date: 01/10/2020												



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Hazard/Risk Assessment																			
Operation/Task: Lifting operations						RA Number 1		Sheet 2 of 2											
						MS Name D1062													
Location/Area: Motray- water pipe bridge						MS No rev 1		RA Written by M Beattie											
						Name of person completing Assessment													
Item	Activity	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility								
			S	L	RR		S	L	RR										
	Lifting operation continued	Entrapment , personal injury	4	4	16	*Establish exclusion zones, erecting barriers with appropriate signage. *Limit number of people in area	4	1	4	Operatives & Supervisor	Site Manager								
		Load in stability	3	4	12	Ensure qualified slingers.signallers use approved methods	3	1	3	Lifting supervisor Slinger and signaller	Site Manager								
		Slips and trips and falls	3	4	12	Keep Access route clear of obstruction	3	1	3	All	Site Manager								
KEY																			
Severity		Likelihood		Risk Rating			Catastrophic	Extremely Harmful	Harmful	Slightly Harmful									
4	Very severe	4	Very high	13-16	Intolerable	Very likely	16	12	8	4									
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Hazard/Risk Assessment																							
Operation/Task:				RA Number		5		Sheet		1 of 1													
				MS Name		D1062																	
				MS No		rev 1		RA Written by		M Beattie													
Location/Area: Motray- water pipe bridge				Name of person completing Assessment																			
Item	16/09/2019	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility												
			S	L	RR		S	L	RR														
1	Working at height	Personnel falling	4	4	16	*Work off appropriate working platform, handrails, toe-boards, debris netting as required * maintain 3 points of contact when on ladder at all *pre use inspection of ladder and access equipment *Suitably trained operatives *Work involving leaning out or if working outside appropriate working platform (i.e. Open leading edge), full body safety harness must be worn at all times connected to appropriate anchor point	4	1	4	Operatives & Supervisor	Site Manager												
		Falling materials/equipment	4	4	16	*Platforms sheeted to prevent materials falling through gaps * Exclusion zones set up to prevent persons accessing area below work using solid barriers and signs *Keep working platforms clear of any obstructions	4	1	4	Operatives & Supervisor	Site Manager												
KEY																							
Severity		Likelihood		Risk Rating		Catastrophic	Extremely Harmful	Harmful	Slightly Harmful														
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Hazard/Risk Assessment															
Operation/Task:				RA Number				6		Sheet		1 of 1			
				MS Name				D1062							
				MS No				rev 1		RA Written by		M Beattie			
Location/Area:				Motray- water pipe bridge				Name of person completing Assessment							
Item		25/07/2019		Hazards/Risks Identified		Risk Rating		Control		Risk Rating		Responsibility		Monitoring Responsibility	
						S L RR				S L RR					
1		Cutting steel using oxy/propane burning gear		Fire/Explosion		4 4 16		*Ensure trained, experienced operatives use equipment *Daily inspection of hoses and equipment *Gas bottles in bottle cage/trolley *Flash back arrestor fitted *Hot work permit are requested and issued *Fire watchman in place with fire extinguisher *Minimise combustible materials.		4 1 4		Operatives & Supervisor		Site Manager	
				Eye injury to burner/welder		3 4 12		*Burner to wear eye goggles/visor to BS EN 169 *Welding screens erected around work area *Hearing protection to be worn by burner to BS EN 352		3 1 3		Operatives & Supervisor		Site Manager	
				Burns		4 4 16		*Hands, arms and legs to be covered at all times by appropriate clothing. Leather gauntlets, jackets and spats to be worn		4 1 4		Operatives & Supervisor		Site Manager	
				Fumes causing respiratory disease and systemic poisoning		4 4 16		*Good natural ventilation Not permitted to work on this activity *Sundstrom SR100 with A1 P3 filters *Blood lead levels monitored		4 1 4		Operatives		Site Manager	
KEY															
Severity		Likelihood		Risk Rating				Catastrophic		Extremely Harmful		Harmful		Slightly Harmful	
4 Very severe		4 Very high		13-16 Intolerable		Very likely		16		12		8		4	
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2 Minor		2 Moderate		5-7 Moderate		Unlikely		8		6		4		2	
1 Negligible		1 Low		1-4 Tolerable		Highly unlikely		1		3		2		1	
Approved by:		A Beattie		Signature				Date:						01/10/2020	



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Hazard/Risk Assessment																	
Operation/Task:				RA Number 8				Sheet		1 of 1							
				MS Name D1062													
				MS No rev 1				RA Written by		M Beattie							
Location/Area: Motray- water pipe bridge				Name of person completing Assessment													
Item	16/09/2019	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility						
			S	L	RR		S	L	RR								
1	Wagon movements onto, off and around site	Persons being trapped or hit by wagons	4	4	16	*Wherever possible provide pedestrian free traffic route	4	1	4	Operatives & Supervisor Traffic Marshall slinger	Site Manager						
		Mud carried onto public highway	3	4	12	*All vehicles observe 5mph speed limit on site *Wagon wheels must be clean/cleaned when leaving site *All vehicle movements controlled by dedicated trained banksman *Provision should be made for mechanical road sweeping, especially during wet weather when needed Drivers must deploy easy covers prior to leaving site	3	1	3	Operatives & Supervisor	Site Manager						
		Injury to members of public	4	4	16	*All vehicle movements controlled by dedicated trained banksman	4	1	4	Operatives & Supervisor	Site Manager						
		Debris & Dust	3	2	6	All vehicles are to be covered before leaving site	1	2	2	Operatives & Supervisor	Site Manager						
KEY																	
Severity	Likelihood	Risk Rating				Catastrophic	Extremely Harmful	Harmful	Slightly Harmful								
4 Very severe	4 Very high	13-16	Intolerable	Very likely	16	12	8	4									
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Hazard/Risk Assessment													
Operation/Task:				RA Number				10		Sheet		1 of 1	
				MS Name				D1062					
Location/Area:				MS No				rev 1		RA Written by		M Beattie	
Motray- water pipe bridge								Name of person completing Assessment					
Item	16/09/2019	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility		
			S	L	RR		S	L	RR				
1	Demolition with hand tools	Injury from poorly maintained, wrongly used tools	3	4	12	*Ensure only trained, experienced operatives are carrying out the works	3	1	3	Operatives & Supervisor	Site Manager		
						*Daily inspection of all tools to be carried out.							
		Eye injury from flying debris	4	4	16	*Eye protection to be worn to BS EN 166B impact grade 1.	4	1	4	Operatives & Supervisor	Site Manager		
		Inhalation of dust	3	4	12	*Damp down to suppress dust *Good ventilation - if not then forced ventilation	3	1	3	Operatives & Supervisor	Site Manager		
		Cuts and abrasions	3	4	12	*Wear protective gloves to BS EN 374	3	1	3	Operatives & Supervisor	Site Manager		
		Slips and trips	3	4	12	*Ensure that access/egress are kept clear at all times *Ensure that materials are stored correctly and removed as soon as practicable *Ensure a good level of lighting * Cover slippery walkways with non-slippery materials	3	1	3	Operatives & Supervisor	Site Manager		
KEY													
Severity		Likelihood		Risk Rating		Catastrophic	Extremely Harmful	Harmful	Slightly Harmful				
4	Very severe	4	Very high	13-16	Intolerable	Very likely	16	12	8	4			
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1	Negligible	1	Low	1-4	Tolerable	Highly unlikely	1	3	2	1			
Approved by:		A Beattie		Signature				Date:		01/10/2020			



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Hazard/Risk Assessment											
Operation/Task: demolition of tank				RA Number: 13		Sheet: 1 of 1					
				MS Name: D1062							
				MS No: rev 1		RA Written by: M Beattie					
Location/Area: Motray- water pipe bridge				Name of person completing Assessment:							
Item	16/09/2019	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility
			S	L	RR		S	L	RR		
1 Supervising site works		Personal injury due to being hit/entrapment by plant.	4	4	16	*Ensure exclusion zones are in place and they are complied with using barriers where applicable. *Keep good communication with operator and do not enter plant blind spots	4	1	4	Operatives & Supervisor	Site Management
		*Eye injury due to flying debris	4	4	16	*Eye protection to be worn to BS EN 166B impact grade 1 where applicable. *all non essential personnel stay out of demolition zone	4	1	4	Operatives & Supervisor	Site Management
		Noise induced hearing loss	3	4	12	*Ensure that exclusion zones are set up and complied with. *Restrict numbers of operatives inside noisy zones *Ensure all within zone wear hearing protection to BS EN 352	3	1	3	Operatives & Supervisor	Site Management
		Slips and trips	3	4	12	*Store materials in an appropriate manner *Ensure adequate natural or task lighting is available	3	1	3	Operatives & Supervisor	Site Management
		Dust causing respiratory problems	3	4	12	*Ensure that dust is suppressed by damping down. *ensure where appropriate that RPE particle masks are worn to BS EN 149	3	1	3	Operatives & Supervisor	Site Management
KEY											
Severity	Likelihood	Risk Rating				Catastrophic	Extremely Harmful	Harmful	Slightly Harmful		
4 Very severe	4 Very high	13-16	Intolerable	Very likely	16	12	8	4			
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Approved by: A Beattie											
Signature				Date:				01/10/2020			

Hazard/Risk Assessment											
Operation/Task: Breaking concrete using dxr with hydraulic breaker						RA Number: 15		Sheet: 1 of 1			
						MS Name: D1062					
Location/Area: Motray- water pipe bridge						MS No: rev 1		RA Written by: M Beattie			
						Name of person completing Assessment:					
Item	29/08/2018	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility
			S	L	RR		S	L	RR		
1	Breaking concrete using dxr with hydraulic breaker	Personal injury due to being hit/entrapped by plant	4	4	16	*Trained/experienced operator *Ensure exclusion zones are in place and they are complied with.	4	1	4	Operatives Supervisor	Site Manager
		Eye damage from flying debris/dust	4	4	16	*Exclude all other activities within area. If necessary erect debris netting screens to prevent flying debris	4	1	4	Operatives Supervisor	Site Manager
		Noise induced hearing loss	3	4	12	*Ensure that exclusion zones are set up and complied with *Restrict numbers pf personnel inside zone *Ensure all within zone are wearing hearing protection to BS EN 352	3	1	3	Operatives Supervisor	Site Manager
		Slips and trips	3	4	12	*Good standard of house keeping *Store materials in an appropriate manner *Ensure adequate natural or task lighting is available	3	1	3	Operatives Supervisor	Site Manager
		Dust causing respiratory problems	3	4	12	*Ensure that dust is suppressed by damping down *Ensure all personnel working within exclusion zone wear RPE particle masks are worn to BS EN 149	3	1	3	Operatives Supervisor	Site Manager
KEY											
Severity	Likelihood		Risk Rating			Catastrophic	Extremely Harmful	Harmful	Slightly Harmful		
4 Very severe	4 Very high		13-16	Intolerable	Very likely	16	12	8	4		
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Hazard/Risk Assessment

Operation/Task:				RA Number 17				Sheet 1 of 1			
				MS Name D1062							
Location/Area: Motray- water pipe bridge				MS No rev 1				RA Written by M Beattie			
				Name of person completing Assessment							
Item	25/07/2019	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility
			S	L	RR		S	L	RR		
1		Persons being trapped or hit by excavator	4	4	16	*Exclude all pedestrians from area. Wherever practicable areas to be barriered off and signed. *All vehicle movements controlled by dedicated trained banksman	4	1	4	Operatives & Supervisor	Site Manager
		Overtumed plant	4	3	12	*Only trained/competent operators to be used (CPCS) *Only trained/competent operators to be used (IPAF) *Ensure that machinery in good repair and well maintained - daily/weekly log book *Ensure that route to be travelled is clear of obstructions, reasonably level, not liable to move/subside. Ensure that operator is familiar with the site layout and other hazards	4	1	4	Operator & Banksman	Site Manager
KEY											
Severity		Likelihood		Risk Rating		Catastrophic	Extremely Harmful	Harmful	Slightly Harmful		
4	Very severe	4	Very high	13-16	Intolerable	Very likely	16	12	8	4	
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Hazard/Risk Assessment											
Operation/Task:						RA Number		Sheet		1 of 1	
						MS Name		D1062			
Location/Area:						MS No		rev 1		RA Written by	
Motray- water pipe bridge										M Beattie	
						Name of person completing Assessment					
Item	25/07/2019	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility
			S	L	RR		S	L	RR		
1	Using mechanical and electrical hand tools	Eye damage from flying debris/ dust	4	4	16	*Establish exclusion zone limiting access using barriers and signage	4	1	4	Operatives Supervisors	Site Manager
		Damage to hearing	3	4	12	*Establish exclusion zone limiting access using barriers and signage *Everyone within exclusion zone to wear hearing protection (generic noise level 102DbA) to BS EN 352.	3	1	3	Operatives Supervisors	Site Manager
		Inhalation of dust	3	4	12	*Clear dust/slurry regularly *All within exclusion zone to wear particle filter mask to BS EN 143	3	1	3	Operatives Supervisors	Site Manager
		Cuts and abrasion to hands	3	4	12	*Wear protective gloves to BS EN 374	3	1	3	Operatives	Site Manager
		Vibration white finger	3	4	12	*Use modern, well-maintained equipment (anti-vibration mountings etc) *Select labour (non-smokers etc) *Train operatives to use plant *Rotate labour. Rotation log to be maintained *Provide correct type of gloves *Use well-maintained, damped, modern machines	3	1	3	Operatives Supervisors	Site Manager
		Environmental noise	3	4	12	*Close all doors/access panels when in use. *Stop engine when not in use and use well-maintained modern machines	3	1	3	Operatives Supervisors	Site Manager
		Shock with electric tools	4	4	16	*Cables and tools must be in good condition *Inspect before use	4	1	4	Operatives Supervisors	Site Manager
KEY											
Severity		Likelihood		Risk Rating		Catastrophic	Extremely Harmful	Harmful	Slightly Harmful		
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Hazard/Risk Assessment											
Operation/Task:				RA Number		30		Sheet		1 of 2	
				MS Name		D1062					
				MS No		rev 1		RA Written by		M Beattie	
Location/Area: Motray- water pipe bridge				Name of person completing Assessment							
Item	16/09/2019	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility
			S	L	RR		S	L	RR		
1	General	Fire/explosion/arson	4	4	16	*Provision of means to raise alarm *Procedure for calling emergency services *Display for fire instruction notices *Evacuation drills *No smoking policy	4	1	4	Fire Warden	Site Manager
2	Housekeeping	Fire, impede evacuation	4	4	16	*Regular clearing of waste & rubbish *Avoid use of flammable materials *Orderly storage policy *Adopt security oriented culture	4	1	4	Fire Warden	Site Manager
		Arson	4	4	16	*Install Site security *Remove all combustible waste asap *Securely store waste	4	1	4	Fire Warden	Site Manager
		Electrical fire/Explosion	4	4	16	*Test & inspect all static & portable electrical systems *Prevent sources of ignition	4	1	4	3rd party contractor	Site Manager
		Storage of fuels/oils & gasses	4	4	16	*Store fuels in bunded browsers *Limit amount stored on site *Petrol stored under lock and key *Gasses stored in locked cages Designated storage area	4	1	4	Site operatives	Site Manager
KEY											
Severity		Likelihood		Risk Rating			Catastrophic	Extremely Harmful	Harmful	Slightly Harmful	
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Approved by: A Beattie				Signature				Date:		01/10/2020	

Hazard/Risk Assessment											
				RA Number		30		Sheet		2 of 2	
Operation/Task:				Fire prevention on site		MS Name		D1062			
				MS No		rev 1		RA Written by		M Beattie	
Location/Area:				Motray- water pipe bridge		Name of person completing Assessment					
Item	Activity	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility
			S	L	RR		S	L	RR		
2	Housekeeping (Contin...)	Storage of COSHH materials	4	3	12	*Correct & separate storage of flammable & oxidising materials *Limit amount of materials stored *Establish fire point, etc.	4	1	4	Fire Warden	Site Manager
		Hot works activity	4	4	16	*Operate hot works permit system *Fire watch with extinguisher in attendance *Check carried out after hot work activity is complete *Limit amount of combustibles in area	4	1	4		
KEY											
Severity		Likelihood		Risk Rating			Catastrophic	Extremely Harmful	Harmful	Slightly Harmful	
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Hazard/Risk Assessment																		
				RA Number		32		Sheet		1 of 1								
Operation/Task:				MS Name		D1062												
				MS No		rev 1		RA Written by		M Beattie								
Location/Area: Motray- water pipe bridge				Name of person completing Assessment														
Item	16/09/2019	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility							
			S	L	RR		S	L	RR									
1	Driving MEWP around work zone	Overtuning vehicle	4	4	16	*MEWP to be operated by competent MEWP trained operative only *Work area to be kept tidy and free from possible trip hazards *Banksman to be in attendance at all times *Quantities of materials on MEWP to be kept to a minimum *The ground to be suitable for imposed load of MEWP *Importance of safe working load to be stressed to operatives.	4	1	4	Operative Supervisor	Site Manager							
2	Loading materials onto the MEWP	Overtuning vehicle	4	4	16	*Only small quantities to be stored on MEWP *Importance of the safe working load to be stressed to operatives	4	1	4	Operative Supervisor	Site Manager							
3	Working at height in MEWP	Being struck by overhead projection Projection/Fall from MEWP	4	4	16	*Work area to be surveyed *MEWP to be operated by competent MEWP trained operative only *Ground to be suitable to take imposed load of MEWP	4	1	4	Operative Supervisor	Site Manager							
KEY																		
Severity		Likelihood		Risk Rating		Catastrophic	Extremely Harmful	Harmful	Slightly Harmful									
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DOWN TO EXPERIENCE...

Hazard/Risk Assessment												
Operation/Task: dxr demolition						RA Number: 33		Sheet: 1 of 1				
Location/Area: Motray- water pipe bridge						MS Name: D1062		MS No: rev 1		RA Written by: M Beattie		
Name of person completing Assessment												
Item	05/07/2019	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility	
			S	L	RR		S	L	RR			
1	Demolition using dxr	Personal injury due to being hit/entrapped by plant	4	4	16	*Only trained/competent operators to be used (CITB)	4	1	4	Supervisor	Site Manager	
		Eye injury due to flying debris	4	4	16	DXR operator to have 360 vision *Exclude all other work within area. *Use suitable demolition attachments *If necessary erect debris netting screens to prevent flying debris	4	1	4	Supervisor	Site Manager	
		Damage to hearing	3	4	12	*Restrict numbers inside zone *Ensure all within zone wear hearing protection to BS EN 352	4	1	4	Supervisor	Site Manager	
		Unplanned collapse	4	4	16	*Work areas to be accessed prior to works commencing to safe working system	4	1	4	Supervisor	Site Manager	
		Collapse of underground void	4	4	16	*Ensure voids are 'ouunched' through and suitably backfilled	4	1	4	Supervisor	Site Manager	
KEY												
Severity		Likelihood		Risk Rating		Catastrophic	Extremely Harmful	Harmful	Slightly Harmful			
4	Very severe	4	Very high	13-16	Intolerable	Very likely	16	12	8	4		
3	Severe	3	High	8-12	Substantial	Likely	12	9	6	3		
2	Minor	2	Moderate	5-7	Moderate	Unlikely	8	6	4	2		
1	Negligible	1	Low	1-4	Tolerable	Highly unlikely	1	3	2	1		
<div> <div>Approved by: A Beattie</div> <div>Signature</div> <div>Date: 01/10/2020</div> </div>												



DOWN TO EXPERIENCE...

Hazard/Risk Assessment																			
						RA Number	35			Sheet	1 of 1								
Operation/Task: Working near water						MS Name	D1062												
Location/Area: Motray- water pipe bridge						MS No	rev 1			RA Written by	M Beattie								
						Name of person completing Assessment													
Item	Activity	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility								
			S	L	RR		S	L	RR										
1	Demolition using excavator	Driving over the edge	4	4	16	*Only trained & competent machine drivers to operate plant *Stop block edge protection to be maintained & vehicles to be banked by trained banksman at all times	4	1	4	Supervisor	Site Manager								
2	Banksman	Banksman/operatives falling into the water	4	4	16	*Maintain edge protection at all times, access & egress routes to be kept clear at all times & lighting to be well maintained	4	1	4	Supervisor	Site Manager								
		Leptospirosis	4	3	12	*Operatives to receive training/TBT & wear appropriate waterproof PPE *Adequate welfare provisions to be supplied to ensure good standards of personal hygiene are kept	4	1	4	Supervisor	Site Manager								
KEY																			
Severity		Likelihood		Risk Rating			Catastrophic	Extremely Harmful	Harmful	Slightly Harmful									
4 Very severe		4 Very high		13-16		Intolerable	Very likely	16	12	8	4								
3 Severe		3 High		8-12		Substantial	Likely	12	9	6	3								
2 Minor		2 Moderate		5-7		Moderate	Unlikely	8	6	4	2								
1 Negligible		1 Low		1-4		Tolerable	Highly unlikely	1	3	2	1								
<table border="0" style="width: 100%;"> <tr> <td style="width: 20%;">Approved by:</td> <td style="width: 20%;">A Beattie</td> <td style="width: 20%;"></td> <td style="width: 20%;">Signature</td> <td style="width: 20%;"></td> <td style="width: 20%;">Date:</td> <td style="width: 20%;">01/10/2020</td> </tr> </table>													Approved by:	A Beattie		Signature		Date:	01/10/2020
Approved by:	A Beattie		Signature		Date:	01/10/2020													



DOWN TO EXPERIENCE

Hazard/Risk Assessment											
Operation/Task: Lifting operations using a boat skip					RA Number: 38		Sheet: 1 of 1				
Location/Area: Motray- water pipe bridge					MS Name: D1062		MS No: rev 1		RA Written by: M Beattie		
Name of person completing Assessment											
Item	Activity	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility
			S	L	RR		S	L	RR		
1	Overturning of crane	Damage to plant, property & equipment Serious injury or fatality	4	4	16	*Appointment of appointed person * Lift Plan be in place *Check ground conditions *Plan access route, account for any hazards,i.e. overhead services Keep work area clear with exclusion zones as necessary, using barriers and signs *Ensure level area for setting up lift	4	1	4	Appointed Person & Lift Supervisor	Site Manager
2	Failure of lifting equipment	Damage to plant, property & equipment Serious injury or fatality	4	4	16	*Check all crane and lifting test certificates (including boat skip) are in date *Visual inspection of equipment prior to any lifting operations *Check drivers certification	4	1	4	Slings/ Signaller Site Supervisors	Site Manager
3	Injury from falling equipment & materials	Serious injury or fatality	4	4	16	*All slinging and signalling under control of an appointed trained banksman *Keep work area clear & establish exclusion zones *Brief everyone involved with lift on the risks *Establish means of signalling between crane operative & slinger/signaller *Use tag lines as appropriate *Hard hats, high visibility clothing, gloves and safety footwear to be worn at all times	4	1	4	Slinger/ Signaller	Site Manager
4	Entrapment, personal injury	Serious injury, fatality	4	4	16	*Establish exclusion zone, erecting barriers with appropriate signage of people in area.	4	1	4	Slinger/ Signaller	Site Manager
KEY											
Severity		Likelihood		Risk Rating		Catastrophic	Extremely Harmful	Harmful	Slightly Harmful		
4	Very severe	4	Very high	13-16	Intolerable	Very likely	16	12	8	4	
3	Severe	3	High	8-12	Substantial	Likely	12	9	6	3	
2	Minor	2	Moderate	5-7	Moderate	Unlikely	8	6	4	2	
1	Negligible	1	Low	1-4	Tolerable	Highly unlikely	1	3	2	1	
<div> <div>Approved by: A Beattie</div> <div>Signature</div> <div>Date: 01/10/2020</div> </div>											

Hazard/Risk Assessment											
						RA Number	43			Sheet	1 of 1
Operation/Task:						MS Name					
						MS No		rev 1		RA Written by	M Beattie
Location/Area: Motray- water pipe bridge						Name of person completing Assessment					
Item	16/09/2019	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility
			S	L	RR		S	L	RR		
1	Manual handling	Strains & sprains to muscles and joints	3	4	12	*Ensure only trained, experienced operatives carry out the task *Operatives given briefing on work to be carried out *Use mechanical means where possible *Work area to be kept clear at all times *Material stored correctly on delivery and continual use. *Continual training of operatives exposed to possible risk.	3	1	3	Operatives & Supervisor	Site Manager
		Cuts and abrasion from rough surfaces, sharp or jagged edges, splinters	3	4	12		3	1	3		
KEY											
Severity	Likelihood		Risk Rating			Catastrophic	Extremely Harmful	Harmful	Slightly Harmful		
4 Very severe	4	Very high	13-16	Intolerable	Very likely	16	12	8	4		
3 Severe	3	High	8-12	Substantial	Likely	12	9	6	3		
2 Minor	2	Moderate	5-7	Moderate	Unlikely	8	6	4	2		
1 Negligible	1	Low	1-4	Tolerable	Highly unlikely	1	3	2	1		
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DOWN TO EXPERIENCE

Hazard/Risk Assessment													
Operation/Task:				RA Number				50		Sheet		1 of 1	
				MS Name				D1062					
				MS No				rev 1		RA Written by		M Beattie	
Location/Area:				Motray- water pipe bridge				Name of person completing Assessment					
Item	Activity	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility		
			S	L	RR		S	L	RR				
1	ALL WORKS	Personal injury-(cuts bruises, fractures) resulting from any slip,trip or fall	3	4	12	PPE to be worn at all times	3	2	6	opperatives	site manager/ competent person		
						ensure the work area is free from any possible trip hazzard							
						ensure walkways are clear and free from trip hazzards							
						ensure the ground conditions are adequate i.e. even and dry							
						ensure work areas ground conditions are monitored at all times							
						all employees to be diligent and asses the ground conditions at all times whenever moving around the work site.							
						safey harnesses to be worn where appropriate							
KEY													
Severity		Likelihood		Risk Rating			Catastrophic	Extremely Harmful	Harmful	Slightly Harmful			
4 Very severe		4 Very high		13-16		Intolerable	Very likely	16	12	8	4		
3 Severe		3 High		8-12		Substantial	Likely	12	9	6	3		
2 Minor		2 Moderate		5-7		Moderate	Unlikely	8	6	4	2		
1 Negligible		1 Low		1-4		Tolerable	Highly unlikely	1	3	2	1		
Approved by:		A Beattie		Signature				Date:		01/10/2020			



Hazard/Risk Assessment												
Operation/Task: All work activities during covid-19 pandemic				RA Number: 55				Sheet		1 of 1		
				MS Name								
Location/Area:				MS No: rev 1				RA Written by: Mackenzie Beattie				
				Name of person completing Assessment								
Item	Activity	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility	
			S	L	RR		S	L	RR			
1	All work Activities	personell contracting Covid-19 in workplace				<p>* Employees/personell will only be allowed to work or be onsite if they and everyone in there household have no symptoms of covid-19</p> <p>*all personell onsite if not from the same household shall practice social distancing and stay at least 2 meters away from each other at all times. proximity monitors will be worn by GBS operatives and will notify wearer if other GBS operatives are within 2 meters distance and reported back to gbs office with aproprate actions taken there after.</p> <p>*informative posters will be spread around the site informing personell of the risk of covid-19 and that syntomatic individuals will not be permitted onsite.</p> <p>*All GBS employees will have temperatures taken each day at GBS yard and if not within limit will be instructed to go home.</p> <p>*Hygenic requirments (hand washing) and symptoms of covid 19 will be included within site induction.</p> <p>* Increased Cleaning regime in place, employees cleaning equipment more frequently and when finished with.</p> <p>* Hand sanatizers have been issued to all GBS employees and will be located around the workplace.</p> <p>* all personell onsite will follow current government guidance.</p> <p>* Where applicable surgical / P3 face maks will be worn by</p> <p>* Breaks will be staggered to ensure personel do not come in 2 meter distance of eachother</p> <p>* there will be 2 employees max per van and if not from the same houshold 1 will sit in the rear seat and or ppe will be worn.</p> <p>*Site inductions/meeting will be held outdoors to allow social distancing measures to be in place.</p> <p>*If personel develops any symptoms they will not attend site and if onsite will Wearing appropriate RPE inform supervisor then go directly home and follow government guidance.</p>				Supervisor/ operatives	Site Manager/ competent person	
			4	4	16		4	1	4			
KEY		Likelihood		Risk Rating		Very likely		Catastrophic	Extremely Harmful	Harmful		Slightly Harmful
Sever	Very severe	4	Very high	13-16	Intolerable	Likely	16	12		8	4	
4	Severe	3	High	8-12	Substantial	Unlikely	12	9		6	3	
3	Minor	2	Moderate	5-7	Moderate	Highly unlikely	8	6		4	2	
2	Negligiable	1	Low	1-4	Tolerable		4	3		2	1	
1												
Approved by: Alan Beattie				Signature				Date:		24th September 2020		

Hazard/Risk Assessment											
Operation/Task:				RA Number 56				Sheet		1 of 1	
				MS Name D1062							
Location/Area: Motray- water pipe bridge				MS No rev 1				RA Written by M Beattie			
				Name of person completing Assessment							
Item	16/09/2019	Hazards/Risks Identified	Risk Rating			Control	Risk Rating			Responsibility	Monitoring Responsibility
			S	L	RR		S	L	RR		
1 Using recip saw		Injury from flying debris/blade shattering	4	4	16	*Ensure only trained, experienced operatives are used.	4	1	4	Operatives & Supervisor	Site Manager
		Eye injury	4	4	16	*Eye protection to be worn at all times to BS EN 166B impact grade 1	4	1	4	Operatives & Supervisor	Site Manager
		Damage to hearing	3	4	12	*Hearing protection to be worn to BS EN 352 at all times while operating the tool	3	1	3	Operatives & Supervisor	Site Manager
		Cuts and abrasions	3	4	12	*Wear protective gloves to BS EN 374	3	1	3	Operatives & Supervisor	Site Manager
		Vibration	3	4	12	*Keep area clear of all obstructions ie ropes, wires *Ensure well maintained tools/equipment *Know HAVs threshold values *Rotation log - HAV Register in place * Non-smoking operatives	3	1	3	Operatives & Supervisor	Site Manager
KEY											
Severity	Likelihood	Risk Rating		Catastrophic	Extremely Harmful	Harmful	Slightly Harmful				
4 Very severe	4 Very high	13-16	Intolerable	Very likely	16	12	8	4			
3 Severe	3 High	8-12	Substantial	Likely	12	9	6	3			
2 Minor	2 Moderate	5-7	Moderate	Unlikely	8	6	4	2			
1 Negligible	1 Low	1-4	Tolerable	Highly unlikely	4	3	2	1			
<div style="display: flex; justify-content: space-between;"> <div>Approved by: A Beattie</div> <div>Signature</div> <div>Date: 01/10/2020</div> </div>											



PRESTO GEOSYSTEMS

GEOWEB®

SLOPE PROTECTION SYSTEM

INSTALLATION GUIDELINE



PRESTO GEOSYSTEMS

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GWSL000 1-JUNE-09

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NOTE: The following installation techniques and recommendations may require an evaluation by Presto Geosystems to determine applicability of use for individual project requirements.

Site Preparation

- Remove existing vegetation from the proposed slopes.
- Excavate and shape the slope section.
- Place, compact and shape required earth fill.
- Dig toe-in trenches at the crest and perimeter of the slope as required.

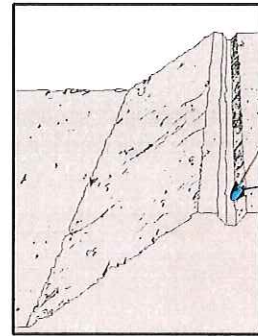


Figure 1 Slope Preparation

Geotextile Separation Layer

- If required, install the specified geotextile over the prepared slope. See Figure 2.
- Adequately overlap adjacent sections and pin per manufacturer's recommendations.
- Ensure geotextile is placed in perimeter toe-in trenches.
- Pin the edges of the geotextile sections to inhibit movement.

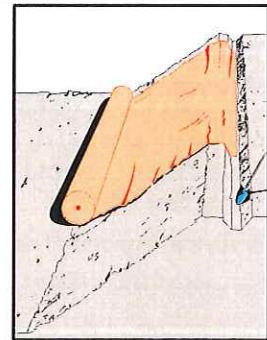


Figure 2 Geotextile Placement

Installation of Geoweb® Sections

- Drive a row of anchor stakes along the upper edge of the proposed slope protection area. Space the stakes at pre-determined single cell centers. See Geoweb® Anchor Spacing Charts for guidance.
- Partially expand the Geoweb® section and place the end cell of the section over its corresponding edge stake. When ATRA® Anchors are used, ensure the ATRA® Clip arm is hooked through the slot hole, or the anchor is placed over the cell wall. See Figure 3.

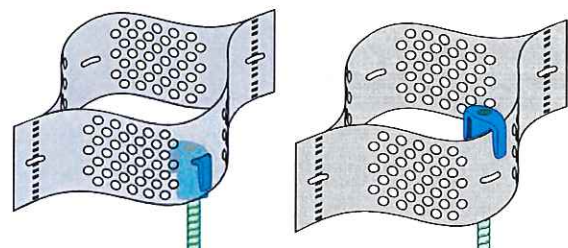


Figure 3 ATRA® Stake Edge Restraint

- Expand the Geoweb® section down the slope to the section's specified length. See Figure 4.

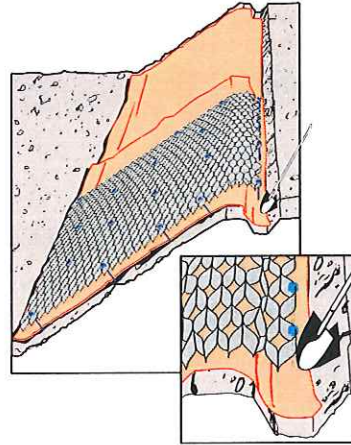


Figure 4 Placement of Geoweb® Section

- Hold the fully expanded sections open using one of the following:
 - a) ATRA® Anchors, straight stakes or J-Pins (permanent or temporary). Specialized driving tools are available through Presto Geosystems' authorized distributors and representatives to speed driving of ATRA® anchors. See Figure 5.
 - b) Infill several peripheral cells.
 - c) Other acceptable methods may be used.
- Align and interleaf edges of adjoining Geoweb® sections, ensuring that the upper surfaces of adjoining sections are flush.

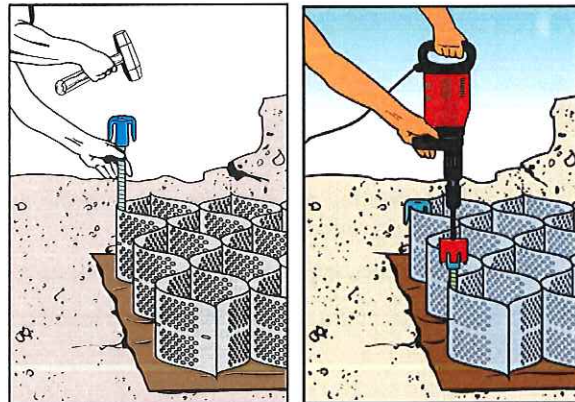


Figure 5 ATRA® Anchor Installation Methods

- Fasten Geoweb® sections together with the ATRA® key connection device. Position the ATRA key through the slots of overlapping sections (side-to-side), or where cells connect (end-to-end), and turn key to "lock" in position. See Figure 6.
- When Geoweb sections are connected end-to-end, under-expand a few rows of the adjoining section to allow easy placement of the ATRA keys before fully expanding the connecting section. For easiest placement, insert the key completely through one cell before inserting through the adjoining cell. Adjoining sections should also be fully connected prior to infilling.
- The use of the ATRA key device will reduce construction time significantly and offers cost-savings compared to stapling operations.
- Geoweb sections may also be connected with pneumatic staplers either side-to-side or end-to-end.
- The ATRA key connection device and pneumatic staplers and staples are available through Presto Geosystems and their authorized distributors/representatives.

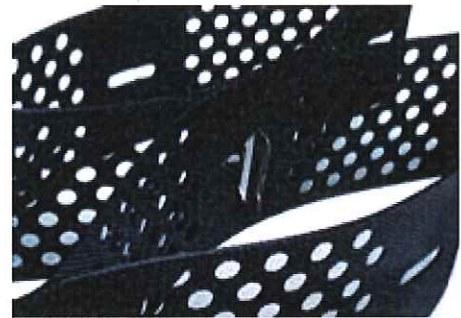


Figure 6 ATRA® Key Connection Device

Installation of Geoweb® Sections on Curved or Irregular Surfaces

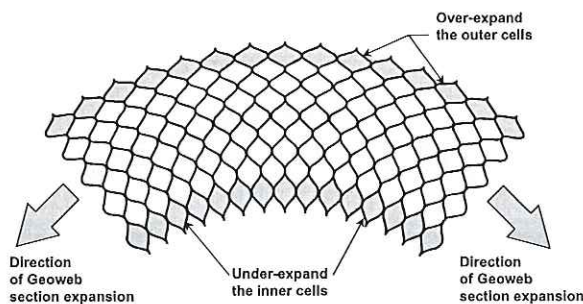


Figure 7 Curved Expansion of Section

Method 1: Geoweb® sections can be readily adapted to cover curved areas by varying the degree of cell expansion across the width of individual sections. See Figure 7.

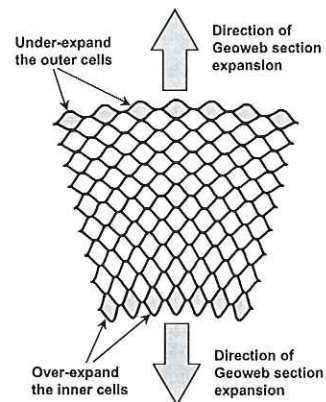


Figure 8 Tapered Expansion of Section

Method 2: Progressively vary the degree of cell expansion along the length of a section. See Figure 8.

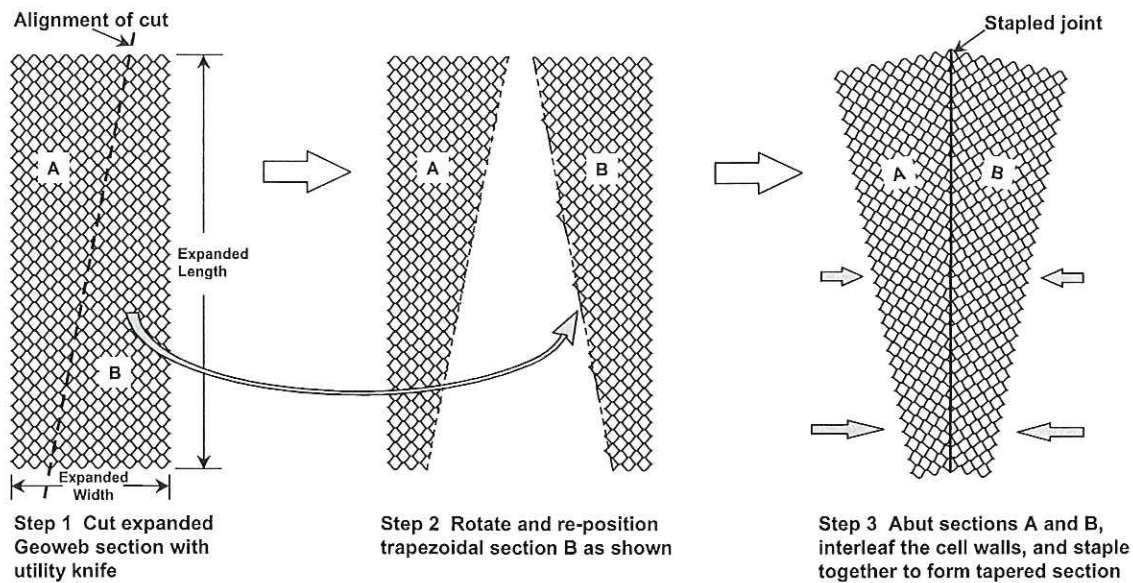


Figure 9 Field Cutting of Geoweb® Section to Form Taper

Method 3: Field cut an expanded section to give the required degree of taper. See Figure 9.

Limiting Vertical Curvature of Geoweb® Sections

Table 1: Cell Depth vs Limiting Radius of Curvature

Geoweb® Cell Depth	Minimum Radius Expansion Direction	Minimum Radius Cross Section Direction
75 mm (3 in)	400 mm (16 in)	600 mm (24 in)
100 mm (4 in)	600 mm (24 in)	1000 mm (40 in)
150 mm (6 in)	900 mm (36 in)	1500 mm (60 in)
200 mm (8 in)	1200 mm (48 in)	2000 mm (80 in)

Preparation of Tendoned Geoweb® Sections

- Geoweb® sections are supplied with tendon slots. Tendons should be threaded through the appropriate cells that will provide the best distribution of the number of tendons per design.
- Individual tendons are typically cut to a total length equal to:
 $1.15 \times \text{expanded Geoweb® section length}$
 $+ 1.0 \text{ m (3 ft) to allow for loops, etc. and}$
 $+ 0.15 \text{ m (6 in) for each ATRA Clip used per}$
 Figure 16 Moore Hitch Non-Slip Connection.

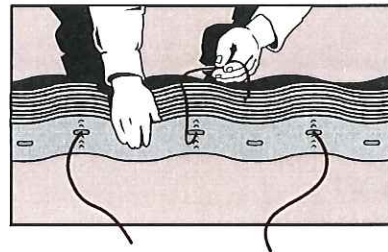


Figure 10 Tendon Insertion

- Feed individual tendons through tendon slots in the collapsed Geoweb® sections prior to section expansion. See Figure 10.

Special Tendon Insertion Methods:

- Use a short length of 2.5 mm (12 gauge) wire with an elongated loop at one end as a threading needle to pull the leading end of the tendon through the Geoweb® section. See Figure 11.
- Insert a short length of thin-wall metal tubing as a smooth guide for the tendon. Once the tendon has been fed through the collapsed Geoweb® section, the tube is removed. See Figure 12.

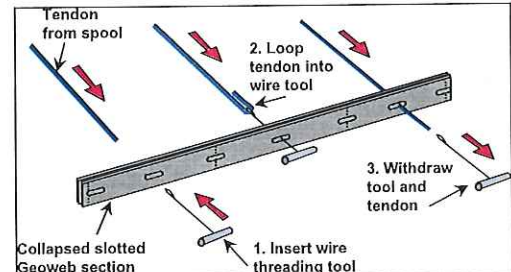


Figure 11 Threading Tendons

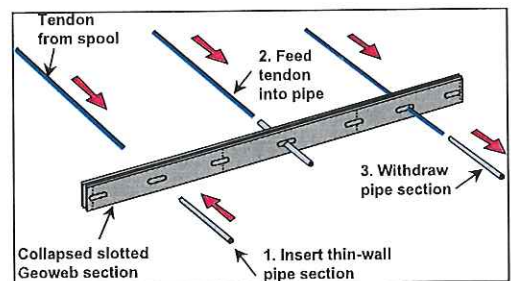


Figure 12 Use of Guide Tubes

Terminating and Anchoring Tendons

There are two standard methods of terminating tendons at an outer edge of Geoweb® sections. See Figure 13 and Figure 14.

1. Double-loop knot with stop washer – normally used at the toe of the slope.

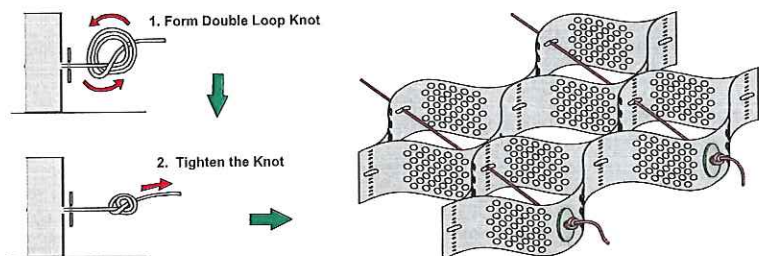


Figure 13 Termination of Integral Tendons



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2. Knotted loop - used to attach tendons to a crest or toe anchor.

The ATRA® Anchor or ATRA® Clip when used as a restraining device is recommended. Loop the tendon around and under the arms of the ATRA® Clip.

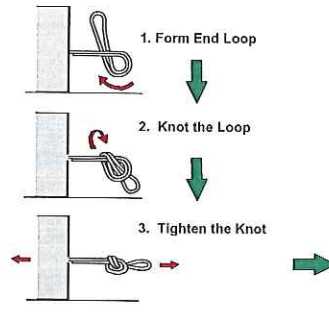


Figure 14 End Anchorage of Tendons

Internal Anchoring

- Drive additional ATRA® Anchors within selected cells of the expanded Geoweb® section at the specified spacing. See Figure 15.
- Ensure the tendon is under the arm of the ATRA® Clip and drive the anchor flush with the base of the cell.
- Final driving of the anchors along a single tendon should progress in sequence from the initial edge anchor (generally at the crest). The trailing length of tendon should remain un-restrained to avoid over-tensioning of the tendon.
- The un-restrained tendon end should be terminated as illustrated above.

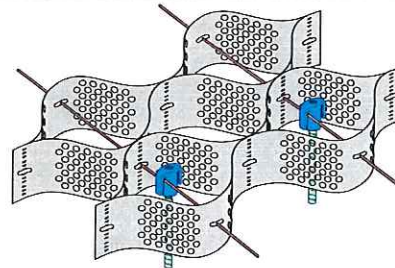


Figure 15 Internal Anchors



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Non-Slip Tendoned Internal Anchorage

- Geoweb® sections can be effectively supported on steep slopes with an array of internal tendons anchors that are attached to the integral tendon system. Typical internal anchors include:
 - a) ATRA® Anchors
 - b) J-pins
 - c) Steel reinforcing rods
 - d) Duckbill® cable anchors
 - e) Wooden stakes
- The recommended method of attachment uses the ATRA® Anchor and a mooring hitch Presto Geosystems refers to as the "Moore Hitch". See Figure 16.

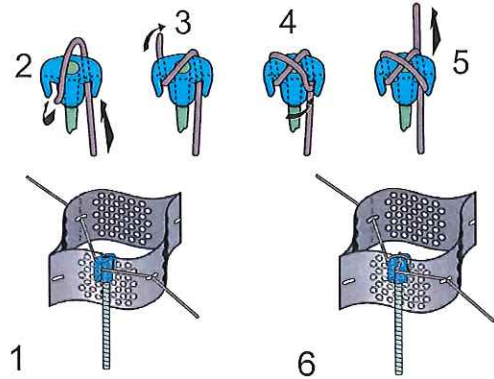


Figure 16 Moore Hitch Non-Slip Connection

Crest Anchorage of Tendoned Geoweb® Systems

- Load transfer to crest anchorage is required when a driven anchor array is impractical (e.g. when a geomembrane or impervious material is present). See Figure 17.
- ATRA® restraining clips transfer load from the Geoweb sections to the tendons in such cases. See Figure 18.
- With tendons inserted, expand the Geoweb® section into position and attach the ATRA® Clips at pre-determined cell spacing.
- Attachment of ATRA® restraining clips can progress in either an up-slope or down-slope direction.
- Pre-anchor the end of the tendon from which the ATRA® Clip attachment commences.
- Remove all internal slack from tendons as the ATRA® Clips are attached.
- Precut tendons must be long enough to allow for attachment knots at each clip. Refer to recommendation on page 4.

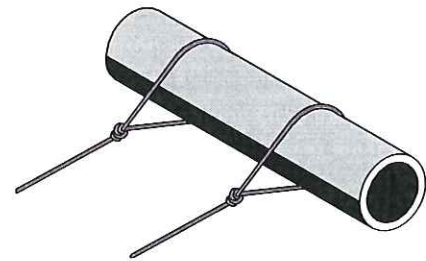


Figure 17 Deadman Crest Anchor

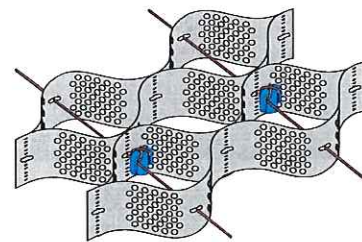


Figure 18 ATRA® Restraint Clips

Attaching ATRA® restraining clips at the required spacing can be accomplished while the Geoweb® section is pre-expanded on a flat surface. The section can then be re-collapsed, attached to crest anchorage, and deployed onto the slope. This method facilitates the installation of sections on extremely steep slopes.

NOTE: Use a small electrical tie to secure the ATRA® Clip to the tendon before collapsing the Geoweb section. This will prevent the clip from falling off the tendon.



Placement of Infill

- Infilling of Geoweb® sections can begin when anchoring work is complete.
- A range of equipment types can be used as illustrated in Figure 19 – Figure 23.
 1. Hydraulic Excavator (Backhoe)
 2. Front-end Loader
 3. Conveyor
 4. Crane-mounted skip
 5. Mixer Chute
- Limit drop-height of infill material to 1 m (3 ft) maximum.
- Infill from the crest of the slope to the toe.
- Controlled overfilling of cells is required to allow for consolidation and compaction of the infill.
- Ensure that infill will be flush with the upper surface of the cells at the completion of the installation.

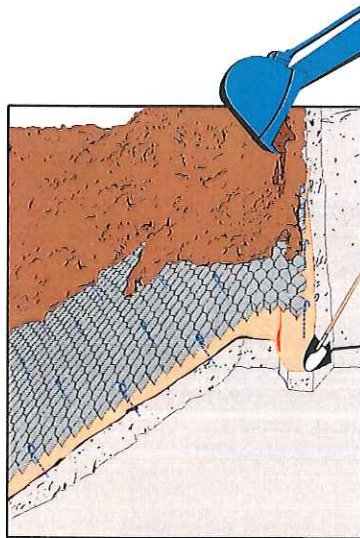


Figure 19 Excavator

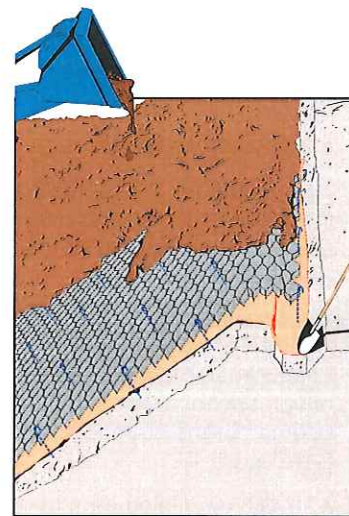


Figure 20 Loader

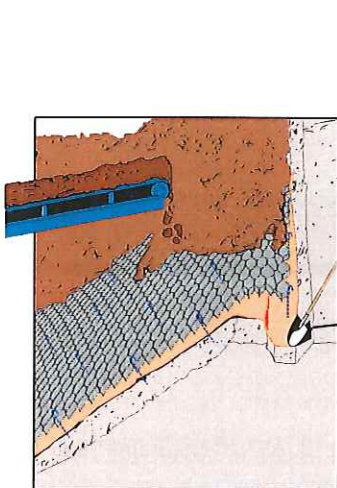


Figure 21 Mobile Conveyor



Figure 22 Skip

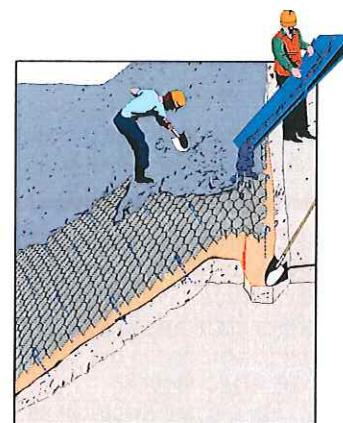


Figure 23 Chute

Dimensions and Weights of Palletized Geoweb® Sections

Geoweb® sections are normally tri-folded and palletized for shipment to the site. Table 2 provides typical pallet dimensions and weights for a range of section and cell sizes.

Table 2: V-Series Geoweb® Shipping Dimensions and Weights

<i>Cell Depth</i>	<i>Pallet Dimensions</i>	<i>Minimum Weight</i>	<i>Maximum Weight</i>
75 mm (3 in)	1070 mm x 1070 mm (42 in x 42 in)	390 kg (860 lb)	710 kg (1,560 lb)
100 mm (4 in)	1070 mm x 1070 mm (42 in x 42 in)	400 kg (880 lb)	730 kg (1,600 lb)
150 mm (6 in)	1070 mm x 1070 mm (42 in x 42 in)	360 kg (800 lb)	660 kg (1,450 lb)
200 mm (8 in)	1070 mm x 1070 mm (42 in x 42 in)	400 kg (880 lb)	730 kg (1,600 lb)

Infill Volumes

Table 3: Infill Volumes for Geoweb® Sections

<i>Cell Depth</i>	<i>75 mm (3 in)</i>	<i>100 mm (4 in)</i>	<i>150 mm (6 in)</i>	<i>200 mm (8 in)</i>
Volume (m³ / 100 m² of area)	7.5 m³	10.0 m³	15 m³	20.0 m³
Volume (yd³ / 100 yd² of area)	8.3 yd³	11.1 yd³	16.7 yd³	22.2 yd³

Tools and Equipment

Installation efficiency is greatly improved by the appropriate choice of construction equipment and tools. The following guidelines apply to most Geoweb® system applications. Non-standard tools and equipment may provide additional benefits in some situations.

Table 4: Standard Construction Tools for Installation of the Geoweb® System

Geoweb® Components	Power Tools	Concrete Finishing	Surveying Equipment
ATRA® Clips/Anchors	Heavy-duty drill	Bull floats	Surveyor's auto-level
ATRA® Connection Device	Circular saw	Hand floats	Tripod and rod
Hand Tools	Percussion hammer	Steel trowels	Laser beacons
Shovels and spades	Stanley-Bostitch stapler	Poker vibrators	Audio target receiver
Rakes and screed bars	SB103020 wire staples	Tamping rods	Survey stakes
Sledge hammers	Gas generator		Markers + spray cans
Crowbars	Air compressor		String-lines + spirit level
Utility knives	Electric Impact Hammer ATRA® Anchor Driving Tool and Gad.		
Spikes, nails + lumber			
Templates			



PRESTO GEOSYSTEMS

GEOWEB®
SLOPE PROTECTION SYSTEM
INSTALLATION GUIDELINE

Excavation and Materials Handling Equipment

Conventional excavators, front-end loaders, mini-excavators and skid-steer loaders, equipped with smooth-edged buckets, are normally employed for the installation of Geoweb® systems. Infilling of Geoweb® sections can also be carried out with conveyors, chutes and skips. As a rule, the overall rate of installation relates directly to the speed and efficiency of infill placement and compaction.

Compaction Equipment

Compaction of slope surfaces prior to installation of the Geoweb® system is normally carried out with: 1) vibratory plate compactor attachments for backhoes, 2) a mobile winch assembly at the slope crest to support a roller or plate compactor, or 3) manual tamping. Slope pre-compaction is primarily intended to minimize sloughing of loose surface topsoil or aggregate fill materials.

Limited Warranty

Presto Geosystems warrants each Geoweb® section which it ships to be free from defects in materials and workmanship at the time of manufacture. Presto's exclusive liability under this warranty or otherwise will be to furnish without charge to Presto's customer at the original f.o.b. point a replacement for any section which proves to be defective under normal use and service during the 10-year period which begins on the date of shipment by Presto. Presto reserves the right to inspect any allegedly defective section in order to verify the defect and ascertain its cause.

This warranty does not cover defects attributable to causes or occurrences beyond Presto's control and unrelated to the manufacturing process, including, but not limited to, abuse, misuse, mishandling, neglect, improper storage, improper installation, improper alteration or improper application.

PRESTO MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, WRITTEN OR ORAL, INCLUDING, BUT NOT LIMITED TO, ANY WARRANTIES OR MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, IN CONNECTION WITH THE GEOWEB® SYSTEM. IN NO EVENT SHALL PRESTO BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR THE BREACH OF ANY EXPRESS OR IMPLIED WARRANTY OR FOR ANY OTHER REASON, INCLUDING NEGLIGENCE, IN CONNECTION WITH THE GEOWEB® SYSTEM.

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APPENDIX 4

HABITAT REGULATIONS ASSESSMENT

Intended for
Avison Young

On behalf of
University of St Andrews

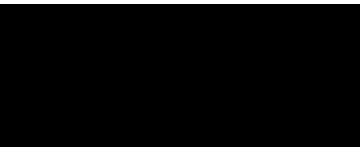
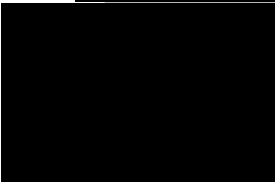
Date
April 2021

Project Number
1620006756

GUARDBRIDGE RESERVOIR DECOMMISSIONING Habitats Regulations Appraisal

GUARDBRIDGE RESERVOIR DECOMMISSIONING
HABITATS REGULATIONS APPRAISAL

Project No. **1620006756**
Issue No. **1**
Date **19th April 2021**
Made by **Sarah Carruthers/Danny Oliver**
Checked by **Danny Oliver**
Approved by **Adam Fitchet**

Made by:	
Checked/Approved by:	

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Version Control Log

Revision	Date	Made by	Checked by	Approved by	Description
1	19/04/2021	SC/DO	DO/DM	AF	Final

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1. INTRODUCTION

1.1 Background

Ramboll UK Limited (Ramboll) was commissioned by Avison Young on behalf of the University of St Andrews (the Client) to undertake ecological surveys in preparation for the decommissioning of a reservoir, and the associated infrastructure, situated in Guardbridge, Fife (the "site").

Under the Habitats Regulations, all competent authorities must consider whether any plan or project will have a 'likely significant effect' on a European site by conducting a Habitats Regulations Appraisal (HRA). As part of the proposed decommissioning works will be carried out within the Firth of Tay and Eden Estuary Special Protection Area (SPA) and Firth of Tay and Eden Estuary Ramsar site, a HRA must be carried out to assess if the project will have a likely significant impact on these sites and determine if an Appropriate Assessment (AA) is required.

The reservoir and associated infrastructure is owned by the Client and historically fed the, now redundant, Guardbridge Paper Mill, located approximately 250 m to the south east, which is also owned by the Client. The Client is redeveloping the paper mill and wishes to decommission the reservoir as it is no longer needed. The decommissioning of the reservoir shall involve the removal of the reservoir, a pipe bridge, a mill lade and a settlement pond, as described in Guardbridge Reservoir Discontinuance: Works Information & Specifications¹. These features are shown on Figure 1: Proposed Works and Designated Sites.

As the reservoir planned to be removed is situated within the Firth of Tay and Eden Estuary SPA and RAMSAR site, the proposed works have the potential to impact on those features for which the site is designated, including ornithological and ecological features. As a result, in addition to the ecological assessments that have been carried out by Ramboll, there is a requirement for the completion of a Habitats Regulations Appraisal. This ensures compliance with Regulations 61 - 63 of The Conservation (Natural Habitats, &c) Regulations 1994²; detailed as follows:

Regulation 61.

*(1) Where it is intended to carry out development in reliance on the permission granted by a general development order, application may be made in writing to the appropriate nature conservation body for their opinion whether the development is likely to have such an effect as is mentioned in regulation 60(1)(a) or (2)(a). The application shall give **details of the development** which is intended to be carried out.*

(2) On receiving such an application, the appropriate nature conservation body shall consider whether the development is likely to have such an effect.

*(3) Where they consider that they have **sufficient information to conclude that the development will, or will not, have such an effect**, they shall in writing notify the applicant and the local planning authority of their opinion.*

(4) If they consider that they have insufficient information to reach either of those conclusions, they shall notify the applicant in writing indicating in what respects they consider the information insufficient; and the applicant may supply further information with a view to enabling them to reach a decision on the application.

(5) The opinion of the appropriate nature conservation body, notified in accordance with paragraph (3), that the development is not likely to have such an effect as is mentioned in regulation 60(1)(a) or (2)(a) shall be conclusive of that question for the purpose of reliance on the planning permission granted by a general development order.

Regulation 62. –

*(1) Where it is intended to carry out development in reliance upon the permission granted by a general development order, application may be made in writing to the **local planning authority** for their approval.*

(2) The application shall–

¹ AECOM, April 2020: Guardbridge Reservoir Discontinuance: Works Information & Specifications

² <http://www.legislation.gov.uk/uksi/1994/2716/regulation/60/made>

- (a) give **details of the development** which is intended to be carried out; and
- (b) be accompanied by–
- (i) a **copy of any relevant notification by the appropriate nature conservation body under regulation 61**, and
- (ii) any **fee required** to be paid.
- (3) For the purposes of their consideration of the application the local planning authority shall assume that the development is likely to have such an effect as is mentioned in regulation 60(1)(a) or (2)(a).
- (4) The authority shall send a copy of the application to the appropriate nature conservation body and shall take account of any representations made by them.
- Regulation 63.
- (1) The local planning authority for the purposes of regulations 60 to 62 shall be the authority to whom an application for approval under regulation 62 would fall to be made if it were an application for planning permission.
- (2) The fee payable in connection with an application for such approval is–
- (a) £25 in the case of applications made before 3rd January 1995, and
- (b) **£30** in the case of applications made on or after that date.

1.2 Consultation

Ramboll spoke to each of the environmental regulators identified above, the output of that initial consultation is set out below. It should be noted that this consultation was required by the Client in advance of the decommissioning design being progressed, thus Ramboll's discussions with the regulators were high level and sought to identify whether the regulators could foresee any potential issues with the general proposals for decommissioning the reservoir.

1.2.1 Initial Consultation with NatureScot

Ramboll spoke with Gavin Johnson of NatureScot (then Scottish Natural heritage [SNH]) in February 2017. Gavin Johnson was NatureScot's lead officer for the Eden Estuary.

Ramboll outlined the Client's plans for opening up the reservoir, effectively resulting in the area of the reservoir connecting with the adjacent Motray Water and creating a lagoon type environment. SNH agreed in principle, seeing this as a potential for habitat creation which is likely to result in an extension of the habitat currently provided by the Motray Water immediately adjacent to the reservoir.

The following key points for consideration were identified:

- A full Habitat Regulations Assessment of impacts on the SPA/SAC would be required but thinking at the time (dependent upon the design of the decommissioning methodology) was that the impacts should be beneficial rather than detrimental; and
- Effective management of the dam by the former Paper Mill is key to managing ecological risk. Without removing the dam, creation of the lagoon will not succeed which would likely cause NatureScot to oppose the plans.

In conclusion, NatureScot considers the idea of decommissioning the reservoir, resulting in the creation of a lagoon type environment, to be a good prospect, however further consultation with NatureScot will be required as the decommissioning design and methodology is developed and before it is finalised. That consultation would require undertaking of an HRA.

1.2.2 Initial Consultation with SEPA

Ramboll spoke with Steve Archibald, SEPA officer for Fife in February 2017. SEPA advised that as the site is within an area of intertidal waters (i.e. the watercourse is below mean high water springs (MHWS)), it is Marine Scotland rather than SEPA that would regulate the

decommissioning of the reservoir. This means that the works would not be covered by the CAR regulations.

1.2.3 Initial Consultation with Marine Scotland

Ramboll has had a number of discussions with Marine Scotland relating to various aspects of work that we are undertaking on behalf of the Client in relation to redevelopment of the former Paper Mill site. Ramboll discussed the reservoir decommissioning specifically with Marine Scotland in February 2017. That discussion concluded that there is no current standard approach for this specific type of project, therefore, Marine Scotland required to see the draft detailed design for the reservoir decommissioning in order to enable it to confirm whether a Marine Licence is required for the works. This was supplied by Ramboll in September 2020 and Marine Scotland confirmed that a license would be required on the basis that the decommissioning will involve works below and over the area of Mean High Water Springs (MHWS).

1.2.4 Field Surveys

Identification of protected sites, habitats and species and baseline data collation has been completed through an extended Phase 1 habitat survey conducted by Elizabeth Butler and Sarah Carruthers (Qualifying CIEEM) on 17th July 2019, followed by an updated survey conducted by Danny Oliver (MCIEEM) and Sarah Carruthers on 26th January 2021.

1.3 Objectives

The objectives of this HRA are:

- To assess the potential for likely significant effects upon the European site(s) from the proposed decommissioning works, either alone or in combination with other plans or projects and in the absence of any mitigation (this assessment is known as the screening stage); and
- Where likely significant effects are identified through the screening stage, consider whether the proposed development has the potential to have an adverse effect on the integrity of the European site (s), having had regard to their conservation objectives and mitigation measures proposed.

2. HABITATS REGULATIONS APPRAISAL – SCREENING

2.1 Firth of Tay and Eden Estuary SPA

2.1.1 Qualifying Interests of the SPA

The proposed development has potential connectivity with the Firth of Tay and Eden Estuary SPA. The Firth of Tay and Eden Estuary SPA is a complex of estuarine and coastal habitats from the mouth of the River Earn in the inner Firth of Tay, east to Barry Sands on the Angus coast and St Andrews on the Fife coast. The articles for which the Firth of Tay and Eden Estuary SPA qualify are detailed in Table 2.1.

Table 2.1 Firth of Tay and Eden Estuary SPA Qualifying species	
Article Number	Qualifying species
Article 4.1	Marsh harrier, Little tern, Bar-tailed godwit
Article 4.2	Redshank, pink-footed goose and greylag goose.
Article 4.2	Regularly supports 20,000+ wintering waterfowl. Named species which make up an important component of the waterfowl assemblage include: Shelduck, Common scoter, Goosander, Grey plover, Black-tailed godwit, Velvet Scoter, Eider, Ostercatcher, Dunlin, Cormorant, Long-tailed duck, Goldeneye, Red-breasted merganser and Sanderling.

The Firth of Tay and Eden Estuary SPA qualifies under Article 4.1 by regularly supporting populations of European importance of the Annex I species: marsh harrier *Circus aeruginosus* (1992 to 1996, an average of 4 females, 3% of the GB population); little tern *Sternula albifrons* (1993 to 1997, an average of 25 pairs, 1% of the GB population) and bar-tailed godwit *Limosa lapponica* (1990/91 to 1994/95, a winter peak mean of 2,400 individuals, 5% of the GB population).³

The Firth of Tay and Eden Estuary SPA further qualifies under Article 4.3 by regularly supporting populations of European importance of the migratory species redshank *Tringa totanus* (1990/91 to 1994/95, a winter peak mean of 1,800 individuals, which is the equivalent of 1% of the Eastern Atlantic biogeographic population; greylag goose *Anser anser* (1990/91 to 1994/95 a winter peak mean of 1,200 individuals, which is equivalent to 1% of the Iceland/UK/Ireland biogeographic population) and pink-footed goose *Anser brachyrhynchus* (1990/91 to 1994/95 a winter peak mean of 2,800 individuals, 1% of the Eastern Greenland/Iceland/UK biogeographic population).

The Firth of Tay and Eden Estuary SPA also qualifies under Article 4.2 by regularly supporting in excess of 20,000 individual waterfowl. During the period 1990/91 to 1994/95 a winter peak mean of 48,000 individual waterfowl was recorded, comprising 28,000 wildfowl and 20,000 waders, including nationally important populations of the following species: velvet scoter *Melanitta fusca* (730 individuals, 24% of the GB population); pink-footed goose (2,800 individuals, 1% of the GB population); greylag goose (1,200 individuals, 1% of the GB population); redshank (1,800 individuals, 2% of the GB population); cormorant *Phalacrocorax carbo* (230 individuals, 2% of the GB population); shelduck *Tadorna tadorna* (1,200 individuals, 2% of the GB population); eider *Somateria mollissima* (13,800 individuals, 18% of the GB population); bar-tailed godwit

³ European Parliament and Council of the conservation of wild birds. 2018. Citation for Special Protection Area (SPA). Firth of Tay and Eden Estuary (UK9004121). Available online: [SiteLink \(nature.scot\)](#)

(2,400 individuals); common scoter *Melanitta nigra* (3,100 individuals, 9% of the GB population); black-tailed godwit *Limosa limosa islandica* (150 individuals, 2% of the GB population); goldeneye *Bucephala clangula* (230 individuals, 1% of the GB population); red-breasted merganser *Mergus serrator* (470 individuals, 5% of the GB population); goosander *Mergus merganser* (220 individuals, 2% of the GB population); oystercatcher *Haematopus ostralegus* (5,100 individuals, 1% of the GB population); grey plover *Pluvialis squatarola* (920 individuals, 2% of the GB population); sanderling *Calidris alba* (220 individuals, 1% of the GB population); dunlin *Calidris alpina alpina* (5,200 individuals, 1% of the GB population) and long-tailed duck *Clangula hyemalis* (560 individuals, 2% of the GB population).

2.1.2 Site Condition and Monitoring

The condition of each of the features for which the Firth of Tay and Eden Estuary SPA has been classified is provided in Table 2.2, along with the date of the most recent assessment. The negative pressures for each feature are also listed.

Table 2.2 Firth of Tay and Eden Estuary SPA Condition and Negative Pressures		
Classifying Species	Latest Assessed Condition	Negative Pressures
Bar-tailed godwit	Favourable declining (31/03/15)	None
Common scoter	Unfavourable declining (31/03/15)	None
Cormorant	Favourable maintained (31/03/15)	None
Dunlin	Favourable declining (31/03/15)	None
Eider	Favourable recovered (31/03/15)	Natural event Recreation/disturbance
Goldeneye	Unfavourable declining (31/03/15)	None
Goosander	Favourable maintained (31/03/15)	None
Grey plover	Favourable maintained (31/03/15)	None
Greylag goose	Unfavourable declining (31/03/15)	None
Black-tailed godwit	Favourable maintained (31/03/15)	Recreation/disturbance Water management
Little tern	Unfavourable no change (28/02/01)	Natural event

Table 2.2 Firth of Tay and Eden Estuary SPA Condition and Negative Pressures		
Long-tailed duck	Unfavourable declining (31/03/15)	None
Marsh harrier	Favourable maintained (01/09/17)	Recreation/disturbance
Oystercatcher	Favourable maintained (31/03/15)	None
Pink-fotted goose	Favourable maintained (31/03/15)	Natural event Recreation/disturbance (dog walking)
Red-breasted merganser	Unfavourable declining (31/03/15)	None
Redshank	Favourable declining (31/03/15)	Invasive species
Sanderling	Favourable maintained (31/03/15)	None
Shelduck	Unfavourable declining (31/03/15)	None
Velvet scoter	Unfavourable declining (31/03/15)	None
Waterfowl assemblage	Favourable maintained (01/04/15)	Climate change Recreation/disturbance

2.1.3 Conservation Objectives

The conservation objectives for the SPA area as follows:

- To avoid deterioration of the habitats of the qualifying species (listed in Table 2.1) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained; and
- To ensure for the qualifying species that the following are maintained in the long-term: Population of the species as a viable component of the site; distribution of the species within the site; distribution and extent of habitats supporting the species; structure, function and supporting processes of habitats supporting the species; and no significant disturbance of the species.

2.2 Firth of Tay and Eden Estuary SAC

2.2.1 Qualifying Interests of the SAC

The designating features of the SAC have been listed alongside the condition of each of the features for which the SAC has been designated is provided in Table 2.3, along with the date of the most recent assessment. The negative pressures for each feature are also listed.

Table 2.3: Firth of Tay and Eden Estuary SAC Qualifying Interests			
Scientific Name	Common Name	Latest Assessed Condition	Negative Pressures
Estuaries	Estuaries	Condition not assessed	None
Mudflats and sandflats not covered by seawater at low tide	Intertidal mudflats and sandflats	Favourable maintained (31/12/02)	Game/fisheries management
<i>Phoca vitulina</i>	Common seal	Unfavourable declining (22/08/13)	Recreation/disturbance To be identified
Sandbanks which are slightly covered by sea water all the time	Subtidal sandbanks	Favourable maintained (04/07/02)	None

The Annex I habitats that are the primary reason for this site's designated status are estuaries. The Firth of Tay and Eden estuary are two high-quality estuarine areas. The Tay is the least modified of the large east coast estuaries of Scotland, while the Eden estuary represents a smaller 'pocket' estuary. The inner parts of the estuary are largely sheltered from wave action, while outer areas, particularly of the Tay, are exposed to strong tidal streams, giving rise to a complex pattern of erosion and deposition of the sandbank feature at the Firths' mouth.

Subtidal sandbanks and intertidal mudflats are Annex I habitats that are present as a qualifying feature of the SAC but not a primary reason for selection of the site.

Harbour seal *Phoca vitulina* is an Annex II species that are a primary reason for the designation of this site. The Firth of Tay & Eden Estuary supports a nationally important breeding colony of Harbour seal *Phoca vitulina*, part of the east coast population of common seals that typically utilise sandbanks. Around 600 adults haul-out at the site to rest, pup and molt, representing around 2% of the UK population of this species.

2.2.2 Site Condition and Monitoring

The condition and negative pressures on the SAC designating features is provided in Table 2.3 above.

2.2.3 Conservation Objectives

The conservation objectives for the SAC are as follows:

- To avoid deterioration of the qualifying habitats (listed in Table 2.2) thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and
- To ensure for the qualifying habitats that the following are maintained in the long term: extent of the habitat on site, distribution of the habitat within site, structure and function of the habitat, processes supporting the habitat, distribution of typical species of the habitat, viability of typical species of the habitat, no significant disturbance of typical species of the habitat.

2.3 Firth of Tay and Eden Estuary Ramsar

2.3.1 Qualifying Interests of the Ramsar site

The qualifying interests of the Ramsar site are provided in Table 2.4.

Table 2.4 Firth of Tay and Eden Estuary RAMSAR Qualifying Interests	
Criterion	Description
3a	Regularly supports in winter over 20,000 waterfowl with a 1990/91-94/95 winter peak mean of 48,000 waterfowl, comprising 28,000 wildfowl and 20,000 waders.
3c	Regularly supports internationally important wintering populations of pink-footed goose <i>Anser brachyrhynchus</i> , greylag goose <i>A. anser</i> , bar-tailed godwit <i>Limosa lapponica</i> and redshank <i>Tringa totanus</i> .

The RAMSAR site was listed in February 2000 and has a boundary that is contiguous with the SPA site. The qualifying species/populations identified at designation are the following species with peak counts in winter:

- Pink-footed goose;
- Greylag goose; and
- Bar-tailed godwit.

Invertebrate-rich mudflats comprise the majority of the RAMSAR site. These include important areas of eelgrass *Zostera* spp. in Tayport Bay. Small areas of saltmarsh can be found in Tayport Bay, Eden Estuary and the Inner Tay Estuary. These are dominated by *Juncus gerardii*, *Scirpus* spp. and *Schoenoplectus* spp. on the Inner Tay and *Puccinellia/Festuca* on the Eden Estuary. Successional sand-dune communities are to be found on Tentsmuir Point which is one of the most extensive dune systems in Scotland. In total 14 NVC communities are found there. The *Phragmites australis* reedbeds (S4 swamp) are the some of the most important in the UK and include the largest continuous stand of reed in the UK.

2.4 Potential Impacts

The proposed decommissioning works involve:

- Breach of the reservoir including excavation of the dam embankment material, installation of breached slope surface protection, regrading of the existing embankment upstream face, removal and reinstatement of existing fence and infilling of the overflows and bottom outlet structures;
- Pipe bridge removal; and
- Settlement tank infilling.

As the proposed reservoir works in addition to the pipe bridge removal occur within the boundary of the SPA and Ramsar sites there is a potential for disturbance of a number of the qualifying features of these sites, namely wintering bird populations. The reservoir currently provides an area of intertidal mudflat used by birds from the SPA and Ramsar.

The proposed works will not occur within the boundary of the SAC. The boundary of the Firth of Tay and Estuary SAC lies 420 m to the south-east of the proposed reservoir decommissioning works.

The works within the SPA and Ramsar site are proposed to be undertaken once the relevant licences and permissions (i.e. Marine Scotland License) are in place, with this presumed to be in July/August 2021.

2.4.1 Disturbance

There is potential for SPA, SAC and Ramsar features to be disturbed during the decommissioning works. This would take the form of noise or visual disturbance from machinery and contractors preventing birds and animals from using areas they would otherwise occupy.

SPA and Ramsar

In order to assess the disturbance potential to wintering birds as well as breeding birds (marsh harrier and little tern) for which the SPA and RAMSAR sites qualify, the species have been considered individually in Table 2.5 below.

Table 2.5 Firth of Tay and Eden Estuary SPA and Ramsar species impacts⁴		
Species	Likely Significant Effect	Reason
Bar-tailed godwit	No	This species feeds in the outer estuary, at Balgove and West Sands and roosts at the Goose Pools in the north east part of the estuary (5 km NE) and at Tentsmuir Point (11 km NE). Classified during the non-breeding season, so unlikely to be present during proposed works.
Common scoter	No	A sea duck species not frequenting the estuary at Edenside. Primarily found in St Andrews Bay and off Tentsmuir with rare occurrences in Balgove Bay during easterly storms. Classified during the non-breeding season, so unlikely to be present during proposed works.
Cormorant	No	Cormorant are scarce visitors to feed on the Eden. Main roost within the SPA is on the southern piers of the fallen and replacement Tay Rail Bridges, at Newport-on-Tay. There is limited use of tidal sand banks in the middle and inner Tay estuary, especially Naughton Banks. All features that are approximately 9km NNW. Classified during the non-breeding season, so unlikely to be present during proposed works.

⁴ Bell, D. (2014) Guardbridge Energy Centre: Report to Inform Appropriate Assessment, version 6. Report to University of St Andrews.

Table 2.5 Firth of Tay and Eden Estuary SPA and Ramsar species impacts⁴

Dunlin	No	<p>Feeds on the Edenside and Balgove mudflats and occasionally roosts on Edenside saltmarsh in low numbers. Records indicate that the boundary of dunlin distribution does not extend west of the A919 into the Motray Water.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>
Eider	No	<p>Very few visit Edenside, mainly arriving on the rising tide and usually numbering less than 10 birds. Eider are primarily associated with the outer Tay where the 2012/13 peak count on the WeBS Low Tide Survey was 12,669 birds and in the 1990's counts sporadically exceeded 20,000 birds.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>
Goldeneye	No	<p>Visit Edenside at high water in very small numbers with feeding birds arriving at high tide, normally less than five birds.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>
Goosander	No	<p>Other than a summer moulting flock roosting at Lucky Scaup, an island off Tayport in the River Tay, there is no other known roosting aggregation within the SPA.</p> <p>Numbers vary at Edenside, depending on time of year and state of tide. Small aggregations are recorded off the papermill to the east of the proposed works and birds are often observed feeding in front of the papermill.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>
Grey plover	No	<p>Not regularly present as either feeding or roosting birds in the inner estuary at Edenside. The main feeding areas are Balgove Bay with the preferred roost at the Goose Pools.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>

Table 2.5 Firth of Tay and Eden Estuary SPA and Ramsar species impacts⁴

Greylag goose	No	<p>Roost Oct-Mar at Edenside at night and have done so throughout operation of both papermill and RAF Leuchars and during the period prior to the declaration of the LNR, and the agreement that the Edenside mudflats would become a no-shooting sanctuary zone. It is unknown whether they extend into the Motray water to the west, so on a precautionary basis it is assumed they may be adversely affected by the development.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>
Black-tailed godwit	No	<p>Within the SPA the main feeding and roosting area is at Edenside, Guardbridge. (A few birds are occasionally present in Invergowrie and Kingoodie Bay but are not known to use the middle Tay.)</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>
Little tern	No	<p>None currently nest within the SPA. When present they attempt to breed at Tentsmuir Point and, in recent years, at the Goose Pools.</p> <p>Classified during the breeding season, so potential to be present during the proposed works. However, rarely recorded breeding in SPA and never within a disturbance distance of the proposed works.</p>
Long-tailed duck	No	<p>Sea duck not normally frequenting the inner estuary at Edenside.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>
Marsh harrier	No	<p>This species breeds in the inner Tay reedbeds and makes no use of the Eden estuary for breeding or other purposes. Rarely recorded at Earleshall, Tentsmuir on passage, mainly spring.</p> <p>Classified during the breeding season, so potential to be present during the proposed works. However, only recorded breeding in SPA in the Tay Reedbeds, away from proposed works.</p>
Oystercatcher	No	<p>Feeds in very small numbers at Edenside and roosts in relatively small numbers on the saltmarsh. The main oystercatcher roost is at the Goose Pools whilst most feeding takes place on the mussel beds in Balgove Bay.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>

Table 2.5 Firth of Tay and Eden Estuary SPA and Ramsar species impacts⁴

Pink-footed goose	No	<p>Roost Oct-Mar at Edenside at night and have done throughout operation of both papermill and RAF Leuchars and during the period prior to the declaration of the LNR, and the agreement that Edenside mudflats would become a no-shooting sanctuary zone.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>
Red-breasted merganser	No	<p>Does not regularly frequent Edenside.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>
Redshank	No	<p>Roost at Edenside and feed on the adjacent mudflats and mainly on the south east side of the main channel between the saltmarsh and Bridge and along the Eden channel at lower states of the tide.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>
Sanderling	No	<p>Species does not frequent the inner estuary at Edenside preferring the mouth of the Eden, West Sands and Tentsmuir shorelines for feeding and roosting. On the north side of the Tay the area between Broughty Ferry and Carnoustie can also hold significant numbers of sanderling.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>
Shelduck	No	<p>A very small number breed on the Earleshall Muir, adjacent farmland and Tentsmuir with a few scattered pairs on the south side of Balgove Bay therefore the breeding resources will not be affected. The main feeding and roosting area for wintering birds is in Balgove Bay. A few, normally <10 feed on the mudflats to the north of the channel between the Motray Water and the RAF Leuchars airfield.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>
Velvet scoter	No	<p>Sea duck do not frequent the inner estuary at Edenside. Main flocks are in St Andrews Bay and off Tentsmuir.</p> <p>Classified during the non-breeding season, so unlikely to be present during proposed works.</p>

Table 2.5 Firth of Tay and Eden Estuary SPA and Ramsar species impacts ⁴		
Waterfowl assemblage	No	Overall assembly could be significantly adversely affected by the development. Classified during the non-breeding season, so unlikely to be present during proposed works.
Un-named waterfowl assemblage component: Grey heron	No	Breed at North Haugh, St Andrews (four pairs rearing 10 young in 2013) and feeds on the river channel at Edenside. Frequently roost/loaf on the south end of the seawall at the papermill and one or two birds feed on adjacent flats and the Eden channel.

The exercise carried out in Table 2.5 indicates that there are no SPA or Ramsar species that have potential to be disturbed during the proposed works.

SAC

Common seals' main haulouts are at Tentsmuir Point (11 km NE) whilst local haulouts are in Balgove Bay (3.2 km east) and the mouth of the Eden (5 km east). The distance to the haulouts make it very unlikely that they would be disturbed, particularly as there will be no underwater noise generation from activities such as piling. Common seals do forage in the vicinity of the papermill but only in very small numbers and there is no reason why terrestrial activities during construction and operation would affect very local feeding opportunities.

2.4.2 Pollution

Pollution events, resulting from fuel leakages or from concrete spillages, have the potential to enter the water environment which could in turn lead to effects on the designated sites or the qualifying features of the designated sites. Effects would include indirect impacts from the deterioration of water quality and altering of water chemistry.

As work is due to be undertaken within the boundary of the SPA and Ramsar, the impact pathway for pollution impacts on these designated sites is short. The shortest impact pathway for potential pollution impacts to the SAC is 450 m in the channel of the Motray Water.

Pollution impacts have the potential to result in likely significant effects on SPA, SAC and Ramsar features.

2.4.3 Maintaining of Intertidal Habitat

The area of the reservoir currently functions as an intertidal mudflat that is used by birds seasonally. At high tide it is covered by brackish water and at low tide it provides exposed mudflats, used for feeding and refuging. The decommissioning of this reservoir will maintain this lagoon-type environment suitable for use by wintering birds. There would be a slight increase in area, where the reservoir wall is removed to create a very small increase in the mudflat area. It is considered that the movement of water and suspended material into and out of the lagoon would be increased through a channel compared to through a pipe, but not to a significant extent.

The mudflats to the east of the reservoir at Guardbridge papermill are included in the boundary of the Firth of Tay and Eden Estuary SAC. This SAC is designated primarily for Annex I habitats that in turn support assemblages of wintering waterfowl. The habitats present as qualifying features are estuaries, intertidal mudflats and sandflats in addition to subtidal sandbanks.

The opening up of the reservoir will allow this area to continue connecting with the Motray Water and maintain the lagoon environment that would be used by the birds currently using the Motray water in addition to those using the mudflats to the east. While only a small proportion of the designated sites' bird assemblage uses the mudflats to the east of the Motray water and the Motray water itself, the habitat maintain during decommissioning works will support these species.

This effect is considered to be a definite, beneficial effect on a very small area, and is not considered to provide a likely significant effect.

2.5 Conclusions of HRA

There is not considered to be potential for likely significant effects on the SPA, SAC or Ramsar or their features from disturbance. The majority of species for which the SPA and Ramsar are classified are present within the designated sites in the non-breeding season, and so are unlikely to be present at the time of the decommissioning works. The two species for which the SPA is classified for as breeding species, little tern and marsh harrier, have not been recorded breeding in the vicinity if the proposed decommissioning works. The proposed decommissioning works are sufficiently far away from any significant common seal haulouts or feeding areas, hence no likely significant effects are predicted from common seal disturbance.

There is potential for pollution effects from fuel or concrete runoff to result in likely significant effects on the SPA, SAC and Ramsar. These indirect effects would result in changes in water quality or chemistry.

The act of decommissioning the reservoir shall maintain the feature's effectiveness as a foraging and roosting location for wintering birds. There would be a small increase in reservoir area and a potential slight increase in water flow into the lagoon, but neither of these are considered to have potential to be likely significant effects.

3. APPROPRIATE ASSESSMENT

3.1 Potential Impacts

There is not considered potential for any direct likely significant effects on the SPA, SAC or Ramsar.

The only likely significant effects are indirect effects from pollution entering the water environment. Fuel, required for the machinery which shall undertake the decommissioning work, or concrete, required to cap exposed pipes, both have potential to act as pollutants if either are spilled or otherwise accidentally enter the water environment. If this were to occur there is potential for significant changes to the water quality or chemistry which could in turn have significant impacts on the fauna and flora of the Motray Water and Eden Estuary. This has the potential to have a likely significant impact on the qualifying features of SPA, SAC and Ramsar by damaging the habitats that the species use, the primary conservation objective of the SPA and SAC.

3.2 Mitigation Measures

A Pollution Prevention Plan (PPP) would be developed for the management of environmental impacts including those on ecological and ornithological features such as the SPA, SAC and Ramsar. The PPP would be based upon the Guardbridge Reservoir Discontinuance: Works Information and Specification report and Contractor Method Statement.

Standard mitigation and pollution prevention measures and good practice, as described in the PPP, would be implemented during the construction work. As a minimum, these would follow SEPA Guidelines for Water Pollution Prevention from Civil Engineering Contracts⁵ and Special Requirements⁶. These measures would limit the potential for silt laden run-off and other forms of pollution and in turn ensure the integrity of the designated sites is protected.

The methods of working outlined in the PPP to protect the designated sites are as follows:

- Preventing any polluting substance, such as fuels/oils, wet cement, raw concrete or silty water, from entering groundwater, watercourses or, in particular, aquatic waterways that have hydrological connectivity with the Motray Water. This would be achieved through the implementation of a detailed PPP. The PPP will include detailed site plans showing the location of pollution sources, potential pollution pathways and the receptors. The PPP will include drawings showing the location of silt fences, cut-off drains, silt traps and other mitigation measures as deemed necessary to avoid pollution. The PPP will also include details of rapid response actions that will be taken in the event of a pollution event and the maintenance and inspection programme proposed to ensure that the plan will be effective, including the provision of spill kits with all plant. Whenever any construction vehicles are stationary, absorbent “nappies” would be positioned underneath them to catch any dripping oils or other liquids. Cement and concrete pollution would be avoided by positioning concrete and cement mixing and washing areas⁷, which would:
 - be sited on an impermeable designated area;
 - be sited 10 m from any watercourse or surface water drain to minimise the risk of run off entering a watercourse;
 - have settlement and re-circulation systems for water reuse, to minimise the risk of pollution and reduce water usage;

⁵ https://www.sepa.org.uk/media/152233/wat_sg_32.pdf

⁶ https://www.sepa.org.uk/media/152220/wat_sg_31.pdf

⁷ Natural Resources Wales (NRW), the Northern Ireland Environment Agency (NIEA) and SEPA (2017), *Guidance for Pollution Prevention: Works and maintenance in or near water: GPP 5*. Available at: <https://www.netregs.org.uk/media/1303/gpp-5-works-and-maintenance-in-or-near-water.pdf> [Last accessed 10 September 2020]

- have a contained area for washing out and cleaning of concrete batching plant or ready mix lorries; and
- collect wash waters and, where necessary, discharge to the foul sewer (you must have permission from the local sewerage undertaker for this), or contain wash water for authorised disposal off site.
- This would be achieved through a buffer distance between construction works and all watercourses of 30 m (or closer under the supervision of the ECoW) and through the use of silt fences, cut-off drains, silt traps and drainage into vegetated areas. These would be monitored by the ECoW and by site staff to ensure any faults are rectified;
- Mechanical plant would be located in designated areas and protected from run-off. Mechanical plant would be well maintained and inspected regularly for leaks. Sump trays would be used;
- Fuel deliveries and refuelling would be undertaken by trained staff in a designated area with an impermeable base. All fuel related activities would take place more than 50 m away from any watercourse, unless previously agreed with the ECoW;
- All reasonable steps would be taken to prevent the transport of sediments or other matter disturbed by the construction work. Where possible, works would be undertaken during drier periods and avoid periods of high rainfall;
- Spill kits would be available on all plant on the site as well as at any pollution sources and sensitive features.

The mitigation measures proposed above are standard working procedures when working near water on developments in Scotland. They are well known to experienced contractors and are known to be effective at mitigating the potential significant impacts predicted. The mitigation measures would be secured by appropriately worded conditions.

3.3 Conclusions

The proposed decommissioning works have the potential to impact the River Tay and Eden Estuary SPA, SAC and Ramsar through pollution from fuel or cement leaks or spillages. This has potential to result in likely significant effects on the conservation objectives of the SPA, SAC and Ramsar. Effects would be indirect, with impact pathways being immediate for the SPA and Ramsar and approximately 450 m for the SAC.

Standard pollution prevention measures, to be detailed in the PPP, would avoid pollution through these impact pathways and, therefore, avoid adverse effects on the integrity of the SPA, SAC and Ramsar. Mitigation measures would manage both the source of the potential impact (trapping any fuel spills to prevent them from leaving the site works etc.) and the impact pathway (avoiding construction works close to watercourses, and ensuring pollution/sediment does not enter any watercourses etc.). These mitigation measures are standard working procedures next to watercourses in Scotland and are known to be effective.

Consequently, there would be no significant adverse residual effects on the integrity of the River Tay and Eden Estuary SPA, SAC or Ramsar, either through their qualifying features or conservation objectives through the implementation of appropriate mitigation measures.