Aberdeen Harbour Expansion Project

Construction Environmental Management Document

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DRAGADOS

Contents

Chapter 1	Introduction
Chapter 2	Roles and Responsibilities of Staff
Chapter 3	Construction Method Statement
Chapter 4	Archaeology Plan
Chapter 5	Construction Lighting Management Plan
Chapter 6	Construction Traffic Management Plan
Chapter 7	Dredging and Dredge Spoil Disposal Management and Monitoring Plan
Chapter 8	Fish Species Protection Plan
Chapter 9	Habitat Management Plan and Otter Protection Plan
Chapter 10	Landscape Mitigation Compensation Plan
Chapter 11	Marine Mammal Mitigation Plan
Chapter 12	Marine Invasive Non-Native Species and Biosecurity Management Plan
Chapter 13	Noise and Vibration Management Plan
Chapter 14	Piling Management Plan
Chapter 15	Pollution Prevention Plan
Chapter 16	Nigg Bay Site of Special Scientific Interest Management Plan
Chapter 17	Vessel Management Plan
Chapter 18	Waste Management Plan
Chapter 19	Existing Abstractions and Discharges
Chapter 20	Ground Gas and Groundwater Report: Phase II Site Investigation Risk Assessment

Chapter 16

Nigg Bay Site of Special Scientific Interest Management Plan

Contents

Page

16 Nigg Bay Site of Special Scientific Interest Management Plan 1

16.1 Introduction 1
16.2 Legislation 5
16.3 Proposed Construction Works Near the SSSI 6
16.4 Potential Risks to SSSI 11
16.5 Engineering Risk Assessment 12
16.6 Mitigation Measures 20
16.7 Conclusion 24

16 Nigg Bay Site of Special Scientific Interest Management Plan

16.1 Introduction

16.1.1 Overview

A Site of Special Scientific Interest (SSSI) is a statutory designation made by Scottish Natural Heritage (SNH) under the Nature Conservation (Scotland) Act 2004. SSSI's are those areas of land that SNH considers to best represent the natural heritage of an area – its diversity of plants, animals, habitats, rocks and landforms, or a combination of such natural features. The Aberdeen Harbour Expansion Project (AHEP) proposed development site is adjacent to and within the boundary of the Nigg Bay SSSI located on the south west of Nigg Bay, approximately 1km south of Aberdeen Harbour (National Grid Reference NJ966045).

This SSSI Management Plan outlines any risks to the Nigg Bay SSSI associated with the construction of the AHEP as detailed within the Environmental Statement (ES)[1]. As part of the Construction Environmental Plan (CEMP) this document must be used in order to avoid, mitigate and manage these risks.

The requirement to produce a Nigg Bay SSSI Management Plan is listed under Schedule 3.2.4, section a, of both the Marine Construction Licence, Marine Dredging Licence and Schedule 2 of the Harbour Revision Order. This Plan is considered to fulfil these requirements.

The location of the SSSI can be seen in Figure 16.1

[1] Waterman and Fugro (2015), Environmental Statement

Figure 16.1: SSSI boundary in relation to AHEP

16.1.2 Role, Responsibilities and Cross- Referencing

The following roles are responsible for ensuring that the requirements of this Nigg Bay Site of Special Interest Management Plan are implemented at the AHEP site.

Table 16.1: Roles and Responsibilities

Job Title	Name	Responsibilities
Environmental Manager	Craig Hynd	Ensure that spill kits are appropriately located and appropriate oil and chemical stores are in place on site. Ensure risk assessments are undertaken for planned construction activities close to or within the SSSI and consents sought from SNH as appropriate.
Environmental Clerk of Works	Emma Bias	Ensure all construction works are undertaken in adherence with the SSSI Management Plan. Site inspection Tool Box Talks During construction works the Ecological Clerk of Work (ECoW)

Job Title	Name	Responsibilities
		will be responsible for inspecting the SSSI slope for any adverse changes and also inspect drainage measures to ensure they are operating effectively
Construction Manager	Jose Enrique Perez	Ensure Environmental Manager is aware of all construction activities planned and ongoing close to or within the SSSI.
Blasting Contractor (Jan de Nul)	TBC	Produce Blasting plan Undertake Test Blast
Ground Investigation Contractor	TBC	Follow SSSI Mitigation

16.1.2.1 Cross-Referencing

The Nigg Bay SSSI plan should be read in conjunction with the following CEMDs:

- Construction Method Statement;
- Pollution Prevention Plan; and
- Piling Management Plan.

16.1.3 Description

The Nigg Bay SSSI was first designated in 1984 and covers an area of 4.72 hectares (ha). The Nigg Bay SSSI consists of the exposed cliff face as well as the foreshore as pictured in Appendix A, NBY-ARP-ZZ-XX-DR-CG-0809. The Nigg Bay SSSI is designated for its geological features and is described as follows:

Nigg Bay is a classic locality for Quaternary stratigraphy in north-east Scotland. The sequence of deposits at Nigg Bay represents several glacial events, and the sediments record at least two glaciations. The exposed section at Nigg Bay shows six distinct horizons, *"including two tills, a layer of "morainic" gravels and a basal layer of sand and gravel containing Scandinavian erratics. There has been considerable debate about the number of ice advances represented by these deposits. Currently, all the deposits are believed to relate to the Late Devensian (last) glaciation (circa 33 000-15 000 years ago), except the basal sand and gravel. The latter was probably deposited during an earlier glacial event. Since the late 19th century, the Nigg Bay section has been recognised as a key reference site for interpreting the glacial history and ice movement patterns in north-east Scotland. Moreover, it illustrates particularly well the complexity of deposits which may be produced during a single glacial episode."*[2]

The exposed slope face, within the designated SSSI area is currently over-steep. Localised historical slope failures are evident across the slope face, and associated debris is present at the toe of the slope. It is considered that the slope face is

[2] SNH (2011), Nigg Bay Site of Special Scientific Interest Citation.

currently undergoing a progressive failure through natural weathering, and will continue to do so until the slope achieves its natural angle of stability.

16.1.4 Information Sources

The following sources of information have been reviewed to inform this document:

- SNH, (2011) Nigg Bay Site of Special Scientific Interest Citation[3]
- SNH (2011) Nigg Bay Site of Special Scientific Interest Site Management Statement
- SNH (2011) Nigg Bay Site of Special Scientific Interest, Operations Requiring Consent from Scottish National Heritage
- Earth Science Documentation Series, Nigg Bay Site of Special Scientific Interest, December 1992

[3] All documentation relating to the features of interest, management and operations requiring consent at Nigg Bay SSSI can be found at https://gateway.snh.gov.uk/sitelink/siteinfo.jsp?pa_code=1224 Accessed: 23/02/2017

16.2 Legislation

16.2.1 Operations Requiring Consent

Operations requiring consent (ORCs) are those activities that SNH believe could damage the natural features of a SSSI, and for which SNH are responsible for giving consent. If you propose to carry out, or permit to be carried out, any of the operations listed in Table 16.2 consent must first be obtained from SNH. Any works, whether within or outwith the SSSI boundary, that have the potential to damage a SSSI, require consent from SNH. SNH may refuse consent to prevent an activity taking place if they believe it could damage the natural features of the SSSI. Consents are issued under the Nature Conservation (Scotland) Act 2004[4].

Since 1981, SNH has refused only a small number of consents. Where there is perceived risk of damage to the natural features of a SSSI, SNH will usually agree that an operation can be acceptable if carried out in a particular way or confined to a certain area or season. In such situations, conditional consent will be granted[5].

Acting without consent or intentionally or recklessly damaging a SSSI's natural feature, constitutes a criminal offence.

A list of operations requiring consent by SNH[6] at Nigg Bay, has been provided by SNH and is summarised in Table 16.2. Those operations in **bold** have the potential to occur as part of the AHEP.

Table 16.2: SNH list of operations requiring consent

Standard reference number	Type of operation
7	Dumping, spreading or discharging or any materials.
19	**Erection of sea defences or coast protection measures, including cliff or landslip drainage or stabilisation measures.**
20	Extraction of minerals including sands and gravels.
21	**Construction, removal or destruction of roads, tracks, walls, fences, hardstands, banks, ditches or other earthworks, or the laying, maintenance or removal of pipelines and cables, above or below ground.**
22	**Storage of materials within any part of the site.**
23	The undertaking of engineering works, including drilling.
24	Modification of natural features by battering, buttressing or grading cliff face.

[4] SNH (2016). SSSI Management and Protection. http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/national-designations/sssis/sssi-management/. Accessed 09/02/2017.
[5] SNH. Sites of Special Scientific Interest: Operations within SSSIs. http://www.snh.org.uk/pdfs/publications/designatedareas/sssi.pdf. Accessed09/02/2017.
[6] SNH (2011), Nigg Bay Site of Special Scientific Interest: Operations Requiring Consent from Scottish Natural Heritage.

16.3 Proposed Construction Works Near the SSSI

The proposed sequence of construction is detailed within the Construction Method Statement provided within the CEMD.

The proposed construction works within the vicinity of the SSSI include

- Intrusive ground investigation works near to the top of the SSSI slope
- Pre-construction, construction and reinstatement of the temporary haul road at/near toe of the SSSI slope
- Pre-construction and construction of the new cycle path adjacent to the top of the slope within the SSSI
- Pre-construction, construction and reinstatement of Southern Compound area (Greg Ness headland), including offices, laboratory and storage areas
- Blasting in the vicinity of the SSSI, relating to the formation of the toe trench to form the revetment, dredging works to deepen the bay locally and re-profiling works along the southern headland slopes
- Piling of the open deck section of the west quay, using a rotary bored pile type

Figure NBY-ARP-ZZ-XX-DR-CG-0809 in Appendix A identifies the location of the proposed construction works in relation to the SSSI.

Consent relating to the borehole positions near the SSSI, will be applied for from SNH if necessary, in advance of ground investigation works commencing at these locations. If consent is not granted then the borehole positions will be cancelled.

In addition, consent for the haul road at the base of the cliff will be applied for two months prior to haul road construction works commencing.

16.3.1 Intrusive Ground Investigation Works

Additional intrusive ground investigation works are proposed along the top of the slope adjacent to the SSSI to investigate the sequence and engineering properties of the strata within the slope. The proposed drilling works in the vicinity of the SSSI include for sinking six cable percussive boreholes with rotary continuation.

Boreholes will be located at least 5m from the top of the slope to provide a safe working area during drilling works.

It should be noted that none of the proposed exploratory holes are located within the SSSI boundary. Reference should be made to drawing NBY-ARP-ZZ-XX-DR-0812 in Appendix A, which shows the location of the proposed boreholes in the vicinity of the SSSI boundary.

Subject to consent from SNH, all samples and data from the boreholes in the vicinity of the SSSI will be retained for SNH and quaternary researchers to access.

16.3.2 Temporary Haul Road at Toe of SSSI Slope

A temporary haul road is required to provide access to the drilling and blasting works within the southern area of the inner basin and the entrance basin.

The proposed route runs from north west to south east through the SSSI area. Initially, from the road, the haul road passes across the flat area at the toe of the SSSI slope, for approximately 90m, after which the haul road shall pass over the foreshore area beyond the flat area at the toe of the SSSI slope. At no point does the route of the haul road encroach upon the slope within the SSSI.

Reference should be made to drawing AHEP-DRA-SKE-048 in Appendix A which shows the route of the haul road in relation to the SSSI boundary.

The haul road is closest to the SSSI slope at chainage 250. A cross section of the haul road at this location during the dredging works is shown in Figure 16.1 below.

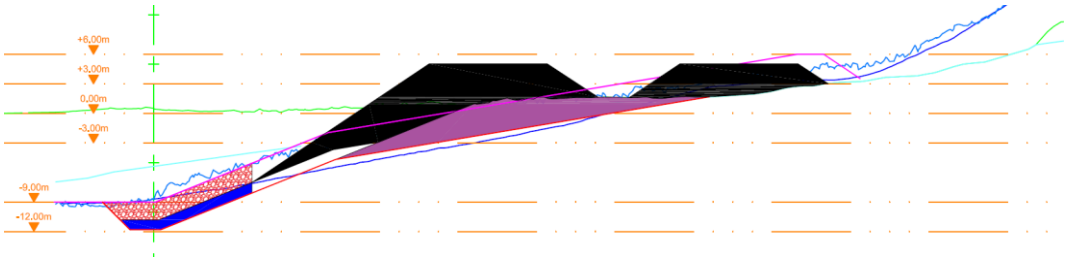


Figure 16.1: Chainage 250 Cross Section

As shown in Figure 16.1, the haul road will be constructed upon an embankment. Therefore, no excavation within the SSSI will be necessary. The embankment will be constructed using site won granular fill, compliant with core material of 0-500kg size. This material will be porous to allow run-off from the SSSI slope to drain freely through the embankment and therefore avoid the accumulation of water between the haul road embankment and the SSSI slope.

During construction works the Environmental Clerk of Work (ECoW) will be responsible for inspecting the SSSI slope for any adverse changes and also inspect drainage measures to ensure they are operating effectively.

16.3.3 Cycle Path

It is proposed that a cycle path will be constructed adjacent to the top of the SSSI slope. The route will initially be a temporary route during construction but will be incorporated into the permanent works at the end of the construction period.

The proposed cycle path route is shown on drawing NBY-ARP-ZZ-XX-DR-0812 in Appendix A. In general the path is outwith the SSSI boundary, with the exception of a small length of cycle path, that encroaches into the north west corner of the SSSI.

No excavation is proposed for the construction of the cycle path. The cycle path will tie into the existing coast road carriageway and slope at 2.5% away from the

SSSI, so that any surface water flows onto the existing carriageway and is collected by the road drainage network.

A 0.50m wide landscape strip is proposed along the edge of the cycle path nearest to the SSSI, which will soften the transition between the edge of the cycle path and the top of the slope, while also providing cover to the top of the slope to help prevent further weathering. The landscaping strip will be in the order of 150mm thick.

Reference should be made to NBY-ARP-ZZ-XX-DR-CH-1004 in Appendix A for further details regarding the cycle path alignment and construction details.

16.3.4 Southern Compound Area

The Southern Compound area and associated access roads are located on the southern headland, immediately to the east of the Coast Road. It is proposed that the southern compound area will include roofed structures, hardstanding areas, and associated access roads and car parking facilities.

The boundary of the compound area is defined by a new 2.4m high steel mesh fence. Fence posts will be at approximately 10m intervals along the fenceline, as shown on Drawing DRA-T-SOC-TW0001-DWG-000002-000 and 001 in Appendix A.

The fenceline is located approximately 10m south of the SSSI boundary, at its closest point.

Within the Southern Compound area access routes run from the south west, across the southern edge of the compound area, and along the eastern boundary before exiting the compound area in it north west corner. Traffic flow through the Southern Compound area is controlled such that access is restricted to the south west gate only and egress is via the north west gate only.

The access roads within the Southern Compound area will be used by HGV, LGV and cars. The Southern Compound Highways Layout can be seen in drawings DRA-T-SOC-TW0001-DWG-010000-000 and 001

The access roads are located within the fenceline, approximately 20m from the SSSI boundary at its closest point. All car parking areas and associated earthworks are also within the fenceline, located approximately 13m from the SSSI boundary.

Reference should be made to drawings, DRA-T-SOC-TW0001-DWG-000000-000 and DRA-T-SOC-TW0001-DWG-000001-000 in Appendix A for details of the Southern Compound layout plan.

The proposed buildings will be founded within the existing natural soils beneath the area.

During the construction of the Southern Compound area drainage will be installed. This will include a swale filter trench along the northern edge of the compound area, between the hardstanding area and the boundary fenceline. This

will gather run-off from the compound area and discharge to the sea, adjacent to the Southern Breakwater.

Reference should be made to the drainage layout and drainage detail drawings in Appendix A DRA-T-SOC-TW0001-DWG-050001-000 and 001, as well as DRA-T-SOC-TW0001-DWG-050002-000 and 001 for further details.

16.3.5 Blasting Works

Drilling and blasting of rock will be carried out across two regions, as detailed in Table 16.3;

Table 16.3 - Summary of Blasting Works

Drilling and Blasting Location	Approximate Distance from SSSI (m)
North area	300
South area	0

Drilling and blasting operations will be carried out from onshore and over water. The field of blasting typically comprises 40 to 80 holes, and the drilling pattern is chosen in such a way to ensure there is an open face on one side, so that rock can freely expand sideways during blasting.

Drill holes will be sunk using rotary bored methods to the design depth, an igniter/starter is placed at the bottom of the hole and the explosive is pumped into the hole. The holes are typically charged using approximately 1kg of explosive per cubic metre of rock.

The field is immediately blasted upon its completion, so it is anticipated that blasting will take place every day or every second day, unless the platform switches to dredging.

Rock characteristics are likely to be different in each blasting field, and this will influence the magnitude of vibrations generated during blasting works. Impact of vibrations will also be dependent on the distance from the blast.

Prior to blasting, the immediate vicinity of the blasting area will be subject to a photographic survey with particular care taken to capture details of the SSSI. One or more vibration meters (dependent on client/authority requirements) will be installed close to the SSSI by the blasting contractor to measure the vibration and acceleration during the blasting works.

A blasting plan will be provided prior to commencement of the blasting works, which will contain the limits set for vibration and thus for the characteristics of the blast (hole spacing, charge per hole, etc.).

The first number of blasts are executed with reduced loads and are used to calculate the optimum blasting parameters. This procedure has to be followed to ensure the vibration limits are not exceeded.

For further information regarding the blasting works, reference should be made to the Dredging Works Method Statement[7].

16.3.6 Rotary Piling Works

It is proposed that the western quay and part of the northern quay shall be constructed using a piled open deck section. The pile will be a rotary pile type, and no impact piling techniques are proposed.

The piling works will be land based and include the formation of 96 piles, terminated at a deepest level of -42mOD. It is envisaged that the piling works will include 2456.1m of drilling within soil and 257.5m of drilling in rock. It is estimated that drilling works will take 2 days per pile on average.

The nearest pile is located approximately 15m north of the SSSI redline boundary, and the furthest pile is located 380m to the north of the SSSI.

It is envisaged that drilling within soil will not generate significant vibration. Drilling within rock will generate vibration, however the selection of a bored piling method will significantly reduce the magnitude of vibrations generated in comparison to the previously envisaged driven method.

Any vibrations generated from the piling works will quickly dissipate laterally through the rock. Based on the estimated piling rate, it is considered that vibrations will only be generated over a relatively short period of time.

Furthermore, given the nearest pile is located 15m from the boundary of the SSSI, it is envisaged that the vibrations generated during the works will be no greater than the vibrations generated by HGVs currently traveling along the Coast Road immediately to the south and west of the SSSI.

Further descriptions of piling can be found in the Piling Management Plan.

[7] Jan De Nul NV, Method Statement – Dredging Works, Aberdeen Harbour Expansion Project, Revision 1, 26 August 2016

16.4 Potential Risks to SSSI

Given the proposed development and the construction programme detailed in Section 16.3, the following potential risks to the SSSI have been identified.

1. Vibration:
    - Ground Investigation Drilling Works
    - Construction and Reinstatement Works in the Southern Compound Area
    - Construction works associated with the cycle path
    - Plant Movements
    - Blasting Works
    - Piling Works
2. Surface Water Run-Off:
    - Run-off from haul road
    - Run-off from the cycle path
    - Run-off from Southern Compound
    - Redirection of existing groundwater flow as a result of new haul road and Southern Compound area
3. Global Slope Stability:
    - Increase load at top of slope due to , cycle path, haul road and compound area
    - Reduction in passive resistance at toe of slope during construction of revetment
    - Increase load at top of slope due to uncontrolled vehicle parking
4. Contamination:
    - Fuel spillages and leaks
    - Migration of contamination via surface water run-off

16.5 Engineering Risk Assessment

The following engineering risk assessment provides an assessment of the probability of the risks identified in Section 16.4, occurring, given the proposed construction works discussed in Section 16.3. The assessment also considers the existing site conditions, including the current condition of the SSSI, topography and existing road and drainage networks.

When considering the potential risk to the SSSI, it is important to note that the existing exposed slope face is currently oversteep. There is clear evidence of historical slope failures, and the slope will continue to slip progressively until it achieves a natural stable slope angle. This will continue to occur through natural erosion as well as from continued disturbance from currently existing infrastructure in the surrounding area.

Table 16.4: Engineering Risk Assessment

Risk Item	Details	Risk Assessment	Mitigation Measures Required? (Y/N)
Vibration	Vibration caused by construction works, vehicle movements, blasting works and piling works, may cause excessive vibration which could result in material falling off the exposed slope face.	**Ground Investigation** Ground investigation works are proposed along the top of the SSSI slope, and located at least 5m back from the top of the slope. It is envisaged that cable percussive drilling will progress at a rate of 5-10m per day depending on ground conditions encountered. Vibrations will be localised to the bottom of the drill hole while drilling through the superficial soils, and therefore it is unlikely that vibrations from the drilling works within the superficial soils will impact the SSSI slope. Similarly, rotary drilling within the bedrock will result in vibrations being localised to the bottom of the drill hole, which will be below the toe the SSSI slope given the depth to rockhead. Therefore, it is unlikely that vibrations from the rotary drilling works will impact the exposed slope face within the SSSI. It should also be noted that ground investigation plant will not track within 5m of the top of the slope, to minimise the potential impact of slope instability due to vibrations from plant movement. It is noteworthy that the majority of the proposed ground investigation locations are no closer to the edge of the SSSI boundary than the existing Coast Road in places, therefore the ground investigation works are unlikely to expose the slope to vibrations any worse than those current experienced due to passing traffic along the existing Coast Road. **Pre - Construction** Nearest rotary piling operation is at the southern edge of the West Quay, which is 15m from the SSSI site boundary. Therefore it is considered highly unlikely that vibrations from piling operations will impact the SSSI. Piling works will be carried out using a rotary bored pile type, which is a low vibration method of pile installation. It is envisaged that pile drilling works will progress at a rate of	N N Y N

Risk Item	Details	Risk Assessment	Mitigation Measures Required? (Y/N)
		approximately 1 pile per 2 days, therefore it is unlikely that any vibrations in the vicinity of the SSSI will be over a prolonged period of time. Given the method of pile installation selected, the distance of the nearest pile from the SSSI and the duration of drilling, it is unlikely that vibrations from the piling works will impact the exposed slope face within the SSSI. During construction of the haul roads at the bottom of the SSSI, and the Southern Compound area, plant machinery may need to operate near to the SSSI in order to construct the roads and southern compound area. The haul road at the toe of the exposed slope in the SSSI will be built across the fill material that has been placed across the toe of the slope to protect it. Outwith the SSSI the haul road will be built upon granular embankment fill. The proposed haul road within the SSSI is further from the exposed slope face than the existing Coast Road. However, it is envisaged that the number and frequency of plant on the haul road (estimated to be 68 25T trucks per day, 6 days a week over a 14 month period) is more onerous than the traffic loading currently on the Coast Road. That being said the haul road is constructed upon an embankment which will dissipate the traffic vibrations and loading. Furthermore, the haul road embankment is set back from the toe of the SSSI slope and is not in direct contact with the slope, therefore it is unlikely that vibrations from the haul road will impact the SSSI slope. The Southern Compound area is located at least 10m from the SSSI boundary, with car parking areas and access roads within the compound located 13m and 20m from the SSSI. Given the dense nature of the underlying deposits it is considered that the vibrations from vehicle movements within the compound area will be dissipated by the compound construction and underlying natural soils, so as to pose a negligible risk to the SSSI slope. A new cycle path is to be constructed along the edge of the existing coast road. The cycle path passes locally within the SSSI area, but is located approximately 20m back from the top of the SSSI slope. No excavation works are proposed as part of the construction works for the cycle path, and the cycle path construction is relatively thin. On the basis of the limited construction works and distance	N Y Table 16.5, Reference Number 1 N

Risk Item	Details	Risk Assessment	Mitigation Measures Required? (Y/N)
		from the top of the SSSI slope it is considered that vibrations from the construction works will be low and will dissipate sufficiently so they do not influence the stability of the SSSI slope. It is recommended that demarcation is provided to stop vehicles (both public and construction plant) from parking or crossing between the SSSI and the southern compound area, cycle path, or across the verges along the top of the SSSI. Blasting works are proposed in two locations, firstly at the toe of the southern slopes in order to excavate a trench to construct the revetment, and secondly within the bay area to remove rock so that the required depth of water within the harbour can be achieved. The blasting works are likely to be approximately 20m from the exposed slope face, although still within the SSSI. The blasting will typically be undertaken by a charge within a blast borehole. The borehole is plugged ("stemmed") to prevent the loss of explosives energy from blowouts. The plug will contain the blast energy at the toe of the borehole. Adjacent boreholes will be triggered with a small incremental time delay to reduce the overall impact of the blast. It is not envisaged that significant vibrations will occur at the location of the exposed slope face, following the adoption of the control measures by the blasting Contractor, which will be determined following initial blast trials. The blasting trials will determine optimum blasting parameters and ensure that vibration limits are not exceeded. The vibration limits are to be agreed with the client/authority prior to commencement of works, and will be detailed within the blasting plan, which will be prepared by the blasting contractor. **Construction** The haul road and Southern Compound area are not located any closer to the exposed slope face within the SSSI than the existing Coast Road. Therefore, it is considered that vibrations as a result of day to day operations within the compound will not be greater than level of vibration currently imposed on the exposed slope face by the existing Coast Road. Therefore, no mitigation is required.	Y Y (Refer to pre-construction phase) Y (Refer to pre-construction phase) N

Risk Item	Details	Risk Assessment	Mitigation Measures Required? (Y/N)
		The use of the cycle path will be limited to bicycles and pedestrians. Therefore, negligible vibrations will be generated along the cycle path during the construction works. Demarcation set up during the pre-construction phase should remain in place during the construction phase. **Reinstatement** During reinstatement, all material used to construct the temporary haul road will be removed and reused elsewhere on site, within the construction works. The fill material will be removed using land based mechanical excavators, which will the fill material onto a dumper truck that will transport the material to the location of its proposed use. Therefore the risks to the SSSI and appropriate control measures are the same at those identified during the pre-construction phase.	
Water Movement	Construction of new haul roads and Southern compound area may generate additional volumes of surface water run-off, and/or interfere with the existing groundwater flow regime. Additional water movement across the face of the exposed SSSI slope, may damage the SSSI by washing material	**Pre – Construction** During construction of the Southern Compound area, swale filter drains will be installed along the northern edge of the Southern Compound area, which will collect any surface water run-off from the compound area. The collected run-off will then flow eastwards, away from the SSSI, before being discharged into the sea. Dragados shall be responsible for carrying out regular inspections to ensure drainage remains effective and operations for the life of the construction period. The proposed haul road will be build using site won granular fill, complying with Class core material (0-500kg) size material, that will sufficiently porous to ensure no run off accumulates between the haul road embankment and the SSSI slope. The construction works associated with the cycle path are limited and during construction it is unlikely that the associated works will result in an increase in surface water flow, therefore no mitigation measures are proposed.	Y Table 16.5, Reference Number 3 N N

Risk Item	Details	Risk Assessment	Mitigation Measures Required? (Y/N)
	away from its surface. Significant loss of material from the slope face could result in a global slope failure.	**Construction** Drainage within the haul road and Southern Compound area shall be sufficient to capture surface water run-off, and ensure it will not impact the exposed slope face within the SSSI. Surface water run-off from the cycle path will drain onto the existing coast road, and be collected by the road drainage. Therefore, there is no impact to the SSSI. **Reinstatement** During reinstatement, the site will be left such that the run-off regime is equivalent or preferable to current conditions.	N N
Slope Stability	Additional loading at the top of the slope due to the new haul road, traffic movements, and parked vehicles, may increase active pressures within the slope resulting in slope failure. Similarly, excavation of soil and rock from the toe of the slope may reduce passive pressure, which can also result in slope failure.	**Ground Investigation Works** Ground investigation plant will be a minimum of 5m from the top of the slope to allow a safe working area when drilling. Demarcation will be required locally to minimise the risk of plant passing within 5m of the top of the slope. **Pre - Construction** During construction of the haul road and cycle path construction plant machinery may require to move within the vicinity of the top of the slope. Demarcation will be required locally to minimise the risk of plant machinery and public vehicles moving near to the top of the slope. The establishment of a barrier around the edge of the road and the compound areas will also stop vehicles and other plant parking at the top of the slope during the construction works. **Construction** The finished road level of the operational haul road is typically at grade and is located 15m from the top of the slope to be protected at its closest point. Therefore, it is unlikely that the haul road or	Y Table 16.5, Reference Number 5 Y Table 16.5, Reference Number 6 Y

Risk Item	Details	Risk Assessment	Mitigation Measures Required? (Y/N)
		vehicles travelling along the haul road will have an adverse impact on the slope stability. It is advisable that the wayleaves established during the construction period remain in place to stop vehicles parking off the haul road, near the top of the slope to be protected. Use of the cycle path will be limited to bicycles and pedestrians. The construction thickness of the cycle way is thin, therefore the additional load from the cycle path will be negligible, and is therefore unlikely to impact the slope stability within the SSSI **Reinstatement** During reinstatement works the risks in relation to the slope stability of the SSSI are considered to be the same as during construction. Reference should be made to the risk assessment during construction phase.	Table 16.5, Reference Number 6 N Y (refer to construction phase)
Contamination	Potential impact on SSSI as a result of fuel spillages and leaks, and potential for contaminants associated with the works within the Southern Compound area and cycle path to migrate towards the SSSI. This may result in damage to the SSSI and discolouration on the slope face.	**Ground Investigation** Fuel and hydraulic fluid leaks will be managed under the ground investigation contractors risk assessment and method statement. Plant will be inspected daily to ensure it is fit for purpose and to check for leaks. Spill kits will be carried by all plant during the ground investigation works **Pre - Construction** Fuel spillages and leaks will be managed under the pollution prevention plan. Given that the general topography falls towards the north east it is unlikely that any spillages or leaks will impact the SSSI. However, isolated spillages or leaks in the immediate vicinity of the SSSI may also occur. Spill kits should be carried by plant while on site and plant refuelling should only be carried out within designated areas within the compound areas. This is further outlined within the Pollution Prevention Plan (PPP). **Construction**	Y Table 16.5, Reference Number 7 Y Table 16.5, Reference Number 7 Y

Risk Item	Details	Risk Assessment	Mitigation Measures Required? (Y/N)
		Fuel and chemical storage within the Southern Compound area will be within agreed bunded areas. Fuelling areas are to be designated by the Contractor, and detailed within the PPP. **Reinstatement** During reinstatement the associated risks are considered to be identical to those considered during the construction phase. Reference should be made to the mitigation measures provided during the construction phase.	Table 16.5, Reference Number 8 Y (refer to construction phase)

16.6 Mitigation Measures

16.6.1 Objectives for management

SNH wish to work with owners and users to protect and maintain the site, and where possible, enhance its features of special interest. The management objectives of the Nigg Bay SSSI are:

1. **To maintain the visibility of exposures:** vegetation growth has obscured some of the exposures. However, vegetation stabilises the slope and is relatively easy to clear. It is thus recommended by SNH that vegetation is only removed if suitable research projects arise.

2. **To maintain access to the site and to the exposures.**

16.6.2 Historical management

In 1984, tipping of rubble, concrete, tarmacadam, cassies, paving slabs and unknown waste was carried out to protect the bottom of the cliff from coastal erosion. This created a platform along the entire extent of the cliffs, halted erosion and obscured the lower sediment layers. By halting erosion, vegetation growth was promoted on the cliff face which further covered the deposits[3].

In 1999, a report managing coastal erosion in Aberdeen Bay was produced and recommended that Nigg Bay should be left to allow coastal processed to continue, allowing SSSI deposits to become re-exposed in the longer term. This recommendation was to be reviewed at regular intervals with a view of monitoring any lowering of the foreshore in front of the retained road and car park. In 2010, an inspection confirmed that that coastal erosion was breaking down the platform and it was considered likely that the southern section of the SSSI would be re-exposed within a few years[3].

In 2002, a series of vegetation ‘windows’ were cleared on the cliff face to expose samples of the deposits. Some sediments remain visible but some slumping and regrowth of vegetation has occurred[3].

16.6.3 Current management

There is currently little or no active management of the SSSI and public use tends to be confined to occasional bonfires and motorbike scrambling. Illegal tipping has been a problem in the past but has ceased in recent years[3].

The University of Aberdeen has used Nigg Bay, however, leachate from the nearby landfill site is believed to be detracting from the use of the site as an educational resource[3].

The SSSI is part of the Balnagask to Cove Local Nature Conservation Site for its botanical and bird interest and a local Biodiversity Action Plan has been prepared for the whole Nigg area. An interpretation panel including information about the SSSI has been placed in the car park to the north of Nigg Bay[3].

16.6.4 Mitigation Measures During Harbour Development Works

Based on the proposed development works and associated risk assessment, the mitigation measures outlined in Table 16.5 are recommended. These should ensure the slope within the SSSI is protected from impacts resulting from AHEP.

Table 16.5: Recommended mitigation measures

Reference Number	Risk	Operation	Phase	Timescales	Mitigation	Responsible Person/Party
1	Vibration	Construction Plant Movements	Construction & Reinstatement	From pre-construction works (April 2017) for the duration of works	Demarcation of areas to restrict construction plant movements in the vicinity of the slope	Construction Manager ECoW
2	Vibration	Blasting	Construction	Prior to commencement of blasting (June 2017)	Blasting contractor to carry out blasting trial to demonstrate blast energy and show that the slope is unaffected.	Construction Manager/ Blasting Contractor/ Environmental Manager
3	Water Movement	Surface water run-off	Construction & Reinstatement	Installed during pre-construction work (April 2017) and checked throughout the duration of works.	Drainage ditches and /or collection drains to be installed locally to carry water away from the SSSI. Weekly inspections required to ensure drainage remains effective and operates for the life of the construction period. Increased inspections to daily during periods of heavy and sustained wet weather.	Construction Manager ECoW
4	Water Movement	Surface Water run-off	Operation	Installed during pre-construction work (April 2017) and checked throughout the duration of works.	Drainage within the haul road and Southern Compound area will be adequate to capture surface water run-off.	Construction Manager

Reference Number	Risk	Operation	Phase	Timescales	Mitigation	Responsible Person/Party
5	Slope Stability	Plant movements at top of the slope	Ground Investigation	From pre-construction works (April 2017) for the duration of works	Demarcation of areas to restrict ground investigation plant movements in the vicinity of the slope	Ground Investigation Contractor/Construction Manager
6	Slope Stability	Plant movements at the top of the slope	Construction, Operation & Reinstatement	From pre-construction works (April 2017) for the duration of works	Demarcation of areas to restrict construction plant movements in the vicinity of the slope	Construction Manager
7	Contamination	Chemical spillages and leaks	Construction & Reinstatement	From initiation of construction works (April 2017) for the duration of works	Spill kits to be carried by site plant. Refuelling only to be carried out in agreed areas, as set out in the Pollution Prevention Plan	Health and Safety Manager
8	Contamination	Chemical spillages and leaks	Operation	From initiation of construction works (April 2017) for the duration of works	Fuel and chemical storage to be within bunded areas in the Southern Compound area, in accordance with the Pollution Prevention Plan.	Health and Safety Manager

In addition to the above, it is recommended that weekly tool box talks are carried out on site to highlight the risks detailed above and recommended mitigation measures. These will be given by the ECoW.

Discussion will also be held with SNH on whether, when machinery is on site for construction purposes, any additional works could be completed at the SSSI to enhance the SSSI management, such as clearing of an area of the face to better expose the geological feature. SNH will be contacted near the end of the operational stage of the temporary haul road to discuss any consents required to undertake this work as well as methodology for the removal of vegetation including the removal of any non-native invasive species if found to be present.

16.7 Conclusion

Based on the information detailed within this document, it is evident that some of the proposed construction works associated with the Aberdeen Harbour Expansion Project, will be within the SSSI area or within influence of the SSSI.

However, it is important to note that the area of particular concern within the SSSI is the exposed slope face, which is currently in an unstable conditions as it is over steep, and will continue to progressively fail naturally until the slope achieves its natural angle of stability.

The majority of the proposed construction works will not result in exposing the SSSI to conditions any worse than it is exposed to currently. The proposed construction works on and within influence of the SSSI have been assessed in relation to;

- Method of construction, and where possible timescales
- Existing site conditions
- Proposed layouts
- Proposed engineering measures already incorporated within the works

The potential risk to the SSSI was assessed over the duration of the construction works, and spilt into pre-construction, construction and reinstatement phases.

Overall, the majority of the proposed construction works were considered not to have an impact on the SSSI, however where an aspect of the proposed works was assessed to present a potential risk to the SSSI, mitigation measures have been recommended, and include;

- Control of vibrations during blasting through blasting trials, and agreement of vibration levels with the client/authority
- Demarcation of zones near at the top of the SSSI near the Coast Road
- Incorporation and maintenance of drainage within haul roads and Southern Compound area to control surface water run-off
- Establishment of refuelling zones within the compound areas and management of potential contamination incidents in accordance with the Pollution Prevention Plan

The implementation and management of these mitigation measures will ensure that the proposed construction works will have a negligible impact on the SSSI.

If the proposed construction works vary from what is described within this report, the CEMP will require to be revisited and impacts to the SSSI reassessed to ensure no further mitigation measures are required.

Appendix A

Drawings

A1 Drawings

NOTES:

KEY:
- SITE COMPOUND FENCE
- EXISTING PUBLIC ROAD
- ROAD DIVERSIONS
- NORTH BREAKWATER ACCESS
- HAUL ROAD
- SSSI BOUNDARY

Rev.	Date	By	Chkd	Appd	Description
0	06.04.17	TWC	ZC	ZC	Haul Road SSSI Overlay

DRAGADOS

Citrus House
Greenbank Road
East Tullos Industrial Estate
Aberdeen
AB12 3BG
Tel: +44 (0) 1224 439980

Client

Aberdeen Harbour

Job Title
Aberdeen Harbour Expansion Project

Haul Road & SSSI Overlay

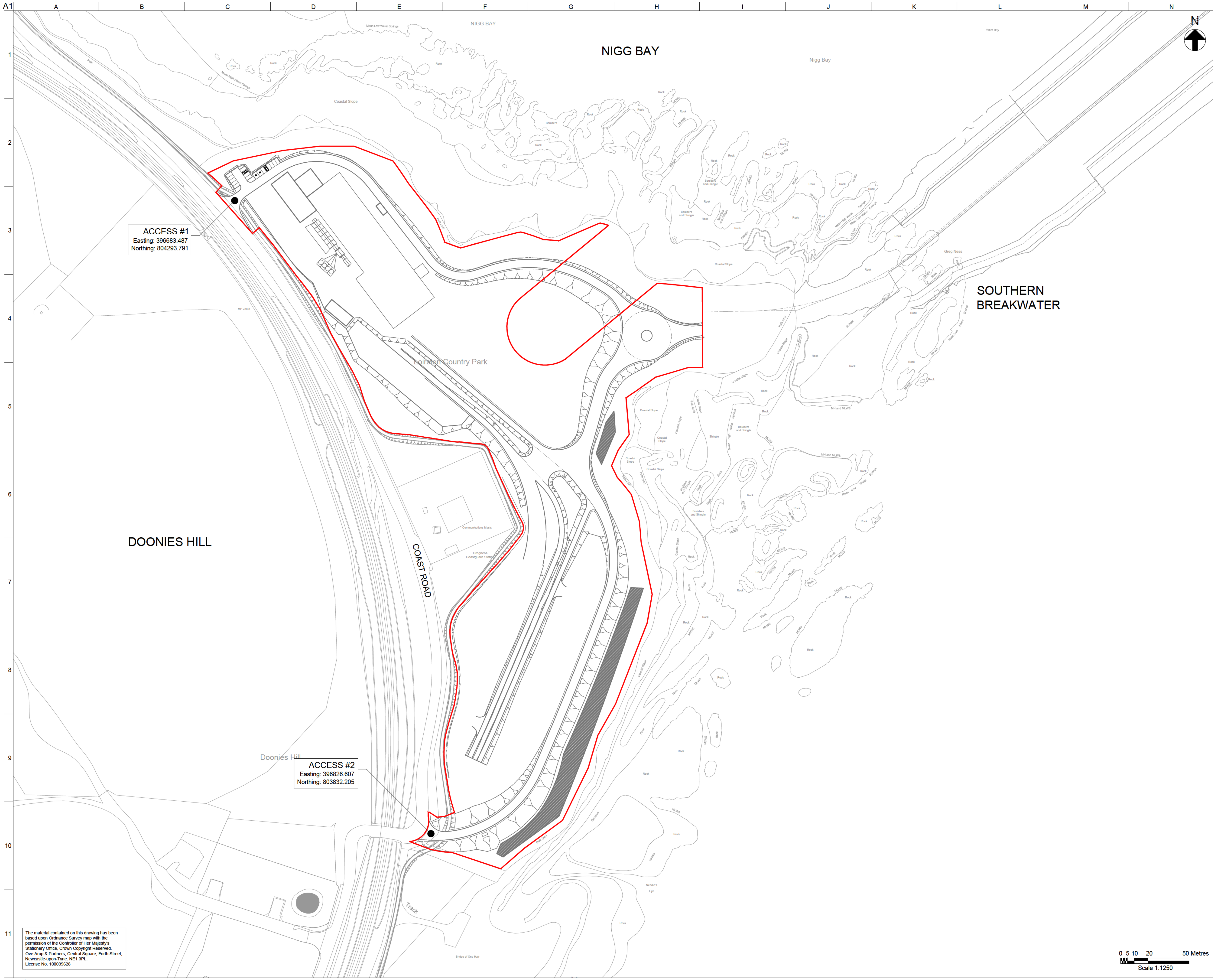
Scale at A1: 1:1000

Discipline: Civil Engineering

Drawing Status

Drawing No: AHEP-DRA-SKE-048

Revision: 00



Do not scale

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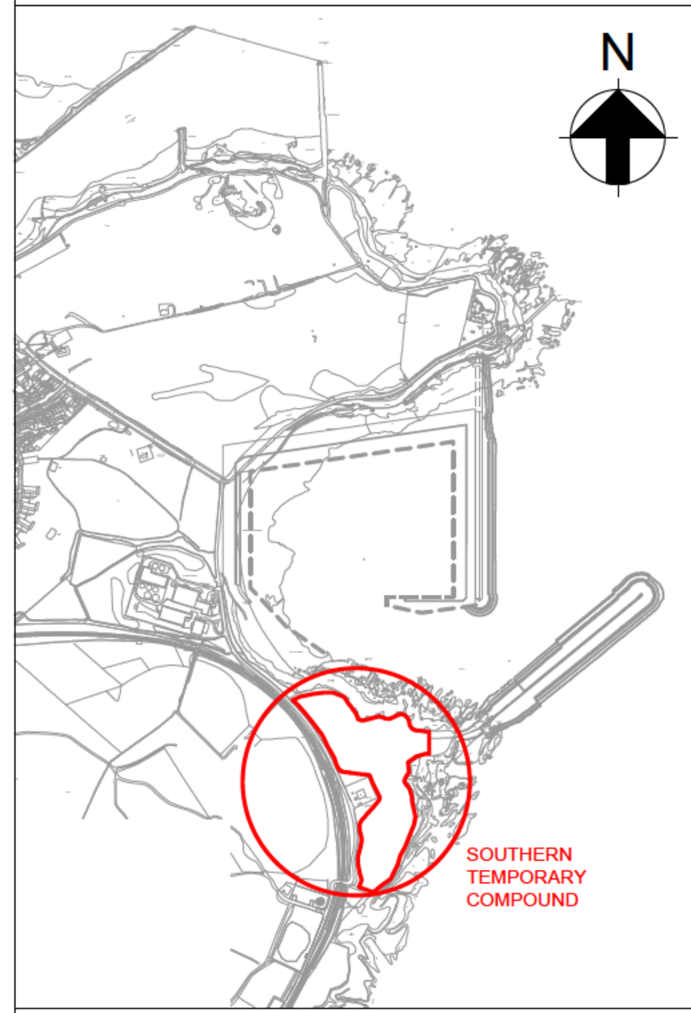
SIGNIFICANT OR EXCEPTIONAL RISKS ARE IDENTIFIED BELOW

(Insert Risks Here)



Key Plan

Legend:

Site Boundary

Issue	Date	By	Chkd	Appd
0	17/02/17	MWM	RF	NL
Issued For Information				

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Client

DRAGADOS

Job Title

Aberdeen Harbour Expansion Project

Drawing Title

Southern Temporary Compound Site Location Plan

Arup Job No	Scale at A1
253300-00	1:1250

Discipline: 00 - General Drawings

Drawing Status: **Issued For Information** — Rev **0**

Drawing No: **DRA-T-SOC-TW0001-DWG-000000-000**

A1

N

NIGG BAY

Nigg Bay

Staff Parking
(17 Spaces)

Welfare
(15m x 15m)

Fabrication Shed
(115m x 38m)

EXIT

Aggregate Storage
(15m x 35m)

Batching Plant
(42m x 22m)

Laboratory
(15m x 15m)

Temporary
Stilling Pond

Topsoil Storage

Topsoil Storage

Balnagask Country Park

COAST ROAD

Doonies Hill

ENTRY

Greg Ness

Gregness
Coastguard Station

Communications Masts

Track

Bridge of One Hair

Needle's Eye

0 5 10 20 50 Metres
Scale 1:1250

Do not scale

HEALTH AND SAFETY INFORMATION

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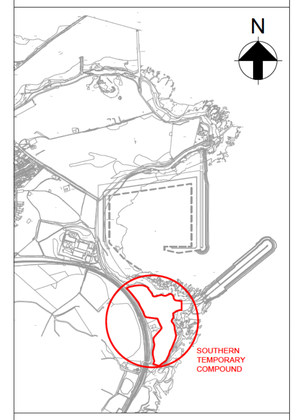
(Insert Risks Here)



Key Plan

Legend:

Site Boundary

Storage Areas
Total = 23350m²

Issue	Date	By	Chkd	Appd
0	17/02/17	MWM	RF	NL
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Job Title
Aberdeen Harbour
Expansion Project

Drawing Title
Southern Temporary Compound
Site Layout Plan

Arup Job No 253300-00
Scale at A1 1:1250
Discipline 00 - General Drawings
Drawing Status **Issued For Information**
Rev **0**
Drawing No **DRA-T-SOC-TW0001-DWG-000001-000**

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A1

EXIT ONLY

MP 238.5

Path (um)

Boulders

Rock

Rock

Rock

Shingle

Coastal Slope

Coastal Slope

Path (um)

Coastal Slope

Coastal Slope

Coastal Slope

Coastal Slope

Coastal Slope

Mean High Water

See drawing DRA-T-SOC-TW0001-DWG-000002-001

0 5 10 20 Metres

Scale 1:500

Do not scale

HEALTH AND SAFETY INFORMATION

SIGNIFICANT OR EXCEPTIONAL RISKS ARE IDENTIFIED BELOW

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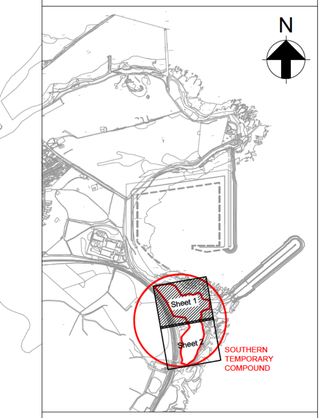

Key Plan

Legend:

2.4m High Steel Mesh Fence

Gate / Site Access

Issue	Date	By	Chkd	Appd
0	17/02/17	MWM	RF	NL

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Job Title

Aberdeen Harbour Expansion Project

Drawing Title

Southern Temporary Compound Boundary Treatment Layout Sheet 1 of 2

Arup Job No	Scale at A1
253300-00	1:500

Discipline: 00 - General Drawings

Drawing Status: **Issued For Information**

Rev: 0

Drawing No: **DRA-T-SOC-TW0001-DWG-000002-000**

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A1

See drawing DRA-T-SOC-TW0001-DWG-010000-000

Communications Masts

Gregness Coastguard Station

Path (um)

Path (um)

Boulders and Shingle

Rock

Boulders and Shingle

Rock

Rock

MHWS

MLWS

Rock

Rock

Rock

Rock

Rock

MHWS

MLWS

Rock

Rock

MLWS

Rock

Rock

MLWS

Rock

Rock

Boulders

Path (um)

MLWS

Rock

ENTRY ONLY

0 5 10 20 Metres

Scale 1:500

N

HEALTH AND SAFETY INFORMATION

SIGNIFICANT OR EXCEPTIONAL RISKS ARE IDENTIFIED BELOW

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N

Sheet 1

Sheet 2

SOUTHERN TEMPORARY COMPOUND

Key Plan

Legend:

2.4m High Steel Mesh Fence

Gate / Site Access

Issue	Date	By	Chkd	Appd
0	17/02/17	MWM	RF	NL

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Job Title

Aberdeen Harbour Expansion Project

Drawing Title

Southern Temporary Compound Boundary Treatment Layout Sheet 2 of 2

Arup Job No	Scale at A1
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Discipline: 00 - General Drawings

Drawing Status: **Issued For Information** | Rev: 0

Drawing No: **DRA-T-SOC-TW0001-DWG-000002-001**

Do not scale

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A1

EXIT ONLY

R10

R10

MP 238.5

Path (um)

Boulders

Rock

Rock

Rock

Shingle

Coastal Slope

Coastal Slope

Path (um)

Coastal Slope

Coastal Slope

Coastal Slope

Coastal Slope

Coastal Slope

Mean High Wat

See drawing DRA-T-SOC-TW0001-DWG-010000-001

0 5 10 20 Metres

Scale 1:500

Do not scale

HEALTH AND SAFETY INFORMATION

SIGNIFICANT OR EXCEPTIONAL RISKS ARE IDENTIFIED BELOW

(Insert Risks Here)

N

Sheet 1

Sheet 2

SOUTHERN TEMPORARY COMPOUND

Key Plan

Notes:

1. Dimensions are in metres unless noted otherwise.
2. All levels are to Admiralty Chart Datum (2.25m above OS datum).

Legend:

- Site Boundary
- Road Edge
- Centreline
- Verge
- Extent of Earthworks

Issue	Date	By	Chkd	Appd
0	17/02/17	MWM	RF	NL
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Job Title

Aberdeen Harbour Expansion Project

Drawing Title

Southern Temporary Compound Highways Layout Sheet 1 of 2

Arup Job No	Scale at A1
253300-00	1:500

Discipline: 01 - Road Geometry

Drawing Status: **Issued For Information**

Rev: 0

Drawing No: **DRA-T-SOC-TW0001-DWG-010000-000**

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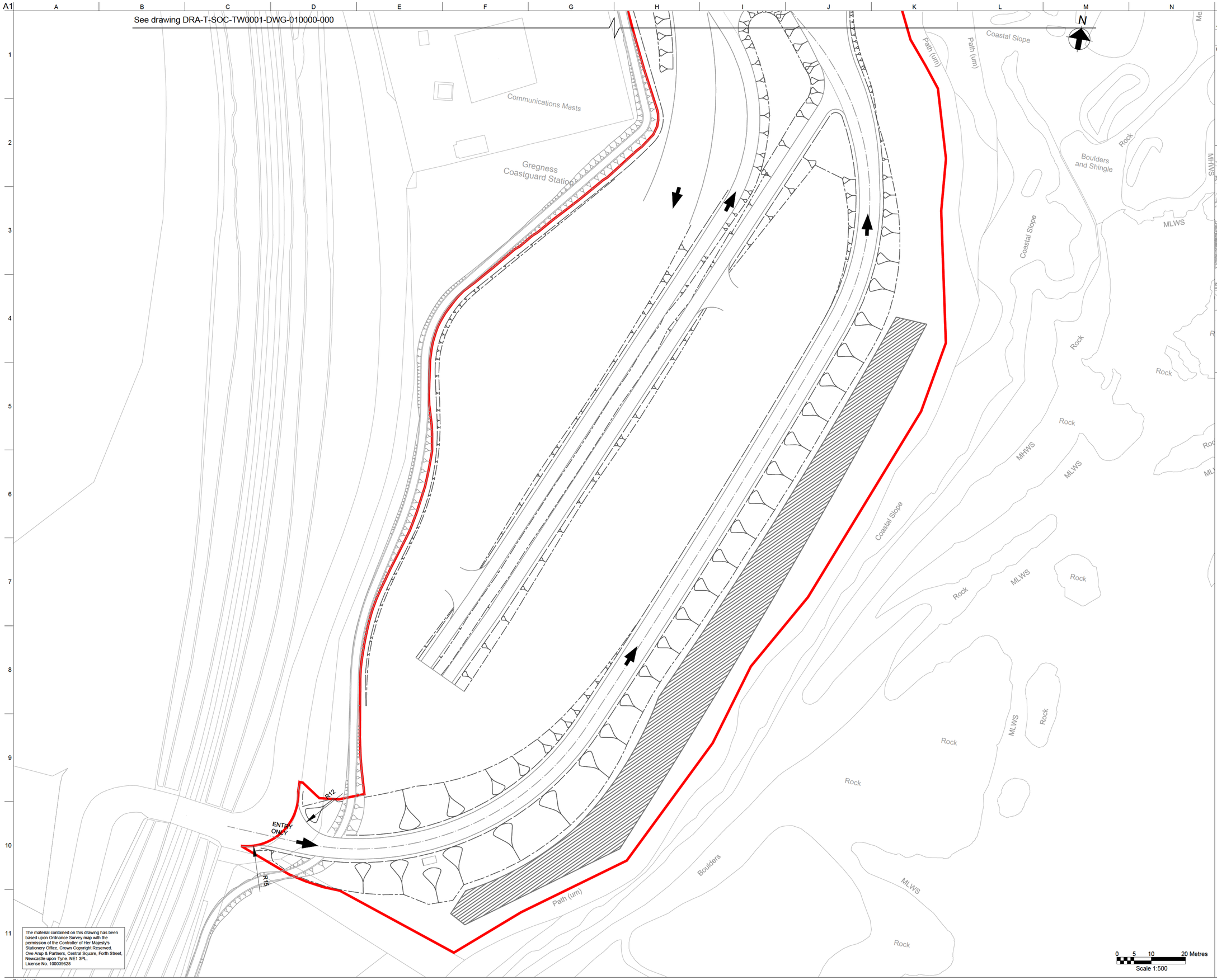
A1

See drawing DRA-T-SOC-TW0001-DWG-010000-000



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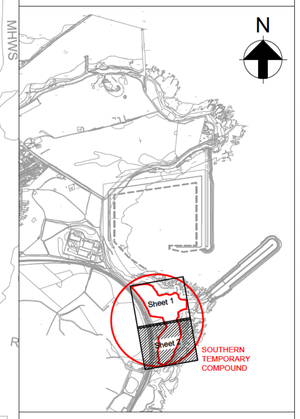

Key Plan

Notes:

1. Dimensions are in metres unless noted otherwise.
2. All levels are to Admiralty Chart Datum (2.25m above OS datum).

Legend:

- Site Boundary
- Road Edge
- Centreline
- Verge
- Extent of Earthworks

Issue	Date	By	Chkd	Appd
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Job Title

Aberdeen Harbour Expansion Project

Drawing Title

Southern Temporary Compound Highways Layout Sheet 2 of 2

Arup Job No	Scale at A1
253300-00	1:500

Discipline: 01 - Road Geometry

Drawing Status	Rev
Issued For Information	0

Drawing No

DRA-T-SOC-TW0001-DWG-010000-001

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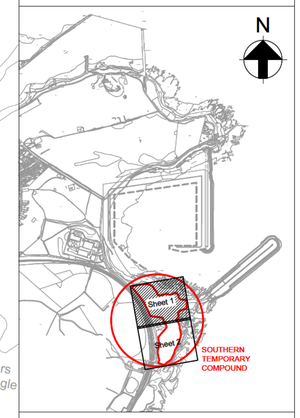

Key Plan

Notes:

1. All levels are to Admiralty Chart Datum (2.25m above OS Datum).
2. Existing sewer information based on Scottish Water sewer records. Manhole locations are approximate and will need to be confirmed on site.
3. Plant protection measures to Scottish Water sewer to be confirmed.
4. Raising or lowering existing manhole cover levels to proposed will be subject to Scottish Water approval details of which will need to be confirmed.
5. A new foul water connection and consent to discharge to the public sewer to be made to Scottish Water.
6. Outfall surface water discharge rates are approximate and subject to change upon completion of detailed design.

Legend:

- Site Boundary
- Existing Combined Sewer
- Proposed Foul Network
- Proposed Trade Effluent Pipe
- Trade Effluent Treatment - PH Correction and Sediment Settlement
- Proposed Buried Surface Water Pipe
- Proposed Surface Water Pipe Above Ground
- Proposed Swale With Filter Trench
- Proposed Swale Silt Trap
- Proposed Chanel Drain - Width
- Proposed Drainage Ditch
- Back of Retaining Wall Drainage with Access Chamber
- Top Soil Storage
- Hard Standing Areas
- Roofed Buildings
- Proposed Surface Water Outfall with Stone Protection
- Granular Mattress - Velocity Reducer

See drawing DRA-T-SOC-TW0001-DWG-050001-001

Surface Water Discharge Rate
1:1 = 582l/s
1:30 = 1189 l/s

Temporary Stilling Pond

Scale 1:500 (0 5 10 20 Metres)

Issue	Date	By	Chkd	Appd
0	17/02/17	JT	RF	NL
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Client: DRAGADOS

Job Title: Aberdeen Harbour Expansion Project

Drawing Title: Southern Temporary Compound Drainage Layout Sheet 1 of 2

Arup Job No	Scale at A1
253300-00	1:500

Discipline: 05 - Drainage and Service Ducts

Drawing Status: **Issued For Information** | Rev: **0**

Drawing No: **DRA-T-SOC-TW0001-DWG-050001-000**

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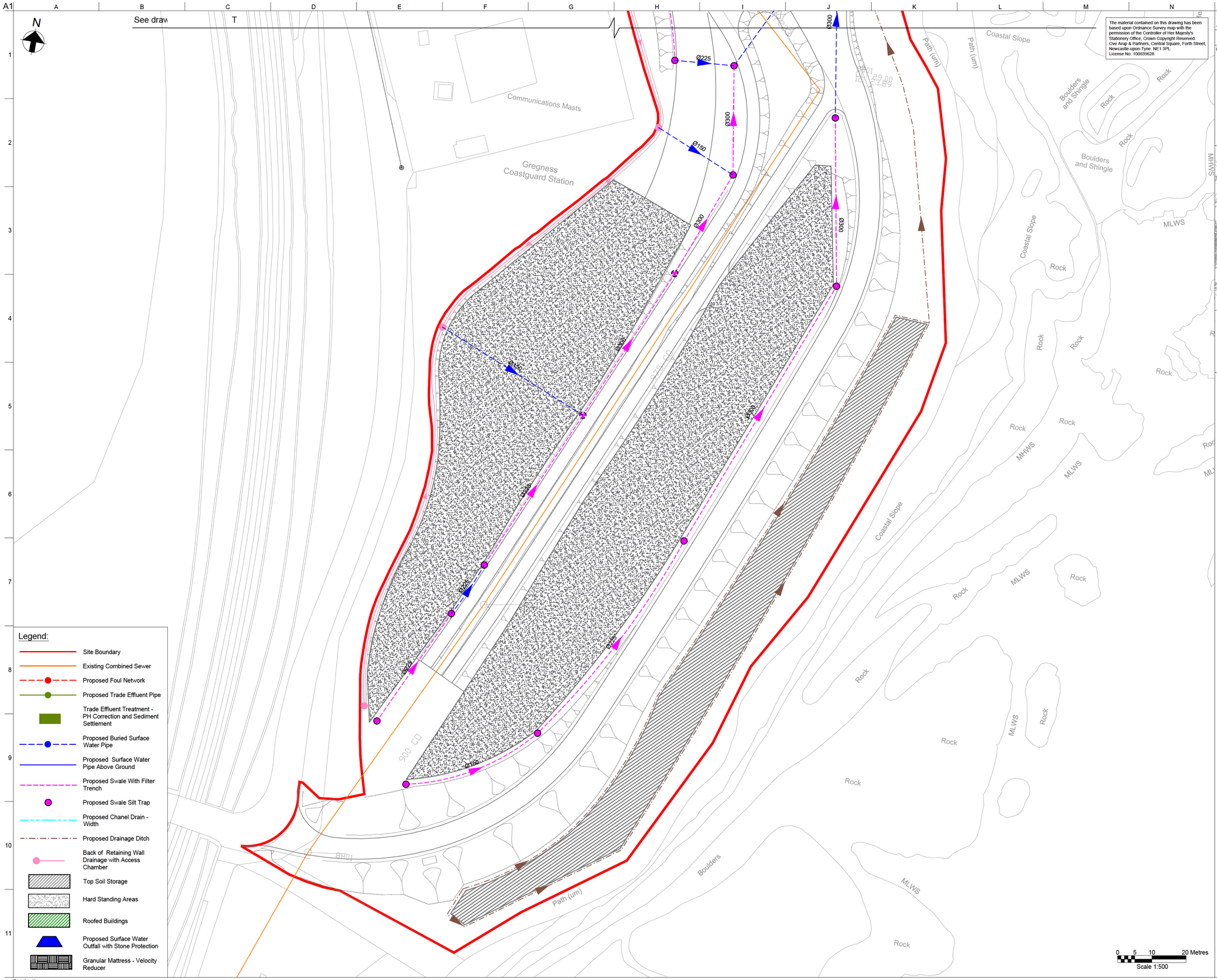

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Legend:

—	Site Boundary
—	Existing Combined Sewer
- -●- -	Proposed Foul Network
—●—	Proposed Trade Effluent Pipe
■	Trade Effluent Treatment - PH Correction and Sediment Settlement
- -●- -	Proposed Buried Surface Water Pipe
—	Proposed Surface Water Pipe Above Ground
- - -	Proposed Swale With Filter Trench
●	Proposed Swale Silt Trap
-·-·-	Proposed Chanel Drain - Width
-··-··-	Proposed Drainage Ditch
●—	Back of Retaining Wall Drainage with Access Chamber
▨	Top Soil Storage
▒	Hard Standing Areas
▨	Roofed Buildings
▲	Proposed Surface Water Outfall with Stone Protection
▦	Granular Mattress - Velocity Reducer

HEALTH AND SAFETY INFORMATION

SIGNIFICANT OR EXCEPTIONAL RISKS ARE IDENTIFIED BELOW

(Insert Risks Here)

Key Plan

Notes:

1. All levels are to Admiralty Chart Datum (2.25m above OS Datum).
2. Existing sewer information based on Scottish Water sewer records. Manhole locations are approximate and will need to be confirmed on site.
3. Plant protection measures to Scottish Water sewer to be confirmed.
4. Raising or lowering existing manhole cover levels to proposed will be subject to Scottish Water approval details of which will need to be confirmed.
5. A new foul water connection and consent to discharge to the public sewer to be made to Scottish Water.
6. Outfall surface water discharge rates are approximate and subject to change upon completion of detailed design.

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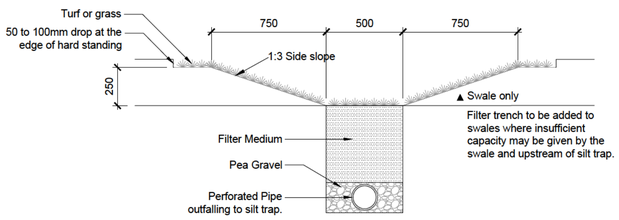
Job Title
Aberdeen Harbour
Expansion Project

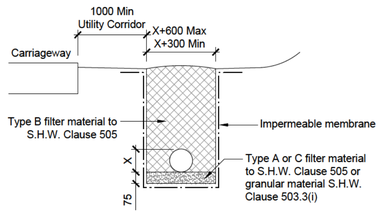
Drawing Title
Southern Temporary Compound
Drainage Layout
Sheet 2 of 2

Arup Job No 253300-00
Scale at A1 1:500
Discipline 05 - Drainage and Service Ducts
Drawing Status **Issued For Information**
Rev **0**
Drawing No
DRA-T-SOC-TW0001-DWG-050001-001



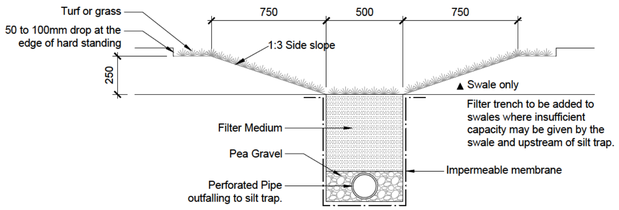
Swale With Filter Trench Cross Section

Scale 1:20



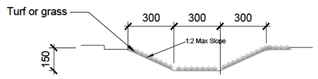
Filter Trench with Impermeable Membrane

Scale 1:20



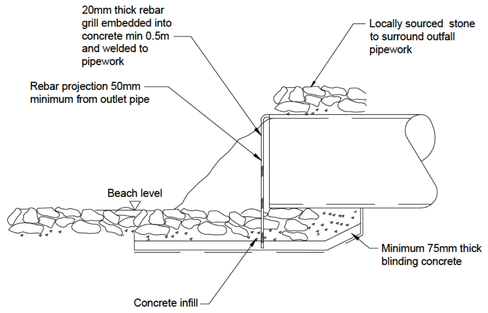
Swale Swale With Filter Trench Cross Section with Impermeable Membrane

Scale 1:20



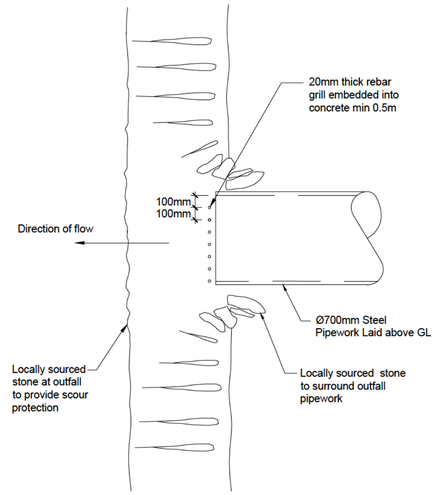
Drainage Ditch

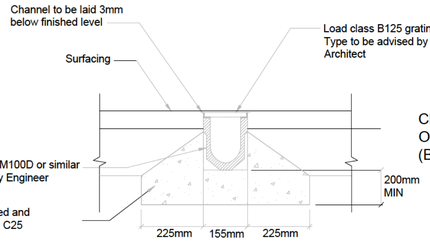
Scale 1:20



Typical Sea Outfall Pipework

Scale 1:50



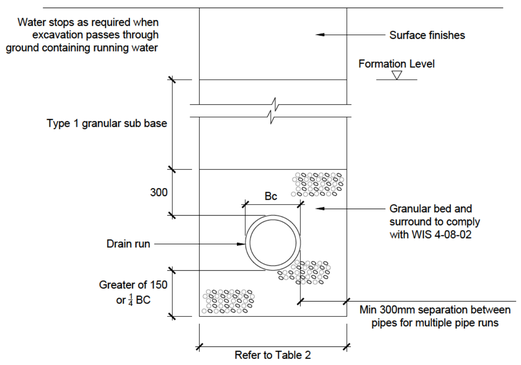


Channel not in Ruskin Office Phase 1 Package (B03)

10mm Flexible joints, flexcell or similar approved, to be provided in the concrete surround at intervals not exceeding 8m, to coincide with channel joints.

Drainage Channel Detail

Not to scale

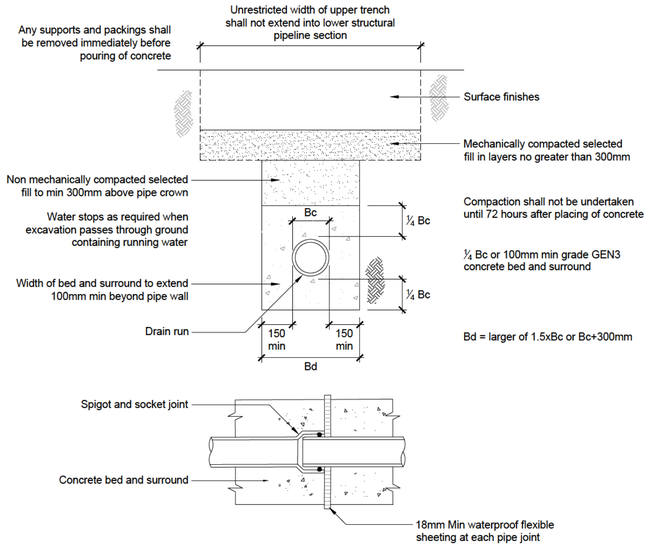


Class S Pipe Bed and Surround

Scale 1:20

Table 1 - Granular Bed and Surround	
Pipe Diameter (mm)	Aggregate
150	10mm or 14mm single size or 14mm to 5mm graded
225-525	14mm or 20mm single size or 20mm to 5mm graded or 14mm to 5mm graded
1200	10,14,2mm or 40mm single size or 40mm to 5mm graded or 20mm to 5mm graded or 14mm to 5mm graded.

Table 2 - Trench Width	
Pipe Diameter (mm)	Trench Width
100	450
150	600
225	700
300	750
375	1060
450	1150
525	1200
600	1350
675	1450
750	1500
825	1600
900	1900
1050	2050
1200	2300



Unreinforced Concrete Bed and Surround

Scale 1:20

HEALTH AND SAFETY INFORMATION

SIGNIFICANT OR EXCEPTIONAL RISKS ARE IDENTIFIED BELOW

(Insert Risks Here)

Issue	Date	By	Chkd	Appd
0	17/02/17	JT	RF	NL

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Client

DRAGADOS

Job Title

Aberdeen Harbour Expansion Project

Drawing Title

Southern Temporary Compound Drainage Details Sheet 1 of 2

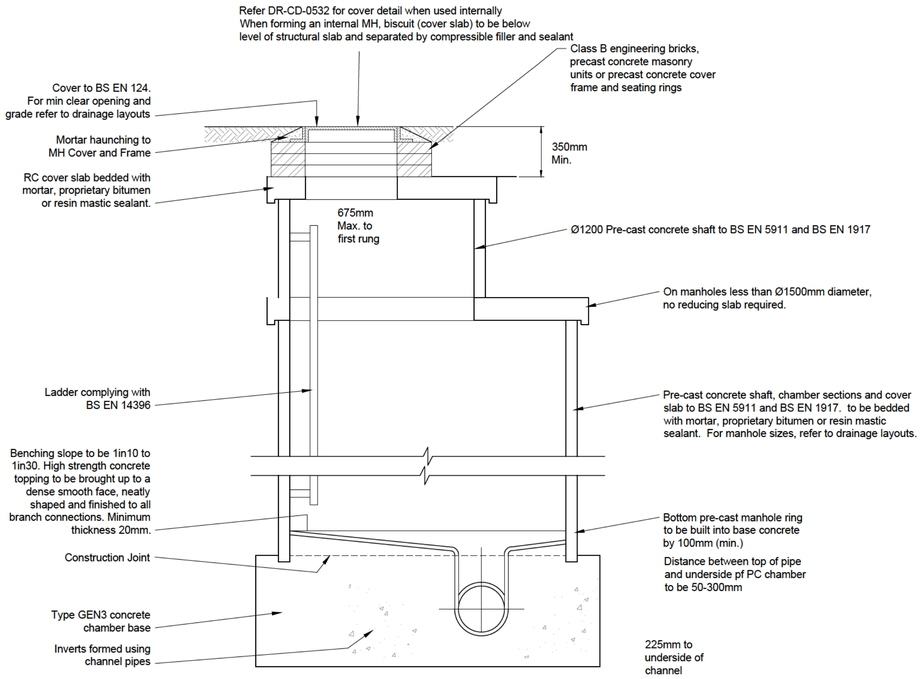
Arup Job No	Scale at A1
253300-00	As Shown

Discipline: 05 - Drainage and Service Ducts

Drawing Status: **Issued For Information** | Rev: **0**

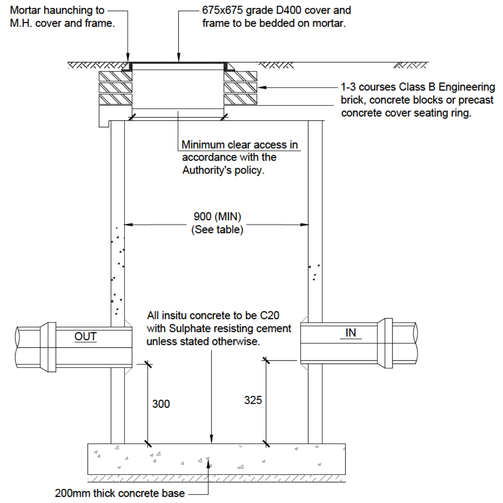
Drawing No: **DRA-T-SOC-TW0001-DWG-050002-000**

F:\250000\253300\00 AHEPOA DELIVERABLES\4-18 South Compound\4-18.1 Civils & Highways\Drawings\DRA-T-SOC-TW0001-DWG-050002-000.dwg 16 Feb 2017 16:40:58



Type A PCC Manhole - Depth from cover to soffit 3 - 6m
Typical Detail

Scale 1:20

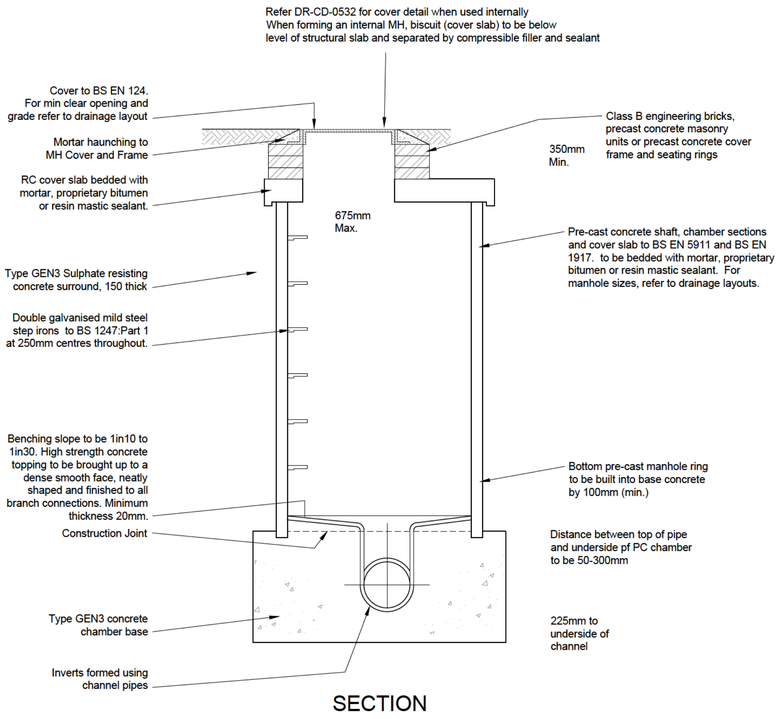


Typical Swale Silt Trap Detail

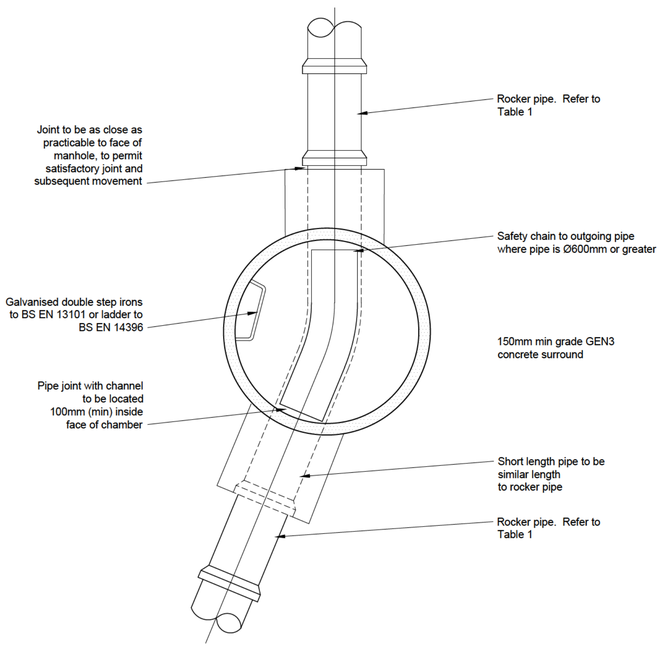
Scale 1:20

Depth to pipe soffit (mm)	Diameter of largest pipe DN (mm)	Min internal diameter of manhole (mm)	Min clear opening size (mm)
< 1500	150 225 300 > 300	1200 1200 1200 Larger of 1800 or DN+450	675 x 675
> 1500	225 300 375-450 > 450	1200 1200 1200 Larger of 1800 or DN+775	675 x 675
Manhole Shaft > 3000	Steps Ladder Winch	1050 1200 900	675 x 675

TABLE 1 Minimum chamber dimensions



SECTION



PLAN

Type B PCC Manhole - Maximum depth from cover 3m
Typical Detail

Scale 1:20

HEALTH AND SAFETY INFORMATION

SIGNIFICANT OR EXCEPTIONAL RISKS ARE IDENTIFIED BELOW

(Insert Risks Here)

Issue	Date	By	Chkd	Appd
0	17/02/17	JT	RF	NL

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Client

DRAGADOS

Job Title

Aberdeen Harbour Expansion Project

Drawing Title

Southern Temporary Compound Drainage Details Sheet 2 of 2

Arup Job No	Scale at A1
253300-00	1:20

Discipline: 05 - Drainage and Service Ducts

Drawing Status: **Issued For Information**

Rev: **0**

Drawing No: **DRA-T-SOC-TW0001-DWG-050002-001**

A1

SITE BOUNDARY

Greyhope Road

NORTH QUAY

WEST QUAY

Suspended Deck Quay
Structure Over
Revetment

Heavy Loading Area

Scottish Water
Sewage
Treatment Plant

INNER
BASIN

FL -9.00

Coast Road

FL -10.5

Heavy Loading Area

EAST QUAY

NORTH BREAKWATER

North breakwater
crown wall

S.S.I. Land

South west
revetment slope

SOUTH EAST PIER

60m

175m

ENTRANCE
BASIN

FL -9.00

Harbour Entrance Width 165m

ENTRANCE CHANNEL

FL -10.50

SOUTH BREAKWATER

Southern
Compound Area

N

Key

- Site Boundary
- SSSI Boundary
- Rock Excavation

Issue	Date	By	Chkd	Appd
I2	23/02/17	ML	JL	AC
	Issued for Information			
I1	01/12/16	RA	JL	AC
	Issued for Information			

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Job Ti le

Aberdeen Harbour Expansion Project

Proposed Development Works
In Relation to SSSI

Scale at A1 1:2500

Discipline Civil Geotechnical

Job No 247468-00

Drawing Status Information

Drawing No NBY-ARP-ZZ-XX-DR-CG-0809

Issue I2

\\global\europe\Edinburgh\Jobs-Related-Data\Civils\Infrastructure\Aberdeen Port Nigg Bay\Drawings\Geotechnical\NBY-ARP-ZZ-XX-DR-CG-0809.dwg 23 Feb 2017 17:00:30

Do not scale

A1

RCL07
BHL52
BHL204
RCL08
BHL53
BHL54
BHL15
BHL55
WSL301
WSL302
BHL16
BHL08
BHL17
WSL303
BHL09
TPL402
TPL401
BHL10
BHL401
BHL18
BHL11
BHL12
BHL402
TPL404
TPL406
TPL403
TPL405
BHL403

Key

- Site Boundary
- SSSI Boundary
- TPL08 — Proposed Trial Pit Location
- BHL44 — Proposed Borehole Location
- RCL10 — Proposed Road Core Location
- WSL302 — Proposed Window Sample Location
- Proposed Cycle Alignment

Issue	Date	By	Chkd	Appd
I1	06/04/17	RA	JL	AC

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DRAGADOS

Job Title

Aberdeen Harbour Expansion Project

Proposed GI Works and Cycle Path Alignment in Relation to SSSI

Scale at A1 1:2500

Discipline Civil Geotechnical

Job No 247468-00

Drawing Status Information

Drawing No NBY-ARP-ZZ-XX-DR-CG-0812

Issue I1

Do not scale

B S S

S I I SRO D

R P R

S Y

B Y

B B

DN U H D N N

S

S

Cyclepath locally
narrowed at Coastal Gully.

ARUP

DRAGADOS

A

Y A P X H