



**Construction Environmental Management Plan (CEMP)
Outhead, Eden Estuary, St Andrews**

St Andrews Links Trust
Construction Environmental Management Plan (CEMP)
Proposed Sand Recharge – Outhead, St Andrews

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1 INTRODUCTION

1.1 Purpose of the Report

- 1.1.1 This Construction Environmental Management Plan (CEMP) supports a Planning Application and Marine Licence Application for sand recharge at an area known as Outhead, St Andrews, Fife.
- 1.1.2 The purpose of the CEMP is to ensure that construction work considers aspects of environmental protection within the context of compliance with local legislation and minimising the impacts on people, natural heritage interests and the wider environment.
- 1.1.3 The CEMP ensures that environmental impacts identified through a range of environmental studies (in this case, ecological reporting and geomorphological reporting) will be managed appropriately.
- 1.1.4 Production and adherence to a CEMP allows a proactive approach to controlling potentially polluting activities to prevent adverse public health impacts, nuisance, and hazards to the natural and human environment.

1.2 Content of the Report

- 1.2.1 There is no set format for producing a CEMP, but best practice generally requires key elements as set out in Table 1 to be covered.

Table 1 – CEMP Contents

Subject	Typical Content
Introduction, Distribution List, Key Reference Documents	<ul style="list-style-type: none"> • Name and definition of the project Applicant and contractor contact details (if known) • External Recipients - Planning Authority and Consultees. Internal Recipients – Site Personnel, Contractors etc. Roles and responsibilities / training & competencies. • Details of any relevant information used to produce the CEMP.
Project Description	<ul style="list-style-type: none"> • Overview of the project and scope of the proposed works, including location, general activities, and project schedule.
Environmental Baseline	<ul style="list-style-type: none"> • Identification of sensitive receptors and environmental baseline information
Environmental Management – Action Table	<ul style="list-style-type: none"> • Identification of potential receptors, proposed works elements, and necessary actions and mitigations to manage environmental impacts. • Details of any environmental management systems, identification of regulations and requirements, environmental awareness and commitments • Consideration of emissions to air, water and land. Including noise & vibration, dust, general discharges, traffic impacts and waste management impacts • Other potential site-specific issues and impacts to be addressed may relate, for example, to ground contamination, archaeology, groundwater and drainage, and ecology

Subject	Typical Content
	<ul style="list-style-type: none"> • Appropriate mitigation measures and control plans regarding identified environmental impacts. • Procedures for audits, monitoring, and inspections. Environmental performance monitoring and reporting requirements. Incident reports, performance reports, environmental checklists
Documentation	<ul style="list-style-type: none"> • Any documentation kept as required by the CEMP as a live document.
Annexes	<ul style="list-style-type: none"> • Any additional information or documents

1.3 Distribution List

1.3.1 The CEMP is a core document and will be distributed to key persons with updates produced pre-start of construction to capture findings and mitigation associated with aspects such as a pre-start ecological walkover or other changes such as advice from statutory consultees.

- Fife Council Planning Officer
- Statutory Consultees
- St Andrews Links Trust
- Main Contractor and any Sub-Contractors through the site induction process

1.3.2 Whilst the CEMP summarises the key construction phase mitigation to be applied, contractors must fully comply with all relevant legislative requirements, codes and standards and the planning conditions the planning authority applies.

1.4 Reference Documents

1.4.1 This CEMP has been informed by the following documentation:

- Eden Ecology Ltd (2008) Environmental Impact Assessment, Environmental Statement, Proposed Beach Nourishment of Outhead Dune System.
- Posford Duvivier Environment (2000) Feasibility Study for Foreshore Recharge on the Eden Estuary April 2000. Scottish Natural Heritage Commissioned Report F99LJ02
- Ironside Farrar (March, 2022) Outhead, St Andrews Sand Recharge Works Feasibility Report.
- Prof. A Dawson (May 2023) Geomorphology Report, Outhead, St Andrews
- ECOS Countryside Services LLP (May 2023) Ecological Impact Assessment, Outhead, St Andrews
- ECOS Countryside Services LLP (May 2023) Report to Inform Appropriate Assessment (RIAA), Outhead, St Andrews

1.4.2 Key recommendations for mitigation from the Geomorphology Report and ECIA/RIAA and advice from NatureScot have been referenced in the CEMP Action Table.

1.5 Wider Reference Documents

1.5.1 There are a series of pertinent reference documents which have informed the preparation of

this CEMP and will inform works during the construction stage:

- SEPA Pollution Prevention Guidelines
 - PPG 1: Understanding your environmental responsibilities – good environmental practice
 - GPP 5: Works and maintenance in or near water
 - PPG 6: Working at construction and demolition sites
 - GPP 8: Safe Storage and Disposal of Used Oils
 - GPP21 - Pollution Incident Response Planning
 - GPP22 - Incident Response – Dealing With Spills
- Control of water pollution from construction sites, CIRIA Report C532 (2001)
- Control of water pollution from linear construction sites, CIRIA Report C648 (2006)
- Environmental Good Practice on Site 4th Edition, C741, CIRIA (2015)
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended)
- Town and Country Planning (Hazardous Substances) (Scotland) Regulations 1993
- Water Environment and Water Services (Scotland) Act 2003
- Control of Pollution Act (1974)

2 DESCRIPTION OF THE SITE AND ENVIRONMENTAL BASELINE

2.1 The Site

2.1.1 The site is located at Outhead (NO 49278 19487), a sandy coastal headland situated east of the River Eden and east of St Andrews Bay in northeast Fife. Outhead is formed of a build-up of accreted sand and dunes at the mouth of the Eden Estuary. The St Andrews Links golf courses (the Old, New, Jubilee, Eden, Strathtyrum and Balgove courses) are situated upon (Jubilee) and to the south of Outhead.

2.1.2 The project comprises natural beach recharge and stabilisation of the dune system at the Eden Estuary Sands (NGR NO 493196), St Andrews. The project includes placing sand against the existing eroding dune system and to cover in-situ sloping gabion baskets for a length of approximately 175m along the dunes/parallel to the beach and extending seawards by some 25m – 30m. The area of deposition is 1.99ha. The extraction area is 4.37 ha.

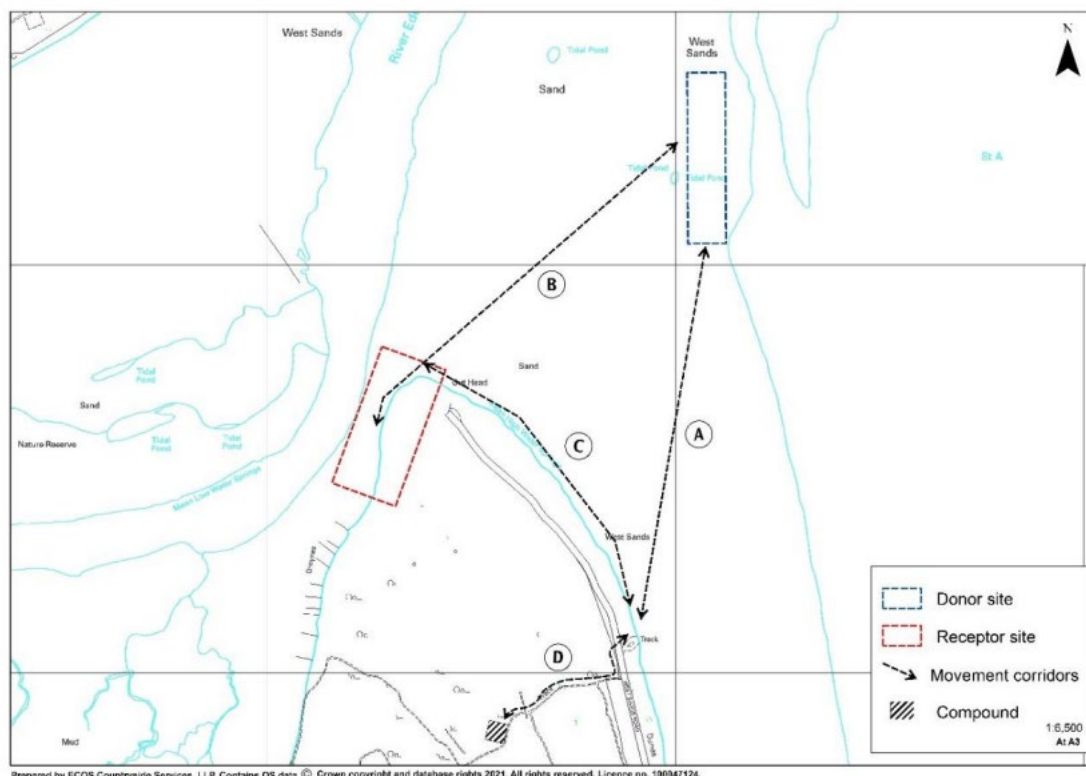
2.1.3 The co-ordinates for the extraction and deposition sites are as follows:

Deposition Area	Extraction Area
NW – NO 494198	NW – NO 501205
NE – NO 495197	NE – NO 502205
SE – NO 493194	SE – NO 502201
SW – NO 492194	SW – NO501201

2.2 The Proposed Development

- 2.2.1 The proposed recharge design is a straightforward replication of the two previous recharges which have been undertaken successfully and without incident or criticism, the most recent providing dune restoration that lasted for 15 years. The third recharge, hauling sand and shaping, will take place over a pre-selected spring tide series over 10 days. The proposed working window would be January-March for the recharge with planting and fencing in March before sand temperatures rise.
- 2.2.2 Sand will be removed from the same donor site used for the two previous Out Head recharges, 2001 and 2008, location is NGR NO 498202. This is ideal because that area has been proved to replenish very quickly and is a known area of long-term accretion. Approximately 12,000-15,000m³ of sand will be transported to the receptor site on the south west interface with the Eden Estuary.
- 2.2.3 Working will take place over both low tides each day. Sand will be extracted to a maximum depth of 0.5m over an area of approximately 200x200m using a single 360-degree backhoe excavator loading three or four “Moxy” type dump trucks following agreed movement corridors per Figure 9 (ECOS Countryside Services LLP).
- 2.2.4 Three machine movement corridors (A,B and C) will be used for gaining access to the donor site, hauling sand to the receptor site and return to a safe storage over high tide. Working will be limited to a low tide window of a few hours which will “roll” according to the times of low tide. All refuelling and maintenance will be completed at the remote site compound (D).

Figure 9 - Locations of donor and receptor site and vehicle movement corridors (ECOS Countryside Services LLP).



- 2.2.5 Work at the receptor site will involve tipping and bulldozing sand into place to create a new 200m long sand cliff, with a top platform approximately 10m wide. A slope will extend seawards to a depth of 25-30m, previous recharges extended to approximately 40m. The profile will reflect previous recharges, although it may be slightly steeper.
- 2.2.6 An upper bench, raised slightly higher than the existing eroded ridge, will be transplanted with cell grown marram plants of local provenance, or transplants taken from adjacent dunes, at a density of 5 plants per square metre.
- 2.2.7 Prior to marram planting, a series of chestnut pale fences will be installed across the face. After planting these fences will be closed at the toe with another public exclusion fence. Anti-erosion roll bags will be temporarily placed inside the toe fence to limit initial losses for 6-12 months.

2.3 Environmental Baseline and Key Features

- 2.3.1 A topographic survey was undertaken in 2022 (Douglas Land Surveys). This indicates that the landform to be restored from the northern end of the existing gabion defences comprises a gently sloping sandy beach running up to the dune system. The edge of the dunes is defined by a steeply raised, narrow dune crest which rises by a maximum of 5 or 6 metres from the beach before dropping down several metres to the grassed dune system on the landward side. The dune system is at an elevation of 2 or 3 metres above the top of the beach.
- 2.3.2 Outhead is the northern limit of a naturally accreting cuspidate foreland, that has been extending northwards since the mid-19th C. Accretion is not uniform and mainly confined to the seaward edge and promontory. Open and semi-fixed dunes have been eroding along a 200m south western section and have reached a crucial phase because the main ridge is now very narrow and at risk of being breached.
- 2.3.3 During World War II a barrier line of steel tubes was placed across the Eden Channel around 300 m NW of Outhead (Figure 5). In addition, during the 1930s a wall of wooden railway sleepers was placed along ca. 300 m length of shoreline on the south side of the estuary to protect against coastal erosion (McManus and Green 1977; Ritchie 1979). During the following decades a series of additional coastal defence measures were introduced. These included a variety of wooden groynes trending perpendicular to the shoreline.
- 2.3.4 A natural solution to current erosion, avoiding such measures as gabion mattresses, gabion baskets and rock armour, has been to recharge the erosion zone with sand to forestall the risk to the courses. Recharges took place in 2001 and 2008, and a third recharge is being proposed for 2024.
- 2.3.5 Within the Fife Shoreline Management Plan (2011), the Outhead area is located within Policy Unit 49. The document recognises that there is a combination of natural and man-made coastal defences within this Policy Unit and that the approach to be adopted for future climate change scenarios is that of 'Hold the Line'.
- 2.3.6 The Proposed works lie within the boundaries of two UK designated sites:
- Eden Estuary SSSI, EU Code 135289, declared in 1971 and last notified 16 February 1990
 - Eden Estuary LNR, declared in 1978

-
- 2.3.7 The Eden Estuary Site of Special Scientific Interest (SSSI) was notified in 1971 for 17 biological features. Primary habitats being coastland and woodland, primary species being botanical and ornithological. Included in the 1160ha SSSI are the fully integrated Out Head and West Sands dune systems. The 12 notified bird species are wintering or passage waterfowl that were later given further protection under internationally agreed Ramsar and SPA designations. Botanical features include upstream alder-willow swamp, woodland and scrub, complex freshwater and brackish transitions with diverse green algal seagrass beds (*Zostera*) and representative lagoonal saltmarsh types. Three species of eelgrass are present, namely, narrow-leaved eelgrass (*Zostera angustifolia*), dwarf eelgrass (*Zostera nana*) and common eelgrass (*Zostera marina*). Relevant to this CEMP are the habitats associated with the sand dunes.
- 2.3.8 North East Fife Council, with the support of the Nature Conservancy Council for Scotland, local nature conservation organisations and the wildfowling community declared the Eden Estuary Local Nature Reserve (LNR) in 1978. An LNR Management Plan was subsequently agreed and published in 1987 with the aim of protecting the nature conservation interest of the already notified SSSI of 1971, whilst ensuring continued public access for recreation and education. LNR byelaws included provision for the establishment of three sanctuary zones that had the main effect of excluding human activities from the vicinity of high tide roosts and preventing disturbance to feeding birds on the Guardbridge mudflats. The latter is an important feeding location for the Eden wintering and passage Icelandic race of black-tailed godwit (*Limosa limosa islandica*) population.
- 2.3.9 The wider Eden Estuary has several environmental designations due to its habitats and species composition and potential impacts have been addressed through a standalone Report to Inform Appropriate Assessment (RIAA – ECOS Countryside Services LLP, May 2023):
- The Firth of Tay-Eden Estuary SPA is designated for its bird assemblages and includes marsh harrier, little tern and bar-tailed godwit.
 - The Firth of Tay-Eden Estuary SAC is designated for its intertidal habitats, subtidal sandbanks, and common seal.
 - Firth of Tay and Eden Estuary RAMSAR designated for bird assemblies that include Marsh harrier, little tern, velvet sector and bar-tailed godwit.
- 2.3.10 Phase 1 habitat and National Vegetation Classification (NVC) surveys are relatively recent¹ confirming the dominance of open dune and fixed dunes and fixed dune grassland across Out Head. The pattern of mapped NVC communities is a typical, if very narrow, succession on accreting dunes with transition from accumulating bare sand through seasonal strandline, pioneering foredune, yellow dune to fixed dune. Vegetation changes have taken place since these surveys. Principally the northward extension of foredune on the east side of Out Head creating new SD2 and SD4, whilst severe erosion on the south west has resulted in a severe loss of open dune (H6.8/SD5b).
- 2.3.11 In terms of protected species, breeding otter are resident upstream of [REDACTED] and on [REDACTED], where signs are frequent. There are no regular observations to the east

¹ DARGIE (2001) Sand Dune Survey of Scotland. Report to SNH. CES (2003) NVC survey of the Eden Estuary SSSI. Report to SNH and ECOS (2011) NVC survey of the West Sands Dunes. Report to SUSCOD (EU North Sea Region SUSCOD Project).

of [REDACTED], where any otter use must be infrequent or unobserved.

2.3.12 Common Seal (European Protected Species) are present in the Eden Estuary. Formal seal counts were started in 1991 and undertaken by the Eden Estuary Reserve Managers (Les Hatton and Ranald Strachan) until they ended counting in 2017. Counts now rely on annual monitoring by the Sea Mammal Research Unit (SMRU), St Andrews University and ad hoc counting by the Fife Seal Group. Numbers have declined dramatically on the Eden, from a peak of 325 in 2002 and an average monthly count of 174 in 2003. Seal numbers are now very low, averaging 3.41 in 2017. The latest two winter surveys by the Fife Seal Group reported a peak of four common seals during the period of proposed dune restoration at Out Head, January-March. Common seal are a qualifying feature of the Firth of Tay SAC and potential impacts of the proposals have been fully assessed in a standalone Report to Inform Appropriate Assessment (RIAA – ECOS Countryside Services LLP, May 2023). The RIAA concludes no likely adverse impact on common seals for the following reasons:

- The haulout on the south bank of the Eden Channel is irregularly used by a very small number of seals
- The alternative seal haulout in Balgove Bay will not be disturbed
- Common seals are particularly vulnerable to disturbance during their pupping and moulting season May-September. This period lies out with the proposed working window of January-March for the recharge with planting and fencing in March before sand temperatures rise.
- There will be no adverse impact on any habitat supporting the seals prey species, nor the supporting processes creating those habitats.

2.3.13 Breeding birds - No work will take place during the normal bird breeding season.

2.3.14 Non-breeding passage and wintering birds - there is no regular high tide waterfowl roost in proximity to works and roosts will therefore not be disturbed. WeBS data and low tides surveys by SALT were used to assess the potential impact on feeding oystercatcher, the RIAA (RIAA – ECOS Countryside Services LLP, May 2023) concluding no adverse effect, mainly due to the significant extents of alternative foraging available to the relatively small number of birds likely to be displaced.

2.3.15 Biodiversity - scarce plants - distribution of three scarce Fife dune plants, blue fleabane (*Erigeron acer*), purple milk-vetch (*Astragalus danicus*) and the sand cats-tail (*Phleum arenarius*) were mapped by ECOS in 2010-11. Populations of blue fleabane and sand cats-tail are likely to increase slightly as a result of dune restoration.

2.3.16 Invasive non-native species (INNS) were mapped by ECOS 2010-2011. The most common invasive non-native species on the dune system is the tree lupin (*Lupinus arborea*), a native of California. This species is currently part of a control programme by SALT who also routinely remove invasive scrub, mainly willow (*Salix* sp.) and white poplar (*Populus alba*). These species invade dunes shading out native species, decreasing diversity and loss of marram in particular can result in a risk of a blowout. Sea buckthorn (*Hippophae rhamnoides*) and Japanese knotweed (*Fallopia japonica*) were absent at the time of last survey.

2.3.17 Terrestrial invertebrates have not been closely studied, however, typical species are known to be present. Invertebrate conservation management to date has been to maintain a range

of habitats and micro-habitats to maintain diversity. Key butterfly species are the common blue (*Polyommatus icarus*) and the locally scarce grayling (*Hipparchia semele*). The latter has been recently added to the Red List of British Butterflies Endangered category. Larvae are dependent upon a narrow range of grass food plants including marram grass and red fescue, both very common at Outhead.

2.3.18 The marine interest adjacent to the project has been well documented, most recently by the University of St Andrews. The sands adjacent to the receptor site and present on the donor site are impoverished unstable sands supporting mobile in-fauna including burrowing amphipods and isopod.

2.3.19 Whilst the coastline is not within a designated landscape, the coastline at Outhead is sensitive due to its location adjacent to St Andrews and the golf courses associated with the 'Home of Golf'. The beach at West Sands of which Outhead lies at the northern end of is popular for a range of recreational activities.

3 SPECIFIC ACTION REQUIREMENTS

3.1 Overview

3.1.1 The purpose of this CEMP is to provide an accessible summary of known environmental sensitivities and to promote a proactive approach to environmental mitigation during the construction phase. Table 2 below presents the Action Table to be followed in order to deliver best environmental management practices onsite and also incorporates measures stipulated in the specified supporting reports (see section 1.4) that are to be adhered to while undertaking site works.

3.2 CEMP Action Table

Table 2 – Summary of Key Mitigation During Works

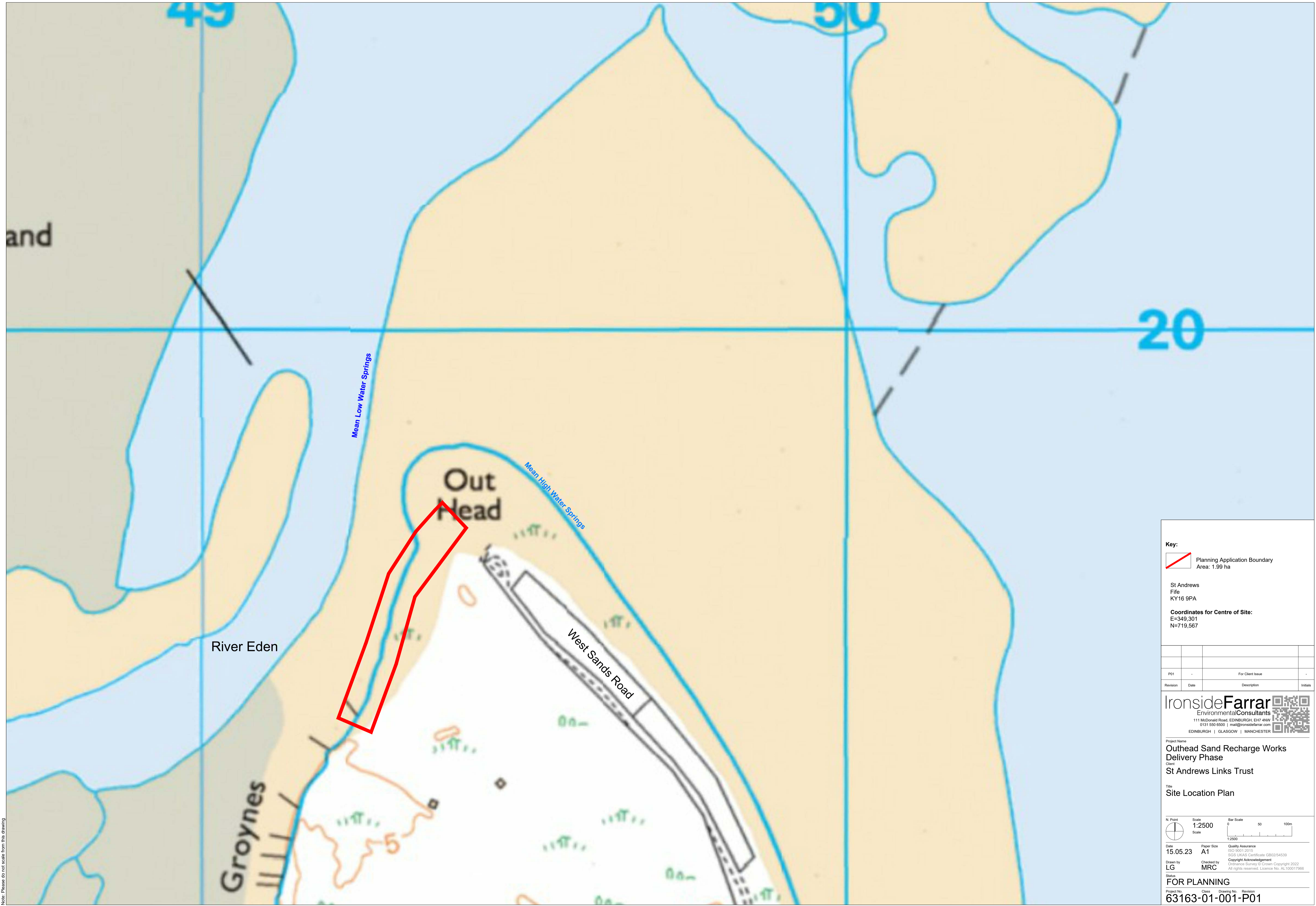
Action No.	Receptor	Element of Works	Requirement	Responsibility	Action
Early Action - Site Set-Up and Management					
1	Site Wide	Designate a 'Responsible Person'	The 'Responsible Person' will implement and monitor all pollution prevention and environmental protection measures and has sufficient authority to act to prevent issues which may include halting works.	Responsible Person (SALT and Contractor)	Details of responsible person (s) made available to all workers on site and the Public.
2	Site Wide	Signage for the construction traffic, pedestrians and other users of the site	Construction Zone will be defined within which all construction works will be contained. The detail of the fencing or demarcated areas and signage will be the responsibility of the appointed Contractor, however generally construction areas will be controlled and will be signposted and secured for entry to authorised construction personnel only. Any pedestrian footpath diversions will be clearly marked. The signage will include a Site Information Board with emergency contacts to address any complaints raised.	Contractor	Install fencing or demarcation / signage and site information board to prevent unauthorised access and provide a point of contact for the Public.
3	Site Wide	Protection of Habitats to be Retained	The third recharge will have a smaller restored dune footprint, a reduction of approximately 25%. Loss is short term and will be naturally restored and repopulated by in-fauna as the erosion process advances. Working footprint at the donor site will be minimised by on-going review of the volume of sand required at the receptor site. Minimum volumes will be deployed to reduce habitat impact.	Contractor	Contractor to work to the approved plans and pre-start advice from the Ecological Clerk of Works (ECOW).
4	Site Wide	Seals	The third recharge will be programmed outwith the pupping	Contractor	Contractor to work to

Action No.	Receptor	Element of Works	Requirement	Responsibility	Action
			and moulting season, May-September inclusive. To maintain welfare a visual inspection of the haulout will be completed prior to daily start up and maintained during truck haul movements. Haul routes will be amended, if necessary.		the approved plans / timings and pre-start advice from the Ecological Clerk of Works (ECOW).
5	Site Wide	Oystercatcher	Remote compound for fuelling and maintaining machines. Contractor Construction Management Statement (CMS) must include an agreed Pollution Plan with which all construction staff are familiar. All machines must carry a spill kit for use in the event of a spill e.g. hydraulic failure or fuel leak. Contractor's CMS must be agreed in advance with NatureScot.	Contractor	Contractor to work to the approved plans and pre-start advice from the Ecological Clerk of Works (ECOW).
6	Site Wide	Wintering Birds	Disturbance of feeding and resting birds during cold weather - Working will be suspended during any severe cold periods likely to limit feeding opportunity through frozen substrates or tax energy budgets during very low temperatures. NatureScot will be consulted on the need for this action.		Contractor to work to the approved plans and advice from the Ecological Clerk of Works (ECOW).
7	Site Wide	Inform all Workers of Environmental Protection Requirements	Ensure all workers on site are 'informed' of environmental protection/ pollution prevention and control through site induction / toolbox talks etc.	Responsible Person (SALT and Contractor via ECOW and Site Manager)	All staff should receive an induction outlining key issues and requirements. Copy of the CEMP should be onsite and available for inspection and reference at all times.
8	Site Wide	Working Hours	Three machine movement corridors (A,B and C) will be used	Contractor	Appointed Contractor

Action No.	Receptor	Element of Works	Requirement	Responsibility	Action
			for gaining access to the donor site, hauling sand to the receptor site and return to a safe storage over high tide. Working will be limited to a low tide window of a few hours which will “roll” according to the times of low tide		to adhere to the consented working hours.
7	Site Wide	Site Welfare	No living accommodation shall be permitted on the construction site. General welfare rooms for breaks and meals, locker room, toilets and showers, shall be permitted and their location agreed. The appointed Contractor may request to relocate the Site Compound, however the suggested location is as shown on Figure 9.	Contractor	Agree location of welfare facilities with ‘Responsible Person’/Project Manager.
8	Site Wide	Prevention of debris being deposited on the public highway	<ul style="list-style-type: none"> • Only the agreed access point to the site will be used and the construction compound and access to the site will be clearly signed; • Limiting the number of vehicles coming into work areas in the first instance where possible; • All loading and unloading of vehicles shall take place off the public road; • Access to construction compounds shall be brushed clean frequently to ensure that no material is tracked onto the public road; and • Monitoring of public road conditions in vicinity of site. 	Contractor	Working in accordance with CEMP to minimise impacts.
9	Site Wide	Construction Traffic / Traffic Management	Appropriate signage of site compound and during works.	Contractor	Working in accordance with CEMP to minimise impacts.
10	Water Environment	Spill Kits	Spill Kits should be available within each vehicle and site compound / refuelling area (see compound at Figure 9) and	Contractor	Appointed Contractor to provide Spill Kits at

Action No.	Receptor	Element of Works	Requirement	Responsibility	Action
			operators should all be adequately trained on use. Visual inspection of vehicles before and after each shift and regularly during the works given location of works in close proximity to Eden Estuary.		designated locations and give Toolbox Talks to ensure staff know where spill kits are located and how and when to use them.
11	Water Environment	Fuel and oil storage	Contractor to locate fuel storage in a bunded tank to prevent migration of fuel spillages in designate compound (Figure 9). Spill kits will be available within the construction compound, at refuelling/chemical storage areas as well as with each construction vehicle and site construction plant. Mobile plant will only be refuelled in the designated area on a plant nappy.	Contractor	Agree location of fuel/oil storage within the contractor compound. Ensure requirements are met and security is maintained.
12	Water Environment	Inspection and maintenance	Contractor responsible for carrying out daily visual inspections for pollution incidents / spills. Records should be kept up-to-date and available to review within the site office.	Contractor	Records of inspections and remedial action should be maintained and made available for review at the site office. Pollution incidents will be reported to SEPA and Marine Scotland.
13	Public	General protection of public amenity	Demarcation / fencing of work areas and signage to avoid adverse health and safety issues. Site safety and security control – secure construction areas.	Contractor	Appropriate site management, fencing and signage.
14	Waste	Storage of Waste	The contractor shall implement a waste management strategy for storage, handling and disposing of construction	Contractor	Appropriate site management

Action No.	Receptor	Element of Works	Requirement	Responsibility	Action
			waste. Rubbish will be removed at frequent intervals and the site kept clean and tidy.		procedures and adherence to Waste Management Legislation.
15	Historic wreckage	Site wide	In the event that wreckage is discovered on site during the works, the contractor shall liaise with the Ministry of Defence in their capacity to for administration of the Protection of Military Remains Act 1986.	Contractor	Liaison with Ministry of Defence with regards to Protection of Military Remains Act 1986
16	Public / Natural Environment	Noise, Vibration & Dust	Contractor responsible to comply with all relevant legislative controls, construction health, safety and environmental standards and other relevant best practicable means (BPM), including those which relate to noise, vibration and dust in relation to sensitive receptors. BPM are defined in Section 72 of the Control of Pollution Act 1974 and Section 79 of the Environmental Protection Act 1990 as those measures which are: <i>“reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to financial implications”</i> .	Contractor	Appropriate site management procedures and adherences to Noise, Vibration & Dust Legislation.



Note: Please do not scale from this drawing

Key:
 Planning Application Boundary
 Area: 1.99 ha

St Andrews
 Fife
 KY16 9PA

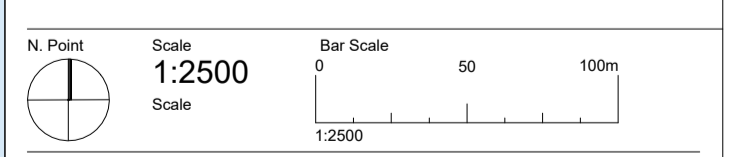
Coordinates for Centre of Site:
 E=349,301
 N=719,567

Revision	Date	Description	Initials
P01	-	For Client Issue	-

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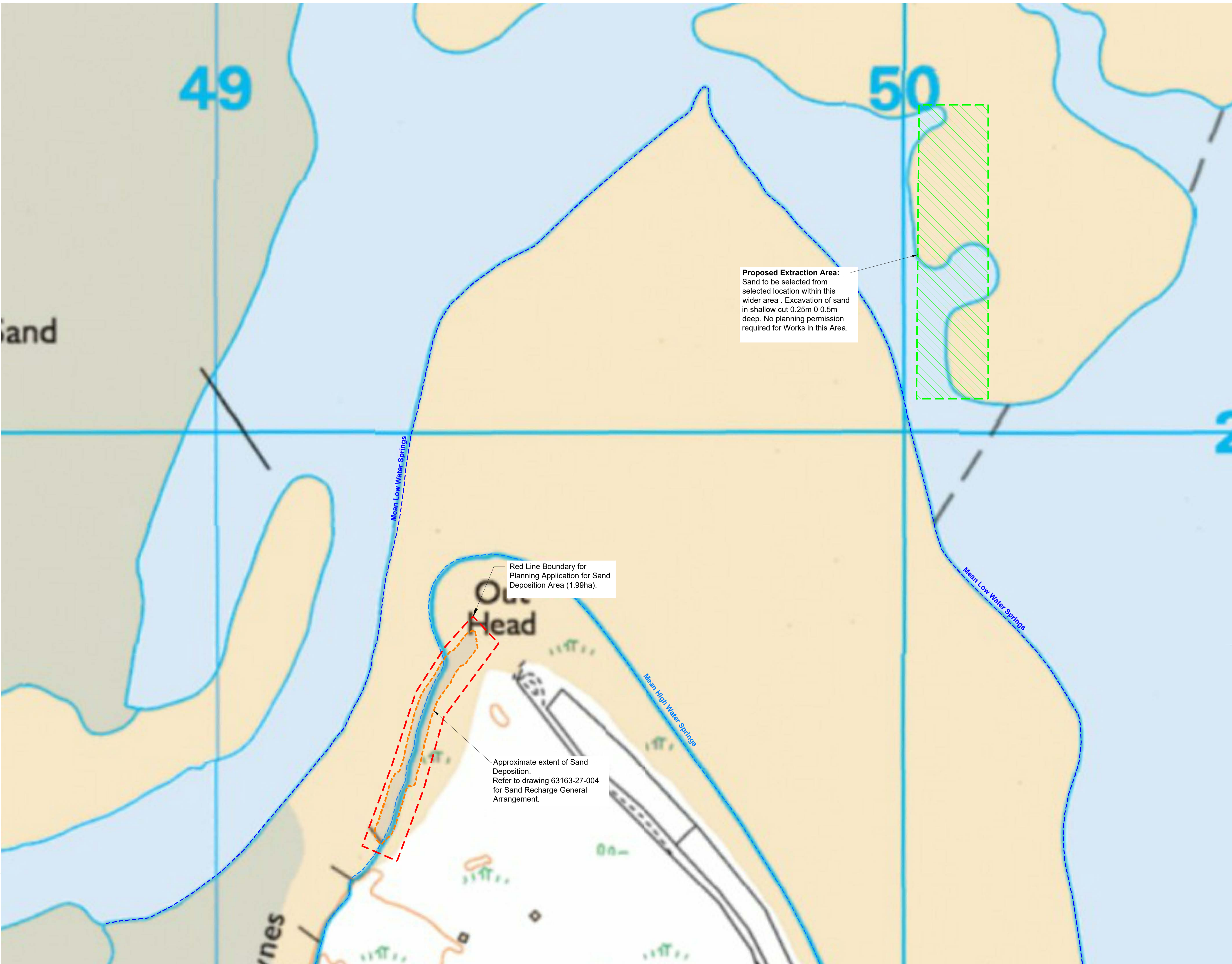
Project Name
**Outhead Sand Recharge Works
 Delivery Phase**
 Client
St Andrews Links Trust

Title
Site Location Plan



Date
 15.05.23
 Paper Size
 A1
 Quality Assurance
 ISO 9001:2015
 SCS UKAS Certificate CS60254539
 Checked by
 MRC
 Copyright Acknowledgement
 Ordnance Survey © Crown Copyright 2022
 All rights reserved. Licence No. AL100017966

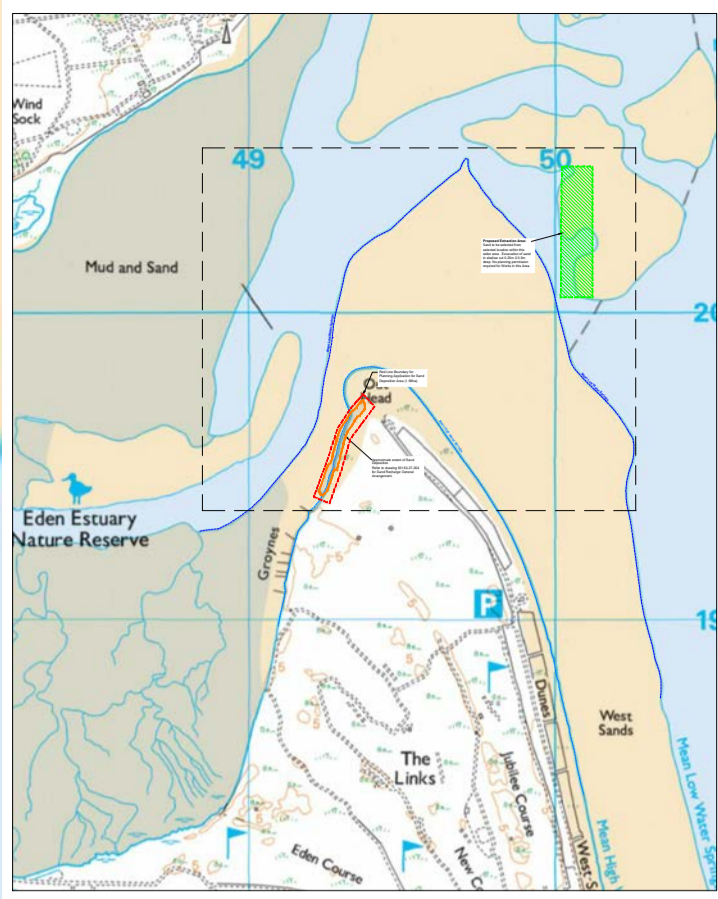
Status
FOR PLANNING
 Project No. Class Drawing No. Revision
63163-01-001-P01



Proposed Extraction Area:
 Sand to be selected from selected location within this wider area. Excavation of sand in shallow cut 0.25m 0.0.5m deep. No planning permission required for Works in this Area.

Red Line Boundary for Planning Application for Sand Deposition Area (1.99ha).

Approximate extent of Sand Deposition. Refer to drawing 63163-27-004 for Sand Recharge General Arrangement.



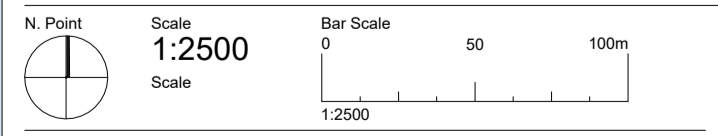
Location Plan
 1:25,000

PO3	23.05.23	Proposed Extraction Area revised	LG
PO2	18.04.23	Proposed Extraction Area revised	KMcN
PO1	-	For Client Issue	-
Revision	Date	Description	Initials

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 EDINBURGH | GLASGOW | MANCHESTER

Project Name
Outhead Sand Recharge Works Delivery Phase
 Client
St Andrews Links Trust

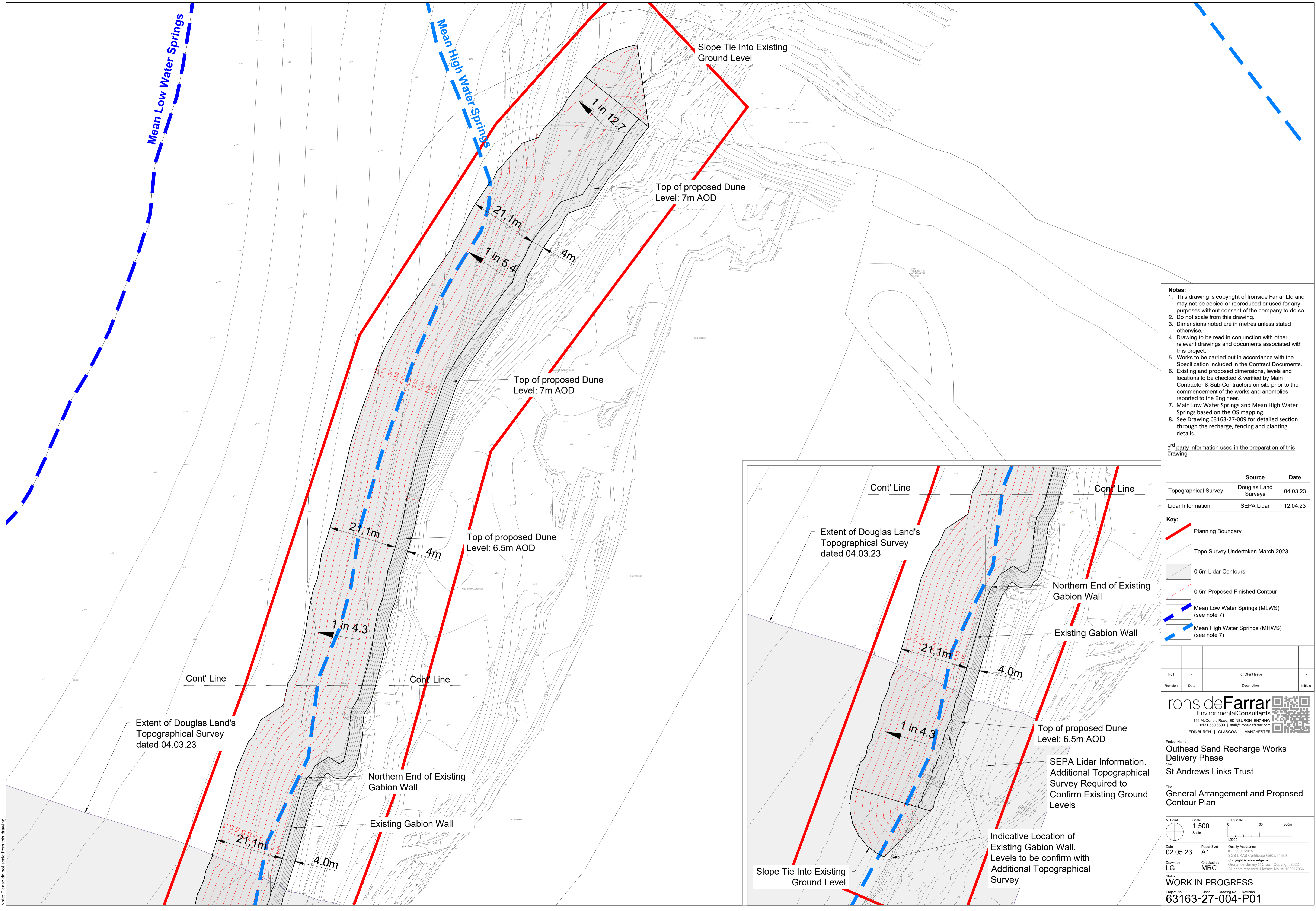
Title
Proposed Extent of Works: Extraction and Deposition Areas



Date
13.04.23
 Paper Size
A1
 Quality Assurance
 ISO 9001:2015
 SGS UKAS Certificate GB0254539
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Drawn by
KMcN
 Checked by
MRC
 Status
WORK IN PROGRESS
 Project No. Class Drawing No. Revision
63163-27-003-PO3

Note: Please do not scale from this drawing



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 7. Main Low Water Springs and Mean High Water Springs based on the OS mapping.
 8. See Drawing 63163-27-009 for detailed section through the recharge, fencing and planting details.

3rd party information used in the preparation of this drawing

	Source	Date
Topographical Survey	Douglas Land Surveys	04.03.23
Lidar Information	SEPA Lidar	12.04.23

- Key:**
- Planning Boundary
 - Topo Survey Undertaken March 2023
 - 0.5m Lidar Contours
 - 0.5m Proposed Finished Contour
 - - - Mean Low Water Springs (MLWS) (see note 7)
 - - - Mean High Water Springs (MHS) (see note 7)

Revision			
Revision	Date	Description	Initials

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Project Name
Outhead Sand Recharge Works Delivery Phase
 Client
St Andrews Links Trust

Title
General Arrangement and Proposed Contour Plan

N. Point Scale 1:500
 Bar Scale 0 100 200m
 Date 02.05.23 Paper Size A1 Quality Assurance ISO 9001:2015
 Checked by MRC
 Status **WORK IN PROGRESS**

Project No. 63163-27-004-P01
 Class
 Drawing No.
 Revision

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Table 1. Cut & Fill Earthworks Volumes

Location	Area m ²	Cut Volume m ³	Fill Volume m ³	Net Volume
Proposed Sand Recharge	8,161.70	-78.90	12,894.20	12,815.30

Cut and Fill Notes

1. Cut and fill volumes have been calculated based on the Douglas Land's Topographical Survey dated 04.03.2023.
2. Cut and fill volumes have been calculated from the Existing Ground Level to the Proposed Finished Ground level.
3. Extent of earthworks limited within earthworks boundary.
4. Earthworks modelling does not take account of contractor's sequence of works and consideration should be given to handling and stockpiling of material.

Refer to drawings
63163-27-006 to 008 for
Cross Sections

Extent of Douglas Land's
Topographical Survey
dated 04.03.23

Refer to drawings
63163-27-006 to 008 for
Cross Sections

SEPA Lidar Information. Additional
Topographical Survey Required to
Confirm Existing Ground Levels

Northern End of
Existing Gabion Wall

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- 3rd party information used in the preparation of this drawing

	Source	Date
Topographical Survey	Douglas Land Surveys	04.03.23
Lidar Information	SEPA Lidar	12.04.23

- Key:**
- Topo Survey Undertaken March 2023
 - Topo Survey Undertaken March 2023
 - 0.5m Lidar Contours
 - Topo Survey Undertaken March 2023
 - Mean Low Water Springs (MLWS) (see note 7)
 - Mean High Water Springs (MHWS) (see note 7)

- CUT Depth Bands**
- Band 1 -0.00 - -0.50
 - Band 2 -0.50 - -1.00
 - Band 3 -1.00 - -1.55
- FILL Depth Bands**
- Band 1 0.00 - 0.50
 - Band 2 0.50 - 1.00
 - Band 3 1.00 - 1.50
 - Band 4 1.50 - 2.00
 - Band 5 2.00 - 2.50
 - Band 6 2.50 - 3.00
 - Band 7 3.00 - 3.50
 - Band 8 3.50 - 4.20

Revision	Date	Description	Initials
P01	-	For Client Issue	-

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Project Name
**Outhead Sand Recharge Works
Delivery Phase**

Client
St Andrews Links Trust

Title
**Cut and Fill Earthwork Depth Bands
and Volumes**

N. Point
Scale
Noted
Scale

Date
04.04.23

Paper Size
A1

Quality Assurance
ISO 9001:2015
SCS UKAS Certificate CB0254539
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Project No. Class. Drawing No. Revision
63163-27-005-P01

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 7. Main Low Water Springs and Mean High Water Springs based on the OS mapping.

3rd party information used in the preparation of this drawing

	Source	Date
Topographical Survey	Douglas Land Surveys	04.03.23
Lidar Information	SEPA Lidar	12.04.23

For full details of Fencing and Planting and Other Works, refer to the specification.

Planting Notes:
Planting to be cell grown plants Marram sprigs of local provenance to maximise growth and early stability of the planted areas.

Cell grown marram of local province sourced from:

<https://cheviot-trees.co.uk/grasses/119-ammophila-arenaria-marram-grass.html>

NPK, or organic alternative, should be applied at least twice in the first season to promote growth.

Planting density of 10 plants/m².

Allow for return visits to site during the 12-month maintenance period for regular maintenance of plant. To include replacement of dead plants during Autumn visit (allow for 20% replacement, see BO) as well of replanting/reinstatement of any plants affected by erosion but which are still viable.

Fencing and Sandbag Notes:

Area to be fenced with three lines of Chespaie Fencing with diagonal SE/NW cross fencing:

- Public exclusion from the outset via outer fence lines at eastern edge of existing dune and western edge of toe of new dune recharge area.
- Additional protection for marram planting by intermediate fence
- Diagonal fences aligned SE-SW at 20m intervals along the length of the recharge.
- All fences will require regular maintenance over the 12-month maintenance period and partial removal as the new landform erodes to some sort of equilibrium.
- Toe fence to be partially buried for increased stability.
- Line of jute sandbags to be installed and buried below the sand near the toe of the existing dunes to offer additional erosion control if required.
- Allow for regular maintenance/reinstatement of fences during the 12-month maintenance period and return visit on completion of the 12 months (or other time to be agreed with SALT/the Engineer) to remove jute bags

Topographic Surveys and Monitoring Notes:

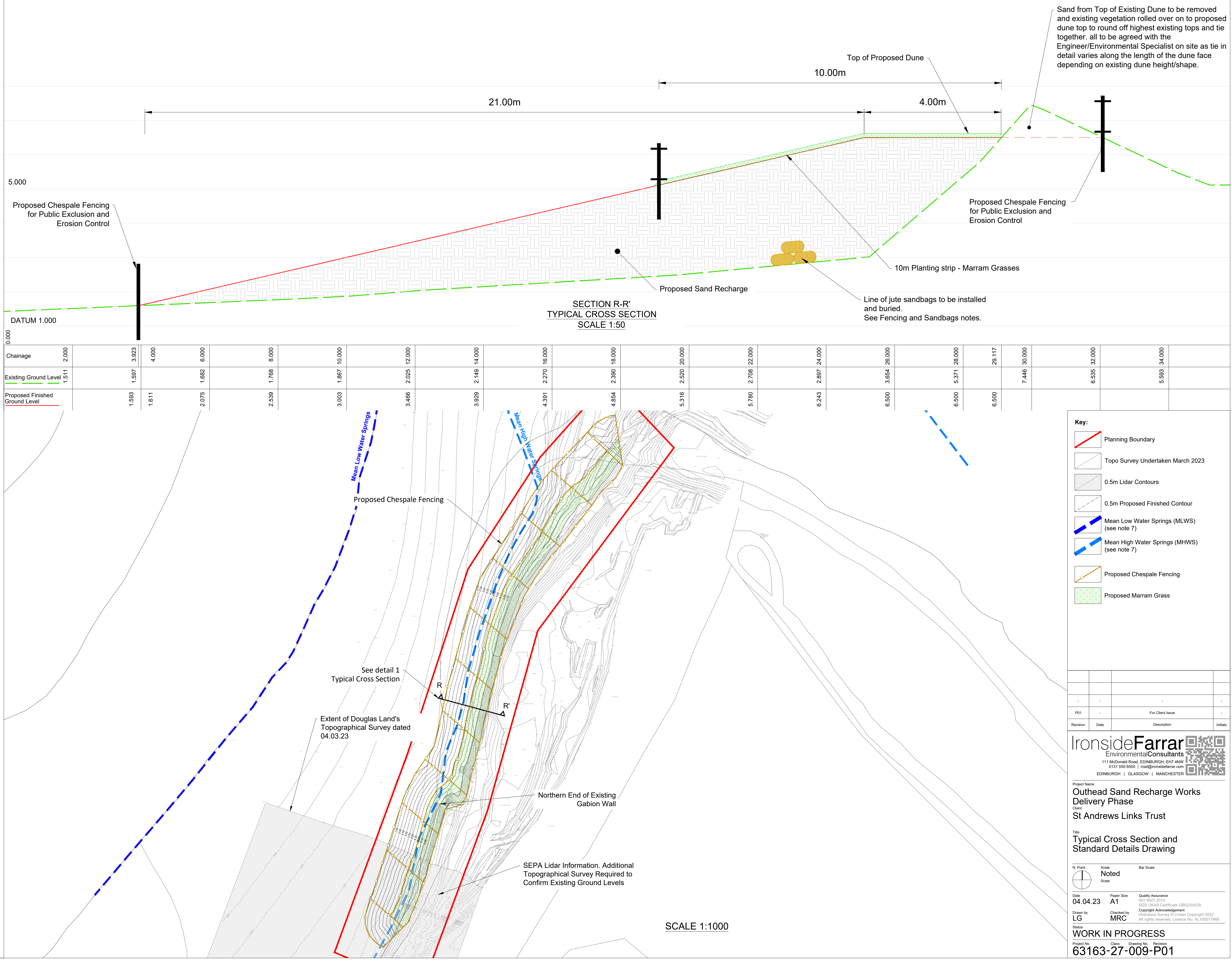
Provision of full topographic survey of recharge area plus 50m buffer zone North and South and 20m East and West via Douglas Land Surveys (who undertook previous surveys) prior to the works or other approved surveyor.

Calculation of volumes required for recharge works against the topographic survey - for agreement and checking by the Engineer. Note that ongoing erosion may have altered volumes required for the works since January 2023 topographic Survey.

Further topographic surveys to monitor the dunes at:

- One immediately post construction.
- Two at approximate six-month intervals - October 2024 and April 2025
- Four further April surveys at yearly intervals April 2026 - 2029

All surveys to be undertaken at Low Tide and to be in 3D CAD format to allow volume calculations and overlaying exercises to be completed.



Sand from Top of Existing Dune to be removed and existing vegetation rolled over on to proposed dune top to round off highest existing tops and tie together. all to be agreed with the Engineer/Environmental Specialist on site as tie in detail varies along the length of the dune face depending on existing dune height/shape.

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 - Mean High Water Springs (MHS) (see note 7)
 - Proposed Chespaie Fencing
 - Proposed Marram Grass

Revision	Date	Description	Initials
P01		For Client Issue	

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Project Name
Outhead Sand Recharge Works Delivery Phase
Client
St Andrews Links Trust

Title
Typical Cross Section and Standard Details Drawing

N. Point
Scale
Noted
Scale

Date
04.04.23
Paper Size
A1
Quality Assurance
ISO 9001:2015
SCS UKAS Certificate CB0254539
Checked by
MRC
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Status
WORK IN PROGRESS
Project No. Class Drawing No. Revision
63163-27-009-P01

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IMAGE 1
PROPOSED MODEL - GENERAL ARRANGEMENT ISOMETRIC VIEW
N.T.S

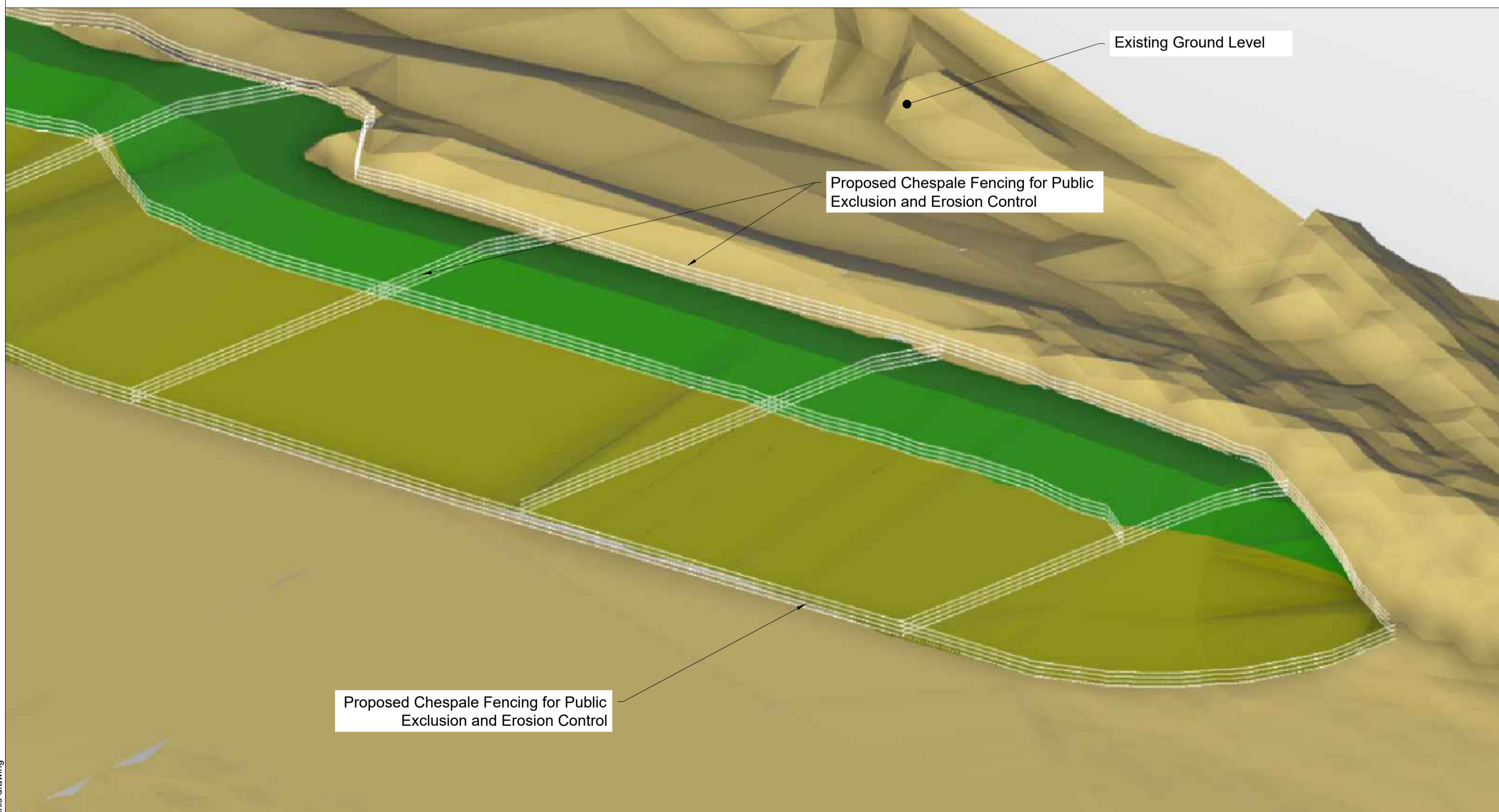
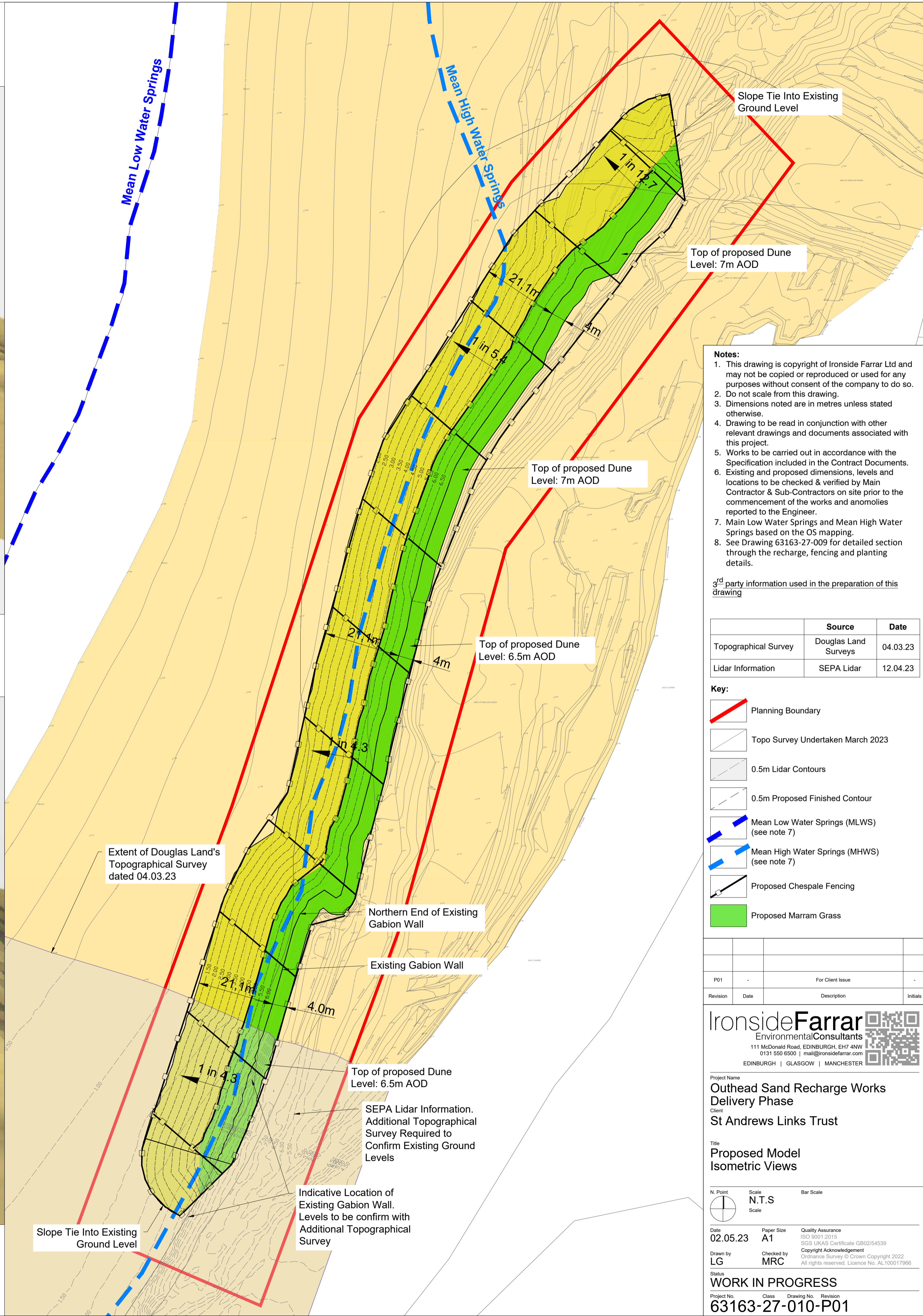


IMAGE 2
PROPOSED MODEL - FENCING ISOMETRIC VIEW
N.T.S



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 8. See Drawing 63163-27-009 for detailed section through the recharge, fencing and planting details.

3rd party information used in the preparation of this drawing

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Topographical Survey	Douglas Land Surveys	04.03.23
Lidar Information	SEPA Lidar	12.04.23

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Revision	Date	Description	Initials
P01	-	For Client Issue	-

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Project Name
Outhead Sand Recharge Works Delivery Phase
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St Andrews Links Trust

Title
Proposed Model Isometric Views

N. Point	Scale	Bar Scale
	N.T.S	

Date	Paper Size	Quality Assurance
02.05.23	A1	ISO 9001:2015 9001 UKAS Certificate GB0254539
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