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Sizewell C
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Sizewell C Project

Package to Inform Countryside Rights of Way (CRoW) Act and Habitats Regulations Assessment (HRA)

Permit MDS/CWDA/90: TCA Site Discharge

DOCUMENT CONTROL

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CONTENTS

1 PROJECT BACKGROUND

1.1 Introduction

1.1.1.1 The Sizewell C Project ('SZC Project') is a consented nuclear power station[1], comprising two UK European Pressurised Reactors™ located north of the existing Sizewell B power station in Suffolk. The Secretary of State's (SoS) Habitats Regulations Assessment (HRA)[2] (hereafter referred to as the 'SoS HRA') records his decision on the potential for adverse effects on the integrity of European and Ramsar sites as a result of the construction and operation of the SZC Project. The SZC Project is currently preparing construction-related permit applications. These are required for a number of project-related activities, including, for example, water discharges and realignment of channels. Several these permits also require a HRA or have Countryside and Rights of Way 2000 (CRoW) Act considerations.

1.1.1.2 The Competent Authority (Environment Agency, EA) has screened each permit identified as being required for the project to determine a potential zone of influence (ZoI) of the proposed permittable activities on both European sites, Ramsar sites and Sites of Special Scientific Interest (SSSI). Through the EA Screening Tool, a ZoI for European and/or Ramsar sites is determined for each permit. For the permit that this information package relates to, referred to as MDS/CWDA/90, the ZoI comprises a 100m buffer around each proposed discharge outfall set out in the permit application (discharge of surface water run-off from outlets O1: TM 47216 64922, O2: TM 46872 65459 and EO3: TM 46558 64548 to the Leiston drain) and extending downstream to sea.

1.1.1.3 This package to inform HRA and SSSI assessment has been put together to aid the EA in completing their HRA and CRoW assessment for this permit.

1.1.1.4 This package was submitted to the EA for initial comments prior to the formal permit submission.

1.2 Purpose of Report

1.2.1.1 This report comprises a package to inform HRA and SSSI assessments to support the EA in their assessment of permit application MDS/CWDA/90 which is a water discharge activity permit application for the discharge of rainfall-dependent surface water run-off, from the Main Development Site (MDS), to receiving watercourses following treatment.

1.3 Protected Sites and Risks Under Consideration

1.3.1.1 As described in **Section 1** above, the EA Screening Tool has been used to identify European, Ramsar sites and/or SSSIs within the ZoI which may be impacted by permit MDS/CWDA/90. The ZoI for this discharge permit has been defined as a 100m buffer around each discharge point and extending downstream to sea.

1.3.1.2 In accordance with the EA approach to screening, the European and Ramsar sites, and SSSIs given in **Table 1.1** fall within the spatial ZoI of the Permit (refer to **Figure 1.1**).

[1] The Sizewell C (Nuclear Generating Station) Order 2022. Available online at: https://www.legislation.gov.uk/uksi/2022/853/contents/made. [Accessed 25/09/2024]

[2] Secretary of State (Department for Business, Energy and Industrial Strategy) (2022). Habitats Regulations Assessment for an Application Under the Planning Act 2008: Sizewell C New Nuclear Power Station. Available online at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-011167-SZC-HRA.pdf.

Table 1.1 Sensitive Receptor Sites

Sensitive Receptor Site	Distance from Permit Location
Minsmere to Walberswick Heaths and Marshes SSSI	Permit activities are located, at their closest point, 1m southwest
Sizewell Marshes SSSI	Permit activities are located, at their closest point, 0.5m north
Minsmere to Walberswick Heaths and Marshes Special Area of Conservation (SAC)	Permit activities are located, at their closest point, 246m west
Minsmere-Walberswick Special Protection Area (SPA)	Permit activities are located, at their closest point, 246m west
Minsmere-Walberswick Ramsar site	Permit activities are located, at their closest point, 246m west
Southern North Sea SAC	Permit activities are located, at their closest point, 468m west
Outer Thames Estuary SPA	Permit activities are located, at their closest point, 452m west

1.1.1.1 A description of these sites is provided below.

1.3.2 Minsmere-Walberswick Heaths and Marshes SSSI

Table 1.2 Features Present within Minsmere-Walberswick Heaths and Marshes SSSI and their Condition

Feature	Condition
Aggregations of breeding birds – Avocet	Favourable
Aggregations of breeding birds - Bearded tit	Unfavourable – declining
Aggregations of breeding birds - Bittern	Favourable
Aggregations of breeding birds - Cetti's warbler	Favourable
Aggregations of breeding birds - Gadwall	Favourable
Aggregations of breeding birds - Garganey	Favourable
Aggregations of breeding birds - Marsh harrier	Favourable
Aggregations of breeding birds - Nightjar	Favourable
Aggregations of breeding birds - Shoveler	Favourable
Aggregations of breeding birds - Teal	Unfavourable – no change
Aggregations of breeding birds - Tufted duck	Not recorded
Aggregations of breeding birds - Water rail	Unfavourable – declining

Feature	Condition
Aggregations of breeding birds - Woodlark	Favourable
Aggregations of non-breeding birds - Dunlin	Favourable
Aggregations of non-breeding birds - Redshank	Favourable
Aggregations of non-breeding birds - variety of passage species	Not recorded
Aggregations of non-breeding birds - variety of wintering species	Not recorded
Assemblages of breeding birds - lowland damp grasslands	Unfavourable – declining
Assemblages of breeding birds - variety of species	Favourable
Coastal vegetated shingle (SD1-3)	Partially destroyed
Ditches	Not recorded
Fixed dune grassland	Favourable
Floodplain fen (lowland)	Not recorded
Invert. assemblage F111 bare sand & chalk	Favourable
Invert. assemblage F112 open short sward	Favourable
Littoral sediment	Not recorded
Lowland calcareous grassland (CG7)	Favourable
Lowland dry acid grassland (U1b,c,d,f)	Not recorded
Lowland dry acid grassland (U4)	Not recorded
Lowland dry heath	Not recorded
Mire grasslands and rush pastures (upland)	Not recorded
Population of Schedule 8 plant - Filago lutescens, red-tipped cudweed	Not recorded
Saline coastal lagoons	Not recorded
Sand dune; strandline, embryo and mobile dunes (SD1-6)	Favourable
SM4-28 - Saltmarsh	Not recorded
Vascular plant assemblage	Not recorded
Wet woodland	Unfavourable – recovering

1.3.3 Sizewell Marshes SSSI

Table 1.3 Features Present within Sizewell Marshes SSSI and their Condition

Feature	Condition
Assemblage of breeding birds – Lowland damp grasslands	Favourable
Ditches	Favourable
Floodplain fen (lowland)	Favourable
Invertebrate assemblage W211 – Open water on disturbed sediments	Unfavourable – recovering
Invertebrate assemblage W314 reed-fen & pools	Favourable
Lowland mire grassland and rush pasture	Favourable
Vascular plant assemblage	Not recorded

1.3.4 Minsmere to Walberswick Heaths and Marshes SAC

1.3.4.1 The site qualifies due to the presence of the following Annex I habitats:

- Annual vegetation of drift lines;
- European dry heaths; and
- Perennial vegetation of stony banks.

1.3.5 Minsmere to Walberswick SPA

1.3.5.1 During the breeding season the area regularly supports:

1.3.5.2 Qualifies under Article 4.1, by supporting, in summer, nationally important breeding populations of the following Annex 1 species:

- Bittern *Botaurus stellaris* (breeding);
- Marsh Harrier *Circus aeruginosus* (breeding);
- Avocet *Recurvirostra avosetta* (breeding);
- Little tern *Sternula albifrons* (breeding); and
- Nightjar *Caprimulgus europaeus* (breeding).

1.3.5.3 Qualifies under Article 4.1 by regularly supporting, in winter, a nationally important wintering population of:

- Hen harrier *Circus cyaneus* (non-breeding).

1.3.5.4 Qualifies under Article 4.2 by supporting, in summer, in recent years, nationally important breeding populations of three regularly occurring migratory species:

- Eurasian teal *Anas crecca* (breeding);
- Gadwall *Anas strepera* (breeding); and
- Shoveler *Anas clypeata* (breeding).

1.3.5.5 Qualifies under Article 4.2 by supporting nationally important wintering populations of three migratory waterfowl:

- Greater white-fronted goose *Anser albifrons albifrons* (non-breeding);
- Gadwall (non-breeding); and
- Shoveler (non-breeding).

1.3.6 Minsmere-Walberswick Ramsar Site

1.3.6.1 Ramsar criterion 1: The site contains a mosaic of marine, freshwater, marshland and associated habitats, complete with transition areas in between. Contains the largest continuous stand of reedbeds in England and Wales and rare transition in grazing marsh ditch plants from brackish to fresh water.

1.3.6.2 Ramsar criterion 2: This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc *Vertigo angustior* (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls. The site also supports an important assemblage of rare breeding birds associated with marshland and reedbeds including: Bittern, gadwall, Eurasian teal, shoveler, marsh harrier, avocet and bearded reedling *Panurus biarmicus*.

1.3.7 Southern North Sea SAC

1.3.7.1 The site qualifies due to the presence of the following Annex II species:

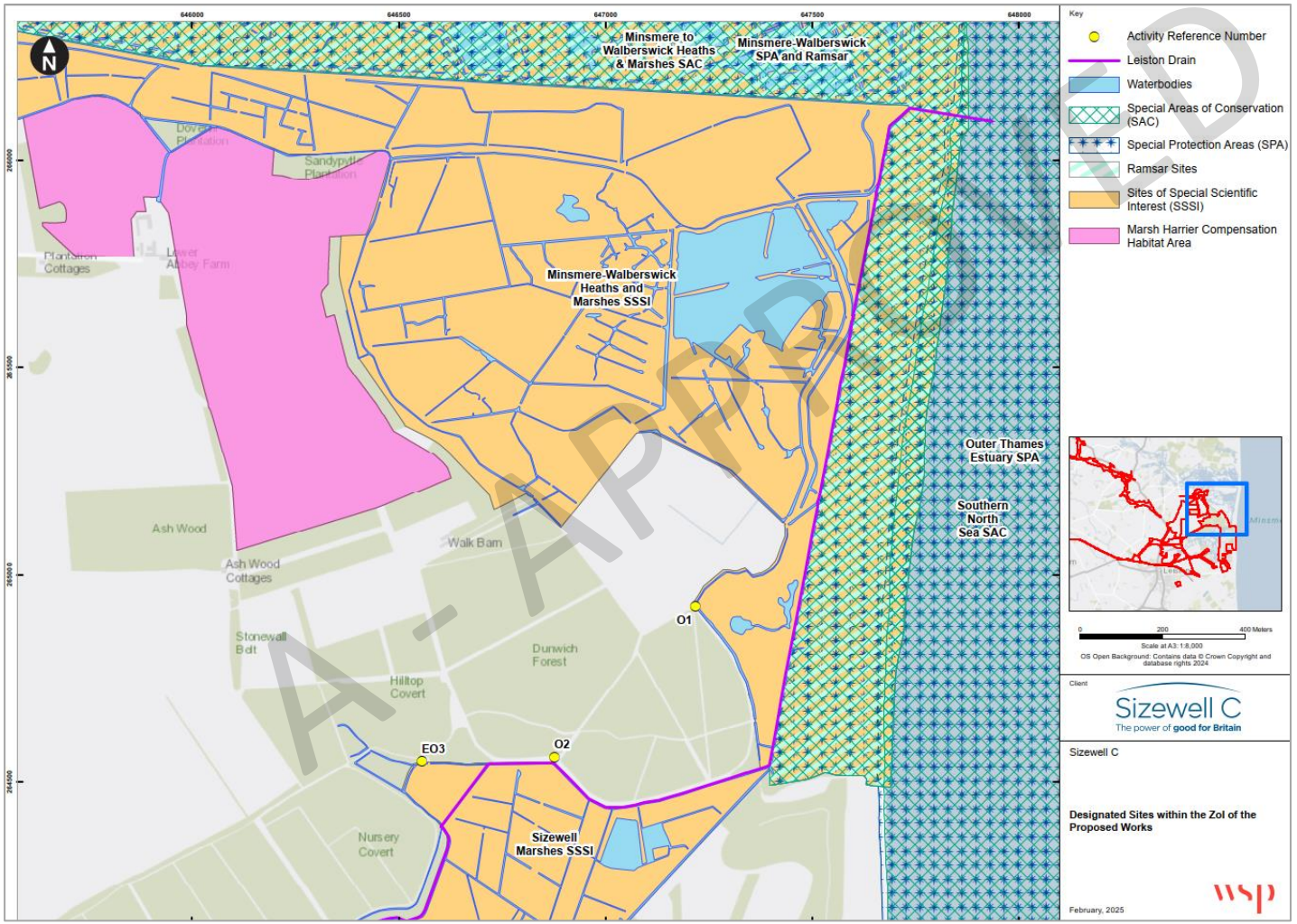
- Harbour Porpoise *Phocoena phocoena.*

1.3.8 Outer Thames Estuary SPA

1.3.8.1 The site qualifies under Article 4.1 as it is used regularly by 1% or more of the Great Britain populations of the following species listed in Annex I in any season:

- Common tern *Sterna hirundo* (breeding);
- Little tern *Sternula albifrons* (breeding); and
- Red-throated diver *Gavia stellata* (non-breeding).

Figure 1.1 European and Ramsar Sites within Proximity to Permit Activities



1.4 Environment Agency Risks

1.4.1.1 When considering the potential for an activity to impact upon a protected site the focus of the EA's assessment is risk-based. There are specific risks for specific activities, and these are the focus of their assessment. It is understood that the following risks are potentially associated with this Permit and the package of information provided has been cognisant of these risks.

- Turbidity;
- Toxic contamination;
- Siltation;
- Physical damage;
- Changes in pH;
- Nutrient enrichment;
- Changes in thermal regime; and
- Changes in salinity regime.

1.4.1.2 Although this package of information does not explicitly refer to these risks or provide an assessment of significance, a matrix has been provided in **Appendix A.1 to A.7**, which summarises the likely conclusions of the assessment with regard to these risks. The purpose of this matrix is to support a separate, strategic in-combination activity being undertaken for which this information is necessary. The results of this matrix will be agreed and/or modified on the basis of the EA's own HRA conclusion.

1.5 Definitions

Term / Abbreviation	Definition
BTEX	Benzene, Toluene, Xylene and Ethylbenzene
CIRIA	Construction Industry Research and Information Association
CRoW	Countryside Rights of Way
CWDA	Construction Water Discharge Activity
DCO	Development Consent Order
EA	Environment Agency
ES	Environmental Statement
EQS	Environmental Quality Standard
FRAP	Flood Risk Activity Permit
GAC	Generic Assessment Criteria
HRA	Habitats Regulations Assessment
LDC	Land Drainage Consent
MAR	Main Access Road
MCA	Main Construction Area

Term / Abbreviation	Definition
MDS	Main Development Site
NE	Natural England
NGR	National Grid Reference
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyl
PNEC	Predicted No Effect Levels
SAC	Special Area of Conservation
SLR	Sizewell Link Road
SoS	Secretary of State
SPA	Special Protection Area
SSSI	Sites of Special Scientific Interest
SuDS	Sustainable Drainage Systems
SZC	Sizewell C
TCA	Temporary Construction Area
TSD	Temporary Sea Defence
TSS/SS	Total Suspended Solids
WMZ	Water Management Zone
WFD	Water Framework Directive
WRA	Water Resources Abstraction
ZoI	Zone of Influence

2 OVERVIEW OF INTENDED OPERATION

2.1.1.1 This package to inform HRA and SSSI assessment relates to a permit application for a discharge activity required to support the initial construction activities for the SZC project: the discharge of surface water run-off from outlets O1, O2 and EO3 to the Leiston drain.

2.1.1.2 The proposed water discharge activity is linked to the Temporary Construction Area (TCA) of the MDS. The TCA encompasses an area of land to the north of Sizewell Marshes SSSI. This area is to be used for temporary construction purposes only and will house various aspects including contractor and worker campus accommodation and welfare facilities, haul roads, construction laydown areas and stockpiles, concrete batching plant and other treatment plants. The outfalls are located within the south-east corner of the TCA (refer to **Figure 2.1**).

2.1.1.3 All three outfalls to receiving watercourses required under this permit lead to the Leiston Drain.

2.1.1.4 The proposed works do not include the construction and installation of the outfalls, which will be subject to a separate permit application.

2.1.1.5 It is anticipated that discharging from the TCA will be required to take place from October 2025 (at the earliest). It is expected that this Outlet will be used throughout the construction phase of the TCA. The discharges via these outfalls from the TCA will be intermittent as they will be rainfall-runoff dependent. The overall anticipated discharging operational duration from Outfalls O1, O2 and EO3 are currently expected to be required for approximately 11 years (until 2036) or for 132 months. It is expected that these outfalls will be required for the full duration of the permit, however the need for each outfall will be intermittent over this period depending on rainfall and sequencing of work. The EA will be kept updated of any changes to the planned discharge durations.

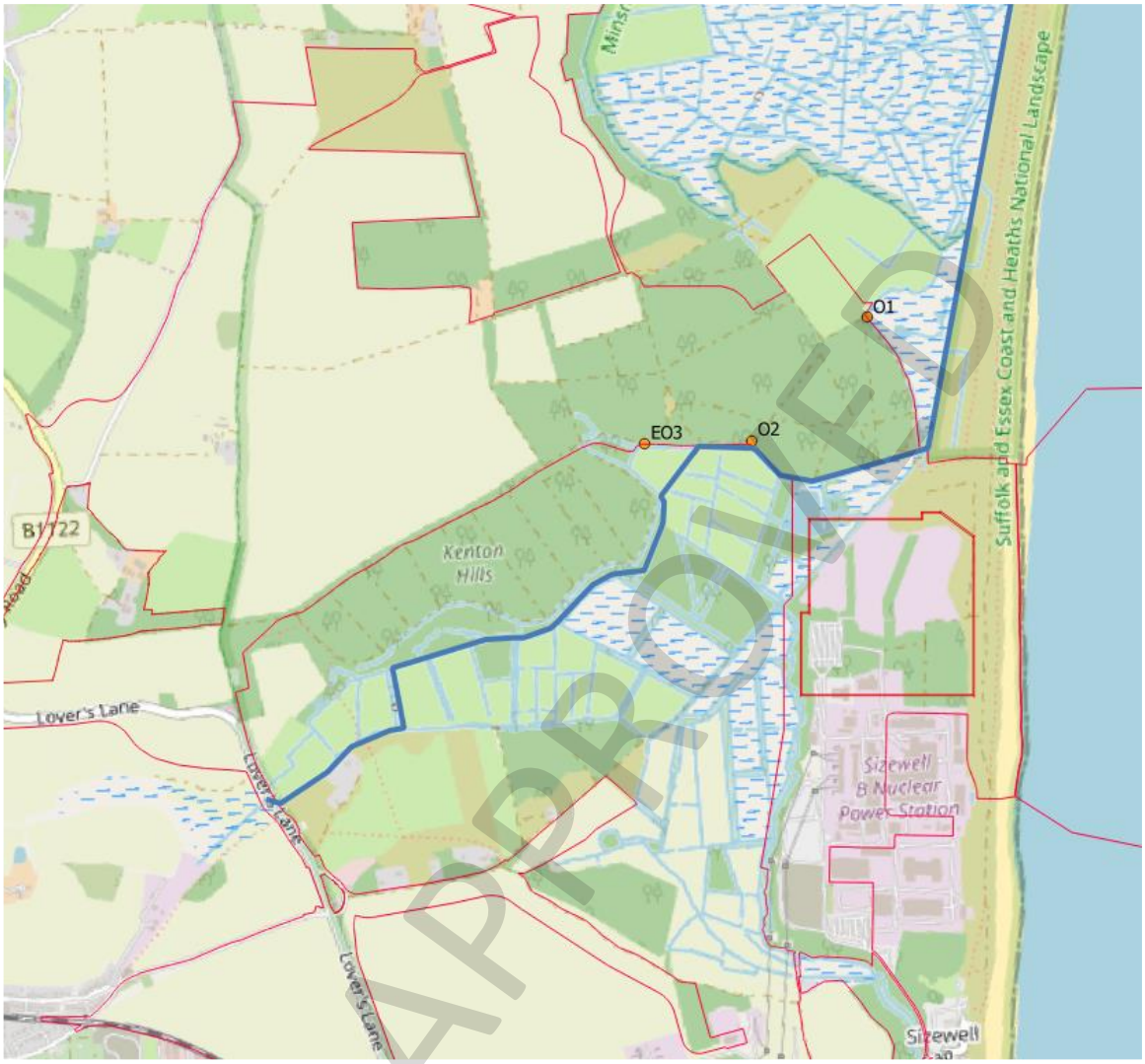


Figure 2.1 Location of Outfalls 01, 02 and E03

3 LOCATIONS OF OUTFALLS AND DISCHARGE RATES

3.1.1.1 The scope of the permit application includes the below discharge activities only:

- TCA: Discharge of rainfall-dependent surface water run-off from Water Management Zone (WMZ) 1 via O1 to an upstream tributary of Leiston Drain. Outlet O1 will be located immediately adjacent to WMZ1. WMZ1 is currently a woodland greenfield site bounded by further woodland. The site is approximately 16.03ha in area.
- TCA: Discharge of rainfall-dependent surface water run-off from WMZ2 via O2 to Leiston Drain. Outlet O2 will be located immediately adjacent to TCA WMZ2 which is currently a woodland greenfield site. The site is approximately 18.48ha in area.
- TCA: Discharge of rainfall-dependent surface water run-off from WMZ3 and WMZ4 via EO3 to an upstream tributary of Leiston Drain. Outlet EO3 will be located immediately adjacent to TCA WMZ3 and will receive runoff discharges from both WMZ3 and WMZ4. WMZ4 will have an infiltration basin with a connection to a non-infiltration storage basin within WMZ3. From WMZ3, water will be treated, if necessary, prior to discharge via Outfall EO3 to a local watercourse within the Sizewell Marshes SSSI.
    - The TCA WMZ3 is currently a greenfield agricultural site bounded by woodland to the south and grassland to the north. The site is approximately 20.58ha in area.
    - The TCA WMZ4 is currently a greenfield agricultural site bounded by grassland on each side. The site is approximately 33.75ha in area.

3.1.1.2 The location of each Outlet subject to the permit application is shown in **Figure 2.1** and **Table 3.1** below.

3.1.1.3 The WMZ layouts are shown on **Figure 3.1.**

Table 3.1 Discharge Locations

Catchment Reference	SZC Outlet Reference	Discharge Source	Receptor (EA WDA Reference)	National Grid Reference (NGR)
Leiston Beck Water Framework Directive (WFD) waterbody catchment.	01	TCA: Discharge of rainfall-dependent surface water run-off from WMZ1.	Leiston Drain	TM 47217 64922
	02	TCA: Discharge of rainfall-dependent surface water run-off from WMZ2.		TM 46876 64559
	E03	TCA: Discharge of rainfall-dependent surface water run-off from WMZ3 and 4.		TM 46556 64549

3.1.1.4 To inform the water discharge activity permit application, anticipated discharge flow rates have been calculated. These are provided in **Section 4.1.6** of the Technical Supporting Document[3] which accompanies the permit application and have also been presented below, in **Table 3.2** for ease of reference.

3.1.1.5 As part of the Development Consent Order (DCO) Drainage Strategy[4] it was agreed that run-off rates from the catchments would be limited to greenfield run-off rates. Due to the natural soils having high permeability, greenfield run-off rates for frequent rainfall events are very low and use of such rates would result in

[3] Sizewell C (2024). Construction Water Discharge Activity Permit Application MDS/CWDA/90. ***Document Reference tbc***

[4] Sizewell C (2022). The Sizewell C Project – SZC Co.'s Response to the Secretary of State's Request for Further Information dated 18 March 2022: Appendix 3 - The Drainage Strategy Part 1 of 12. Revision: 2.0. April 2022.

impractical storage requirements. SZC Co have therefore proposed to restrict discharge rates to the greater of 1 l/s/ha or QBAR (mean annual flood - the value of the average annual flood event recorded in a river). For outlets O1 and O2 we are proposing a QBAR value of 1.5/l/ha, for outlet EO3 we are proposing to use 50% this value due to concerns about introducing to large a point flow for WMZ3 and 4 combined [4], further details are given in **Table 3.2**. Any changes to flow rates submitted at DCO will be subject to separate planning applications, as required.

3.1.1.6 It should be noted this is a peak discharge rate and flow rates from lower intensity, higher frequent rainfall events will likely be lower than this; once detailed design of construction drainage has been completed by the Principal Contractor, and hydrographs applied for relevant rainfall return periods, it is possible that daily discharge volumes may decrease.

3.1.1.7 A maximum daily discharge volume in m^3/day has been estimated. To provide the maximum daily (24 hour) discharge volume, the following calculation was applied:

Maximum discharge flow rate x 60 seconds x 60 minutes x 24 hours = daily litres then / 1000 to convert to m^3

3.1.1.8 Discharges are ultimately dependent on levels of rainfall and as such, will be undertaken on an intermittent basis. Due to the nature of the discharge i.e. rainfall dependent, prescribed durations for the discharge cannot be predicted. Furthermore, due to the nature of the discharge it is not possible to provide accurate hourly or annual discharge rates although these could be inferred from the maximum discharge rate estimates provided in **Table 3.2** and seasonal average annual rainfall estimations.

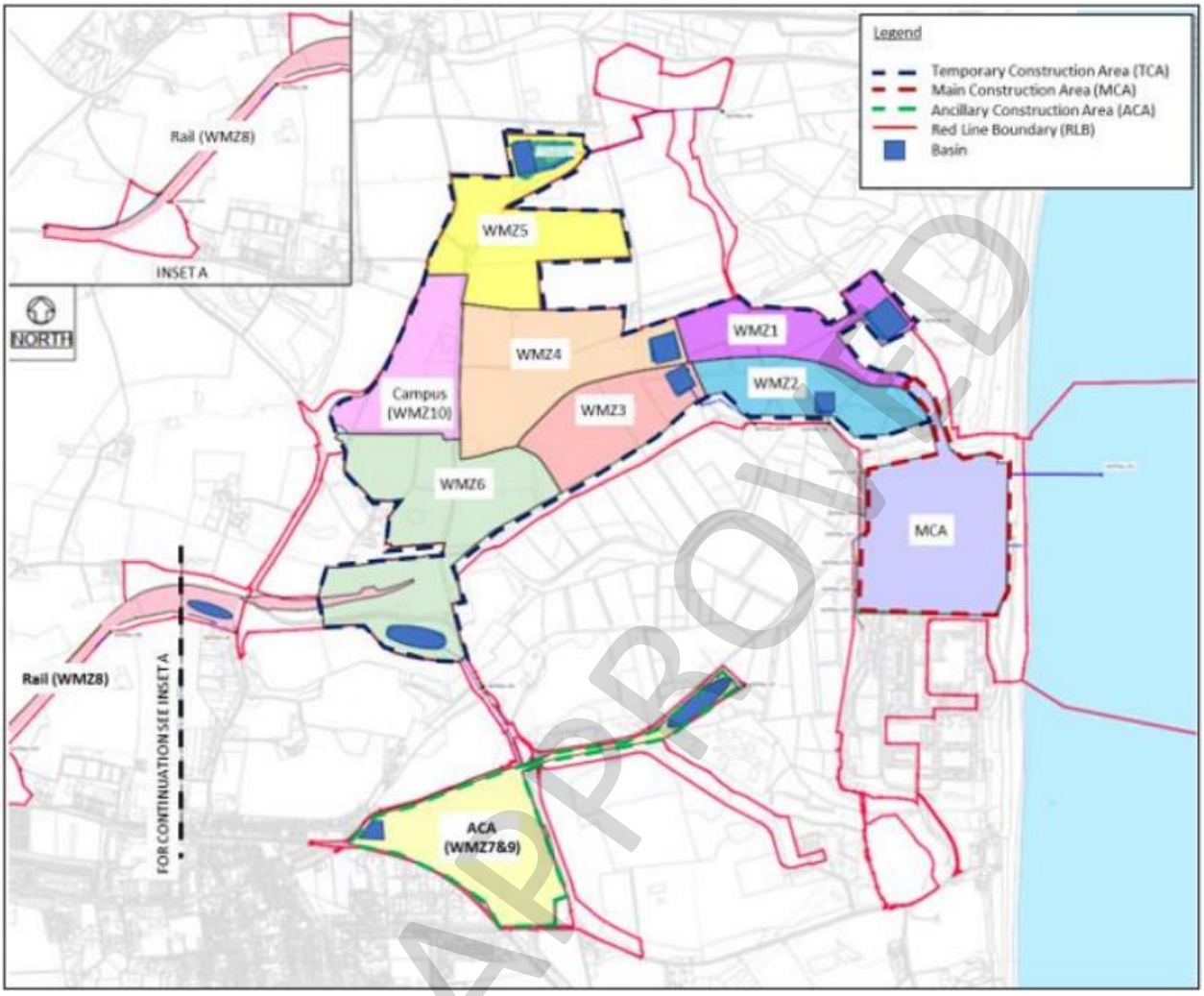
3.1.1.9 The Leiston Drain is the only feature that falls within the above-described site setting that is being proposed as the main receptor for the discharge activities included within the permit application. The flow in the Leiston Drain is not anticipated to dry up during the year because of the flow as it receives from the upstream catchment, and also from discharged effluent from the Leiston Sewage Treatment Works, which serves the nearby town of Leiston. It is important to note however that the flow levels in the Leiston Drain are affected by the control of the Minsmere Sluice further upstream, over which SZC do not have any control. This is operated by the relevant regulator based on tidal aspects and flows from other watercourses.

Table 3.2 Discharge Rates

Outlet Reference No. and NGR Location (approximate)	Receptor	Maximum Discharge Rate (litres / second) and Maximum Discharge Volume (m3 / day)
O1 NGR: TM 47217 64922	Tributary of Leiston Drain	Maximum discharge = 23.7 l/s / 2,048 m3/day The discharge flow rate from Outlet O1 will be limited to a maximum of 23.7 l/s. using the QBAR greenfield run-off rate as opposed to the assumed value of 1l/s/ha used in the DCO Drainage Strategy[4] which equated to 19.4l/s. The discharge from the TCA will be intermittent, dependent upon rainfall. The flow rate will be controlled from the treatment plant system(s) that will be incorporated as part of the discharge treatment train (see **Section 6**).
O2 NGR: TM 46876 64559	Leiston Drain	Maximum discharge = 27.6 l/s / 2,385 m3/day The discharge flow rate from Outlet O2 will be limited to a maximum of 27.6 l/s. using the QBAR greenfield run-off rate as opposed to the assumed value of 1l/s/ha used in the DCO Drainage Strategy[4] which equated to 17.4l/s. The discharge from the TCA will be intermittent, dependent upon rainfall and dewatering activities. The flow rate will be controlled from the treatment plant system(s) that will be incorporated as part of the discharge treatment train (see **Section 6**).

Outlet Reference No. and NGR Location (approximate)	Receptor	Maximum Discharge Rate (litres / second) and Maximum Discharge Volume (m3 / day)
EO3 NGR: TM 46556 64549	Tributary of Leiston Drain	Maximum discharge = 40.7 l/s / 3,516 m3/day The discharge flow rate from Outlet EO3 will be limited to a maximum of 40.7l/s via a positive outfall to a local watercourse within the Sizewell Marshes SSSI. This flow rate has been calculated based on 50% of the QBAR greenfield run-off rate as opposed to the assumed value of 1l/s/ha used in the DCO Drainage Strategy[4]. This is due to redistribution of the WMZ3 and WMZ4 catchments compared to the existing situation. This results in the run-off from these catchments being discharged to the Sizewell Marshes at a single point, rather than being more distributed. As a consequence, it is not considered appropriate to use the full QBAR rate as this could have adverse hydro-geomorphological consequences within the Sizewell Marshes.

Figure 3.1 Location of WMZs for the SZC Project



4 NATURE OF DISCHARGE

4.1.1.1 The proposed discharge at all three outfalls will comprise rainfall-dependent surface water run-off during construction, as described in **Table 4.1**.

Table 4.1 Nature and Source of Effluent

Outlet Reference No. and NGR Location (approximate)	Effluent Type and Source
O1	Rainfall-dependent surface water run-off from WMZ 1. Activities taking place within the TCA will include typical construction activities including earthworks, transfer and storage of materials, plant and equipment, use of vehicles, waste management and concreting activities.
O2	Rainfall-dependent surface water run-off from WMZ 2. Activities taking place within the MDS will include typical construction activities including earthworks, transfer and storage of materials, plant and equipment, use of vehicles, waste management and concreting activities.
EO3	Rainfall-dependent surface water run-off from WMZ3 and WMZ4. Activities taking place within the MDS will include typical construction activities such as bulk earthworks, transfer and storage of materials, plant and equipment, use of vehicles, waste management and concreting activities.

4.1.1.2 The surface water run-off proposed to be discharged will be treated prior to discharge to ensure potentially elevated levels of suspended solids (SS) and pH (from run-off from areas where concreting might take place) are reduced to appropriate levels if in exceedance of the permitted discharge criteria. Proposed treatment measures are described in **Section 6**.

4.1.1.3 Operational phase discharges are excluded from the scope of this permit application.

4.1.1.4 A Surface Water Pollution Risk Assessment (H1) is not required as the only polluting substance anticipated to be present in the run-off is SS, as a result of groundworks and those activities listed above.

4.1.1.5 The run-off will be treated as required (and described in **Section 6**) to ensure levels of SS and pH meet condition permit requirements to discharge to the receiving watercourses. For any outlets where dosing of coagulants / flocculants might be undertaken for treatment purposes (for example where sediment treatment systems are being used, see **Section 6**). The amount of dosing chemicals that may be required will be dependent of on-site testing and calibration, therefore it is not possible to provide an indication of how much would be used at this time. The minimum dosing level could be none, if the water meets the proposed discharge criteria it will not be directed to the treatment plant. In the circumstances that dosing is required however, a limit will likely be set in the permit for iron (total Fe). Material safety data sheets will be provided and available for the substances that will be used when known.

4.1.1.6 A specific substances Surface Water Pollution Risk Assessment has not been undertaken as there is not expected to be any carry over of chemicals present in the discharge streams. When introduced into the water on a flow proportional basis at the optimum pH, the coagulant (for example, Ferric Chloride) primarily forms an insoluble hydroxide, which is bound up within the settled/floated SS. As a result, any added chemicals will be removed with the settled solids. The concentrations of these chemicals in the solids are, however, very low, and consequently are unlikely to change the waste classification of the settled/floated solids.

4.1.1.7 It is currently unknown which coagulant will be used, the treatment performance specifications set out preferred chemicals however the specific treatment option will be decided by the contractor when appointed.

4.1.1.8 The exemption from a H1 risk assessment has been discussed with the EA during Pre-Application discussions. It is acknowledged that if there are any changes to the current proposed treatment measures, the need for a H1 assessment may need to be revisited.

4.1.1.9 A Qualitative Environmental Risk Assessment and a Surface Water Baselining Assessment have been undertaken to assist in the delivery permit application. These Risk Assessments are attached to the Technical Supporting Document[3] as Appendix J and L respectively and the results of the Surface Water Baselining Assessment is summarised in **Section 5**.

5 SAMPLING AND MODELLING

5.1 Prevailing Environmental Conditions

5.1.1.1 Leiston Drain flows west to east before flowing northwards along the boundary of Minsmere to Walberswick Heaths and Marshes SAC, Minsmere to Walberswick SPA and Minsmere to Walberswick Ramsar site (see Figure 1.1). Leiston Drain flows into a sluice chamber along with two other waterbodies (Scotts Hall Drain which flows from the north and Minsmere New Cut which flows from the west), from here it drains into the sea.

5.1.1.2 Paragraph 14.9.1 of the Ecology Environmental Statement (ES) chapter for the DCO[5] states that glass (young) eels (*Anguilla anguilla*) were found in the Leiston Drain during aquatic macrophyte surveys showing that the Minsmere sluice is permeable to eels and that eels are therefore present within the ditch network of Sizewell Marshes SSSI. Paragraph 14.8.99 of the Ecology ES chapter[8] states that Norfolk hawker is found in Leiston Drain.

5.1.1.3 According to paragraph 1.4.86 of the plants and habitats appendix of the Ecology ES chapter[6], Leiston Drain and Sizewell ditch supported two scarce aquatic plant species: frogbit *Hydrocharis morsus-ranae* and soft hornwort *Ceratophyllum submersum*, but that the ditches within the north-western corner of Sizewell Marshes SSSI did not support as diverse aquatic communities as elsewhere within the Sizewell Marshes SSSI, due to shading from dense riparian vegetation. Pages 551 and 552 of the plants and habitats appendix[6] note that the vegetation communities on the Leiston Drain are S26 Common Reed-Common Nettle tall-herb fen, A2 Common Duckweed aquatic community, A16 Common Water starwort aquatic community, typical sub-community. Page 564 states that 'The Leiston Drain was choked by Common Reed, with Branched Bur-reed, Floating Sweetgrass and Lesser Water-parsnip scattered throughout'.

5.2 Surface Water Baseline Assessment

5.2.1.1 Surface water baselining has been undertaken to understand the background water quality across the site (refer to **Section 5.2** of the Technical Supporting Document[3]).

5.2.1.2 In terms of existing background water quality, or baseline conditions, these are heavily influenced by the inflow of saline water at Minsmere Sluice and from the baseline flow in Leiston Drain, which is characterised largely by the flow received from the upstream Leiston Sewage Treatment Works. The watercourses have been characterised, within the Surface Water chapters provided as part of the DCO Drainage Strategy[4], as generally very low energy flows and near vertical banks. Generally, they are heavily vegetated, and the substrate is largely obscured. The substrate typically consists of fine sediments (silts) when it flows over the peat and coarser gravel when flows run over the Crag bedrock. The surface water features within the area of the proposed development site are prone to sediment deposition and transportation (when flows have sufficient energy). Appropriate water quality parameters for outfall discharging activities and the associated

[5] Sizewell C (2020). Chapter 14 Terrestrial Ecology and Ornithology. Revision 1.0. Available online at: EN010012-001844-SZC_Bk6_ES_V2_Ch14_Terrestrial Ecology and Ornithology.pdf (planninginspectorate.gov.uk)

[6] Sizewell C (2020). Chapter 14 Terrestrial Ecology and Ornithology. Appendix 14A3 Plants and Habitats. Revision 1.0. Available online at: https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-001879-SZC_Bk6_ES_V2_Ch14_Terrestrial_Ecology_Ornithology_Appx14A3_Plants_Habitats.pdf

treatment methods described in **Sections 6 and 7**. The below bullet points summarise the key outcomes and findings from the Surface Water Baselining Assessment:

- Results for pH within the baseline dataset ranged between 7.2 and 9.2. Only one pH measurement was out of the range of the freshwater operational environmental quality standard (EQS).

5.2.1.3 Baseline data for SS indicated a broad range of values (<5 mg/l to 2,300 mg/l). Most results obtained were assessed less than 60 mg/l. The higher SS that was identified are likely to be associated with episodes of higher rainfall and are not considered to be representative of general conditions within the surface water network.

5.2.1.4 Most dissolved polycyclic aromatic hydrocarbons (PAHs), phenolics, BTEX (benzene, toluene, xylene and ethylbenzene), polychlorinated biphenyl (PCBs) and other volatile or semi volatile organic concentrations recorded were below the laboratory limit of detection. This range of potential contaminants also principally relate to abstractions and dewatering of groundwater and have therefore been disregarded for further consideration. Limiting values have been proposed based on the outcomes of the assessment for pH, SS and visible oil and grease (see Table 8-1). Limits have been proposed for these parameters only as these are typically contaminants which may be associated with construction works and surface water run-off.

5.2.1.5 Surface water samples were taken from monitoring points (see Appendix 2) and screened against Freshwater EQS[7] which are generally protective of receptors in freshwater surface waterbodies. The screening criteria adopted for ammonia, BOD and phosphorus were determined through review of the WFD classification, the values and rationales for these are provided within the Surface Water Quality Flow and Baseline Surface Water Discharge Report[10] (see Tables 2-5 to 2-8). The surface water monitoring points included in the assessment were upstream of tidal effects and therefore it was not necessary to screen data against Coastal and Estuarine EQS.

5.2.1.6 Surface water data was processed through the EA WFD Metal Bioavailability Assessment tool (M-BAT) (WFD - United Kingdom Technical Advisory Group[8]) which was used to derive predicted no effect levels (PNEC) for copper, lead, nickel, manganese and zinc. In line with the guidance, the 10th Percentile PNEC for calculated values were used as the Generic Assessment Criteria (GAC) The EQS value for cadmium was adjusted based on average surface water hardness as per EA guidance[9].

5.2.1.7 On completion of the sample screening exercise, a number of inorganic determinands exhibited concentrations that exceeded the adopted EQS criteria, see **Table 5.1** below.

[7] European Council (2015). The Water Framework Directive (Standards and Classification) Directions (England and Wales)

[8] Water Framework Directive - United Kingdom Technical Advisory Group (WFD-UKTAG). (2014). Rivers & Lakes - Metal Bioavailability Assessment Tool (M-BAT). (WFD-UKTAG) Available online at: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.wfduk.org/sites/default/files/Media/Environmental%20standards/MBAT%20UKTAG%20Method%20Statement.pdf

[9] Environment Agency (2008). Environmental Quality Standards for Metal in The Aquatic Environment. April 2008.

Table 5.1 Summary of EQS Screening Exercise

Constituent	Unit	GAC (mg/l)	No. of Samples	Min. Value	Max. Value	No. of Exceeds	Locations of Exceedances (No.Exceeds)
Chloride	mg/l	250	69	50	350	6	SW8; G1; G8 (4)
Total ammonia as N*	mg/l	0.6	69	<0.05	86	13	G1 (3); G3 (2); G4 (1); G5 (1); G6A (2); G7A (1); GW8; ; SW1
Nitrite	mg/l	0.01	61	<0.02	1.1	56	G3 (7); G4 (7); G5 (7); G6A (8); G7A (6); G8 (4); SW1 (2); SW10; SW2; SW3; SW4; SW8 (2)
Cadmium (Dissolved)	mg/l	0.00008	69	<0.00008	0.00056	7	G5; G6a (2); SW2; SW8; G7A
Copper (Dissolved)	mg/l	0.0134	69	<0.0005	0.031	1	G1
Manganese (Dissolved)	mg/l	0.123	41	<0.001	17	15	G1 (4); G3; G4 (2); G5 (2); G6A; G7A; G8 (3); GW8
Nickel (Dissolved)	mg/l	0.00859	69	<0.0005	0.021	3	G7A; G3; G4
Zinc (Dissolved)	mg/l	0.0348	69	0.0014	0.046	2	G1
Iron (Dissolved)	mg/l	1	69	<0.005	10	2	G1; GW8

*Results reported as ammonium converted to total ammonia as N using molecular weight of compounds in order to progress screening process.

5.2.1.8 Surface flow monitoring was collected for Leiston drain[10] at 15-minute intervals between 2013 and 2021 at monitoring locations G1, G4, G5, G6A and G7A, these locations are shown in Appendix 2. The level data from monitoring locations was utilised to calculate flows using measured velocity and stage using a calibrated rating equation provided by the Hydro-logic Services LLP. A review of the monthly gauging results showed that the calculated flows based on the continuous monitoring data can be subject to significant errors. Errors are likely due to vegetation in a relatively wide, deep slow flowing channel. This is most noticeable at G6A and G1 where errors of up to 75% and 100%, respectively were recorded. Errors at G5 and G7A were generally less than 40% and errors at G4 (a weir gauge) were on average 15%. Timeseries flow and stage data was analysed at each flow monitoring location with any suspect data removed from the dataset. The mean flow and Q95 results at monitored locations are given in **Table 5.2** below.

[10] Sizewell C (2023). Surface Water Quality Flow and Baseline Surface Water Discharge. Reference unavailable.

Table 5.2 Summary of Mean Flow and Q95 Results

Monitoring Location	Mean Flow (m^3/s)	Q95 Low Flow (m^3/s)	Data confidence
Leiston Drain upstream of crossing			
G5	0.0508	0.0168	Medium
G4	0.0848	0.0267	High
G6A	0.0783	0.0350	Medium / Low
Sizewell Drain upstream of crossing			
G3 (branch of Leiston Drain flowing into Sizewell Drain)	No data*	No data*	-
G7A	0.0527	0.0009	Low
Downstream of crossing			
G1	0.0690	-0.0419	Low

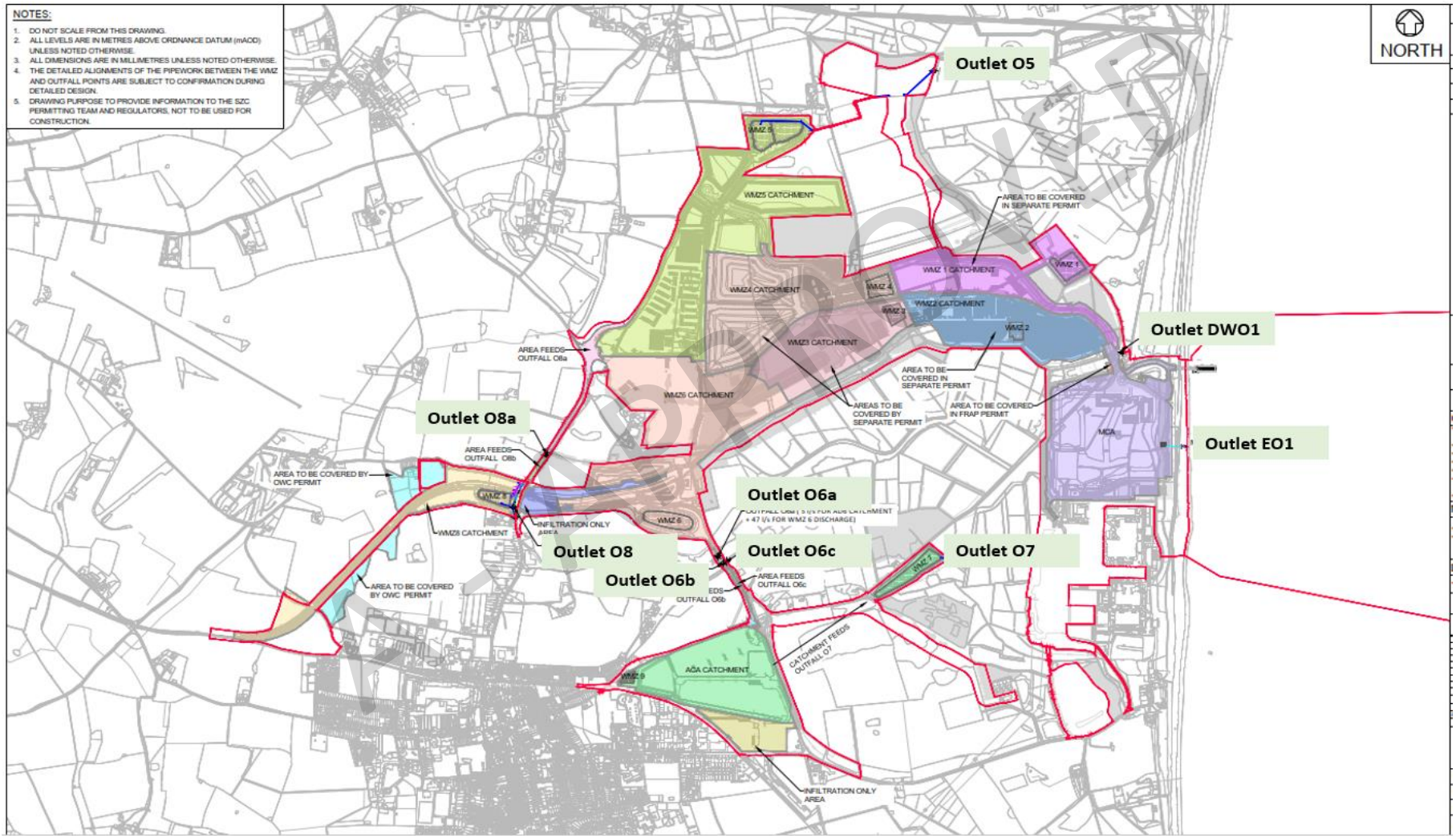
* stage data indicates that the water does not reach the weir crest, indicating no flow past this point, for much of the time

5.2.1.9 There may be other aspects affecting the baseline conditions, for instance discharge from the Leiston Sewage Treatment Works upstream, however these are not associated with the proposed discharging activities and will therefore not be monitored as part of on-site management measures.

5.3 Discharges into Leiston Drain

5.3.1.1 There are seven discharge points to the Leiston Drain which are consented under permit CWDA/18, these are in addition to the three discharge points detailed under this permit application. The relevant locations of these discharges are Outlets O6a, O6b, O6c, O7, O8a, O8 and DW01 as shown on **Figure 5.1** below. Discharges EO1 and O5 also shown on Figure 5.1 discharge to Sizewell Marshes and the foreshore respectively and do not flow into Leiston Drain.

Figure 5.1 Discharge Points to Leiston Drain for SZC Permits



6 PROPOSED TREATMENT METHODS

6.1 Overview

6.1.1.1 As described in **Section 4.4** of the Technical Supporting Document[3], the principal discharge strategy for the project is to mimic existing surface water run-off patterns where possible and follow the conventional Construction Industry Research and Information Association (CIRIA) Sustainable Drainage Systems (SuDS) hierarchy[11].

6.1.1.2 The drainage strategy for the permit includes standard best practice designs for managing sediment in discharges and comprises v-ditches, swales, filter and carrier drains and WMZ attenuation ponds. The attenuation ponds are considered the primary or main control measure, allowing suspended sediments to settle, and allowing supernatant overflow to be discharged and monitored via the collection chamber. Drain down of waters within the basins will be typically 24-48 hours to restore storage and attenuation volumes, however this will be dependent upon receiving watercourse flows and levels.

6.1.1.3 Proposed pollution control and treatment methods for each of the WMZs associated with outfalls O1, O2 and E03 are detailed in **Section 4.4** of the Technical Supporting Document[3] and summarised in **Sections 6.2 – 6.4** below.

6.2 Outfall O1 Drainage Flow and Treatment

6.2.1.1 Based upon the maximum flow rate of 23.7 l/s, the maximum volume of discharge that could be discharged from the TCA outlet over a 24-hour period is 2,048 m^3. Flow rate will be controlled through the use of a vortex flow control, such as a Hydrobrake or similar.

6.2.1.2 Swale networks are proposed along the Main Access Road (MAR) and haul road. Networks with a combination of swales and carrier drains are anticipated to be included within the service plots; however, the end-users of the plots may propose integrative SuDS features to deliver the required water treatment and improve runoff quality entering the drainage being conveyed to the WMZ basin. The networks combine in a buried carrier drain which conveys the run-off to the WMZ1 basin located in the east of the catchment.

6.3 A flow path diagram Outfall O2 Drainage Flow and Treatment

6.3.1.1 Based upon the maximum flow rate of 17.4 l/s, the maximum volume of discharge that could be discharged from the TCA outlet over a 24-hour period is 2,385 m^3. The discharge from the TCA will be intermittent, dependent upon rainfall and runoff conditions and controlled through the use of vortex flow controls, such as a Hydrobrake or similar. The flow rate will be controlled from the treatment plant system(s) that will be incorporated as part of the discharge treatment train.

6.3.1.2 WMZ2 is made up of a combination of networks, including filter drains to serve the railhead, and swales to treat and convey the water from the MAR and serviced plots. The outfall from WMZ2 will discharge south into the Leiston Drain. Potentially contaminated surface water runoff from the concrete mixing process and loading areas within the concrete batching plant will be recycled for use in concrete production and will not enter the surface water drainage network. Runoff from the roofs and uncontaminated hardstanding areas of this facility will be routed through the surface water drainage system.

[11] Ciria (2017). Guidance on the Construction of SuDS (C768).

6.3.1.3 A flow path diagram for the WMZ2 catchment and Outfall O2 is shown in **Figure 6.2** below.

6.3.1.4 for the WMZ1 catchment and Outfall O1 is shown in **Figure 6.1** below.

6.4 Outfall EO3 Drainage Flow and Treatment

6.4.1.1 The maximum volume that could be discharged in a 24-hour period is 3,516 m^3. It should be noted that the reduction in discharge rate below QBAR does not reduce the total volume of water that will be discharged to the Sizewell Marshes, but rather the same volume will be discharged over a longer period of time (50% reduction in flow rate equates to double the time required to discharge waters).

6.4.1.2 WMZ3: The proposed drainage system for the catchment area of WMZ3 Outfall (EO3) shall receive, treat, and store surface water run-off in WMZ3, prior to discharging via a positive outfall to a tributary of the Leiston Drain. The network comprises drainage within the serviced plots, which then discharge into the MAR swale. The swales alongside the Haul Road also discharge into the MAR swales to be conveyed towards the WMZ3 basin. The rail head is drained by filter drains, and run-off will be treated by a Class 1 full retention interceptor before reaching WMZ3.

6.4.1.3 A flow path diagram for WMZ3 and EO3 are shown in **Figure 6.3** below.

6.4.1.4 WMZ4: The proposed drainage system for WMZ4 shall convey, treat, and store surface water run-off. The basin within WMZ4 will facilitate the disposal of some run-off by infiltration while also having a connection to WMZ3. Design and environmental ground conditions do not allow for the WMZ4 basis to fully infiltrate all incoming flows, hence the need for an overflow to WMZ3. The water will then be treated prior to discharge from WMZ3, if necessary, before being discharged. Perimeter ditches will be provided around the base of stockpiles. Swales are proposed alongside the haul road and MAR. Filter drains and swales will manage run-off from the water tankering facility.

6.4.1.5 Treatment may be required prior to discharge from WMZ3 if the permitted conditions for discharge are exceeded which will be identified through the in person or online sensors. As described in Section 8, the online sensors comprises data from continuous effluent quality metres which monitor pH, TSS and flow, when readings are above permitted parameters, they will automatically redirect water that needs treatment to the WMZs (see **Figure 6.5**). When meeting these parameters, water will be discharged directly through the penstock chamber to the outfall headwall and receiving watercourse. When surface water runoff or discharge is observed via the online monitoring or in person inspections to be outside or above the allowable discharge parameters or conditions, the penstock will be shut to allow the water to be pumped to the surface water treatment plant. Once water has been treated and is of suitable quality to release it will be discharged to the proposed outfall position. Treatment would comprise an in-situ treatment with inline chemical addition for increased floc formation and silt coagulation. Treated effluent will then be discharged from the plant when satisfying the permitted discharge criteria.

6.4.1.6 A flow path diagram for WMZ4 and EO3 is shown in **Figure 6.4** below.

Figure 6.1 Outfall O1 Drainage Flow Diagram

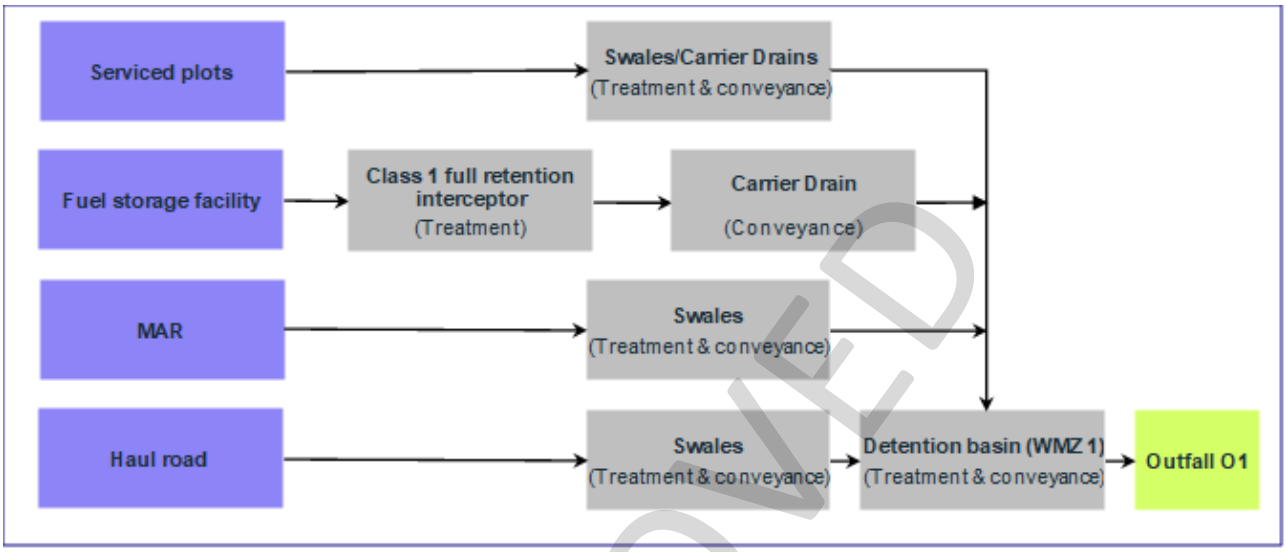


Figure 6.2 Outfall O2 Drainage Flow Diagram

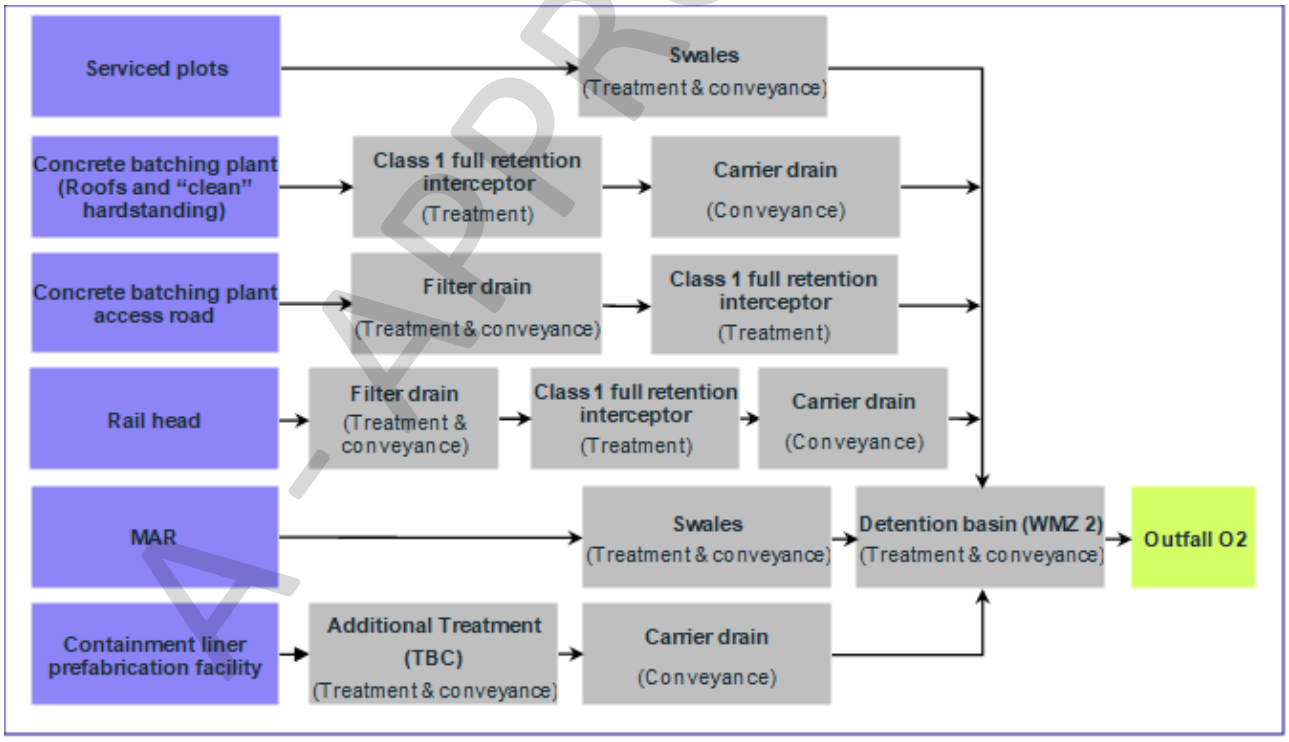


Figure 6.3 Outfall O3 (WMZ3) Drainage Flow Diagram

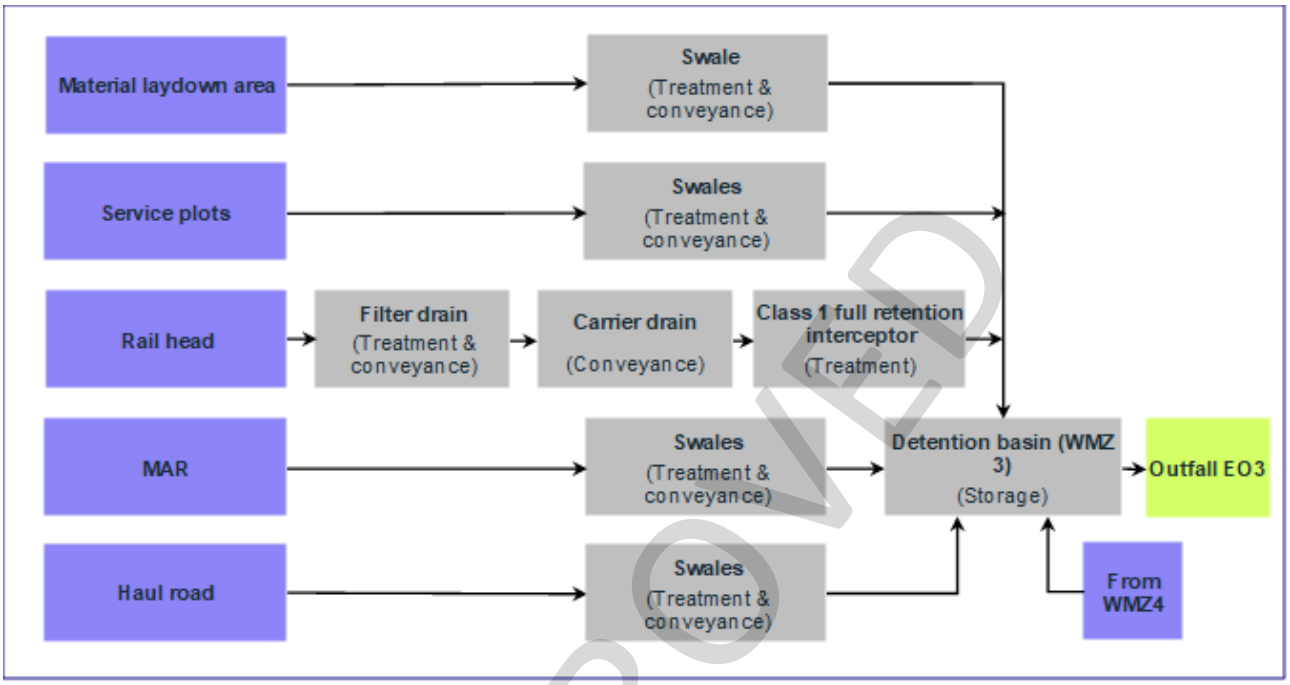
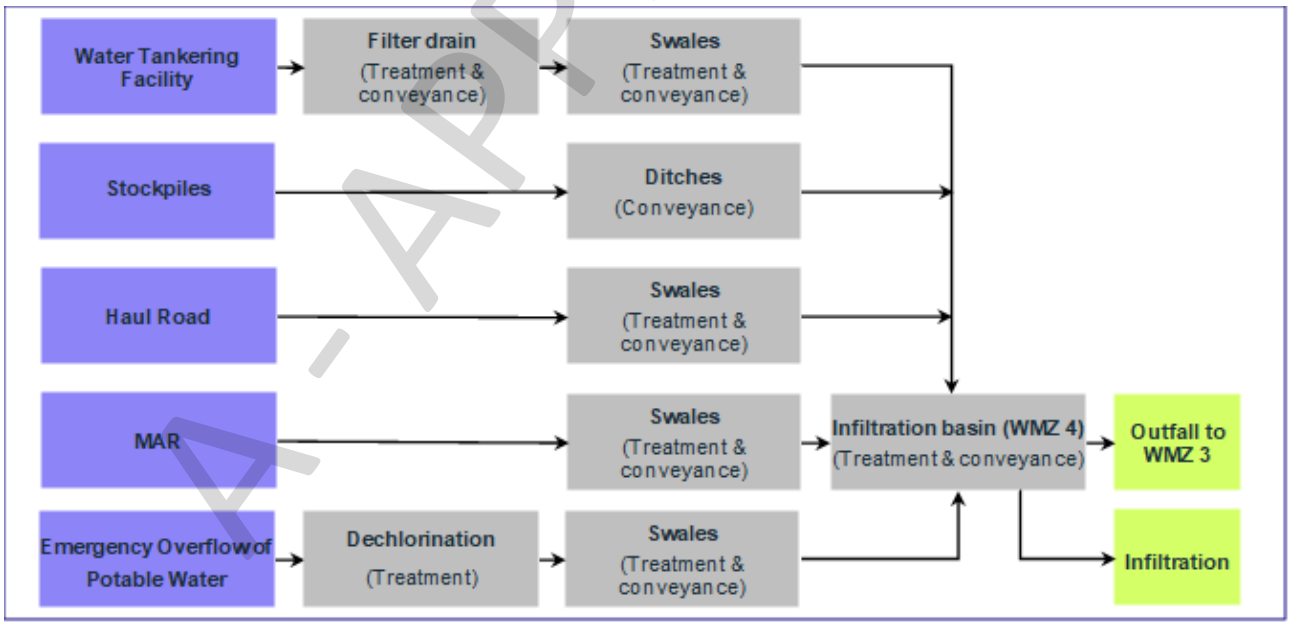


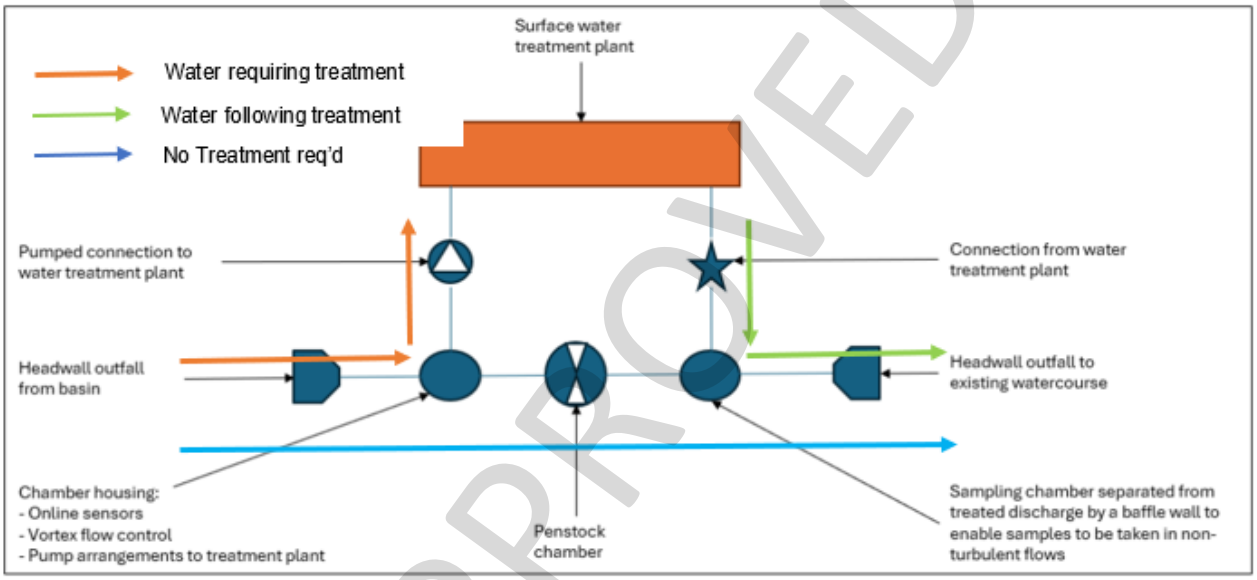
Figure 6.4 Outfall E03 (WMZ4) Drainage Flow Diagram[12]



6.4.1.7 For the emergency overflow of potable water, this is an emergency provision that will be required in the event that there is a need for emergency maintenance of the dechlorination tank. This drain down will require discharge of the remnant / dead water stored in the tank to the receiving drainage network. All water will be fully dechlorinated through the use of sodium bisulphate, which will also be totally consumed in the dechlorination process as astatic addition.

6.4.1.8 The total volume of this drain down is 2 x 250 m3 = 500 m3. The total dead storage of these tanks is 175m3, meaning that the potential total discharge amount is less than 200m3, which will be released slowly into the drainage network Given that this is an emergency management provision, there is not specified frequency for this requirements however it is considered as minimal or negligible in terms of total quantity and possible risk, due to the efficiency of the process and inclusion of other downstream control measures as described in this document. Potable water entering the dechlorination tank does not contain contaminants that require further treatment.

Figure 6.5 Schematic of Discharge and Treatment Arrangement for Outlets O1, O2 and EO3



6.4.1.9 Most sediment will settle out in the SuDS treatment trains as described above. After final settlement in the attenuation basins, water will be discharged into nearby watercourses via the proposed outfall locations. Each WMZ attenuation basin will have a penstock valve located on the upstream headwall of the outfall pipe / collection chamber which can be closed to eliminate the risk of discharging pollution downstream in case of a pollution incident on site. In such an event, the water will be removed from the basin via tanker and the contents taken offsite for disposal by a registered waste carrier at a suitably licensed facility.

6.4.1.10 In addition to the attenuation basins, small sumps with silt fencing are expected to be located periodically along track routes to manage entrained sediment within surface water.

6.4.1.11 The sumps and silt fencing will be removed at the end of the construction phase once vegetation on the filter strips and swales have become established.

6.4.1.12 Following treatment (and pollution prevention methods described in **Section 7**) there will be no impacts on receiving watercourses and therefore no impacts to designated sites downstream.

6.4.1.13 None of the proposed treatment methods will influence the temperature of the discharge or receiving watercourse (as no thermal components are involved). The maximum temperature of the discharge is dependent on the ambient temperature and is therefore only expected to reach approximately 21 degrees (in

[12] Potable, de-chlorinated water will be directed to the drain only where there are emergency maintenance drain-down requirements (with no set regularity or frequency and therefore not a constituent in the main runoff). All of the chlorine will be consumed by addition of sodium bisulphate.

summer months for example). For most of the time, the temperature will reflect typical ambient temperatures (approximately between 9-15 degrees).

6.4.1.14 It is proposed that inline treatment systems such as the use of silt busters or similar, will be adopted to provide additional treatment for settlement of SS when required. As per previous permit application for CWDA/18, for any outlets where dosing of coagulants / flocculants might be undertaken through the use of such inline treatment systems, a specific substances Surface Water Pollution Risk Assessment has not been undertaken as there is not expected to be any carry over of chemical present in the discharge stream.

6.4.1.15 Online telemetry systems, including flow monitoring, will also provide real time monitoring for discharges to allow for restricting / stopping discharge in the event that upstream surface waters in the WMZ's exhibit conditions or parameters outside those conditioned within the permit. This will be coupled with regular site monitoring activities of the treatment train and systems, including the outfall condition described further in **Section 8**.

7 PROPOSED POLLUTION PREVENTION METHODS

7.1.1.1 In addition to the measures integrated into the proposed treatment trains described in **Section 6** above, generic pollution prevention measures will be integrated within the site. These are typical measures used on most construction sites which, from a water perspective, are intended to further reduce the potential for any contaminants entering receiving watercourses. These include management systems that would be followed in the event of an unexpected pollution incident. The methods below have been included in the drainage design to reduce the risk of SSor hydrocarbons entering receiving watercourses:

- The installation of small sumps with silt fencing to manage entrained sediment within surface water. Sumps and fencing will be removed at the end of the construction phase when vegetation on filter strips has established.
- Haul roads to be swept to minimise the build-up of sediment.
- Surface water run-off from any sweeper tip facility or concrete batching plant will have suitable containment or treatment systems in place to ensure that any run-off into the downstream internal drainage system would meet the expected parameters set within the permit.

7.1.1.2 General pollution prevention methods for the management of fuels and chemicals are detailed below.

7.1.1.3 These methods are considered standard best practice and are not specifically designed to prevent impacts to the designated sites. Following the drainage design which includes the treatment described above (see **Section 6**) and pollution prevention methods described in this section, the risk of a pollution event is considered to be fully negated.

7.2 Management of Fuel, Chemicals and Oil

7.2.1.1 The risk of fuel/oil spillage exists where mobile plant and machinery are used and as a result of the storage of construction-related waste, it should be noted oil spills are controlled as best practice. In-built best practice methods, including the below, will provide tried-and-tested effective controls.:

- If chemicals are used, a COSHH register will be maintained and substances will be stored appropriately in accordance with relevant best practice (e.g., in suitable containment, labelled containers, designated areas, spill equipment nearby, away from surface watercourses and other pollution pathways wherever possible).
- Oil storage containers and facilities will be designed and maintained in accordance with the Control of Pollution (Oil Storage) (England and Wales) Regulations 2001, as amended.
- All fuels will be stored within bunded tanks and all other potentially environmentally hazardous liquids stored on or within bunded storage units. Any ancillary equipment (i.e., nozzles, hoses) will be equipped with an automatic shut of device, maintained in good order and stored within bunds where possible.
- Oil/chemical spill kits will be provided in strategic locations and operatives will be trained in their use. Contents will be replaced following any use. A site spill response procedure, or similar, will be implemented. Any used spill equipment will be disposed of as hazardous waste.
- Fuel and/or oil storage areas will be located as far away from watercourses as possible, and the quantities stored kept to a minimum.

- Refuelling facilities, if required, will be sited as far away as possible from watercourses and surface water drainage systems. Wherever practicable, these will be located on areas of hardstanding. Site specific fuel management procedures will be adopted as part of management system arrangements.
- Regular site inspections/walkovers will incorporate checks (visual) on all fuel and oil storage containers and areas. This will include checks for any leaks or damage. Any issues identified will be escalated as per the relevant contractor site management procedures.

7.2.1.2 As described in **Section 8**, monitoring and sampling points will be established, after final treatment systems and prior to the discharge entering the receiving environment to enable a representative sample to be obtained in line with any applicable permit requirements. Frequent visual inspections of the surface water network will also take place prior to the discharge entering the receiving watercourse as required, to identify any issues associated with hydrocarbons (oil / fuel) which may leave visible sheens for example. In the unexpected event that hydrocarbons are identified as being present in the discharge, that discharge valve will be shut off and will prevent any polluted water entering the receiving watercourse. The pollution will be contained as close to source as possible, and water will be further treated (e.g. by use of skimmers) and/or removed by tankers. Treatment or removal of water by tankers would be fully effective in containing the pollution.

8 MONITORING

8.1.1.1 **Section 6** of the Technical Supporting Document[3] details the sampling and monitoring strategy for the permit; it describes that on-site water quality monitoring and sampling requirements for the proposed discharging activities will be dependent upon any specific conditions and requirements set out in the permit. It also notes that, once contractors are appointed for the scheme, they may advise that alternative arrangements are implemented, e.g., due to site-specific characteristics and conditions. A final sampling and monitoring programme will therefore be developed once the permit is issued and contractors are appointed. This will be subject to review by the relevant SZC Site Environment Team to ensure any requirements set out in the permit will be sufficiently met.

8.1.1.2 However, a summary, informed by the above-described Surface Water Baselining Assessment (**Section 5**), of the expected monitoring and sampling arrangements that may be implemented on site once the discharging activities commence is described, as follows.

8.1.1.3 It is being proposed that all the discharges from the WMZs will be monitored continuously for TSS and pH using online sensors e.g. continuous effluent quality metres. TSS treatment measures installed at all three locations and will be left in situ and automatically turned on in response to online monitoring if there is a potential exceedance in terms parameter conditions, a diagram of the process that will automatically be triggered should the online monitoring detect TSS and pH levels above those permitted is shown in Section 6 (Figure 6-5).

8.1.1.4 It is anticipated that periodic instantaneous spot samples will be required when discharging activities are taking place. In addition to visual inspections of the surface water network (where accessible), in particular to identify any issues associated with hydrocarbons (oil / fuel) which may leave visible sheens, online sensors will also be in place at the outlet of the basin. Specific monitoring and sampling arrangements will ultimately be dependent upon the substances which are required to be monitored, and any other conditions set in the environmental permit. As detailed in **Table 8.1**, it is anticipated that this will include SS (<40mg/L), pH and oil (6.0 < ph <9.0) and oils and grease (visible).

8.1.1.5 The below **Table 8.1** outlines the proposed parameters for the discharge streams from WMZ1, WMZ2, WMZ3 and WMZ4 within the scope of this permit application (applicable to O1, O2 and EO3) and proposed sampling type.

Table 8.1 Proposed Water Quality Parameters

Criteria	Treatment Level Required at Monitoring Point	Sample Type
Visible oils and grease	No significant trace present	Visual inspection
SS (105c)	40 mg/l *	Instantaneous (spot sample)
pH	pH between 6-9	Instantaneous (spot sample)
Total Iron as Fe*	1000 µg/l	Instantaneous (spot sample)

**If additional treatment is required that could involve the dosing of iron (e.g., ferric chloride) as a flocculant, it is acknowledged that a limit of 1000 µg/l is likely to be set in the permit. It is recognised that, depending on the treatment chemicals used, a limit may also be set on aluminium. Safety data sheets will be provided if it is determined (once contractors are appointed) that such treatment is required.*

8.2 Flow Rates

8.2.1.1 Discharge flow rates will be controlled using suitable flow control methods and / or devices, such as a vortex flow control (Hydrobrake or similar).

8.2.1.2 Design for the system has undertaken to incorporate continuous flow meters immediately downstream of the outfall sample chamber. Where continuous flow meters are required to be installed, these will meet MCERTS requirements for flow meter specification (as set out in the EA Minimum Requirements for the Self-Monitoring of Effluent Flow'13 guidance).

8.3 Monitoring and Sampling Locations

8.3.1.1 Monitoring and sampling points will be located after final treatment systems and prior to the discharge entering the receiving environment to enable a representative sample to be obtained. Access to the sampling points will be provided in accordance with relevant safety considerations. This will be maintained as necessary. The expected monitoring and sampling point locations, at the time of writing, are set out in **Table 8.2** below. These may be subject to change slightly however as final detailed designs are still in development at the time of writing this application. Therefore, based on advice received during the Pre-Application stage from the EA, we understand that it is possible that a Pre-Operational Condition may be included in the environmental permit which would likely require that the exact monitoring and sampling locations are confirmed 1-3 months prior to discharging activities commencing on site. This could require SZC to submit for approval a monitoring plan detailing the monitoring regime and accreditation methods to be used for monitoring and sampling of discharging and dewatering activities on site prior to discharging activities commencing.

Table 8.2 Estimated Monitoring / Spot Sampling Point Locations

Discharge Stream	Outlet Reference	Monitoring and Sampling Location NGR	Receptor
A	O1	TM 47183 64952	Tributary to Leiston Drain
B	O2	TM 46886 64581	Leiston Drain
C	EO3	TM 46362 64613	Tributary to Leiston Drain

8.3.1.2 Any changes to proposed sampling locations will be communicated to the EA and requirements captured in relevant construction-related environmental management documentation and procedures to ensure site personnel are aware.

8.4 Monitoring Frequency

8.4.1.1 It is being proposed that all the discharges from the WMZs will be monitored continuously for TSS and pH. Online treatment measures for management of TSS such as siltbuster units or similar, are proposed to installed at all three locations and left in situ and automatically turned on (using an automated control system including Programme Logic Controllers) in response to online monitoring, if there is a potential exceedance in terms parameter conditions.

8.4.1.2 In addition to any continuous monitoring, it is anticipated that periodic instantaneous spot samples will be required where discharge activities are taking place, based on typical environmental permit requirements for this type of construction-related discharge. Visual inspections of the surface water within the basins will also

[13] Minimum requirements for self-monitoring of flow: MCERTS performance standard - GOV.UK (www.gov.uk)

take place, in particular to identify any issues associated with hydrocarbons (oil / fuel) which may leave visible sheens for example. Specific monitoring and sampling arrangements will ultimately be dependent upon the substances which are required to be monitored, and any other conditions set in the environmental permit. As described above, it is anticipated that this will include (but may not be limited too) TSS, pH and oil / grease (visible).

8.5 Provision of Remedial Measures

8.5.1.1 Monitoring, or sampling, will be undertaken in accordance with any set environmental permit conditions. These are anticipated to set out the type, method and frequency of monitoring required along with parameter limits.

8.5.1.2 If the sampling or monitoring results / inspections indicate an issue with the discharge that cannot be treated, the control system will automatically prevent discharge by means of closing the penstock valve. The surface water run-off will either be subject to further treatment, and/or collected and removed off-site (e.g., via tankering) or held in the respective WMZ basins, until the issue has been resolved. Further sampling may be undertaken where considered necessary prior to discharge operations re-commencing to be absolutely certain the discharge is not resulting in pollution to the receiving environment.

8.5.1.3 Sampling equipment will be regularly visually inspected and calibrated in accordance with the manufacturer's specifications. Any faulty or defected equipment will be replaced as required. Any issues identified through sampling will be addressed as per on-site non-conformance procedures.

8.6 Maintenance of Treatment Systems

8.6.1.1 Routine inspections are described in **Section 7.4.3** of the Technical Supporting Document. These will be required to ensure optimal performance of the proposed drainage and pollution prevention and treatment mitigation measures that have been described in detail in **Sections 6 and 7** above. This is particularly important during periods of prolonged or intense rainfall to ensure that WMZs and other associated drainage features / infrastructure operate as intended and continue to provide sufficient control and treatment of discharging activities.

8.6.1.2 All treatment systems will be maintained and operated in accordance with the manufacturer's instructions. These will be provided to relevant site operatives and any additional training / information supplied from the manufacturer as considered necessary. Operation and maintenance of treatment system has been considered in the environmental risk assessment produced to support this permit application. Any faulty or defected systems will be replaced as soon as practically possible. The EA will be notified of any issues relating to treatment systems that could impact required monitoring and reporting arrangements.

9 INFORMATION TO INFORM IN-COMBINATION ASSESSMENT

9.1.1.1 The permit has the potential to act in-combination with other aspects of the SZC project. A summary of related SZC MDS permits, licences and permits already consented, currently being determined, or determined but not yet implemented, are provided below in **Table 9.1**. Please also refer to the strategic in-combination tracker for a high-level overview of upcoming permits, which may be of relevance for future applications.

Table 9.1 Other Related SZC MDS Permits, Licences and Consents

Permit type	SZC permit application reference	Regulator	Regulator permit reference	Activities covered	Status	Timing	Location
Construction Water Discharge Activity (CWDA)	MDS/CWDA/89	EA	EPR/WB3145KB	Discharge of rainfall dependant surface water during the construction of the Sizewell Link Road (SLR). The permit covers 24 outfall locations.	In determination	March 2025 – October 2027	TM 38582 67084 to TM 44494 64905
CWDA	MCA/CWDA/78	EA	EPR/VB3849KJ	Water discharge associated with the temporary construction-period desalination plant. The temporary desalination plant requires an outfall into the Outer Thames Estuary SPA.	In determination	October 2025 - 2032	Outfall at TM 48005 64027
Flood Risk Activity Permit (FRAP)	MDS/FRA/61	EA	EPR/TB3157GQ	Installation of security fencing for the foreshore.	Obtained	December 2024 – January 2025	TM 476 640 to TM 476 637
FRAP (variation)	MDS/FRA/91	EA	EPR/TB3157GQ/V001	Variation for EPR/TB3157GQ.	Obtained	N/A	N/A
FRAP	MDS/FRA/50	EA	EPR/BB3590JX	Construction of temporary site access tracks for SSSI vegetation clearance (including tree stump removal). Erection of fencing (security and ecological), water voles habitat destruction, including vegetation clearance	Obtained and being implemented	Now implemented	Centroid of MDS: TM473640 SSSI Clearance within the 'SSSI triangle' corners: TM 46972 64083 TM 46996 64446 TM 47392 64532 Water Vole displacement area:

Permit type	SZC permit application reference	Regulator	Regulator permit reference	Activities covered	Status	Timing	Location
							Upstream- TM 47298 64506 Downstream- TM 47339 64518
FRAP	MCA/FRA/12	EA	EPR/DB3147LF	Construction of the temporary sea defence (TSD) within the main construction area (MCA) of the SZC project. Works include vegetation removal, topsoil stripping, construction of a piling platform and piling of the TSD.	In determination	Construction - January 2025 to end of Q1 2027. Decommission Q4 2034	TM 47627 64317 to TM 47581 63701
FRAP (variation)	MDS/FRA/73	EA	EPR/BB3590JX/V001	Variation for BB3590JX for name change from NNB Generation Company (SZC) Limited to Sizewell C Limited.	Obtained	N/A	N/A
FRAP	MCA/FRA/53	EA	EPR/BB3590JX/V002	Variation for SSSI vegetation clearance consent (EPR_BB3590JX), extension of water vole clearance dates	Obtained	Now implemented	TM 47298 64506 to TM 47339 64518
FRAP (Variation)	MDS/FRA/56	EA	EPR/BB3590JX/V003	SSSI UXO and vegetation clearance	Obtained	Now implemented	Centroid of MDS: TM473640
Land Drainage Consent (LDC)	MDS/LDC/21 MDS/LDC/40 MDS/LDC/41 MDS/LDC/42	ESWMB	22_07411_C 22_07412_C 22_07413_C 22_07414_C 22_07415_C 23_07743_C 23_23639_C 23_23643_C 23_24431_C 23_24434_C 24_26691_C	Vegetation clearance. Mink trapping and monitoring raft. Installing culverts for access. Erection of fencing (security and ecology). Retainment of existing culvert. Installation of silt curtains.	Obtained	Now implemented	MDS/LDC/21 SSSI Clearance within the 'SSSI triangle' corners: TM 46972 64083, TM 46996 64446, TM 47392 64532

Permit type	SZC permit application reference	Regulator	Regulator permit reference	Activities covered	Status	Timing	Location
							Also around Drain Realignment area: Upstream- TM 46972 64083, Downstream- TM 47003 63625 Water Vole displacement area: Upstream- TM 49695 64071, Downstream- TM 47395 64529 MDS/LDC/40 647071 264181 +/- 10m 647178 264299 647033 263738 or 647017 263722 MDS/LDC/41 From 646954 263284 to 647400 264541 MDS/LDC/42 From 646954 263284 to 647400 to 647400 264541
CWDA	MDS/CWDA/18	EA	EPR/RP3820SH	Early site drainage, surface water discharges from MCA/TCA/ACA.	In determination	Estimated from October 2024 to December 2036	E01 NGR: TM 47654 64054 DW01 NGR: TM 47349 64530 O5 NGR: TM 46463 65940 O7

Permit type	SZC permit application reference	Regulator	Regulator permit reference	Activities covered	Status	Timing	Location
							NGR: TM 46528 63491 O6a NGR: TM 45443 63501 O6b NGR: TM 45442 63495 O6c NGR: TM 45474 63488 O8a NGR: TM 44614 64000 O8 NGR: TM 44466 63737
FRAP	MCA/FRA/2	EA	EA-SZC-21833Y	SSSI Crossing – Excavation of a temporary ditch diversion, Single span bridge crossings, Construction of utility corridors, Installation of sheet piles.	In determination	Winter 2024/25	NGRs of crossing: southern end: TM 47339 64432; and northern end: TM 47296 64563. NGRs of water course activities bounded by: upstream point: TM 47281 64500; and downstream point: TM 47347 64522.
LDC	MCA/LDC/1	ESWMB	ESWMB-SZC-21832Y	SSSI Crossing - Temporary diversion and infilling of former course of Sizewell Drain to facilitate SSSI Crossing earthworks Installation of temporary construction access culverts.	In determination	Winter 2024/25	NGR of upstream connection with Sizewell Drain: TM 47293 64503 NGR of downstream connection with Leiston Drain: TM 47295 264427

Permit type	SZC permit application reference	Regulator	Regulator permit reference	Activities covered	Status	Timing	Location
							NGR of culvert crossings: Point 3.1 TM 47019 64123 Point 3.2 TM 47202 64332 Point 3.3 TM 47319 64464 Eastings and Northings of isolation points at Sizewell Drain to allow permanent realignment construction: 2A Easting – 647378.334 Northing – 264516.957 2B Easting – 647294.163 Northing – 264430.150
Water Resources Abstraction (WRA)	MCA/WRA/7	EA	NPS/WR/043048	SSSI Crossing – temporary groundwater dewatering within cofferdams to allow installation of pile caps associated with SSSI crossing abutments	In determination	Winter 2024/25	NGR of corners of cofferdams to be dewatered are: Northern cofferdam: 47283 54512, 47284 64508, 47351 64534, 47353 64530 Southern cofferdam:

Permit type	SZC permit application reference	Regulator	Regulator permit reference	Activities covered	Status	Timing	Location
							47293 64482, 47294 64477, 47361 64504, 47363 64500.

A.1 EA Risks Relevant to Permit MDS/CWDA/90 on Minsmere to Walberswick Heaths and Marshes SAC

EA Risk	Annual vegetation of drift lines	European dry heaths	Perennial vegetation on stony banks	Justification
Turbidity	X	X	X	Run-off from construction activities can increase SS within receiving watercourses. However, following the use of the control measures and pollution prevention methods described in **Sections 6 and 7** above, sediment will settle out during the treatment process prior to discharge.
Toxic contamination	X	X	X	There is a risk of hydrocarbon spillage associated with the construction activities which could be mobilised in the surface water run-off. However inbuilt best practice designs methods described in **Sections 6 and 7** above i.e. use of plant nappies and drip trays for refuelling controls the risk of a pollution event. Furthermore, the drainage design and proposed monitoring / sampling arrangements mean that in the unlikely event that there was a non-compliance, an incident would be quickly realised and the pollution controlled.
Siltation	X	X	X	There may be increased sediment in the run-off as a result of the construction works, which could lead to siltation downstream of the receiving watercourses. However as described above for turbidity, after embedded control measures and pollution prevention methods the discharge will be appropriately treated and not exceed limits proposed and therefore there will be no impacts on the designated sites as a result of siltation.
Physical damage	X	X	X	No works are taking place within the designated sites. The closest works are 0.6km from the Minsmere to Walberswick Heaths and Marshes SAC.
Changes in pH	X	X	X	The primary risk from the construction activities under permit CWDA 90 is an increase in sediment. Any outlets where dosing of coagulants / flocculants might be undertaken through the use of such inline treatment systems, will not carry over into the discharge stream. Run-off from concrete may affect pH prior to treatment however, pH levels from discharge basins will be monitored and should any non-compliances be identified, the activity will be stopped at the earliest opportunity (as soon as identified

EA Risk	Annual vegetation of drift lines	European dry heaths	Perennial vegetation on stony banks	Justification
				and as soon as safe to do so), and the surface water run-off will either be collected and removed off-site (e.g., via tankering) or held in the respective WMZ basins, until the issue has been resolved. Further sampling may be undertaken where considered necessary prior to discharge operations re-commencing to be absolutely certain the discharge is not resulting in pollution to the receiving environment.
Nutrient enrichment	X	X	X	Increased SS and hydrocarbon spills to surface water are the risks considered under this permit. SS will be allowed to settle before being discharged, where discharge levels are increased and where SS levels are high, dosing will be used to reduce the levels of TSS. Hydrocarbon risks will be controlled via best practice pollution prevention methods. Following treatment, there will not be any additional nutrients within the discharge.
Changes in thermal regime	X	X	X	There are no thermal components within the proposed treatment or pollution prevention methods that could change the temperature of the discharge or receiving watercourse.
Changes in salinity regime	X	X	X	The permit is for discharge of surface water run-off only, flow rates will be controlled as described above and will be within parameters agreed with the EA for this permit. Therefore, there will be no downstream changes in salinity regime which may affect the designated sites.

A.2 EA Risks Relevant to Permit MDS/CWDA/90 on Minsmere-Walberswick SPA

EA Risk	Aggregations of breeding and non-breeding birds	Justification
Turbidity	X	The justification given for Minsmere to Walberswick Heaths and Marshes SAC is relevant for Minsmere-Walberswick SPA
Toxic contamination	X	As detailed in the Natural England (NE) Site Improvement Plan[14] water pollution could impact on the supporting habitats of some SPA birds (see page 13 of the Site Improvement Plan[14]). Groundwater monitoring has not been carried out however details of water quality monitoring on Minsmere Old River in 2019 and 2022 are available on the Defra website[15]. The discharge to watercourses will be surface water run-off from rainwater therefore it is not expected that there will be any increase in the contaminants listed within the Site Improvement Plan (page 13) for Minsmere-Walberswick SPA however, due to construction activities and road traffic there could be traces of oil and grease. Daily visual checks and weekly water sample monitoring will be carried out, the frequency of water sampling will increase if site activities or weather conditions are such that discharging activities could be affected (i.e. during prolonged periods of rainfall). During these periods in-situ monitoring will be increased to a level that would ensure any management of discharge activities are quick and effective.
Siltation	X	The justification given for Minsmere to Walberswick Heaths and Marshes SAC (see Table A.1) is relevant for Minsmere-Walberswick SPA
Physical damage	X	
Changes in pH	X	

[14] Natural England (2014). Site Improvement Plan: Minsmere to Walberswick Heaths and Marshes. 08/10/2014. Version 1.0

[15] Department for Environment Food and Rural Affairs (Defra). Catchment Data Explorer. Minsmere Old River Water Body. Available online at: https://environment.data.gov.uk/catchment-planning/WaterBody/GB105035046270?cycle=3. Accessed October 2024.

EA Risk	Aggregations of breeding and non-breeding birds	Justification
Nutrient enrichment	X	
Changes in thermal regime	X	
Changes in salinity regime	X	

A.3 EA Risks Relevant to Permit MDS/CWDA/90 on Minsmere -Walberswick Ramsar Site

EA Risk	Criterion 1 (habitats[16])	Criterion 2 (plants, breeding birds and invertebrates[17])	Justification
Turbidity	X	X	The justifications given in Tables A.1 and A.2 are relevant for Minsmere-Walberswick Ramsar
Toxic contamination	X	X	
Siltation	X	X	
Physical damage	X	X	
Changes in pH	X	X	
Nutrient enrichment	X	X	
Changes in thermal regime	X	X	

[16] Ramsar Criterion 1: The site contains a mosaic of marine, freshwater, marshland and associated habitats, complete with transition areas in between. Contains the largest continuous stand of reedbeds in England and Wales and rare transition in grazing marsh ditch plants from brackish to fresh water.

[17] Ramsar Criterion 2: This site supports nine nationally scarce plants and at least 26 red data book invertebrates. Supports a population of the mollusc *Vertigo angustior* (Habitats Directive Annex II; British Red Data Book Endangered), recently discovered on the Blyth estuary river walls. An important assemblage of rare breeding birds associated with marshland and reedbeds including:*Botaurus stellaris*, *Anas strepera, Anas crecca, Anas clypeata, Circus aeruginosus, Recurvirostra avosetta, Panurus biarmicus*

EA Risk	Criterion 1 (habitats[16])	Criterion 2 (plants, breeding birds and invertebrates[17])	Justification
Changes in salinity regime	X	X	

A.4 EA Risks Relevant to Permit MDS/CWDA/90 on the Outer Thames Estuary SPA

EA Risk	Common tern *Sterna hirundo* (breeding)	Little tern *Sternula albifrons* (breeding)	Red-throated diver *Gavia stellata* (non-breeding)	Justification
Turbidity	X	X	X	The justifications given in Tables A.2 and A.3 are relevant for the Outer Thames Estuary SPA
Toxic contamination	X	X	X	
Siltation	X	X	X	
Physical damage	X	X	X	
Changes in pH	X	X	X	
Nutrient enrichment	X	X	X	
Changes in thermal regime	X	X	X	
Changes in salinity regime	X	X	X	

A.5 EA Risks Relevant to Permit MDS/CWDA/90 on the Southern North Sea SAC

EA Risk	Harbour porpoise Phocoena phocoena	Justification
Turbidity	X	The justifications given in Tables A.2 and A.3 are relevant for the Southern North Sea SAC
Toxic contamination	X	
Siltation	X	
Physical damage	X	
Changes in pH	X	
Nutrient enrichment	X	
Changes in thermal regime	X	
Changes in salinity regime	X	

A.6 EA Risks Relevant to Permit MDS/CWDA/90 on Minsmere-Walberswick Heaths and Marshes SSSI

EA Risk	Aggregations of breeding and non-breeding birds	Habitats	Invertebrate assemblages	Botanical interest and vascular plant assemblage	Justification
Turbidity	X	X	X	X	As described in Table A.1 above, there are no anticipated changes in turbidity following treatment and pollution prevention methods, therefore there will be no impact on the SSSI as a result of activities undertaken under permit CWDA 90.
Toxic contamination	X	X	X	X	There is a risk of hydrocarbon spillage from the construction activities compounds which could be picked up by surface water run-off. However, with the inbuilt best practice construction pollution prevention measures i.e. use of plant nappies and drip trays for refuelling, the risk of a pollution event is reduced. The risk of hydrocarbons in discharge is from surface water running through a spillage, any spillages will be identified in real time and actions taken to remediate these (use of spill kits) therefore reducing the risk of surface water run-off picking up residue from spillages. Furthermore, the drainage design and monitoring means that in the unlikely event that an incident occurred, it would be identified quickly and the pollution controlled as close to source as possible. The risk of toxic contamination from hydrocarbons is low and the pollution prevention methods effective at containing any contamination. Therefore, it is not considered that the works under this permit will result in toxic contamination which could impact the designated site.
Siltation	X	X	X	X	As described in Table A.1 above, there are no anticipated changes in siltation following treatment and the embedded pollution prevention methods, therefore there will be no impact on the SSSI as a result of activities undertaken under permit CWDA 90.
Physical damage	X	X	X	X	Works are not taking place within the SSSI therefore there will be no physical damage as a result of the groundworks or associated surface water run-off taking place under permit CWDA 90.

EA Risk	Aggregations of breeding and non-breeding birds	Habitats	Invertebrate assemblages	Botanical interest and vascular plant assemblage	Justification
Changes in pH	X	X	X	X	The justification given in Table A.1 is relevant to the SSSI.
Nutrient enrichment	X	X	X	X	The justification given in Table A.1 is relevant to the SSSI.
Changes in thermal regime	X	X	X	X	The justification given in Table A.1 is relevant to the SSSI.
Changes in salinity regime	X	X	X	X	The justification given in Table A.1 is relevant to the SSSI.

A.7 EA Risks Relevant to Permit MDS/CWDA/90 on the Sizewell Marshes SSSI

EA Risk	Assemblage of breeding and wintering birds	Ditches	Floodplain fen and lowland mire	Invertebrate assemblages	Lowland mire grassland and rush pasture	Vascular plants	Justification
Turbidity	X	X	X	X	X	X	The justifications given in Tables A.1, A.2 and A.6 above are relevant to Sizewell Marshes SSSI.
Toxic contamination	X	X	X	X	X	X	
Siltation	X	X	X	X	X	X	
Physical damage	X	X	X	X	X	X	
Changes in pH	X	X	X	X	X	X	
Nutrient enrichment	X	X	X	X	X	X	
Changes in thermal regime	X	X	X	X	X	X	
Changes in salinity regime	X	X	X	X	X	X	

APPENDIX 2 – SURFACE WATER SAMPLING LOCATIONS