

Early Years Water Demand and Supply TCA Borehole

Project	SZC: Sizewell C	Teamcenter ID	101504622
Teamcenter Contract	Early Works EWXXXX_098_01		
Client	NNB Generation Co.	Contractor Reference	SZC-EW0300-ATK-XX-SEI-00XXXX-NOT-UTI-900001
Contractor	AtkinsRéalis	Contractor Rev	P04
Purpose of Issue	P1 - Published for Implementation		
Supplier	AtkinsRéalis	Originators Ref	5213850-SNC-00-XX-TTCN-Z-900002
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REVISION HISTORY

Revision	Purpose	Amendment	Prepared By	Date
P04	P1 - Published for Implementation	Updated Water Construction Demand	JP	24/03/26
P03	P1P1Published for Implementation	Expansion of water demand build up level of detail.	PH	24/07/25
P02	P1Published for Implementation	Detailed Water Demand Breakdown	PH	03/07/25
P01	P1Published for Implementation	First Revision	PH	13/05/25



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Document history

Client Doc Code: SZC-EW0300-ATK-XX-SEI-00XXXX-NOT-UTI-900001

Document title: Early Years Water Demand and Supply TCA Borehole

Rev	Status	Purpose Description	Originated	Checked	Reviewed	Authorised	Date
P04	S3	P1 - Updated Water Construction Demand	JP	GR	AF	CM	24/03/26
P03	S3	P1 - Expansion of water demand build up level of detail.	PH	GR	AF	SF	24/07/25
P02	S3	P1 - Detailed Water Demand Breakdown	PH	GR	AF	AP	03/07/25
P01	S3	P1 - First Revision	PH	AF	CM	AP	13/05/25
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Contents

1.	Introduction	5
2.	Industrial Water Overview	5
2.1	Demand	5
2.1.1	Concrete Batching	5
2.1.2	Marine and Tunnelling (M&T)	5
2.1.3	Ground Improvement.....	5
2.1.4	Bentonite Slurry	6
2.2	Supply.....	6
2.3	Storage	7
3.	Summary.....	8

1. Introduction

This memorandum outlines the breakdown of the activities creating the demand for industrial water and justifies the need for abstraction from the Temporary Construction Area (TCA) Borehole.

2. Industrial Water Overview

2.1 Demand

- Initial demands for industrial water in the early years (2026-2027) are driven by Concrete batching, Marine and Tunnelling (M&T), Ground Improvements, and Bentonite Slurry.
- These activities create peak demands of 1600 m³/day in July of 2026 and in March of 2027.
- Industrial water accounts for about 95% of the overall water demand, while potable water makes up the remaining 5%. Potable water will be supplied using tankers during this period and does not form part of the TCA Borehole demand profile.
- Peak demands will be provided using stored water. Daily peak demand values need to be accommodated, rather than monthly averages.

2.1.1 Concrete Batching

- Concrete batching (400 m³/day at peak) as defined by the Civil Works Alliance (CWA) Water Forecast Demand data. This demand is driven by site establishment construction activities.
- This leads to a total water demand of 29,708m³ of water between April 2026 and March of 2027.

2.1.2 Marine and Tunnelling (M&T)

- Marine and Tunnelling (M&T) (356 m³/day at peak) as defined by the CWA Interface Control Document: M&T/EW300 – Supply and Discharge of Tunnelling Water. This demand is split between activities involving the Combined Discharge Outfall (CDO) and the Tunnel Boring Machine (TBM).
- The CDO creates a daily water demand of 45m³ until the end of April 2026.
- The Tunnel Boring Machine (TBM) general activity begins in July of 2026 and generates a daily water demand of 168m³, driven by a 20m³/h water demand for the TBM cooling plant and 7m³/h water demand for general TBM usage.
- This leads to a total water demand of 50,206m³.

2.1.3 Ground Improvement

- Ground Improvement (1279m³/day at peak) as defined by the CWA Water Forecast Demand data. This demand is driven by site establishment construction activities.
- This leads to a water demand of around 176,048m³ of water between April 2026 and March of 2027.



2.1.4 Bentonite Slurry

- Bentonite Slurry (353m³/day at peak) as defined by the Civil Works Alliance (CWA) Water Forecast Demand data. This demand is driven by site establishment construction activities.
- This leads to a water demand of around 24,198m³ of water between April 2026 and March of 2027.

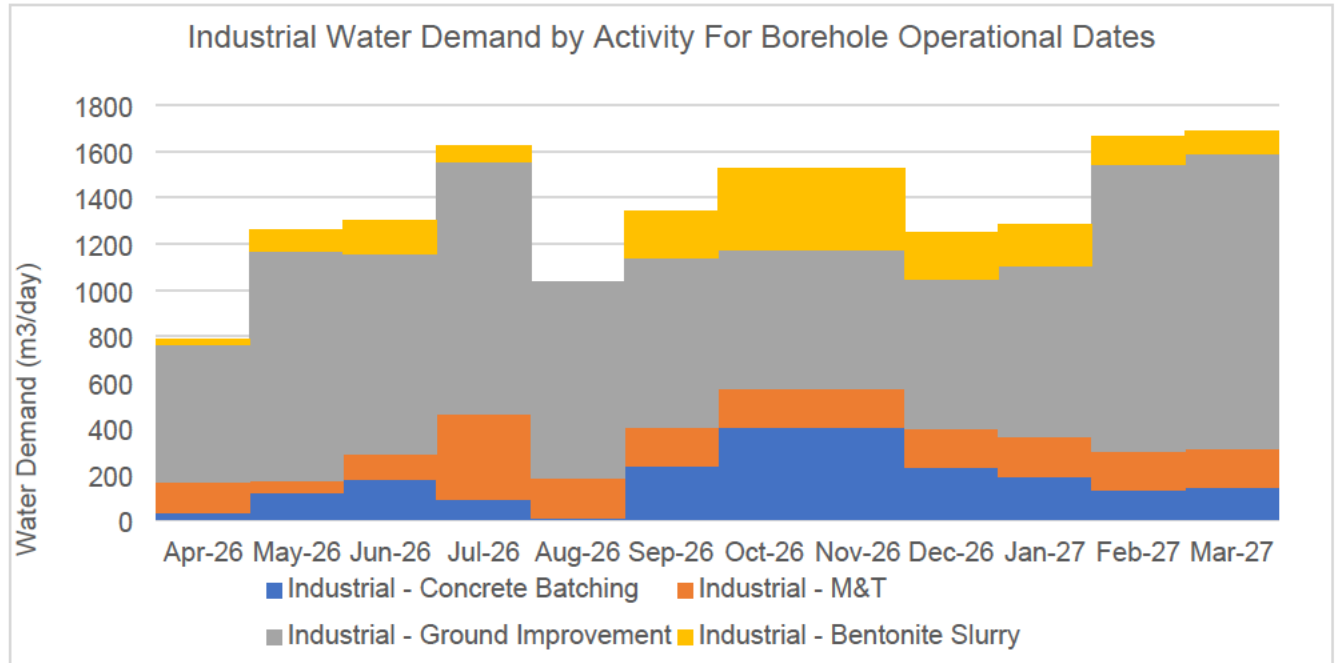
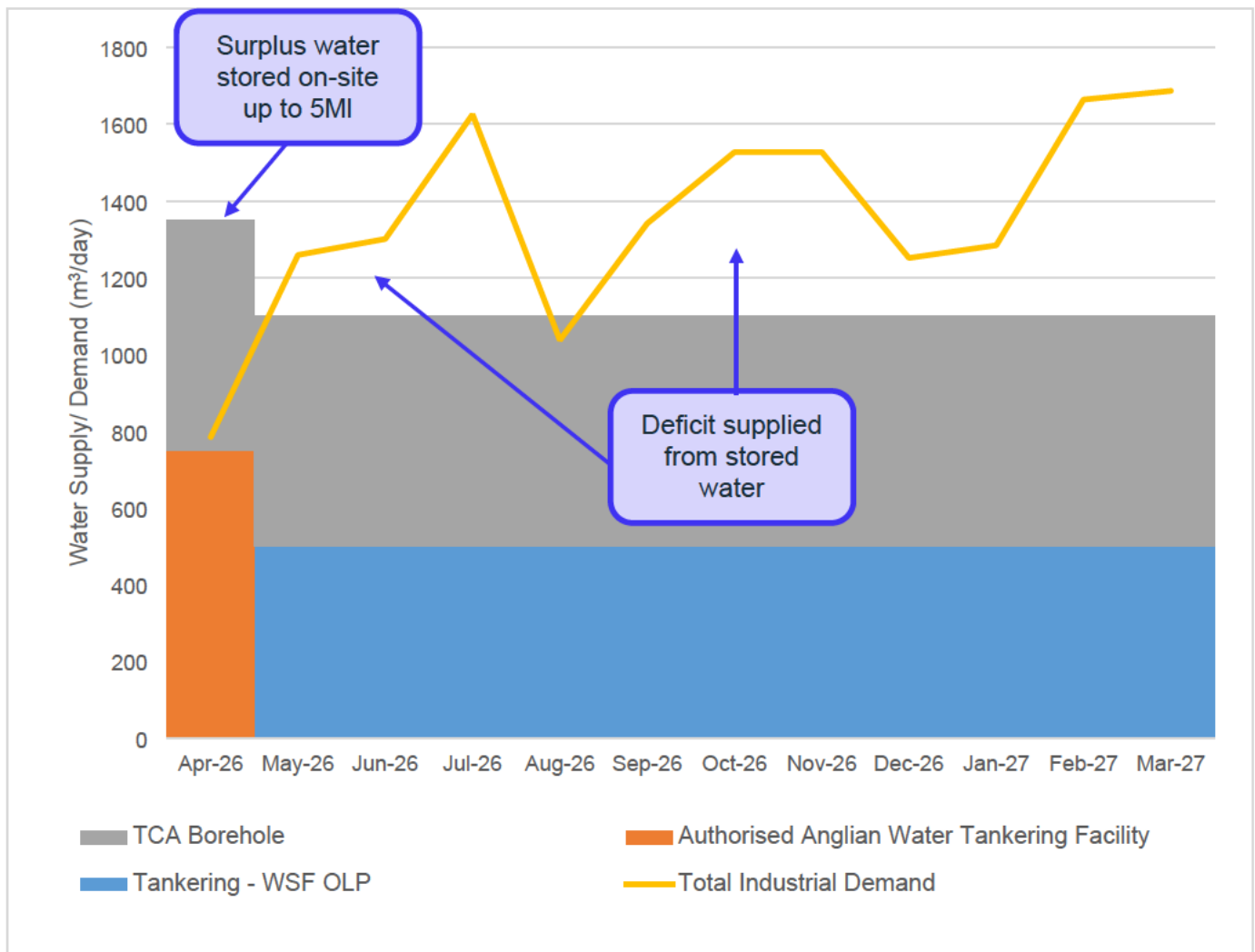


Figure 1: Industrial Water Demand by Activity

2.2 Supply

- Currently the site is supplied from Authorised Anglian water tankering filling points with up to 750m³/day, but from May 2026, this will transition to SZC's water sourcing facility Orwell Logistics Park, supplying up to 500 m³/d.
- The TCA borehole abstraction is planned to be utilised from April of 2026 up until the start of operation of the desalination plant.
- A volume of 600m³/day is proposed for the abstraction from the TCA borehole based on the existing third-party licensed capacity of 600m³/day which is to be acquired through license trading.
- The desalination plant is planned to commence at in July 2027 and supply potable quality water up to 4950 m³/day. This will support the potable water sourced from the water sourcing facility at Orwell Logistics Park to meet the demands on site.

NOT PROTECTIVELY MARKED**Figure 2: TCA Borehole Supply/Demand**

2.3 Storage

- 4no. 25m³ storage tanks have been constructed in the Water Transfer Facility, which is the slab and stone area constructed beside the TCA Borehole. These tanks will be used for buffering of the daily tankering on site as well as peak demand storage.
- 1no. 1000m³ storage tank is planned for construction within the permanent concrete batcher (CWA).
- 4no. 30m³ is planned for construction within the MCA (CWA).
- Total 60m³ planned for construction within the in Mobile concrete batcher (CWA).

Additional storage to accommodate peak water demands is being designed and will be confirmed.



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3. Summary

In summary the TCA borehole abstraction will be utilised for the key demands listed in the previous sections, majority of the abstracted water supporting the Concrete Batching, M&T, Ground Improvement and Bentonite Slurry, totalling 280,160m³ compared to a borehole total abstraction volume at 600m³ for 365 days totalling 219,000 m³ over the annual operation period of the TCA borehole. This results a deficit of 61,160 m³ during the operational period.



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Sizewell C Project

Appendix C: Package to Inform Countryside and Rights of Way Act Assessment and Habitats Regulations Assessment

Permit reference TCA/WRA/43 (Variation to
TCA/WRA/16)

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DOCUMENT CONTROL

This document is stored and approved in the Electronic Document and Records Management System (EDRMS).

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REVISION HISTORY

Rev	Status	Amendment	Prepared By	Date
0.1	Draft	Drafting initial document		05/03/25
0.2	Final	Final document following SZC and Environment Agency comments		31/03/25
1.0	Updated final	Final document following SZC and Environment Agency comments		23/04/25
2.0	Final	Update for variation application TCA/WRA/43		10/08/26

HABITATS REGULATIONS ASSESSMENT AND COUNTRYSIDE AND RIGHTS
OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

CONTENTS

1	INTRODUCTION	4
1.1	Overview.....	4
1.2	Key Definitions	4
1.3	References	5
1.4	Permit Details	6
1.5	SSSI and Habitat Sites	6
2	TECHNICAL INFORMATION	7
2.1	Permit TCA/WRA/43	7
2.1.1	Details of abstraction method; pump type and location (including national grid references), borehole specifics etc	7
2.1.2	Fish screening details; type, size, etc	7
2.1.3	Groundwater investigation consent details if applicable	7
2.1.4	Pump test results if applicable.....	7
2.1.5	Groundwater modelling if applicable	8
2.1.6	Surface water modelling if applicable.....	10
2.1.7	Impoundment details and details of intended operation of impoundment structure	11
2.1.8	Maps and drawings	11
2.1.9	Fish pass detail; type, size, any action being taken to enable fish utilisation	11
2.1.10	Non-native invasive species surveys	11
2.1.11	Protected species surveys	11
2.1.12	Estimation of any habitat loss.....	12
2.1.13	Details of proposed quantities and abstraction period	12
2.1.14	Hydrological impact assessment if applicable.....	12
2.1.15	Details of any water level/flow monitoring undertaken including location(s) of monitoring, frequency and data acquired	12
2.1.16	Details of water quality of any water intending to be discharged as part of a dewatering operation	13
2.1.17	Details/assessment of prevailing environmental conditions.....	13
2.1.18	Details of any mitigation	14
3	INFORMATION TO INFORM THE IN-COMBINATION ASSESSMENT	15
3.1	Other plans and projects	15
	APPENDIX A: EA RISKS RELEVANT TO PERMIT TCA/WRA/43	21
A.1	EA Risks Relevant to Permit TCA/WRA/43 and Sizewell Marshes SSSI	21
A.2	EA Risks Relevant to Permit TCA/WRA/43 and Minsmere to Walberswick Heaths and Marshes SSSI	23
A.3	EA Risks Relevant to Permit TCA/WRA/43 and Minsmere to Walberswick Heaths and Marshes SAC.....	25
A.4	EA Risks Relevant to Permit TCA/WRA/43 and Minsmere-Walberswick SPA	26
A.5	EA Risks Relevant to Permit TCA/WRA/43 and Minsmere-Walberswick Ramsar	28

HABITATS REGULATIONS ASSESSMENT AND COUNTRYSIDE AND RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

1 INTRODUCTION

1.1 Overview

- 1.1.1.1 The Sizewell C Project ('SZC Project') is a proposed nuclear power station in respect of which certain planning permission has been granted via a Development Consent Order (the "DCO") [1]. The SZC Project will comprise two UK European Pressurised Reactors™ located north of the existing Sizewell B power station in Suffolk. The DCO was made and came into force in 2022 [2]. The DCO was granted based on assessment work (underpinned by extensive baseline surveys and studies) submitted to the Secretary of State. The Secretary of State's (SoS) Habitats Regulations Assessment (HRA) (hereafter referred to as the 'SoS HRA') [3] records his decision on the potential for adverse effects on the integrity of habitat sites as a result of the SZC Project.
- 1.1.1.2 The SZC Project is currently preparing construction permit applications. These permits are required for several of the works and construction activities. Through the Environment Agency (EA) Screening Tool, a risk has been identified to Sizewell Marshes Site of Special Scientific Interest (SSSI) and Minsmere to Walberswick Heath and Marshes SSSI from permit TCA/WRA/43. A risk has also been identified to Minsmere to Walberswick Heaths & Marshes Special Area of Conservation (SAC) and Minsmere-Walberswick Special Protection Area (SPA) and Ramsar site. Therefore, this package has been put together to aid the EA in completing their HRA and Countryside and Rights of Way Act (CROW) assessments for this permit.

1.2 Key Definitions

Term / Abbreviation	Definition
AOD	Above Ordnance Datum
CROW	Countryside and Rights of Way Act
CWDA	Construction Water Discharge Activity
DCO	Development Consent Order 2022
EA	Environment Agency
ES	Environmental Statement
FPA	Fish Pass Approval
FRAP	Flood Risk Activity Permit
GIC	Ground Investigation Consent
HDPE	High Density Polyethylene
HRA	Habitats Regulations Assessment
LDC	Land Drainage Consent
MCA	Main Construction Area
MDS	Main Development Site
mm	Millimetre
NGR	National Grid Reference
SAC	Special Area of Conservation
SoS	Secretary of State
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest

HABITATS REGULATIONS ASSESSMENT AND COUNTRYSIDE AND RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

Term / Abbreviation	Definition
SZC Project	The Sizewell C Project
TCA	Temporary Construction Area
TSD	Temporary Sea Defence
WMMP	Water Monitoring and Management Plan
WRAL	Water Resource Abstraction Licence
WRIL	Water Resources Impoundment Licence

1.3 References

Ref	Title	Location	Document No. / Link
[1]	The Sizewell C (Nuclear Generating Station) Order 2022	Online	https://www.legislation.gov.uk/uksi/2022/853/contents/made
[2]	The Sizewell C (Nuclear Generating Station) Order 2022. Made 20th July 2022, Coming into force 11th August 2022	Online	https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-011165-SZC-DCO.pdf
[3]	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	Online	https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-011167-SZC-HRA.pdf
[4]	Draft Water Monitoring and Management Plan (September 2021)	Online	https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-007610-Sizewell%20C%20Project%20-%20Other-%20SZC%20Bk9%209.87(A)%20Draft%20Water%20Monitoring%20and%20Management%20Plan%20Clean%20Version.pdf
[5]	Environment Agency – Statement of Common Ground (October 2018)	Online	https://infrastructure.planninginspectorate.gov.uk/wp-content/ipc/uploads/projects/EN010012/EN010012-008186-Sizewell%20C%20Project%20-%20Final%20SoCG%2027.pdf#page=13
[6]	Atkins, Hyder, Royal Haskoning DHV. 2015. Sizewell C SSSI Crossings: Environmental appraisal of options under consideration. November 2015	Unpublished but available on request	Unpublished but available on request
[7]	The Sizewell C Project 6.3 Main Development Site Terrestrial Ecology and Ornithology Appendix 14B1 – Plants and Habitats Synthesis Report, Revision 1.0, May 2020, DCO Examination Library Reference APP-250	Online	EN010012-001871-SZC_Bk6_ES_V2_Ch14_Terrestrial_Ecology_Ornithology_Appx14B1_Plants_Habitats_Synthesis.pdf (planninginspectorate.gov.uk)
[8]	Groundwater and surface water DCO ES chapter	Online	EN010012-001912-SZC_Bk6_ES_V2_Ch19_Groundwater_and_Surface_Water.pdf (planninginspectorate.gov.uk)

HABITATS REGULATIONS ASSESSMENT AND COUNTRYSIDE AND RIGHTS
OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

Ref	Title	Location	Document No. / Link
[9]	Sizewell C, Comments on Written Representations – Appendices, June 2021	Online	EN010012-005470-D3 - The Sizewell C Project - Comments on WRs Appendices.pdf (planninginspectorate.gov.uk)

1.4 Permit Details

- 1.4.1.1 The permit application with reference number TCA/WRA/43 is an application for a Water Resource Abstraction Licence (WRAL), proposed to enable the abstraction of groundwater through a borehole within the temporary construction area. This abstracted water is then to be utilised for process water and dust suppression.

1.5 SSSI and Habitat Sites

- 1.5.1.1 The following SSSI, SACs, SPAs and Ramsar sites have the potential to be affected by the EA's pre-identified risks according to initial EA screening.

Table 1.1 Sensitive Receptor Sites

Sensitive Receptor Site	Distance from Permit location
Sizewell Marshes SSSI	Permit activities are located circa 0.7km northwest of this SSSI
Minsmere to Walberswick SSSI	Permit activities are located circa 2.1km west of this SSSI. The Leiston Drain flows through the SSSI.
Minsmere to Walberswick Heaths and Marshes SAC	Permit activities are located circa 2.2km west of this SAC. The Leiston Drain flows through the SAC.
Minsmere-Walberswick SPA	Permit activities are located circa 2.2km west of this SPA. The Leiston Drain flows through the SPA.
Minsmere-Walberswick Ramsar site	Permit activities are located circa 2.2km west of this Ramsar site. The Leiston Drain flows through the Ramsar site.

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2 TECHNICAL INFORMATION

2.1 Permit TCA/WRA/43

2.1.1 Details of abstraction method; pump type and location (including national grid references), borehole specifics etc

- 2.1.1.1 The proposed methodology is to abstract groundwater from the Crag formation. This abstraction will take place via a borehole to be located at TM 4601264982.
- 2.1.1.2 The abstraction point is a 300mm diameter borehole screened to allow abstraction of groundwater from the Crag. The daily limit for abstraction is 600m³, with abstraction taking place throughout the year.
- 2.1.1.3 The maximum yearly abstraction is to be 101,495m³, with a maximum hourly abstraction of 25m³. The maximum flow rate for this abstraction is to be 7 litres per second.
- 2.1.1.4 The borehole is to be 40 metres deep with a High Density Polyethylene (HDPE) plastic liner. Figures 1 and 2 in the Appendix show the borehole within the context of designated sites, Wild Aldhurst and the Marsh Harrier Compensation Area for the SZC DCO.

2.1.2 Fish screening details; type, size, etc

- 2.1.2.1 No fish screening required as the abstractions will not be from a watercourse but from groundwater within the Crag formation.

2.1.3 Groundwater investigation consent details if applicable

- 2.1.3.1 Ground Investigation Consent (GIC) No. 7/35/3 SZC Crag Borehole (Plan B) V.5 (updated discharge location) has been obtained in accordance with the received pre-application advice AN/035/0003/016 (dated 09/02/2024). The outcome of the GIC is presented in a Pumping Test Technical Note (SZC_Pumping Test TN, Rev02, EDRMS 101492743).

2.1.4 Pump test results if applicable

- 2.1.4.1 The outcome of the pumping test is presented in a Pumping Test Technical Note (SZC_Pumping Test TN, Rev02, TC 101492743). A constant rate test of 11 days was undertaken. A steady flow rate of 7l/s (equivalent to 600m³/d) was maintained during the test and monitoring of water levels showed a maximum drawdown of 0.75m in the pumped well. Following an initially rapid change in water level within the pumped borehole, related to wellbore storage effects, the water level stabilised within 2 hours of the start of pumping and showed little variation for the remainder of the pumping stage of the test. A drawdown no greater than 0.1m was observed in the monitoring points closest to the Temporary Construction Area (TCA) borehole (within 200m). None of the observation points further than 200m from the TCA borehole that were monitored during the test, in accordance with the GIC, showed an observable response to the pumping. Regarding Sizewell Marshes SSSI, the groundwater level was recorded at 3.10m AOD in the Crag aquifer prior to the beginning of the pump test and 3.11m AOD at the end of the pump test. The total variation in groundwater water level is an increase of 0.01m which shows no impact of the pumping test at this location. Within the Peat, the variation of the groundwater level in P9 before and immediately after the pumping test is a similarly negligible decrease of 0.01m. With regard to Mismere & Walberswick Heaths and Marshes SSSI, groundwater does not show any decrease in water levels as a result of the abstraction.

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OF WAY ACT ASSESSMENT SUPPORTING INFORMATION**

- 2.1.4.2 The pumping tests confirmed that the real-world response is less than that predicted by either numerical model. It is considered appropriate to use the predicted changes in the numerical models to assess potential impacts as they are more conservative than the results of the pumping test.

2.1.5 Groundwater modelling if applicable

- 2.1.5.1 The impact of this abstraction has been assessed using results from the two available numerical groundwater models in the area, which are the EA's NEAC model and the SZC-specific groundwater model developed for the DCO. The EA NEAC model is a regional model, but the DCO model is a site-specific groundwater model specifically created to assess the impacts at the area near the proposed works. It is therefore the most detailed model to apply.
- 2.1.5.2 Abstraction is anticipated to occur from September 1st 2025 to 31st March 2030 however, modelling under the DCO model was conducted for each of the four years following the start of abstraction (with year 2 including the Main Development Site (MDS) Cut-off Wall and year 3 being the start of MDS dewatering). The data presented are for the locations requested by the EA, located at the edge of the SSSIs in the vicinity of the abstraction (names north, east and south).
- 2.1.5.3 The DCO modelling data shows that the drawdown at the location of abstraction is generally stable between 0.59 m and 0.63 m in the Crag at the four reported model times. The modelled drawdown at the three observation locations, in the Peat, is lower than the drawdown reported at the abstraction location. The maximum drawdown in the peat after four years of abstraction is 0.12 m at the eastern observation location, 0.09 m at the northern observation location and 0.13 m at the southern observation location.
- 2.1.5.4 Comparison of modelled values show that the dewatering of the MDS has a limited combined impact on the eastern and northern observation locations with a minor increase in drawdown of 0.02 and 0.01 m respectively. The drawdown at the abstraction location itself is also generally similar with a maximum increase of 0.03 m.
- 2.1.5.5 The southern observation location reports the largest increase with the Peat reporting a difference of 0.06 m and the Crag (top and bottom) reporting a 0.1 m increase. The southern observation location is the closest observation location to the MDS dewatering, located on the edge of the Sizewell Marshes, and so has the most potential for combined interaction with the dewatering. The final drawdown plot (Year 4 with the impact of the dewatering included) shows that the drawdown across the Peat of the Sizewell Marshes SSSI generally remains below 0.1 m with a small number of highly localised islands with drawdown above 0.1m yet still below 0.2m. These islands may reflect a model artefact rather than acting as a specific predictor of locations where drawdown will exceed 0.1m. This is comparable to the distribution of drawdowns reported in the baseline DCO modelling across the Sizewell Marshes.
- 2.1.5.6 Further details of the groundwater modelling are included in section 3.1 of the supporting information document included with this permit application.

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OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

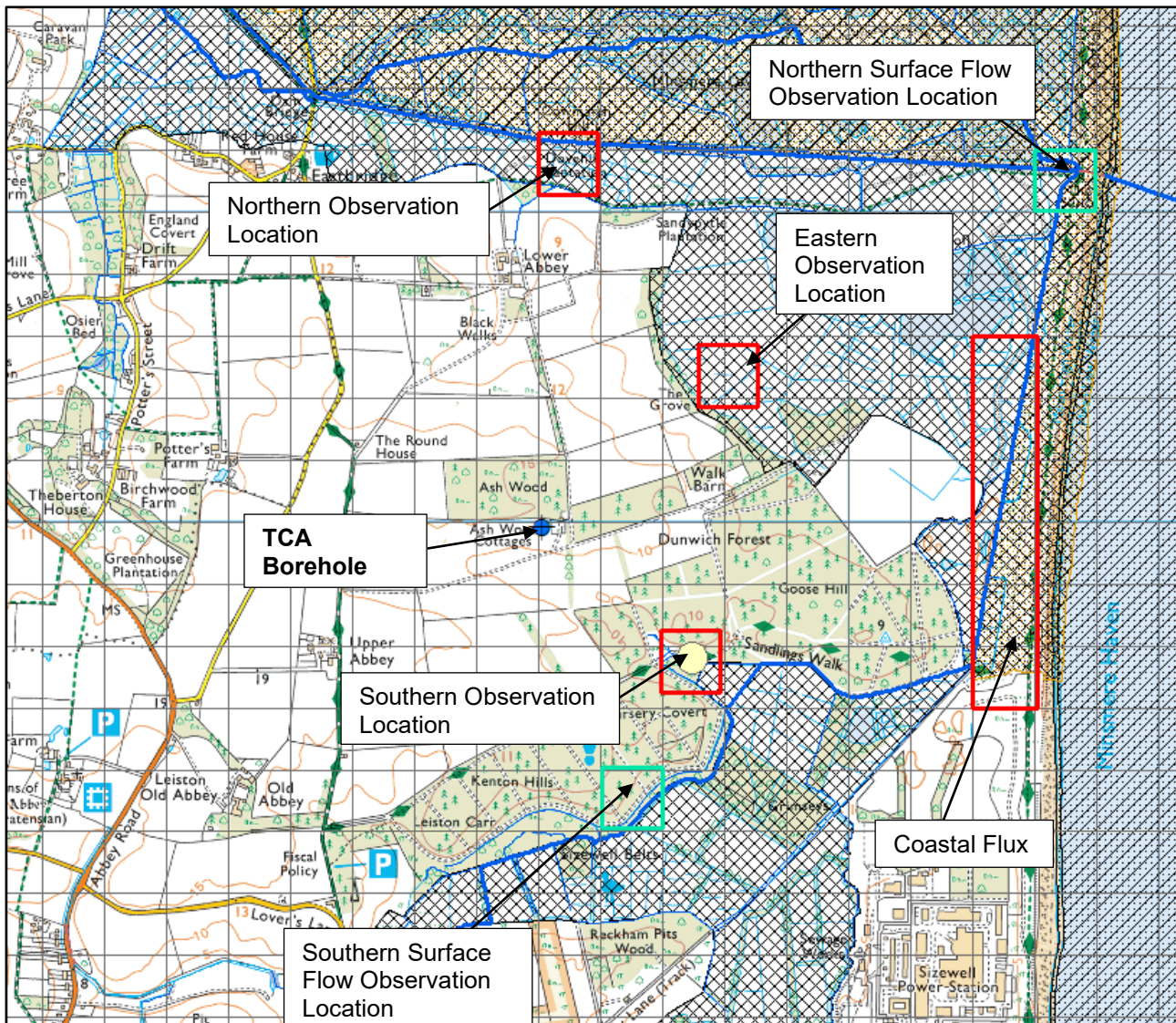


Figure 1 – Model assessment point locations

- 2.1.5.7 Updated groundwater modelling was undertaken to account for planned changes to the cut off wall design around the main construction area. This modelling was uncoupled from surface water modelling. This modelling was also undertaken with an assumption of the TCA abstraction operating at its upper credible limit output, 1,100 m³/d, throughout the MCA dewatering and SZC construction phase. This equates to 10 years within the model run, between 2022 and 2032.
- 2.1.5.8 The maximum drawdown within the Sizewell Marshes with the TCA abstraction also included in the modelling is observed seven and a half years after the commencement of abstraction (2,709 days) and 6 and a half years after the commencement of dewatering (2,344 days). The modelled drawdown represents a worst case theoretical maximum drawdown associated with the Main Construction Area (MCA) dewatering and the TCA abstraction. However, in this case, the modelled maximum drawdown is not considered to be likely to be possible in the real-world operation of the abstraction because existing agreed groundwater monitoring and trigger levels would result in a reduction or cessation of abstraction should the drawdown associated with the abstraction reach these levels, and so reduce the maximum effect of the abstraction itself.

HABITATS REGULATIONS ASSESSMENT AND COUNTRYSIDE AND RIGHTS
OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

- 2.1.5.9 The comparisons between the models with and without the TCA abstraction show that the 0.1 m drawdown contour in the Peat beneath the Sizewell Marshes increases in area when the TCA abstraction is also present, covering more of the Sizewell Marshes and more of the surrounding vicinity north and south for the marshes with variable drawdown up to 0.1 m. The 0.2 m do not change much within the Marshes, but do increase to the north of the Marshes and towards the location of the abstraction. The data suggests that the maximum drawdown across the majority of the Peat will not be significantly higher with the TCA abstraction present. The effect of dewatering on the Minsmere SSSI is also minimal, with small change in the location of the 0.1 m and 0.2 m drawdown contours.
- 2.1.5.10 The change in drawdown within the Crag is more pronounced, with the 0.1 m, 0.2 m and 0.3 m contours beneath the Sizewell Marshes moving westward, and towards the north of the Sizewell Marshes SSSI, in the immediate vicinity of the TCA. The 0.1 m drawdown contour in the Crag extends beneath the Sizewell Marshes significantly, covering the whole of the Sizewell Marshes and surrounding vicinity south of the Marshes. The area of the 0.3 m contour beneath the Sizewell Marshes extends to a wider area north-west, around the TCA. The effect of dewatering on the Minsmere SSSI is generally low, with a minor increase in drawdown and the location of the 0.1 m and 0.2 m drawdown contours in the far south of the area of the SSSI.
- 2.1.5.11 The TCA abstraction is targeting, and pumping from, the Crag and so the identified change in the Crag aligns with this, as does the difference between the maximum drawdown in the Peat compared to the Crag. Compared to the Original DCO modelling, the model with the TCA abstraction is not notably higher in the Peat with little difference in the maximum drawdown, but covers a notably larger area within the Crag, with the maximum area of 0.1 m of drawdown over a larger area and covering most of the Sizewell SSSI. However, whilst the maximum area of drawdown when the TCA abstraction is active is higher than the original modelling, particularly in the Crag, the addition of the TCA abstraction still has little impact on levels within the Peat of the Sizewell Marshes SSSI itself.

2.1.6 Surface water modelling if applicable

- 2.1.6.1 The surface flow/groundwater interaction data has been modelled and analysed and is summarised in **Table 2**, below.

Table 2 - Surface Flow Data

Discharge Parameter (m ³ /s unless specified)	Northern Surface Flow Observation		Southern Surface Flow Observation	
	Location		Location	
	DCO	Proposed Abstraction	DCO	Proposed Abstraction
Q95 [^]	0.002	0.00078	0.025	0.025
Q95 [^] (MI/d)	0.173	0.067	2.177	2.143
Minimum	-0.26	-0.27	-0.07	-0.06
Maximum	0.46	0.46	0.34	0.35
Total Discharge*	527.42	517.45	475.47	472.61
Total Positive Discharge*	546.71	537.65	475.72	472.96
Total Negative Discharge*	-19.29	-20.19	-0.25	-0.35

[^]Q95 for dry model run (4 years).

*Total discharge is the cumulative discharge (m³/s) across the four years of model run

Negative discharge values indicate modelled periods of reversed, upstream, flow at the selected location.

These may occur due to e.g. sea level change and inundation or storm events.

HABITATS REGULATIONS ASSESSMENT AND COUNTRYSIDE AND RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

- 2.1.6.2 The modelled Q95 values are not directly comparable to assessment values provided by the EA, because of the location of measurement points, the nature of the model setup (running of a dry model scenario) and associated model calibration and constraints. The original model objectives were not to model flow rates within surface water courses and, whilst calibration of such was undertaken, they could be subject to significant errors (as discussed in the 2020 numerical modelling report *Atkins Limited. March 2020*¹). As such, a comparison between the baseline (DCO) and scenario (DCO plus proposed abstraction) model has been undertaken. The modelled data indicates that the abstraction will have little impact on surface water-groundwater interaction at the Sizewell Marshes SSSI.
- 2.1.6.3 The observation locations discussed below are the locations of the green squares as requested by the EA (see Figure 1, in section 2.1.5 of this document). The reported data and calculated Q95 show that the proposed abstraction will have little impact on the southern surface flow observation location (Leiston Drain, located in the Sizewell Marshes SSSI) with the data suggesting almost no change in Q95 and similar minimum and maximum flow values. The northern surface water flow observation location (representing the confluence of the Leiston Drain and Minsmere New Cut) reports a slightly greater change with a slight reduction in the calculated Q95. However, the minimum and maximum flow rates at the northern location remain similar.
- 2.1.6.4 The northern location is considered less representative of the area in the vicinity of the MDS and is likely to be less well represented in the model as it is close to/at the northern edge of the model domain. This northern location is therefore less likely to be a reliable representation of flow, as was acknowledged in the 2020 numerical modelling report¹. The Minsmere River and its flow is not included in the model, and the model boundary conditions may have a large impact on the conditions at this location.
- 2.1.6.5 As stated above, the modelled data indicates that the abstraction will have little impact on surface water-groundwater interaction at the Sizewell Marshes SSSI, which is considered to be the more reliable and representative data point for the purposes of this assessment.
- 2.1.7 Impoundment details and details of intended operation of impoundment structure**
- 2.1.7.1 There is no anticipated impoundment of water resources that will take place under this permit.
- 2.1.8 Maps and drawings**
- 2.1.8.1 The abstraction point is to be located as shown on **Figure 1**.
- 2.1.9 Fish pass detail; type, size, any action being taken to enable fish utilisation**
- 2.1.9.1 No fish pass is required since there is no impoundment of any watercourse.
- 2.1.10 Non-native invasive species surveys**
- 2.1.10.1 No non-native invasive species surveys have been undertaken for the abstraction and none are relevant since the abstraction will take place entirely from groundwater.
- 2.1.11 Protected species surveys**

¹ *Sizewell C Numerical Modelling Report, R04 (Volume 2, Chapter 19 Appendix A, Groundwater and Surface water: Numerical Modelling Report*

**HABITATS REGULATIONS ASSESSMENT AND COUNTRYSIDE AND RIGHTS
OF WAY ACT ASSESSMENT SUPPORTING INFORMATION**

2.1.11.1 Protected species surveys are not relevant to this abstraction application, or to the assessment of abstraction impacts on designated sites.

2.1.12 Estimation of any habitat loss

2.1.12.1 Limited temporary habitat loss is anticipated as part of the overall TCA works but there will be no loss within Sizewell Marshes SSSI or from Wild Aldhurst; moreover, abstraction works form a limited part of the overall scheme.

2.1.13 Details of proposed quantities and abstraction period

2.1.13.1 Estimated abstraction volumes are a maximum value of 600m³/day. The maximum yearly abstraction is to be 101,495m³, with a maximum hourly abstraction of 25m³. The maximum flow rate for this abstraction is to be 7 litres per second. Abstraction will occur year-round. Abstraction is expected to take place from September 1st 2025 to 31st March 2030.

2.1.13.2 The maximum value is calculated based on the water supply strategy.

2.1.14 Hydrological impact assessment if applicable

2.1.14.1 A full hydrological impact assessment is included within the supporting information document supplied with this permit application. Its conclusions regarding potential effects at receptors are reproduced below

2.1.14.2 Given the small magnitude of change predicted outside the abstraction borehole it is not considered that there is a mechanism for impact on any of the identified receptors. The DCO modelling indicated that the expected drawdown within the Crag resulting from a maximum abstraction rate of 600m³/d in the TCA borehole would result in a drawdown of less than 0.1m at all existing licenced abstractions except for 7/35/03/*G/0045 and 7/35/03/*G/0051 where the maximum drawdown would be between 0.1m and 0.2m.

2.1.14.3 The EA numerical modelling also indicates that there is no potential impact on surface water.

2.1.14.4 Given the magnitude of the drawdown in both the Crag and the overlying Peat designated sites, as well as the nearby surface water bodies, are not likely to be significantly affected by the abstraction at the new TCA borehole. Additionally, the operation of the TCA borehole is anticipated to be limited to a few years, from September 1st 2025 to 31st March 2030 after which a new desalination plant will be used to supply industrial process water.

2.1.14.5 Taking into account the small magnitude of change predicted outside the abstraction borehole, it is not considered that there is a credible mechanism for effect at any of the identified receptors.

2.1.15 Details of any water level/flow monitoring undertaken including location(s) of monitoring, frequency and data acquired

2.1.15.1 In support of the DCO a numerical model was developed to represent the groundwater and surface water regime in the area of the SZC development. The area covered by the model domain is approximately 60 km². The numerical model was based on a robust conceptual understanding of the groundwater and surface water flow regimes based on extensive ground investigation and monitoring data. The SZC model was developed to allow appropriate interface with the EA's regional model (the NEAC model). This meant that suitable boundary conditions could be determined, and model predictions validated against the NEAC model, particularly within the Sizewell Marshes SSSI. Within the domain of the SZC model the grid was refined around areas of interest to allow greater resolution in assessing change. In the Sizewell Marshes SSSI grid cells reduce to be less than 1m in scale. The model includes a coupled representation of groundwater

HABITATS REGULATIONS ASSESSMENT AND COUNTRYSIDE AND RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

and surface water in the Sizewell Marshes SSSI, which allows change in the interaction between groundwater and surface water to be assessed at each timestep in the model runs.

- 2.1.15.2 The numerical model was calibrated against real world monitoring data to demonstrate that there is a high degree of correlation between the model behaviour and observed groundwater and surface water responses. Once the baseline model had been developed and validated against real world data as being suitably representative a series of model runs were undertaken to allow the change associated with individual aspects of the SZC project to be assessed.
- 2.1.15.3 During the DCO Examination period the EA set out in their Statement of Common Ground [5] that:
- The SZC numerical model was an appropriate tool to use in assessing change resulting from the construction and operation of SZC (MDS_GW1)
 - The groundwater conceptualisation on which the numerical model was based is appropriate (MDS_GW2)
 - The surface water conceptualisation on which the numerical model was based is appropriate (MDS_GW3)
 - The assessment of predicted impacts is appropriate (MDS_GW6)
 - The proposed Water Monitoring and Management Plan (WMMP) (which includes the control structure on the realigned stretch of Sizewell Drain) is appropriate (MDS_GW8)
 - The proposed terrestrial ecology assessment methodology, identified impacts, and mitigations is appropriate.
- 2.1.15.4 The Draft WMMP [4] outlined existing monitoring efforts, consisting of 86 borehole locations to monitor groundwater, Velocity and stage monitoring at 7 locations to monitor surface water and a weather station to monitor rainfall. This plan also sets out further monitoring locations as detailed in [plate and table 6.1](#). This draft was agreed with the EA in the Statement of Common Ground (MDS_GW8).
- 2.1.15.5 Subsequent to the DCO monitoring of water levels and flows within the Sizewell Marshes has continued. During the revision of the WMMP, more recent (post-DCO) monitoring data was compared to that used during the DCO assessments. This comparison showed that the characterisation of baseline conditions in the Sizewell Marshes SSSI established prior to the DCO remains valid, with no significant deviation in monitoring data. This is set out in para. 4.2.11 of the WMMP recently approved to discharge Requirement 11 of the DCO.
- 2.1.16 Details of water quality of any water intending to be discharged as part of a dewatering operation**
- 2.1.16.1 Groundwater abstracted under this permit is not being abstracted as part of a dewatering operation. The water abstracted is to be used as process water and dust suppression.
- 2.1.17 Details/assessment of prevailing environmental conditions**
- 2.1.17.1 During the DCO Examination a note was produced [16] that sets out the water balance in the Sizewell Marshes. [Paras. 1.4.14-15](#) of this note state that (in summary) the majority of the surface water levels and flows within the Sizewell Marshes are comparable between baseline and development model runs through the year. The exception is in the Sizewell Drain at the downstream end of the Sizewell Marshes. Here, there is a small increase in the maximum predicted flow rate, and the frequency at which it occurs. This is associated with the realigned Sizewell Drain. There is little or no change predicted in the Leiston Drain, downstream of the SSSI.

HABITATS REGULATIONS ASSESSMENT AND COUNTRYSIDE AND RIGHTS
OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

- 2.1.17.2 The assessment made during the DCO was based on data and evidence collected prior to submission of the DCO and supporting documentation. This included the draft WMMP [4]. This draft was agreed with the EA in the Statement of Common Ground (MDS_GW8).
- 2.1.17.3 Subsequent to the DCO monitoring of water levels and flows within the Sizewell Marshes has continued. During the recent revision of the WMMP more recent (post-DCO) monitoring data was compared to that used during the DCO assessments. This comparison showed that the characterisation of baseline conditions in the Sizewell Marshes SSSI established prior to the DCO remains valid, with no significant deviation in monitoring data.

2.1.18 Details of any mitigation

- 2.1.18.1 Measures are being implemented to address the impacts of the overall project (e.g. via the DCO). No mitigation is proposed regarding protecting SSSIs or designated habitat sites.
- 2.1.18.2 The HRA package(s) consider the potential impacts to sensitive receptors dependant on groundwater, as well as the availability of water within the catchment, based on abstraction from the TCA borehole being undertaken **in addition** to the existing licenced abstractions. All assessment of change considered in the HRA package(s) consider the new abstraction from the TCA borehole as a net increase in water being taken from the catchment, with the existing abstractions assumed to be operated at their maximum licenced rates. The licence trades originally included as part of the application served as a mechanism to secure abstraction rights without increasing net abstraction from the catchment. However, the assessment of impact on the integrity of the catchment was based on new abstraction from the TCA borehole taking place in addition to the existing licenced abstractions. This demonstrated no undue harm would be caused to the groundwater supply even without the trades in effect. It is proposed to use existing monitoring infrastructure within the Sizewell Marshes SSSI to identify whether there is any unanticipated change in water levels outside the abstraction borehole monitoring of water levels is currently undertaken in accordance with the WMMP, secured under Requirement 11 of the DCO, which was discharged on 09/04/24. Water levels are monitored at 15-minute intervals at several locations across the Sizewell Marshes SSSI as set out in the WMMP. The scope of this ongoing monitoring is overseen by the Water Management Working Group, which includes representation from the EA. Following initiation of abstraction, water level monitoring data from the locations identified in the WMMP will be reviewed to identify any deviation from baseline pre-abstraction conditions.

HABITATS REGULATIONS ASSESSMENT AND COUNTRYSIDE AND RIGHTS
OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

3 INFORMATION TO INFORM THE IN-COMBINATION ASSESSMENT

3.1 Other plans and projects

3.1.1.1 The permit has the potential to interact in combination with other aspects of the SZC project. However, for key risks this has been factored into the overall assessment work undertaken for the DCO. For example:

- offsetting habitat creation for habitat loss in the Sizewell Marshes SSSI from SZC as a whole has already been undertaken at Aldhurst Farm, through the fen meadow plan, and in an area of wet woodland to the west of the Grove through the wet woodland plan. There is no significant habitat loss under this permit which will therefore not affect the plant, invertebrate or bird interest features of the SSSI.
- the Environmental Appraisal of the SSSI crossing options [6] (summarised in Appendix 14B1 – Plants and Habitat Synthesis [paragraph 1.3.104 and 1.3.105](#) [7]), details a modelling exercise that was undertaken to assess the predicted changes in water levels within Leiston Drain as a result of actually constructing the SSSI crossing. This modelling predicted only a very small, highly localised effect, such that during construction, there would be a temporary 2cm reduction in water levels to the east of the crossing and a 1cm reduction to the west. This effect would rapidly diminish over distance, not being apparent beyond a radius of 90m. During the operational phase, water levels would stabilise, and long-term changes are predicted to be less than a 1cm increase in levels to the west of the crossing (i.e. up-gradient), with a corresponding reduction to the east, with no change apparent 60m from the SSSI crossing on both sides; and
- the construction of the MCA platform (including excavating the temporary ditch diversion and infilling the existing ditch, stockpiling arisings, installation of sheet piles, and improvement for the approach embankment) would result in a loss of part of the existing functional floodplain associated with Sizewell Marshes SSSI. However, compensatory flood storage has already been created, and advice from the EA in the DCO Environmental Statement (ES) when this was considered alongside floodplain loss due to the MCA identifies that when comparing the maximum water levels for the baseline with the development scheme scenarios, the loss contributes to a maximum relative difference of less than 15mm across the floodplain. As such, compensation would not be required due to the small magnitude, and as floodplain connectivity will not be at risk ([Paragraph 19.6.70 Sizewell C ES Volume 2, Chapter 19 Groundwater and Surface Water](#) [8]).

3.1.1.2 A summary of related permits granted and sought in respect of the SZC Project is provided below.

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

Table 3.1 Other related SZC MDS permits, licences and consents

Permit type	SZC permit application reference	Regulator	Regulator permit reference	Activities covered	Status	Location	Timing	Further information
Construction Water Discharge Activity (CWDA)	MDS/CWDA/90	EA	EPR/DB3946KP/A001	Water discharge from three outfall linked in the TCA of the MDS.	In determination	TM 47217 64922 TM 46876 64559 TM 46556 64549	October 2025 – end TCA construction	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.
Flood Risk Activity Permit (FRAP)	MDS/FRA/61	EA	EPR/TB3157GQ	Installation of security fencing for the foreshore	Obtained	TM 476 640 to TM 476 637	Now implemented	To facilitate subsequent foreshore and marine consents
FRAP (variation)	MDS/FRA/91	EA	EPR/TB3157GQ/V001	Variation for EPR/TB3157GQ.	Obtained	N/a	Now implemented	N/A – Admin change only
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	Centroid of MDS: TM473640 SSSI Clearance within the 'SSSI triangle' corners: TM 46972 64083 TM 46996 64446 TM 47392 64532 Water Vole displacement area: Upstream- TM 47298 64506 Downstream- TM 47339 64518	Now implemented	This is to facilitate the SSSI crossing works and ensures that the vegetation within the footprint of the crossing has already been cleared.
FRAP	MCA/FRA/12	EA	EPR/DB3147LF	Construction of the temporary sea defence (TSD) within the 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	N/A – Admin change only
FRAP	MCA/FRA/53	EA	EPR/BB3590JX/V002	Variation for SSSI vegetation clearance consent (EPR_BB3590JX), extension of water vole clearance dates	Obtained	TM 47298 64506 to TM 47339 64518	Now implemented	This is to facilitate the SSSI crossing works and ensures that the vegetation within the footprint of the crossing has already been cleared.

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

Permit type	SZC permit application reference	Regulator	Regulator permit reference	Activities covered	Status	Location	Timing	Further information
FRAP (Variation)	MDS/FRA/56	EA	EPR/BB3590JX/V003	SSSI UXO and vegetation clearance	Obtained and being implemented	Centroid of MDS: TM473640	Now implemented	This is to facilitate the SSSI crossing works and ensures that the vegetation within the footprint of the crossing has already been cleared.
Land Drainage Consent (LDC)	MDS/LDC/21 MDS/LDC/40 MDS/LDC/41 MDS/LDC/42	East Suffolk Water Management Board (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	Mink trapping and monitoring raft. Installing culverts for access. Erection of fencing (security and ecology). Retainment of existing culvert. Installation of silt curtains.	Obtained	MDS/LDC/21 SSSI Clearance within the 'SSSI triangle' corners: TM 46972 64083, TM 46996 64446, TM 47392 64532 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	Now implemented	This is to facilitate the SSSI crossing works and ensures that the vegetation within the footprint of the crossing has already been cleared.
FRAP	MCA/FRA/2	EA	To be confirmed – application not yet submitted	Construction of SSSI Crossing including bridge over Leiston Drain and temporary realignment of Leiston Drain.	Obtained	southern end: TM 47339 64432; northern end: TM 47296 64563.	January to March 2025	Similar water quality protection measures will be implemented as standard for the SZC project. Clear span bridge avoiding works within the Leiston Drain.
WRAL	MCA/WRA/7	EA	To be confirmed – application not yet submitted	Construction of SSSI Crossing – including bridge over Leiston Drain. Dewatering for piling headscap, to create foundation for the new bridge structures to	Submitted	Crossing: southern end: TM 47339 64432;	Winter 2024/2025	Dewatering of the cofferdams for installation of the pile caps on the SSSI bridge abutments is integral to

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

Permit type	SZC permit application reference	Regulator	Regulator permit reference	Activities covered	Status	Location	Timing	Further information
				build upon. Sheet piling driven in to the ground, concrete piling used for trench in between.		northern end: TM 47296 64563. <u>Corners of cofferdams to be dewatered:</u> Northern cofferdam: 47283 54512, 47284 64508, 47351 64534, 47353 64530 Southern cofferdam: 47293 64482, 47294 64477, 47361 64504, 47363 64500 <u>Water course activities:</u> upstream point: TM 47281 64500; downstream point: TM 47347 64522.		delivering the SSSI Crossing and will be undertaken simultaneously.
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	National Grid Reference (NGR) of upstream connection with Sizewell Drain: TM 47293 64503 NGR of downstream connection with Leiston Drain: TM 47295 264427 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	LDC

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

Permit type	SZC permit application reference	Regulator	Regulator permit reference	Activities covered	Status	Location	Timing	Further information
							Northing – 264430.150	
CWDA	MDS/CWDA/18	EA	EPR/RP3820SH	Early site drainage, surface water discharges from MCA/TCA/ACA.	In determination	E01 NGR: TM 47654 64054 DW01 NGR: TM 47349 64530 O5 NGR: TM 46463 65940 O7 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	Estimated from October 2024 to December 2036	
FRAP	MCA/FRA/8	EA	To be confirmed - application not yet submitted	Sizewell Drain realignment – connection into Leiston Drain including headwall installation and works in/ loss of floodplain due to installation of MCA environmental sheet pile barrier	In preparation	NGR for the reach of Sizewell Drain being realigned: from TM 47021 63731 to TM 47394 64540. NGR for new connection point of Sizewell Drain into Leiston Drain: TM 47038 64437.	Winter 2024/25	Permanent connection to Leiston Drain following realignment will replace the temporary connection created for the SSSI Crossing and will be undertaken later (not simultaneously).
LDC	MCA/LDC/5	ESWMB	To be confirmed - application not yet submitted	Sizewell Drain realignment	In preparation	NGR for the reach of Sizewell Drain being realigned: from TM 47021 63731 to TM 47394 64540. NGR for new connection point of Sizewell Drain into Leiston Drain: TM 47038 64437.	Winter 2024/25	Permanent connection to Leiston Drain following realignment will replace the temporary connection created for the SSSI Crossing and will be undertaken later (not simultaneously).

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

Permit type	SZC permit application reference	Regulator	Regulator permit reference	Activities covered	Status	Location	Timing	Further information
Fish Pass Approval (FPA)	MCA/FPA/1	EA	To be confirmed – application not yet submitted	Sizewell Drain realignment – fish/eel pass	In preparation	NGR for the reach of Sizewell Drain being realigned from TM 47021 63731 to TM 47394 64540.	Winter 2024/25	Fish pass is ecologically positive and will not have negative effects in combination with other works (which will not involve any in channel works).
Water Resources Impoundment Licence (WRIL)	MCA/WRIL/2	EA	To be confirmed – application not yet submitted	Sizewell Drain realignment – permanent level control structure – weir and control structures on connecting lateral drains	In preparation	Approx NGR: TM 47392 64524.	Winter 2024/2025	The structure is proposed to be set back from the confluence of Sizewell Drain and Leiston Drain by a short distance (ideally by 5 m to 10 m up Sizewell Drain). This weir is being included as a positive structure to enable better control of flows in the Sizewell Drain when and if desired. It is therefore environmentally positive. Blocking of lateral drains being undertaken to enable Sizewell Drain permanent realignment and to prevent hydrological or water quality impacts on Sizewell Marshes SSSI (and thus its role as supporting habitat for birds of Minsmere-Walberswick SPA). These works will therefore work to avoid adverse effects. Hydrological modelling of the straightening of the Sizewell Drain itself (which will be subject to a Land Drainage Consent application) was undertaken for the DCO and will be discussed and presented in the permit to be submitted for the permanent realignment. Modelling confirmed no impact on water quality or hydrology in Sizewell Marshes following drain realignment. Therefore no in combination effects. Similar water quality protection measures will be implemented as standard for the SZC project.
FRAP	AD6/FRA/1	EA	To be confirmed – application not yet submitted	Construction of crossing of Leiston Drain including works within the floodplain (e.g.	In preparation	Approximately TM 45444 63497	January to February 2025 then resuming in September 2025	Will be undertaken over the same timescale to the dewatering works covered by this permit and is directly linked as the dewatering is for the pile caps for the bridleyway crossing

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

Permit type	SZC permit application reference	Regulator	Regulator permit reference	Activities covered	Status	Location	Timing	Further information
				mammal tunnel) for bridleway AD6			to avoid bird nesting season.	of Leiston Drain. Similar water quality protection measures will be implemented as standard for the SZC project. Clear span bridge avoiding works within the Leiston Drain.

APPENDIX A: EA RISKS RELEVANT TO PERMIT TCA/WRA/43

The following appendices set out SZC Limited's assessment of EA risks for each permit for each SSSI or Habitat site.

A.1 EA Risks Relevant to Permit TCA/WRA/43 and Sizewell Marshes SSSI

EA Risk	Assemblage of breeding and wintering birds	Ditches	Floodplains in fen and lowland mire	Invertebrate assemblages ²	Lowland mire grassland and rush pasture	Vascular plants	Justification
Reduced dilution capacity	X	X	X	X	X	X	Changes in the flow or the velocity regime of a watercourse, or in groundwater levels, could result in an inability to dilute and manage discharges into the same habitat. Reduced dilution capacity could have a direct effect on some of the interest features for which the SSSI is partly designated (notably the ditch habitat and invertebrate populations) as well as indirectly on other SSSI features through potential effects on prey fish and invertebrates, although the Leiston Drain is only one of many watercourses within the foraging distances of relevant SSSI birds. Abstraction of groundwater related to this permit application have been shown to have minimal impact on water levels and quality in surface water flows and thus won't affect dilution capacity. Results of modelling at the nearest point of Sizewell Marshes SSSI indicate that the drawdowns in the peat would be a maximum of 0.10m in year 1 and less in following years, with drawdowns over much of the SSSI being below this and with minimal change to surface water flows. There will be no effects on the SSSI habitats, plants or invertebrates.
Habitat Loss	X	X	X	X	X	X	Abstraction will not cause habitat loss in Leiston Drain or elsewhere in the SSSI (i.e. through drying out of fen and mire) due to the small drawdown levels. Results of modelling at the nearest point of Sizewell Marshes SSSI indicate that the drawdowns in the peat would be a maximum of 0.10m in year 1 and less in following years, with drawdowns over much of the SSSI being below this and with minimal change to surface water flows. As a result, there will be no drying out of SSSI habitats or those that support SSSI plants or invertebrate species, or fish on which some SSSI birds feed.
Entrapment/impingement	X	X	X	X	X	X	Abstraction from ground will not result in any entrapment or impingement of fish species on which SSSI birds might prey and would therefore have no indirect effect on the ability of the SSSI to meet its conservation objectives.

² W211 – Open water on disturbed sediments and W314 reed-fen & pools

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

EA Risk	Assemblage of breeding and wintering birds	Ditches	Floodplains in fen and lowland mire	Invertebrate assemblages ²	Lowland mire grassland and rush pasture	Vascular plants	Justification
Changes in water levels or table	X	X	X	X	X	X	Abstraction will not cause reduction in water levels in SSSI fen or mire habitats due to the small drawdown in water levels. Results of modelling at the nearest point of Sizewell Marshes SSSI indicate that the drawdowns in the peat would be a maximum of 0.10m in year 1 and less in following years, with drawdowns over much of the SSSI being below this and with minimal change to surface water flows. As a result there will be no change in water levels in Leiston Drain or other SSSI features and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which some SSSI birds feed. There will be no direct or indirect effects on SSSI habitats, plants or invertebrates.
Change in flow or velocity regime	X	X	X	X	X	X	Abstraction will not cause any change in the flow or velocity regime in Leiston Drain, or other SSSI watercourse, due to the small drawdown in water levels. Results of modelling at the nearest point of Sizewell Marshes SSSI indicate that the drawdowns in the peat would be a maximum of 0.10m in year 1 and less in following years, with drawdowns over much of the SSSI below this and with minimal change to surface water flows. As a result there will be no change in flow or velocity in Leiston Drain and therefore no effect on SSSI habitats, plants or fauna dependent on flows in Leiston Drain or Sizewell Drain.
Changes in surface water flooding	X	X	X	X	X	X	Abstraction will not cause any change in surface water flooding within Sizewell Marshes SSSI due to the small drawdown in water levels. Results of modelling at the nearest point of Sizewell Marshes SSSI indicate that the drawdowns in the peat would be a maximum of 0.10m in year 1 and less in following years, with drawdowns over much of the SSSI being below this and with minimal change to surface water flows. As a result there will be no change in flooding in the SSSI and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which SSSI birds feed, or habitats on which SSSI birds might roost in the SSSI. There will be no direct effects on the SSSI itself and no direct or indirect effects on SSSI habitats, plants or invertebrates.
Change in water chemistry	X	X	X	X	X	X	Abstraction will not affect water chemistry in the surrounding area or Leiston Drain. As a result, there will be no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which SSSI birds feed, or habitats on which SSSI birds might roost in the SSSI. There will be no direct effects on the SSSI itself and no direct or indirect effects on SSSI habitats, plants or invertebrates.
Change in salinity regime	X	X	X	X	X	X	Abstraction will not cause any change in the salinity regime in Leiston Drain or other watercourses in the SSSI due to the small drawdown in water levels and the fact that groundwater and surface water are in continuity. Results of modelling at the nearest point of Sizewell Marshes SSSI indicate that the drawdowns in the peat would be a maximum of 0.10m in year 1 and less in following years, with drawdowns over much of the SSSI being below this and with minimal change to surface water flows. As a result, there will be no change in salinity regime in SSSI watercourses.
Change in freshwater flows to estuary	X	X	X	X	X	X	The abstraction will not significantly affect flows in the Leiston Drain as results of modelling at the nearest point of Sizewell Marshes SSSI indicate that the drawdowns in the peat would be a maximum of 0.10m in year 1 and less in following years, with drawdowns over much of the SSSI being below this and with minimal change to surface water flows. Additionally, there is no estuarine component to Sizewell Marshes SSSI.

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

A.2 EA Risks Relevant to Permit TCA/WRA/43 and Minsmere to Walberswick Heaths and Marshes SSSI

EA Risk	Aggregations of breeding and non-breeding birds ³	Habitats ⁴	Invertebrate assemblages ⁵	Botanical interest and vascular plant assemblage ⁶	Justification
Reduced dilution capacity	X	X	X	X	Changes in the flow or the velocity regime of a watercourse could result in an inability to dilute and manage discharges into the same habitat. Reduced dilution capacity could have an indirect effect on some of the interest features for which the SSSI is partly designated through potential effects on prey fish and invertebrates, although the Leiston Drain is only one of many watercourses within the foraging distances of relevant SSSI birds. Abstraction of ground water related to this permit application have been shown to have minimal on water levels and quality in surface water flows and thus won't affect dilution capacity. Results of modelling within Minsmere to Walberswick Heaths and Marshes SSSI indicate that the drawdowns in the peat would be a maximum of 0.12m, with minimal change to surface water flows. There will be no effects on the SSSI habitats, plants or invertebrates.
Habitat Loss	X	X	X	X	Abstraction will not cause habitat loss due to the small drawdown levels. Results of modelling within Minsmere to Walberswick Heaths and Marshes SSSI indicate that the drawdowns in the peat would be a maximum of 0.12m, with minimal change to surface water flows. As a result there will be no drying out of habitats that would support wetland fish or invertebrate species, or aquatic plants, on which some SSSI birds feed. There will be no direct effects on the SSSI itself and no direct or indirect effects on SSSI habitats, plants or invertebrates.
Entrapment/impingement	X	X	X	X	Abstraction from ground will not result in any entrapment or impingement of fish species on which SSSI birds might prey and would therefore have no indirect effect on the ability of the SSSI to meet its conservation objectives. There will be no direct effects on the SSSI itself and no direct or indirect effects on SSSI habitats, plants or invertebrates.
Changes in water levels or table	X	X	X	X	Abstraction will not cause reduction in water levels in Leiston Drain due to the small drawdown in water levels and the fact that groundwater and surface water are in continuity. Results of modelling within Minsmere to Walberswick Heaths and Marshes SSSI indicate that the drawdowns in the peat would be a maximum of 0.12m, with minimal change to surface water flows. As a result there will be no change in water levels in Leiston Drain and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which some SSSI birds feed. There will be no direct effects on the SSSI itself and no direct or indirect effects on SSSI habitats, plants or invertebrates.
Change in flow or velocity regime	X	X	X	X	Abstraction will not cause any change in the flow or velocity regime in Leiston Drain due to the small drawdown in water levels outside the sheet piling retaining wall and the fact that groundwater and surface water are in continuity. Results of modelling within Minsmere to Walberswick Heaths and Marshes SSSI indicate that the drawdowns in the peat would be a maximum of 0.12m, with minimal change to surface water flows. As a result there will be no change in flow or velocity in Leiston Drain and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which SSSI birds feed. There will be no direct effects on the SSSI itself and no direct or indirect effects on SSSI habitats, plants or invertebrates.

³ See section 3.3 for the full list of avian features

⁴ See section 3.3 for the full list of designated habitats

⁵ See section 3.3 for the full list of invertebrate assemblage features

⁶ See section 3.3 for the full list of designated botanical interest features, including vascular plant assemblage.

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

EA Risk	Aggregations of breeding and non-breeding birds ³	Habitats ⁴	Invertebrate assemblages ⁵	Botanical interest and vascular plant assemblage ⁶	Justification
Changes in surface water flooding	X	X	X	X	Abstraction will not cause any change in surface water flooding within the SSSI due to the small drawdown in water levels. Results of modelling within Minsmere to Walberswick Heaths and Marshes SSSI indicate that the drawdowns in the peat would be a maximum of 0.12m, with minimal change to surface water flows. As a result there will be no change in flooding in the SSSI and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which SSSI birds feed, or habitats on which SSSI birds might roost in the SSSI. There will be no direct effects on the SSSI itself and no direct or indirect effects on SSSI habitats, plants or invertebrates.
Change in water chemistry	X	X	X	X	Abstraction will not affect water chemistry in the surrounding area or Leiston Drain. As a result there will be no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which SSSI birds feed, or habitats on which SSSI birds might roost in the SSSI. There will be no direct effects on the SSSI itself and no direct or indirect effects on SSSI habitats, plants or invertebrates.
Change in salinity regime	X	X	X	X	Abstraction will not cause any change in the salinity regime in Leiston Drain due to the small drawdown in water levels. Results of modelling within Minsmere to Walberswick Heaths and Marshes SSSI indicate that the drawdowns in the peat would be a maximum of 0.12m, with minimal change to surface water flows. As a result there will be no change in salinity regime in Leiston Drain and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which SSSI birds feed. There will be no direct effects on the SSSI itself and no direct or indirect effects on SSSI habitats, plants or invertebrates.
Change in freshwater flows to estuary	X	X	X	X	The abstraction will not substantially affect flows in the Leiston Drain. There is no estuary that would be affected by abstraction or discharges via Leiston Drain. The Leiston Drain ultimately drains to the sea via a control structure on Minsmere New Cut. Therefore there will be no change in freshwater flows to sea.

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

A.3 EA Risks Relevant to Permit TCA/WRA/43 and Minsmere to Walberswick Heaths and Marshes SAC

EA Risk	Annual vegetation of drift lines	European dry heaths	Perennial vegetation on stony banks	Justification
Reduced dilution capacity	X	X	X	All three SAC habitats are dry habitats that rely on freely draining substrates and are not dependent on flowing or standing water, or a high-water table.
Habita Loss	X	X	X	
Entrapment/impingement	X	X	X	
Changes in water levels or table	X	X	X	
Change in flow or velocity regime	X	X	X	
Changes in surface water flooding	X	X	X	
Change in water chemistry	X	X	X	
Change in salinity regime	X	X	X	
Change in freshwater flows to estuary	X	X	X	

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

A.4 EA Risks Relevant to Permit TCA/WRA/43 and Minsmere-Walberswick SPA

EA Risk	Aggregations of breeding and non-breeding birds ⁷	Justification
Reduced dilution capacity	X	Changes in the flow or the velocity regime of a watercourse could result in an inability to dilute and manage discharges into the same habitat. Reduced dilution capacity could have an indirect effect on some of the interest features for which the SPA is designated through potential effects on prey fish and invertebrates, although the Leiston Drain is only one of many watercourses within the foraging distances of relevant SPA birds. Drawdown won't affect levels in Leiston drain and thus won't affect dilution capacity, as groundwater is in hydraulic continuity with the Leiston Drain and water will be returned to the drain. Results of modelling at the nearest point of the habitat site to the abstraction indicate that the drawdowns in the peat would be a maximum of 0.09m in year 2 with drawdowns of 0.01 in other years, with minimal change to surface water flows.
Habitat Loss	X	Abstraction will not cause habitat loss in Leiston Drain due to the small drawdown levels. Results of modelling at the nearest point of the habitat site to the abstraction indicate that the drawdowns in the peat would be a maximum of 0.09m in year 2 with drawdowns of 0.01 in other years, with minimal change to surface water flows. As a result there will be no drying out of habitats that would support wetland fish or invertebrate species, or aquatic plants, on which SPA birds feed. There will be no direct effects on the SPA itself.
Entrapment/impingement	X	Since it is abstraction from groundwater and will result in negligible change in water levels or flows, abstraction will not result in any entrapment or impingement of fish species on which SPA birds might prey and would therefore have no indirect effect on the ability of the SPA to meet its conservation objectives. There will be no direct effects on the SPA itself.
Changes in water levels or table	X	Abstraction will not cause reduction in water levels in Leiston Drain due to the small drawdown in water levels. Results of modelling at the nearest point of the habitat site to the abstraction indicate that the drawdowns in the peat would be a maximum of 0.09m in year 2 with drawdowns of 0.01 in other years, with minimal change to surface water flows. As a result there will be no change in water levels in Leiston Drain and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which SPA birds feed. There will be no direct effects on the SPA itself.
Change in flow or velocity regime	X	Abstraction will not cause any change in the flow or velocity regime in Leiston Drain due to the small drawdown in water levels outside the sheet piling retaining wall. Results of modelling at the nearest point of the habitat site to the abstraction indicate that the drawdowns in the peat would be a maximum of 0.09m in year 2 with drawdowns of 0.01 in other years, with minimal change to surface water flows. As a result there will be no significant change in flow or velocity in Leiston Drain and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which SPA birds feed. There will be no direct effects on the SPA itself.
Changes in surface water flooding	X	Abstraction will not cause any change in surface water flooding within Sizewell Marshes SSSI due to the small drawdown in water levels. Results of modelling at the nearest point of the habitat site to the abstraction indicate that the drawdowns in the peat would be a maximum of 0.09m in year 2 with drawdowns of 0.01 in other years, with minimal change to surface water flows. As a result there will be no change in flooding in the SSSI and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which SPA birds feed, or habitats on which SPA birds might roost in the SSSI. There will be no direct effects on the SPA itself.
Change in water chemistry	X	Abstraction will not affect water chemistry in the surrounding area or Leiston Drain. As a result there will be no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which SPA birds feed, or habitats on which SPA birds might roost in the SSSI. There will be no direct effects on the SPA itself.

⁷ See section 3.5 for the full list of avian features

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

EA Risk	Aggregations of breeding and non-breeding birds ⁷	Justification
Change in salinity regime	X	Abstraction will not cause any change in the salinity regime in Leiston Drain due to the small drawdown in water levels. Results of modelling at the nearest point of the habitat site to the abstraction indicate that the drawdowns in the peat would be a maximum of 0.09m in year 2 with drawdowns of 0.01 in other years, with minimal change to surface water flows. As a result there will be no change in salinity regime in Leiston Drain and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which SPA birds feed. There will be no direct effects on the SPA itself.
Change in freshwater flows to estuary	X	The abstraction will not affect flows in the Leiston Drain. There is no estuary that would be affected by abstraction or discharges via Leiston Drain. The Leiston Drain ultimately drains to the sea via a control structure on Minsmere New Cut. Therefore there will be no change in freshwater flows to sea.

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

A.5 EA Risks Relevant to Permit TCA/WRA/43 and Minsmere-Walberswick Ramsar

EA Risk	Criterion 1 (habitats ⁸)	Criterion 2 (plants, breeding birds and invertebrates ⁹)	Justification
Reduced dilution capacity	X	X	Changes in the flow or the velocity regime of a watercourse could result in an inability to dilute and manage discharges into the same habitat. Reduced dilution capacity could have an indirect effect on some of the interest features for which the Ramsar is partly designated through potential effects on prey fish and invertebrates, although the Leiston Drain is only one of many watercourses within the foraging distances of relevant Ramsar birds. Drawdown won't affect levels in Leiston drain and thus won't affect dilution capacity, as groundwater is in hydraulic continuity with the Leiston Drain and water will be returned to the drain. Moreover, a sheet piling retaining wall will be in place to limit hydraulic connection to the wider groundwater body. Results of modelling at the nearest point of the habitat site to the abstraction indicate that the drawdowns in the peat would be a maximum of 0.09m in year 2 with drawdowns of 0.01 in other years, with minimal change to surface water flows. There will be no direct effects on the Ramsar itself and no direct or indirect effects on Ramsar habitats, plants or invertebrates.
Habitat Loss	X	X	Abstraction will not cause habitat loss in Leiston Drain due to the small drawdown levels. Results of modelling at the nearest point of the habitat site to the abstraction indicate that the drawdowns in the peat would be a maximum of 0.09m in year 2 with drawdowns of 0.01 in other years, with minimal change to surface water flows. As a result there will be no drying out of habitats that would support wetland fish or invertebrate species, or aquatic plants, on which some Ramsar birds feed. There will be no direct effects on the Ramsar itself and no direct or indirect effects on Ramsar habitats, plants or invertebrates.
Entrapment/impingement	X	X	Since it is abstraction of groundwater and will result in negligible change in water levels or flows, abstraction will not result in any entrapment or impingement of fish species on which Ramsar birds might prey and would therefore have no indirect effect on the ability of the Ramsar to meet its conservation objectives. There will be no direct effects on the Ramsar itself and no direct or indirect effects on Ramsar habitats, plants or invertebrates.
Changes in water levels or table	X	X	Abstraction will not cause reduction in water levels in Leiston Drain due to the small drawdown in water levels. Results of modelling at the nearest point of the habitat site to the abstraction indicate that the drawdowns in the peat would be a maximum of 0.09m in year 2 with drawdowns of 0.01 in other years, with minimal change to surface water flows. As a result there will be no change in water levels in Leiston Drain and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which some Ramsar birds feed. There will be no direct effects on the Ramsar itself and no direct or indirect effects on Ramsar habitats, plants or invertebrates.
Change in flow or velocity regime	X	X	Abstraction will not cause any change in the flow or velocity regime in Leiston Drain due to the small drawdown in water levels. Results of modelling at the nearest point of the habitat site to the abstraction indicate that the drawdowns in the peat would be a maximum of 0.09m in year 2 with drawdowns of 0.01 in other years, with minimal change to surface water flows. As a result, there will be no change in flow or velocity in Leiston Drain and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which Ramsar birds feed. There will be no direct effects on the Ramsar itself and no direct or indirect effects on Ramsar habitats, plants or invertebrates.
Changes in surface water flooding	X	X	Abstraction will not cause any change in surface water flooding within Sizewell Marshes SSSI due to the small drawdown in water levels. Results of modelling at the nearest point of the habitat site to the abstraction indicate that the drawdowns in the peat would be a maximum of 0.09m in year 2 with drawdowns of 0.01 in other years, with minimal change to surface water flows. As a result there will be no change in flooding in the SSSI and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which Ramsar birds feed, or habitats on which Ramsar

⁸ 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.

⁹ 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*

HABITATS REGULATION ASSESSMENT AND COUNTRYSIDE RIGHTS OF WAY ACT ASSESSMENT SUPPORTING INFORMATION

EA Risk	Criterion 1 (habitats ⁸)	Criterion 2 (plants, breeding birds and invertebrates ⁹)	Justification
			birds might roost in the SSSI. There will be no direct effects on the Ramsar itself and no direct or indirect effects on Ramsar habitats, plants or invertebrates.
Change in water chemistry	X	X	Abstraction will not affect water chemistry in the surrounding area or Leiston Drain. As a result there will be no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which Ramsar birds feed, or habitats on which Ramsar birds might roost in the SSSI. There will be no direct effects on the Ramsar itself and no direct or indirect effects on Ramsar habitats, plants or invertebrates.
Change in salinity regime	X	X	Abstraction will not cause any change in the salinity regime in Leiston Drain due to the small drawdown in water levels. Results of modelling at the nearest point of the habitat site to the abstraction indicate that the drawdowns in the peat would be a maximum of 0.09m in year 2 with drawdowns of 0.01 in other years, with minimal change to surface water flows. As a result there will be no change in salinity regime in Leiston Drain and therefore no effect on habitats that would support wetland fish or invertebrate species, or aquatic plants, on which Ramsar birds feed. There will be no direct effects on the Ramsar itself and no direct or indirect effects on Ramsar habitats, plants or invertebrates.
Change in freshwater flows to estuary	X	X	The abstraction will not affect flows in the Leiston Drain. There is no estuary that would be affected by abstraction or discharges via Leiston Drain. The Leiston Drain ultimately drains to the sea via a control structure on Minsmere New Cut. Therefore there will be no change in freshwater flows to sea.