



Gunton and Corton Options Appraisal

Appendix E - Environmental Considerations

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Contents

1.	Introduction	1
2.	Environmental baseline	2
2.1	Population and human health.....	2
2.2	Material assets (recreation and amenity).....	2
2.3	Biodiversity, flora and fauna.....	3
2.4	Coastal processes and geology.....	4
2.5	The water environment	5
2.6	Potential sources of contamination	6
2.7	Cultural heritage	7
2.8	Landscape.....	7
3.	Summary of updates to the environmental baseline	9
4.	Consideration of management approaches.....	10
5.	References.....	18
 Annex A. Figures.....		 20

1. Introduction

The purpose of this appendix is to provide a summary of the baseline environment specific to the Corton to Gunton frontage and to support the options appraisal process in respect of environmental constraints and opportunities. This review draws on information from the following key sources:

- The Gorleston to Lowestoft Coastal Strategy (Coastal Partnership East, 2016) specifically:
 - Annex C1 Environmental baseline report (CH2MHill, 2016a)
 - Annex C2 Scoping Technical Report (CH2MHill, 2015)
 - Annex C4 Environmental Options Appraisal (CH2MHill, 2016b)
- Kelling to Lowestoft Ness Shoreline Management Plan (AECOM, 2012)
- Interactive map from MAGIC (Multi-Agency Geographic Information for the Countryside) (2021)
- Catchment Data Explorer (Environment Agency, 2021)
- Marine Planning Portal (Marine Management Organisation (MMO), 2021)
- Suffolk County Council data (Suffolk County Council, 2021a and 2021b)

The project frontage lies between Corton to Gunton, which includes the SMP policy units 6.21 (Hopton - Corton), 6.22 (Corton) and 6.23 (Corton - Lowestoft) (see Figure 1-1). The northern boundary is the former radar station, just south of the recreation ground at Hopton (TM5375 9926). The southern boundary is Links Road (TM5509 9531) at Gunton.

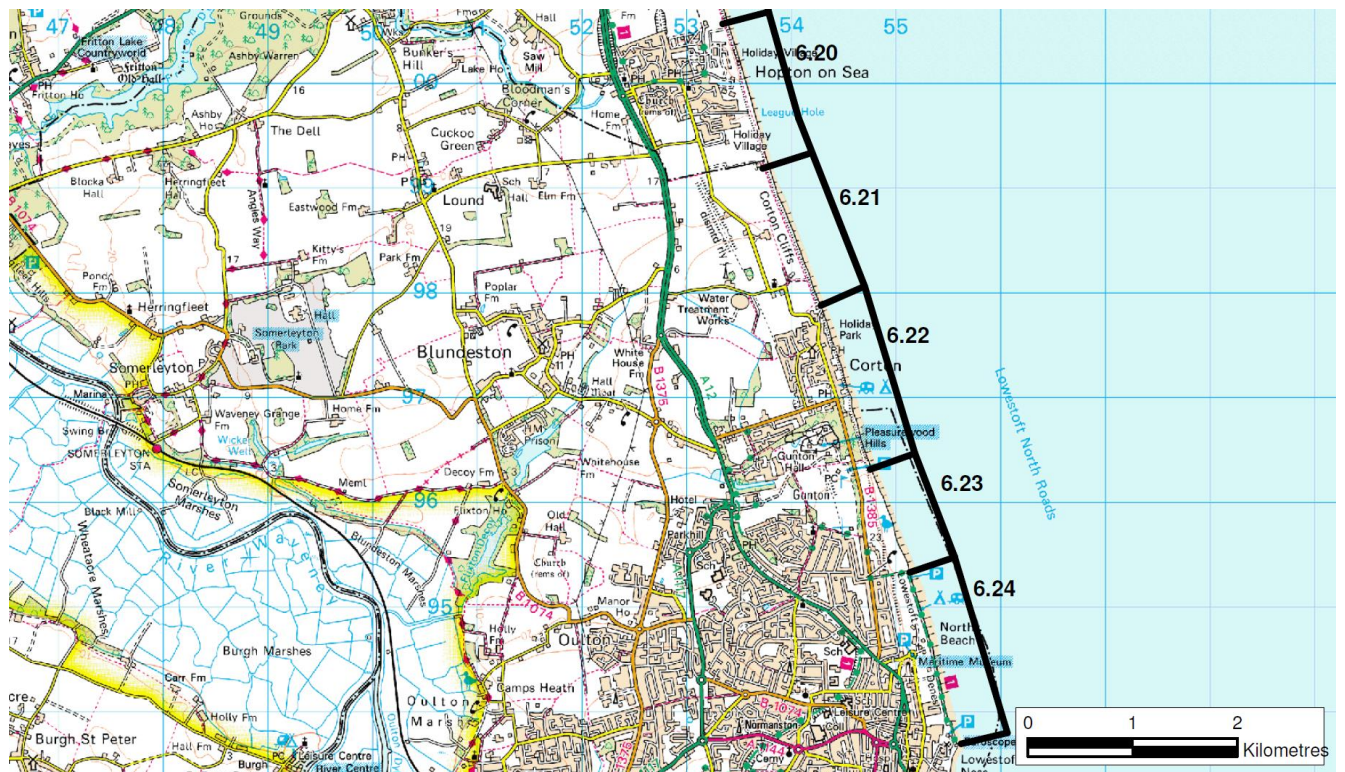


Figure 1-1: Shore Management Plan policy units (AECOM, 2012).

2. Environmental baseline

2.1 Population and human health

The frontage between Gunton and Corton lies within the jurisdiction of East Suffolk Council and is predominantly rural. The coastline comprises low dunes, sand-rich cliffs and narrow beaches with defences present along some of the frontages, backed by areas of residential properties, a theme park and a caravan park. Corton village is a popular holiday centre and the village population swells during summer months. There are two holiday villages in Corton, which are situated along the cliff top, and a number of associated facilities. The beach and the proximity of the Nature Reserves of Corton Woods and Gunton Warren are key attractions.

The population of Waveney District is predicted to increase from 118,000 in 2018 to 125,000 in 2028 (Suffolk Observatory, 2021a). The unemployment rate in East Suffolk District is 4.4% (Suffolk Observatory, 2021b). The main occupation type is management but other administrative roles and employment in the caring, leisure and service occupations are also important (Suffolk Observatory, 2021b).

General health and wellbeing in East Suffolk is in line with regional and national levels with around 5% of the population reporting bad or very bad health (Suffolk Observatory, 2021a).

In terms of deprivation, 18.4% of children in Waveney District live in low income families which is slightly higher than the national average (17%), whilst 12.4% households are in fuel poverty which is slightly higher than the national average (Suffolk Observatory, 2021a).

2.2 Material assets (recreation and amenity)

2.2.1 Public rights of way and access

The following Public Rights of Way (ProW) are present along the Corton and Gunton frontage (see Annex A, Figure A 1) (Suffolk County Council, 2021a):

- A public footpath (No.2) which runs along/just behind the foreshore from just south of Hopton to Corton where it links up with Church Lane.
- A public footpath (No.6) which leads around the sewage works that links up with footpath No.2 and a bridleway (No.5) that links with Stirrups Lane.
- Footpaths No.31 and No.26 south of Pleasurewood Hills theme park, which lead onto the foreshore just north of Gunton cliffs.

There are no National Trails along the frontage. The England Coast path currently stretches north from Hopton and there is an aim to provide access further south as part of the England Coast Path project.

There are numerous informal access points to the beach at Corton. There are car parks at Gunton Cliffs (just south of Pleasurewood Hills theme park) and at Links Road which are also likely to be popular access points. Three main beach access points are mentioned in the SMP at Baker's Score, Tibbenham's Score and Tramps Alley (AECOM, 2012).

2.2.2 Recreation and tourism

Tourism is an important industry of considerable economic value to the local community and is based primarily on the cliff-tops, dunes, sand and shingle beaches, coastal scenery and countryside. The beaches at Corton and Gunton provide an important amenity resource to the local community and are particularly well used in summer

months. The beach is popular all year round with dog-walkers, mainly from the local area. In the wider area there are opportunities for watching wildlife including birds and seals.

Cycling is also popular with a number of routes available in Gunton and Corton, including an on-road route from Corton to Hopton (No.517) that is part of the National Cycle Network (Sustrans, 2021). Gunton and Corton are not high use areas for watersports pursuits such as sailing or windsurfing, with watersports more concentrated around Lowestoft (MMO, 2021). At Gunton Warren, Tramps Alley is a key access point and this, together with the promenade, at Corton are used by local fisherman (Coastal Partnership East, 2016). Sea angling is also popular along this stretch. Pleasurewood Hills theme park is located just south of Corton approximately 300m from the sea. This is one of East Anglia's premier amusement parks, attracting thousands of visitors each year from around the country.

2.3 Biodiversity, flora and fauna

2.3.1 Sites of international importance (SAC, SPA, Ramsar)

The frontage lies adjacent to the Southern North Sea Special Area of Conservation (SAC) and the Outer Thames Estuary Special Protection Area (SPA) with the boundaries roughly following the line of Mean High Water.

The Southern North Sea SAC is designated for harbour porpoise *Phocoena phocoena*. The porpoise population within the North Sea appears to concentrate in some areas close to the coast between June and September, whilst the rest of the year it is found in deeper waters. The conservation objectives for the site are to ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS) for harbour porpoise in UK waters.

The Outer Thames SPA is a marine site designated for red-throated diver *Gavia stellate*, common tern *Sterna hirundo* and little tern *Sternula albifrons*. The site protects the at-sea foraging areas for these species to enhance the protection afforded to them in the adjacent coastal SPAs. The conservation objectives for the site are to ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:

- the extent and distribution of the habitats of the qualifying features;
- the structure and function of the habitats of the qualifying features;
- the supporting processes on which the habitats of the qualifying features rely;
- the population of each of the qualifying features; and
- the distribution of the qualifying features within the site.

Other sites which are outside of the study area but could potentially be affected by any change in management along the frontage include:

- The Broads SAC and Broadlands SPA and Ramsar site located approximately 5 km south west of the southern end of the frontage.
- Breydon Water SPA and Ramsar site located approximately 8 km north west.
- The Great Yarmouth North Denes SPA located approximately 10 km north of the frontage.
- Benacre to Easton Bavents Lagoons SAC and SPA located approximately 10 km south of the frontage.

2.3.2 Sites of national importance (SSSI, NNR, MCZ)

There is one Site of Special Scientific Interest (SSSI) within 2km of the Gunton to north Corton coastline, Corton Cliffs SSSI, which is designated for its geological importance (See Section 2.4).

There are no National Nature Reserves (NNR) within 2km of the frontage.

There are no Marine Conservation Zones (MCZ) within 30km of the Gunton to north Corton coastline.

2.3.3 Sites of local importance (LNR)

The area of dunes from Links Road north to the Pleasurewood Hills theme park is designated as Gunton Warren and Corton Woods Local Nature Reserve (LNR). This LNR is split into two sections: Gunton-Warren covering the dunes and heathland; and Corton Woods which stretches north around the edges of the theme park. A separate site, Gunton Wood LNR, lies approximately 700 m inland.

2.3.4 Habitats

The following priority habitats (those listed in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006) are present within 500 m of the frontage:

- maritime cliffs and slopes (this habitat is found in strip just behind the beach stretching from the northern tip to just south of Pleasurewood Hills theme park);
- lowland heathland (covering Gunton Warren/Gunton Denes);
- coastal sand dunes (between the heathland and the intertidal zone at Gunton Warren/Gunton Denes); and
- deciduous woodland (isolated areas including Corton Woods, two small areas along Corton Road and an area immediately north of Links Road).

The intertidal substrate along the length of the frontage is shown as 'sand and gravel' (Magic, 2021).

2.4 Coastal processes and geology

2.4.1 Coastal processes

Since 2016 there has been significant recent recession (landward movement) along the undefended Gunton Warren shoreline, especially towards the very southern end. The beach line remains some distance from the relict vegetated cliffs, but erosion of the beach has resulted in some cut back into the low vegetated backshore dunes that sit below the cliffs. This has led to some exposure of buried oil deposits, concerns over risks to the existing Anglian Water pipelines, and also the potential for localised undermining and outflanking of the Lowestoft North Denes seawall along Links Road. The recent erosion of the beach and dunes at this location represents an increase of rates from those anticipated by either the SMP or the Strategy. This is not however a new situation and may be attributable to changes at a larger scale. These changes are the key driver for reassessing suitable options for the frontage, particularly at Gunton Warren. A separate coastal processes report has been produced as part of the Review (see Annex A).

2.4.2 Geological Sites of Special Scientific Interest (SSSI)

Corton Cliffs SSSI covers a 700 m stretch of cliffs and beach immediately east of Corton Woods. It is designated for its geological importance as it is the type locality for the Anglian Cold Stage, during which occurred the most extensive Pleistocene glaciation of the British Isles. The cliffs expose a clear sequence of two tills with non-glacial water-lain sands between, together with a third till and associated deposits above. The whole Anglian sequence

here can be clearly related to the underlying Cromerian freshwater beds. There is one SSSI unit (5.5 ha) which was assessed in 2008 as being in favourable condition (Natural England, 2021).

Variation in levels at the cliff face at Bakers Score at Corton are evidence of cliff slumping; this could potentially be the result of land drainage issues (Coastal Partnership East, 2016 and see Appendix B), but requires further investigation.

2.4.3 Local geological interest sites

There are no known County Geodiversity Sites within 500 m of the frontage (GeoSuffolk, 2021).

2.5 The water environment

2.5.1 Water Framework Directive waterbodies

The relevant waterbodies and the current statuses are shown in Table 2-1. There are two coastal waterbodies relevant to the Corton and Gunton frontage, with the boundary between them located at Gunton Warren (TM549 959). Both water bodies are classified as heavily modified.

Table 2-1 WFD Water body names and status

Water body name (and ID)	Water body type	Overall status/potential	Distance from Corton-Gunton frontage
Norfolk East (GB650503520003)	Coastal	Moderate potential	0km ¹
Suffolk (GB650503520002)	Coastal	Moderate potential	0km ¹
BURE & WAVENEY & YARE & LOTHING (GB510503410700)	Transitional	Moderate	2.9km south of Links Road (the southern boundary of the frontage).
Broadland Rivers Chalk & Crag (GB40501G400300)	Groundwater	Poor	0km

The Norfolk East water body is heavily modified for coastal protection use and flood protection use. A list of mitigation measures for the Norfolk East water body was provided by the Environment Agency (J. Clemence 2020, pers. comm., 21 Sept). The mitigation measures for the Norfolk East water body, which are all assessed as being 'in place' are:

- Sediment management.
- Dredge disposal site selection.
- Manage disturbance.

The Suffolk water body is also heavily modified for coastal protection use and flood protection use. The Environment Agency confirmed that there are no water body specific mitigation measures for the Suffolk coastal water body (J. Clemence, 2019, pers. comm., 16 May).

¹ The boundary between the two coastal water bodies is located approximately halfway along Gunton-Warren at TM549959.

2.5.2 Bathing water quality

The closest designated Bathing waters are at Gorleston Beach (4 km north of the frontage) and at Lowestoft (North of Claremont Pier) (3 km south).

2.5.3 Drinking water quality

There is a Source Protection Zone (SPZ) inland from the study frontage with Zone III being located 1.2 km east of the coastline. There is a drinking water protected area approximately 600 m south of Links Road at the southern end of the frontage which covers part of Gunton village but not the coastline.

2.5.4 Abstraction and discharge points

The locations of licenced abstraction and discharge points were provided by the Environment Agency on 26 February 2021, following a data request, and are shown in Annex A, Figure A 2.

There is one licenced abstraction point within 500 m of the frontage, located at Pleasurewood Hills theme park (Licence number 7/34/19/*G/0132). This is a bore hole that supplies groundwater for 'make-up or top-up' use.

There are two licenced discharges into coastal waters: a sewage discharge at Corton (TM543978) and another at Lowestoft Ness (TM556937).

There is also an Anglian Water pipeline buried within the dunes north of Links Road. Rapid coastal erosion along the Gunton frontage in recent years has resulted in a risk of exposure of this pipeline. For this study, an assessment of risk to this asset from coastal erosion has been undertaken (see Appendix D), which indicates that if recent trends continue then it could be at risk from erosion in approximately 20 years from now. If the pipeline was to be rerouted along Anglian Water's preferred alignment, exposure could occur between 25 and 40 years from now.

2.6 Potential sources of contamination

There are a number of historic landfill sites in the coastal area between Corton and Gunton, which are shown in the SMP (AECOM, 2012) (see Annex A, Figure A 3 to Figure A 5). At these locations, continued erosion of the coastline could result in adverse impacts on coastal water quality. From north to south the landfill sites are located:

- south of Longfulans Lane just south of Hopton at TM528993, approximately 700 m inland and 850 m north west of the frontage;
- south of Stirrups Lane at TM53799783, approximately 500 m west of the frontage;
- along Station Road at TM54159743, approximately 200 m west of the frontage; and
- just south of Links Road at TM550895 11.1 km south of the frontage.

Another source of contamination relates to an historic oil spill which took place in 1978 when two ships collided resulting in the spillage of approximately 5,000 tonnes of the heavy fuel oil. Much of this was washed onshore over a 35 km stretch of the coastline, including along the study frontage (Hydrock Consultants Ltd, 2014). The majority of the resulting oil-contaminated beach sands were excavated and removal to landfill, but some oily waste was buried in pits along the foreshore above the high water mark.

Ground investigations carried out in 2013 found evidence of a buried oily 'mass' which was described as black, malodorous, oil-bound, beach-derived sands and gravels (Hydrock Consultants Ltd, 2014). The investigation indicated that the hydrocarbon-impacted waste is restricted to an area to the southwest of the postulated position of Pit 2 (at borehole locations 2P, 2Q and 2R) measuring approximately 10 m by 5 m (see Annex A, Figure A 6).

Due to coastal erosion this material has in recent years become periodically exposed, and there is some evidence that the oily waste, which appears to be by now largely solidified, is leaching into the North Sea. Whilst it is considered that short-term exposure to the oily mass is unlikely to result in effects on human health, there are other effects that may result from exposure such as adherence of oil particles to skin, clothing and animal fur, together with odours and the coating of structures and other items along the foreshore (Hydrock Consultants Limited, 2014). The SMP noted that some measures to slow the erosion at Gunton-Warren may be appropriate in the long-term to address the potential erosion of the oily waste, but this erosion appears to have occurred over a shorter than anticipated timescale.

2.7 Cultural heritage

There are no Scheduled Monuments within 2 km of the Gunton to north Corton coastline.

Belle Vue Registered Parks and Garden (Grade II) lies approximately 900 m south of the frontage.

There are over fifty listed buildings within 2 km of the study area, mainly concentrated in Lowestoft. There are three listed buildings (all Grade II) within 300 m of the frontage (from south to north): Hillingdon, Towers Mill and the Church of St Bartholomew.

North Lowestoft Conservation Area is located approximately 300 m south of Links Road. Minor changes to the boundary were adopted in June 2021 (East Suffolk Council, 2021).

There are a number of non-designated archaeological sites and monuments along the study frontage (Suffolk County Council, 2021b). A number of these relate to historic sea defences or remains associated with military activities, such as WW2 pillboxes, barbed wire, bomb craters, pill boxes and the gun emplacement at Broadland Sands Holiday Park. At north Corton there is a former WW2/Cold War radar station site, which includes a guardhouse, operations block and two radar stations.

The area also contains significant evidence of human occupation, including records from the medieval village of Corton. There are records from the prehistoric period as well as evidence of medieval and post-medieval farming practices.

2.8 Landscape

There are no Areas of Outstanding Natural Beauty (AONBs) within 2 km of the frontage.

The study frontage lies within the Suffolk Coastal and Heaths National Character Area (NCA) (Natural England, 2015). NCAs are areas that share similar landscape characteristics and NCA Profiles are guidance documents to inform decision-making. The profile for the study frontage includes the following Statements of Environmental Opportunity (SEO) which have particular relevance to management of this coastline:

- SEO 1: Manage the nationally significant coastal landscapes, ensuring that coastal management decisions take full account of landscape, environmental and visual impacts as part of an integrated approach working with coastal processes. Improve people's understanding of the process of coastal change.
- SEO 2: Manage the components of characteristic productive agricultural landscapes to benefit food production, biodiversity and soil and water quality. Promote sustainable farming practices that are able to adapt to changing agricultural economics, the considerable challenges of climate change and water availability.

Despite being in Suffolk, the frontage lies within the Norfolk Coastal Waters Character Area 9 (seascape character area) (MMO, 2012). The Character Area exhibits the following key characteristics:

- Extensive erosion of soft glacial till cliffs.
- Wide variety of erosion protection measures implemented along the coastline.
- Relatively inhospitable marine environment with few safe havens for marine users except ports of Great Yarmouth and Lowestoft.
- Heavily exploited waters, particularly for shellfish species.
- Presence of major offshore shipping routes challenges natural character.
- Much of the coastline is designated as RYA sailing areas.
- Coastal holiday resorts.
- Remote character strongly influenced in places by concentrated urban settlements, commercial activities and both on and offshore wind farm developments.

3. Summary of updates to the environmental baseline

Since the Gorleston to Lowestoft Coastal Strategy was published (Coastal Partnership East, 2016) the key changes in the environmental baseline are as follows:

- Erosion of the frontage in the southern part of Gunton-Warren resulting in erosion risk to an Anglian Water pipeline and exposure of buried oil deposits.
- Designation of the Southern North Sea SAC in 2019 to protect harbour porpoise *Phocoena phocoena*.

The works would be mainly carried out above water and best practice methods would be employed to reduce the risk of any pollutants (e.g. oils or fuel) from entering the sea. Therefore, there are no likely impacts on harbour porpoise and it has not been necessary to revisit the options appraisal as a result of the new designation.

4. Consideration of management approaches

4.1.1 Introduction

The Gorleston to Lowestoft Strategy considered a number of management approaches, these were assessed against defined SEA objectives (see Table 4-1) using the assessment criteria set out in Table 4-2. The findings from this appraisal are reported in Annex C4 'Environmental Options Appraisal' of the Strategy (CH2MHill, 2016b).

Table 4-1: SEA objectives defined by the Strategy

SEA receptor	SEA objective
Population and human health	1. Manage risk to health of people and local communities
	2. Avoid damage to, and enhance, where possible, recreation and tourism
	3. Minimise risk to economic activities
Material Assets	4. Minimise risk to infrastructure
Biodiversity, flora, fauna	5. Maintain, and where possible, enhance flora and fauna
Soil, Geology and Geomorphology	6. Protect geological diversity and restore natural geomorphological processes
	7. Minimise risk to sites with pollution potential
Land Use	8. Manage varied land uses along the coastline
Water and hydromorphology	9. Support proposed measures under the WFD
The Historic Environment	10. Conserve and enhance the historic environment, heritage assets and their settings
Landscape	11. Maintain and enhance the quality and character of the landscape

Table 4-2: Assessment criteria defined by the Strategy

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement. This would be considered to be a significant effect.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective, i.e. no change from present day.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.
n/a	Where there is no impact on the receptor, e.g. at locations where there are no residential properties and therefore no effect on population and human health

This study has reassessed the feasibility of the management approaches proposed by the Strategy, and also explored additional approaches in some locations, taking account of the recent shoreline change along the frontage and the resultant change in coastal erosion risk.

To allow comparison with the Strategy, the same appraisal methodology and assessment criteria have been applied. The assessment is based on professional judgement supported by appropriate evidence and takes account of changes in the environmental baseline. Changes to receptors as a result of the proposals have been assessed against the present day.

Once a project has been defined to implement these works then further assessment may be needed to meet the requirements of legislation such as The Conservation of Habitats and Species Regulations 2017 (as amended), the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 and The Marine Works (Environmental Impact Assessment) Regulations 2007 (as amended) where these apply.

4.1.2 Appraisal of management approaches

Figure 4-1 shows the location of all four frontages (Gunton Warren, northern Gunton Warren/ Corton Woods, Corton and North Corton Cliffs) considered for the appraisal of management approaches.

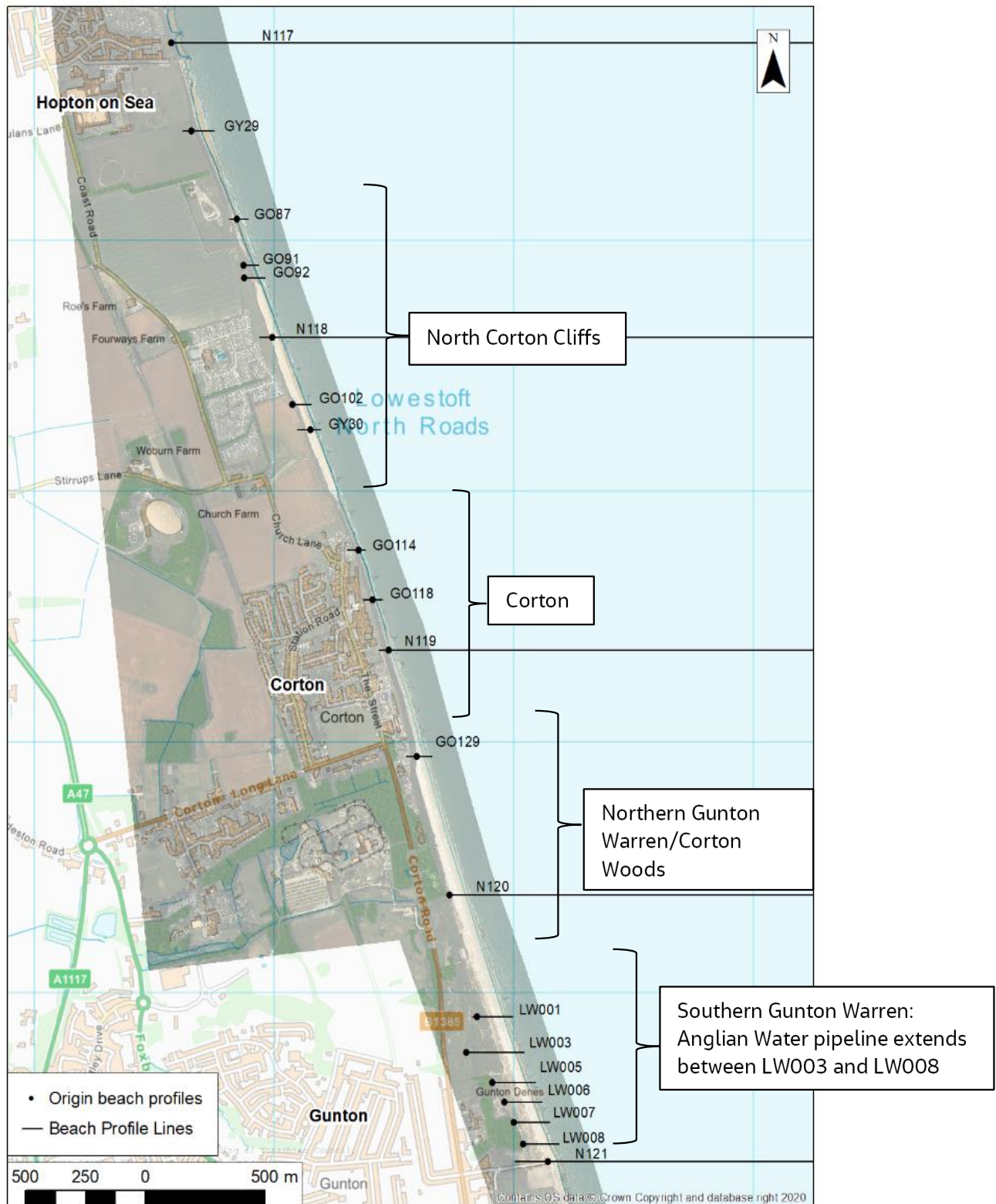


Figure 4-1: Location of the frontages considered for the appraisal of management approaches.

Gunton Warren

a) Proposed management approach

Since the Strategy was developed, the rate of change to coastal processes and shoreline recession have been more rapid than anticipated. There were no intervention options identified in the Strategy for the immediate future, therefore new approaches have been considered here.

The preferred approach is to manage rather than halt beach and shoreline movement. Whilst it is not possible at this stage to define the most effective approach and configuration of any interventions, the intention would be to locally hold the beach line in an advanced position whilst allowing continued sediment transport alongshore. This is likely to involve two or three mini-headlands, constructed of rock, positioned at key points along the frontage.

b) Environmental considerations

An updated appraisal for the frontage is provided in Table 4-3.

Table 4-3: Appraisal of revised option for Gunton Warren

Option	Assessment of SEA objectives against present day (see Table 2 for SEA objectives and Table 3 for assessment criteria)										
	1	2	3	4	5	6	7	8	9	10	11
Beach management + control structures (groynes)	N	N	N	+	x	x	+	N	+	N	x

The key environmental considerations of this option are summarised below:

Beneficial:

- Reduces risk of oil exposures/ allows time for remediation works – therefore supporting WFD objectives. The water body is already heavily modified.
- Reduces risk to Anglian Water pipeline to allow time for relocation or realignment.
- Retains beach material during periods of southerly (or northerly) drift, helping to reduce risk of any reactivation of cliffs along this section and protecting infrastructure, habitats and amenity.
- Protection of the LNR and associated priority habitats (coastal sand dunes and lowland heathland) which support flora and fauna.
- Protects access and beach amenity for locals and tourists.

Adverse:

- This option would interfere with natural coastal processes, however the water body is already heavily modified for coastal protection use and flood protection and use so this would not compromise WFD objectives.
- There would be a reduction in landscape quality and visual amenity through introduction of new rock material.
- There would be a need to consider public access across any structures to avoid impacts on recreation and tourism.
- Noise and visual disturbance should be considered during construction to avoid disturbance of species, particularly birds, some of which may be features of designated sites.

- There would be a small loss of intertidal (and possibly subtidal) habitat from within the SAC and SPA under the footprint of the rock, although the area would be very small in comparison to the area of the designated sites.

Corton Woods (northern section of Gunton Warren)

a) Proposed management approach

This area lies within SMP policy unit 6.22, but was considered as part of the Gunton Warren frontage in the Strategy. This area has been separated out for the purposes of the review due to the recent erosional trends observed south of this point at Gunton Warren which has necessitated a different approach.

The recommended approach for this stretch remains the same as the Strategy with no major works envisaged as being necessary in the near future. If works were to be required, they would involve the extensions of the linear defence or the construction of headland structures at the end of the main Corton defences to retain and stabilise the sand. It could also be necessary to implement options for cliff stabilisation in this location as described below.

An alternative approach for this frontage is to build a terminal structure at the end of main Corton defences, similar to that proposed at Links Road, together with another additional headland control structures towards Tramps Alley. This approach is similar to that proposed at Gunton-Warren and avoids the need to extend the larger Corton defences along this stretch.

b) Environmental considerations

If the works at Corton are extended into the Corton Woods frontage then the environmental considerations are the same as for the Corton frontage (see below). If an alternative approach is taken then the environmental considerations are as follows:

Beneficial:

- Retains beach material during periods of southerly (or northerly) drift, helping to reduce risk of any reactivation of relict cliffs behind the dunes and protecting infrastructure, habitats and amenity.
- Protection of Corton Woods LNR and priority habitats (maritime cliff and slopes and deciduous woodland) which support flora and fauna.
- Protects access and beach amenity for locals and tourists.

Adverse:

- This option would interfere with natural coastal processes, however the water body is already heavily modified for coastal protection use and flood protection use so this would not compromise WFD objectives.
- There would be a reduction in landscape quality and visual amenity through introduction of new rock material.
- There would be a need to consider public access across any structures to avoid impacts on recreation and tourism.
- Noise and visual disturbance should be considered during construction to avoid disturbance of species, particularly birds, some of which may be features of designated sites.
- There would be a small loss of intertidal (and possibly subtidal) habitat from within the SAC and SPA under the footprint of the rock, although the area would be very small in comparison to the area of the designated sites.

Corton**a) Proposed management approach**

The recommended approach remains the same as the Strategy; to build a more substantial structure over and above the existing wall, capable of providing more robust, longer term protection. This could take the form of a new seawall or rock revetment.

Even with the current defences, cliff instability at Corton due to both groundwater flows and overtopping of defences is an issue. Although not directly related to coastal protection, possible options have been considered as part of this study to address this risk. Possible solutions include controlling land drainage and early detection and repair of water leakages on the clifftop and hinterland area to prevent adverse effects on cliff stability and erosion. Engineered interventions to stabilise the cliff could also be considered including:

- regrading the cliff face to a more stable angle;
- implementing a cliff drainage scheme to manage groundwater; and
- cliff stabilisation measures, such as soil nails and meshing.

These interventions would need to be considered in conjunction with options being considered for the coastal defence works to protect the toe of the cliff.

b) Environmental considerations

This option was previously included in the environmental options appraisal and the findings remain applicable (see Table 2-10 in Annex C4 Environmental Options Appraisal (CH2MHill, 2016b). The key environmental considerations of this option are summarised below.

Beneficial:

- Long-term reduction in erosion risk to properties, caravan and chalet parks, Grades 2 and 3 agricultural land.
- Continued protection to cliff top assets, but prolonged compared to today, namely Holiday Parks and the residential and commercial properties further inland.
- Continued protection to a listed building, WW2 features and the Historic Settlement Core of Corton.
- Increased confidence in coastal protection therefore potential for investment in local businesses.
- Prevents potential pollution to waterbodies which would occur if defences were allowed to fail.
- Although new defences will have a visual impact this is better than if defences were allowed to fail.

Adverse:

- Defences would continue to obscure the exposures at Corton Cliffs SSSI (geological). A new sea wall or rock revetment would reduce the risk to the SSSI from overtopping however it may also lead to reduced exposures. Consultation with Natural England at the project stage will help to determine the best approach.
- Construction of new defences contravenes WFD objectives – however the water body is already heavily modified for coastal protection use and flood protection use and whilst the footprint of the defences would be larger than the existing, they would be small in comparison to the scale of the waterbody.

c) Alternative measures

The lower cost alternative is to patch and replace concrete revetment and maintain the existing rock revetment, in order to buy some time for the works to the base of the cliff. This would not resolve cliff instability and the works at the base could potentially render works higher up on the cliff face vulnerable to failure as it would remain

susceptible to wave overtopping and some destabilisation on lower parts. The low-cost option would not provide the environmental or social benefits of the recommended approach, but would also not present a change in the existing conditions.

An appraisal of the interventions to address cliff stability against the SEA criteria has not been undertaken as part of this study; however, it is likely that any works could impact on the integrity of the SSSI. The condition of the SSSI is assessed based on the following factors: exposures of features of interest; vegetation; tipping or landfill; tree planting; engineering works; geological specimen collecting; and natural processes (Natural England, 2021). Stabilisation measures may encourage the establishment of vegetation and whilst this may protect the cliff face from erosion, it could also reduce the exposure of features of interest. The works may also require assent from Natural England to carry out works within a SSSI under the Wildlife and Countryside Act 1981 (as amended). Therefore it is recommended that Natural England are consulted at an early stage of any further consideration of intervention options.

North Corton Cliffs (Hopton to Corton)

a) Proposed management approach

The recommended approach remains the same as the Strategy, to adapt and allow some realignment along this section of shoreline. This would involve removal of the existing defences comprising sections of sheet piles, allowing cliff erosion to increase but allowing the foreshore to become more accessible. A series of hard points could be created using rock armour to reduce the rate of erosion.

b) Environmental considerations

This option was previously included in the environmental options appraisal and the findings remain applicable (see Table 2-8 in Annex C4 Environmental Options Appraisal (CH2MHill, 2016b)). The key environmental considerations of this option are summarised below.

Beneficial:

- The rate of loss could be reduced by creating hard points; these may also provide diversification opportunities for farmland areas.
- This would provide a safer beach that can be accessed for amenity purposes.
- Removal of failing timber groynes would improve landscape quality and visual amenity.

Adverse:

- This option would interfere with natural coastal processes, however the water body is already heavily modified for coastal protection use and flood protection and use so this would not compromise WFD objectives.
- Continues loss of Grade 2 agricultural land.
- Continued loss of caravan pitches with potential loss of properties in the long-term and disused buildings associated with former water treatment centre.
- The creation of new defences contravenes WFD objectives, however the water body is already heavily modified for coastal protection use and flood protection use. The new defences would occupy a smaller footprint than the current defences (which would be removed) and scale of effects would be small compared to the scale of the waterbody.
- There would be a small loss of intertidal (and possibly subtidal) habitat from within the SAC and SPA, however the area would be very small in comparison to the area of the designated sites.

A lower cost alternative would be to remove the structures but place rock at the toe of the cliff. This would not prevent the loss of the beach and may continue to be difficult to access safely and therefore remain unusable for amenity purposes. The other considerations are the same as for the recommended approach.

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Annex A. Figures



Figure A 1: Public Rights of Way (Suffolk County Council, 2021).

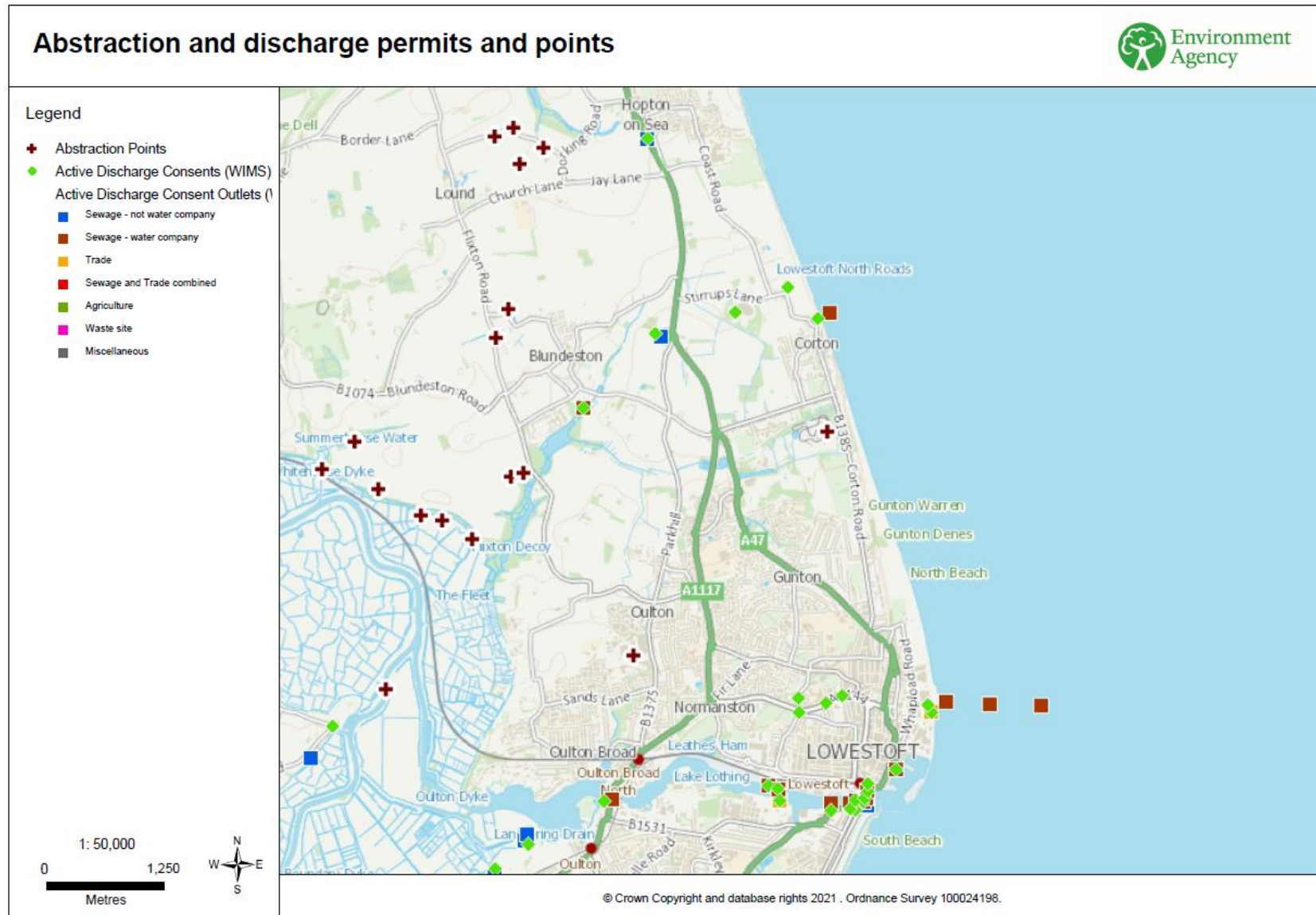


Figure A 2: Location of licenced abstraction and discharge points (S.Clemens, 2021, pers.comm, 26 Feb).

Appendix E - Environmental Considerations

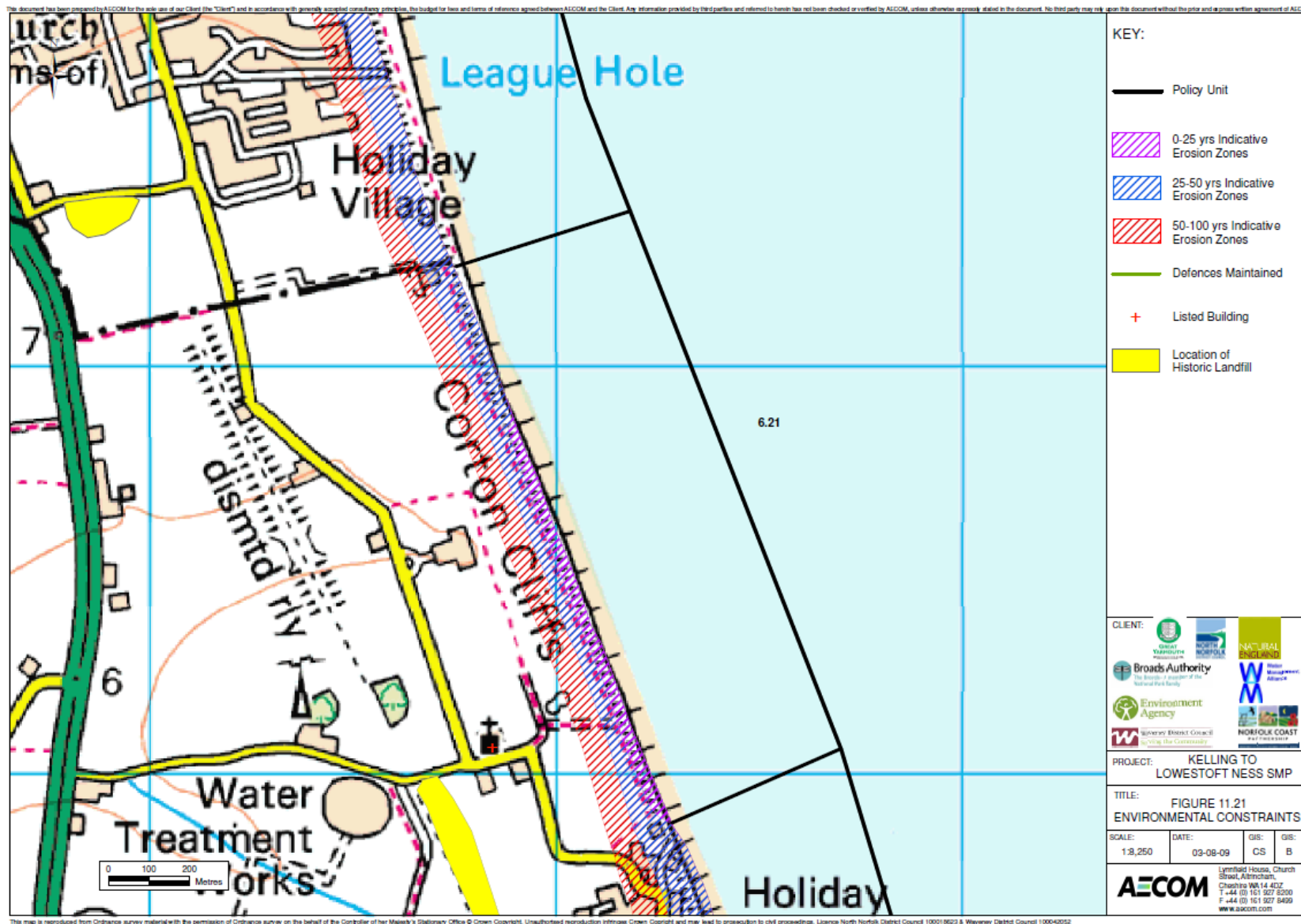


Figure A 3: Location of historic land fill sites, taken from the SMP (AECOM, 2012).

Appendix E - Environmental Considerations



Figure A 4: Location of historic land fill sites, taken from the SMP (AECOM, 2012).

Appendix E - Environmental Considerations

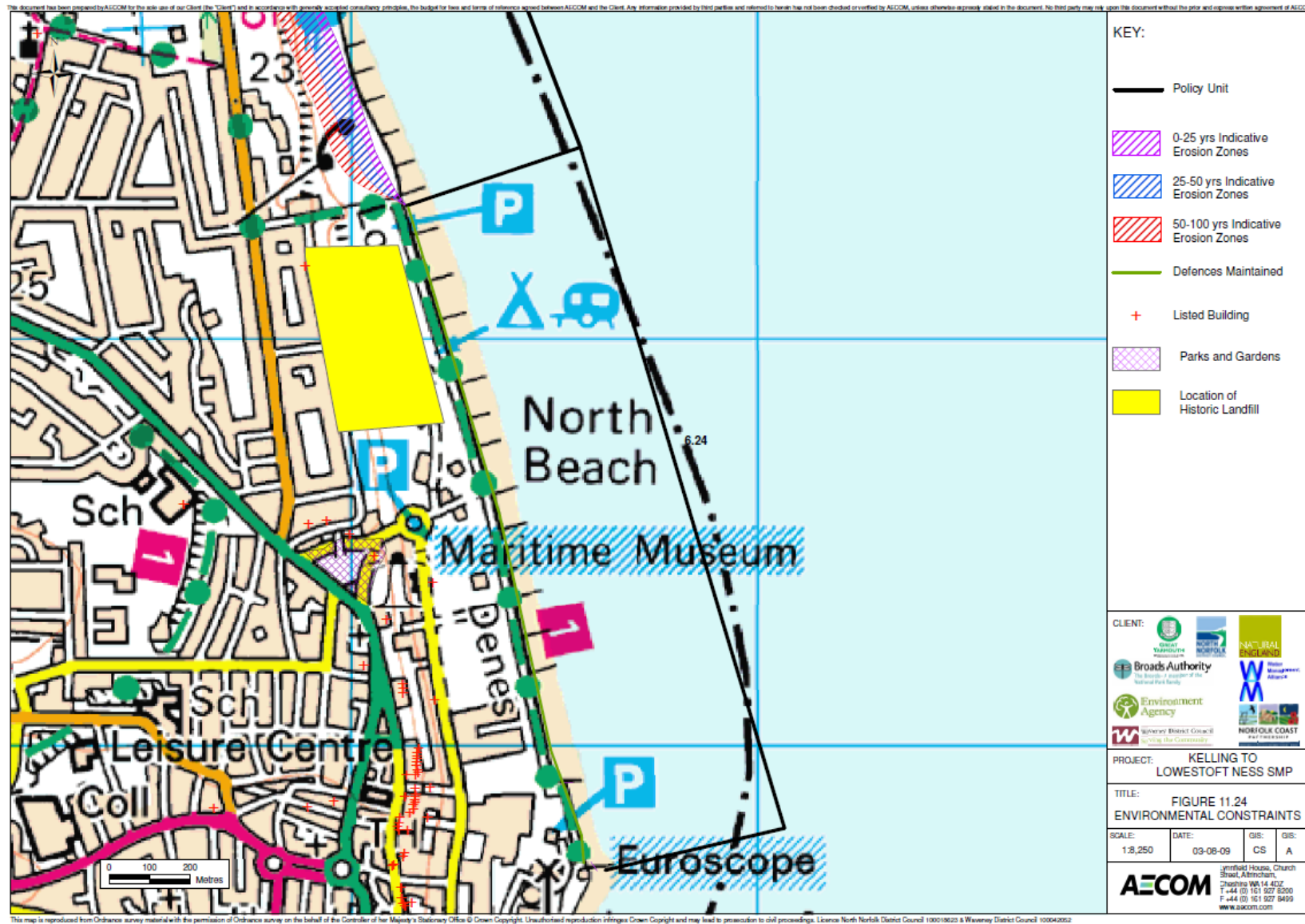


Figure A 5: Location of historic land fill sites taken from the SMP (AECOM, 2012).

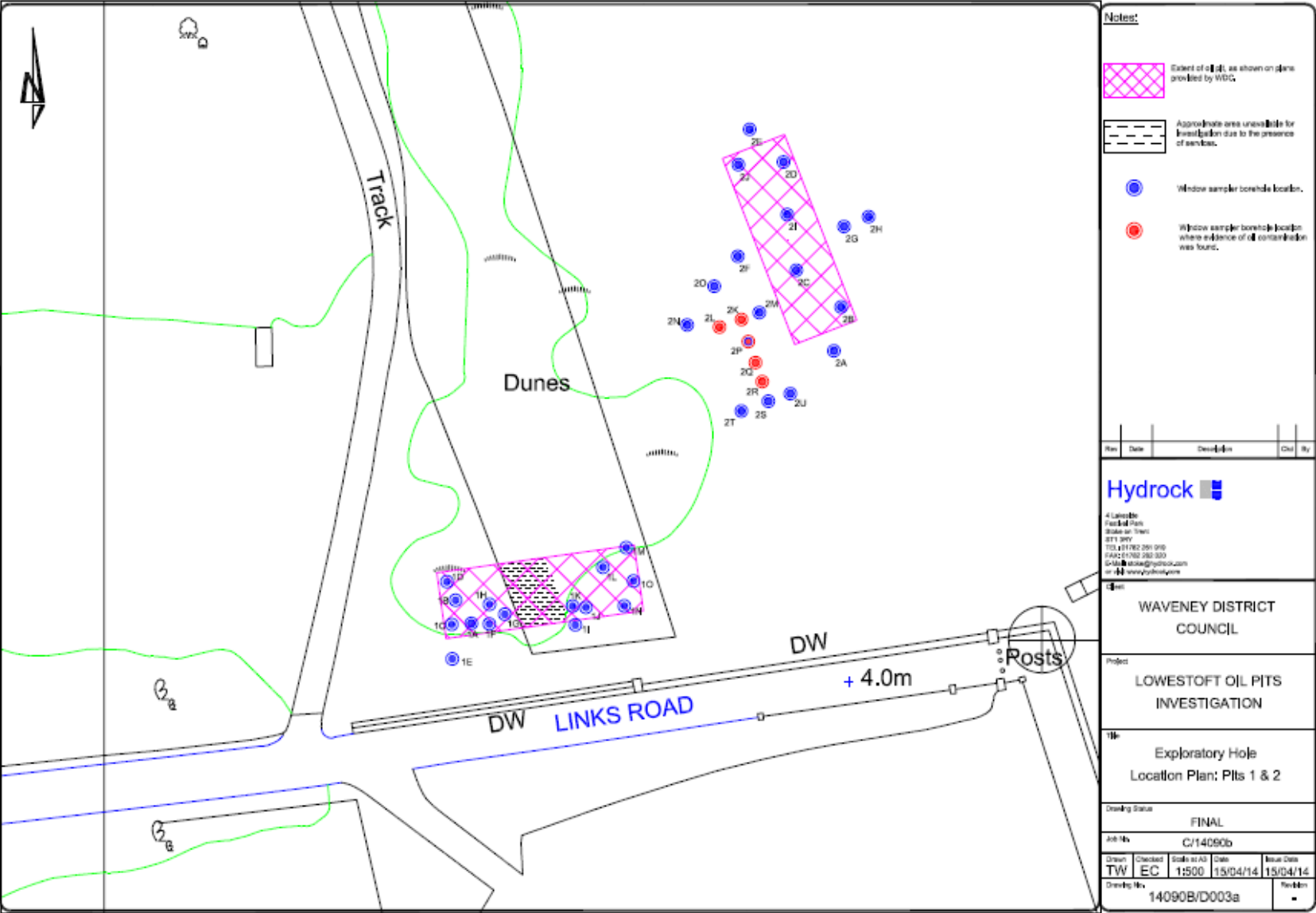


Figure A 6: Locations where evidence of oil contamination was found (Hydrock Consultants Ltd, 2014).