Minerals Development Documents: Issues and Options: Appropriate Assessment Screening Report

Essex County Council

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Report for:

Essex County Council

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Disclaimer

EXECUTIVE SUMMARY

Essex County Council is in the process of developing their Minerals Development Framework (MDF). Once adopted, the documents will provide the planning basis for the provision of mineral resources to fulfil the needs of Essex for at least the next 15 years.

The suite of documents that comprise the MDF will set out in specific spatial terms, exactly where minerals facilities can be located within Essex. The County Council therefore has to consider the most appropriate locations for such facilities. As part of these considerations, there is a statutory requirement to undertake an Appropriate Assessment (AA).

An AA is required for all plans which may have an impact on the network of sites which are designated as areas of European importance in terms of their habitats, flora and fauna. These sites are known as Natura 2000 sites and include both Special Areas of Conservation (SACs) and Special Protected Areas (SPAs). Ramsar sites are also treated as sites with European designation for the purpose of this assessment.[1] [2]

The AA process is designed to ensure that the MDD (and any other plan to which it applies) does not impact upon these sites of European importance.

The Appropriate Assessment is divided into 4 stages[3]:

- Screening: Description of the plan and relevant Natura 2000 sites. Assessment of significance of impacts;
    - Step 1: Determining whether the plan or program is directly connected with or necessary to the management of the Natura 2000 site;
    - Step 2: Description of the plan or program and any other plans or programs which may have, in combination, a significant impact on the Natura 2000 site;
    - Step 3: Description of the characteristics of the Natura 2000 site and identification of potential impacts;
    - Step 4: Assessment of the significance of these impacts
- Appropriate Assessment: Description of impacts and possible mitigation measures;
- Assessment of Alternatives: Identification and assessment of alternative options; and
- Mitigation: Compensatory measures.

[1] In accordance with PPS9: Biodiversity and Geological Conservation

[2] In Essex, Ramsar sites are completely contained within the SACs/ SPAs and so are not shown separately on the maps.

[3] Based on: European Commission. 2001. Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.

This report covers steps 1, 2 and 3 of Stage 1 and provides a description of Natura 2000 sites in Essex, outlines the potential impacts to these sites, along with other relevant plans or programs, and proposes criteria to assess the significance of these impacts where potential impacts have been identified.

E.1.0 Approach

This screening report provides an overview of Natura 2000 sites in Essex, the reasons for their qualification and potential impacts of minerals facilities on these sites. Impacts are described and criteria by which to measure these impacts have been provided.

E.2.0 Key Findings

A total of 2 SACs and 10 SPAs fall within the Essex boundary. A further 1 SPA and 1 SAC are in close proximity to Essex (within 10km). Several of these sites are of a large area and most are already under threat or potential threat to habitat or species.

The screening stage of the AA indicates that further assessment will need to be carried out when the Preferred Options for sites have been identified.

E.3.0 Recommendations

Due to the large number of sites of European importance and the potential impact of minerals and waste sites, the screening stage of the Appropriate Assessment should be carried out again, with greater site-specific detail, as the Preferred Options for site allocations are determined. If Step 4 of Stage One determines that there are likely to be significant effects on Natura sites, Stage 2 of the Appropriate Assessment should be undertaken.

Contents

1.0 Introduction

1.1 Background

The Habitats Directive 92/43/EEC was adopted by the European Community in 1992 as a means to protect 189 habitats outlined in Annex I and 788 species of flora and fauna set out in Annex II. These lists were used to identify a number of sites designated for protection entitled Special Areas of Conservation (SACs). Under the European Union Directive on the Conservation of Wild Birds (79/409/CEE), areas which are important for either avian (bird) breeding or migration were also given a status known as Special Protected Areas (SPAs). Together, these areas form a network of sites known as Natura 2000. In the UK these Directives have been enforced through the Conservation Regulations, 1994 and the Conservation Regulations (Northern Ireland), 1995, jointly known as the Habitats Regulations.

1.2 Appropriate Assessment

The Habitats Directive sets out under Article 6 (3) the requirement for an Appropriate Assessment. It states:

> *"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives. In the light of the conclusions of the assessment of the implications for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public."*

The requirement for an Appropriate Assessment is transposed to UK law through Habitats Regulations (Part IVa).

The Appropriate Assessment aims to assess the impacts of a plan or project on the integrity of Natura 2000 sites in relation to the conservation objectives applicable to the site as laid out in Annex I or II of the Habitats Directive. The scope of the report depends on the size and potential implications of the plan and so will vary on a case-by-case basis. The Assessment follows several stages;

1. Screening: Description of the plan and relevant Natura sites. Assessment of significance of impacts;
    - Step 1: Determining whether the plan or program is directly connected with or necessary to the management of the Natura site;
    - Step 2: Description of the plan or program and any other plans or programs which may have, in combination, a significant impact on the Natura site;
    - Step 3: Description of the characteristics of the Natura site and identification of potential impacts;
    - Step 4: Assessment of the significance of these impacts
2. Appropriate Assessment: Description of impacts and possible mitigation measures;

3. Assessment of Alternatives: Identification and assessment of alternative options; and
4. Mitigation: Compensatory measures.

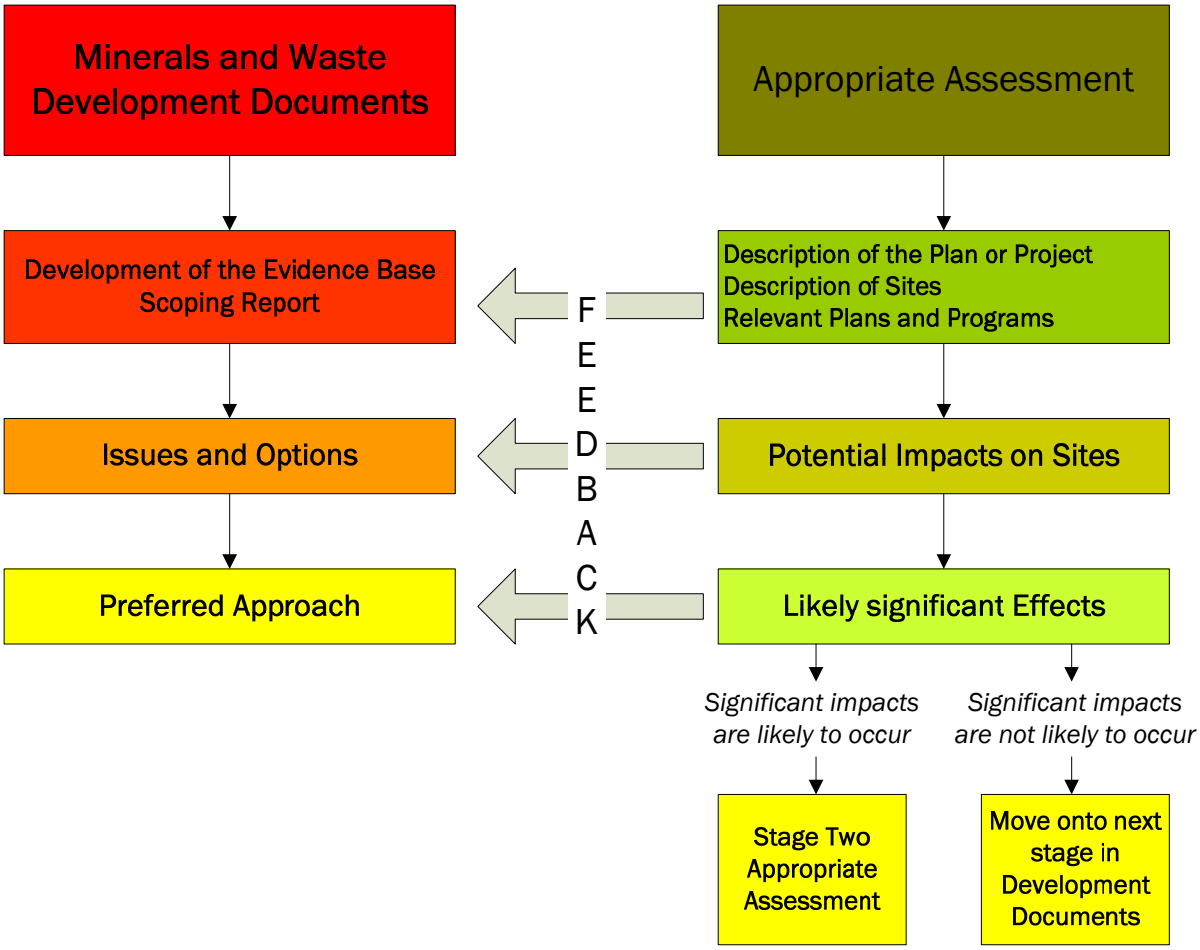
This report covers the screening stage of the process.

2.0 The Essex Minerals Development Documents

The Essex Minerals Development Documents provide a strategy to assist the implementation of mineral facilities across Essex in a sustainable way. They form a suite of documents which includes the Core Strategy, which sets out the overall vision, objectives and policies for minerals development; the Development Control Policies, which set out specific policies to be implemented when individual planning applications are made for mineral development; and site allocations, which show where new mineral developments can be located. The process of the development of these documents along with the pertinent stages of the Appropriate Assessment (AA) is shown in Figure 1. As the AA is developed it will feed into and shape the emerging MDD. The diagram indicates stages up to the Preferred Approach in terms of the MDD, at which stage the AA process will be complete. After this stage the MDD will be finalised.

The current stage in this process is the Issues and Options of the MDD and potential impacts within the AA, as outlined in this document.

Figure 1: MDD and AA Development



3.0 Other Plans or Projects

Appropriate Assessment requires that other plans or projects which may act in combination with the Minerals plans should also be considered. These are explored in Table 1.

Table 1: Relevant Plans or Projects

Plan or Project	Description
International Plans or Projects	
Directive on the Conservation of Wild Birds 1979/409/EC	The directive identifies 194 species and subspecies of endangered birds and seeks to preserve these through the designation of SPA sites.
Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora 1992/43/EC	The habitats directive aims to conserve fauna and flora of European importance through the establishment of the Natura 2000 sites.
Ramsar Convention on Wetlands of International Importance especially as Waterfowl Habitat 1971	The signatories of the Ramsar Convention agree to designate wetland conservation sites. In Essex, all Ramsar sites are also covered within the SPA designation.
Water Framework Directive – 2000/60/EC	Many of the protected areas in Essex are aquatic habitats and this directive aims to protect inland surface waters, transitional waters, coastal waters and groundwater.
National Plans or Projects	
Planning Policy Statement 1; Delivering Sustainable Development 2005	This policy sets out key principles in order to promote sustainable development.
Planning Policy Statement 9; Biodiversity and Geological Conservation 2005	This policy aims to preserve wildlife diversity and geology.
Planning Policy Guidance 13; Transport 2001	This policy promotes the use of sustainable transport.
Planning Policy Guidance 20; Coastal Planning 1992	The Coastal Planning Guidance states that coastal character should be maintained and enhanced. A coastal location should only be selected for development if the plan requires a coastal location. If it does not, these locations should be avoided, apart from in the case of previously developed coastal areas where the plan may enhance the region.
Planning Policy Statement 23; Planning and Pollution Control 2004	The PPS covers sustainable development in terms of the encouragement of the use of previously developed land in preference to Greenfield sites.
Planning Policy Guidance Note 24; Planning and Noise 1994	The PPGs main objective is to minimise the impact of noise without placing unreasonable restrictions on development.

Planning Policy Statement 25; Development and Flood Risk 2006	The main objectives cover the reduction of flood risk to the natural environment and the requirement of a Strategic Flood Risk Assessment, where applicable.
Minerals Policy Statement 1; Planning and Minerals 2006	Sets out key principals and key planning policy objectives against which plans for minerals and decisions on individual applications should be made.
Minerals Policy Statement 2; Controlling and Mitigating the Environmental Impacts of Minerals Extraction in England 2005	The MPS aims to ensure that the environmental impacts caused by minerals operations are kept to a minimum. This includes sufficient restoration of minerals sites and the protection of nationally designated areas.
Road Traffic Reduction (National Targets) Act 1998	The Act was brought in order to reduce the negative effects of road traffic. This includes impacts on air quality and biodiversity.
UK Biodiversity Action Plan 1994	The Plan outlines the current biological resources in the UK and sets out a strategy for the conservation of these resources through individual species and habitat action plans as well as Local Biodiversity Action Plans.
The Habitats Regulations 1994	These regulations implement the Habitats and Birds Directives. It requires that for any development which may have a significant effect on a designated site of European importance, that an Appropriate Assessment must be undertaken.
The Wildlife Act and Countryside Act 1981	Parts 1 and 2 of the Act provide the legislative protection of wildlife and the designation of protected areas.
Regional Plans or Projects	
East of England Plan (Draft Revision to the Regional Spatial Strategy for the East of England) May 2008	Sets out a strategy for development in the region for the next 20 years. This includes sufficient apportionments of minerals as well as ensuring sustainable minerals extraction. It aims to place 60% of new development on previously developed land. The Strategy also sets out annual targets of new housing development in the region.
Sustainable Development Framework for the East of England 2001	The Framework sets out a vision for sustainable development in the region, including the reduction of CO2 emissions, reduction of environmental impacts of minerals extraction, a review of the effects of offshore dredging practices on the coastal environment and to decrease the risk of flooding related to new development.
Integrated Regional Strategy for the East of England (Revised) 2007	The Strategy covers objectives such as the reduction of greenhouse gas emissions and the conservation of the natural environment.

Local Plans or Projects	
Essex Landscape Character Assessment	The Assessment sets out the environmental characteristics of the area including its ecological attributes.
Local District Plans and Local Development Framework	These have been considered and will be cross-checked with proposed sites at the Preferred Options Stage of the Mineral Development Documents.
Woodland for Life: The Regional Woodland Strategy for the East of England (2003)	The Strategy vision sets out to: ➢ Enhance awareness and education ➢ Manage existing woodland areas in the region ➢ Continue woodland expansion One of its aims is to ensure that SACs and SPAs in the region are brought to a favourable condition
Large Scale Local Development	➢ Stansted G1 (approved) ➢ Bathside Bay/Haven Port (permitted) ➢ Shellhaven Container Port (permitted) ➢ Infrastructure Developments: • A12 junction (programmed) • A120 improvement (proposed) • M11/A120 junction improvements (programmed) • M25 widening (programmed) • Sadlers Farm junction improvement (programmed) • Roscommon Way Extension; improved access to Canvey Island (proposed) • CrossRail

4.0 Natura 2000 Sites in Essex

A description of the Natura 2000 sites in Essex is provided in Table 2. Some sites are not entirely within the boundary of Essex, but are included as they are still potentially impacted. Qualifying features are given for each site; these describe the grounds for assigning the area Natura 2000 status. Current and potential threats to the sites are also given. Data was obtained from the individual SAC and SPA data forms[4].

All Ramsar sites in Essex are also designated SPAs or SACs, so these are not dealt with separately.

Table 2: Natura Sites, Qualifying Features and Vulnerability

Site	Qualifying Features	Current Trends and Vulnerability
Special Areas of Conservation (SACs)		
Epping Forest (Greater London/Essex) **1,604.95ha**	Epping Forest represents the North-Eastern range of Atlantic acidophilus beech forest. Secondary qualifying habitats are Northern Atlantic Wet Heaths and European Dry Heaths. The primary qualifying species is the stag beetle (*Lucanus cervus*), which has been recorded frequently in Epping Forest.	The population of epiphytic bryophytes in the forest has decreased significantly, although reintroduction of historic forest management practices, such as pollarding, has reduced this decline. The 1956 Clean Air Act has reduced the detrimental effect of acid rain and helped restoration. A management plan has now been formed and taken into practice.

[4] Joint Nature Conservation Committee

Site	Qualifying Features	Current Trends and Vulnerability
Essex Estuaries (Essex) **46,140.82ha**	These estuaries, mudflats and sandflats represent a large area of estuarine habitat. There are a variety of diverse and several unusual marine communities found in the estuaries and a large number of sediment-living organisms. Secondary qualifying habitats are areas of sandbanks which are constantly shallowly submerged by seawater. Qualifying species are the various glasswort species found from the intertidal zone to the upper saltmeadows. The area contains the most extensive stand of small cord-grass (*Spartina maritime*) in the UK. There are also important areas of Atlantic salt meadows and Mediterranean and thermo-Atlantic halophilus scrubs.	These coastal habitats are restricted by man made sea defences, which prevent the spread of the habitat inland in response to rising sea level. Further loss of estuarine habitat is likely as sea levels rise. Other threats include coastal or off-shore development which affects the transport of sediments.
Wormley Hoddesdonpark Woods (Hertfordshire) **335.53ha**	These woods, close to the West of Essex, represent large areas of hornbeam (*Carpinus betulus*) and sessile oak (*Quercus petraea*). The area also encompasses stands of great wood-rush (*Luzula sylvatica*) and mosses (*Dicranum majus* and *Leucobryum glaucum*). Other mosses present include *D. montanum*, *D. flagallare* and *D. tauricum*.	The area is under no direct threat, although some areas have suffered from past management or neglect. This has lead to the introduction of inappropriate species, distortion of the age structure and storage of coppiced areas. There is some pressure from recreational activities, although this is confined to well established paths.

Site	Qualifying Features	Current Trends and Vulnerability
Special Protected Areas (SPAs)		
Colne Estuary (Essex) **2,701.43ha**	The estuary supports a large number of breeding bird species, including Little Tern (*Sterna albifrons*), Northern Harrier (*Circus cyaneus*), Pochard (*Aythya farina*), Ringed Plover (*Charadrius hiaticula*). Important wintering populations are Brant Goose (*Branta bernicla*) and Common Redshank (*Tringa totanus*). The estuary also qualifies due to the important winter assemblage of around 38,600 waterfowl.	The site is threatened by habitat loss due to rising sea levels and the prevention of the spread of the habitat inland ('coastal squeeze'). There are also issues relating to sediment movement and low levels of freshwater flow into the estuary. There is disturbance from recreational use of the area, although this is being addressed through restrictions in jet and water ski use and the control of further coastal development.
Abberton Reservoir (Essex) **726.2ha**	The reservoir is an important breeding area for a number of species including Cormorant (*Phalacrocorax carbo*), Northern Shoveller (*Anas clypeata*), Teal (*Anas crecca*), Wlgeon (*Anas Penelope*), Gadwall (*Anas strepera*), Pochard, Tufted Duck (*Aythya fuligula*), Common Goldeneye (*Bucephala clangula*), Mute Swan (*Cygnus olor*), Coot (*Fulica atra*) and Great Crested Grebe (*Podiceps cristatus*). During the winter the reservoir supports around 39,763 waterfowl.	The reservoir has experienced low water levels in recent years due to drought and high demands for water use. This has resulted in lower numbers of waterfowl, although numbers of waders are increasing. There are current proposals to increase water levels to secure water supply.

Site	Qualifying Features	Current Trends and Vulnerability
Lee Valley (Essex/Greater London/Hertfordshire) **447.87ha**	Important wintering species include Great Bittern (*Botaurus stellaris*), Northern Shoveller and Gadwall.	The area is threatened by eutrophication of the water and pressures from recreation, although both issues are being addressed. Other issues are arising from extraction of ground water for public use and threats from development.
Blackwater Estuary (Essex) **4395.15ha**	The estuary supports several important breeding populations of birds including Little Tern, Pochard and Ringed Plover. Wintering species include Hen Harrier, Brant Goose, Dunlin (*Calidris alpina*), Ringed Plover, Black-tailed Godwit (*Limosa limosa*), Grey Plover (*Pluvialis squatarola*). The estuary also qualifies due to its wintering assemblage of around 109,964 waterfowl.	A significant threat is through erosion of the coast through the rise in sea level and isostatic processes. There is also a loss of habitat through the sea defences preventing the spread of habitat inland. Eutrophication is also occurring through agricultural run-off and sewage effluent, although these problems are being addressed. Disturbance through recreational activities is being minimised through restrictions on jet ski use. Drought is also a significant threat to habitat and water is being added from alternative sources to raise the water table.
Crouch and Roach Estuaries (Essex) **1735.58ha**	There are several important wintering populations including Hen Harrier and Brant Goose. The area also qualifies due to the large winter assemblage of around 18,607 waterfowl.	Habitat is threatened through the rise in sea level and coastal squeeze, although some conservation measures are being considered. Disturbance from recreational activities will be minimised through a management scheme as well as the low water table resulting from abstraction. Eutrophication will be reduced through the encouragement of farmers to control the application of chemicals to agricultural fields.

Site	Qualifying Features	Current Trends and Vulnerability
Hamford Water (Essex) **2187.21ha**	The area supports several important breeding species including Little Tern. Wintering birds include Avocet (*Recurvirostra avosetta*), Teal, Brant Goose, Ringed Plover, Black-tailed Godwit, Grey Plover, Shelduck (*Tadorna tadorna*) and Common Redshank.	The saltmarsh areas are being eroded through the rise in sea level, although this is being alleviated through reinforcement of the base of the seawall with sand and gravel dredged from Harwich Harbour. Sewage and industrial effluent as well as discharge from boats may lad to problems in water quality. This is currently being monitored. Disturbance through recreational activities is currently controlled by wardens.
Foulness (Essex)	The area supports breeding populations of Avocet, Little Tern, Common Tern (*Sterna hirundo*), Sandwich Tern (*Sterna sandvicensis*) and Ringed Plover. There are also wintering populations of Hen Harrier, Bar-tailed Godwit (*Limosa lapponica*), Avocet, Brant Goose, Red Knot (*Calidris canutus*), Oystercatcher (*Haematopus ostralegus*), Grey Plover (*Pluvialis squatarola*) and Common Redshank. The area also qualifies due to the fact that it supports around 107,999 wintering waterfowl.	The area is afforded extra protection due to the fact that it is owned by the MoD and so is not exposed to threats by development or recreational pressures. Saltmarshes are being eroded due to natural processes, although this is currently being addressed. Lower levels of rainfall and changes in drainage for agriculture have led to aridification, although this is compensated for by the addition of sea water.
Dengie (Essex)	The area supports wintering populations of Northern Harrier, Brant Goose, Red Knot and Grey Plover. The area also qualifies due to the assemblage of around 31,454 wintering waterfowl.	Intertidal areas are being eroded through a rise in sea level and isostatic processes as well as increasing winter storm occurrences. Hard sea walls are adding to the process of coastal squeeze, although plans are in progress to alleviate this situation.
Stour and Orwell (Essex/Suffolk)	The area supports a population of breeding Avocet as well as wintering populations of Northern Pintail (*Anas acuta*), Brant Goose, Dunlin, Red Knot, Black-tailed Godwit, Grey Plover and Redshank. The area also qualifies due to the assemblage of around 63,017 wintering waterfowl.	The area is under threat from port expansion and recreational activities, both of which are currently being addressed. Dredging of the rivers could potentially threaten habitat, although the dredgings are being utilised to restore eroded saltmarsh areas.

Site	Qualifying Features	Current Trends and Vulnerability
Benfleet and Southend Marshes (Essex/Southend)	The area supports wintering populations of Brant Goose, Dunlin, Red Knot, Ringed Plover and Grey Plover. The area also supports around 34,789 wintering waterfowl.	There are current threats associated with coastal squeeze. Recreational activities are currently well managed. Dredging of the Thames as well as agricultural pollutants may be leading to loss of intertidal habitats. The marshland area is affected by low rainfall.
Thames Estuary and Marshes (Medway/Thurrock/Kent/ Essex)	An overwintering population of Avocet, Ringed Plover and Hen Harrier is found in this area. The area also qualifies due to the assemblage of around 33,433 wintering waterfowl.	There is threat from erosion due to natural processes and the effects of sea defence and minerals extraction. There is current research into restoration with the use of dredging spoils. There is some disturbance through recreational activities, although this is being addressed. The terrestrial ecosystem is reliant on grazing practices and water management and changes to these may pose a threat. There are also some issues resulting from new development which is addressed through the planning system.

Figure 2: Natura 2000 Sites in and Around Essex

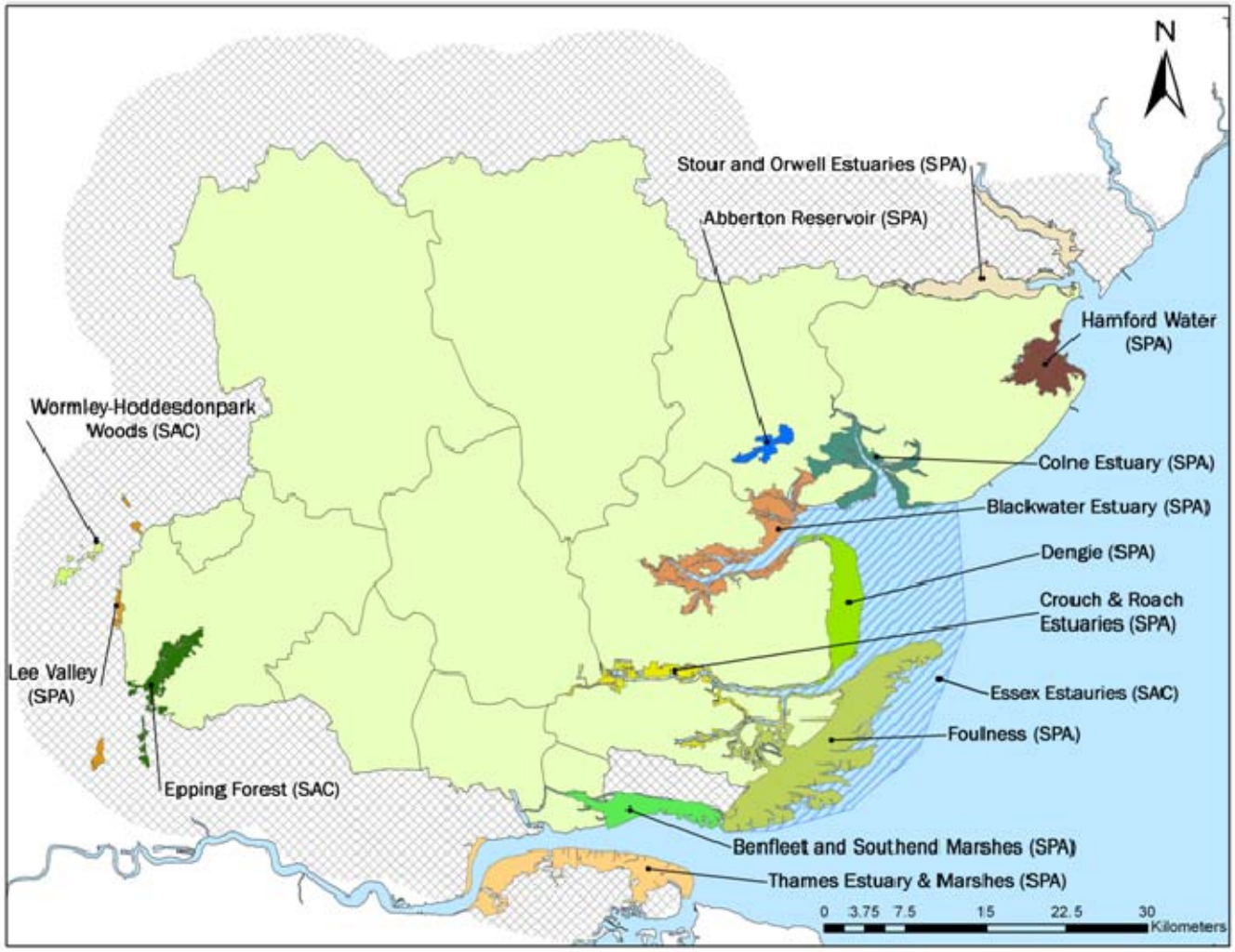


Figure 2 illustrates all Natura sites within Essex and includes a 10Km 'buffer zone' around the County, shown in grey cross-hatching. The Natura 2000 sites are predominately estuarine and marine and so are concentrated in the Eastern coastal region.

5.0 Possible Impacts

The European Commission guidance[5] states that along with a description of the project or plan and a description of the sites, all possible impacts of the project must be outlined. This includes direct impacts from the plan as well as those which may occur in combination with other relevant projects or plans. A list of these is provided in Table 1.

Assessment of impacts was based on those set out in the European Commission guidance and include direct or indirect impacts as well as setting out criteria by which to measure these impacts.

5.1 Habitat Loss

Minerals sites can cause loss of habitat, depending on the placement of these sites. The scale and proximity to Natura sites will determine the degree to which this will impact the natural habitat.

The main potential impacts would be a loss in habitat through development on SPAs or SACs, or through fragmentation of existing continuous stretches of habitat. It is, however, important to note that some minerals development may compliment current conservation practice where restoration and after-use incorporate a biodiversity component through extending habitat, such as the formation of reservoirs on previous minerals sites.

Measurable criteria are:

- Size of mineral site;
- Area of natural habitat lost through development;
- Type of restoration;
- Extent of fragmentation of previously continuous habitat; and
- Proximity to Natura 2000 sites.

5.2 Emissions

Dust pollution may affect Natura 2000 sites through both minerals extraction and aggregate recycling. Particulate matter deposition can disrupt plant growth and other natural processes[6]. It can also change the physical properties of soils or cause respiratory problems in animals, particularly where particulate matter is less than 10 micrometers in diameter, known as PM_{10}. The effects of dust tend to diminish with distance from the source and so proximity of the minerals site to Natura 2000 areas will determine the level of impact. Good management practices can help prevent the spread of dust and this is also monitored and controlled through the Integrated Pollution Prevention and Control (IPPC) (now Environmental Permitting) system as well as MPS2: Controlling and Mitigating the Environmental Effects of Mineral Extraction in England. Annex 1 to this document relates to dust in particular, whilst Annex 2 covers the mitigation and control of noise.

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[5] European Commission (2001) *Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the Provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC.*

[6] www.goodquarry.com

Secondary minerals processing and minerals recycling (e.g. concrete batching) may also result in similar emissions. Other emissions are related to asphalt production (such as PM_{25}, particles larger than PM_{10} and ones which may travel further and cause greater damage in some cases). Sulphur and Nitrogen oxides are also emitted during asphalt production and can cause acidification.

Reliance on roads for the transportation of minerals and mineral waste can also increase emissions of HGV-related pollutants. These emissions can cause acidification, although the marginal impacts of these are likely to be relatively small when compared with emissions from all current vehicles on the road. More likely problems resulting from vehicles are through disturbance as discussed in 5.4.

Measurable criteria are:

- Proximity of sites to Natura 2000 sites;
- Levels of air/water pollutants; and
- Reliance on roads with close proximity to Natura 2000 sites.

5.3 Flooding and Water Use

Minerals sites have the potential to impact on water flows, the impact of which can be relatively far reaching. Impacts include disturbance to groundwater flow, changes to runoff patterns, water table or groundwater storage sites.

Disturbance of groundwater or surface water flows may alter the water balance of Natura 2000 sites, causing either flooding or water loss. This is particularly relevant to SPAs as they encompass sites of importance to waterbirds, so maintaining an optimal water balance is essential. Additionally, the largest SAC in Essex is estuarine/intertidal so is vulnerable to changes in water balance.

It is, again, worth noting that restoration of minerals sites can also be beneficial in terms of flood storage, although the location of overburden can have a negative impact on flooding.

Measurable criteria are:

- Proximity to ground and surface water flows necessary for the maintenance of Natura 2000 sites; and
- Site restoration conditions.

5.4 Human Disturbance

Noise, vibration and light can have an impact on biodiversity. This can be through the presence of humans, additional traffic or disturbance associated with the workings of the site (i.e. excavation work or tipping). Situating sites near existing roads would reduce the need for road construction and consideration of alternative transport such as rail or water may reduce the effects of transport impacts. Any roads where traffic may be increased through the plan should also be considered in terms of their proximity to Natura sites.

Many Natura 2000 sites are important breeding sites for birds, which are particularly vulnerable to disturbance. This may, however, be reduced through sensitive siting of facilities and minimisation of impacts using barriers and screens.

Measurable criteria are:

- Proximity to alternative transport infrastructure (rail, water);
- Reliance on roads with close proximity to Natura 2000 sites;

- Noise and light levels; and
- Implementation of barriers;

5.5 Other Factors

Construction of tall buildings close to flight paths or other corridors of movement may disrupt species utilising a Natura 2000 site.

Changes in species composition can cause ecological imbalance. Mineral sites may, for example, facilitate the introduction of new species through changes in habitat.

The introduction of invasive plant species or pathogens through human movement or vehicles associated with minerals or waste sites should also be considered.

Measurable criteria are:

- Size of site (particularly height); and
- Proximity of site and related roads to Natura 2000 sites.

5.6 Summary of Possible Impacts

Table 3 summarises the measurable criteria used to appraise the possible impacts of the Options.

Table 3: Measurable Criteria for Use in this Assessment

Criteria	Notes
1. Size of mineral site	Due to the fact that the Issues and Options paper does not specify which sites will be taken forward, this criteria is not measurable
2. Area of natural habitat lost through development	Can be measured through the overlap of proposed minerals areas with Natura 2000 sites
3. Type of restoration	Although the Issues and Options paper describes the type of restoration on suggested sites, it does not specify which sites will be taken forward and so this criteria is not measurable
4. Extent of fragmentation of previously continuous habitat	Can be measured through the overlap of proposed minerals sites with continuous habitat which may act as a corridor for Natura 2000 sites
5. Proximity to Natura 2000 sites	Can be measured through the proximity of proposed sites to Natura 2000 sites
6. Levels of air/water pollutants	Need a very detailed assessment and so is not possible at this high level stage
7. Proximity to alternative transport infrastructure (rail, water)	Proximity of rail heads and wharfs to proposed minerals sites can be measured
8. Proximity to existing transport infrastructure	Proximity of primary roads to proposed minerals sites can be measured
9. Reliance on roads with close proximity to Natura 2000 sites	Measurable with criteria 8
10. Noise and light levels	Will depend on the planning of the sites, so not appraisable.

6.0 Options Appraisal

The Essex County Council Further Issues and Options paper sets out several Spatial Options for mineral development. These indicate geographic areas which may be taken forward during the period of the plan. At present, these are high level, general areas and the detailed appraisal of these Options will be considered as the MDD development process moves forward to the Preferred Approach stage, at which point more detail will be known.

The Further Issues and Options document also introduces several 'suggested sites'. Whilst this list is up to date, it is as yet incomplete since the consultation on the issues and options paper includes a call for sites during which more sites may well be added. Due to this, all of the sites, once complete will be more specifically assessed at the next stage of the MDD.

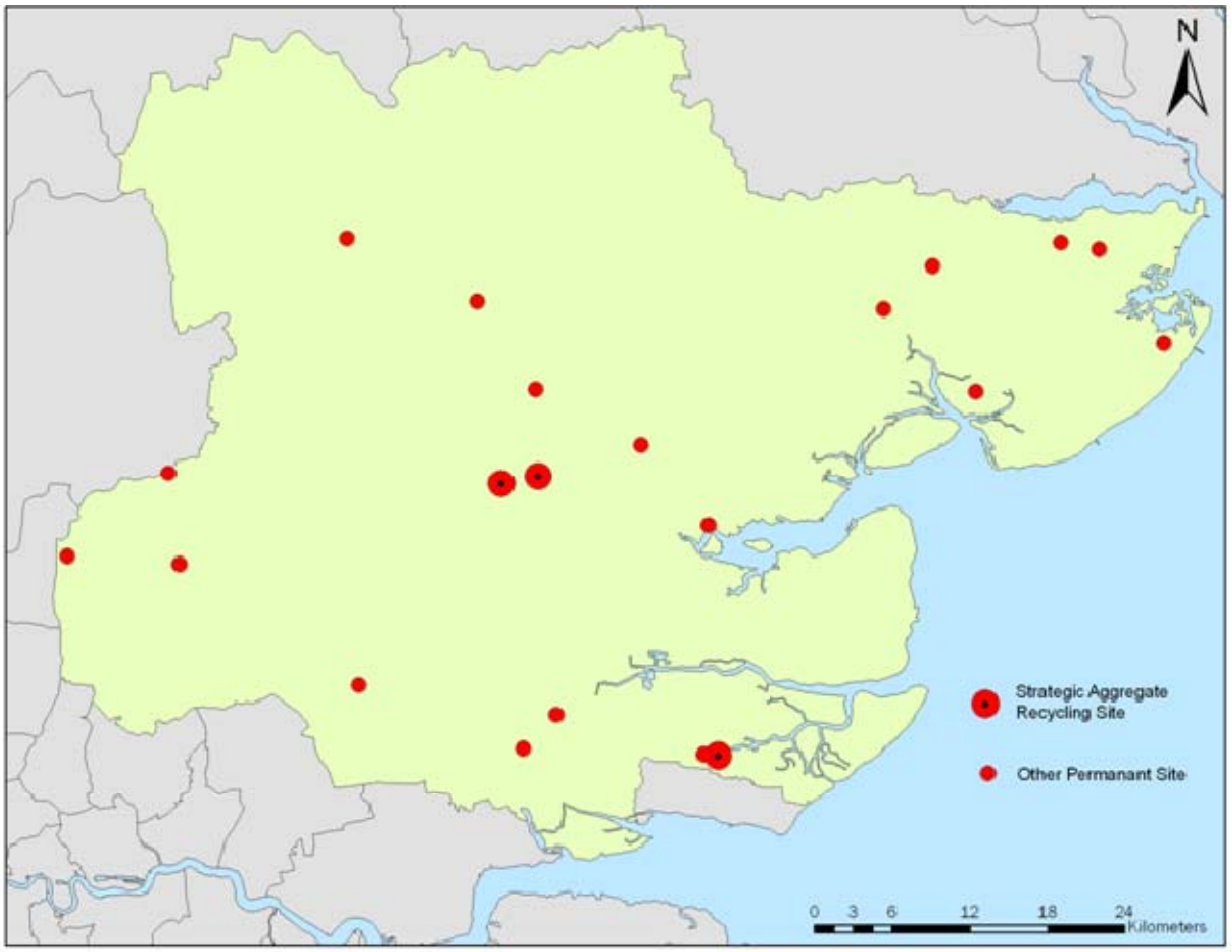
6.1 Aggregate Recycling

The Essex Further Issues and Options paper states:

"There are three existing sites which accord with the definition of strategic aggregate recycling sites, capable of producing 100,000 tonnes or more of recycled material per year, which could provide the basis for a Countywide network."

The three strategic sites are the focus of the assessment, which are shown in Figure 3. It is possible that these sites may be extended or mineral recycling intensified on them, which may lead to impacts on Natura 2000 sites.

Figure 3: Aggregate Recycling Locations in and Around Essex



6.2 Primary Extraction

Four Spatial Options have been proposed for primary extraction sites. These are on a very general level, with no specific site locations, although Options 2 and 3 have some spatial element to them.

6.2.1 Option 1

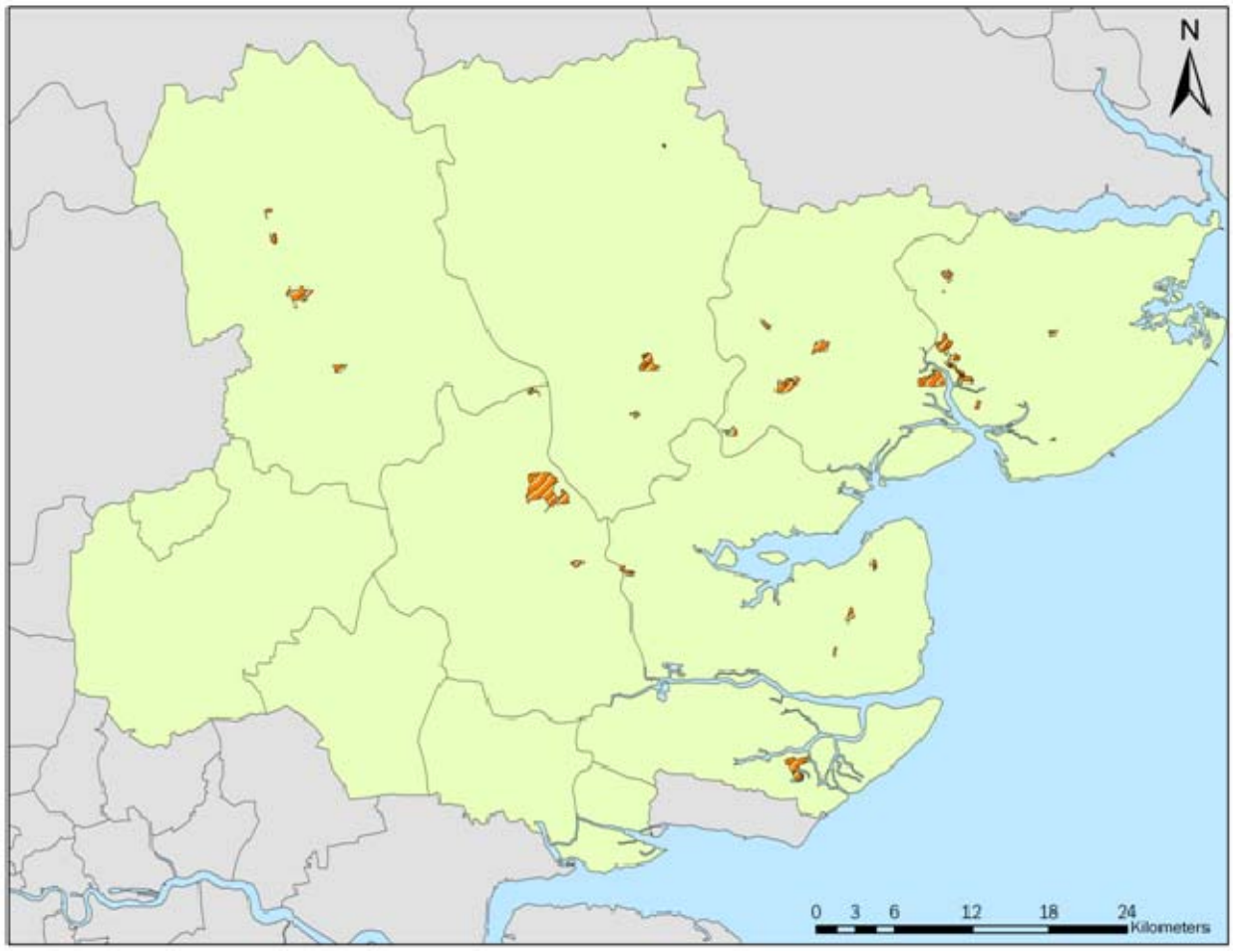
Predominantly Extensions to Existing Extraction Sites

The Essex Further Issues and Options paper states:

"This Option is based on a preference for extensions to existing sites with primary processing plant (where environmentally acceptable). The current distribution of land won sand and gravel extraction sites would be largely maintained, although there would continue to be a gap in the south west of the County. The sites depicted below are indicative only, no assessments have been carried out as to the potential for existing sites to be extended or their acceptability. All extension proposals would be required to meet new highway and environmental standards."

Existing sites are shown in Figure 4. It is, however, important to emphasise that not all of these sites will be suitable for extensions.

Figure 4: Existing Minerals Extraction Sites in Essex (2006)



6.2.2 Option 2

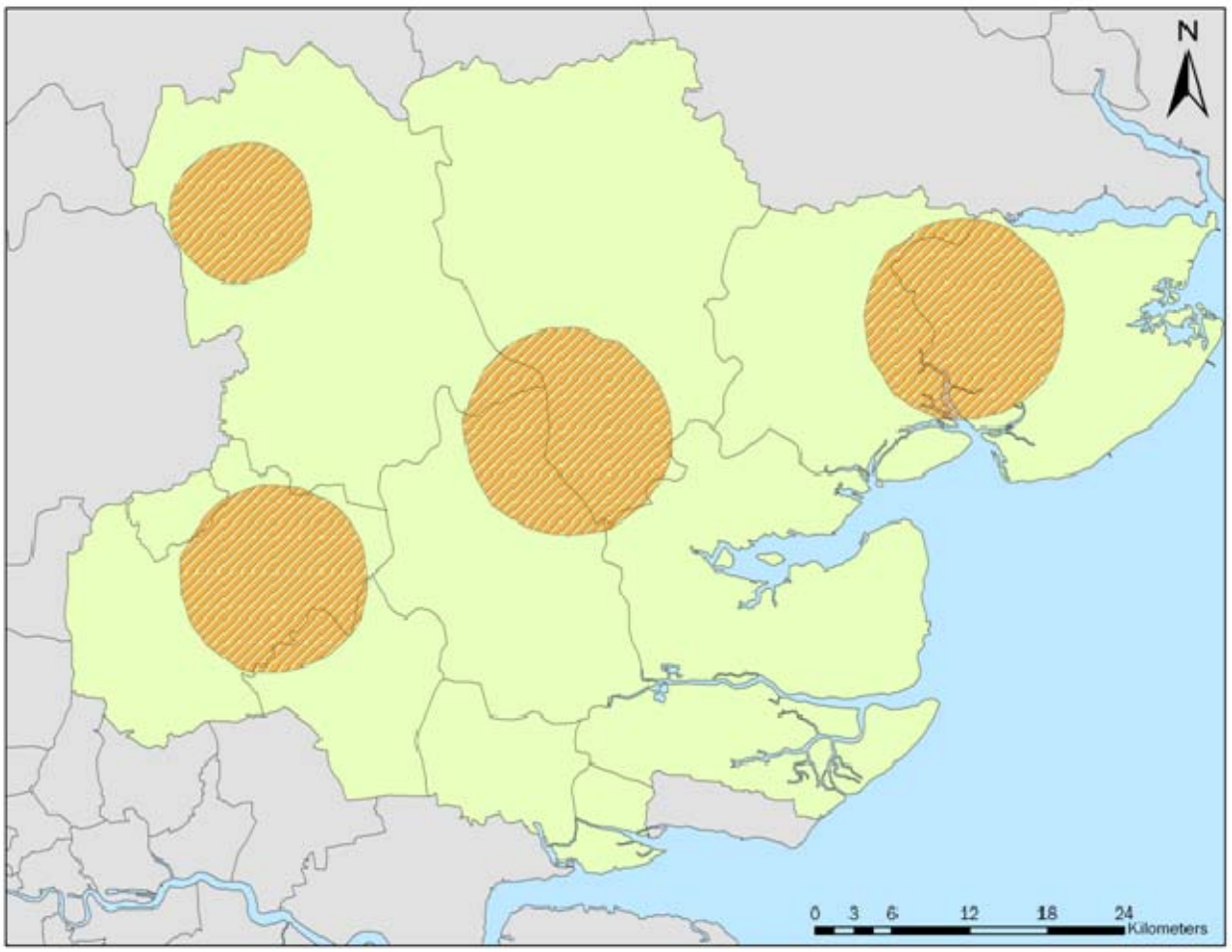
Dispersed Spread of Sites Across the County

The Essex Further Issues and Options paper states:

"This would be based predominantly on a dispersed spread of sites across the County with some concentration in the centre of the county. It would be based across the extent of the geological resources and could contribute to minimising mineral transport miles to serve the Essex market. This Option could incorporate a mix of site extensions and new sites, as well as small or large sites. There are no suggested sites in the southwest and this option would be dependent upon suitable sites coming forward in this area."

Figure 5 shows the four clusters of dispersed sites, which are spread across the County.

Figure 5: Map to Show Option 2 Dispersed Sites



6.2.3 Option 3

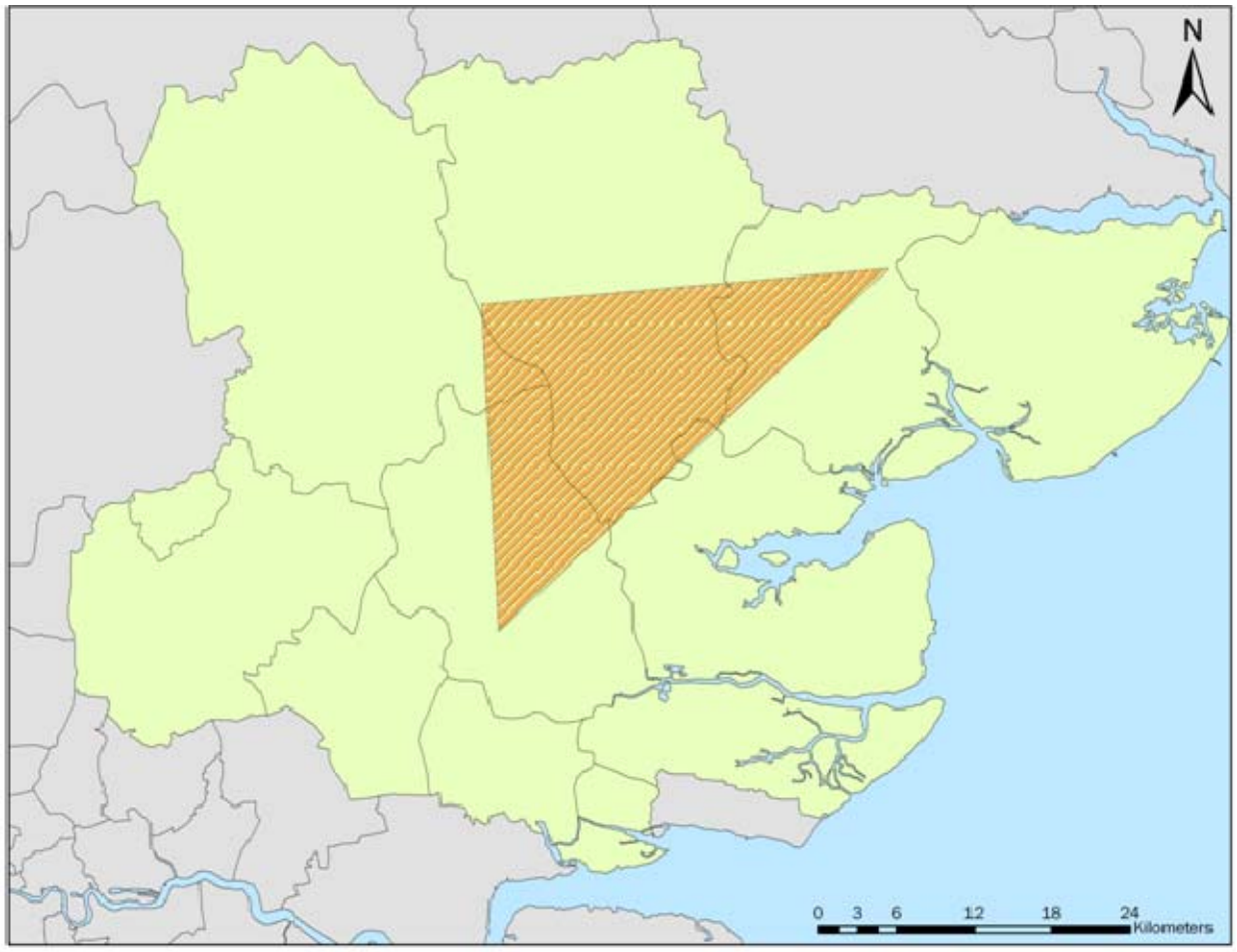
Concentrated Supply of Sites with Some Dispersed Sites

The Essex Further Issues and Options paper states:

"This Option concentrates supply in the heart of Essex based upon the triangle of Chelmsford, Braintree & Colchester and utilising the main highway network of A12, A120 and A131 to distribute the minerals across the county to serve the Essex market. This Option could incorporate a mix of extensions and new sites, as well as small or large sites."

Figure 6 illustrates the more concentrated 'triangle' approach.

Figure 6: Map to Show Option 3 Concentrated Sites with some Dispersed



6.2.4 Option 4

The Essex Further Issues and Options paper states:

"A hybrid of the above options may be more appropriate to serve our needs, given that none of the above options in isolation would have sufficient resources to meet the plan requirement, based upon the existing suggested sites."

As this Option comprises of a combination of the previous Options, it has not been separately appraised in this document.

7.0 Assessment of Significant Impacts

Each Option has been appraised in turn, under each of the criteria highlighted in Table 3. Due to the high level nature of the Options, the appraisal assesses the entire area given in the Essex Further Issues and Options paper, although only selected sites within that area will be taken forward. A more detailed appraisal will be carried out at the next stage, which will be more site specific.

7.1 Aggregate Recycling

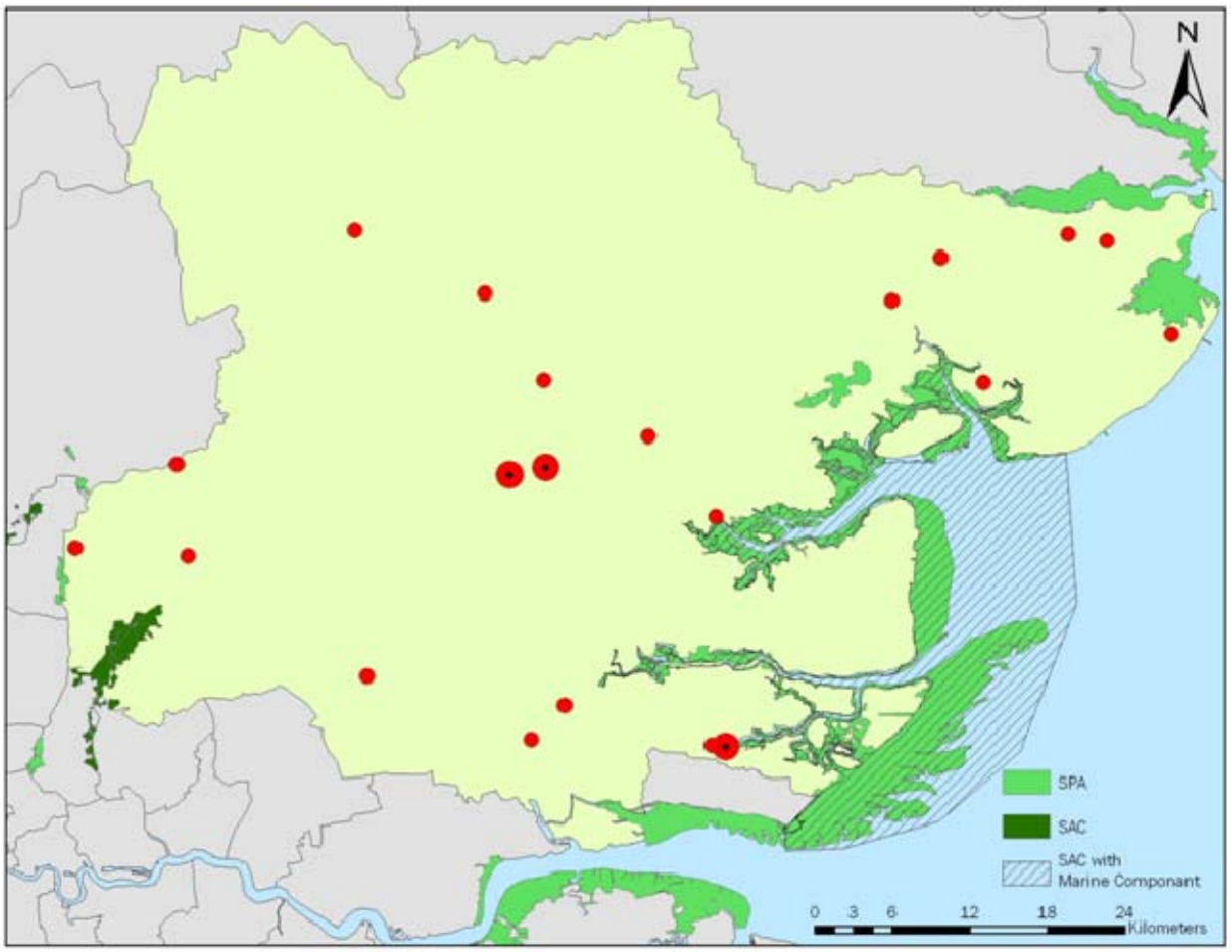
Figure 7 shows the location of current aggregate recycling sites in relation to Natura 2000 sites. The potential impacts on Natura 2000 sites of this option are discussed below.

7.1.1 Habitat Loss

Loss of habitat will depend on the proximity or overlap of aggregate recycling facilities on Natura 2000 areas. This would also be very dependant on the size of the facility, which is unknown at this stage of the assessment.

Only the South Eastern strategic site is in close proximity to a Natura 2000 area and expansion of this aggregate recycling site may encroach on this habitat.

Figure 7: Aggregate Recycling Facilities and Natura 2000 sites



7.1.2 Emissions

Dust emissions from aggregate recycling can be significant, due to material crushing, screening and segregation. Specific measures, such as dampening or the erection of barriers, can mitigate this impact. Due to the fact that dust can be carried relatively far from the site of origin, several of the strategic and non-strategic aggregate recycling facilities may have a negative impact on Natura 2000 sites. This will, however, depend on many aspects such as wind direction, topography, rainfall, mitigating measures etc.

Water pollutants may also be linked to the storage of unwanted or non-aggregate materials on the site[7], although this can be avoided through good site maintenance.

7.1.3 Flooding and Water Use

Relatively little water is used in the aggregate recycling process, so this is likely to be of little impact. There is also no physical excavation so disturbance of groundwater is avoided.

7.1.4 Human Disturbance

Noise and light disturbance is dependant on the location of the facilities and Figure 7 illustrates that several facilities are in close proximity of Natura 2000 sites. These impacts, however, can be avoided through the in-design of mitigating measures such as noise barriers and the careful placement of site lighting.

Transportation of material to the facility and the recycled aggregate from the facility may cause disturbance to Natura sites. Siting facilities close to main roads which are away from Natura 2000 sites will reduce this impact. Alternative transportation by rail or wharf may also reduce disturbance of sites. Current rail/ water transport links are outlined in Table 4.

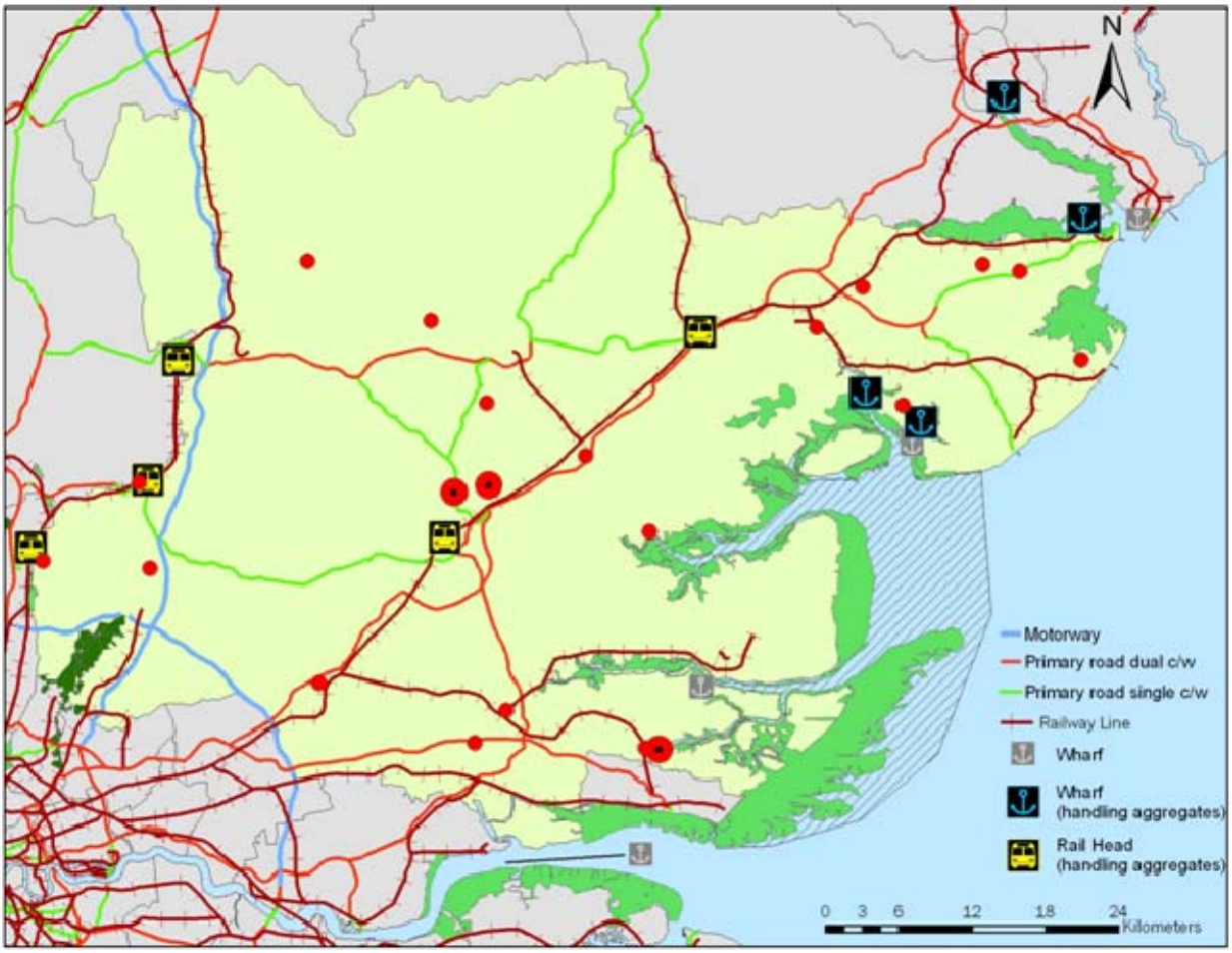
Table 4: Rail and Water Links for Minerals Transportation in Essex

	Name	Description
Rail	Marks Tey	Minerals export only
	Harlow Mill	Minerals import/export facilities
	Chelmsford	Minerals import/export facilities
Water	Harwich	Previous export port
	Haven Gateway	Not yet operational
	Fringinghoe	Minerals export only
	Brightlingsea	Has no rail connection
	Wellwick Wharf	Has no rail connection
	St Osyth	Has no rail connection
	Thames Gateway	Several export options, although not currently in use

[7] WRAP: http://www.aggregain.org.uk/recycling_infrastructure/environmental_impacts_of_aggregate_recycling/water_pollution.html

Figure 8 illustrates that many existing recycling sites are close to main roads or existing rail/wharf links. There are, however, several non-strategic sites which do not have major road links. The site in the East is extremely close to the Blackwater Estuary and has no major roads nearby. It is possible that this may lead to reliance on smaller roads which are close to this Natura 2000 site. Whilst by no means certain, disturbance may be more of an issue for here.

Figure 8: Aggregate Recycling Facilities with Road, Rail and Water Links



7.2 Primary Extraction: Option 1

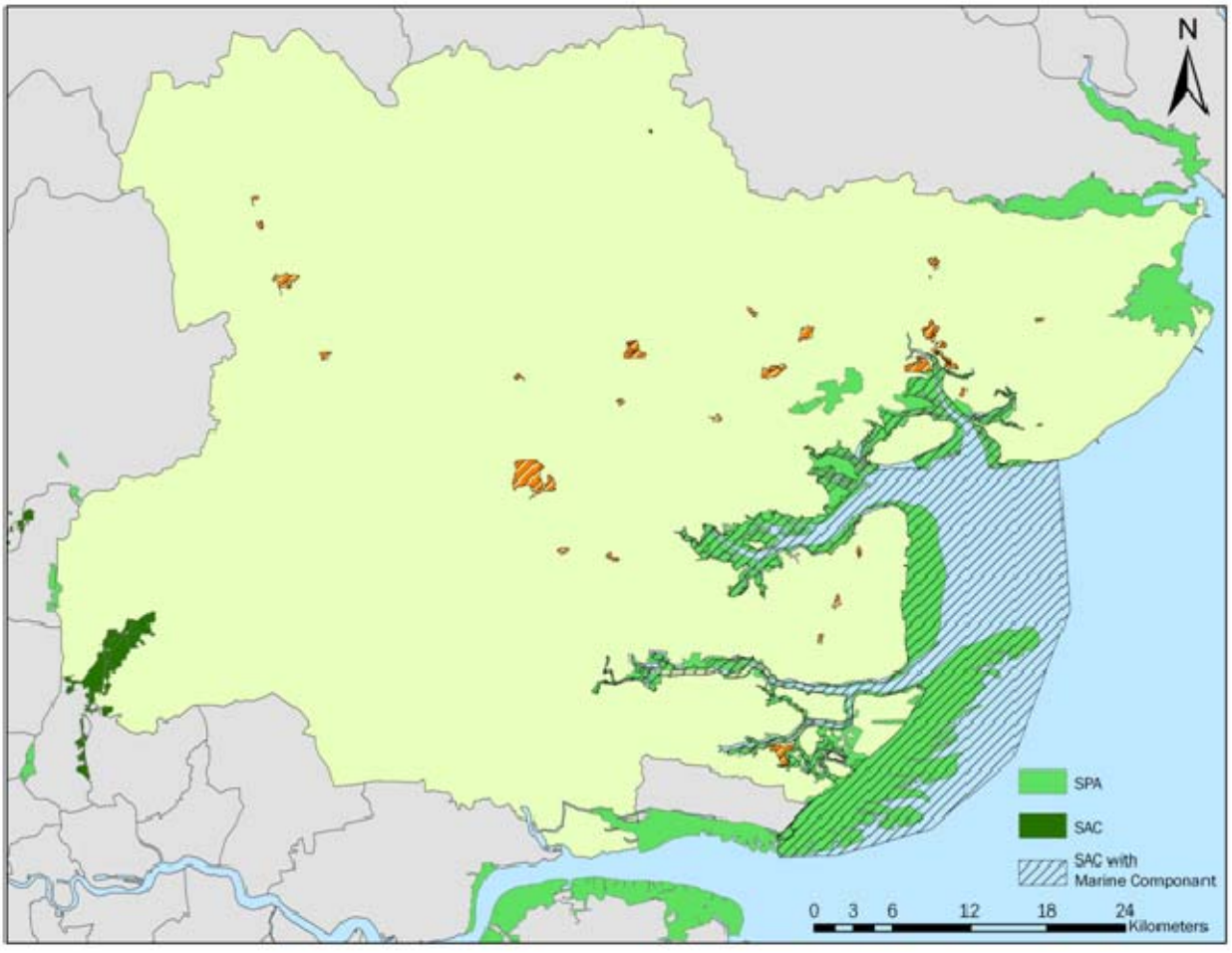
Figure 9 shows the location of current primary extraction sites in relation to Natura 2000 sites.

7.2.1 Habitat Loss

Habitat loss or fragmentation will be dependant on the proximity and overlap of extended minerals sites on Natura 2000 areas. It could also be affected by the extent and type of site restoration, which may have positive benefits via habitat generation.

There may be some benefits gained from extending sites rather than creating new extraction sites, as it is possible that this would decrease disturbance, but this is highly dependant on the location of the site. There are three current mineral extraction sites which encroach on Natura 2000 sites; the Colne Estuary and the Croach and Roach Estuaries. It is, however, difficult to determine the impact on Natura sites as these are not necessarily extensions which would be taken forward.

Figure 9: Existing Mineral Extraction Sites and Natura 2000 sites



7.2.2 Emissions

Dust pollution will be dependant on proximity to sites, extraction method, wind direction, topography etc. At this high level stage, it is difficult to assess possible impacts.

Although several current extraction sites are in close proximity to rivers which feed into Natura 2000 estuarine habitats, there is not likely to be any significant issues in terms of water

pollution. The main water pollutants affecting Natura sites in Essex are those which cause eutrophication. These tend to be linked to agriculture, water treatment or sewage sources rather than minerals sites.

Emissions which occur from HGV transportation of minerals are not likely to have a significant impact on Natura 2000 sites as the levels of these emissions are relatively small when compared with transport related pollution as a whole. However, without a full transport impact assessment this is impossible to determine.

7.2.3 Flooding and Water Use

Flood risks are detailed further in the High Level Flood Risk Assessment which accompanies the consultation on the MDD issues and options paper.

Although several sites in Option 1 are close to tributaries which feed into the Blackwater Estuary and the Colne Estuary, these are not necessarily those which will be taken forward for extension. It is therefore difficult to assess the possible impacts on Natura sites. This is illustrated in Figure 10**Error! Reference source not found.**.

Figure 10: Existing Mineral Extraction Sites and Hydrological Features

Due to the Estuarine and marine nature of the majority of the Natura sites in Essex, the main threat from minerals extraction would be through marine dredging causing a reduction in sediment and exasperating the effects of coastal squeeze. All of the proposed sites are land-based, and so this is not likely to be an issue.

There are possibilities that minerals sites may aid in habitat extension through the creation of new reservoirs and so the habitat like that at Abberton Reservoir may be expanded. This would largely depend on the type and extent of the restoration of sites.

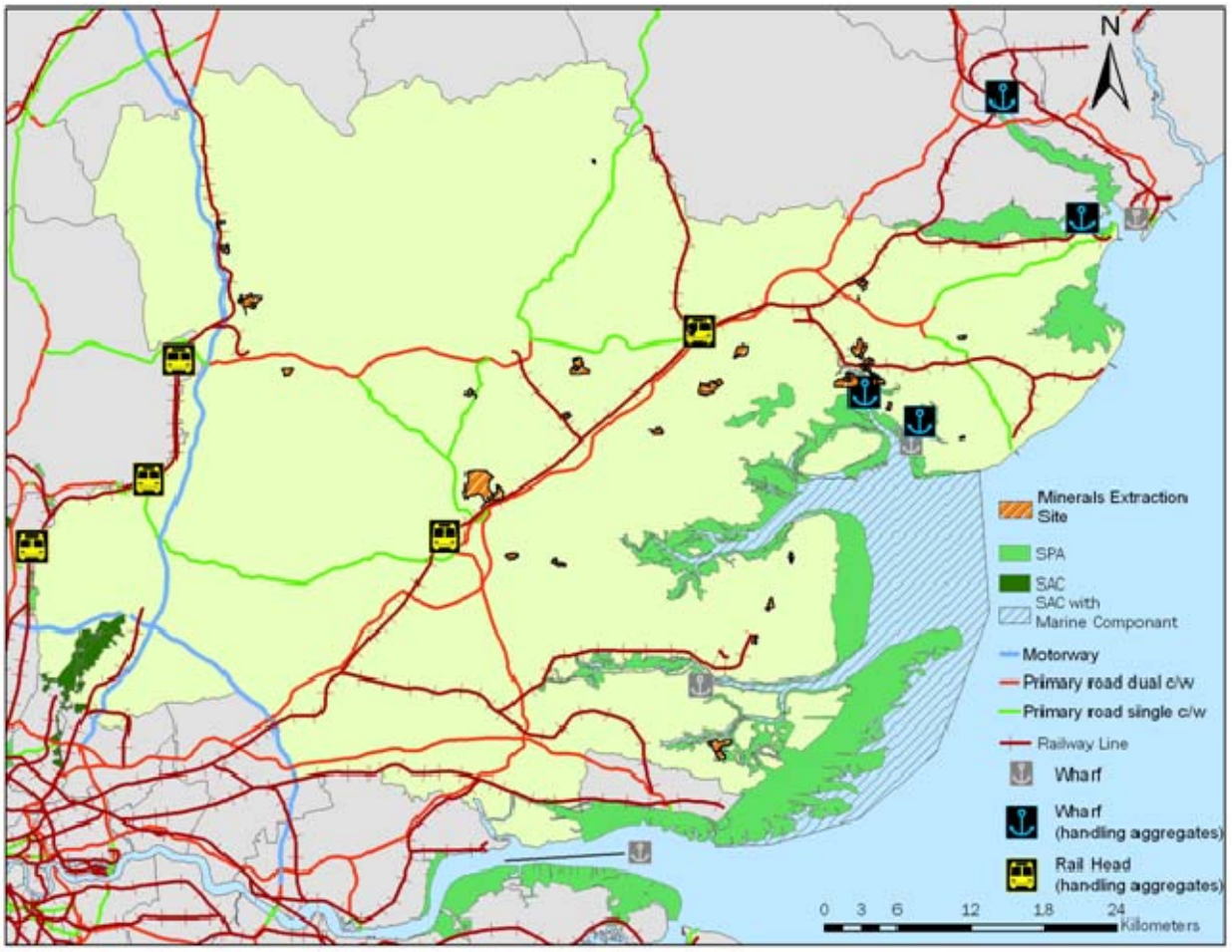
7.2.4 Human Disturbance

Noise and light disturbance from actual minerals workings are highly dependant on proximity and so is covered in Figure 9, although the implementation of barriers can reduce this impact.

The transportation of minerals can be a disturbance to Natura 2000 sites, particularly where birds are breeding or wintering. This can be reduced through alternative transport links or use of roads which are at a distance from Natura 2000 sites.

Option 1 incorporates extensions to existing sites, which tend to be close to both rail or water links, as can be seen in Figure 11**Error! Reference source not found.**. This may decrease reliance on road, if they are utilised, therefore reducing road disturbance which may adversely affect Natura sites. There are also main A road links to sites which do not run in close proximity to Natura 2000 sites and so transportation by road can also be utilised with minimal disturbance.

Figure 11: Existing Mineral Extraction Sites with Road, Rail and Water Links



7.3 Primary Extraction Option 2

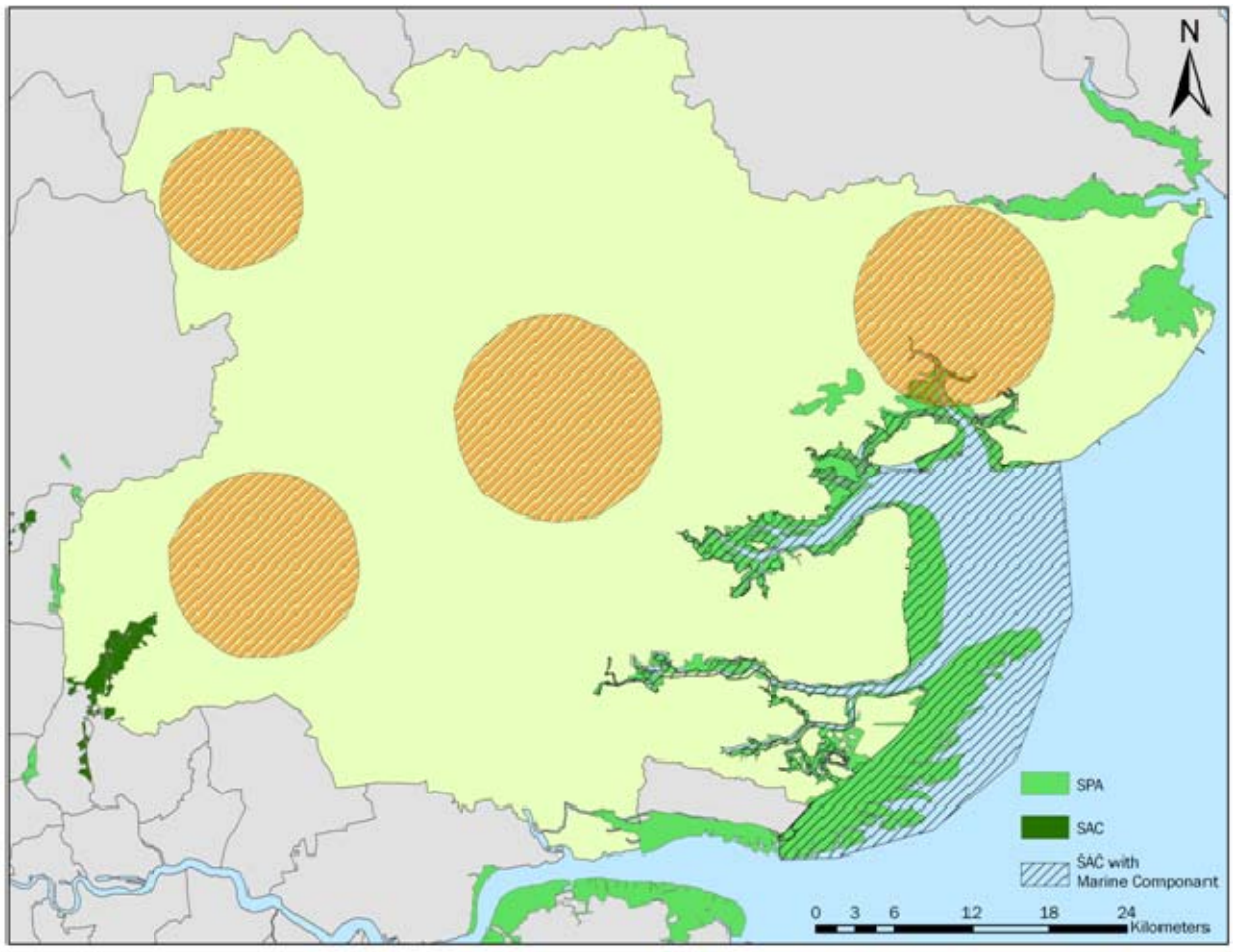
7.3.1 Habitat Loss

Again, the amount of habitat lost will be dependant on the extent of encroachment or fragmentation caused by mineral development.

Option 2 shows some overlap with Natura 2000 sites in the Colchester/Tendring cluster in the North East of Essex. The cluster encroaches on the Colne Estuary SPA and is in close proximity to the Stour and Orwell Estuaries SPA to the North. This is shown in Figure 12**Error! Reference source not found.**.

Although the four clusters are general areas, if this Option were to be taken forward there may be both positive or negative impacts on Natura 2000 sites – for example the restoration of extraction sites may create new habitats or extend existing ones.

Figure 12: Option 2 Sites and Natura 2000 sites



7.3.2 Emissions

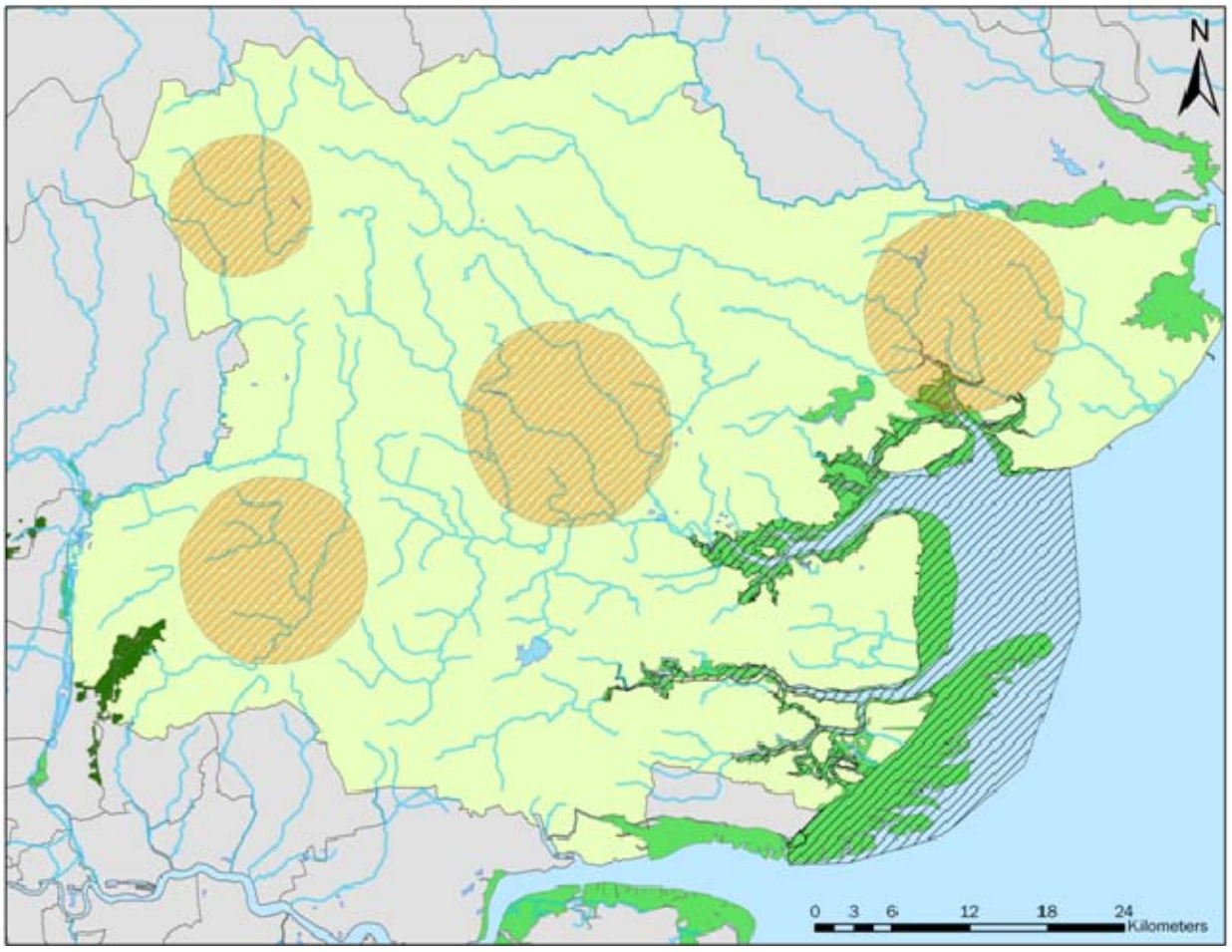
There may be issues with dust emissions from extraction sites in the North East cluster due to the close proximity to Natura 2000 sites, although this would be highly dependant on many other factors (topography, wind direction, use of mitigation measures etc). As detailed in 7.1.2, water and vehicle related pollutants are not likely to have a significant impact.

7.3.3 Flooding and Water Use

Flood risk is covered in the accompanying High Level Flood Risk Assessment.

Figure 13**Error! Reference source not found.** illustrates the rivers and tributaries in Essex with the proposed minerals sites. Both the central and North West clusters cover rivers which feed into the Blackwater Estuary and the Colne Estuary, respectively. Both of the sites are threatened from low levels of freshwater running into the estuary or drought and so individual minerals sites should be assessed to investigate possible impacts. At this stage in the MDD development process it is difficult to assess any potential issues.

Figure 13: Option 2 and Hydrological Features

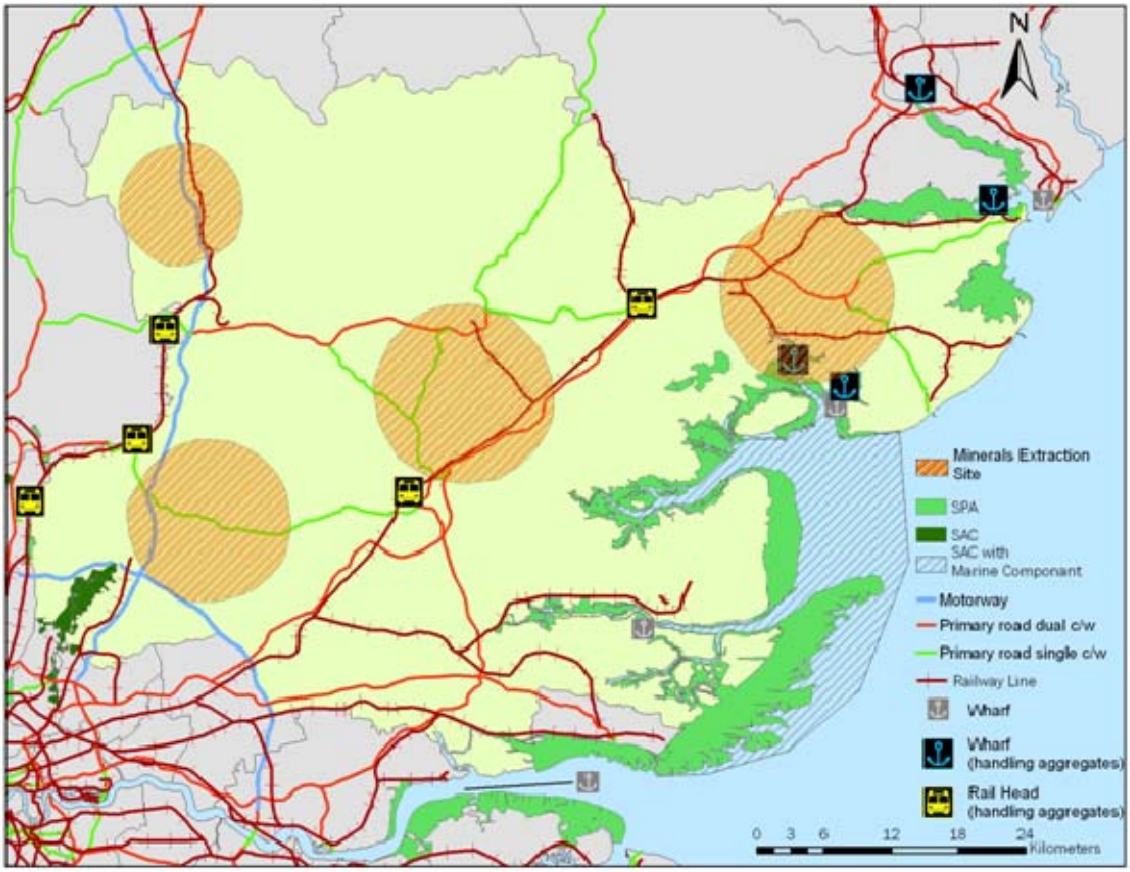


7.3.4 Human Disturbance

Again, this will be very dependant on the proximity of Natura 2000 sites to primary extraction sites. The overlap of the North East cluster with the Colne Estuary SPA may lead to potential disturbance of this Natura 2000 site.

Transportation of minerals via roads with close proximity to Natura 2000 sites may have an impact, although Figure 14 indicates that there are adequate links to major roads and alternate transport. This may reduce congestion on smaller roads and lessen the emissions resulting from minerals transportation. Therefore, the impact on Natura 2000 sites is likely to be negligible, although as with other options this should be investigated in further detail once the full site locations are known.

Figure 14: Option 2 with Road, Rail and Water Links



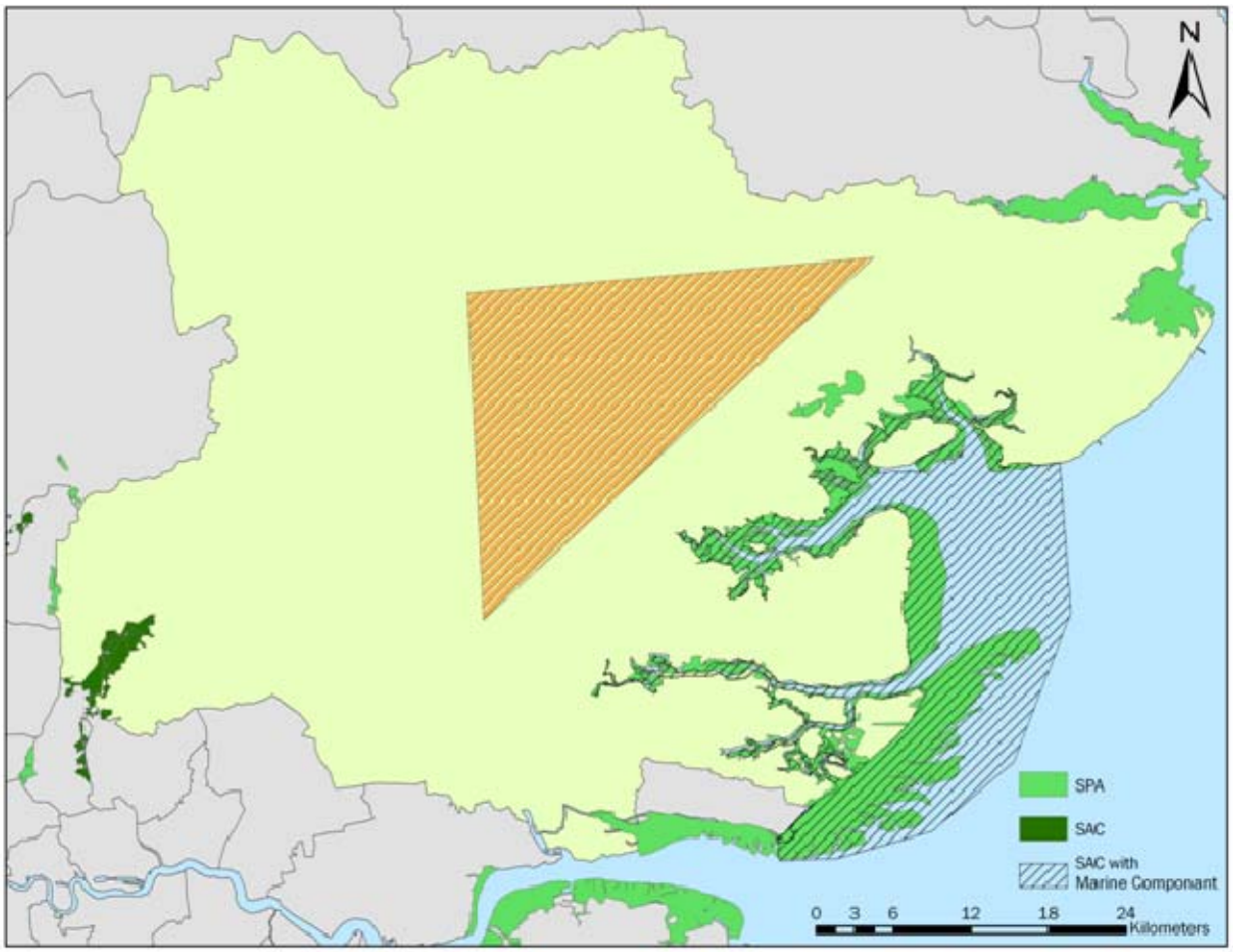
7.4 Primary Extraction Option 3

7.4.1 Habitat Loss

Option 3 represents a central concentration of extraction sites, and therefore does not encroach on the predominantly coastal Natura sites. It is also not in any close proximity to designated sites, as can be seen in Figure 15**Error! Reference source not found.**.

There is therefore considered that there will be no significant impact in terms of habitat loss or fragmentation from this option.

Figure 15: Option 3 and Natura 2000 sites



7.4.2 Emissions

Although minerals extraction can lead to dust pollution, the extent to which this may occur is dependant on many factors. Key to this is the proximity of a site to Natura habitats. This has already been discussed and this option is not considered to have any likely significant impact on Natura 2000 sites in relation to emissions.

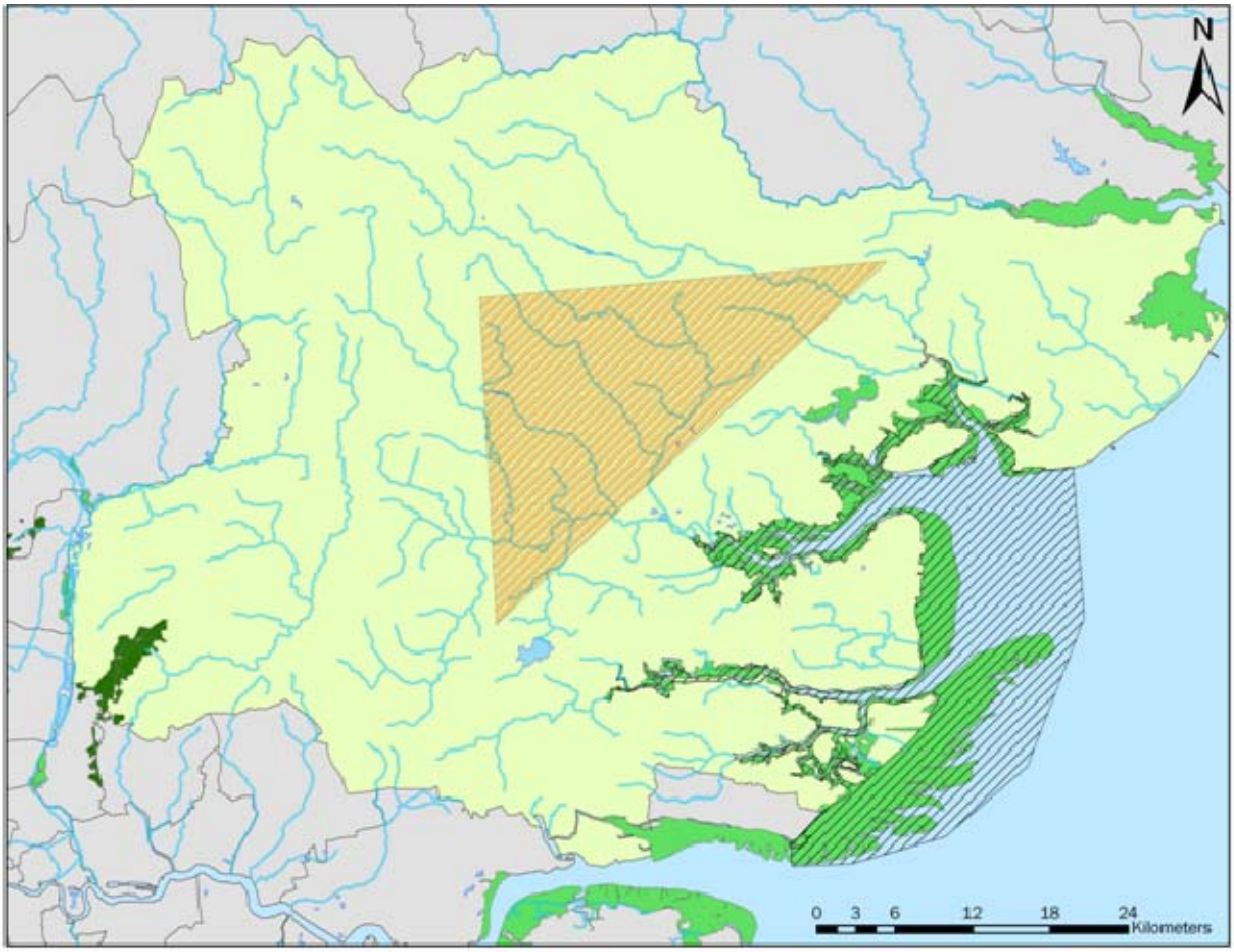
The main water pollutants that are affecting Natura sites in Essex are those which cause eutrophication. These tend to be linked to agriculture or sewage rather than

minerals sites. It is therefore unlikely that water pollution resulting from minerals extraction will have an impact on Natura sites.

7.4.3 Flooding and Water Use

Option 3 similarly encompasses rivers which flow into the Blackwater Estuary and the Colne Estuary, as can be seen in Figure 16**Error! Reference source not found.**, and so may have an impact on the freshwater flow that feeds into these Natura sites. Again, this would depend on the specific location of the minerals sites and their possibility of impacting on these rivers which cannot be determined at this time.

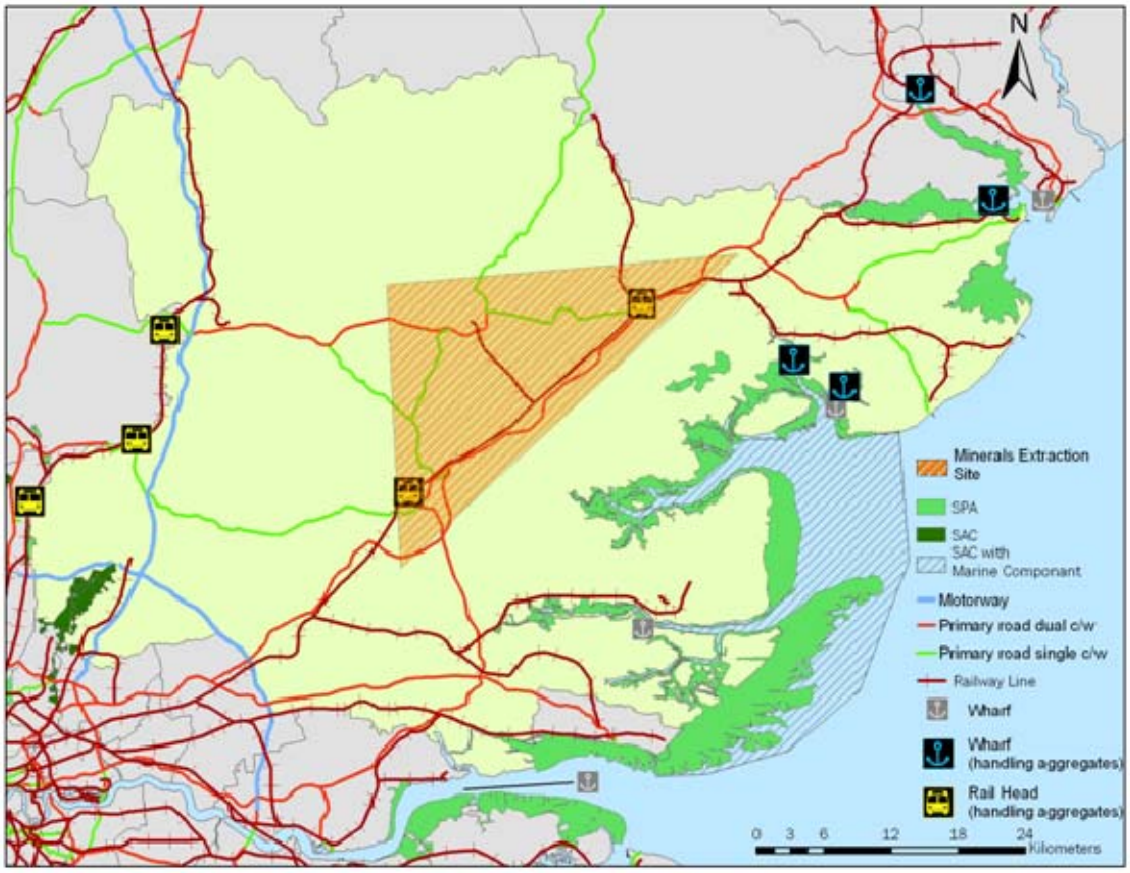
Figure 16: Option 3 and Hydrological Features



7.4.4 Human Disturbance

Due to the distance of any Natura 2000 sites from the excavation area in Option 3, there is unlikely to be a major issue with human disturbance. There are major road and rail links within the identified area and these do not run close to any Natura 2000 sites, as can be seen in Figure 17.

Figure 17: Option 3 with Road, Rail and Water Links



7.5 Other Factors

7.5.1 Size of Site (Particularly Height)

This would also be dependant on the planning of the site, but minerals excavation does not usually require large structures so this is unlikely to have an impact on bird flight paths.

7.5.2 Proximity of Site and Related Roads to Natura 2000 Sites

The introduction of non-native species is not a threat facing the Natura sites in Essex and so the proximity of minerals sites or transportation routes is unlikely to be a threat.

8.0 Summary of Impacts

Table 5 summarises the assessment of each Option and the potential impacts which have been identified.

Table 5: Summary of Potential Impacts to Natura Sites

Possible Impact	Option	Extent of Impact
Aggregate Recycling	Habitat Loss	***Possible Impact*** Overlap and close proximity to Natura sites
	Emissions	***Possible Impact*** Close proximity to Natura sites
	Flooding and Water Use	***No Impact***
	Human Disturbance	***Possible Impact*** Close proximity to Natura sites
Option 1	Habitat Loss	***Possible Impact*** Overlap and close proximity to Natura sites
	Emissions	***Possible Impact*** Close proximity to Natura sites
	Flooding and Water Use	***Possible Impact*** Encompasses rivers which flow into estuarine Natura sites
	Human Disturbance	***Unknown*** Dependant on which sites will be extended in this Option
Option 2	Habitat Loss	***Possible Impact*** Overlap and close proximity to Natura sites
	Emissions	***Possible Impact*** Close proximity to Natura sites
	Flooding and Water Use	***Possible Impact*** Encompasses rivers which flow into estuarine Natura sites
	Human Disturbance	***Unknown*** Dependant on which location of sites

Option 3	Habitat Loss	*No Impact* No proximity or overlap with Natura 2000 sites
	Emissions	*No Impact* No proximity or overlap with Natura 2000 sites
	Flooding and Water Use	*Possible Impact* Encompasses rivers which flow into estuarine Natura sites
	Human Disturbance	*No Impact* No proximity or overlap with Natura 2000 sites
Other Factors	All Options	*No Impact* Obstruction of flights paths and introduction of non-native species is unlikely to impact on the Natura sites