Minerals Local Plan
Flood Risk Appraisal

June 2023

Essex County Council
Flood Services

VERSION CONTROL

Issue	Date	Details	Prepared By	Reviewed By	Approved By
0.1	25/08/2022	Phase 1 -Working draft report for client review	Peter Richardson (Project Design Engineer) Juliana Dempsey (Essex Paths to Prosperity Project Manager)	Jo Ludlow (Project Design Engineer)	Dave Chapman (Project Delivery Manager)
0.2	19.05.2023	Updates to draft 1 and inclusion of Phase 2	Peter Richardson (Project Design Engineer) Charlotte Palmer (Project Design Engineer)	Dave Chapman (Project Delivery Manager)	Dave Chapman (Project Delivery Manager)
0.3	12.06.2023	Updates to sites due to removal and reclassifications of submitted sites	Peter Richardson (Project Design Engineer) Charlotte Palmer (Project Design Engineer)	Dave Chapman (Project Delivery Manager)	Dave Chapman (Project Delivery Manager)

This document has been produced by Essex Flood Services

Address: Flood and Water Management Team,
Environment and Climate Change Action,
County Hall,
Market Road,
Chelmsford,
Essex
CM1 1QH

Telephone: 08457 430430
email: floods@essex.gov.uk

Disclaimer

Essex County Council and the Project Delivery Team accept no responsibility or liability for any use that is made of this document other than by the owner for the purpose for which it was originally commissioned and prepared. This report is based upon the information available at the time of writing and when using the information all efforts should be made to use the most up to date information. The conclusions and recommendations could, therefore, differ in the event of material subsequently being updated or found to be erroneous or incomplete. Essex County Council will, therefore, accepts no liability should this prove to be the case.

Essex County Council

0 EXECUTIVE SUMMARY

0.0.1 This Appraisal undertakes an investigation into flood risk to aid with future planning and development decisions for the Minerals Local Plan (MLP). It covers 52 locations in Essex which vary from newly allocated sites to extensions of existing sites.

0.0.2 This Appraisal looks to ensure that future mineral related development can be built safely within those locations submitted to the Minerals and Waste Planning Authority (MWPA) through a Call for Sites exercise for potential allocation as a mineral extraction site. As such, this Appraisal encourages sustainable development that not only mitigates against flood risk but also achieves wider socio-environmental benefits in relation to biodiversity, amenity and multifunctionality.

0.0.3 Both national and local level planning policies have been reviewed, as well as relevant strategic and supplementary planning documents, to ensure a holistic approach is applied to mitigating flood risk whilst also encouraging new development, and future remedial works within the identified locations. These policies and documents include:

- National Planning Policy Framework (NPPF)
- Environment Agency Climate Change Allowances
- The Essex SuDS Design Guide
- The Essex Green Infrastructure Strategy
- The Essex Green Infrastructure Standards
- The Essex Local Flood Risk Management Strategy
- National Flood and Coastal Erosion Risk Management Strategy (NFCERMS)

0.0.4 This Appraisal provides a Flood Risk Overview for the 52 MLP sites from each flood risk source including, coastal, fluvial, surface water, and groundwater.

0.0.5 This appraisal has been compiled using flood modelling data and records from several flood risk stakeholders including Essex County Council and the Environment Agency.

0.0.6 This report has used all up to date hydraulic modelling available at the time of writing and has been updated in conjunction with local planning policy, including the Local Development Plan and Supplementary Planning Documents.

CONTENTS

LIST OF TABLES

LIST OF APPENDICES

1 INTRODUCTION

1.0 Document Purpose

1.0.1 This Strategic Flood Risk Assessment for the Minerals Local Plan (MLP) is an assessment of 52 potential allocations for mineral extraction. Assessment has been carried out using the most current flood risk information national planning policy, climate change allowances and flood risk zones, and outlines the impacts of these.

1.0.2 It summarises documentation and policies regarding planning and flood risk mitigation to highlight information relevant to future mineral-related development within the study area. This appraisal should be used so that any mineral-related development is properly mitigated against flood risk and that maximum benefit to the local area is achieved.

1.0.3 A review has been undertaken of existing flood modelling and other flood risk information to summarise flood risks within the 52 potential allocations to allow appropriate consideration and mitigation during future minerals sites and developments.

1.0.4 The modelling review identifies sites more at risk of flooding (these vary in terms of type of flooding) and therefore assesses these further with the addition of providing some mitigation recommendations.

1.0.5 The MLP forms part of the statutory Development Plan for Essex which delivers the spatial planning strategy for the area. Each Plan, including the MLP, has to undergo a Sustainability Appraisal (SA) which assists ECC in ensuring their policies fulfil the principles of sustainability. Strategic Flood Risk Assessments (SFRAs) are one of the documents to be used as the evidence base for planning decisions and form a component of the SA process.

1.1 Scope and Limitations

1.1.1 This appraisal has undertaken a modelling review of the latest available surface water, fluvial and tidal models, produced by the Environment Agency (EA) and Essex County Council (ECC). Groundwater flood risk has also been assessed using the latest available EA and British Geological Society (BGS) data.

1.1.2 The hydraulic models reviewed as part of this appraisal were provided by several key flood risk partners including Essex County Council and the Environment Agency.

1.1.3 Modelling combining information on all flood risk sources was not created due to the significant time and costs involved. Each respective hydraulic model was reviewed individually and overlayed to enable a complete review of all data received from key stakeholders.

1.1.4 A SFRA is a planning document used to fully understand the flood risk in an area to inform the assessment and selection of appropriate strategic development sites to ensure they are either outside of flood risk areas or where development needs to take place in areas of flood risk, that the potential impacts are appropriately assessed, and mitigation measures can be put in place'. It involves the assessment of;

- Flood risk from main rivers, other rivers and streams, surface water, groundwater, and the sea, all including the impacts of climate change.
- The impact that land use changes and development in an area will have on wider flood risk.

1.1.5 The National Planning Policy Framework requires Local Planning Authorities and Minerals and Waste Planning Authorities to prepare an SFRA in consultation with the Environment Agency to refine information on areas at risk of flooding, taking into account all sources of flooding and the impacts of climate change.

1.1.6 In their creation and updating of policies under the Local Development Framework, planning authorities must develop a robust evidence base to inform and justify decision making. The SFRA forms an essential part of this evidence.

1.1.7 Advice and guidance on how an SFRA should be used in plan making is provided in the National Planning Practice Guidance[1].

1.1.8 The scope of this SFRA is to;

- Provide information on national, regional, and local policies regarding flood risk
- Undertake a full GIS assessment of flood risk to the 52 MLP SFRA sites using the latest flood risk information. This includes sequential tests and further site-specific assessment where appropriate.

1.2 Definition of Event Frequencies

1.2.1 Rainfall and flood events are defined based on the frequency at which they are predicted to occur. Historically this has been expressed as a return period with a form of 1 in x; so, a 1 in 20-year storm is likely to occur on average once every 20 years and a 1 in 100-year storm on average once every 100 years.

1.2.2 To reduce confusion this has subsequently be redefined to become Annual Exceedance Probability (AEP) by the Environment Agency. This method details the risk of an event happening each year as a percentage, with a 1 in 20-year storm becoming a 5% AEP event and a 1 in 100-year storm a 1% AEP event.

1.2.3 This flood risk appraisal refers to flood risk in the form of AEP. All flood risk and rainfall probabilities should be expressed in this format to comply with EA best practice[2].

[1] National Planning Practice Guidance notes (November 2016); https://www.gov.uk/government/collections/planning-practice-guidance

[2] Environment Agency Fluvial Design Guide (January 2010); http://evidence.environment-agency.gov.uk/FCERM/en/FluvialDesignGuide/Chapter2.aspx?pagenum=4

2 Flood Risk and Environmental Policies

2.0.1 This section identifies all high level and strategic documents relevant to planning, development within the proposed MLP site allocations as well as any other documentation that should be considered when assessing flood risk for these locations.

2.0.2 Relevant aspects of each are outlined within this section to provide an overview of the requirements and policies that will be applied regarding the mitigation of flood risk for development within the area.

Flood Risk Policy	Purpose	Scale
National Planning Framework (NPPF) 2022	The National Planning Policy Framework sets out the Government's planning policies for England and how these should be applied.	National
National Flood and Coastal Erosion Risk Management Strategy (NFCERMS) 2022	National Flood and Coastal Erosion Risk Management strategy sets out a vision of a nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100.	National
Climate Change Allowances	Climate change allowances are predictions of anticipated change for, peak river flow, peak rainfall intensity, sea level rise, offshore wind speed and extreme wave height. Environment Agency provide guidance on climate change allowance for local authorities preparing strategic flood risk assessment, for developers and their agents preparing flood risk assessments for planning applications, and development consent orders for nationally significant infrastructure projects.	National
Flood and Water Management Act (2010)	The Flood and Water Management Act (FWMA) 2010 updated legislation to create clearer structures and responsibilities for managing flood and coastal erosion risk, it also established Flood Risk Management Authorities. These include the Environment Agency (EA), Lead Local Flood Authorities (LLFAs), water and sewerage undertakers, highway authorities, district authorities and Internal Drainage Boards.	National
Essex SuDS Design Guide (updated 2020)	Essex SuDS Design Guide is a technical guide for developers, designers and for consultants. Demonstrates how new developments in Essex can accommodate SuDS, and the standards expected of any new SuDS scheme to be suitable for approval and adoption.	Regional
Essex Green Infrastructure Strategy (2020)	The strategy establish a positive approach to enhance, protect and create an inclusive and integrated network of high-quality green infrastructure in Greater Essex, to create a county-wide understanding of green infrastructure	Regional

	– its functions and values, and to identify opportunities for delivering green infrastructure.	
Essex Green Infrastructure Standards	The Essex Green Infrastructure Standards Framework Guidance has been drafted through collaboration with multiple stakeholders and partners. The “Making Better Planning for Better Placemaking” and” Place-Keeping” workshops held October – November 2020 identified the 9 Essex GI Principles. These principles were translated into 9 proposed GI standards for Essex. The GI Standards are action plans to ensure the GI Principles have been achieved.	Regional
Environment Act (2021)	The Environment Act, became law in 2021, acts as the UK’s new framework of environmental protection. It provides the Government with powers to set new binding targets, including for air quality, water, biodiversity, and waste reduction.	National
Essex Local Flood Risk Management Strategy (2018)	The strategy sets out the aims and actions to reduce impact of local flooding. ‘Local’ flooding in Essex means the risk of water from man-made drainage systems, small watercourses, and rainfall off the land.	Regional
Flood Risk Management Plans (FRMPs) (2021-27)	They are strategic plans that set out how to manage flood risk in nationally identified flood risk areas (FRAs) for the period 2021-2027, and are statutory plans required by the Flood Risk Regulations 2009.	National/Regional
River Basin Management Plans (RBMP)	Set out how organisations, stakeholders and communities will work together to improve the water environment.	National/Regional
Catchment Flood Management Plans (2009)	Catchment flood management plans (CFMP’s) set out the flood risk management policies which will deliver sustainable flood risk management for the long term across a catchment.	National/Regional
Essex Climate Action Commission	The Essex Climate Action Commission (ECAC) was set up to advise Essex County Council about tackling climate change. The commission has over 30 members. They include a Lord, local councillors, academics, business people and 2 members of the Young Essex Assembly. ECAC Identify ways to mitigate the effects of climate change, improve air quality, reduce waste across Essex and increase the amount of green infrastructure and biodiversity in the county.	Regional
Essex Water Strategy	The Essex Water Strategy Framework is a positive step to achieve Essex Climate Action commission targets. The strategy will be highlighting the water scarcity issues and what collective measures can be taken to make our water resources resilient. The framework will be delivered by engaging stakeholders, from the water industry, planning, agriculture, and highways to develop a holistic view and action plan.	Regional

Shoreline Management Plans	Policy Paper regarding how the Environment Agency and local councils are developing shoreline management plans to manage the threat of coastal change.	National/Regional

2.1 National Planning Policy Framework (NPPF) (updated 2021)

2.1.1 The NPPF[3] sets out the Government's planning policies for England and how these should be applied and provides a framework within which locally prepared plans for housing and other development can be produced. The NPPF states that when determining any planning applications, Local Planning Authorities should ensure that flood risk is not increased elsewhere.

2.1.2 NPPF paragraph 20 refers to strategic policies that should set out an overall strategy for the pattern, scale, and quality of development, and make sufficient provision for Infrastructure for transport, telecommunications, security, waste management, water supply, wastewater, flood risk and coastal change management, and the provision of minerals and energy (including heat).

2.1.3 These planning policies ensure that worked land is reclaimed at the earliest opportunity, taking account of aviation safety, and that high-quality restoration and aftercare of mineral sites takes place.

2.1.4 Minerals planning authorities should maintain landbanks of at least 7 years for sand and gravel and at least 10 years for crushed rock whilst ensuring that the capacity of operations to supply a wide range of materials is not compromised. The planning authority should calculate and maintain separate landbanks for any aggregate materials of a specific type or quality which have a distinct and separate market. It is however noted that Essex does not have any reserves for crushed rock and evidence[4] supporting the MLP Review confirms that the sand and gravel resources and reserves in the ground in Essex are not capable of being identified separately and unambiguously and therefore a separate landbank cannot be calculated for its sand and gravel deposits.

[3] The National Policy Planning Framework section 1
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005759/NPPF_July_2021.pdf

[4] A Re-examination of Building Sand Provision in Essex, 2019

2.1.5 Paragraph 183 of the NPPF states that planning policies and decisions should ensure that a site is suitable for its proposed use, taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation).

2.1.6 Where a site is affected by contamination or land stability issues, responsibility for securing safe development rests with the developer and/or landowner.

2.1.7 Flood risk is addressed in Section 14 of the NPPF.

2.1.8 Paragraph 153 states that “Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply and changes to biodiversity and landscape, and the risk of overheating from rising temperatures. Policies should support appropriate measures to ensure the future resilience of communities and infrastructure to climate change impacts, such as providing space for physical protection measures, or making provision for the possible future relocation of vulnerable development and infrastructure.”

2.1.9 Paragraph 154 states that “New development should be planned for in ways that:
Avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and
can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government’s policy for national technical standards”

2.1.10 Paragraph 159 states that “Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.”

2.1.11 Paragraph 160 says that “Strategic policies should be informed by a strategic flood risk assessment and should manage flood risk from all sources. They should consider cumulative impacts in, or affecting, local areas susceptible to flooding, and take account of advice from the Environment Agency and other relevant flood risk management authorities, such as lead local flood authorities and internal drainage boards.”

2.1.12 The National Planning Policy Framework also stipulates that all plans should apply sequential testing to the location of development outlined in sub paragraphs 161, 162, 163, 164, 165, and 166 of the NPPF document. Paragraphs 161 and 162 state:
“161. All plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:

a. applying the sequential test and then, if necessary, the exception test as set out below;
b. safeguarding land from development that is required, or likely to be required, for current or future flood management;
c. using opportunities provided by new development and improvements in green and other infrastructure to reduce the causes and impacts of flooding, (making as much use as possible of natural flood management techniques as part of an integrated approach to flood risk management);
d. d) where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to relocate development, including housing, to more sustainable locations.”

“162. The aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. This strategic flood risk assessment can provide the basis for applying this test. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.”

2.1.13 The NPPF gives vulnerability classifications for different types of development. Minerals working and processing sites are classified as ‘Less Vulnerable’ with sand and gravel working classified as ‘Water-Compatible Development’. Neither classification requires the completion of an exception test.

2.1.14 Paragraph 167 of the NPPF states that “when determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;
b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;
c) it incorporates Sustainable Drainage Systems (SuDS), unless there is clear evidence that this would be inappropriate;
d) any residual risk can be safely managed; and
e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

2.1.15 An appropriate time for a site specific flood risk assessment is noted as being for “all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.”

2.1.16 Further to this, paragraph 169 explains that “major developments should incorporate SuDS unless there is clear evidence that this would be inappropriate. The systems used should:

a) take account of advice from the lead local flood authority;

b) have appropriate proposed minimum operational standards;

c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and

d) where possible, provide multifunctional benefits.”

2.1.17 As well as mitigating against flood risk, the NPPF goes further to say in paragraph 174 (d, e, f) that “planning policies and decisions should contribute to and enhance the natural and local environment by:

d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, considering relevant information such as river basin management plans; and

f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.”

2.1.18 These classifications should be used to inform decision making surrounding flood risk during a planning application. Despite their lower risk classifications, the assessment of flood risks is still required to be undertaken for minerals sites.

2.1.19 The National Planning Policy Framework (NPPF) and its supporting Technical Guidance (CLG March 2012) were originally published in March 2012 with the last update released in 2021. All Minerals Planning Guidance Notes and Policy Statements were revoked and have been replaced by the NPPF, supplemented by Planning Practice Guidance. In addition, the National Planning Policy for Waste (NPPW 2014) should be read in conjunction with the NPPF.

2.2 National Flood and Coastal Erosion Risk Management Strategy (NFCERMS) 2022[5]

2.2.1 The Flood and Water Management Act 2010 places a statutory duty on the Environment Agency to develop a National Flood and Coastal Erosion Risk Management Strategy for England. This strategy describes what needs to be done by all risk management authorities (RMAs) involved in flood and coastal erosion risk management for the benefit of people and places. This includes:

- The Environment Agency
- Lead local flood authorities
- District councils
- Internal drainage boards
- Highways authorities
- Water and sewerage companies

2.2.2 They must exercise their flood and coastal erosion risk management (FCERM) activities, including plans and strategies, consistently with the strategy. Through its 'strategic overview' role the Environment Agency exercises its strategic leadership for all sources of flooding and coastal change. This strategy seeks to better manage the risks and consequences of flooding from:

- Rivers
- The sea
- Groundwater
- Reservoirs
- Ordinary watercourses
- Surface water
- Sewers
- Coastal erosion

2.2.3 This strategy's long-term vision is for: a nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100.

[5] National Flood and Coastal Erosion Risk Management Strategy for England https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-management-strategy-for-england--2

2.2.4 It has 3 long-term ambitions, underpinned by evidence about future risk and investment needs. They are:

1. Climate resilient places: working with partners to bolster resilience to flooding and coastal change across the nation, both now and in the face of climate change
2. Today's growth and infrastructure resilient in tomorrow's climate: making the right investment and planning decisions to secure sustainable growth and environmental improvements, as well as infrastructure resilient to flooding and coastal change
3. A nation ready to respond and adapt to flooding and coastal change: ensuring local people understand their risk to flooding and coastal change, and know their responsibilities and how to take action

2.2.5 This strategy seeks to build a nation of people who:

- Understand their risk to flooding and coastal change
- Know their responsibilities and how to take action

2.2.6 Consequently, the EA should be consulted in relation to any proposal to allocate these potential sites through the MLP Review as well as at any future planning application stage to ensure site operation and restoration align with local FRM activities

2.3 Climate Change Allowances[6]

2.3.1 The NPPF (2021) requires climate change allowances to be included as part of any flood risk assessment to ensure future development is both resilient and sustainable[7].

2.3.2 Climate change allowances are predictions of anticipated change for:

- peak river flow
- peak rainfall intensity
- sea level rise

[6] Climate Change Allowances https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

[7] National Planning Policy Framework (July 2021) Section 14

Surface Water Climate Change Allowances

2.3.3 Surface water climate change allowances apply to peak rainfall intensity and the subsequent surface water flooding that the storms cause.

2.3.4 For new developments, the Peak Rainfall Allowances map[8] should be used and shows anticipated changes in peak rainfall intensity.

2.3.5 The Environment Agency states that peak rainfall allowances should be used for site-scale applications (for example, drainage design), and for surface water flood mapping in small catchments (less than 5 square kilometres) and urbanised drainage catchments. From here the development lifetime guidance should be used to work out the lifetime of your development.

2.3.6 For development with a lifetime beyond 2100 (all residential), flood risk assessments and strategic flood risk assessments should assess the upper end allowances. This must be done for both the 1% and 3.3% annual exceedance probability events for the 2070s epoch (2061 to 2125). Any development should be designed so that for the upper end allowance in the 1% annual exceedance probability event:

- there is no increase in flood risk elsewhere
- your development will be safe from surface water flooding

2.3.7 For development with a lifetime between 2061 and 2100, the same approach should be taken but the central allowance should be used for the 2070s epoch (2061 to 2125).

2.3.8 For development with a lifetime up to 2060, the same approach should be taken but the central allowance should be used for the 2050s epoch (2022 to 2060).

2.3.9 Therefore when submitting planning applications for minerals extraction sites, the aforementioned surface water climate change allowances should be used. Contact the lead local flood authority if you are unsure which allowance to use when producing the necessary planning applications.

Fluvial Climate Change Allowances

2.3.10 Peak river flow allowances show the anticipated changes to peak flow by management catchment. Management catchments are sub-catchments of river basin districts.

2.3.11 When submitting a planning application for a minerals extraction site, for the associated flood risk assessments and strategic flood risk assessments, the Environment Agency, as a statutory consultee, will assess using the management catchment climate change allowances from the peak river flow map as benchmarks[9]. For Essex, this can be seen in Tables 2.1, 2.2, and 2.3

2.3.12 Planning applications for mineral extraction sites therefore should assess both the central and higher central allowances for strategic flood risk assessments.

2.3.13 For planning applications in Flood Zones 2 or 3a:

- essential infrastructure – the higher central allowance should be used
- highly vulnerable – the central allowance (development should not be permitted in flood zone 3a) should be used
- more vulnerable – the central allowance should be used
- less vulnerable – the central allowance should be used
- water compatible –the central allowance should be used

2.3.14 In flood zone 3b for:

- essential infrastructure – the higher central allowance should be used
- highly vulnerable – development should not be permitted
- more vulnerable – development should not be permitted
- less vulnerable – development should not be permitted
- water compatible – the central allowance should be used

2.3.15 The flood risk vulnerability classification[10] dependents on the type of development being implemented. Minerals working and processing (except for sand and gravel working) is considered less vulnerable and sand and gravel working is considered water compatible. However when restoring the land post extraction, the intended future use can affect the classification further and thus which allowance to use.

[8] Peak rainfall allowances map https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall

[9] Climate change allowances for peak river flow in England https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow

[10] https://www.gov.uk/guidance/national-planning-policy-framework/annex-3-flood-risk-vulnerability-classification Flood Risk Vulnerability Classifications.

2.3.16 Where the strategic flood risk assessment shows an increased risk of flooding in the future, planning applications for mineral extraction sites should also apply the peak river flow allowances to developments and allocations. This includes locations that are currently in flood zone 1 but might be in flood zone 2 or 3 in the future.

2.3.17 When working on existing floodplains, floodplain storage compensation should be assessed. The appropriate allowance to assess off-site impacts and calculate floodplain storage compensation depends on land uses in affected areas. Use the:

- central allowance for most cases
- higher central allowance when the affected area contains essential infrastructure

2.3.18 Contact the Environment Agency if you are unsure which allowance to use for flood storage compensation when putting together a planning application.

Combined Essex Management Catchment peak river flow allowances			
Epoch	Central	Higher	Upper
2020s	7%	13%	27%
2050s	8%	16%	37%
2080s	25%	38%	72%

Table 2.1: Combined Essex Management Catchment peak river flow allowances

South Essex Management Catchment peak river flow allowances			
Epoch	Central	Higher	Upper
2020s	6%	11%	22%
2050s	5%	11%	27%
2080s	17%	26%	48%

Table 2.2: South Essex Management Catchment peak river flow allowances

Roding, Beam, and Ingrebourne Management Catchment peak river flow allowances			
Epoch	Central	Higher	Upper
2020s	15%	20%	31%
2050s	14%	21%	38%
2080s	26%	36%	64%

Table 2.3: Roding, Beam, and Ingrebourne Management Catchment peak river flow allowances

2.4 Flood and Water Management Act (2010)

2.4.1 The Pitt Review (2008)[11] investigated the severe flooding across England and Wales in the summer of 2007 and identified a number of measures and changes to the way organisations in the UK adapt and react to increasing risks of flooding. The Flood and Water Management Act of 2010[12] (the Act) enacts the recommendations of the Pitt Review.

2.4.2 The Act designated County Councils and Unitary Authorities as Lead Local Flood Authorities (LLFAs). As LLFA for Essex, ECC has responsibility to lead and co-ordinate local flood risk management; defined as the risk of flooding from surface water, groundwater, and ordinary watercourses.

2.4.3 Section 9 of the Act requires LLFAs to produce a Local Flood Risk Management Strategy (LFRMS) to set out a county-wide approach to the management of local flood risk. Further information on this can be found in Section 2.9.

[11] The Pitt Review (June 2008); http://webarchive.nationalarchives.gov.uk/20100807034701/http:/archive.cabinetoffice.gov.uk/pittreview/thepittreview/final_report.html

[12] The Flood and Water Management Act (2010); http://www.legislation.gov.uk/ukpga/2010/29/contents

2.4.4 Schedule 3 of The Flood and Water Management Act proposed the establishment of Sustainable Drainage Systems (SuDS) Approval Boards (SABs) within LLFAs to assess SuDS within planning applications and manage adoption and maintenance. Following further consultation this schedule was not enacted and the implementation and delivery of SuDS must be achieved through the planning process.

2.4.5 In April 2015 LLFAs became statutory consultees on surface water drainage and SuDS for all major planning applications. ECC has produced a SuDS Design Guide[13] to demonstrate how new developments can accommodate SuDS and the standards expected of them so they are suitable for approval in the county of Essex. It also provides advice on maintenance. See section 2.5 for more information.

2.4.6 The Act also changed and formalised the activities of other flood risk management authorities. The responsibility to lead and co-ordinate the management of flooding from Main Rivers and the sea remains with the Environment Agency.

2.4.7 Section 7 of the Act required the EA to produce a National Flood and Coastal Erosion Risk Management Strategy (NFCERMS) outlining a wide-scale approach to the understanding of flood risks and how resilience can be better built through joint working and community engagement.

2.5 Essex SuDS Design Guide (updated 2020)

2.5.1 In April 2015, as the Lead Local Flood Authority for Essex, Essex County Council (ECC) became a statutory consultee for surface water drainage on all major developments of which the mineral sites are classified.

2.5.2 Sustainable Drainage Systems (SuDS) are a range of site-specific measures that mimic natural processes. They aim to manage rainwater run-off from site to reduce the quantity and improve the quality of water entering the downstream surface water networks. Whilst providing this function they can also deliver a multitude of further benefits, especially around enhancing biodiversity and amenity.

[13] Essex County Council SuDS Design Guide (April 2016); https://www.essex.gov.uk/Environment%20Planning/Environment/local-environment/flooding/View-It/Documents/suds_design_guide.pdf

2.5.3 To aid the incorporation of well designed, beneficial SuDS into developments and to ensure developments meet the requirements of the NPPF, the Essex SuDS Design Guide (ESDG)[14] was created. This guide provides comprehensive information on the planning, design, and delivery of attractive and high-quality schemes that offer multiple benefits to the environment and communities. The philosophy and concepts contained within the ESDG is based upon those within the CIRIA Manual C753[15]. The guide seeks to complement the CIRIA Manual, and both should be used when designing SuDS for any development.

2.5.4 The ESDG provides detailed information on the standards and delivery of SuDS required in Essex and it will form the basis for all responses to applications ECC are consulted on. It is strongly recommended that the guide be used at the earliest opportunity to avoid unnecessary delays to planning applications, ultimately saving time and money for developers and the LPA.

2.5.5 The ESDG highlights that the following drainage hierarchy should be followed for all developments including mineral sites during their operational stages and restoration stages:

a) Rainwater re-use (rainwater harvesting/greywater recycling)
b) An adequate soakaway or other infiltration system
c) Hybrid solution of infiltration and discharging to a surface water body
d) To a surface water body (e.g. an ordinary watercourse)
e) To a surface water sewer, highway drain, or other drainage system
f) To a combined sewer

2.5.6 Therefore, first and foremost, rainwater reuse should be considered, if this is not viable or is to be used partially then a detailed site investigation should be undertaken to determine the suitability of discharging to ground via infiltration. This should be based on detailed infiltration testing and ground water monitoring in line with BRE365[16] and the methods outlined in the CIRIA Manual C753[17].

[14] Essex SuDS Design Guide (2020): https://www.essexdesignguide.co.uk/suds
[15] The CIRIA SuDS Manual C753 https://www.ciria.org/ItemDetail?iProductCode=C753&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91
[16] BRE365 (soakaway design) https://www.ecomerchant.co.uk/pub/media/productattachments/files/productattachments_files_b_r_bre_digest_365.pdf
[17] The CIRIA SuDS Manual C753 Chapter 25 https://www.ciria.org/ItemDetail?iProductCode=C753&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91

2.5.7 For all cases where infiltration is not possible, the ESDG specifies that all sites should limit discharge rates to the 100% AEP (1 in 1 year) greenfield runoff rate for all storm events up to and including the 1% AEP (1 in 100 year) (plus climate change) storm event. Alternatively, matched discharge rates can be used allowing discharge rates for particular storm events to match their associated greenfield runoff rate.

2.5.8 For all sites, the ESDG asks that above ground green features are considered before proprietary devices. This is because they provide a large range of benefits such as enhancing biodiversity, amenity, surface water treatment, sustainability, and climate change mitigation.

2.5.9 One benefit which above ground green features can be very proficient at is the provision of interception storage. As stated in the ESDG, interception storage should be provided for the first 5mm of rainfall as much as possible in order to closely mimic greenfield scenarios. Interception and evaporation can account for 15-50% of yearly precipitation. Interception should be utilised to closely reflect the greenfield runoff behaviour, and to decrease the risk of pollution downstream further.

2.5.10 The ESDG also states that when providing storage not only does it need to be able to provide storage for all storm events up to and including the 1% AEP plus climate change storm event (plus a 10% urban creep allowance if it is residential) but it also needs the ability to cater for consecutive events. It should be shown that all storage features can half drain within 24 hours of a 3.33% AEP plus climate change storm event. Alternatively, it should be shown that all storage features have the capacity to store a 10% AEP storm event, 24 hours after a 3.33% AEP plus climate change storm event.

2.5.11 Another important feature in which the LLFA look for and in which the ESDG talks about, is the need for surface water treatment. It states that all surface water should be treated before leaving the site (and ideally before storage, in order to maintain capacities) in line with the Simple Index Approach found within the CIRIA Manual C753[18]. If proprietary devices are proposed, then their mitigation indices should be provided along with detailed information about the device. This can be provided from the manufacturer.

[18] The CIRIA SuDS Manual C753 Chapter 26
https://www.ciria.org/ItemDetail?iProductCode=C753&Category=BOOK&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91

2.5.12 During the planning stages of any mineral development it will have to be demonstrated that the proposals are adhering to the ESDG and not increasing surface water discharge rates, surface water flood risk, as well as managing the risk via green infrastructure as much as possible. This is similarly true for the restoration stage of minerals development whereby when restored, the runoff rates should be similar to what the rates were prior to the minerals site. Where possible, and where needed, the restoration stage will also provide fantastic opportunities to consider ways to decrease wider surface water flood risk to the local area.

2.6 Essex Green Infrastructure Strategy (2020)

2.6.1 The Essex Green Infrastructure Strategy[19], steered by the Essex Green Infrastructure Partnership, describes the need for change in Essex and sets out a vision and objectives for the delivery of green infrastructure. This strategy provides a clear plan to guide the future planning and delivery of green infrastructure in Essex considering increased development and population growth.

2.6.1.1 The Green Infrastructure Strategy[20] has the following vision:

> *"We will protect, develop and enhance a high quality connected green infrastructure network that extends from our city and town centres, and urban areas to the countryside and coast and which is self-sustaining and is designed for people and wildlife."*

2.6.2 The Green Infrastructure Strategy aims to deliver its vision through the seven objectives below[21]:

- Protect existing green infrastructure, especially designed sites
- Improve existing infrastructure so it is better functioning for people and wildlife
- Create more high-quality multi-functional green infrastructure especially in areas of deficiency
- Improve the connectivity of green infrastructure for people and wildlife
- Increase use and inclusivity of green infrastructure across all user groups, social groups, and abilities
- Provide green infrastructure facilities to promote health and wellbeing

[19] The Essex Green Infrastructure Strategy 2020 https://www.placeservices.co.uk/resources/built-environment/essex-gi-strategy/
[20] The Essex Green Infrastructure Strategy 2020 Section 3.1 https://www.placeservices.co.uk/resources/built-environment/essex-gi-strategy/
[21] The Essex Green Infrastructure Strategy 2020 Section 3.2 https://www.placeservices.co.uk/resources/built-environment/essex-gi-strategy/

- Working with partners to build and secure funding, effective governance, and stewardship for new and existing green infrastructure to ensure their long-term sustainability.

2.6.3 If considered at an early stage, the viability of using green infrastructure is increased and the easier it is to benefit from its inclusion. For example:

- Green infrastructure can make construction easier and more cost effective whilst additionally providing higher returns on properties.
- Green infrastructure can be multifunctional such as flood attenuation through SuDS, biodiversity enhancement, aesthetic and amenity value, public open spaces, etc.
- Green infrastructure can be cheaper than installing conventional grey infrastructure structures such as pipes and tanks for flood management

2.6.4 Section 8.1.1[22] of the Green Infrastructure Strategy states that green infrastructure can be incorporated on any scale and should be integral to planning the layout and design of new developments from the outset. In respect to mineral development, green infrastructure can play a vital part in the sites restoration post extraction works and can result in multiple opportunities for necessary betterment. For example local/regional flood risk can be alleviated through design, similarly (and at the same time) biodiversity and ecology can be enhanced.

2.6.5 It is a common perception that the requirements for development sites (inclusive of the restoration of mineral sites) to protect and enhance biodiversity, protect local landscapes, provide for informal recreation, and facilitate sustainable drainage, are all separate issues and therefore all incur additional costs. This is incorrect by combining these aspects together and using a multi-functional approach, such as through the delivery of SuDS, costs can be reduced whilst at the same time delivering a high-quality end product.

[22] Essex Green Infrastructure Strategy (2020) Section 8.1 https://www.placeservices.co.uk/resources/built-environment/essex-gi-strategy/

2.7 Essex Green Infrastructure Standards

2.7.1 The Essex Green Infrastructure Standards are guidance which provides support to professionals in the built environment, highways, health, and environment to deliver better Green Infrastructure (GI). Essex's Nine GI standards have been developed to support policy and development management in the planning and delivery of multifunctional GI for placemaking and placekeeping. These standards are written as a form of assessment criteria to enable policy and development management to go beyond the statutory requirements, to create great places for people and wildlife to thrive. The standards will help with policy and strategy writing, master-planning, design, and implementations of developments. They can be applied to GI projects and to the management and maintenance of GI.

2.7.2 This document brings together existing guidance, examples of good practices and information on how to meet the GI Standards. That will be laid out in the Essex Design Guide[23].

2.7.3 It is the intention of the Essex GI Standards Framework to embed GI within new developments (including mineral sites, although mainly the restoration stage), retrofitting into our towns, cities, and villages and for GI to become an integral part of the day-to-day considerations and decision making in other key sectors and services to ensure that future planning, design, management, and maintenance is coherent, structured, and focused. Mineral development, specifically during the restoration stage can help enhance GI within the local towns, and villages by providing greater GI connection, Biodiversity Net Gain, sites of nature recovery.

2.7.4 ECC's Green Infrastructure team will apply the Essex GI Principles and Standards to consultations. These standards can be applied to major developments as outlined in the National Planning Policy Framework (NPPF). Conclusions drawn will inform the responses to planning policy and application consultations.

2.7.5 This approach to green infrastructure design, planning and delivery will be promoted where possible and will be the foundation of comments. It is recommended that the principles and standards are applied as early as possible at the design and feasibility stage of policy development and for strategic documents/plans, developments, or projects.

2.7.6 Table 2.4 defines the 9 GI principles which are the core components needed for delivering better placemaking and place-keeping.

2.7.7 In relation to this report, Principles and Standards 3, 4, 7, and 9 are especially important. This is because, as previously mentioned, SuDS can be extremely effective and cost-efficient ways to manage surface water flood risk and are extremely strong at providing multifunctional features on site in terms of flood risk, biodiversity, and amenity. They therefore are fantastic examples of multifunctional GI features. This however is dependent on good, early planning as well as a robust maintenance plan. It is recommended that early engagement with relevant stakeholders and planning bodies are held. During the restoration stages, mineral sites can consider using SuDS to help reduce surface water flood risk to surrounding areas and nearby towns, villages, and cities.

2.7.8 Creating GI connectivity through mineral site restoration will help to reconnect existing and fragmented nature areas; for instance, through green corridors, through an integrated suds network, and/or green bridges, as well as improving the general ecological quality of the wider environment. It is therefore highly recommended that where possible all mineral sites look to have connected and interrelating GI and where possible SuDS, during the restoration stage.

GI Principles		GI Standards
1.	Mainstreaming and Integration	The Placemaking and Place-keeping policies in Local Plans recognise GI as a key delivery mechanism. GI functions and associated benefits are recognised and valued in key strategic documents and policies, beyond those with an environmental scope.
2.	Evidence-led	The planning, design and delivery of GI is evidence-led using natural capital and ecosystem service assessments, and GI GIS mapping to ensure appropriate place-based GI interventions are being implemented and enhanced.
3.	Multifunctionality	GI interventions are designed, planned, and delivered to enhance multifunctionality and deliver multiple benefits to people and biodiversity in both rural and urban areas.

[23] Essex Design Guide https://www.essexdesignguide.co.uk/

GI Principles		GI Standards
4.	Early Engagement	There is early collaboration and engagement with all relevant stakeholders, partners, and communities to support the delivery of effective and connected GI.
5.	Managing different expectations	Differing views need to be identified early and managed effectively and in a transparent manner to secure both short- and long-term outcomes.
6.	Heath, Wellbeing and Social Equity	GI Is designed to meet different people's needs (including physical and mental health), providing accessibility to GI, green spaces, and local amenities, while ensuring GI is inclusive to all. This includes: • Targeting GI interventions to those groups and areas most in need as part of a place-keeping agenda. • Reducing health and wellbeing inequalities between different populations e.g. access to green space and ecosystem service benefits.
7.	Connectivity	GI interventions are designed, planned, and delivered and connected across multiple scales; from the wider landscape scale network to more local and neighbourhood scales including green corridors habitat and nature recovery networks to enhance connectivity for people, wildlife, and habitats.
8.	Strong policy wording and commitment	Policy for GI is strongly worded with a commitment to positive action(s) as reflected in statutory plans and industry/local guidance and supported by incentives and clear guidance about what success looks like.
9.	Stewardship	The long-term management and stewardship plans are identified at the early stage with the necessary funding and monitoring components in place.

Table 2.4: The GI Principles and the corresponding GI Standards for Essex

2.8 Environment Act (2021)[24]

2.8.1 The Environment Bill was passed in November 2021, thereby becoming the Environment Act. This legislation establishes the UK's new framework of environmental protection after leaving the European Union. The main aims are to improve air and water quality, reduce waste and increase resource efficiency, and protect and enhance nature and biodiversity. A key part of delivering the aims will be through setting targets for those priorities; The Act commits to halt the decline in wildlife populations through a legally binding target for species abundance by 2030. The outcome of a consultation on targets by DEFRA in December 2022 confirmed a long-term target to 'ensure that species abundance in 2042 is greater than in 2022, and at least 10% greater than 2030.' The Act also introduces mandatory requirements for local authorities and development such as Local Nature Recovery Strategies (LNRS), and Biodiversity Net Gain (BNG).

2.8.2 Natural England state that "BNG is an approach to development, land and marine management that leaves biodiversity in a measurably better state than before the development took place. BNG is additional to existing habitat and species protections. Intended to reinforce the mitigation hierarchy, BNG aims to create new habitats as well as enhance existing habitats, ensuring the ecological connectivity they provide for wildlife is retained and improved."

2.8.3 Developments often results in impact on, and losses of, nature (net loss). BNG requires developers to deliver for nature, setting a minimum requirement to increase biodiversity by 10% compared to the baseline (net gain) (Local legislation may ask for greater than 10% improvement however this is the minimum national standard.). The idea behind BNG is that the environment does not suffer as a result of development, and that there will be more higher-quality places for wildlife to thrive and for people to enjoy.

2.8.4 At the time of writing, we are in the two-year transition period for mandatory BNG. Under the Environment Act 2021 the requirement for 10% BNG will become mandatory for the majority of Town and Country Planning Act developments in November 2023. Given how long it can take for planning proposals to progress from the design stage to a planning application, it is considered that proposals should now be taking the provisions of the Environment Act into account and proposing 10% BNG at a minimum.

2.8.5 There are also LNRS, outlined in the Environment Act 2021, which are mandatory requirements and are a new system of spatial strategies for nature, which will cover the whole of England, forming a nature recovery network.

2.8.6 The county-wide LNRS for Essex will help inform how and where BNG should be delivered, e.g., which habitats are appropriate in what locations and will help to identity large-scale 'recovery sites' for offsetting large amounts of biodiversity units.

2.8.7 LNRS's can be used to target offsite BNG so that it contributes to the wider nature recovery network LNRS will be a strategy for all, co-designed by a wide range of partners in Essex. The LNRS will reflect local priorities.

2.9 Essex Local Flood Risk Management Strategy (2018)

2.9.1 The Local Flood Risk Management Strategy (LFRMS)[25] sets out a county-wide approach to the management of local flood risk, defined as the risk of flooding from surface water, groundwater, and ordinary watercourses.

2.9.2 An outcome of the LFRMS is the production of Surface Water Management Plans (SWMPs) which investigate local flood risk on smaller scales. This allows flooding processes to be better understood, highlighting potential mitigation measures and opportunities for joint working with partner Risk Management Authorities (RMAs).

2.9.3 SWMPs identify Critical Drainage Areas (CDAs), which are sub-catchments within the wider SWMP study area at higher risk of surface water flooding. In Essex these are prioritised county-wide based on a range of factors to determine which are taken forward for further analysis and the potential provision of a flood alleviation scheme.

2.9.4 In Essex 12 SWMPs have been completed and a review was undertaken in 2019 to update and standardise all underlying hydraulic modelling. A SWMP covering South Essex was completed in 2012 and updated in 2018. Further information on the sites which either fall within Surface Water Management Plans or Critical Drainage Areas can be seen within Appendix C. Similarly Appendix D shows the locations of the CDAs in Essex.

[24] The Environment Act https://www.legislation.gov.uk/ukpga/2021/30/contents/enacted
[25] Essex County Council Local Flood Risk Management Strategy (2018): https://flood.essex.gov.uk/our-strategies-and-responsibilities/our-local-flood-risk-management-strategy/

2.10 Essex and South Suffolk Shoreline Management Plan 2 (2010)[26]

2.10.1 The Essex and South Suffolk SMP is a high-level strategic document which aims to identify the best ways to manage flood and erosion risk to people and to the developed, historic, and natural environment. It also identifies opportunities where shoreline management can work with others to make improvements.

2.10.2 The outcomes of the SMP are to develop an 'intent of management' for the shoreline that achieves the best possible and achievable balance of all the values and features around the shoreline for the coming 100 years.

2.10.3 The SMP divides the coastal plans into management units which are subcategorised into 4 policy labels:

- **Hold the line (HtL);** Maintaining the defences in their current physical position. No detail is given on the specific standard of protection.
- **Advance the line (AtL);** Building new defences seawards of the existing defence line.
- **Managed realignment (MR);** Allowing or enabling the shoreline to move, with associated management to control or limit the effect on land use and environment. This can take various forms, all characterised by managing change, either technically, for land use or for the environment. This is divided into 2 measures as detailed below.
- **No active intervention (Nal);** No further investment in coastal defences or operations

2.10.4 Further subdivisions of managed retreat exist, and indications are given as to whether the standard of protection should be improved:

- **HtL+, AtL+, MR+;** Maintain or upgrade the standard of protection, including taking into account the impacts of climate change.

[26] Essex and South Suffolk Shoreline Management Plan 2 http://www.eacg.org.uk/docs/smp8/essex&southsuffolk%20smp%20final%202.4.pdf

- **MR1;** Allow local and limited intervention to limit the risks of erosion as long as negative impacts are minimised. This may involve small scale works. And
- **MR2;** Breach of the frontline defence after building any necessary new landward defence line and counter walls to limit flooding to adjacent areas.

2.10.5 Three of the sites are in reasonable proximity to the areas covered by Shoreline Management Plans. These sites and the potential impacts are highlighted in Appendix B.

2.11 Flood Risk Management Plans (FRMPs) (2021-27)[27]

2.11.1 Flood Risk Management Plans identify the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs and are a requirement of the Flood Risk Regulations 2009. They set out how Risk Management Authorities (RMAs) will manage flood and coastal erosion risks and should be used in conjunction with River Basin Management Plans (Section 2.12).

2.11.2 On 12 December 2022 the Environment Agency published updated flood risk management plans (FRMPs)[28] for England to cover the period from 2021 - 2027.

2.11.3 As a result of this update, 18 nationally consistent objectives have been written. In setting the objectives RMAs had regard to the flood risk regulations' aims. These are to:

- reduce the adverse consequences of flooding for human health, economic activity, and the environment
- reduce the likelihood of flooding

2.11.4 Climate change was also taken into account when developing these objectives.

[27] Flood Risk Management Plans https://www.gov.uk/guidance/flood-risk-management-plans-frmps-responsibilities#flood-risk-management-plans-frmps-and-flood-risk-areas-fras

[28] https://www.gov.uk/government/collections/flood-risk-management-plans-2021-to-2027 Flood Risk Management Plans 2021-2027

2.11.5 The full list of this objectives can be found here.

2.11.6 FRMPs align with the Environment Agency River Basin Districts (RBD) and as such Essex is covered by the Anglian and Thames Flood Risk Management Plans.

2.11.7 Each River Basin District is divided into sub-areas. Essex constitutes the Combined Essex area within the Anglian FRMP[29] and parts of the South Essex, Upper Lee and the Roding, Beam and Ingrebourne sub-areas within the Thames FRMP[30].

2.11.8 FRMPs also define Flood Risk Areas (FRA), which are wider areas where there are flood risks to significant numbers of people, based on both modelling and historic events. Within Essex there are 6 Food Risk Areas; Canvey Island Surface Water FRA (Thames FRMP)[31], Chelmsford Surface Water FRA (Anglian FRMP)[32], Colchester Surface Water FRA (Anglian FRMP)[33], Harlow Surface Water FRA (Thames FRMP)[34], Saffron Walden Rivers and Sea FRA (Anglian FRMP)[35], and the South Essex Surface Water FRA (Anglian FRMP)[36].

2.11.9 The Canvey Island FRA sits within Castle Point District Council in the administrative area of Essex County Council (ECC). In the Canvey Island FRA, some 10,082 of the 39,401 people live in areas at risk of flooding from surface water, of these 5% are considered high risk.

2.11.10 The Chelmsford FRA covers an area of approximately 20km2, which includes the main urban area of the city. There is a wide range of public and private schools and higher and further education establishments in the area, including Anglia Ruskin University, Chelmsford College, and King Edwards Grammar School. In the Chelmsford FRA, 12,134 of the 85,249 people live in areas at risk of flooding from surface water. Of these people, 8% live in areas considered to be at high risk.

2.11.11 The Colchester FRA covers an area of approximately 16km2. It includes the main town centre and parts of north, south and east Colchester urban area, Colchester acts as a regional centre and is the key focus for a wide range of development opportunities and challenges. The transport network in North Colchester is characterised by access to 2 strategic routes; the A12 via junction 28 and 29, and the A120. In the Colchester FRA, 5,728 of the 59,030 people live in areas at risk of flooding from surface water. Of these people, 10% live in areas considered to be at high risk.

2.11.12 The Harlow Surface Water (SW) Flood Risk Area (FRA) is in the Southeast of England and to the north-east of the Thames River Basin District (RBD). It falls across the Thames and Anglian RBDs and can therefore be found in both plans. It has been identified as an FRA because the risk of flooding from surface water is significant nationally for people, the economy, or the environment (including cultural heritage). In the Harlow FRA it is estimated that 11,045 (12.7%) live at risk of flooding from surface water.

2.11.13 The Saffron Walden FRA covers the Slade River network, a main river, which flows through Saffron Walden town centre and along the outskirts of the town. The FRA includes residential, business and amenity areas which are surrounded by the urban area of Saffron Walden. The FRA is focused on the area close to the main river and does not include the wider urban area of Saffron Walden. The reason for this relates to the methodology used to identify the FRA boundaries. It is important to note, however, that measures included for the Saffron Walden FRA will apply to Saffron Walden as a whole.

[29] https://www.gov.uk/government/publications/anglian-river-basin-district-flood-risk-management-plan Anglian FRMP

[30] https://www.gov.uk/government/publications/thames-river-basin-district-flood-risk-management-plan Thames FRMP

[31] https://environment.data.gov.uk/flood-planning/explorer/cycle-2/flood-risk-area?uri=http%3A%2F%2Fenvironment.data.gov.uk%2Fflood-risk-planning%2Fso%2FFloodRiskArea%2FUK06A0004ENG Canvey Island Flood Risk Area

[32] https://environment.data.gov.uk/flood-planning/explorer/cycle-2/flood-risk-area?uri=http%3A%2F%2Fenvironment.data.gov.uk%2Fflood-risk-planning%2Fso%2FFloodRiskArea%2FUK05A0006ENG Chelmsford Flood Risk Area

[33] https://environment.data.gov.uk/flood-planning/explorer/cycle-2/flood-risk-area?uri=http%3A%2F%2Fenvironment.data.gov.uk%2Fflood-risk-planning%2Fso%2FFloodRiskArea%2FUK05A0007ENG Colchester Flood Risk Area

[34] https://environment.data.gov.uk/flood-planning/explorer/cycle-2/flood-risk-area?uri=http%3A%2F%2Fenvironment.data.gov.uk%2Fflood-risk-planning%2Fso%2FFloodRiskArea%2FUK06A0016ENG Harlow Flood Risk Area

[35] https://environment.data.gov.uk/flood-planning/explorer/cycle-2/flood-risk-area?uri=http%3A%2F%2Fenvironment.data.gov.uk%2Fflood-risk-planning%2Fso%2FFloodRiskArea%2FUK05A0025ENG Saffron Walden Flood Risk Area

[36] https://environment.data.gov.uk/flood-planning/explorer/cycle-2/flood-risk-area?uri=http%3A%2F%2Fenvironment.data.gov.uk%2Fflood-risk-planning%2Fso%2FFloodRiskArea%2FUK05A0027ENG South Essex Flood Risk Area

2.11.14 In the Saffron Walden FRA, 521 people live in areas at risk of flooding from rivers and the sea. Of these people, 55% live in areas considered to be at high risk.

2.11.15 The South Essex FRA covers an area of approximately 164km2, extending between Southend-on-Sea in the east, to Basildon in the west and north, encompassing the towns of Billericay and villages of Ashington and Hockley. The urban areas of Rayleigh, Benfleet, Hadleigh and Thundersley are also encompassed within the FRA. In the South Essex FRA, 88,176 of the 479,110 people live in areas at risk of flooding from surface water. Of these people, 18% live in areas considered to be at high risk.

2.11.16 None of the 52 sites within this report fall within the Flood Risk Areas. Any new minerals sites should be subjected to a new assessment to determine and incorporate any impacts of the FRMP and South Essex Flood Risk Area.

2.11.17 Within the administrative area of Essex, Essex County Council as Lead Local Flood Authority has prepared Surface Water Management Plans to further investigate flood risk and identify Critical Drainage Areas (CDAs). These CDAs have fed into a capital programme where flood alleviation schemes have been constructed to reduce flood risk.

2.11.18 It should be noted that for Essex, SWMPs contain more localised information and detail than FRMPs.

2.12 River Basin Management Plans (RBMP)[37]

2.12.1 A River Basin Management Plan (RBMP) provides a framework for protecting and enhancing the benefits provided by the water environment to ensure social, economic, and environmental needs are met and maintained into the future. They are a requirement of the Flood Risk Regulations 2009.

2.12.2 To achieve this RBMPs set out the following, and should be used to inform land use planning decisions due to their close links with the water environment;

- the current state of the water environment
- Pressures affecting the water environment
- Environmental objectives for protecting and improving the waters

[37] River Basin Management Plans https://www.gov.uk/government/collections/draft-river-basin-management-plans-2021

- A programme of measures and actions needed to achieve the objectives

2.12.3 The release of RBMPs operates over a six-year cycle with the current 2021 versions forming an update to the previous 2015 documents.

2.12.4 River Basin Management Plans align with the EA River Basin Districts (RBDs) with parts of Essex falling within the Anglian[38] and Thames[39] RBMPs.

2.12.5 RBDs are divided into sub-catchment areas to facilitate management, with Essex forming the Essex Combined area within the Anglian FRMP and parts of the South Essex, Upper Lee, and the Roding, Beam and Ingrebourne areas within the Thames FRMP.

2.12.6 The issues for water bodies within each RBD are divided into the following categories;

- **Physical Modifications:** Includes changes to the size and shapes of water bodies, the creation of flood defences, and changes to aid navigation.
- **Pollution form Wastewater:** Nitrates, phosphates, ammonia, bacteria, and other chemicals entering water bodies through leakages, storm overflows and where there is a lack of treatment technology.
- **Pollution from Towns, Cities and Transport:** Rainwater from roofs, roads and other hard areas containing pollutants also including mis-connected drainage.
- **Changes to the Natural Flow and Levels of Water**: Reduced water availability in rivers and groundwater so that there is not enough for people to use or for wildlife to survive. This includes changes due to human activities such as abstraction and reduced rainfall due to climate change.
- **Negative Effects of Invasive Non-Native Species**: The economic and social impacts of controlling invasive species to ensure flood defences and the natural environment are not compromised. This is likely to be exacerbated by climate change.
- **Pollution from Rural Areas:** Approaches to land management have increased the amounts of soil, sediment and nitrates from fertiliser being washed into water bodies causing eutrophication.

[38]Anglian River Basin District https://environment.data.gov.uk/catchment-planning/v/c3-draft-plan/RiverBasinDistrict/5

[39] Thames River Basin District https://environment.data.gov.uk/catchment-planning/v/c3-draft-plan/RiverBasinDistrict/6

2.12.7 Surface water bodies can be classed as high, good, moderate, poor, or bad status based on the criteria within the Water Framework Directive (WFD). The aim of all water bodies is to achieve at least good or potential status.

2.12.8 The current status, issues and objectives for waterbodies can be found and downloaded from the EA Catchment Data Explorer website[40]. Appendix E provides a short summary of how each River Basin Management Plan effects each site.

2.12.9 This should be considered when allocating a minerals extraction site and should also be considered when restoration works begin to ensure that any waterbodies are not negatively affected and so that mechanisms can be put in place to help achieve their objectives. Site operators are requested to contact the EA for further information.

2.13 Catchment Flood Management Plans (2009)[41]

2.13.1 A Catchment Flood Management Plan (CFMP) is a high-level strategic document produced by the Environment Agency to provide an overview of the main sources of flood risk and recommend measures to mitigate this over the subsequent 50 to 100 years.

2.13.2 CFMPs are used to inform local planning policy and support the implementation of Water Framework Directive objectives. Policies are outlined based on levels of flood risk and future management intentions.

2.13.3 Due to its location across multiple catchments the county of Essex falls within the North Essex, South Essex, and Thames Catchment Flood Management Plans.

2.13.4 CFMPs are divided into sub-areas based on their similar characteristics with Essex covering 30 of these smaller catchments. Each are assigned one of six policies detailing the preferred approach to managing flood risk. These are;

- Policy 1: Areas of little or no flood risk where the EA will continue to monitor and advise.
- Policy 2: Areas of low to moderate flood risk where RMAs can generally reduce existing flood risk management actions.

[40] EA Catchment Data Explorer website https://environment.data.gov.uk/catchment-planning/v/c3-draft-plan/RiverBasinDistrict/5

[41] Catchment Flood Management Plans https://www.gov.uk/government/collections/catchment-flood-management-plans

- Policy 3: Areas of low to moderate flood risk where RMAs are generally managing existing flood risk effectively.
- Policy 4: Areas of low, moderate, or high flood risk where RMAs are already managing the flood risk effectively but where we may need to take further actions to keep pace with climate change.
- Policy 5: Areas of moderate to high flood risk where RMAs can generally take further action to reduce flood risk.
- Policy 6: Areas of low to moderate flood risk where RMAs will take action with others to store water or manage run-off in locations that provide overall flood risk reduction or environmental benefits.

2.13.5 It should also be noted that whilst CFMPs haven't been formally repealed or replaced they have not been updated since their creation in 2009. As many newer regional documents and policies concerning flooding exist, the content and policies contained within CFMPs should not be considered by themselves. EA recommends any sites impacted by the CFMPs that they are contact by the applicant during the planning process.

2.14 Essex Climate Action Commission

2.14.1 The Essex Climate Action Commission was set up to advise Essex about tackling climate change.

2.14.2 The Essex Climate Action Commission will:

- identify ways to mitigate the effects of climate change, improve air quality, reduce waste across Essex and increase the amount of green infrastructure and biodiversity in the county
- explore how to attract investment in natural capital and low carbon growth

2.14.3 In July 2021 the Commission published its Net Zero: Making Essex Carbon Neutral report[42] which reiterates the risks to Essex of increasing extreme weather, rising sea levels, food shortages, and water scarcity. It outlines recommendations for how to improve the environment and the economy of Essex.

[42] Net Zero: Making Essex Carbon Neutral report https://assets.ctfassets.net/knkzaf64jx5x/1fzMJKNmIfz8WHx4mzdy2h/e7c57523466f347fd6cdccb3286c113c/Net-Zero-Report-Making-Essex-Carbon-Neutral.pdf

2.15 Essex Water Strategy

2.15.1 The ECC Essex Water Strategy work follows recommendations of the Essex Climate Action Commission.

2.15.2 The Essex Water Strategy project will look closely at the water scarcity challenges, along with what actions we need to take locally.

2.15.3 Nature-based solutions such as tree planting, wetlands, and sustainable drainage are part of the solution locally, so ECC are working closely with Local Nature Partnerships and other Green Infrastructure projects cross-cutting the ECC Climate Adaptation and Mitigation service.

2.15.4 The Essex Water Strategy team will be engaging with stakeholders from the water industry, planning, agriculture, and highways to develop a holistic view and action plan.

2.15.5 Therefore it is important to consider the Essex Water Strategy and the ability of future mineral sites (mainly during their restoration stage) to assist with future water scarcity issues as well as local flood risk issues.

2.15.6 A draft report should be released in September 2023 highlighting areas of water stress, areas of flood risk, as well as areas where other water authorities such as water companies are undertaking works or projects.

3 STUDY AREA

3.0.1 There are 52 locations to be considered for the MLP. These sites are widespread throughout Essex. Some are brand new sites, and some would be worked as extensions to existing MLP sites if they were allocated. The 52 sites can be seen in Table 3.1.

3.0.2 The 52 new sites are widely spread through Essex and span seven different district and boroughs. One sites' cross borders with two districts and boroughs, (Shellow Cross Farm (A60a and A60b) and one site spans three district and boroughs (A94 Land at Highfields Farm). The seven districts and borough covered are:

- Braintree District Council (15 sites) – including A94 Land at Highfields Farm which also falls within Colchester and Maldon
- Chelmsford City Council (8 sites, including Shellow Cross Farm (A60a and A60b))
- Colchester Borough Council (5 sites) - including A94 Land at Highfields Farm which also falls within Colchester and Maldon
- Epping Forest District Council (2 sites, including Shellow Cross Farm (A60a and A60b))
- Maldon District Council (7 sites) - including A94 Land at Highfields Farm which also falls within Colchester and Maldon
- Tendring District Council (13 sites)
- Uttlesford District Council (5 sites)[43]

3.0.3 None of the 52 sites which have been initially brought forward for this MLP are situated within Critical Drainage Areas (CDA).

[43] List totals 34 rather than 32 as two sites have been counted twice due to each being in two separate local authority areas

3.0.4 11 sites are found within a Surface Water Management Plan (SWMP) therefore early engagement would be recommended with the Lead Local Flood Authority (LLFA). Similarly 9 sites are in close proximity to a SWMP, so early engagement with the LLFA should be sought for any proposals. A list of these sites can be seen in Appendix C.

3.0.5 Of the 52 identified sites, 35 of them fall within the newly identified Climate Focus Area (CFA). The CFA is a demonstration area for best practice in sustainable land use management and spans 30% of Essex, covering the Blackwater and Colne River catchments. The Essex Climate Action Commission have created the CFA as they believe that by establishing a CFA, they can achieve change faster and trial and test new approaches that can act as pilots to roll out in other areas. They will collaborate with public authorities, charities, residents, landowners, and businesses to accelerate action and improve the natural and urban environments. The Climate Action Commission has the following targets for the CFA by 2030:

- All farmland to adopt sustainable land stewardship practices,
- 30 per cent of rural and urban land cover to be Natural Green Infrastructure,
- Native tree cover to increase by 30 per cent,
- Every parish to have a climate and biodiversity action plan.

3.0.6 Following a detailed review and assessment of the available hydraulic modelling for surface water, groundwater, and fluvial flooding 37 of the 52 sites have been identified as having a medium to high flood risk.

3.0.7 A more detailed analysis of the 37 areas has determined that there are deliverable flood risk mitigation options that should be explored to reduce flood risk going forward. This is discussed further in Section 5 and Appendices H and I.

3.0.8 There is also an emphasis on retaining the economic, environmental, and hydrological importance of the 52 sites if they are taking forward, especially when they approach the restoration stage. The sites may have the opportunity to help tackle key future needs such as flood risk, or drought risk, and also to protect the existing, sensitive environmental designations.

ID	Site Name	Address	District/Borough	CFA
A6	Bradwell Quarry, Rivenhall	Bradwell Quarry, Bradwell, Braintree CM77 8EP	Braintree	Y
A22	Little Bullocks Farm, Little Canfield	Stansted Courtyard, Hope End Green, Bishop's Stortford CM22 6TA	Uttlesford	N
A23	Little Bullocks Farm, Little Canfield	Stansted Courtyard, Hope End Green, Bishop's Stortford CM22 6TA	Uttlesford	N
A31	Maldon Road, Birch	Maldon Road, Birch	Colchester	Y
A47	Bradwell – Monks Farm	Bradwell Quarry, Bradwell, Braintree CM77 8EP	Braintree	Y
A48	Bradwell Quarry – Grange Farm	Bradwell Quarry, Bradwell, Braintree CM77 8EP	Braintree	Y
A49	Colemans Farm - Hill Broad Farm - full site	Colemans Farm Quarry, Little Braxted Lane, Witham CM8 3EX	Maldon	Y
A50	Colemans Farm - Eastern extension (Appleford Farm)	Colemans Farm Quarry, Little Braxted Lane, Witham CM8 3EX	Braintree	Y
A51	Colemans Farm - North extension (Hill Broad Farm)	Colemans Farm Quarry, Little Braxted Lane, Witham CM8 3EX	Maldon	Y
A52	Colemans Farm - Southern extension	Colemans Farm Quarry, Little Braxted Lane, Witham CM8 3EX	Braintree	Y
A54	Whiteheads - Witham	Whiteheads Field, Cressing Road, Witham	Braintree	Y
A55	Sheepcotes Southern	Land at Sheepcotes Farm, Sheepcotes Lane, Little Waltham CM3 3LU	Chelmsford	N
A56	Sheepcotes Western	Land at Sheepcotes Farm, Sheepcotes Lane, Little Waltham CM3 3LU	Chelmsford	N
A57	Chalk End - Roxwell	Roxwell, Chelmsford	Chelmsford	N
A58	Little Smiths - Danbury	Maldon Road, Danbury CM9 6RW	Chelmsford	N
A59	Lowleys Farm - Chelmsford	Goodmans Road, Chelmsford CM3 1PJ	Chelmsford	N
A60a	Shellow Cross Farm Chelmsford	Shellow Cross Farm, Shellow Road, Willingale, Ongar CM5 0SU	Chelmsford and Epping Forest	N

A60b	Shellow Cross Farm Chelmsford	Shellow Cross Farm, Shellow Road, Willingale, Ongar CM5 0SU	Chelmsford and Epping Forest	N
A61	Heckfordbridge - Site 1	Land to the west of Maldon Road Heckfordbridge, Colchester CO2 0LT	Colchester	Y
A62	Heckfordbridge - Site 2	Land to the west of Maldon Road Heckfordbridge, Colchester CO2 0LT	Colchester	Y
A63	Patch Park - Abridge	Patch Park Farm, Abridge	Epping Forest	N
A64	Land East of Asheldham Quarry	Land North of Hall Road, Asheldham, Southminster	Maldon	N
A65	Land South of Asheldham Quarry	Land North of Hall Road, Asheldham, Southminster	Maldon	N
A66	White House Farm - Woodham Walter	Woodham Walter, Maldon	Maldon	N
A67	Church Farm - Alresford (A16)	Church Farm, Alresford	Tendring	Y
A68	Crabtree Farm - Great Bentley	Land to the south of Colchester Road, Great Bentley CO7 8RTLand to the west of Maldon Road Heckfordbridge, Colchester CO2 0LT	Tendring	Y
A69	Frating Hall (A17)	Frating, Colchester	Tendring	Y
A71	Lodge Farm - Alresford (A19)	Lodge Farm, Alresford	Tendring	Y
A72	Martells - Southern extension	Land to the west of Slough Lane, Ardleigh	Tendring	Y
A73	Martells - Western extension	Land to the west of Slough Lane, Ardleigh	Tendring	Y
A74	Thorrington Hall Farm	Clacton Road, Thorrington, Colchester CO7 8JW	Tendring	Y
A75	Land at Orford, Ugley - Bollington Hall	Orford Land, B1383, Ugley CM22 6HP	Uttlesford	N
A76	Elsenham (A46)	Henham Road, Elsenham CM22 6DJ	Uttlesford	N
A77	West Extension to Highwood Quarry - Little Easton	Land to the west of: Highwood Quarry, Stortford Road, Great Dunmow	Uttlesford	N
A79	Crown Quarry - North of Wick Lane	Land North of Wick Lane, Wick Lane, Ardleigh, Colchester	Tendring	Y

A80	Crown Quarry - South of Wick Lane	Land North of Wick Lane, Wick Lane, Ardleigh, Colchester	Tendring	Y
A82	Colemans Farm - Elm Springs Extension	Colemans Farm Quarry, Little Braxted Lane, CM83EX	Maldon	Y
A83	Colemans Farm - Hole Farm	Hole Farm, Witham CM8 2DW	Braintree	Y
A84	Colemans Farm - Appleford Farm North Extension	Colemans Farm Quarry, Little Braxted Lane, CM83EX	Braintree	Y
A85	Martells - North of Frating Road (East)	Rockery Farm, Slough Lane, Ardleigh, Colchester	Tendring	Y
A86	Martells - North of Frating Road (West)	Rockery Farm, Slough Lane, Ardleigh, Colchester	Tendring	Y
A87	Martells - East of Slough Lane, Little Canfield	Slough Lane, Colchester	Tendring	Y
A88	Gurnhams Farm	Gurnhams Farm, Church Road, Little Bentley, Colchester CO78SA	Tendring	Y
A89	Covenbrook Hall Farm	Land to the east of King's Lane, Stisted	Braintree	Y
A90	Rayne Quarry - Northern Extension	Rayne Quarry, Broadfields Farm, Dunmow Road, Rayne CM776SA	Braintree	Y
A91	Land at Chignal St James	Land at the Chignal St James (east of Mashbury Road). Chelmsford CM1 4TZ	Chelmsford	Y
A92	Land at Pattiswick Hall Farm - Small Site	Doghouse Lane, Braintree CM7 8BQ	Braintree	Y
A93	Land at Pattiswick Hall Farm - Full Site	Doghouse Lane, Braintree CM7 8BQ	Braintree	Y
A94	Land at Highfields Farm	Highfield Farm, Highfield Lane, Kelvedon CO59B	Colchester (East) Braintree (Central) Maldon (West)	Y

A95	Land at Bellhouse Farm South	Colchester Quarry, Warren Lane, Stanway, Colchester	Colchester	Y
A96	Rayne Quarry - Southern Extension	Rayne Quarry, Broadfields Farm, Dunmow Road, Rayne CM776SA	Braintree	N
D7	Land at Pond Farm	Land to the north of the London road, Rayne CM776SA	Braintree	Y

Table 3.1: List of the 52 MLP sites assessed within this SFRA

4 FLOOD RISK

4.0.1 The sites which are being assessed are at varying degrees of risk of flooding from one or more flood risk sources. This section will summarise the varying types of flood risk which the sites have been assessed against.

4.1 Fluvial and Coastal

4.1.1 Fluvial flood risk is defined as the risk of flooding from main rivers. It occurs when intense or prolonged rainfall is unable to be contained by drainage channels and water spills out onto adjacent areas. The risk of fluvial flooding is primarily determined by the rainfall duration, topography, proximity to a drainage channel and prior ground conditions.

4.1.2 Coastal flooding occurs when sea levels temporarily rise and flood adjacent land, most often due to low pressure weather systems, high tides, high winds, or a combination of all three. Risk is primarily determined by the proximity to the coast and height of the ground above sea level.

Flood Zone	Probability of Flooding	Definition
Flood Zone 1	Low	Land having a less than 0.1% annual probability of flooding from rivers or the sea. These areas are shown as being clear on the online flood mapping.
Flood Zone 2	Medium	Land having a 0.1 - 1% annual probability of flooding from rivers, or a 0.1 - 0.5% annual probability of flooding from the sea, estuaries, or tidal waters. This is shown as light blue on the online flood mapping.
Flood Zone 3a	High	Land having a greater than 1% annual probability of flooding from rivers, or a greater than 0.5% % annual probability of flooding from the sea, estuaries, or tidal waters. This is shown as dark blue on the online flood mapping.
Flood Zone 3b	The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map). An indicative value for this zone is land that is susceptible to a 5% or greater annual probability of flooding.

Table 4.1: Environment Agency Flood Zone definitions[44]

[44] Environment Agency Flood Zone definitions: https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-zone-and-flood-risk-tables

4.1.3 Fluvial and coastal flooding tends to involve high depths of water with high velocities near main river channels which decrease with distance. Water from fluvial and coastal flooding tends to rise and dissipate more slowly than other types of flooding and as such some measures can be taken to minimise its impact once it commences. Appropriate planning and development decisions, such as adjusting site layouts to accommodate flooding, can have a significant impact on who and what is impacted within a development.

4.1.4 Consequently, where fluvial or coastal flood risks exist within a site, if planning permission has not yet been granted a site-specific assessment should be undertaken as part of the planning application to fully understand how the risk may be altered across the site as a result of the development proposals.

4.1.5 Fluvial and coastal flood risk information is created and managed by the Environment Agency[45]. It should be noted that the zones are theoretically defined based on national modelling and have been revised in some areas where more refined modelling has been completed or errors have been found. The definition of each Flood Zone can be found in Table 4.1 above.

4.1.6 It should be noted that the impact of Flood Zones on the sites has been assessed based on the site boundaries. As mineral working can involve significant changes to ground levels and local topography appropriate consideration should be given to fluvial flood risks existing outside of site boundaries.

4.1.7 Any planning application or proposed development should also seek early consultation and pre-application advice from the Environment Agency to discuss mitigation measures against the flood risk from this source.

4.1.8 The flood zone mapping is termed the “Flood Map for Planning (Rivers and Sea)” and is available online for land use planning purposes and to align with the NPPF sequential and exception tests.

4.1.9 The maps also highlight areas with each Flood Zone that benefit from existing flood defences up to the 0.5% AEP tidal flood event and up to the 1% AEP fluvial flood event. The presence of these areas should be used to inform planning decisions by identifying areas where a flood risk exists but protection up to a certain level is currently in place.

[45] https://www.gov.uk/government/organisations/environment-agency

4.1.10 Separate fluvial flood risk mapping has been produced by the EA to take account of defences and present un-zoned risk. The latest version is the “Risk of Flooding from Rivers and the Sea”. These are updated quarterly with the mapping available to view online[46] or to use in GIS via a WMS layer.

4.1.11 The flood areas are created from national modelling using 50m grids. As such there are limitations to the resolution and as such the mapping cannot be used to determine flood risks for individual properties. It should be used only to indicate the general risk of an area, and whether further analysis and flood risk assessments may be needed.

4.1.12 Climate change increases and their resultant flood depth increase have the potential to impact the standard of protection offered by defences and whether they may be overtopped.

4.1.13 For minerals sites yet to receive planning approval an assessment as to whether they are affected by fluvial flood risk must be included in the supporting Flood Risk Assessment accompanying any future planning application. This risk should be determined using modelling and where no model exists the existing flood zones should be used. Where a site is impacted by fluvial flooding, site specific modelling and supporting flood risk information will then be required to ensure the new climate change allowances can be fully and appropriately incorporated into planning decisions.

4.1.14 No assessment of EA modelling or updated climate change analysis was undertaken on the main rivers and their tributaries as it did not fall within the scope of this report. Until further analyses can be undertaken, or updated modelling is produced, the information within the existing SFRA regarding the flood extents, major flow controls and key features remains relevant, though for guidance purposes only.

4.1.15 Where an MLP allocation contains or borders Flood Zones 2 or 3, further site-specific modelling and flood risk information will need to be provided in the form of an FRA at the planning application stage to ensure that the updated climate change allowances are incorporated in any relevant planning decisions.

[46] Environment Agency Risk of Flooding from Rivers and the Sea mapping; https://flood-warninginformation.service.gov.uk/long-term-flood-risk/

4.1.16 As mineral working can involve significant changes to ground levels and local topography this FRA must also give appropriate consideration to fluvial flood risks existing outside of the site boundary. Where fluvial flood risks exist within the site area itself, detailed information should be provided demonstrating how this risk will be changed during site operation and the mitigation measures being implemented to ensure flood risk is not increased to the site or surrounding area.

4.1.17 Information surrounding flood warning services and existing flood defences does not fall within the scope of this report. The majority of flood defences within the county of Essex provide protection for tidal flooding and have not changed significantly since the creation of the existing SFRA. As such this document should be consulted when assessing the impacts of these on strategic planning decisions, or when determining planning applications, until an updated SFRA is produced.

4.1.18 None of the 52 MLP sites fall within areas protected by existing EA flood defences.

Effects of Climate Change on Fluvial Flood Risk

4.1.19 The current guidance on fluvial climate change allowances can be seen in Section 2.3. This constitutes an increase in the climate change allowance requirements from previous requirements when submitting planning applications.

4.1.20 As such predicted flow volumes and associated flood depths are greater, which increases risk and reduces usable space where potential developments contain or about a main river.

4.1.21 For sites yet to receive planning permission, a Flood Risk Assessment including updated or site-specific modelling will be required to support the submission to ensure climate change is appropriately considered and to deliver appropriate development, sustainability, and the minimising of flood risk.

Effects of EA Policy on Fluvial Flood Risk

4.1.22 The objectives and measures contained within the Anglian and Thames Flood Risk Management Plans (FRMP) should be referred to during all planning policy and decision-making activities. The key measures of the Anglian and Thames FRMPs are outlined in Section 2.11 of this report.

4.2 Surface Water

Probability of Flooding	Definition
Very Low	Areas with a less than 0.1% chance of flooding each year
Low	Areas with a 0.1 - 1% chance of flooding each year
Medium	Areas with a 1 – 3.3% chance of flooding each year
High	Areas with a greater than 3.3% chance of flooding each year

Table 4.2: Environment Agency surface water flood risk area definitions[47]

4.2.1 Surface water flooding occurs following intense or prolonged rainfall when the ground is unable to absorb it causing water to flow over the land surface. The risk of flooding is primarily determined by the rainfall intensity and duration, topography, surface types and prior ground conditions.

4.2.2 This type of flooding tends to involve lower depth but higher velocity flows which initiate and dissipate quickly. As such it is hard to stop surface water flooding once it commences and it is best mitigated through the prior installation of protective measures. As mineral working can involve significant changes to ground levels and local topography appropriate consideration should be given to surface water flood risks existing outside of site boundaries. Where a risk of surface water flooding exists within a site an assessment should be undertaken to fully understand how this risk may be altered across the site during operation. This should be addressed during the construction management plan submitted during the planning application stages.

4.2.3 Appropriate planning and development decisions, such as the implementation of SuDS and the layout of the development can have a significant impact on the depths, extents, and risks of surface water flooding.

[47] Environment Agency Flood Zone definitions; https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-zone-and-flood-risk-tables

4.2.4 Surface water flood risk is managed by LLFAs, however, to ensure standardised mapping nationwide the EA produced surface water flood risk mapping covering the entire UK. This used a national model updated in those areas where LLFAs had more accurate information to better take account of local topography and historic flood data.

4.2.5 As such, surface water flood risk is determined using the Environment Agency's Risk of Flooding from Surface Water (RoFSW) mapping. This mapping is available to interrogate through an online viewer[48] or to use in GIS via a WMS layer.

4.2.6 The model was constructed using a 2m topographic grid based on LiDAR data with corrections made around large structures such as bridges and railway embankments to better replicate flow paths. Ground levels were raised by 0.3m at the location of buildings to represent an average threshold before internal property flooding occurs. Roads were lowered to reflect how water flows along them more readily and varied ground roughness values were employed to take account of land use.

4.2.7 Various rainfall events were modelled to represent differing storm severities, durations, and regional variations across the UK. These were adjusted to consider the effects of formal drainage systems, which are not specifically modelled themselves, and to differentiate the ways in which water infiltrates into the ground in rural and urban areas.

4.2.8 The output map areas show overall risk of surface water flooding and include details on depths and velocities. Risks are categorised into four bands; Very High; High; Medium; and Low as detailed above in Table 4.2.

4.2.9 As with the mapping for fluvial flood zones, the areas shown are based on national modelling with a significant number of simplifications and assumptions. They cannot be used to determine the risk for individual properties and should only be used for spatial planning to assess whether an area is at risk and to what extent.

[48] Environment Agency Risk of Flooding from Surface Water mapping; https://flood-warninginformation.service.gov.uk/long-term-flood-risk/

4.3 Groundwater

4.3.1 Groundwater flooding occurs when seasonal or very prolonged rainfall occurs causing the water table to rise above the ground surface. The risk of flooding from this source is primarily determined by the underlying geological conditions and existing groundwater levels. The British Geological Survey (BGS) have produced datasets to show risks across the country. These can be found on their website[49].

4.3.2 Groundwater flooding tends to involve lower depth, lower velocity flows which initiate and dissipate slowly. As such some measures can be taken once it commences, though due to the subsurface origin of the water, the specific occurrence of it can be hard to predict.

4.3.3 Groundwater flooding is rare in areas without porous bedrock, though the potential risks of it should be considered when designing and assessing developments as the influences of groundwater may impact the effectiveness of other flood mitigation measures.

4.3.4 As mineral working can involve significant changes to ground levels and local topography appropriate consideration should be given to how this may be affected by groundwater flooding. An assessment should be undertaken to fully understand how this risk may be altered across the site and surrounding area during operation

4.3.5 Depending on the type of underlying soils and their drainage characteristics, consideration should also be given to any proposed flood mitigation measures. For example, should the data indicate lower permeability and impeded drainage into the soil then other means of attenuation or storage should be considered instead of infiltration.

4.3.6 When restoring a mineral site, groundwater levels should be taken into consideration. This is because it should be important to ensure that groundwater levels aren't put at an increased risk of pollution, and it should also be important to ensure that groundwater levels aren't negatively affected from lack of natural recharge (i.e. from less porous materials being used).

4.3.7 The use of infiltration may not be suitable if high ground water level is present as a 1m gap is required between the base of all infiltration features and the highest annual ground water level.

[49] BGS geology viewer online mapping: http://mapapps.bgs.ac.uk/geologyofbritain/home.html

4.3.8 The BGS susceptibility of groundwater flood risk maps have been reviewed on a site-specific basis to establish respective susceptibility to groundwater sources for each of the 52 sites. Based on geological and hydrogeological information, the digital data can be used to identify areas where geological conditions could enable groundwater flooding to occur and where groundwater may come close to the ground surface. The classification used within this dataset can be seen within Table 4.3

4.3.9 Please note, that the available data is a susceptibility set, and does not indicate hazard or risk as it does not provide any information on the depth to which groundwater flooding occurs or the likelihood of the occurrence of an event of a particular magnitude.

4.3.10 It should also be noted that the susceptibility data should not be used on its own to make planning decisions at any scale, the susceptibility data cannot be used on its own to indicate risk of groundwater flooding and further site-specific investigations should be undertaken.

4.3.11 The results of the assessment mentioned in 4.3.8 can be found in Appendix G.[50]

Classification	Description
A	**Limited potential for groundwater flooding to occur** based 3 BGS©NERC on rock type and estimated groundwater level during periods of extended intense rainfall.
B	**Potential for groundwater flooding of property situated below ground level:** based on rock type and estimated groundwater level during periods of extended intense rainfall. Where this may have an impact, you are advised to check that this has not been a problem in the past at this location and/or that measures are in place to sufficiently reduce the impact of the flooding.
C	**Potential for groundwater flooding to occur at surface:** based on rock type and estimated groundwater level during periods of extended intense rainfall. You are advised to check that this has not been a problem in the past at this location and/or that measures are in place to sufficiently reduce the impact of the flooding.
Elsewhere (onshore)	**Not considered to be prone to groundwater flooding**: based on rock type.

Table 4.3: BGS Groundwater flooding susceptibility classifications.[51]

[50] BGS Digital Data under Licence (2023/039) British Geological Survey. © and Database Right UKRI. All rights reserved.

[51] BGS Digital Data under Licence (2023/039) British Geological Survey. © and Database Right UKRI. All rights reserved.

4.3.9 Water balance assessments should be undertaken both during operation and restoration phase to ensure that there is minimal disruption to groundwater levels and supplies especially during any dewatering. This should be monitored and extracted in line with the EA requirements for such works. [52]

[52] Environment Agency: Hydrogeological impact appraisal for dewatering abstractions https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/291080/scho0407bmae-e-e.pdf

5 Sequential test

5.0.1 Appendix G summarises the results of the sequential test assessments of all 52 sites. Further site-specific assessments of medium and high-risk sites can be seen in Appendix H and I.

5.0.2 Minerals sites fall within the less vulnerable and water compatible vulnerability classifications so do not meet the threshold required to undertake an exception test.

5.0.3 It should be noted that any re-assessment of the sites has been undertaken to align with the ongoing MLP Review and to apply the latest flood risk information. Where a site has already received planning permission, flood risk would have been assessed as part of this process and no further assessment is required.

5.0.4 For those yet to receive planning permission, the assessment results give an overview of the nature of flood risk to a site and highlight where further information or investigations may be needed though the planning process to ensure risk is appropriately mitigated.

5.1 Minerals Local Plan Site Assessment Methodology

5.1.1 To assess the flood risk for the sites, the following methodology was employed. Further details on the data utilised to undertake this can be found within the report.

5.1.2 Existing flood maps based on a range of national flood modelling data were used to determine the flood risk score for allocated sites. GIS analysis was completed using this data set to identify the percentage area of the sites falling in each flood zone.

5.1.3 All sites were assessed against surface water flood risk, fluvial and groundwater flood risk mapping using GIS software. Risk bandings are assigned to each flood source with additional details on each risk and the impacts to the site.

5.1.4 Low risk sites with high risks of surface or ground water flooding, or those containing a mapped watercourse, are reclassified as medium risk. Site specific mapping and recommendations to reduce flood risk are provided for all medium and high-risk sites.

Risk Category	Definition	Map Symbology
High	Designated sites with over 2% of their total area within Flood Zone 3	**Red border and hatching**
Medium	Designated sites that contain; between 1 and 2% of their total area within Flood Zones 3; Designated sites where, over 5% of their total area within Flood Zone 2; areas of significant surface water or ground water flooding, and/or; a mapped watercourse	**Orange border and hatching**
Low	All remaining sites	**Green border and hatching**

Table 5.1: Minerals Local Plan site risk categories and mapping symbology

5.2 Site Assessment Findings

5.2.1 A total of 52 sites were subjected to the assessment process with 10 found to be high risk and 27 to be medium risk and 15 to be low risk (Appendix G).

5.2.2 Appendix G, H and I demonstrate that sites in high-risk areas can be capable of allocation so long as the risk is identified, and any potential impacts can be adequately mitigated.

5.2.3 Assessment has highlighted the presence of surface water flow paths within several of the 52 existing and new sites for potential allocation in the MLP. Potential mitigation measures are not provided as part of the sequential test results, but recommendations are included within the further site-specific assessments for the high and medium risk sites (Appendices H and I).

5.2.4 Where surface water flood risk has been identified, the impact and potential mitigation measures should be included within a site-specific flood risk assessment as part of the planning process, where permission has not already been granted.

5.2.5 The complete tabulated results of the updated sequential test assessments can be found in Appendix G. The overall flood risk classification of each site is indicated by the text colours in line with the mapping symbology listed in Table 5.1.

5.2.6 All high and medium risk sites were subjected to further site-specific assessment. Detailed mapping, recommendations and planning considerations for each site can be found in Appendices H and I.

5.2.7 The recommendations given for medium and high-risk sites should be used to inform the site-specific Flood Risk Assessments for each site when they are considered for development through the planning process if this has not already been.

5.2.8 All sites should also take Section 6 into consideration if planning for the restoration stages to ensure that multifactorial benefits are achieved.

6 Integrated Water Management

6.0.1 Integrated Water Management (IWM) is a holistic approach for the sustainable management of water resources.

6.0.2 IWM promotes the integrated planning, use, conservation, and management of all water sources, throughout the water cycle, for the whole life cycle of the minerals site.

6.0.3 The potential water related issues encountered on minerals extraction sites are listed below, all of these should have a level of monitoring and relevant targets in place:

1. **Site water demands and sources:**
   - Site water demand and supply methods should be identified and quantified for both for surface water and groundwater.
   - Assessment should include (but not limit to) the frequency and need for use of water for; dust suppression, office and sanitary use, laboratory use, washing of equipment and minerals.
   - Equipment used on site should be regularly reviewed to ensure that new technologies with lower water requirement are utilised.
2. **Water segregation and re use:**
   - There should be a separation of site waters based on quality, to maximise water recycling where possible.
   - Examples include the collection of rainwater which could be stored in tanks. Whereas surface water may be collected and stored in ponds ready for re use. This collected water could be used for onsite activities which do not require potable water quality for example washing equipment.
   - Explore the possibility for the use of any retained water for irrigation either for agricultural purposes or residential.
   - Explore opportunities for infiltration for aquifer recharge where geologically possible.
3. **Surface water diversion:**
   - Redirecting watercourses to prevent water from entering the active extraction area will enable downstream watercourses to be unaffected with little to no reduction in water.
   - This process is known as dewatering and is further covered in section 4.3 of this report.
4. **Surface water protection (pollution control):**
   - Protecting water features such as lakes, ponds, and wetlands to prevent contamination should be a priority. It is possible that any degradation of in pit water quality could have a negative effect on

the surrounding groundwaters especially where extraction is taking place below the water table.
- In locations where water quality is poor (Appendix E) local water quality improvements should be explored. This could be as simple as the implementation of sediment and erosion control measures.

5. **Release strategy:**
   - Strategy for temporary or permanent release of water from the extraction area to the environment should take into consideration flow and water quality characteristics of the receiving environment.
   - Sustainable Drainage Systems (detention basins, ditches, ponds, wetlands swales) can be used to increase water quality and reduce flow, further information can be found in section 2.5 of this report.
   - It is strongly recommended that SuDS options are considered due to the significant wider benefits they have to ecology, biodiversity, amenity, and water quality as well as flood mitigation to both the site and the wider area.
   - SuDS are also favoured by the planning processes in Essex and their inclusion within developments would likely expedite the planning process.
6. **Management Plans:**
   - Before the construction existing structures should be surveyed and assessed to ensure their durability for the life cycle of the site. This would include pumps, pipes, and embankments.
   - Existing and any new assets should have a regular inspection plan in place during the construction phase which should be covered in the Construction Management Plan (CMP) to have mitigation to reduce the impact to the water cycle on and off site.
   - In the restoration phase there should be a Maintenance Plan in line with CIRIA C753 to ensure that all assets have future maintenance plans in place.
7. **Post-extraction water management:**
   - All restoration proposals should be in line with both the Essex Green Infrastructure Strategy and Essex SuDS Design Guide.
   - *Void use*- Pre-extraction water quantity and quality should be agreed to ensure that any opportunities to use the void created to store water has been considered. This may be either on a permanent basis creating new habitats and water reserves for times of drought or for temporary use when neighbouring watercourses flood or groundwater levels rise (flood management).
   - *Infilling*- The infilling of sand and gravel quarries with material of low porosity as this can result in a barrier to groundwater flow and has the potential to increase groundwater levels and therefore cause

flooding. As such the materials used should be thoroughly assessed.

- *Riparian Buffer Zones*- These are strips of vegetation located adjacent to watercourses that help filter pollutants and stabilise the banks, reducing erosion and the risk of flooding. By restoring quarries and extraction sites with riparian buffer zones, we can create a natural flood defence whilst also improving water quality and providing habitat for wildlife.
- *Future Land Management*- Management practices of areas going back to agricultural use should be thoroughly investigated to ensure that there will be no increased flood risk both on and off site.
- *Climate Resilient Planting- W*oodland, hedges, or grasslands could be planted, these have a positive impact on soil structure which in turn increases soil moisture therefore helping reduce the risk of flooding.
- *Wetland Creation*- Wetlands are highly effective at storing water and reducing flood risk. By restoring quarries and extraction sites to create new wetlands, we can simultaneously provide flood protection and create valuable habitat for wildlife.
- *In-channel interventions***:** In-channel interventions such as the creation of meanders, riffles and pools can improve the capacity of the watercourse to accommodate floodwaters. Additionally, these interventions can enhance habitat diversity, creating new niches for different species to inhabit. Similarly where appropriate, interventions such as leaky dams or check dams can utilise the available storage within watercourses whilst also slowing the flow during extreme storm events, thus reducing flood risk.
- *Education*- through the introduction of new public open spaces and community involvement throughout.

6.0.4 It should be noted that the list is not exhaustive and is intended as a starting point when considering potential measures to reduce flood risk.

6.0.5 Where site limitations exist, such as restricted space, measures should be considered in combination to maximise wider benefits.

6.0.6 Consents may be required for any works within and around both a Main River and ordinary watercourse. Consents can be obtained from the EA and LLFA respectively.

7 APPENDICES

Appendix A: List of partner contact details

Organisation	Website	email
Anglian Water (Assets and Flooding)	https://www.anglianwater.co.uk/services/sewers-and-drains/flooding/	
Thames Water	https://www.thameswater.co.uk/developers	
Anglian Water (Planning)	https://www.anglianwater.co.uk/developing/planning--capacity/planning-and-capacity/	planningliaison@anglianwater.co.uk
Environment Agency (Assets)	https://environment.data.gov.uk/asset-management/index.html	enquiries@environment-agency.gov.uk
Environment Agency (Flooding and Planning)	https://www.gov.uk/government/organisations/environment-agency	enquiries@environment-agency.gov.uk
Essex County Council (Environment)	https://www.essex.gov.uk/protecting-environment	environment@essex.gov.uk
Essex County Council (Assets and Flooding)	https://flood.essex.gov.uk/	floods@essex.gov.uk
Essex County Council (Highways)	https://www.essexhighways.org/roads-and-pavements/drainage-and-flooding.aspx	
Essex County Council (Planning and SuDS)	https://flood.essex.gov.uk/new-development-advice/apply-for-suds-advice/	suds@essex.gov.uk

Appendix B: Impacts of Shoreline Management Plan policies on the MLP sites (where sites are not mentioned this means there are no impacts on the site)

MLP ID	MLP Site Name	SMP Unit and Policy	Impacts on Site
A67	Church Farm – Alresford (A16)	SMP unit D6a and Policies are for up to 100 year AEP Hold the Line	Minimal impact as Hold the Line means banks of river are to remain as is and therefore site will be unaffected
A71	Lodge Farm - Alresford (A19)	SMP unit D6a and Policies are for up to 100 year AEP Hold the Line	Minimal impact as Hold the Line means banks of river are to remain as is and therefore site will be unaffected
A74	Thorrington Hall Farm (A21)	Site is affected by two policies effecting the northern and southern side of Alresford Creek: • SMP unit D6a and Policies are for up to 100 year AEP Hold the Line on the northern side • SMP unit D5 and Policies Hold the Line for the 20 Year AEP, Managed Realignment (MR) for the 50 year AEP and Hold the line for the 100 year AEP for the southern side.	Minimal impact during Hold the Line scenarios as site will be unaffected. During Managed Realignment scenario possible local interventions could affect the site but it the site is considered far enough away (with existing infrastructure present between the site and the creek) for it to remain protected.

Appendix C: Impacts of Surface Water Management Plan and Critical Drainage Areas on the MLP sites (Sites that are not mentioned do not fall within a CDA or SWMP, or are not in close proximity e.g. Uttlesford and Tendring do not currently have a SWMP)

MLP ID	MLP Site Name	SWMP Information	Impacts on Site
A6	Bradwell Quarry	Sites within Braintree District which has an SWMP (Braintree and Witham 2016) but not within modelled study area	Low. As the SWMP study area is in close proximity it is recommended that as LLFA, ECC be approached as part of the planning process
A31	Maldon Road, Birch	Site within Colchester District which has an SWMP (Colchester Town 2013) but not within modelled study area	Low. As the SWMP study area is in close proximity it is recommended that as LLFA, ECC be approached as part of the planning process
A49	Colemans Farm – Hill Broad Farm	Sites within Maldon District which has an SWMP (Maldon 2016), Site do not fall with Maldon CDA but does partly fall within Braintree and Witham SWMP modelled study area	Medium. The site falls within SWMP study area and therefore it is recommended that as LLFA, ECC be approached as part of the planning process
A50	Colemans Farm - Eastern extension (Appleford Farm)	Sites within Braintree District which has SWMP (Braintree and Witham 2016). Site does not fall within CDA but partly falls within modelled study area	Medium. The site falls within SWMP study area and therefore it is recommended that as LLFA, ECC be approached as part of the planning process
A51	Colemans Farm - North extension (Hill Broad Farm)	Sites within Maldon District which has a SWMP (Malden 2016), Site does not fall with Maldon CDA but does fall within Braintree and Witham SWMP modelled study area	Medium. The site falls within SWMP study area and therefore it is recommended that as LLFA, ECC be approached as part of the planning process
A52	Colemans Farm - Southern extension	Site is in Braintree District which has a SWMP (Braintree and Witham 2016). Site does not fall within CDA but does fall within SWMP modelled study area.	Medium. The site falls within SWMP study area and therefore it is recommended that as LLFA, ECC be approached as part of the planning process
A54	Whiteheads – Witham	Sites within Braintree District which has a SWMP (Malden 2016), Site does not fall with Maldon CDA but does fall within Braintree and Witham SWMP modelled study area	Medium. The site falls within SWMP study area and therefore it is recommended that as LLFA, ECC be approached as part of the planning process
A55	Sheepcotes Southern	Site is in Chelmsford District which has a SWMP (Chelmsford 2016). Site does not fall within CDA but does fall within SWMP modelled study area.	Medium. The site falls within SWMP study area and therefore it is recommended that as LLFA, ECC be approached as part of the planning process
A56	Sheepcotes Western	Site is in Chelmsford District which has a SWMP (Chelmsford 2016). Site does not fall within CDA but does fall within SWMP modelled study area.	Medium. The site falls within SWMP study area and therefore it is recommended that as LLFA, ECC be approached as part of the planning process
A58	Little Smiths – Danbury	Site falls at the border of Chelmsford and Maldon District and does not fall within SWMP modelled area.	Low. Site does not fall within SWMP study area, but it is in close proximity to Maldon SWMP modelled area. Therefore, early engagement with LLFA is recommended.
A62	Heckfordbridge	Sites within Colchester District which has a SWMP (2016), Site does not fall within SWMP modelled study area.	Low. Site does not fall within SWMP study area, but it is in close proximity to SWMP modelled area. Therefore, early engagement with

			LLFA is recommended.
A66	White House Farm - Woodham Walter (A44)	Sites within Maldon District which has a SWMP (Maldon 2016) but not within modelled study area	Low. Site does not fall within SWMP study area, but it is in close proximity to SWMP modelled area. Therefore, early engagement with LLFA is recommended.
A82	Colemans Farm - Elm Springs Extension	Sites within Maldon District which has a SWMP (Maldon 2016), Site does not fall with Maldon CDA but does fall within Braintree and Witham SWMP modelled study area	Medium. The site falls within SWMP study area and therefore it is recommended that as LLFA, ECC be approached as part of the planning process
A83	Colemans Farm - Hole Farm	Sites within Braintree District which has a SWMP (Braintree and Witham 2016) but not within modelled study area	Low. Site does not fall within SWMP study area, but it is in close proximity to SWMP modelled area. Therefore, early engagement with LLFA is recommended.
A84	Colemans Farm - Appleford Farm North Extension	Sites within Braintree District which has an SWMP (Braintree and Witham 2016) but not within modelled study area	Low. Site does not fall within SWMP study area, but it is in close proximity to SWMP modelled area. Therefore, early engagement with LLFA is recommended.
A89	Covenbrooke Hall Farm	Sites within Braintree District which has a SWMP (Braintree and Witham 2016) but not within modelled study area	Low. Site does not fall within SWMP study area, but it is in close proximity to SWMP modelled area. Therefore, early engagement with LLFA is recommended.
A90	Rayne Quarry - Northern Extension	Sites within Braintree District which has a SWMP (Braintree and Witham 2016), Site does not fall with CDA but does fall within SWMP modelled study area.	Medium. The site falls within SWMP study area and therefore it is recommended that as LLFA, ECC be approached as part of the planning process
A95	Land at Bellhouse Farm South	Sites within Colchester District which has an SWMP (2016), Site does not fall within CDA but does fall within SWMP modelled study area.	Medium. The site falls within SWMP study area and therefore it is recommended that as LLFA, ECC be approached as part of the planning process
A96	Rayne Quarry - Southern Extension	Site at the border of Uttlesford and Braintree District, Braintree has SWMP (Braintree and Witham 2016), site does not fall within modelled study area.	Low. Site does not fall within SWMP study area, but it is in close proximity to SWMP modelled area. Therefore, early engagement with LLFA is recommended.
D7	Land at Pond Farm	Sites within Braintree District which has a SWMP (Braintree and Witham 2016), Site does not fall within CDA but does fall within SWMP modelled study area.	Medium. The site falls within SWMP study area and therefore it is recommended that as LLFA, ECC be approached as part of the planning process

Appendix D: Map of Essex Critical Drainage Areas

Appendix E: Summary of River Basin Management Plan key issues and impacts on the MLP sites.

MLP ID	MLP Site Name	RBD; Area	Operational Area; Catchment	Current Status (catchment)	Reasons for not achieving good status (operational area)	Site Impacts
A6	Bradwell Quarry	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	There are a low number of issues within the catchment but the proximity of the site to the River Blackwater creates an increased potential for pollution from contaminated site runoff. Appropriate measures should be implemented to mitigate against this
A22	Little Bullocks Farm	Thames; Roding Beam and Ingrebourne	Roding Beam and Ingrebourne; Upper Roding (to Crispey Brook	Poor	Pollution from rural areas (12); Physical modifications (4); Pollution from towns, cities, and transport (2)	Catchment has a low classification. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored
A23	Little Bullocks Farm					
A31	Maldon Road, Birch	Anglian; Combined Essex	Colne Essex; Roman River	Moderate	Pollution from rural areas (3); Physical modifications (4); Pollution from towns, cities and transport (1); Pollution from wastewater (1); Changes to the natural flow and level of water (1)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A47	Bradwell Monks Farm (A8)	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against. Proximity to main river creates increased potential for pollution from contaminated site runoff. Appropriate measures should be implemented to mitigate against this
A48	Bradwell Grange Farm	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against. Proximity to main river creates increased potential for pollution from contaminated site runoff. Appropriate measures should be implemented to mitigate against this
A49	Colemans Farm – Hill Broad Farm	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	There are a low number of issues within the catchment but the proximity of the site to the River Blackwater creates an increased potential for pollution from contaminated site runoff. Appropriate measures should be implemented to mitigate against this

A50	Colemans Farm - Eastern extension (Appleford Farm)	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	There are a low number of issues within the catchment but the proximity of the site to the River Blackwater creates an increased potential for pollution from contaminated site runoff. Appropriate measures should be implemented to mitigate against this
A51	Colemans Farm - North extension (Hill Broad Farm)	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	There are a low number of issues within the catchment but the proximity of the site to the River Blackwater creates an increased potential for pollution from contaminated site runoff. Appropriate measures should be implemented to mitigate against this
A52	Colemans Farm - Southern extension	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	There are a low number of issues within the catchment but the proximity of the site to the River Blackwater creates an increased potential for pollution from contaminated site runoff. Appropriate measures should be implemented to mitigate against this
A54	Whiteheads – Witham	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against. There is a watercourse in close proximity therefore appropriate measures should be implemented to avoid contamination runoff.
A55	Sheepcotes Southern	Anglian; Combined Essex	Chelmer (Gt. Easton – R. Can)	Moderate	Physical modifications (2); Pollution from wastewater (1)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A56	Sheepcotes Western	Anglian; Combined Essex	Chelmer (Gt. Easton – R. Can)	Moderate	Physical modifications (2); Pollution from wastewater (1)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A57	Chalk End – Roxwell	Anglian; Combined Essex	Chelmer, Roxwell Brook	Poor	Pollution from rural areas (4); Physical Modifications (1); Pollution from towns, cities, and transport (1); Pollution from wastewater (2)	Catchment has a low classification. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against. Especially as sites borders watercourses. Opportunities to help improve status through site restoration should be explored
A58	Little Smiths – Danbury	Anglian; Combined Essex	Chelmer. Chelmer (D/S confluence with Can)	Poor	Physical modifications (4); Pollution from wastewater (2); Pollution from towns, cities, and transport (1); Pollution from rural areas (2)	Catchment has a low classification. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against.
A59	Lowleys Farm – Chelmsford	Anglian; Combined Essex	Chelmer, Ter	Moderate	Pollution from wastewater (1); Pollution from towns, cities, and transport (1); Pollution from rural areas (1)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored

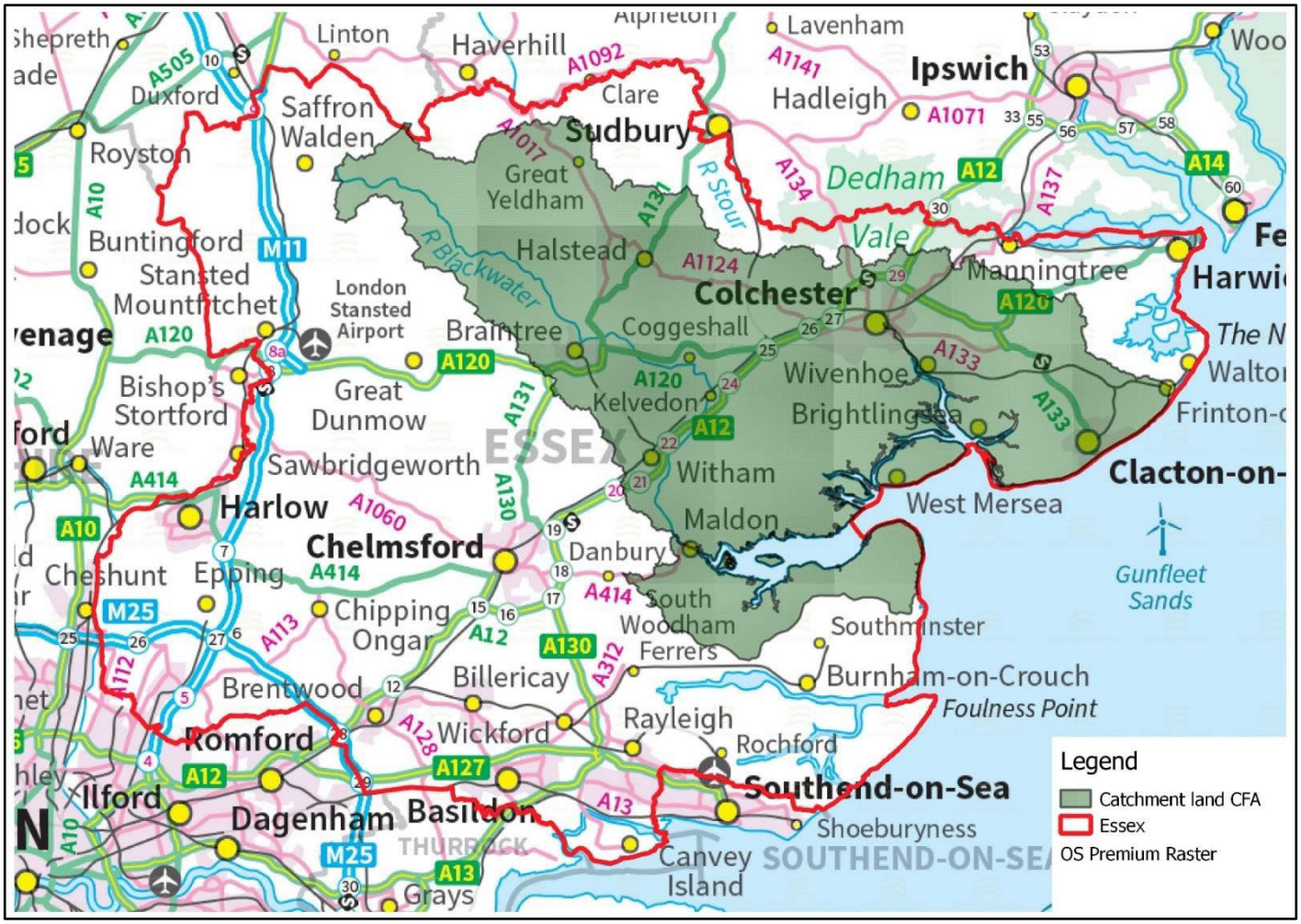
A60a	Shellow Cross Farm Chelmsford	Anglian; Combined Essex	Chelmer, Roxwell Brook	Poor	Pollution from rural areas (4); Physical Modifications (1); Pollution from towns, cities, and transport (1); Pollution from wastewater (2)	Catchment has a low classification. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored
A60b	Shellow Cross Farm Chelmsford	Anglian; Combined Essex	Chelmer, Roxwell Brook	Poor	Pollution from rural areas (4); Physical Modifications (1); Pollution from towns, cities, and transport (1); Pollution from wastewater (2)	Catchment has a low classification. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored
A61	Heckfordbridge	Anglian; Combined Essex	Colne, Roman River	Moderate	Pollution from rural areas (3); Physical modifications (4); Pollution from towns, cities and transport (1); Pollution from wastewater (1); Changes to the natural flow and level of water (1)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A62	Heckfordbridge	Anglian; Combined Essex	Colne, Roman River	Moderate	Pollution from rural areas (3); Physical modifications (4); Pollution from towns, cities and transport (1); Pollution from wastewater (1); Changes to the natural flow and level of water (1)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A63	Patch Park - Abridge (A41	Thames; Roding Beam and Ingrebourne	Roding Beam and Ingrebourne, Lower Rodding	Moderate	Pollution from wastewater (2); Pollution from rural areas (5)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against especially due to proximity to main river creating an increased potential for pollution. Appropriate measures should be implemented to mitigate against this. Opportunities to help improve status through site restoration should be explored
A64	Land East of Asheldham Quarry	Anglian; Combined Essex	Crouch and Roach	Unknown	Unknown	NA
A65	Land South of Asheldham Quarry	Anglian; Combined Essex	Crouch and Roach	Unknown	Unknown	NA
A66	White House Farm - Woodham Walter (A44)	Anglian; Combined Essex	Chelmer. Chelmer (D/S confluence with Can)	Poor	Physical modifications (4); Pollution from wastewater (2); Pollution from towns, cities, and transport (1); Pollution from rural areas (2)	Catchment has a low classification. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against although no bordering watercourses. Opportunities to help improve status through site restoration should be explored

A67	Church Farm – Alresford (A16)	Anglian; Combined Essex	Colne, Sixpenny Brook	Poor	Pollution from towns, cities, and transport (2); Pollution from rural areas (2)	Catchment has a low classification. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored
A68	Crabtree Farm - Great Bentley	Anglian; Combined Essex	Colne, Holland Brook	Moderate	Physical modifications (4); Pollution from rural areas (3); Pollution from towns, cities, and transport (2)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A69	Frating Hall (A17)	Anglian; Combined Essex	Colne, Tenpenny Brook	Moderate	Physical modifications (1); Pollution from wastewater (1)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A71	Lodge Farm - Alresford (A19)	Anglian; Combined Essex	Colne Essex	Unknown	Unknown	NA
A72	Martells - Southern extension	Anglian; Combined Essex	Colne, Salary Brook	Moderate	Physical modifications (3); Pollution from rural areas (2); Pollution from towns, cities, and transport (4)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A73	Martells - Western extension	Anglian; Combined Essex	Colne, Salary Brook	Moderate	Physical modifications (3); Pollution from rural areas (2); Pollution from towns, cities, and transport (4)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A74	Thorrington Hall Farm (A21)	Anglian; Combined Essex	Colne Essex	Unknown	Unknown	Potential pollution from contaminated site runoff due to proximity of watercourse and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored.
A75	Land at Orford, Ugley - Bollington Hall Ltd	Thames, Lee Upper	Stanstead Brook	Poor	Unknown	Potential pollution from contaminated site runoff due to proximity of watercourse and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored.
A76	Elsenham (A25)	Thames, Lee Upper	Stanstead Brook	Poor	Unknown	NA
A77	Westward Extension to Highwood Quarry - Little Easton	Thames; Roding Beam and Ingrebourne	Roding Beam and Ingrebourne, Upper Rodding	Moderate	Pollution from rural areas (12); Physical modifications (4); Pollution from towns, cities, and transport (2)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A79	Crown Quarry - North of Wick Lane	Anglian; Combined Essex	Colne, Salary Brook	Moderate	Physical modifications (3); Pollution from rural areas (2); Pollution from towns, cities, and transport (4)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A80	Crown Quarry - South of Wick Lane	Anglian; Combined Essex	Colne, Salary Brook	Moderate	Physical modifications (3); Pollution from rural areas (2); Pollution from towns, cities, and transport (4)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against

A82	Colemans Farm - Elm Springs Extension	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	There are a low number of issues within the catchment but the proximity of the site to the River Blackwater creates an increased potential for pollution from contaminated site runoff. Appropriate measures should be implemented to mitigate against this
A83	Colemans Farm - Hole Farm	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	There are a low number of issues within the catchment but the proximity of the site to the River Blackwater creates an increased potential for pollution from contaminated site runoff. Appropriate measures should be implemented to mitigate against this
A84	Colemans Farm - Appleford Farm North Extension	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	There are a low number of issues within the catchment but the proximity of the site to the River Blackwater creates an increased potential for pollution from contaminated site runoff. Appropriate measures should be implemented to mitigate against this
A85	Martells - North of Frating Road (East)	Anglian; Combined Essex	Colne, Tenpenny Brook	Moderate	Physical modifications (1); Pollution from wastewater (1)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A86	Martells - North of Frating Road (West)	Anglian; Combined Essex	Colne, Salary Brook	Moderate	Physical modifications (3); Pollution from rural areas (2); Pollution from towns, cities, and transport (4)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A87	Martells - East of Slough Lane	Anglian; Combined Essex	Colne, Salary Brook	Moderate	Physical modifications (3); Pollution from rural areas (2); Pollution from towns, cities, and transport (4)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A88	Gurnhams Farm	Anglian; Combined Essex	Colne, Holland Brook	Moderate	Physical modifications (4); Pollution from rural areas (3); Pollution from towns, cities, and transport (2)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A89	Covenbrooke Hall Farm	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A90	Rayne Quarry - Northern Extension	Anglia, Combined Essex	Blackwater; Brain	Moderate	Physical modifications (1); Pollution from rural areas (1); Pollution from wastewater (1); Pollution from towns, cities, and transport (1)	Average catchment issues. Potential pollution from contaminated site runoff due to proximity of watercourse and operational vehicles should be mitigated against
A91	Land at Chignal St James	Anglian; Combined Essex	Chelmer, Can	Poor	Physical modifications (1); Pollution from rural areas (4); Pollution from wastewater (2)	Catchment has a low classification. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored

A92	Land at Pattiswick Hall Farm - Small Site	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	Average catchment issues. Potential pollution from contaminated site runoff due to proximity of watercourse and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored.
A93	Land at Pattiswick Hall Farm - Full Site	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	Average catchment issues. Potential pollution from contaminated site runoff due to proximity of watercourse and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored.
A94	Land at Highfields Farm	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	Average catchment issues. Potential pollution from contaminated site runoff due to proximity of watercourse and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored. mitigated against
A95	Land at Bellhouse Farm South	Anglian; Combined Essex	Colne, Roman River	Moderate	Pollution from rural areas (3); Physical modifications (4); Pollution from towns, cities and transport (1); Pollution from wastewater (1); Changes to the natural flow and level of water (1)	Average catchment issues. Potential pollution from contaminated site runoff due to proximity to Main River and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored.
A96	Rayne Quarry - Southern Extension	Anglian; Combined Essex	Chelmer, Ter	Moderate	Pollution from wastewater (1); Pollution from towns, cities, and transport (1); Pollution from rural areas (1)	Average catchment issues. Potential pollution from contaminated site runoff due to proximity of Main River and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored.
D7	Land at Pond Farm	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (1); Physical modifications (3); Pollution from wastewater (1)	Average catchment issues. Potential pollution from contaminated site runoff due to proximity of watercourse and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored.

Appendix F: Map of Climate Focus Area



Appendix G: Summary of the flood risk analysis on 52 sites

Site ID	Size (ha)	Site Name	Fluvial FZ %			SW Flood Risk	GW Flood Risk	Flood risk comments
			1	2	3			
A6	38.5	Bradwell Quarry, Rivenhall	100	0	0	High	Low	Watercourse present running through entire site. According to BGS the site is not considered to be prone to groundwater flooding.
A22	7.8	Little Bullocks Farm, Little Canfield	92.2	4.7	3.1	High	High	Multiple SW flow path present across site during multiple AEP events. Western part of site is not considered to be prone to groundwater flooding however part of the eastern half is classed as C
A23	5.2	Little Bullocks Farm, Little Canfield	100	0	0	Low	High	Some minor SW flow paths present along the western border with some small areas of insignificant ponding on the site. Western part of site is not considered to be prone to groundwater flooding however part of the eastern half is classed as C
A31	30	Maldon Road, Birch	89.5	5.7	4.8	High	High	Watercourse present within entire length of site which then turns into a main river. Significant northern area of site at risk during 3.33% AEP SW event. Two SW flow paths present across southern area of site connecting to watercourse. Groundwater flood risk is mainly classed as C however there is a large area classed as B
A47	84.78	Bradwell Monks Farm	100	0	0	High	Medium	There is a SW flow path running north to south with a high (>3.3%AEP) RofSW. This flow path also has a wider flood extent with a low RofSW (1% AEP to 0.1%AEP) There are also multiple isolated areas of surface water flooding, likely associated with topographical low points or what appears to be field boundaries. This surface water flood risk again ranges from high (3.33%AEP) to low risk of SW (1% AEP to 0.1%AEP AEP). The rest of the site has a very low RofSW flooding of (<0.1% AEP) Some Class C groundwater flood risk associated with centre of site however this is closely attributed to the watercourse/flow path and is likely due to the lower ground levels and higher ground water levels here. The rest of the site is not considered to be prone to groundwater flooding.
A48	143.90	Bradwell Quarry Grange Farm	100	0	0	Medium	Low	There is a main river flowing west to east north of the site however it is outside the site boundary. During medium and low modelled storm events (1%-0.1% AEP) there are small flow paths on the site which flow towards the river. These are situated flowing through the northern boundary and eastern boundary. There are multiple areas of isolated surface water flood risk ranging from low risk (>0.1%AEP) to high risk (>3.3%AEP); 11 of these areas are high risk. According to BGS the site is not considered to be prone to groundwater flooding (there is a small section of class C on the western border and small section of class B on the northern border.)
A49	42.38	Colemans Farm - Hill Broad Farm FULL SITE	79	3	18	High	High	Within the site there are two low risk flow path areas (1%-0.1% AEP) which flow towards a large high risk flow path running east to west north of the site (this is associated with the River Blackwater). There is also a high-risk flow path along the western boundary, running towards the offsite flow path in the north. There is one high risk (>3.3%AEP) area of surface water flooding within the south-western extent of the site. Most likely related to a topographical low point. Groundwater Flood Risk = Large proportion of the east of the site is class C and B however the West is not prone to groundwater flooding North-western border along the River Blackwater is Flood Zone 3 and 2, the remaining is Flood Zone 1 Each year the north-western extent has a chance of flooding from fluvial sources >3.33% (high risk)- the remaining is not at risk of fluvial flooding This extent is also at risk of flooding from reservoirs when there is also flooding from rivers.

Site ID	Size (ha)	Site Name	Fluvial FZ %			SW Flood Risk	GW Flood Risk	Flood risk comments
			1	2	3			
A50	24.64	Colemans Farm - Eastern extension (Appleford Farm)	82	8	10	Medium	High	The site has 4 isolated SW areas of low risk (1% to 0.1%AEP) which are most likely topographical low points. However, the site has a wide flow path, flowing north to south, with medium to high risk (>3.3%AEP and > 0.1%AEP) on the right side. There is a flow path on the eastern and northern boundary which encroaches on the site during the medium to low storm events (<3.33%-0.1% AEP) Groundwater Flood Risk = Middle of the site is Class B however the majority is Class C this is most likely due to low topography and proximity to the River Blackwater meaning higher ground water levels At risk of fluvial flooding >3.33% AEP on south-eastern corner (high risk). This extent is also at risk of flooding from reservoirs when there is and when there isn't also flooding from rivers
A51	20.57	Colemans Farm - North extension (Hill Broad Farm)	57	6	37	High	Medium	The site borders the River Blackwater to the west which has an associated surface water flow path which encroaches on the site during the high-risk storm event (>3.33% AEP). During larger storm events the extent extends further into the site (3.33% to 0.1% AEP). There are 2 low risk (1%-0.1% AEP) flow path areas flowing towards the River Blackwater. Groundwater flood risk = western extent (<1/3) of the site is Class C which is closely associated with the proximity to the River Blackwater, the rest of the site is not prone to groundwater flooding. North-western border along the River Blackwater is Flood Zone 3 and 2, the remaining is Flood Zone 1 Each year the north-western extent has a chance of flooding from fluvial sources >3.33% (high risk)- the remaining is not at risk of fluvial flooding This extent is also at risk of flooding from reservoirs when there is also flooding from rivers.
A52	4.04	Colemans Farm - Southern extension	0	5	95	High	High	The majority of this area has a SW flood risk extent of medium (3.33%-1%AEP). There are also some areas of high risk (>3.33%AEP). Groundwater flood risk = Site is completed Class C, most likely due to proximity to River Blackwater and its low topography Each year this area has a chance of fluvial flooding >3.3%. (High risk) At risk of flooding from reservoirs when rivers are normal and when rivers are flooding
A54	10.35	Whiteheads - Witham	100	0	0	Medium	Low	The western boundary borders an area of low to high SW flood risk (>3.33% to 0.1% AEP) which flows north to south. The south-eastern boundary has similar risk and these two-flow path meet south of the site before continuing south According to BGS the site is not considered to be prone to groundwater flooding. The access track however is affected by Class B and Class C and should be considered to be raised to reduce any susceptibility to groundwater flooding There is a potential ditch outside the border Site borders a significant surface water flow path in addition to a pond/lake.
A55	25.27	Sheepcotes Southern	100	0	0	Medium	Low	Along the northern boundary there a SW flow path flowing east to west, which is majority high risk (>3.3% AEP.) The site has four SW flow paths flowing north towards this, three of which are low risk (1% to 0.1% AEP), and one is high risk (>3.33%). According to BGS the majority of the site is not considered to be prone to groundwater flooding however a very small section of the north-western corner is Class C
A56	9.81	Sheepcotes Western	100	0	0	Low	Low	There are few isolated areas of low to high surface water flood risk (>3.33% - 0.1% AEP) however the majority of the site is at very low risk (<0.1%AEP). According to BGS the majority of the site is not considered to be prone to groundwater flooding however a very small section of the southwestern corner is Class B most likely associated with the watercourse outside the western boundary
A57	6.83	Chalk End, Roxwell	100	0	0	Low	Low	The eastern/south-eastern boundary is formed of a watercourse/ditch and has a Surface Water (SW) flow path flowing south westwards, of low to high-risk surface water flooding (>3.3%AEP to 0.1%AEP). The rest and majority of the site however is not at any significant surface water flood risk. According to BGS the majority of the site is not considered to be prone to groundwater flooding, however there is some Class C along southwestern corner/boundary
A58	23.7	Little Smiths - Danbury	100	0	0	Low	High	There is a very small extent of surface water flood risk in the southeast corner. The remainder of the site has no significant areas of surface water flood risk. Groundwater flood risk varies between Class B and Class C over the entirety of the site

Site ID	Size (ha)	Site Name	Fluvial FZ %			SW Flood Risk	GW Flood Risk	Flood risk comments
			1	2	3			
A59	77.41	Lowleys Farm - Chelmsford	100	0	0	High	Medium	There are numerous SW flow paths flowing south to north. The majority are of low risk 1% to 0.1%AEP; one of the flow paths includes an area of both medium and high risk >3.3%AEP to 1%AEP; multiple isolated areas of high risk >3.3%AEP. There is also a flow path on the western boundary which has an area of high risk >3.33%AEP but also low risk 1%-0.1%AEP According to BGS the majority of the site is not considered to be prone to groundwater flooding, however there is some Class C within the northern extent
A60a	104.36	Shellow Cross Farm	100	0	0	High	Low	The area contains multiple significant SW flow paths which through the site eastwards where they are all meet to connect into the nearby main river. They all range from low to high risk however have significant amounts of high SW flood risk (>3.3%AEP) The access track is crossed multiple times by high surface water flood risk (>3.33%AEP) According to BGS the site is not considered to be prone to groundwater flooding Site within Flood Zone 1 and there is no fluvial flood risk however the northern section does border a main river
A60b	114.03	Shellow Cross Farm	100	0	0	High	Low	The area contains multiple significant SW flow paths which through the site eastwards where they are all meet to connect into the nearby main river. They all range from low to high risk however have significant amounts of high SW flood risk (>3.3%AEP) The access track is crossed multiple times by high surface water flood risk (>3.33%AEP) According to BGS the site is not considered to be prone to groundwater flooding Site within Flood Zone 1 and there is no fluvial flood risk however the northern section does border a main river
A61	61.14	Heckfordbridge - Site 1	100	0	0	Low	Medium	There are multiple isolated areas of low SW flood risk (1% to 0.1%AEP); one flow path of low risk (>0.1%AEP), flowing south to north through the western boundary; Where the flow path meets the boundary there is some high SW flood risk (>3.3% AEP). Groundwater flood risk = Entirety of site varies between Class A and B (centre of the site is Class A)
A62	94.53	Heckfordbridge - Site 2	100	0	0	Low	Medium	Site 2 also encompasses site 1 to the north. In addition to the above, there is also some low (1% to 0.1%AEP) surface water flood risk in the south-eastern corner with small traces of high risk (>3.33%AEP) Groundwater flood risk = Entirety of site varies between Class A and B (centre of the site is Class A)
A63	45.83	Patch Park - Abridge	11	10	79	High	High	A statutory main river runs along the border of the site, east to west, and the site is at a large amount of high (>3.33%AEP) and medium SW flood risk (3.33 to 1%AEP) as well as some areas of low SW flood risk (1% to 0.1%AEP). Groundwater flood risk = Majority of site is class C the rest of the site is not prone to groundwater flooding (far eastern side and access). At fluvial flood risk from the River Roding >=3.33%. Similarly at risk of flooding from reservoirs both during river flooding and when the river isn't flooding
A64	24.99	Land East of Asheldham Quarry	100	0	0	Low	High	There is one small low risk SW flow path, west to east, across the northern extent of the site (1% to 0.1%AEP); and there is one very small flow path of low risk (1% to 0.1%AEP) within the centre of the site which is closely associated with some ponding (high risk > 3.3%AEP) along eastern boundary; Groundwater Flood Risk = Majority of site is class B however the centre is Class C with the northeast not being prone to groundwater flooding.
A65	4.17	Land South of Asheldham Quarry	100	0	0	Low	Low	The majority of the site is at very low SW flood risk (<0.1% AEP) and the site is not at significant risk of SW flood risk. There is however some very small low risk ponding in the south-east corner (1%-0.1%AEP) Groundwater Flood Risk = The site is entirely class A
A66	58.49	White House Farm	100	0	0	Low	Medium	The majority of the site is at very low risk (<0.1% AEP) and the site is not at significant risk of SW flood risk. There are some areas of SW flood risk on the boundaries however these are minimal. Groundwater flood risk = Mainly Class A however the corners of the site are class B and C

Site ID	Size (ha)	Site Name	Fluvial FZ %			SW Flood Risk	GW Flood Risk	Flood risk comments
			1	2	3			
A67	22.14	Church Farm, Alresford (A16)	99	0	1	Low	Medium	The majority of the site is at very low SW flood risk (<0.1% AEP) and the site is not at significant risk of SW flood risk. There are some areas of SW flood risk on the boundaries however these are minimal and are low risk (1%-0.1%AEP) The access road has a small section which has a SW flow path running across it with a high SW flood risk (>3.33%AEP) along with an area of high-risk ponding at the end of the access road. This small area on the access road is also Flood Zone 3. Whilst this technically makes the site a medium risk, as the risk is mainly constrained to the access road no further analysis has been undertaken. Groundwater Flood Risk = West is not prone to groundwater flooding however the east and centre (~2/3rd of the site) is Class B. The access route however is Class C and should be ensured to designed in a way that access is not lost.
A68	69.41	Crabtree Farm - Great Bentley	100	0	0	Low	Low	There are multiple areas of low SW flood risk across the site (1%-0.1% AEP) however these are isolated areas of ponding most likely to do with topographical low points. According to BGS the site is not considered to be prone to groundwater flooding
A69	55.15	Frating Hall (A17)	100	0	0	Low	Low	There are some localised areas of low SW flood risk (1%-0.1% AEP)) throughout site (some to medium risk <3.33%-1%AEP. There are the beginnings of a low SW flood risk (1%-0.1%AEP) flow path on the western boundary of the site which flows east to west and offsite. The majority of the site is at very low risk (<0.1% AEP) and the site is not at significant risk of SW flood risk. According to BGS the majority of the site is not considered to be prone to groundwater flooding however small extent of the south-eastern corner is class C
A71	10.65	Lodge Farm, Alresford (A19)	100	0	0	Low	Low	All of the site is at very low SW flood risk (<0.1% AEP) and therefore the site is not at significant risk of SW flood risk. According to BGS the majority of the site is not considered to be prone to groundwater flooding, however the eastern border and the north of the site is Class A
A72	17.70	Martells - Southern extension	100	0	0	Medium	Low	There is one area of ponding centrally with high SW flood risk (>3.3% AEP) to low SW flood risk (1%-0.1%AEP) which has a greater extent however due to the nature of mineral works, if all ancillary buildings and storage areas are kept outside of area of risk then, carefully made topographical changes should not be a problem There is similar SW flooding found at the end of the access track. According to BGS the site is not considered to be prone to groundwater flooding
A73	14.21	Martells - Western extension	100	0	0	Low	Medium	All of the site is at very low SW flood risk (<0.1% AEP) and therefore the site is not at significant risk of SW flood risk aside from the beginning of the access track which has an area of high SW flood risk (>3.33%AEP) According to BGS the majority of the site is not considered to be prone to groundwater flooding however there is some Class B and C crossing the site
A74	105.9	Thorrington Hall Farm	100	0	0	High	Medium	There is one flow path which runs across the site from north to south consisting of high SW flood risk SW (>3.33%AEP) this is associated with a ditch. This flows towards a pond which similarly has a high SW flood risk (>3.33%AEP). The pond has low risk flow path (1%-0.1%AEP) leaving it and flowing eastwards, similarly, associated with a ditch/watercourse. There is a low-risk SW flow path flowing north to south through the southern border. There are some very small, isolated areas of ponding with SW high risk (>3.3% AEP) on the western boundary. According to BGS the majority of the site is not considered to be prone to groundwater flooding except for western extent which is Class A and B) and north-eastern corner (Class B, small bits of C)
A75	10.58	Land at Orford, Ugley - Bollington Hall	100	0	0	Low	Low	The area has one low risk flow path (1%-0.1%AEP) with a small section at medium SW flood risk (3.33% to 1% AEP), east to west, across a short section of the site. This is along a watercourse which flows to a main river on the western side of Cambridge Road. This watercourse and flow path is not within the site boundary. Groundwater flood risk = Majority of the site is Class A; however the eastern border has a small extent of class C and B
A76	39.52	Elsenham (A46)	100	0	0	Medium	Low	The northern boundary of this site has a SW flow path which flows east to west, it has some high to medium (>3.33% to 1% AEP) SW food risk associated with it however the majority is low risk (1% to 0.1% AEP) There are some low SW flood risk areas around the site as well as on the southern boundary however the majority of the site is at very low risk of SW flooding (<0.1%AEP)

Site ID	Size (ha)	Site Name	Fluvial FZ %			SW Flood Risk	GW Flood Risk	Flood risk comments
			1	2	3			
								According to BGS the majority of the site is not considered to be prone to groundwater flooding except for the north-western corner which has a small section of class C.
A77	21.18	West Extension to Highwood Quarry, Little Easton	100	0	0	High	Medium	The site has one SW flow path running north to south through the north-eastern and northern boundary with a medium risk (3.33% to 1% AEP) and a high risk (>3.3% AEP); there is also a low (1% to 0.1%AEP) SW flow path flowing east towards this main flow path. There is also an isolated areas of SW with medium risk (3.33% to 1%AEP) associated with the track. Groundwater water flood risk = The centre of the site is Class B and C, but the remainder is not considered to be prone to groundwater flooding
A79	23.20	Crown Quarry – North of Wick Lane	100	0	0	Low	Medium	There is a minor amount of surface water flood risk in the north-eastern corner (predominantly 1%-0.1% AEP) however it is not considered significant. This is associated with a larger offsite flow path. According to BGS the majority of the site is not considered to be prone to groundwater flooding except for southern border of the site which is class C.
A80	5.65	Crown Quarry – South of Wick Lane	100	0	0	Low	High	There is no surface water flood risk associated with the site According to BGS the eastern half of the site is not considered to be prone to groundwater flooding and the western half is class C
A82	16.07	Colemans Farm – Elm Springs Extension	100	0	0	Medium	Low	There is significant surface water flood risk along the Western boundary, ranging from a 3.33% AEP storm event to the 0.1% AEP storm event. This is due to a watercourse which borders then enters the site, therefore much of this risk is associated with this. As the risk is in and around the watercourse and mainly constrained to the edge of the site it is not considered high risk and can be mitigated against relatively easily without impacting the potential use of a mineral site. According to BGS the majority of the site is not considered to be prone to groundwater flooding and the small extents of the eastern corners are class C and B.
A83	14.07	Colemans Farm – Hole Farm	94.8	4.9 (5.2)	0.3	Medium	Medium	Borders the River Blackwater therefore some parts of the southern extent are within Flood Zone 2 and 3 There is some surface water flood risk cutting across the centre of the site which is associated with ditches/watercourses. This risk is mainly constrained to the watercourse which appears to discharge into the River Blackwater. The risk ranges from 3.33% AEP to mainly 0.1% AEP. According to BGS the majority of the site is not considered to be prone to groundwater flooding and the northern third is partly class C and mainly class B
A84	20.78	Colemans – Appleford Farm North Extension	35	9	56	High	High	Majority of site falls within Flood Zone 3, therefore significant risk of fluvial flooding Majority of the site is at significant surface water flood risk (up to >3.33%AEP). This flood risk is associated to watercourses and proximity to the River Blackwater and can be found centrally and towards the southern and western boundaries According to BGS the centre of the site is not considered to be prone to groundwater flooding however the remaining of the site is Class C Watercourse present on site and also borders River Blackwater
A85	24.43	Martells – North of Frating Road (East)	100	0	0	Medium	Low	There are three main areas shown to be at of surface water flood risk within the southern extent of the site. These areas look to be varying extents of ponding rather than an identified flow path and are also precent down and upstream. Within the site, the extents and level of risk get greater the further south/closer to the southern border they get, with the southernmost area having significant risk during the 3.33%AEP storm event. Due to the nature of mineral sites, this can arguably be mitigated against easily however should be considered carefully to ensure flood risk is not increased offsite. According to BGS the site is not considered to be prone to groundwater flooding
A86	29.57	Martells – North of Frating Road (Full site)	100	0	0	Medium	Low	There are some small negligible areas of ponding around the site which are mainly associated with storm events between 1% and 0.1%AEP. There is however a larger area of ponding covering the centre of the site (mainly at 0.1% AEP, although smaller parts are at risk of 3.33%-1%AEP) Due to the nature of mineral sites and the fact that this is likely associated with a topographical low point and not a watercourse, through careful planning this should be able to be mitigated against easily. According to BGS the site is not considered to be prone to groundwater flooding

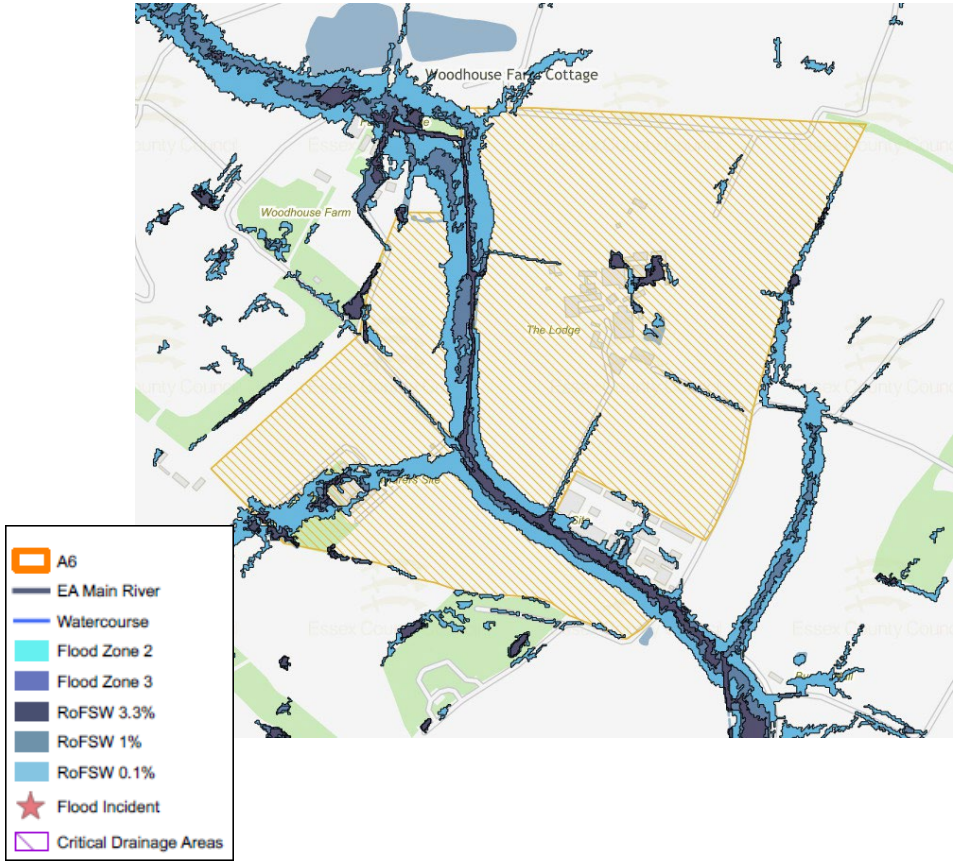
Site ID	Size (ha)	Site Name	Fluvial FZ %			SW Flood Risk	GW Flood Risk	Flood risk comments
			1	2	3			
A87	10.78	Martells – East of Slough Lane	100	0	0	Low	Low	Some small, localised areas of surface water flood risk (0.1%-1% AEP), most likely ponding due to a topographically lower areas. This is not linked to any flow paths and due to the nature of mineral sites would not be considered significant as earthworks will likely be occurring. According to BGS the site is not considered to be prone to groundwater flooding
A88	61.32	Gurnhams Farm	100	0	0	Medium	Low	According to BGS the majority of the site is not considered to be prone to groundwater flooding however the north-eastern corner has a small extent of Class C risk Several small, localised areas of surface water flood risk (0.1%-3.33% AEP), most likely ponding due to a topographically lower areas. This is not linked to any flow paths and due to the nature of mineral sites would not be considered significant as earthworks will likely be occurring. Majority is on the borders of the site; therefore it should be ensured flood risk is not increased off site.
A89	29.43	Covenbrooke Hall Farm	100	0	0	Medium	Low	Several small, localised areas of surface water flood risk (0.1%->3.33% AEP), most likely ponding due to a topographically lower areas. This is not linked to any flow paths and due to the nature of mineral sites would not be considered significant as earthworks will likely be occurring. There is also a small flow route to east associated with an offsite watercourse (0.1.-1% AEP) however is mainly along the border and is not considered significant. This watercourse should be maintained and kept clear to reduce the risk of surface water flood risk. According to BGS southern half of the site is not considered to be prone to groundwater flooding however the remainder is a mix between Class A and B
A90	13.38	Rayne Quarry - Northern Extension	100	0	0	High	Low	There is significant surface water flood risk in the north of the site which is associated partly with watercourse. The main surface water flood risk shown cuts through the site heading in a north easterly direction and, outside of the extent of the mapped watercourse is shown to be at between 1% and 0.1%AEP. There is also some additional surface water flood risk shown to be contributing along the northern boundary, heading east. When the watercourse begins (on the border of the site) the risk is also shown to be at 3.33% AEP. Any mineral site will have to be planned strategically so as to not negatively impact the watercourse and downstream flood risk as well as to ensure that the site and any necessary infrastructure is not negatively impacted. According to BGS the site is not considered to be prone to groundwater flooding
A91	27.71	Land at Chignal St James	98.5	0.5	1	Medium	Medium	Access route cuts across main river and watercourses (this is the area in the flood zone) Parts of the access road is crossed by a main river and is consequently in Flood Zone 2 and 3. Similarly a large part of the access track is affected by surface water flood risk ranging from <3.33% AEP to 0.1% AEP. Therefore where possible and if no adverse effects possible, any access track should consider being raised so as to avoid access issues during times of flooding. Within the main body of the site, there is a surface water flood risk overland flow heading south towards the main river. This has flood risk as high as 3.33% AEP associated with it and it cuts through the western side of the site. According to BGS the site is not considered to be prone to groundwater flooding however the access track has Class A, B, C risk associated with it, most likely due to the main river and therefore consideration should be given to raising this track as it is important to maintain all access routes.
A92	66.80	Land at Pattiswick Hall Farm – Small Site	100	0	0	Low	Low	According to BGS the site is not considered to be prone to groundwater flooding aside from the centre which is Class A and B There is some surface water flood risk along the northwest border this is associated with a watercourse and appears to mainly be contained within the extent of the watercourse. It is important to ensure this watercourse is kept clear and maintained so that flood risk is not increased on site or offsite. There are some small areas of overland flows associated with the 0.1%AEP storm event, however these can easily be mitigated against during any mineral works and are not considered to be significant.
A93	132.84	Land at Pattiswick Hall Farm – Full Site	99.76	0.04	0.2	Low	Low	The site borders the River Blackwater and therefore the northwest border has some extent within Flood Zone 2 and 3. The site is a continuation of A92 therefore the above flood risk comments are also relevant. The northern borders are shown to be at risk of surface water flooding (>3.33%AEP to 0.1%AEP) however these are associated with watercourses on the borders of the site and does not overly encroach on the centre of the site. It is important to ensure this watercourse is kept clear and maintained so that flood risk is not increased on site or offsite Groundwater flood risk = The southern site has a centre of Class A and B with the northern and south extents not being prone to groundwater flooding and the northern site is predominantly not prone to groundwater flooding however the south-eastern corner is Class A, and the north-western extent is Class B

Site ID	Size (ha)	Site Name	Fluvial FZ %			SW Flood Risk	GW Flood Risk	Flood risk comments
			1	2	3			
A94	37.67	Land at Highfields Farm	100	0	0	High	Medium	The site has significant surface water flood risk as it has three main watercourses running south to north through the site, all with a significant amount of surface water flood risk ranging from >3.33%AEP to 0.1%AEP. This flood risk is likely to be more difficult to mitigate against and it should be ensured that surface water flood risk is not increased on site or offsite. It is important to ensure that all watercourses are kept clear and maintained so that flood risk is not increased on site or offsite There are also some other areas of 0.1%AEP surface water flood risk which are a part of overland flows. According to BGS some of the site is not considered to be prone to groundwater flooding however there are multiple areas of Class C and B throughout the site
A95	12.787	Land at Bellhouse Farm South	96.85	0.45	2.7	Low	Medium	Flood zone 2 and 3 southwestern border due to proximity to river Some minor surface water flood risk (0.1-1% AEP) associated with southwestern border, most likely due to proximity to the main river, however rest of the site has a very low surface water flood risk. Groundwater flood risk = Class C on western border, this is closely associated with the watercourse. As the site progresses east, the risk decreases from Class B to Class A. Class A occupies half the site
A96	11.18	Rayne Quarry – Southern Extension	58.7	6.3	35	High	Medium	Significant area falls within flood zone 2 and 3 as a main river runs across the site therefore there is a significant amount of fluvial flood risk Significant surface water flood risk throughout the site due to watercourses and main river (up to >3.33%AEP). Surface water flood risk effects the majority of the site and is very significant. Groundwater flood risk = southern extent is class C (related to the River Ter) however the rest is not considered to be prone to groundwater flooding.
D7	15.42	Land at Pond Farm	100	0	0	Medium	Low	Some surface water flood risk associated with west border and the centre of the site. This flood risk mainly ranges from 1%-0.1%AEP and is associated with watercourses. It is important to ensure this watercourse is kept clear and maintained so that flood risk is not increased on site or offsite. The majority of the site is not considered to be prone to groundwater flood risk however there is a small section of Class B and C on the north-eastern border.

Appendix H: Site Specific Mapping for Medium Risk Sites

MLP ID	Site Name				Area (ha)
A6	Bradwell Quarry				38.5
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	High	Low	**Medium**

Site Map



Summary of Flood Risk to Site

- Watercourse running from north to south through entire site. This creates a risk of flooding with the potential to prevent access to areas of site
- Site within Flood Zone 1
- Potential surface water flood risk from runoff flowing across site to watercourse
- According to BGS the site is not considered to be prone to groundwater flooding.

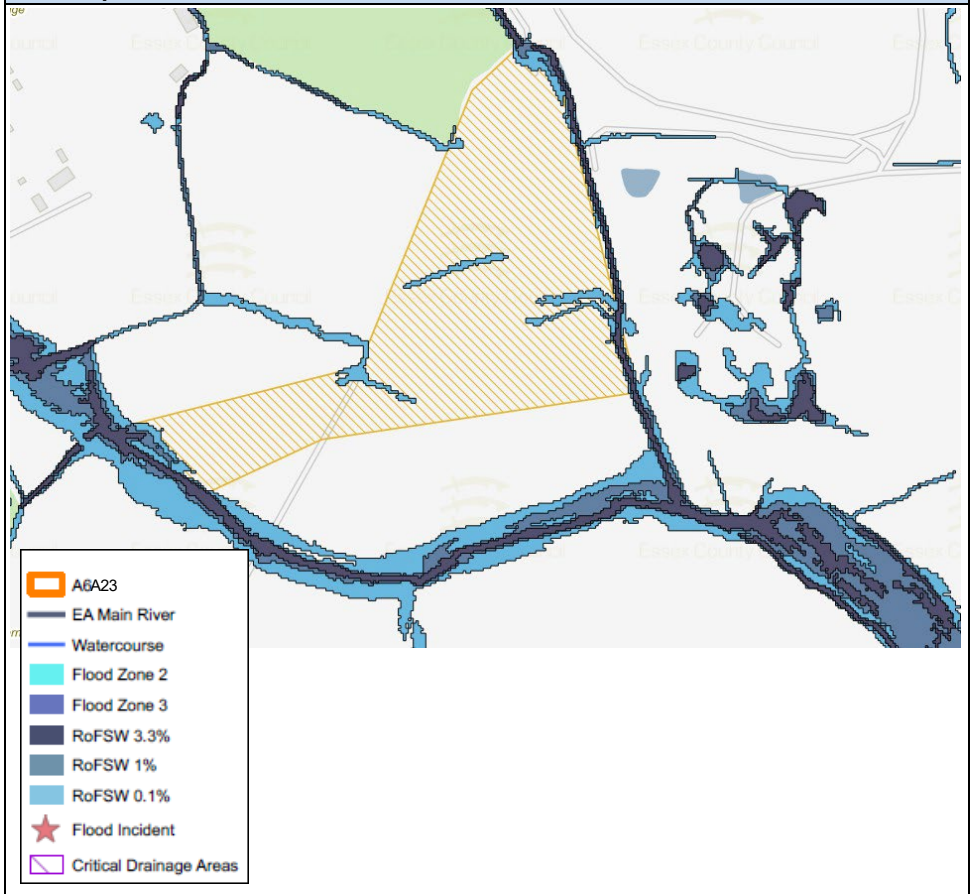
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process (if permission has not yet been granted) and during the operation and restoration phases.

- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Any changes to the main river or adjacent land may need Consent from the EA
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- The location for storing machinery, equipment, welfare units and offices etc. should be outside of flood risk areas
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.

MLP ID	Site Name				Area (ha)
A23	Little Bullocks Farm, Little Canfield				5.2
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Low	High	Medium

Site Map



Summary of Flood Risk to Site

- Some minor SW flow paths present along the western border with some small areas of insignificant ponding on the site.
- Western part of site is not considered to be prone to groundwater flooding however part of the eastern half is classed as C
- Site within Flood Zone 1

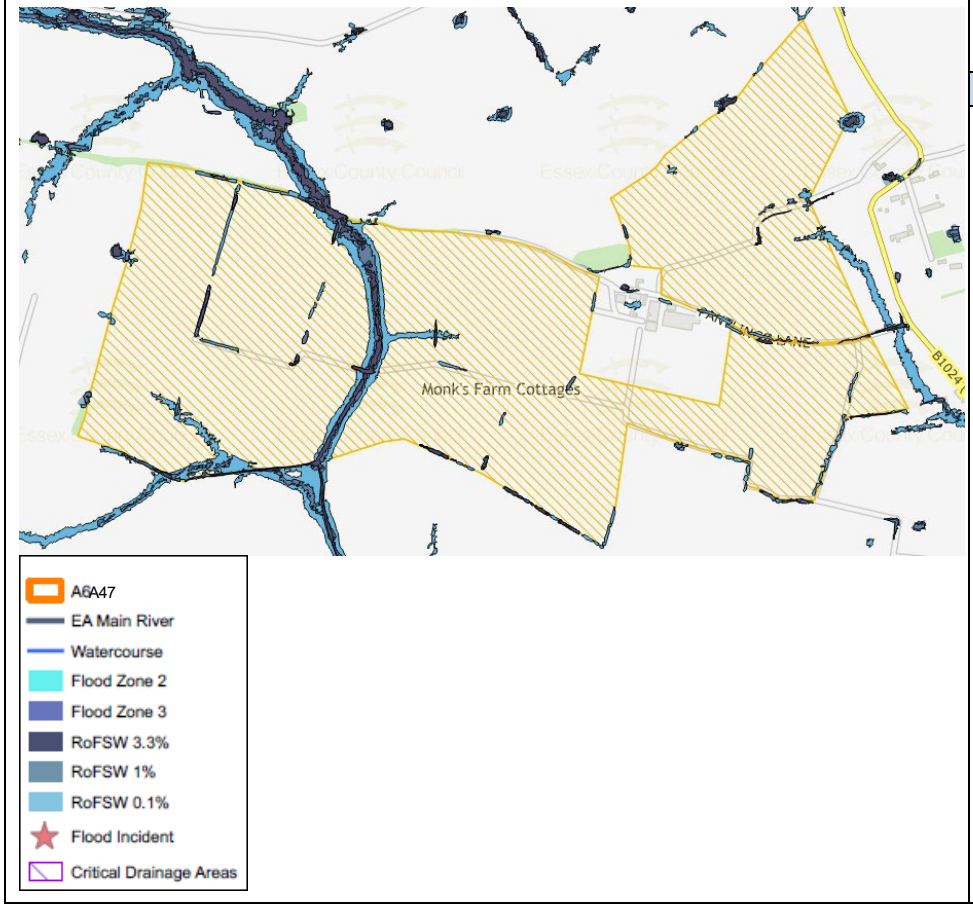
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process (if permission has not yet been granted) and during the operation and restoration phases.

- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Any potential changes to the porosity of the ground following works and its effects on groundwater levels and quality
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- The location for storing machinery, equipment, welfare units and offices etc. should be outside of flood risk areas
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.

MLP ID	Site Name				Area (ha)
A47	Bradwell Quarry Monks Farm				84.78
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Medium	Medium	Medium

Site Map



Summary of Flood Risk to Site

- There is a SW flow path running north to south with a high (>3.3%AEP) RofSW. This flow path also has a wider flood extent with a low RofSW (1% AEP to 0.1%AEP)
  There are also multiple isolated areas of surface water flooding, likely associated with topographical low points or what appears to be field boundaries.
- Some Class C groundwater flood risk associated with centre of site however this is closely attributed to the watercourse/flow path and is likely due to the lower ground levels and higher ground water levels here. The rest of the site is not considered to be prone to groundwater flooding.
- Site within Flood Zone 1 as is not near a section of main river

Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process (if permission has not yet been granted) and during the operation and restoration phases.

- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- The location for storing machinery, equipment, welfare units and offices etc. should be outside of flood risk areas
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.

MLP ID	Site Name				Area (ha)
A54	Whiteheads Field, Cressing Road, Witham				10.35
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Medium	Low	Medium

Site Map

Summary of Flood Risk to Site

- The western boundary borders area of low to high SW flood risk (>3.33% to 0.1% AEP) flowing north to south.
- The south-eastern boundary has similar risk and these two-flow path meet south of the site then continue south
- According to BGS the site is not considered to be prone to groundwater flooding. The access track however is affected by Class B and Class C and should be considered to be raised to reduce any susceptibility to groundwater flooding
- There is a potential ditch outside the border
- Site borders a significant surface water flow path in addition to a pond/lake.

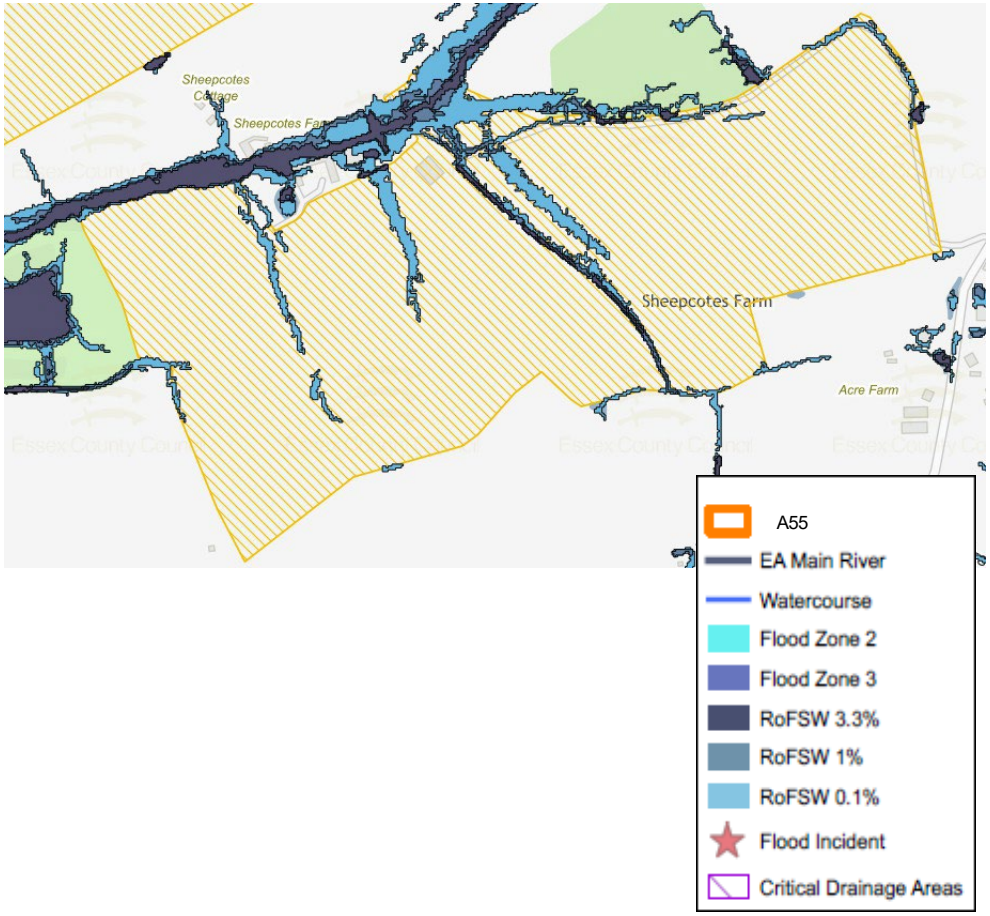
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse and pond/lake
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
-

MLP ID	Site Name				Area (ha)
A55	Sheepcotes Southern				25.27
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Medium	Low	**Medium**

Site Map



Summary of Flood Risk to Site

- Along the northern boundary of the site there is a surface water flow path flowing east to west, which is majority high risk (>3.3% AEP.) The site has four SW flow paths flowing north towards this, three of which are low risk (1% to 0.1% AEP), and one is high risk (>3.33%).
- According to BGS the majority of the site is not considered to be prone to groundwater flooding however a very small section of the north-western corner is Class C
- Site within Flood Zone 1 and there is no fluvial flood risk as is not near a section of main river

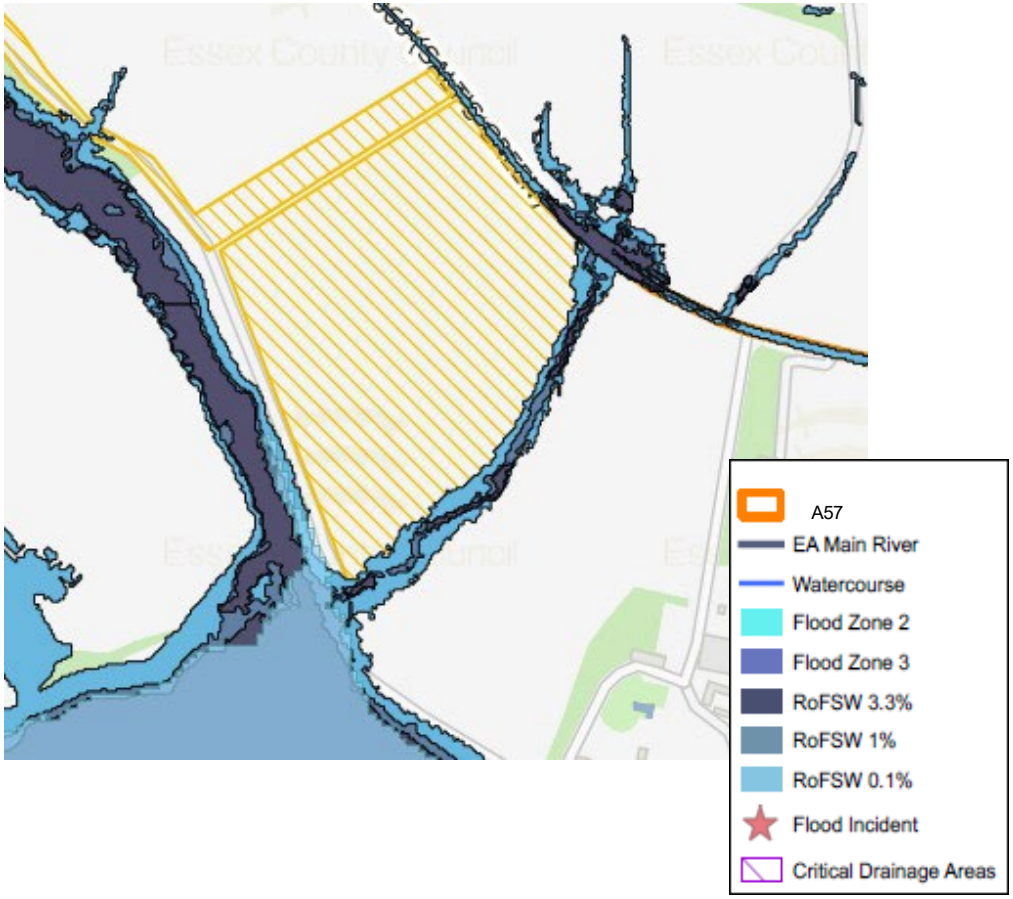
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
A57	Chalk End, Roxwell				6.83
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Low	Low	Medium

Site Map



Summary of Flood Risk to Site

- The eastern/south-eastern boundary is formed of a watercourse/ditch and has a Surface Water flow path flowing south westwards, of low to high-risk surface water flooding (>3.3%AEP to 0.1%AEP). The rest and majority of the site however is not at any significant surface water flood risk.
- According to BGS the majority of the site is not considered to be prone to groundwater flooding, however there is some Class C along southwestern corner/boundary
- Site within Flood Zone 1 and there is no fluvial flood risk although is very close to the flood extents of a main river

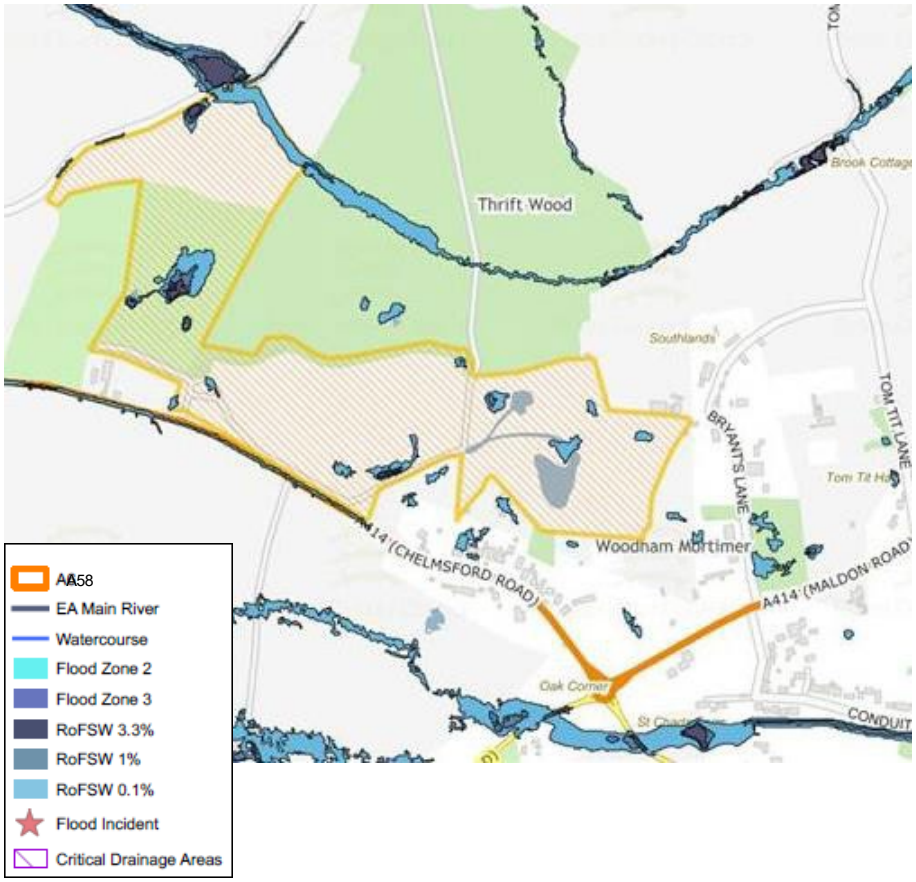
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
A58	Little Smiths Danbury				23.7
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Low	High	Medium

Site Map



Summary of Flood Risk to Site

- There is a very small extent of surface water flood risk in the southeast corner. The rest of the site has no significant areas of surface water flood risk.
- Groundwater flood risk varies between Class B and Class C over the entirety of the site
- Site within Flood Zone 1

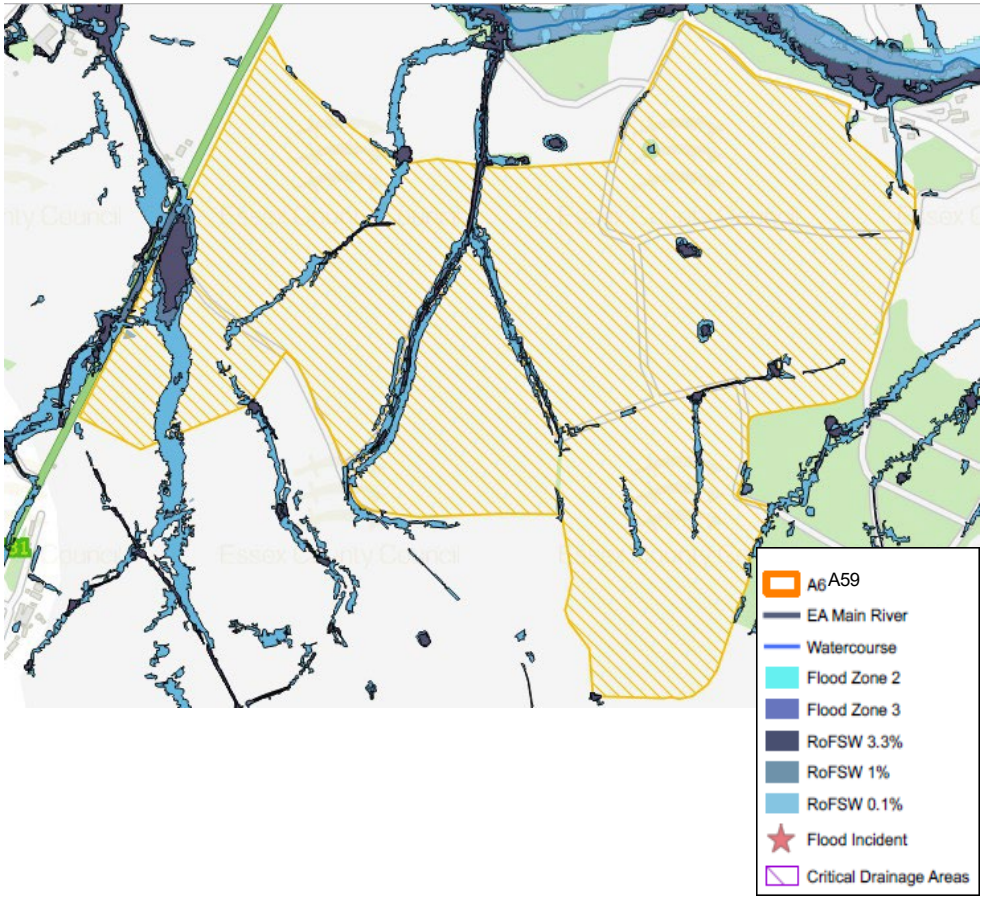
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process (if permission has not yet been granted) and during the operation and restoration phases.

- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Any potential changes to the porosity of the ground following works and its effects on groundwater levels and quality
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- The location for storing machinery, equipment, welfare units and offices etc. should be outside of flood risk areas
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.

MLP ID	Site Name				Area (ha)
A59	Lowleys Farm - Chelmsford				77.41
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	High	Medium	Medium

Site Map



Summary of Flood Risk to Site

- There are numerous SW flow paths flowing south to north. The majority are of low risk (1% to 0.1%AEP); one of the flow paths includes an area of both medium and high risk (>3.3%AEP to 1%AEP); there are also multiple isolated areas of high risk (>3.3%AEP)
- There is also a flow path on the western boundary which has an area of high risk >3.33%AEP
- According to BGS the majority of the site is not considered to be prone to groundwater flooding, however there is some Class C within the northern extent
- Site within Flood Zone 1 and there is no fluvial flood risk

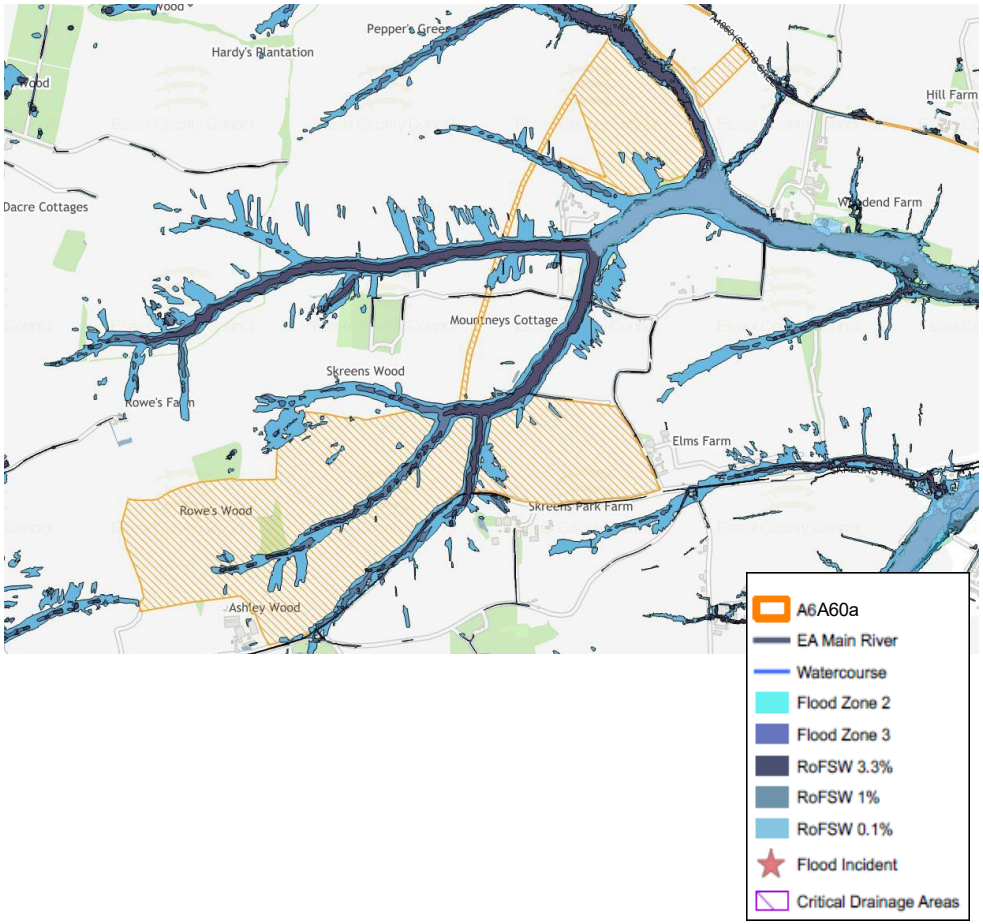
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
A60a	Shellow Cross Farm - Chelmsford				104.36
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	High	Low	Medium

Site Map



Summary of Flood Risk to Site

- The area contains multiple significant SW flow paths which through the site eastwards where they are all meet to connect into the nearby main river. They all range from low to high risk however have significant amounts of high SW flood risk (>3.3%AEP)
- The access track is crossed multiple times by high surface water flood risk (>3.33%AEP)
- According to BGS the site is not considered to be prone to groundwater flooding
- Site within Flood Zone 1 and there is no fluvial flood risk however the northern section does border a main river

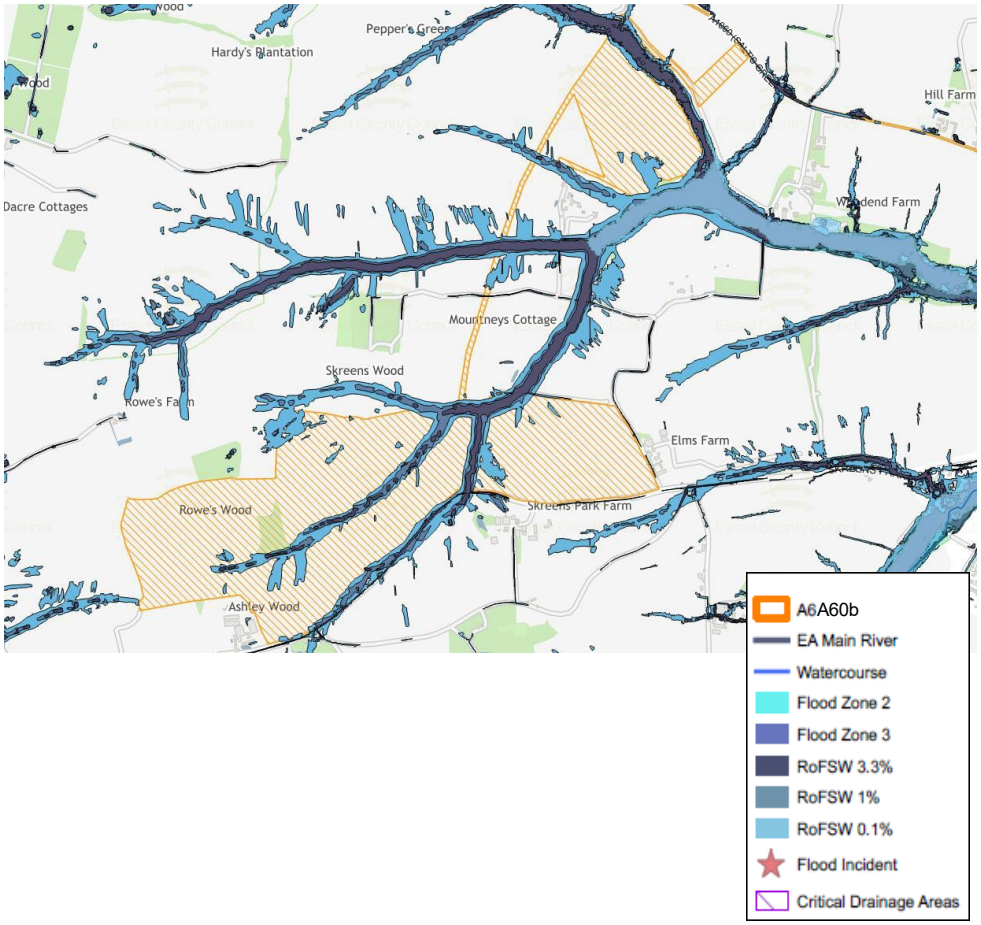
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Any interaction with the neighbouring main river may require consent from the Environment Agency and care should be taken to not increase pollution within it
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
A60b	Shellow Cross Farm - Chelmsford				114.03
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	High	Low	Medium

Site Map



Summary of Flood Risk to Site

- The area contains multiple significant SW flow paths which through the site eastwards where they are all meet to connect into the nearby main river. They all range from low to high risk however have significant amounts of high SW flood risk (>3.3%AEP)
- The access track is crossed multiple times by high surface water flood risk (>3.33%AEP)
- According to BGS the site is not considered to be prone to groundwater flooding
- Site within Flood Zone 1 and there is no fluvial flood risk however the northern section does border a main river

Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Any interaction with the neighbouring main river may require consent from the Environment Agency and care should be taken to not increase pollution within it
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
A64	Land East of Asheldham Quarry				24.99
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Low	High	Medium

Site Map

Summary of Flood Risk to Site

- There is one small low risk SW flow path, west to east, across the northern extent of the site (1% to 0.1%AEP); and there is one very small flow path of low risk (1% to 0.1%AEP) within the centre of the site which is closely associated with some ponding (high risk > 3.3%AEP) along eastern boundary; Both flow paths flow east of site.
- Groundwater Flood Risk = Majority of site is class B however the centre is Class C with the northeast not being prone to groundwater flooding.
- Site within Flood Zone 1 and there is no fluvial flood risk as is not near a section of main river

Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Any potential changes to the porosity of the ground following works and its effects on groundwater levels and quality
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
A67	Church Farm, Alresford				22.14
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
99	0	1	Low	Medium	Medium

Site Map

Summary of Flood Risk to Site

- The majority of the site is at very low SW flood risk (<0.1% AEP) and the site is not at significant risk of SW flood risk.
- There are some areas of SW flood risk on the boundaries however these are minimal and are low risk (1%-0.1%AEP)
- The access road has a small section which has a SW flow path running across it with a high SW flood risk (>3.33%AEP) along with an area of high-risk ponding at the end of the access road. This small area on the access road is also Flood Zone 3 (1% of the site). Whilst this technically makes the site a medium risk, as the risk is mainly constrained to the access road no further analysis has been undertaken.
- Groundwater Flood Risk = West is not prone to groundwater flooding however the east and centre (~2/3rd of the site) is Class B. The access route however is Class C and should be ensured to designed in a way that access is not lost

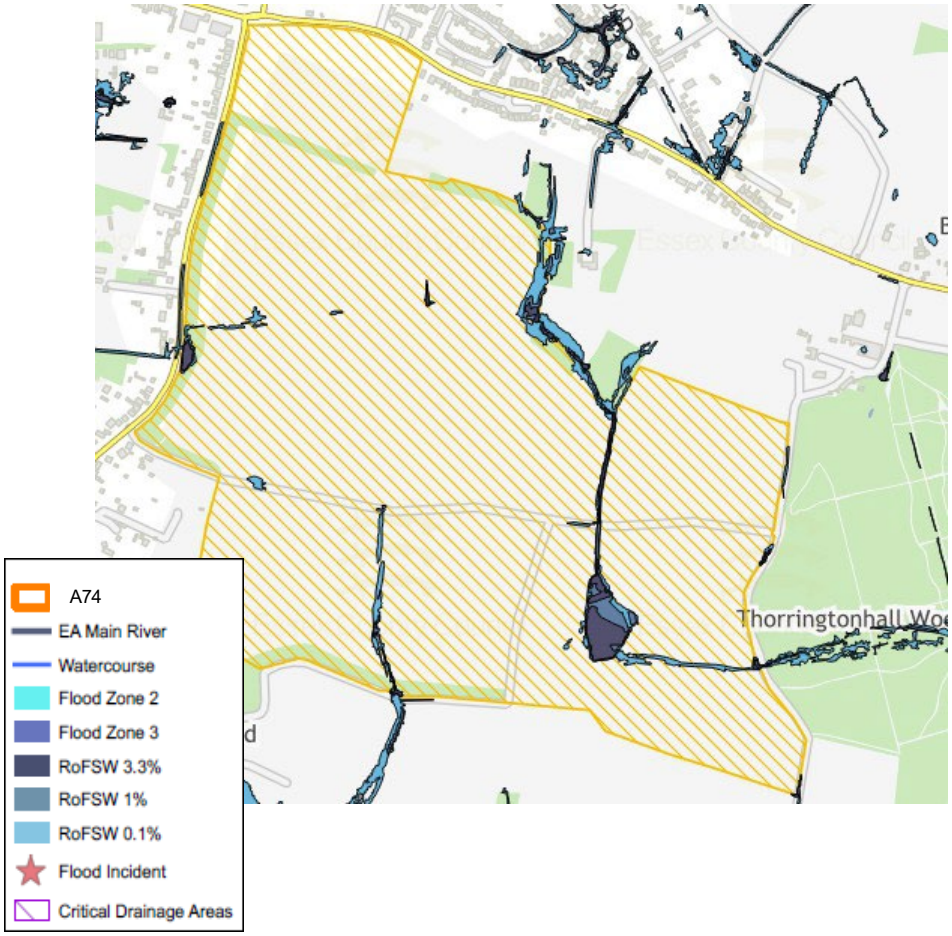
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- Any changes to the flow or routing of the Main River will require permission from the EA
- Care should be made so as to not increase pollution into any watercourses or the Main River
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

MLP ID	Site Name				Area (ha)
A74	Thorrington Hall Farm				105.9
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Medium	Medium	**Medium**

Site Map



Summary of Flood Risk to Site

- The site has one flow path which runs across the site from north to south consisting of high SW flood risk SW (>3.33%AEP) this is associated with a ditch. This flows towards a pond which similarly has a high SW flood risk (>3.33%AEP). The pond has low risk flow path (1%-0.1%AEP) leaving it and flowing eastwards, similarly, associated with a ditch/watercourse. There is a low-risk SW flow path flowing north to south through the southern border. There are some very small, isolated areas of ponding with SW high risk (>3.3% AEP) on the western boundary.
- According to BGS the majority of the site is not considered to be prone to groundwater flooding except for western extent which is Class A and B) and north-eastern corner (Class B, small bits of C)
- Site within Flood Zone 1 and there is no fluvial flood risk as is not near a section of main river

Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
A75	Land at Orford, Ugley – Bollington Hall				10.58
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Medium	Low	Medium

Site Map

Summary of Flood Risk to Site

- The area has one low risk flow path (1%-0.1%AEP) with a small section at medium SW flood risk (3.33% to 1% AEP), east to west, across a short section of the site. This is along a watercourse which flows to a main river watercourse on the western side of Cambridge Road. This watercourse and flow path is not within the site boundary.
- Groundwater flood risk = Majority of the site is Class A; however the eastern border has a small extent of class C and B
- Site within Flood Zone 1 and there is no fluvial flood risk however does border a section of main river

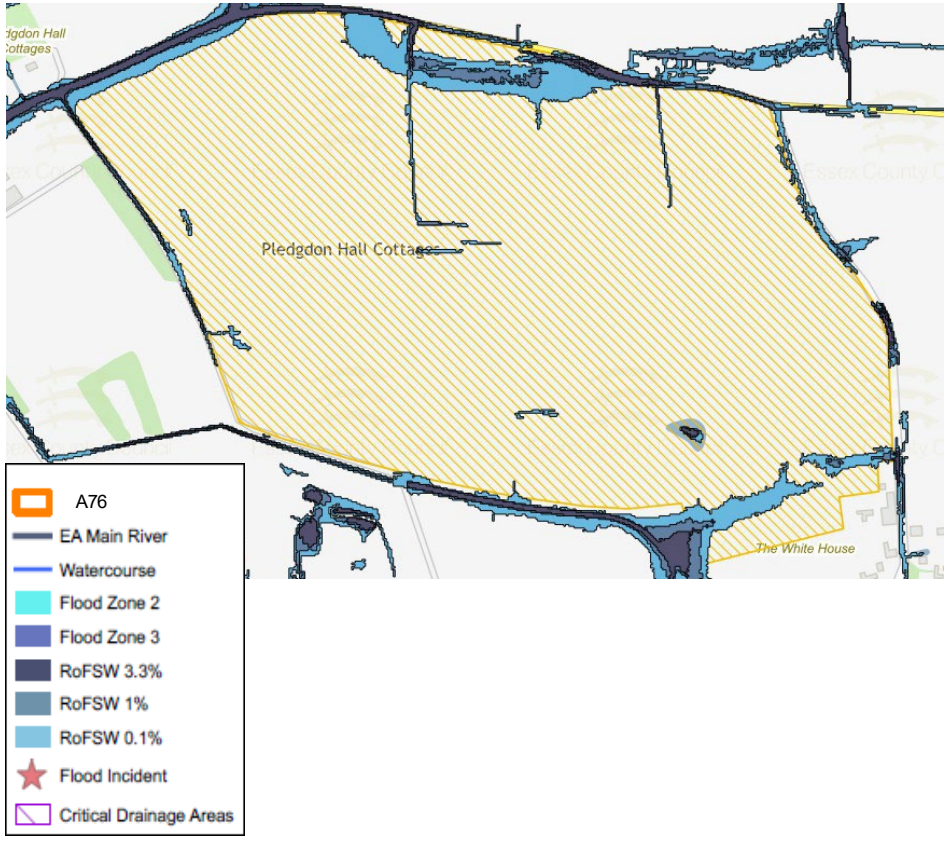
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- Care should be made so as to not increase pollution into any watercourses or the Main River
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

MLP ID	Site Name				Area (ha)
A76	Elsenham (A46)				39.5
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Medium	Low	**Medium**

Site Map



Summary of Flood Risk to Site

- The northern boundary of this site has a SW flow path which flows east to west, it has some high to medium (>3.33% to 1% AEP) SW food risk associated with it however the majority is low risk (1% to 0.1% AEP)
- There are some low SW flood risk areas around the site as well as on the southern boundary however the majority of the site is at very low risk of SW flooding (<0.1%AEP)
- According to BGS the majority of the site is not considered to be prone to groundwater flooding except for the north-western corner which has a small section of class C.
- Site within Flood Zone 1 and there is no fluvial flood risk as is not near a section of main river

Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
A77	West Extension to Highwood Quarry, Little Easton				21.18
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	High	Medium	Medium

Site Map

Summary of Flood Risk to Site

- The site has one SW flow path running north to south through the north-eastern and northern boundary with a medium risk (3.33% to 1% AEP) and a high risk (>3.3% AEP); there is also a low (1% to 0.1%AEP) SW flow path flowing east towards this main flow path. There is also an isolated areas of SW with medium risk (3.33% to 1%AEP) associated with the track.
- Groundwater water flood risk = The centre of the site is Class B and C, but the remainder is not considered to be prone to groundwater flooding
- Site within Flood Zone 1 and there is no fluvial flood risk as is not near a section of main river

Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
A80	Crown Quarry – South of Wick Lane				5.6
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Low	High	MEDIUM

Site Map

Summary of Flood Risk to Site

- Site within Flood Zone 1
- There is no surface water flood risk associated with the site
- According to BGS the eastern half of the site is not considered to be prone to groundwater flooding and the western half is class C.

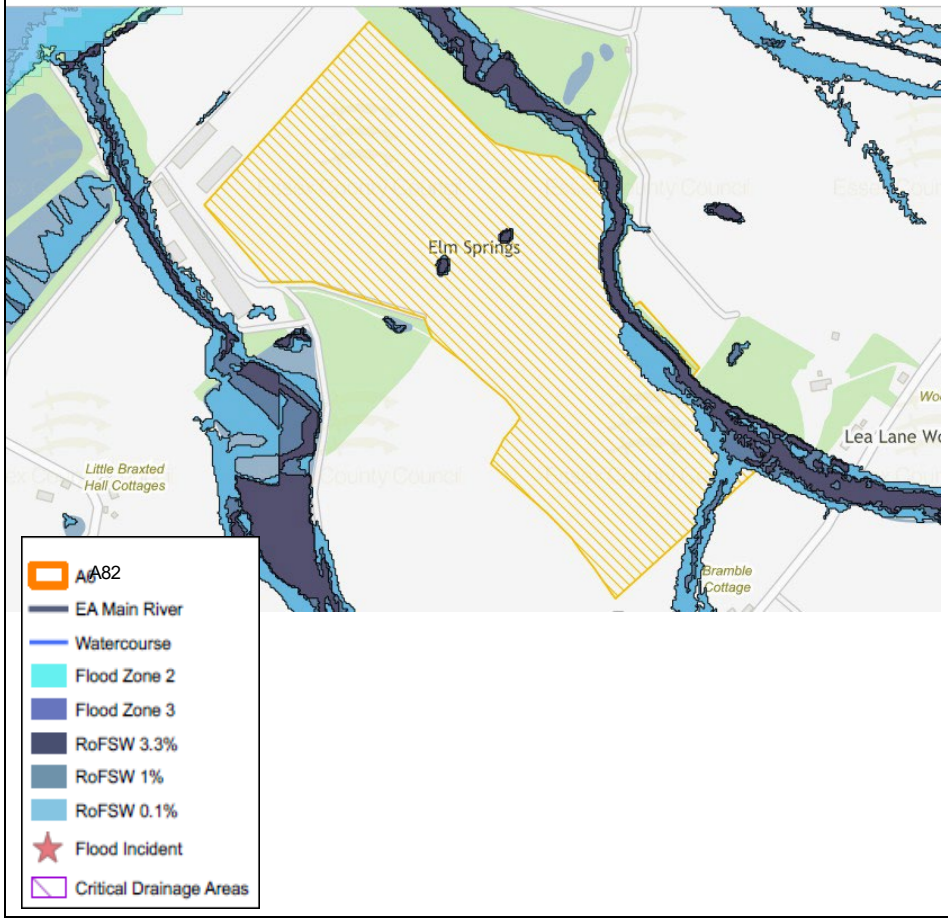
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process (if permission has not yet been granted) and during the operation and restoration phases.

- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Any potential changes to the porosity of the ground following works and its effects on groundwater levels and quality
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- The location for storing machinery, equipment, welfare units and offices etc. should be outside of flood risk areas
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.

MLP ID	Site Name				Area (ha)
A82	Colermans Farm – Elm Springs Extension				16.07
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Medium	Low	Medium

Site Map



Summary of Flood Risk to Site

- There is significant surface water flood risk along the Western boundary, ranging from a 3.33% AEP storm event to the 0.1% AEP storm event. This is due to a watercourse which borders then enters the site, therefore much of this risk is associated with this. As the risk is in and around the watercourse and mainly constrained to the edge of the site it is not considered high risk and can be mitigated against relatively easily without impacting the potential use of a mineral site.
- According to BGS the majority of the site is not considered to be prone to groundwater flooding and the small extents of the eastern corners are class C and B.
- The site is entirely in Flood Zone 1 and has no associated fluvial flood risk.

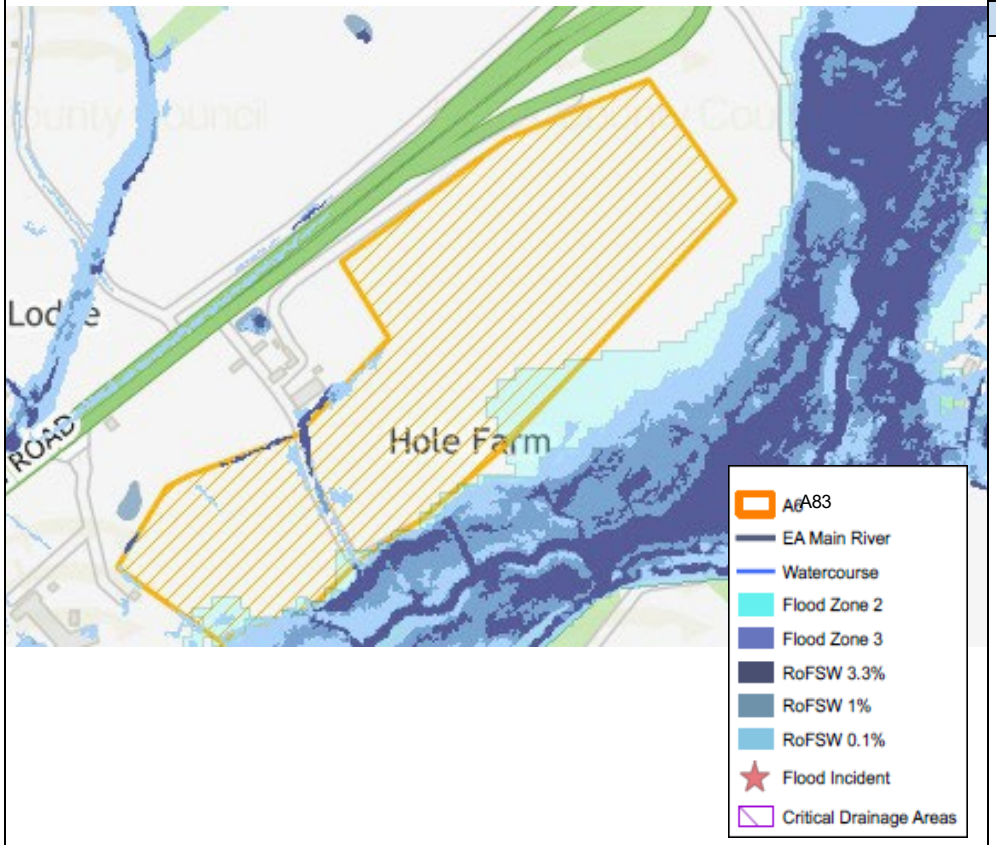
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
A83	Colemans Farm – Whole Farm				14.07
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
94.8	4.9 (5.2)	0.3	Medium	Medium	Medium

Site Map



Summary of Flood Risk to Site

- The site borders the River Blackwater therefore some parts of the southern extent are within Flood Zone 2 (5.2%) and 3 (0.3%).
- This extent is also at risk of flooding from reservoirs when there is also flooding from rivers.
- There is some surface water flood risk cutting across the centre of the site which is associated with ditches/watercourses. This risk is mainly constrained to the watercourse which appears to discharge into the River Blackwater. The risk ranges from 3.33% AEP to mainly 0.1% AEP.
- According to BGS the majority of the site is not considered to be prone to groundwater flooding and the northern third is partly class C and mainly class B

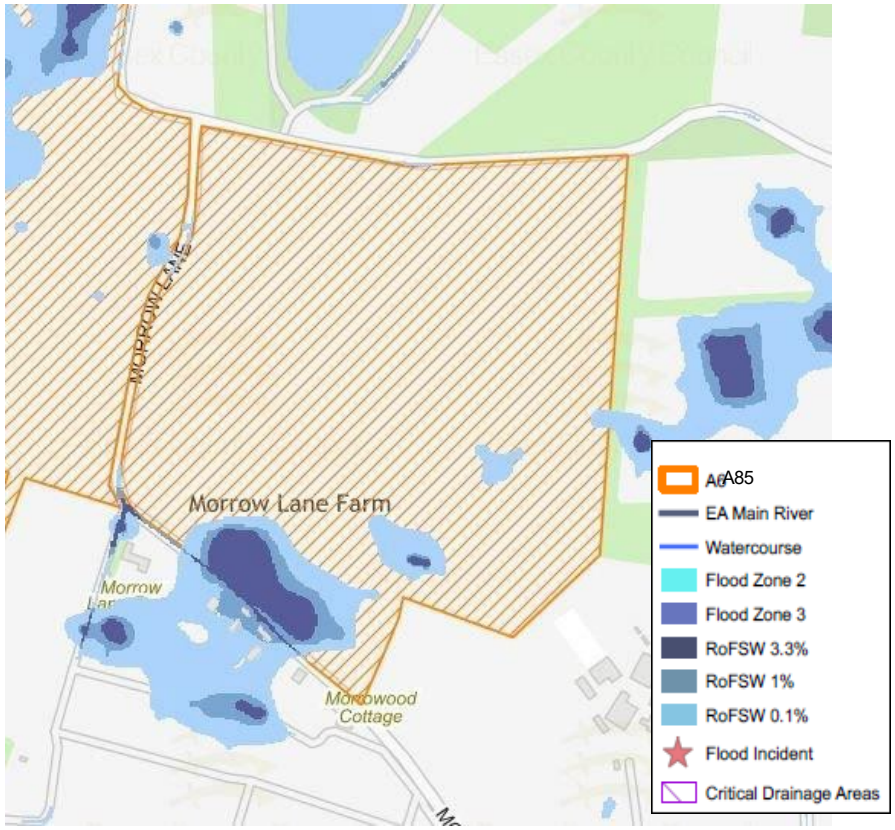
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- Any changes to the flow or routing of the River Blackwater will require permission from the EA
- Care should be made so as to not increase pollution into any watercourses or the River Blackwater
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

MLP ID	Site Name				Area (ha)
A85	Martells – North of Frating Road (East)				24.43
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Medium	Low	Medium

Site Map



Summary of Flood Risk to Site

- There are three main areas shown to be at of surface water flood risk within the southern extent of the site. These areas look to be varying extents of ponding rather than an identified flow path and are also precent down and upstream. Within the site, the extents and level of risk get greater the further south/closer to the southern border they get, with the southernmost area having significant risk during the 3.33%AEP storm event.
- According to BGS the site is not considered to be prone to groundwater flooding
- The site is entirely in Flood Zone 1 and has no associated fluvial flood risk.

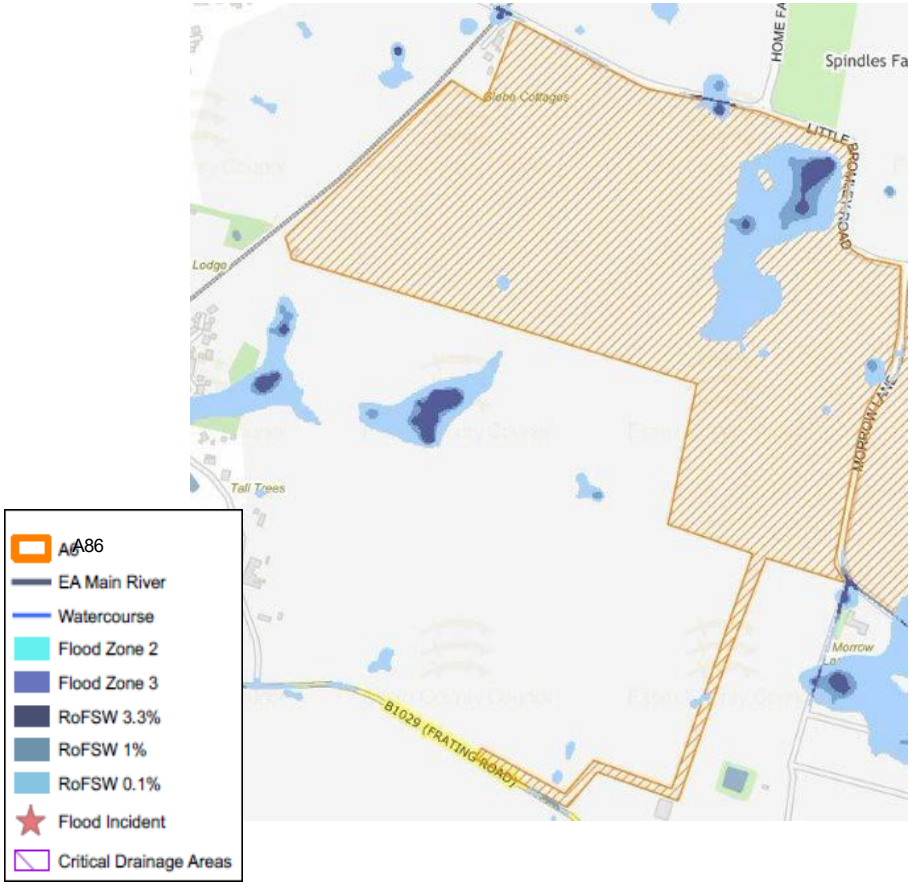
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
A86	Martells – North of Frating Road (West)				29.57
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Medium	Low	Medium

Site Map



Summary of Flood Risk to Site

- There are some small negligible areas of ponding around the site which are mainly associated with storm events between 1% and 0.1%AEP. There is however a larger area of ponding covering the centre of the site (mainly at 0.1% AEP, although smaller parts are at risk of 3.33%-1%AEP) Due to the nature of mineral sites and the fact that this is likely associated with a topographical low point and not a watercourse
- According to BGS the site is not considered to be prone to groundwater flooding
- The site is entirely in Flood Zone 1 and has no associated fluvial flood risk.

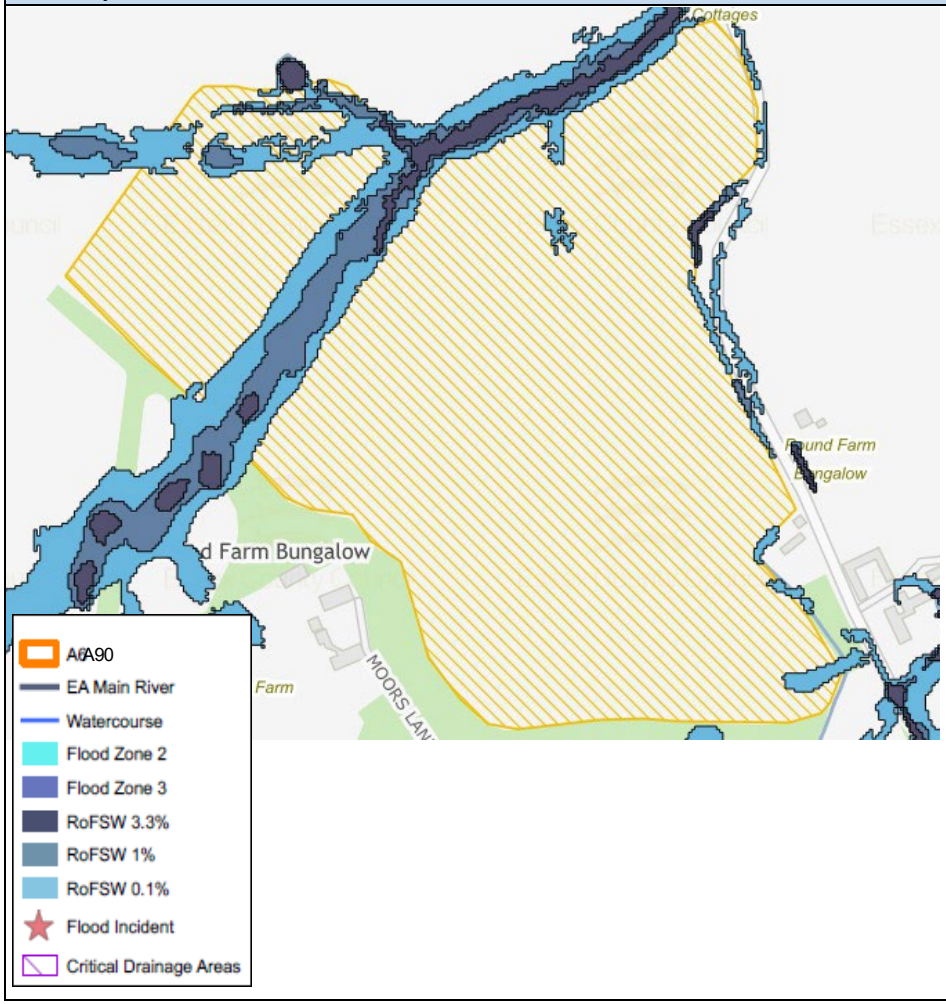
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
A90	Rayne Quarry – Northeast Extension				13.38
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	High	Low	Medium

Site Map



Summary of Flood Risk to Site

- There is significant surface water flood risk in the north of the site which is associated partly with watercourse. The main surface water flood risk shown cuts through the site heading in a north easterly direction and, outside of the extent of the mapped watercourse, is shown to be at between 1% and 0.1%AEP. There is also some additional surface water flood risk shown to be contributing along the northern boundary, heading east. When the watercourse begins (on the border of the site) the risk is also shown to be at 3.33% AEP.
- According to BGS the site is not considered to be prone to groundwater flooding
- The site is entirely in Flood Zone 1 and there is no associated fluvial flood risk

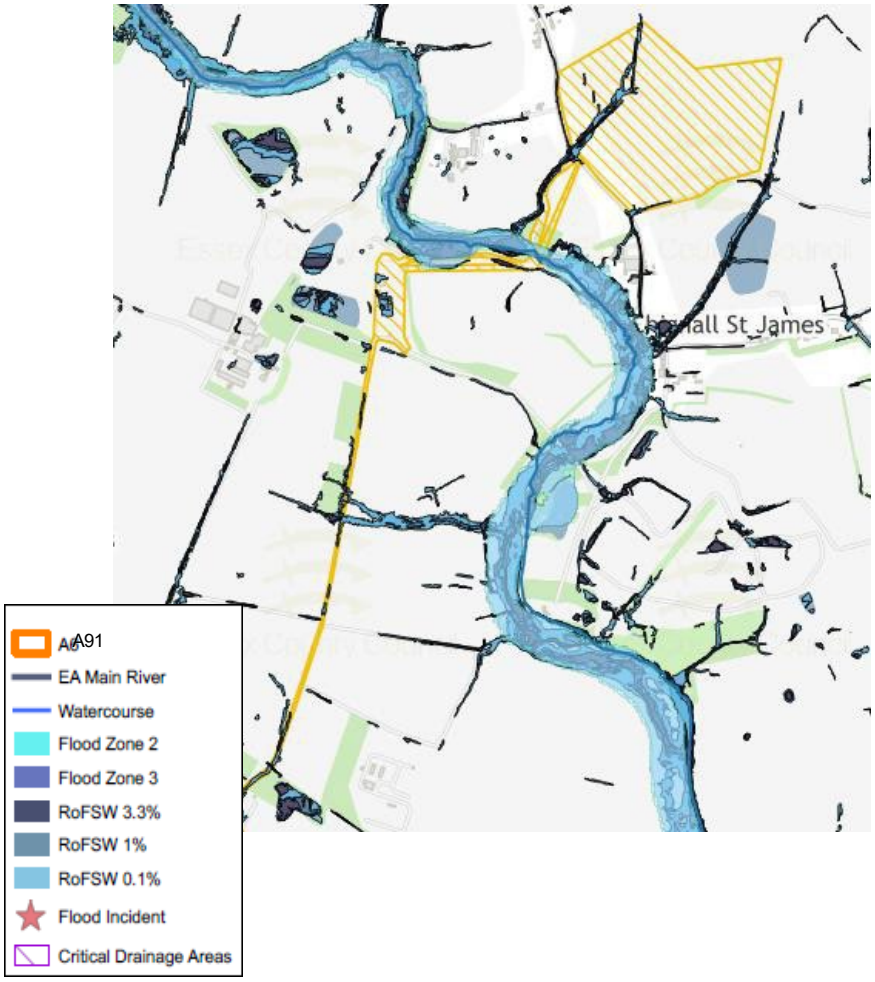
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- Any mineral site will have to be planned strategically so as to not negatively impact the watercourse and downstream flood risk as well as to ensure that the site and any necessary infrastructure is not negatively impacted.

MLP ID	Site Name				Area (ha)
A91	Land at Chignal St James				27.14
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
98.5	0.5	1	Medium	Medium	Medium

Site Map



Summary of Flood Risk to Site

- The access route cuts across main river and watercourses
- Parts of the access road is crossed by a main river and is consequently in Flood Zone 2 (0.5%) and 3 (1%), however the majority of the site is not at fluvial flood risk
- A large part of the access track is affected by surface water flood risk ranging from <3.33% AEP to 0.1% AEP.
- Within the main body of the site, there is a surface water flood risk overland flow heading south towards the main river. This has flood risk as high as 3.33% AEP associated with it and it cuts through the western side of the site.
- According to BGS the site is not considered to be prone to groundwater flooding however the access track has Class A, B, C risk associated with it, most likely due to the main river and therefore consideration should be given to raising this track as it is important to maintain all access routes.

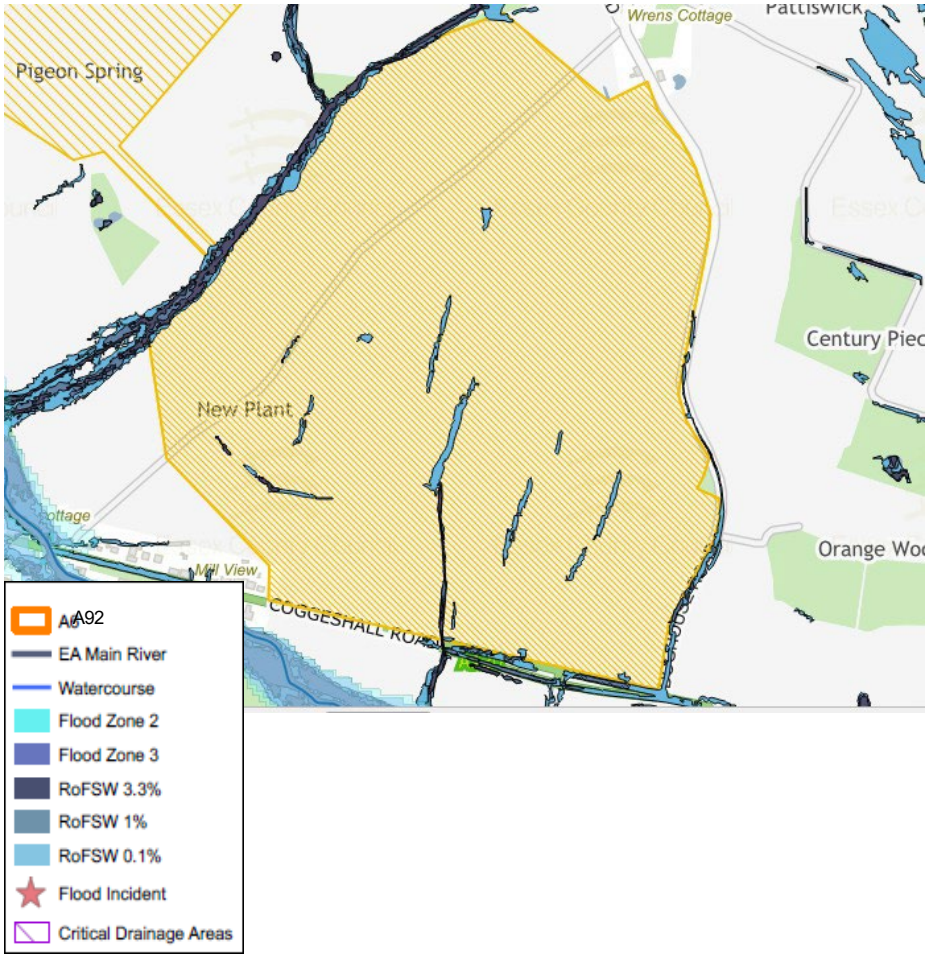
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact on flood risk to the site and local area from the watercourse and main river
- Any potential changes to ground levels and the impact on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Any changes to the flow or routing of the Main River will require permission from the EA
- Care should be made so as to not increase pollution into any watercourses or the Main River
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- Where possible and if no adverse effects possible, any access track should consider being raised so as to avoid access issues during times of flooding
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

MLP ID	Site Name				Area (ha)
A92	Land at Pattiswick Hall Farm – Small Site				66.80
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Low	Low	Medium

Site Map



Summary of Flood Risk to Site

- According to BGS the site is not considered to be prone to groundwater flooding aside from the centre which is Class A and B
- There is some surface water flood risk along the northwest border this is associated with a watercourse and appears to mainly be contained within the extent of the watercourse.
- There are some small areas of overland flows associated with the 0.1%AEP storm event, however these can easily be mitigated against during any mineral works and are not considered to be significant.

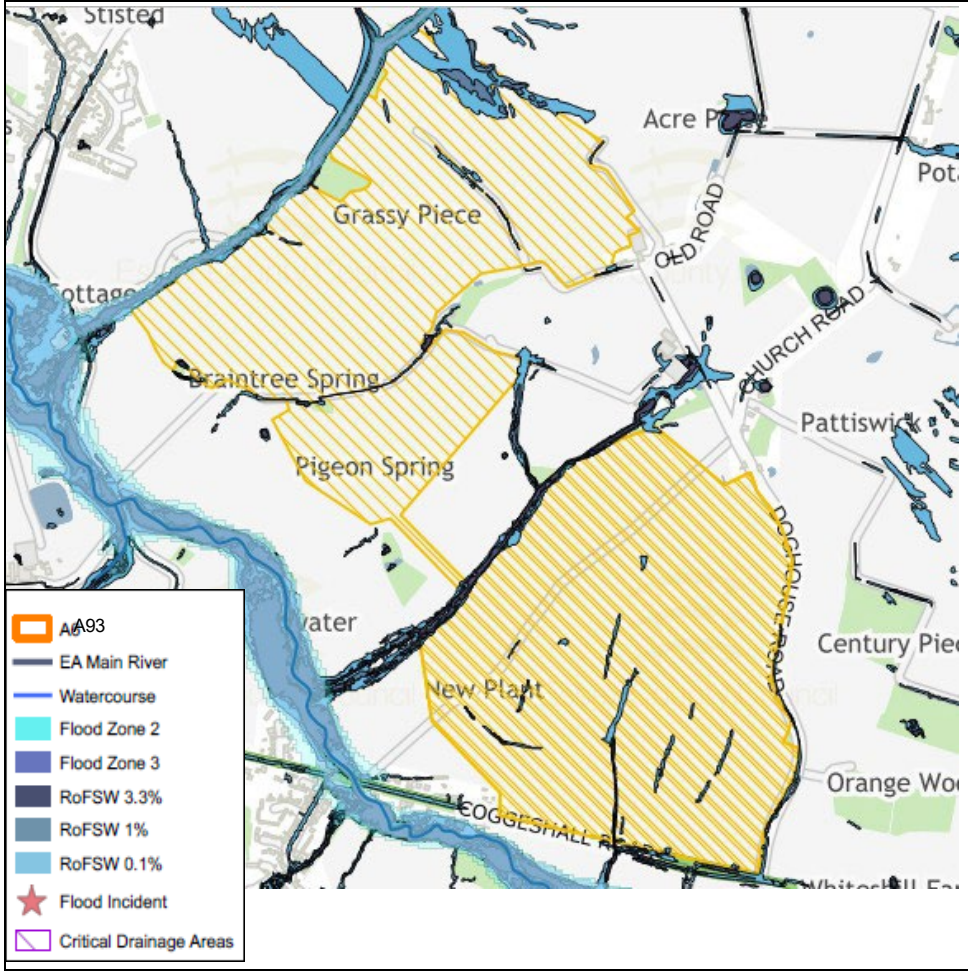
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
A93	Land at Pattiswick Hall Farm – Full Site				132.84
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
99.76	0.04	0.2	Low	Low	Medium

Site Map



Summary of Flood Risk to Site

- The site borders a tributary of the River Blackwater and therefore the northwest border has some extent within Flood Zone 2 (0.04%) and 3 (0.2%). The site is a continuation of A92 therefore the above flood risk comments are also relevant.
- The northern borders are shown to be at risk of surface water flooding (>3.33%AEP to 0.1%AEP) however these are associated with watercourses on the borders of the site and does not overly encroach on the centre of the site.
- Groundwater flood risk = The southern site has a centre of Class A and B with the northern and south extents not being prone to groundwater flooding and the northern site is predominantly not prone to groundwater flooding however the south-eastern corner is Class A, and the north-western extent is Class B

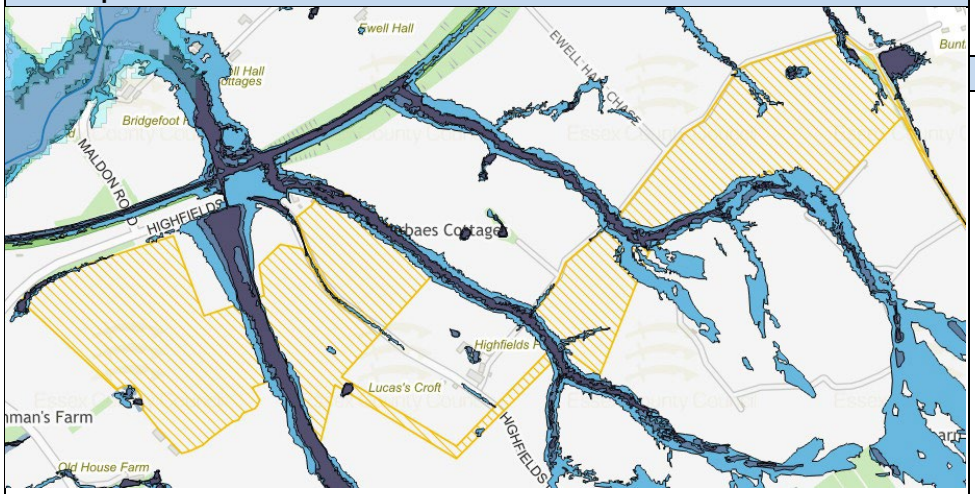
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact on flood risk to the site and local area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

MLP ID	Site Name				Area (ha)
A94	Land at Highfields Farm				37.67
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	High	Medium	Medium

Site Map



Summary of Flood Risk to Site

- The site has significant surface water flood risk as it has three main watercourses running south to north through the site, all with a significant amount of surface water flood risk >3.33%AEP.
- There are also some other areas of 0.1%AEP surface water flood risk which are a part of overland flows.
- The site has no fluvial flood risk and is entirely in Flood Zone 1
- According to BGS some of the site is not considered to be prone to groundwater flooding however there are multiple areas of Class C and B throughout the site

Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

MLP ID	Site Name				Area (ha)
D7	Land at Pond Farm				15.42
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
100	0	0	Medium	Low	Medium

Site Map

Summary of Flood Risk to Site

- Some surface water flood risk associated with west border and the centre of the site. This flood risk mainly ranges from 3.33%-0.1%AEP and is associated with watercourses. It is important to ensure these watercourses are kept clear and maintained so that flood risk is not increased on site or offsite.
- The site is entirely within Flood Zone 1
- The majority of the site is not considered to be prone to groundwater flood risk however there is a small section of Class B and C on the north-eastern border.
- The site is not at any modelled fluvial flood risk.

Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, and weather stations to continuously monitor precipitation, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.

Appendix I: Site Specific Mapping for High Risk Sites

MLP ID	Site Name				Area (ha)
A22	Little Bullocks Farm				7.8
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
92.2	4.7	3.1	High	High	**HIGH**

Site Map

Summary of Flood Risk to Site

- Eastern side of site is bounded by an EA main river
- Small percentages of site are within Flood Zones 2 (6%) and 3 (4%)
- Potential surface water flood risk from runoff flowing across site to the main river
- Western part of site is not considered to be prone to groundwater flooding however part of the eastern half is classed as C

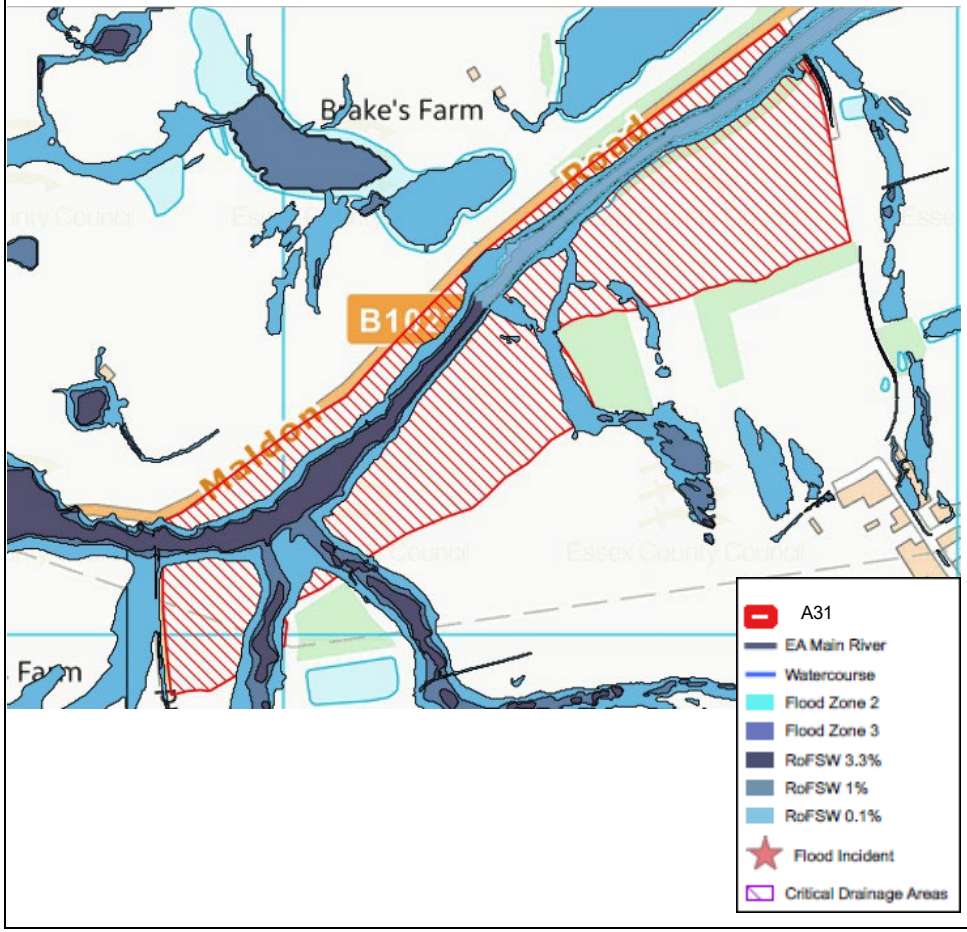
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse and main river
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Any potential changes to the porosity of the ground following works and its effects on groundwater levels
- Installing monitoring systems such as rain gauges, river level sensors, and weather stations to continuously monitor precipitation, river water levels, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- Any changes to the flow or routing of the Main River will require permission from the EA
- Care should be made so as to not increase pollution into any watercourses or the Main River
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., silt fences, sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

MLP ID	Site Name				Area (ha)
A31	Maldon Road, Birch				30
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
89.5	5.7	4.8	High	High	HIGH

Site Map



Summary of Flood Risk to Site

- Watercourse running from west to east through entire site. This creates a risk of flooding with the potential to prevent access to areas of site
- Parts of the site within Flood Zones 2 and 3 (4% FZ2 and 4% FZ3)
- Potential surface water flood risk from runoff flowing across site to watercourse
- Surface water flow paths present within southern area of site
- Groundwater flood risk is mainly classed as C however there is a large area classed as B

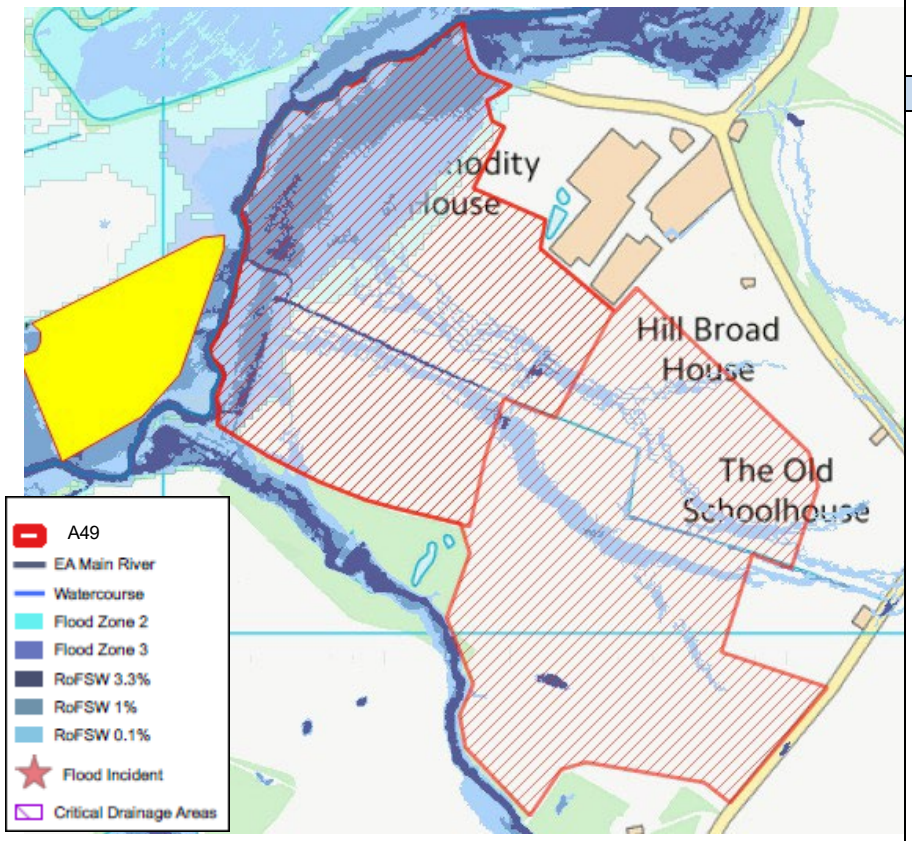
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse and main river
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Any potential changes to the porosity of the ground following works and its effects on groundwater levels
- Installing monitoring systems such as rain gauges, river level sensors, and weather stations to continuously monitor precipitation, river water levels, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- Any changes to the flow or routing of the Main River will require permission from the EA
- Care should be made so as to not increase pollution into any watercourses or the Main River
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., silt fences, sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

MLP ID	Site Name				Area (ha)
A49	Colemans Farm – Hill Broad Farm FULL SITE				42.38
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ1 %	**FZ2 %**	**FZ3 %**			
79	3	18	High	High	**High**

Site Map



Summary of Flood Risk to Site

- The site has two low risk flow path areas (1%-0.1% AEP) which flow towards a large high risk flow path running east to west north of the site (this is associated with the River Blackwater). There is also a high-risk flow path along the western boundary, running towards the offsite flow path in the north. There is one high risk (>3.3%AEP) area of surface water flooding within the south-western extent of the site. Most likely related to a topographical low point.
- Groundwater Flood Risk = Large proportion of the east of the site is class C and B however the West is not prone to groundwater flooding
- North-western border along the River Blackwater is Flood Zone 3 (18% of the site) and 2 (3%), the remaining 79% is Flood Zone 1. Each year the north-western extent has a chance of flooding from fluvial sources >3.33% (high risk)- the remaining is not at risk of fluvial flooding
- This extent is also at risk of flooding from reservoirs when there is also flooding from rivers.

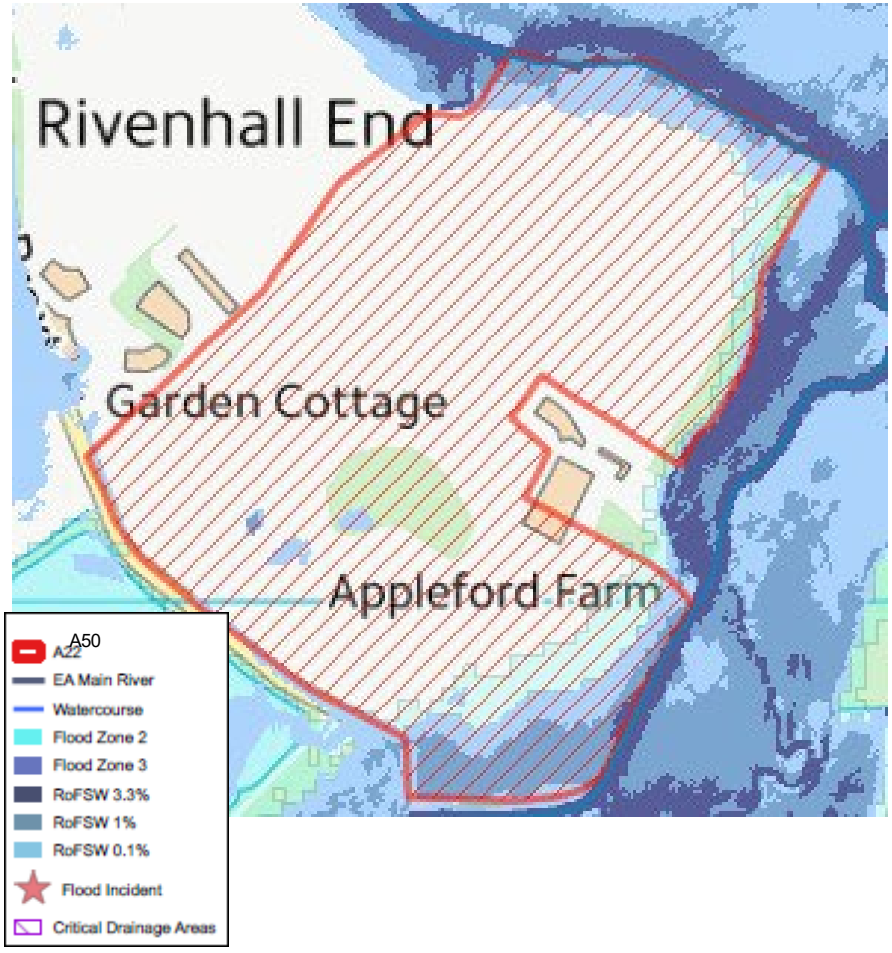
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse and main river
- Any potential changes to ground levels and the impact on surface water flood risk to the site and surrounding area
- Any potential changes to the porosity of the ground following works and its effects on groundwater levels
- Any potential changes to ground levels and the impact on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, river level sensors, and weather stations to continuously monitor precipitation, river water levels, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- Any changes to the flow or routing of the River Blackwater will require permission from the EA
- Care should be made so as to not increase pollution into any watercourses or the River Blackwater
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., silt fences, sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

MLP ID	Site Name				Area (ha)
A50	Colemans Farm – Eastern extension (Appleford Farm)				24.64
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
82	8	10	Medium	High	**High**

Site Map



Summary of Flood Risk to Site

- The site has 4 isolated SW areas of low risk (1% to 0.1%AEP) which are most likely topographical low points. However, the site has a wide flow path, flowing north to south, with medium to high risk (>3.3%AEP and > 0.1%AEP) on the right side.
- There is a flow path on the eastern and northern boundary which encroaches on the site during the medium to low storm events (<3.33%-0.1% AEP)
- Groundwater Flood Risk = Middle of the site is Class B however the majority is Class C this is most likely due to low topography and proximity to the River Blackwater meaning higher ground water levels
- At risk of fluvial flooding >3.33% AEP on southeastern corner (high risk) from the River Blackwater. This extent is also at risk of flooding from reservoirs when there is and when there isn't also flooding from rivers
- 10% of the site is Flood Zone 3 and 8% is within Flood Zone 2, the remaining 82% is Flood Zone 1

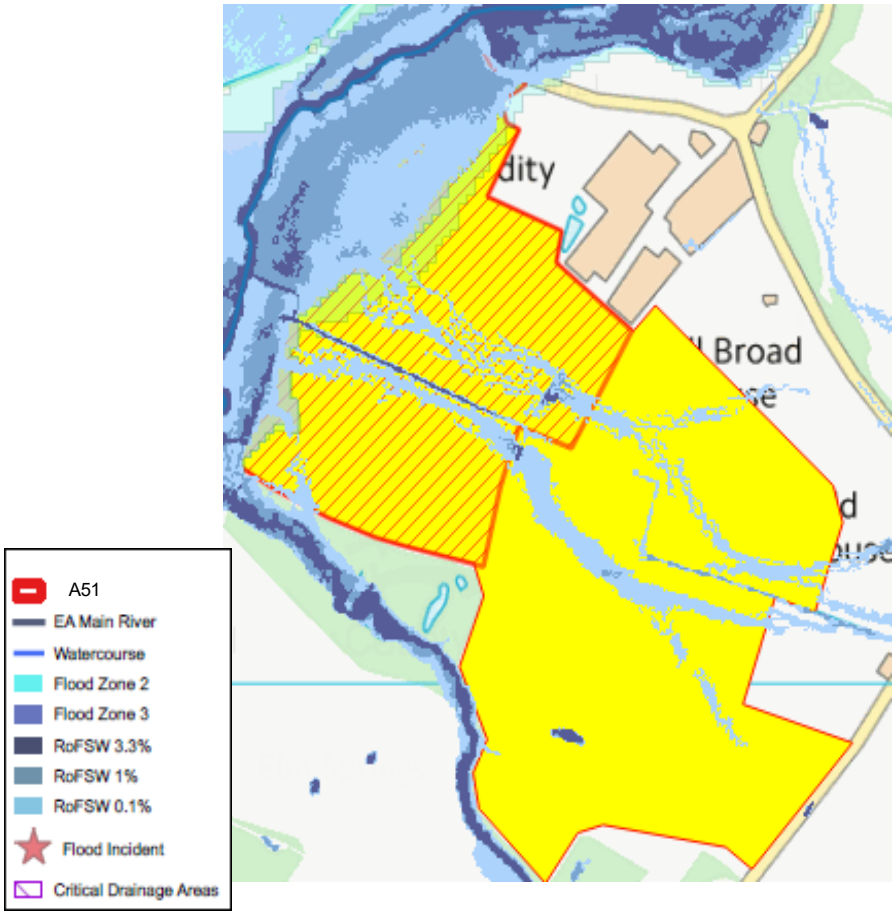
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse and main river
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site
- Any potential changes to the porosity of the ground following works and its effects on groundwater levels
- Installing monitoring systems such as rain gauges, river level sensors, and weather stations to continuously monitor precipitation, river water levels, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- Any changes to the flow or routing of the River Blackwater will require permission from the EA
- Care should be made so as to not increase pollution into any watercourses or the River Blackwater
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., silt fences, sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

MLP	Site Name				Area (ha)
A51	Colemans Farm – North extension (Hill Broad Farm)				20.57
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
57	6	37	High	Medium	**High**

Site Map



Summary of Flood Risk to Site

- The site borders the river Blackwater to the west which has an associated surface water flow path which encroaches on the site during the high-risk storm event (>3.33% AEP). During larger storm events the extent extends further into the site (3.33% to 0.1% AEP). There are 2 low risk (1%-0.1% AEP) flow path areas flowing towards the river Blackwater.
- Groundwater flood risk = western extent (<1/3) of the site is Class C which is closely associated with the proximity to the River Blackwater, the rest of the site is not prone to groundwater flooding.
- North-western border along the River Blackwater is Flood Zone 3 (37% of the site) and Flood Zone 2 (6% of the site), the remainder of the site is Flood Zone 1 (57%)
- Each year the north-western extent has a chance of flooding from fluvial sources >3.33% (high risk)- the remaining is not at risk of fluvial flooding. This extent is also at risk of flooding from reservoirs when there is also flooding from rivers.

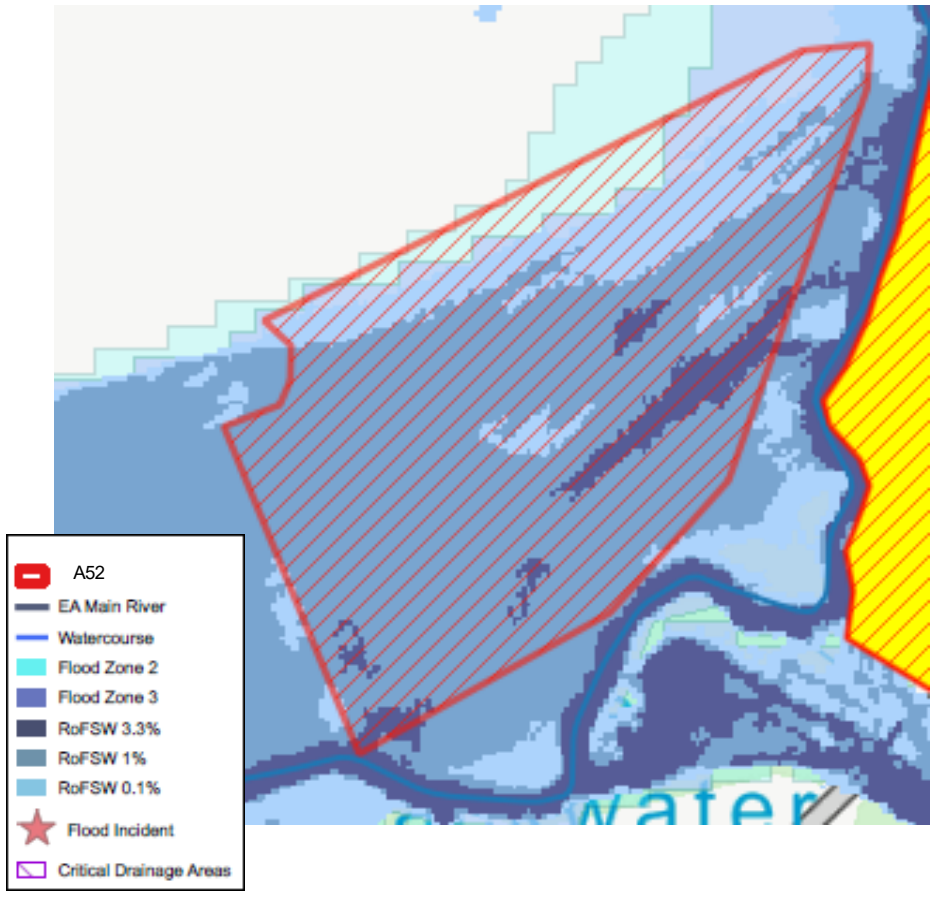
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse and main river
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, river level sensors, and weather stations to continuously monitor precipitation, river water levels, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- Any changes to the flow or routing of the River Blackwater will require permission from the EA
- Care should be made so as to not increase pollution into any watercourses or the River Blackwater
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., silt fences, sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

MLP	Site Name				Area (ha)
A52	Colemans Farm – Southern extension				4.04
Fluvial / Tidal Flood Risk			Surface Water Flood Risk	Groundwater Flood Risk	Overall Risk Rating
FZ 1 %	FZ 2 %	FZ 3 %			
0	5	95	High	High	High

Site Map



Summary of Flood Risk to Site

- The majority of this area has a SW flood risk extent of medium (3.33%-1%AEP). There are also some areas of high risk (>3.33%AEP).
- Groundwater flood risk = Site is completed Class C, most likely due to proximity to River Blackwater and its low topography
- Majority of the site is within Flood Zone 3 (95%)
- Each year this area has a chance of fluvial flooding >3.3% (High risk) from the River Blackwater. At risk of flooding from reservoirs when rivers are normal and when rivers are flooding

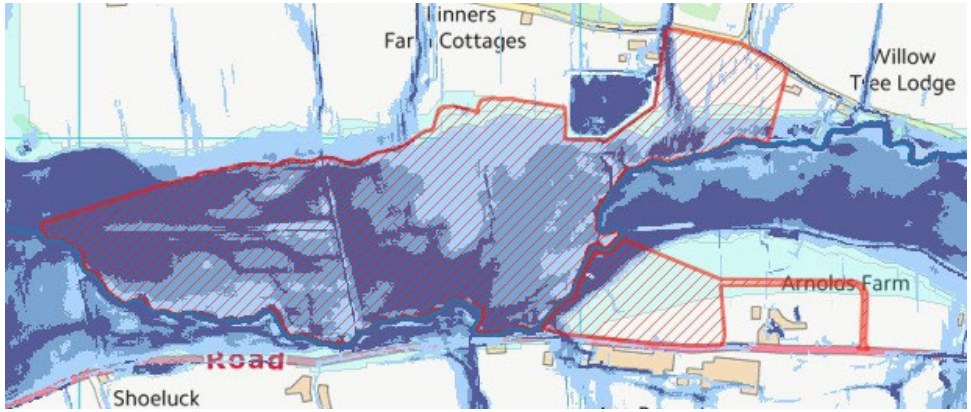
Site Specific Recommendations

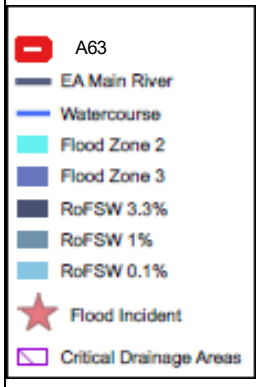
The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse and main river
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Any potential changes to the porosity of the ground following works and its effects on groundwater levels and quality
- Installing monitoring systems such as rain gauges, river level sensors, and weather stations to continuously monitor precipitation, river water levels, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- Any changes to the flow or routing of the River Blackwater will require permission from the EA
- Care should be made so as to not increase pollution into any watercourses or the River Blackwater
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., silt fences, sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

MLP ID	Site Name				Area (ha)
A63	Patch Park - Abridge				45.829
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
11	10	79	High	High	**High**

Site Map





Summary of Flood Risk to Site

- A main river runs along the border, east to west, and the site is at a large amount of high (>3.33%AEP) and medium SW flood risk (3.33 to 1%AEP) as well as some areas of low SW flood risk (1% to 0.1%AEP).
- Majority of the site is within Flood Zone 3 (79%)
- Groundwater flood risk = Majority of site is class C the rest of the site is not prone to groundwater flooding (far eastern side and access).
- At fluvial flood risk from the River Roding >=3.33%. Similarly at risk of flooding from reservoirs both during river flooding and when the river isn't flooding

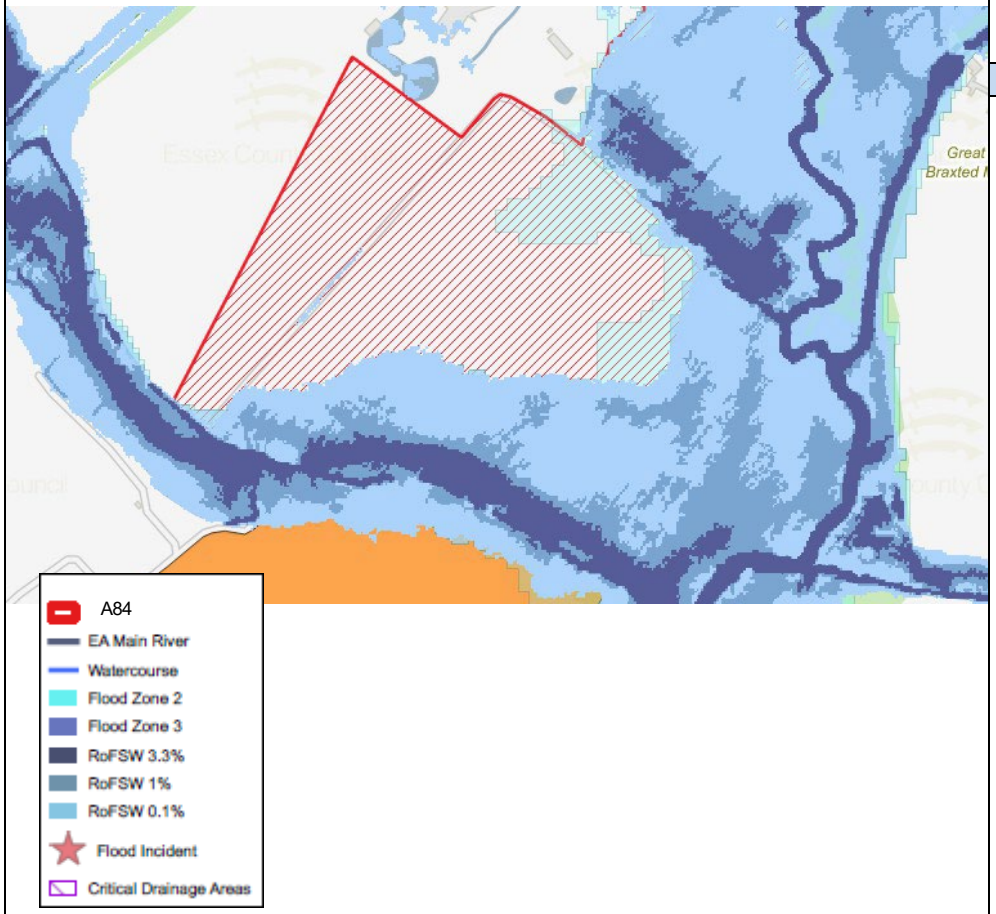
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse and main river
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, river level sensors, and weather stations to continuously monitor precipitation, river water levels, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- Any changes to the flow or routing of the River Roding will require permission from the EA
- Care should be made so as to not increase pollution into any watercourses or the River Roding
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., silt fences, sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

MLP ID	Site Name				Area (ha)
A84	Colemans Farm – Appleford Farm North Extension				20.78
Fluvial / Tidal Flood Risk			**Surface Water Flood**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
35	9	56	High	High	**High**

Site Map



Summary of Flood Risk to Site

- Majority of site falls within Flood Zone 3 (56%), therefore significant risk of fluvial flooding from the River Blackwater (>3.33%AEP). 9% falls within Flood Zone 2. The site is similarly at risk of flooding from reservoirs both during river flooding and when the river isn't flooding
- Majority of the site is at significant surface water flood risk (up to >3.33%AEP). This flood risk is associated to watercourses and proximity to the River Blackwater and can be found centrally and towards the southern and western boundaries
- According to BGS the centre of the site is not considered to be prone to groundwater flooding however the remaining of the site is Class C
- Watercourse present on site and also borders River Blackwater

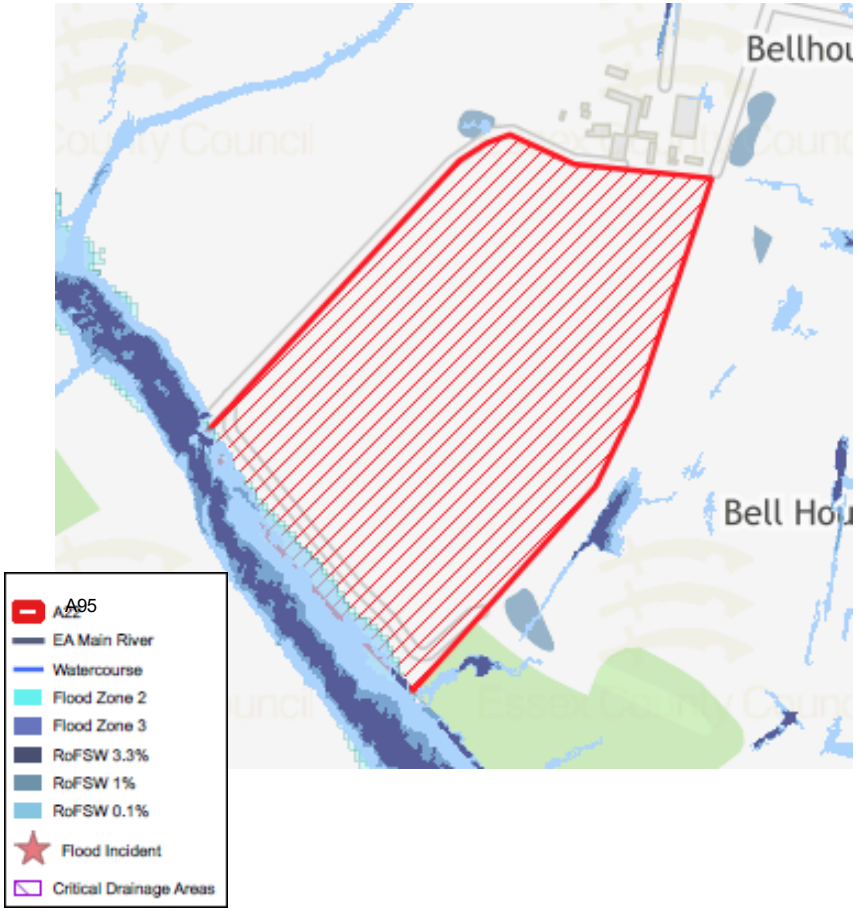
Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse and main river
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, river level sensors, and weather stations to continuously monitor precipitation, river water levels, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- Any changes to the flow or routing of the River Blackwater will require permission from the EA
- Care should be made so as to not increase pollution into any watercourses or the River Blackwater
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., silt fences, sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration of the site after operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

MLP ID	Site Name				Area (ha)
A95	Land at Bellhouse Farm South				12.79
Fluvial / Tidal Flood Risk			**Surface Water Flood Risk**	**Groundwater Flood Risk**	**Overall Risk Rating**
FZ 1 %	**FZ 2 %**	**FZ 3 %**			
96.85	0.45	2.7	Low	Medium	**High**

Site Map



Summary of Flood Risk to Site

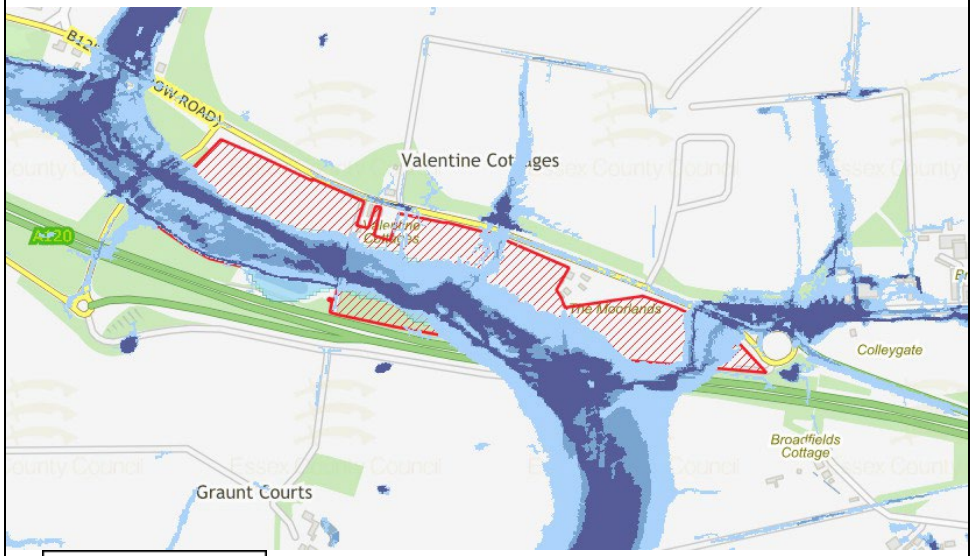
- A statutory main river (Roman River) runs along the border of the site and during times of times of flooding the site is shown to be minorly within Flood zone 2 (0.45%) and 3 (2.7%) experiencing fluvial flood risk of between 1% and 3.33% AEP.
- Some minor surface water flood risk (0.1-1% AEP) associated with southwestern border, most likely due to proximity to the main river, however rest of the site has a very low surface water flood risk.
- Groundwater flood risk = Class C on western border, this is closely associated with the watercourse. As the site progresses east, the risk decreases from Class B to Class A. Class A occupies half the site
- Despite the high overall risk rating due to the methodology used, overall flood risk is deemed minor if that of the Roman River is mitigated against and not negatively impacted.

Site Specific Recommendations

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse and main river
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, river level sensors, and weather stations to continuously monitor precipitation, river water levels, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- Any changes to the flow or routing of the Roman River will require permission from the EA
- Care should be made so as to not increase pollution into any watercourses or the Roman River
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement sediment and erosion control measures, e.g., silt fences, sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- Locations storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment.
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

A96	Rayne Quarry – Southern Extension				11.18
58.7	6.3	35	High	Medium	**High**



- A main river runs through the site, west to east. 35% of the site is within Flood Zone 3 and 6.3% Flood Zone 2.
- The site is at fluvial flood risk from the River Ter 1% - >=3.33%
- Significant surface water flood risk throughout the site due to watercourses and main river (up to >3.33%AEP). Surface water flood risk effects the majority of the site and is very significant.
- Groundwater flood risk = southern extent is class C (related to the River Ter) however the rest is not considered to be prone to groundwater flooding.

The following considerations must be made for a site-specific FRA during the planning process and during the operation and restoration phases:

- Any potential changes to ground levels and the impact these may have on flood risk to the site and surrounding area from the watercourse and main river
- Any potential changes to ground levels and the impact these may have on surface water flood risk to the site and surrounding area
- Any potential changes to ground levels and the impact these may have on groundwater flood risk to the site and surrounding area
- Installing monitoring systems such as rain gauges, river level sensors, and weather stations to continuously monitor precipitation, river water levels, and weather conditions.
- Any changes to the flow or routing of ordinary watercourses will require Consent from the LLFA
- Implement proper drainage systems, including ditches, culverts, and SuDS, to control stormwater runoff and prevent excess water from accumulating at the extraction site. These should be designed based on local regulations and best practices to effectively manage flood risk and should strongly focus on multifunctional, nature based solutions.
- Safe access and egress should be ensured to all areas during a time of flood
- Any changes to the flow or routing of the River Ter will require permission from the EA
- Care should be made so as to not increase pollution into any watercourses or the River Ter
- The location for storing any stripped soils or extracted materials should be outside of flood risk areas
- Implement proper sediment and erosion control measures, such as silt fences, sediment basins, and vegetative cover, to prevent soil erosion and sedimentation in nearby water bodies. This helps reduce the risk of flooding by maintaining proper stormwater management and preventing sediment buildup in waterways.
- The location for storing machinery, equipment, welfare units and offices. should be outside of flood risk areas
- A flood response plan should be developed and documented, including emergency procedures, evacuation routes, and designated safe areas in case of flooding, as well as contact information for emergency services.
- Restoration following operational closure should take account of the Essex Green Infrastructure Strategy
- Restoration of the site following operational closure should take account of the Essex SuDS Design Guide for any sustainable drainage features
- Restoration of the site following operational closure should consider the inclusion of flood reduction measures such as NFM and/or tree planting to reduce risks across the wider catchment
- A 3m buffer strip should retained adjacent to the main river to allow access for maintenance

GLOSSARY AND ABBREVIATIONS

Annual Exceedance Probability	AEP	The probability of a rainfall or flood event occurring in a given year. A 1% AEP event is likely to occur on average once every 100 years.
Areas Susceptible to Groundwater Flooding	AStGWF	Digital mapping produced by the Environment Agency and British Geological Survey showing groundwater flood risk.
British Geological Society	BGS	The organisation who holds geological survey and borehole data for the UK
Critical Drainage Area	CDA	A smaller catchment area identified within a wider Surface Water Management Plan (SWMP) study area as being at higher risk of surface water flooding.
Construction Industry Research and Information Association	CIRIA	An independent organisation which produces technical guidance for the construction industry
Environment Agency	EA	The authority responsible for managing the risk of flooding from main rivers and the sea.
Essex SuDS Design Guide 2020	ESDG	The Essex SuDS Design Guide 2020 is the most up to date guide produced by the LLFA. It was produced to highlight the standards and expectations in regard to surface water drainage schemes for all new developments in Essex. It is referred to when the LLFA review surface water drainage schemes.
Flood and Coastal Erosion Risk Management	FCERM	The term for activities and actions undertaken by RMAs to reduce flood risk and coastal erosion.

Flood Risk Assessment	FRA	A report evidencing and highlighting the different types of flood risk associated with a specific site. They also can be accompanied by mitigation proposals if associated with a development
Flood and Water Management Act 2010	FWM	The Act that implemented the recommendations of the Pitt Review 2008 and created Lead Local Flood Authorities.
Green Infrastructure	GI	A network of multi-functional green space and other green features, both urban and rural, which delivery quality of life and environmental benefits for communities
Ground Investigations	GIs	These include investigations such as soil type and makeup, ground water monitoring, stability investigations, infiltration testing and soil contamination investigations
Greenfield Runoff Rate	GRR	The peak rate of runoff from a given area of land for a specified return period rainfall event. It is used to determine the rate that flow from a new development should be restricted to
Local Development Plan	LDP	The Local Development Plan is a plan for the future development of the local area, drawn up by the Local Planning Authority. It guides decisions on whether or not planning applications can be granted. In law it is described as the development plan documents adopted under the Planning and Compulsory Purchase Act 2004. A Local Plan can consist of one or more documents.
Local flood risk		The risk of flooding from ordinary watercourses, surface water and groundwater, as defined by the Flood and Water Management Act 2010.
Local Flood Risk Management Strategy	LFRMS	A strategic document produced by a LLFA as a requirement of the Flood and Water Management Act 2010. It sets out how local flood risk will be managed.
Lead Local Flood Authority	LLFA	A unity authority or county council with responsibility for managing local flood risk.

Local Planning Authority	LPA	A unitary authority or district council whose duty it is to carry out specific planning functions (producing Local Plans and determining planning applications) for a particular geographical area.
National Planning Policy Framework	NPPF	The NPPF sets out the UK government's current planning policies for England and how they are to be implemented by Local Planning Authorities.
Planning Policy Statement 25	PPS25	A document produced by the UK Government setting out national policy on development and flood risk. It was replaced by the NPPF in 2012
Risk of Flooding from Surface Water	RoFSW	The latest Environment Agency digital mapping showing the risks of flooding from surface water. These are split into three layers showing the 3.33%AEP, 1%AEP and 0.1% AEP events.
Risk Management Authority	RMA	Any authority with a responsibility for managing flood or coastal erosion risks.
Shoreline Management Plan	SMP	A strategic document that sets out policies to assist decision making on coastal flooding and erosion risk management over the next 20, 50 and 100 years.
Sustainable Drainage Systems	SuDS	Measures that manage runoff from a development site by sustainably mimicking natural processes. Many features have wider benefits to water quality, ecology, and local amenity
Surface Water Management Plan	SWMP	A district wide study into surface water flood risk which identifies Critical Drainage Areas (CDAs) that are considered for receipt of a flood alleviation scheme.
Thames Water	TW	The sewerage provider with ownership and responsibility of adopted foul and surface water sewers in parts of Essex.