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**Essex County Council  
Minerals Local Plan  
Strategic Flood Risk  
Assessment  
Addendum**

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May 2020

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Essex County Council Flood Services

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## VERSION CONTROL

Issue	Date	Details	Prepared By	Reviewed By	Approved By
0.1	03/04/2020	Working draft report for internal review	Tom Palmer Project Design Engineer	Dave Chapman Project Delivery Manager	Dave Chapman Project Delivery Manager
0.2	06/05/2020	Working draft report v0.2 for client review	Zahida Yousef Senior Development and Flood Risk Officer	Dave Chapman Project Delivery Manager	Dave Chapman Project Delivery Manager
1.0	15/05/2020	Final version	Marc Inman Project Design Engineer	Dave Chapman Project Delivery Manager	Dave Chapman Project Delivery Manager

This document has been produced by Essex Flood Services for Essex County Council Minerals and Waste Department.

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](mailto:floods@essex.gov.uk)



## 0 EXECUTIVE SUMMARY

0.0.1 This report forms an addendum to the existing Minerals Local Plan Level 1 Strategic Flood Risk Assessment produced by URS in 2012. It includes information on the following new or updated policies and strategies surrounding planning, flooding and climate change;

- National Planning Policy Framework (2012)
- Flood Risk Regulations (2009)
- Flood and Water Management Act (2010)
- National Flood and Coastal Erosion Risk Management Strategy (2011)
- Catchment Flood Management Plans (2009) (North Essex, South Essex and Thames)
- Flood Risk Management Plans (2016) (Anglian and Thames)
- River Basin Management Plans (2016) (Anglian and Thames)
- Climate Change Allowances (2016)
- Climate Change Risk Assessment (2017)
- Essex Local Flood Risk Management Strategy (2018)

0.0.2 Sequential tests have been undertaken for the 16 sites allocated within the 2014 Minerals Local Plan (of which some have since been permitted for extraction and are subsequently in operation). These have been categorised into high, medium and low risk based on interactions with Environment Agency Flood Zones 2 and 3 (relating to flood risk from rivers and the sea), proximity to watercourses, risks of flooding from surface water and risks of flooding from groundwater. Of the sites analysed, 3 have been determined to be at high risk, 1 at medium risk and 12 at low risk.

### 0.1 Key Changes and Updates

#### **National Planning Policy Framework (2012 & Amended 2019);**

0.1.1 This document replaced PPS25 Development and Flood Risk and requires sequential and exception tests to be undertaken for all proposed development sites, where appropriate. It requires Minerals Planning Authorities to set land supplies of at least 7 years for sand and gravel, whilst ensuring that large landbanks bound up in very few sites do not stifle competition.

0.1.2 Although implemented in 2012, the NPPF was recently updated in 2019 and this version should be considered when assessing all future planning applications and planning-related decisions.

### **Flood and Water Management Act (2010);**

0.1.3 This enacted the recommendations of the Pitt Review 2008. It created Lead Local Flood Authorities (LLFAs) and gave them responsibility for managing flood risk from local sources; that from watercourses, surface water and groundwater. It required LLFAs to produce a Local Flood Risk Management Strategy outlining how local flood risks will be managed.

### **Flood Risk Management Plans (2016);**

0.1.4 Flood Risk Management Plans explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs and set out how Risk Management Authorities will manage flood and coastal erosion risk over the next 6 years.

0.1.5 They are a requirement of the Flood Risk Regulations (2009) and set national Flood Risk Areas where there are significant risks of flooding based on both modelling and historic events. Within Essex one such area exists; the South Essex Flood Risk Area, which covers the main urban areas of Southend-on-Sea, Hadleigh, Rayleigh, Wickford, Basildon and Billericay.

0.1.6 Flood risk within this area is managed by the respective Lead Local Flood Authorities, with Essex County Council Flood Team delivering flood alleviation schemes at higher risk areas through a 5-year capital programme.

### **River Basin Management Plans (2016);**

0.1.7 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.

0.1.8 To achieve this RBMPs set out; the current state of the water environment; pressures affecting the water environment; environmental objectives for protecting and improving the waters, and; a programme of measures and actions needed to achieve the objectives.

### **Climate Change Allowances (2016);**

0.1.9 Updated climate change values for both rainfall events and fluvial flooding events were released by the Environment Agency in 2016 based on modelled using updated CO<sub>2</sub> emissions and scenario predictions. The results are categorised into Upper End, Higher Central and Central based on the likelihood of the scenarios occurring.

0.1.10 Values are given as percentage increases, with rainfall events relating to the percentage increase in rainfall intensity and for fluvial flooding the percentage increase relating to peak river flows.

0.1.11 In Essex the Upper End values must be used for surface water flooding, which are 20% or 40% based on the lifetime of the proposed development. The Upper End and Higher Central values should be used for river flooding, with discretion as to the exact value to be agreed by the Local Planning Authority and the Environment Agency based on site specific variables. These are 20% or 35% and 35% or 65% respectively based on the lifetimes of the proposed developments.

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## 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.
Climate Change Risk Assessment	CCRA	Required by the Climate Change Act, the Government must produce an updated CCRA every 5 years to evaluate the risks to the UK from current and predicted changes in climate.
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.
Catchment Flood Management Plan	CFMP	A strategic plan produced by the EA to develop complementary policies for the long-term management of flood risk within a river catchment area over the next 50 years taking into account the likely impacts of changes in climate, the effects of land use and land management, and to seek to identify multiple benefits and to contribute overall towards sustainable development.
Environment Agency	EA	The authority responsible for managing the risk of flooding from main rivers and the sea.
Flood and Coastal Erosion Risk Management	FCERM	The term for activities and actions undertaken by RMA's to reduce flood risk and coastal erosion.
Flood Risk Management Plan	FRMP	FRMP's explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs and set out how Risk Management Authorities will manage them over the next 6 years. They are a requirement of the EU Floods Directive 2007 and cover river basin districts.
Flood and Water Management Act 2010		The Act that implemented the recommendations of the Pitt Review 2008 and created Lead Local Flood Authorities.



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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.
Minerals Local Plan	MLP	The Minerals core strategy and vision which sets out the long-term direction for minerals development and a plan to deliver it.
National Flood and Coastal Erosion Risk Management Strategy	NFCERMS	A strategy produced by the EA as a requirement of the Flood and Water Management Act 2010. It sets out the overarching framework for future action by all risk management authorities to tackle flooding and coastal erosion in England, embedding localism at the heart of the strategy.
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.
National Planning Policy for Waste	NPPW	The NPPW sets out the UK governments current waste planning policies for England and how they are to be implemented by minerals planning authorities.
Preliminary Flood Risk Assessment	PFRA	The Flood Risk Regulations 2009 require all Lead Local Flood Authorities to produce a PFRA which provides a high-level summary of local flood risk.
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.

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Risk Management Authority	RMA	Any authority with a responsibility for managing flood or coastal erosion risks.
Strategic Flood Risk Assessment	SFRA	A study assessing the flood risk from all types of flooding within a Local Planning Authorities administrative area, taking into account predicted changes in the climate. It guides LPAs in applying the sequential and exception tests required by the NPPF. These tests seek to guide new development to the area of lowest flood risk and, if, following the application of the sequential test, development has no alternative other than to go ahead in areas of higher flood risk, then the SFRA provides advice on how to manage that risk.
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.
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.
Updated Flood Map for Surface Water	uFMfSW	Digital mapping produced by the Environment Agency showing surface water flood risk. Layers exist showing Shallow and Deep flooding equating to the 3.33%AEP and 1% AEP events respectively. This data has now been replaced by the RoFSW mapping.

## 1 INTRODUCTION

### 1.1 Report Purpose

- 1.1.1 This report forms an addendum to the existing Minerals Local Plan (MLP) Strategic Flood Risk Assessment (SFRA) produced by URS Infrastructure and Environment UK Ltd in July 2011 and updated in September 2012.
- 1.1.2 It undertakes a re-assessment of the 16 sites allocated within the 2014 MLP<sup>1</sup>, as detailed within Table 1.1, which also details which sites have received planning permission and which appendix the flood risk mapping information for the site and surrounding area can be found in.
- 1.1.3 Re-assessment has been carried out using the most current flood risk information, provides an update to subsequent changes to national planning policy, climate change allowances and flood risk zones, and outlines the impacts of these on the adopted MLP sites.
- 1.1.4 This document does not provide a full SFRA and does not replace the existing SFRA, which should be used in conjunction with this addendum. As only a review of existing and allocated sites has been undertaken, a new and complete SFRA must be undertaken when considering new minerals sites.

MLP ID	MLP Site Name	Site Type	Planning Application Number	Area (ha)	Mapping Location
A3	Bradwell Quarry, Rivenhall	Preferred	ESS/07/16/BTE	9.2	Appendix 5
A4	Bradwell Quarry, Rivenhall	Preferred		25.2	Appendix 5
A5	Bradwell Quarry, Rivenhall	Preferred	ESS/03/18/BTE	35	Appendix 5
A6	Bradwell Quarry, Rivenhall	Reserve		37.5	Appendix 5
A7	Bradwell Quarry, Rivenhall	Reserve	ESS/44/18/BTE/SPO	94.9	Appendix 5
A9	Broadfield Farm, Rayne	Preferred	ESS/19/17/BTE	93.4	Appendix 5
A13	Colchester Quarry, Fiveways	Preferred	ESS/23/14/COL	15.3	Appendix 6
A20	Sunnymead, Arlesford	Preferred	ESS/17/18/TEN	61.9	Appendix 6
A22	Little Bullocks Farm, Little Canfield	Preferred		6.9	Appendix 4
A23	Little Bullocks Farm, Little Canfield	Preferred		5.5	Appendix 4
A31	Maldon Road, Birch	Preferred		25	Appendix 6
A38	Blackley Quarry, Great Leighs	Preferred	ESS/46/16/CHL	22.7	Appendix 5
A39	Blackley Quarry, Great Leighs	Preferred		21	Appendix 5
A40	Shellows Cross, Roxwell	Preferred	ESS/46/19/CHL/SO	16.2	Appendix 4
A46	Colemans Farm	Preferred	ESS/39/14/BTE	54.5	Appendix 5
B1	Slough Farm, Ardleigh	Preferred		11.6	Appendix 6

**Table 1.1:** List of the 2014 MLP sites re-assessed as part of this addendum

<sup>1</sup> As contained within the Essex MLP (July 2014); <https://www.essex.gov.uk/minerals-waste-planning-policy>

## 1.2 Scope and Limitations

1.2.1 An 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 outside of flood risk areas. 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.

1.2.2 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.

1.2.3 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.

1.2.4 Advice and guidance on how an SFRA should be used in plan making is provided in the National Planning Practice Guidance<sup>2</sup>.

1.2.5 The scope of this addendum is to;

- Provide an update on changes to national, regional and local policies regarding flood risk
- Provide information on how changes to policies impact the allocated minerals sites
- Undertake a full GIS assessment of flood risk to the 16 existing and allocated 2014 MLP SFRA sites using the latest flood risk information. This includes sequential tests and further site-specific assessment where appropriate.

1.2.6 This addendum does not; constitute a full SFRA; constitute a replacement to the existing URS SFRA (2012), or; provide sufficient information to allow the assessment of new minerals sites that may be identified into the future. A new, full SFRA must be undertaken to allow this.

1.2.7 Table 1.2 highlights which information has been updated as part of this addendum and identifies which SFRA document contains the most current information on specific aspects of flood risk.

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<sup>2</sup> National Planning Practice Guidance notes (November 2016);  
<https://www.gov.uk/government/collections/planning-practice-guidance>

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Flood Risk Policy	Latest Version	Location of Most Up to Date Information	
		URS Full SFRA (2012)	This Addendum (2020)
National Planning Policy Framework (NPPF)	2019		Fully updated within this addendum (Section 2.3)
Regional Spatial Strategies	2010 (redacted)		Redacted in 2011 and replaced with NPPF
Flood and Water Management Act	2010	Full summary provided	Full summary provided as relates to other updated documentation
National Flood and Coastal Erosion Risk Management Strategy (NFCERMS)	2011 (update due imminently)	Full summary provided	Full summary provided as relates to other updated documentation
Catchment Flood Management Plans (CFMP)	2009	Summary information provided does not include parts of Essex within Thames area	Updated including site specific impacts (Section 2.8)
River Basin Management Plans (RBMP)	2015		Updated including site specific impacts (Section 2.9)
Flood Risk Management Plans (FRMP)	2015		Updated including site specific impacts (Section 2.10)
Shoreline Management Plan (SMP)	2010		Updated including site specific impacts (Section 2.11)
Environment Agency Climate Change Allowances	2016		Fully updated within this addendum (Section 2.12)
Climate Change Risk Assessment (CCRA)	2017		Full information given within this addendum (Section 2.13)
Essex Local Flood Risk Management Strategy (LFRMS)	2018	Labelled incorrectly as Essex Local FCERMS	Fully updated within this addendum (Section 2.13)
Water Framework Directive	2000	Full summary provided	Brief summary provided when referenced in relation to other updated documentation
Floods Directive	2007	Full summary provided	Brief summary provided when referenced in relation to other updated documentation
Flood Risk Regulations	2009	Full summary provided	Full summary provided as relates to other updated documentation
Essex Preliminary Flood Risk Assessment (PFRA)	2017		Summary provided when referenced in relation to other updated documentation
Essex SuDS Design Guide	2020		Summary provided when referenced in relation to other updated documentation

**Table 1.2:** Summary of referenced SFRA documents and policies and location of most up to date information (highlighted boxes)

## 1.3 Background

- 1.3.1 Essex County Council (ECC) is currently reviewing the Adopted Minerals Local Plan (MLP) (2014) in order to meet its obligations as a Minerals Planning Authority (MPA).
- 1.3.2 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.
- 1.3.3 A complete, district-wide Strategic Flood Risk Assessment (SFRA) for both minerals and waste sites which was completed by URS in 2011 and updated in September 2012 to support the publication of the MLP. This included a re-assessment of the existing and allocated minerals sites contained within the 2011 MLP SFRA using the latest available flood risk information.
- 1.3.4 This addendum forms an update to the 2012 MLP SFRA to support the ongoing MLP Review (2020). It incorporates the subsequent changes to planning policy, climate change allowances and updated Environment Agency (EA) flood risk data. It provides details on how these changes impact the existing and allocated minerals sites (as set out in Table 1.1) and also undertakes a re-assessment using the latest available flood risk data.
- 1.3.5 This addendum should not be used for the assessment of new minerals sites.

## 1.4 Definition of Event Frequencies

- 1.4.1 Rainfall and flood events are defined based on the frequency at which they are predicted to occur. Historically this has been expressed as 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.
- 1.4.2 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.
- 1.4.3 This addendum refers to flood risk in the form of AEP. All risk from flooding and rainfall should be expressed in this format to comply with EA best practice<sup>3</sup>.

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<sup>3</sup> Environment Agency Fluvial Design Guide (January 2010); <http://evidence.environment-agency.gov.uk/FCERM/en/FluvialDesignGuide/Chapter2.aspx?pagenum=4>

## **2 PLANNING FRAMEWORK**

### **2.1 Introduction**

- 2.1.1 The purpose of this section is to identify all high level and strategic documents relevant to the content of an SFRA. Further details are given where updates have been completed or changes to policy have been made since the existing SFRA was completed.
- 2.1.2 Only relevant changes concerning new or updated documents are referred to in this addendum. All other additional documentation referenced in the existing SFRA remains current and relevant.

### **2.2 Redacted National Planning Policy**

#### **Planning Policy Statement 25 (2006)**

- 2.2.1 PPS25; Development and Flood Risk was repealed and replaced with the National Planning Policy Framework in March 2012. Details of relevant requirements can be found in the following section.

### **2.3 National Planning Policy Framework (NPPF) (updated 2019)**

- 2.3.1 The NPPF<sup>4</sup> sets out how national planning policies should be implemented by Local Planning Authorities (LPA's). It sets out a presumption for sustainable development, which should be a key consideration in all aspects of plan creation and decision making. It places a focus on protecting the natural and historic environment and encourages the re-use of brownfield sites as a priority.
- 2.3.2 NPPF paragraph 20<sup>5</sup> 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).
- 2.3.3 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.

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<sup>4</sup> National Planning Policy Framework (February 2019); <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

<sup>5</sup> National Planning Policy Framework (February 2019); Paragraph 20



- 2.3.4 Minerals planning authorities should maintain landbanks of at least 7 years for sand and gravel, whilst ensuring that the capacity of operations to supply a wide range of materials is not compromised<sup>6</sup>. 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.
- 2.3.5 Paragraph 178 of the NPPF describes the ground condition and risk of pollution as a result of proposed development where 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).
- 2.3.6 Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner<sup>7</sup>.
- 2.3.7 NPPF paragraph 163 describes the need for site specific flood risk assessment for major developments. 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;
- 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;
  - The development is appropriately flood resistant and resilient;
  - It incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;
  - Any residual risk can be safely managed;
  - Safe access and escape routes are included where appropriate, as part of an agreed emergency plan.
- 2.3.8 Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate<sup>8</sup>. The systems used should;
- Take account of advice from the lead local flood authority;
  - have appropriate proposed minimum operational standards;
  - Have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and
  - Where possible, provide multifunctional benefits.

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<sup>6</sup> National Planning Policy Framework (February 2019); Paragraph 207

<sup>7</sup> National Planning Policy Framework (February 2019); Paragraph 179

<sup>8</sup> National Planning Policy Framework (February 2019); Paragraph 165



2.3.9 Flood risk is addressed in Section 14 of the NPPF<sup>9</sup>. This states that LPA's should adopt proactive strategies to mitigate and adapt to climate change, taking full account of flood risk, coastal change and water supply and demand considerations.

2.3.10 Local Plans should take account of climate change over the longer term, including factors such as flood risk, coastal change, water supply and changes to biodiversity and landscape<sup>10</sup>. New development should be planned to 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<sup>11</sup>.

2.3.11 Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere<sup>12</sup>. A sequential, risk-based approach to the location of development should be implemented to avoid creating flood risk to people and property and manage any residual risk, taking account of the impacts of climate change<sup>13</sup>. This should be achieved by;

- Applying the sequential test
- If necessary, applying the exception test
- Safeguarding land from development that is required for current and future flood management
- Using opportunities offered by new development to reduce the causes and impacts of flooding
- 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 facilitate the relocation of development, including housing, to more sustainable locations.

2.3.12 The aim of the sequential test is to steer new development to areas with the lowest probability of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower probability of flooding.

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<sup>9</sup> National Planning Policy Framework (February 2019); Paragraph 148 onwards

<sup>10</sup> National Planning Policy Framework (February 2019); Paragraph 149

<sup>11</sup> National Planning Policy Framework (February 2019); Paragraph 150

<sup>12</sup> National Planning Policy Framework (February 2019); Paragraph 155

<sup>13</sup> National Planning Policy Framework (February 2019); Paragraph 157

2.3.13 If, following application of the sequential test, it is not possible, consistent with wider sustainability objectives, for the development to be located in zones with a lower probability of flooding, the exception test can be applied if appropriate. For the exception test to be passed<sup>14</sup>;

- It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment where one has been prepared and;
- A site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.

2.3.14 Both elements of the test will have to be passed for development to be allocated or permitted.

2.3.15 The NPPF gives vulnerability classifications for different types of development<sup>15</sup>. 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.

2.3.16 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.

2.3.17 Sequential and exception tests are designed to be applied at a strategic level to highlight those areas of proposed development at higher risks so they can be moved to lower risk areas or re-assigned to a less vulnerable type. If this cannot be done, then the tests provide further details on flood risks to allow site scale risk mitigation.

2.3.18 As such this addendum undertakes a sequential test analysis for all 16 existing and allocated MLP sites, the results of which can be found in Table 6.3. All high and medium risk sites have then been subjected to further site-specific assessment (Appendix 2).

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<sup>14</sup> National Planning Policy Framework (February 2019); Paragraph 160

<sup>15</sup> Government Guidance, Flood Risk and Coastal Change (Table 2); <https://www.gov.uk/guidance/flood-risk-and-coastal-change#Table-2-Flood-Risk-Vulnerability-Classification>

2.3.19 When determining planning applications, local planning authorities should ensure flood risk is not increased elsewhere and only consider development appropriate in areas at risk of flooding where, informed by a site-specific flood risk assessment following the sequential test, and if required the exception test, it can be demonstrated that<sup>16</sup>;

- 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; and,
- Development is appropriately flood resilient and resistant, including safe access and escape routes where required, and that any residual risk can be safely managed, including by emergency planning; and it gives priority to the use of sustainable drainage systems.

2.3.20 For individual developments on sites allocated in development plans through the sequential test, applicants need not apply the sequential test. Applications for minor development and changes of use should not be subject to the sequential or exception tests but should still meet the requirements for site-specific flood risk assessments<sup>17</sup>.

2.3.21 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 February 2019. 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)<sup>18</sup> should be read in conjunction with the NPPF.

2.3.22 The NPPF also sets out the Government's approach to planning policy with respect to flood risk and emphasises the active role planning authorities should have in ensuring flood risk is considered during all stages of strategic land use planning.

2.3.23 To assist MPAs in their strategic land use planning, SFRA should present sufficient information to enable them to apply the sequential approach where possible to the allocation of new mineral extraction and processing sites. As this addendum provides a review of the 16 existing and allocated MLP sites a new SFRA should be undertaken when new sites are being explored.

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<sup>16</sup> National Planning Policy Framework (February 2019); Paragraph 163

<sup>17</sup> National Planning Policy Framework (February 2019); Paragraph 164

<sup>18</sup> National Planning Policy for Waste (October 2014); <https://www.gov.uk/government/publications/national-planning-policy-for-waste>

2.3.24 It is acknowledged within the NPPF that minerals have to be extracted and processed where the minerals are located but that the operational workings 'should not increase flood risk elsewhere and need to be designed, worked and restored accordingly'.

2.3.25 To reduce risk from coastal change, inappropriate development in vulnerable areas, or adding to the impacts of physical changes to the coast, should be avoided. Account must be taken of the UK Marine Policy Statement and marine plans to ensure integration of the terrestrial and marine planning regimes.

## **2.4 Flood and Water Management Act (2010)**

2.4.1 The Pitt Review (2008)<sup>19</sup> 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<sup>20</sup> (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 (LLFA's). 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 2.13.

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<sup>21</sup> 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.

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<sup>19</sup> The Pitt Review (June 2008); [http://webarchive.nationalarchives.gov.uk/20100807034701/http://archive.cabinetoffice.gov.uk/pittreview/thepittreview/final\\_report.html](http://webarchive.nationalarchives.gov.uk/20100807034701/http://archive.cabinetoffice.gov.uk/pittreview/thepittreview/final_report.html)

<sup>20</sup> The Flood and Water Management Act (2010); <http://www.legislation.gov.uk/ukpga/2010/29/contents>

2.4.6 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<sup>22</sup> 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.

2.4.7 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.

2.4.8 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. Further information on this can be found in Section 2.7.

## **2.5 Redacted Regional Planning Policy**

### **East of England Plan (Regional Spatial Strategy for the East of England)**

2.5.1 Regional Spatial Strategies were removed as part of the implementation of the Localism Act 2011<sup>23</sup>, which gave councils and communities greater control over planning decision making. The supply of housing is delivered through LPA Local plans, with a requirement for a continuous, deliverable 5-year land supply<sup>24</sup>. This must be updated annually with numbers agreed by the Planning Inspectorate.

## **2.6 Replacement Minerals Local Plan (Adopted 2014)**

2.6.1 The Adopted Minerals Local Plan (2014) provides the strategy and policies for minerals planning in Essex until 2029 as well as allocations of sites for development. The document sets out the Mineral Planning Authority's 'Vision for Essex' which is comprised of several strategic aims including, but not limited to;

- the promotion of sustainable development;
- the reduction in greenhouse gas emissions including carbon, and to ensure new development is adaptable to changing climatic conditions;

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<sup>21</sup> 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](https://www.essex.gov.uk/Environment%20Planning/Environment/local-environment/flooding/View-It/Documents/suds_design_guide.pdf)

<sup>22</sup> 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](https://www.essex.gov.uk/Environment%20Planning/Environment/local-environment/flooding/View-It/Documents/suds_design_guide.pdf)

<sup>23</sup> The Localism Act (2011); <http://www.legislation.gov.uk/ukpga/2011/20/contents/enacted>

<sup>24</sup> National Planning Policy Framework (March 2012); paragraph 47, page 12

- the promotion of social inclusion and human health and well-being;
- the efficient use of minerals by using them in a sustainable manner and reducing the need for primary mineral extraction;
- the protection and enhancement of the natural, historic and built environment in relation to mineral extraction and associated development;

2.6.2 The Adopted Local Plan (2014) strategy, similarly to the NPPF, is underpinned by the promotion of sustainable development, which includes climate change adaptation, through the recycle and re-use of material as well as a reduction in greenhouse gas emissions.

2.6.3 The specific **Policy S3: Climate Change** considers the challenges of becoming more resilient to changes in climate and gives particular reference to:

- National and local principles/ design standards for Sustainable Drainage Systems, including measures to enhance on-site water efficiency and minimise flood impacts both on-site and in relation to adjacent land and ‘downstream’ land-uses;
- The implications of coastal change, where relevant, and;
- The potential benefits from site restoration and after-use schemes for biodiversity and habitat creation, flood alleviation, and provision of living carbon sinks.

2.6.4 At the time of writing, prior to the formal Regulation 18 consultation, the MPA has engaged with relevant bodies and has so far met the requirements of the Duty to Co-operate<sup>25</sup> with regards to the scope of the MLP Review (2020).

2.6.5 The MLP Review (2020), and policies within it, should be considered going forward, in combination with the Adopted MLP (2014), until such a time the MLP Review (2020) has been formally approved and adopted, at which point it will supersede the Adopted MLP (2014).

2.6.6 A schedule of identified minerals sites has been assessed as part of this SFRA. Details of the findings are outlined in Section 6 with site-specific assessments contained in Appendix 2.

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<sup>25</sup> The duty to cooperate was created by the Localism Act 2011. It places a legal duty on planning authorities and public bodies to engage constructively, actively and on an ongoing basis with regards to strategic cross-boundary matters

## **2.7 National Flood and Coastal Erosion Risk Management Strategy (NFCERMS) (2011)**

2.7.1 The NFCERMS<sup>26</sup> is a requirement of the Flood and Water Management Act 2010<sup>27</sup> and sets out a nationwide approach to actions that can be taken to manage flood and coastal erosion risks to balance the needs of communities, the economy and the environment.

2.7.2 It builds on existing approaches to Flood and Coastal Erosion Risk Management (FCERM) and promotes a wide range of measures to co-ordinate this within catchments and along the coast. It sets the framework for giving communities a greater role in local risk management decisions and sets out the EAs strategic overview role.

2.7.3 The strategy encourages more effective risk management by enabling people, communities, business, infrastructure operators and the public sector to work together to;

- Ensure a clear understanding of the risks of flooding and coastal erosion, nationally and locally, so that investment in risk management can be prioritised more effectively.
- Set out clear and consistent plans for risk management so that communities and businesses can make informed decisions about the management of the remaining risk.
- Manage flood and coastal erosion risks in an appropriate way, taking account of the needs of communities and the environment.
- Ensure that emergency plans and responses to flood incidents are effective and that communities are able to respond effectively to flood forecasts, warnings and advice.
- Help communities to recover more quickly and effectively after incidents.

2.7.4 In setting out future approaches to FCERM, this strategy considers the level of risk and how it might change in the future, the risk management measures that may be used, roles and responsibilities, future funding and the need for supporting information.

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<sup>26</sup> Environment Agency National Flood and Coastal Erosion Risk Management Strategy (May 2011); <https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-management-strategy-for-england>

<sup>27</sup> Flood and Water Management Act (2010) Section 7



- 2.7.5 The NFCERMS focuses primarily on the mitigation and management of existing risk through community engagement and joint working across RMA's, however it should be considered during strategic, policy and planning decisions to ensure they align with the aims of the strategy, and do not create conflict with ongoing management activities.
- 2.7.6 The three sites: Little Bullocks Farm; Maldon Road, Birch; and Colemans Farm, have areas that fall within Flood Zones 2 & 3 in accordance with the EA's fluvial modelling. Consequently, the EA should be consulted to ensure operation and restoration align with local FRM activities.
- 2.7.7 It should be noted that the NFCERMS is currently being reviewed and a new updated version is expected in Spring 2020. This had not been released at the time of producing this addendum.

## 2.8 Catchment Flood Management Plans (CFMPs) (2009)

- 2.8.1 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.
- 2.8.2 CFMP's 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.
- 2.8.3 Due to its location across multiple catchments the county of Essex falls within the North Essex<sup>28</sup>, South Essex<sup>29</sup> and Thames<sup>30</sup> Catchment Flood Management Plans.
- 2.8.4 CFMP's 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.
  - **Policy 3:** Areas of low to moderate flood risk where RMAs are generally managing existing flood risk effectively.

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<sup>28</sup> Environment Agency North Essex Catchment Flood Management Plan (December 2009); <https://www.gov.uk/government/publications/north-essex-catchment-flood-management-plan>

<sup>29</sup> Environment Agency South Essex Catchment Flood Management Plan (December 2009); <https://www.gov.uk/government/publications/south-essex-catchment-flood-management-plan>

<sup>30</sup> Environment Agency Thames Catchment Flood Management Plan (December 2009); <https://www.gov.uk/government/publications/thames-catchment-flood-management-plan>



- **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.

2.8.5 The policies applying to each MLP site and the impact upon them is detailed in Table 2.1. Areas within wider sites have been grouped together to aid the display of information.

2.8.6 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. It is strongly recommended an approach be made to the EA where a CFMP identifies any significant impacts to a site.

Essex Minerals Local Plan: Strategic Flood Risk Assessment Addendum

MLP ID	MLP Site Name	CFMP and Sub Catchment	Policy	Site Impacts and Opportunities
A3	Bradwell Quarry	North Essex CFMP, Lower Blackwater	3	<b>LOW.</b> Overall flood risk is deemed to be appropriately managed and is not expected to increase significantly into the future. Localised consideration of flood risk should be given to the site and surrounding areas through the planning process
A4	Bradwell Quarry			
A5	Bradwell Quarry			
A6	Bradwell Quarry			
A7	Bradwell Quarry			
A9	Broadfield Farm	North Essex CFMP, Blackwater and Chelmer	2	<b>LOW.</b> Overall flood risk is deemed to be low to moderate. It may not be financially viable to continue maintaining defences so resources will generally be moved to higher risk areas. Localised consideration of flood risk should be given to the site and surrounding areas through the planning process taking account of existing defences and the potential reduction of their effectiveness
A13	Colchester Quarry	North Essex CFMP, Colchester	4	<b>MEDIUM.</b> Overall flood risk is currently deemed to be appropriately managed but the risk of flooding is expected to increase significantly into the future. Due to potential increases in risk localised consideration of flood risk should be given to the site and surrounding areas through the planning process taking full and appropriate account of climate change
A20	Sunnymead	North Essex CFMP, Coastal Streams	3	<b>LOW.</b> Overall flood risk is deemed to be appropriately managed and is not expected to increase significantly into the future. Localised consideration of flood risk should be given to the site and surrounding areas through the planning process
A22	Little Bullocks Farm	Thames CFMP, Upper Roding	6	<b>MEDIUM.</b> Areas of low to moderate flood risk where there may be opportunities to manage run-off through storage. Localised consideration of flood risk should be given to the site and surrounding areas through the planning process, taking account of the potential to provide flood alleviation storage during operation and as part of restoration
A23	Little Bullocks Farm			
A31	Maldon Road, Birch	North Essex CFMP, Mid Colne and Stour	3	<b>LOW.</b> Overall flood risk is deemed to be appropriately managed and is not expected to increase significantly into the future. Localised consideration of flood risk should be given to the site and surrounding areas through the planning process
A38	Blackley Quarry	North Essex CFMP, Blackwater and Chelmer	2	<b>LOW.</b> Overall flood risk is deemed to be low to moderate. It may not be financially viable to continue maintaining defences so resources will generally be moved to higher risk areas. Localised consideration of flood risk should be given to the site and surrounding areas through the planning process taking account of existing defences and the potential reduction of their effectiveness
A39	Blackley Quarry			
A40	Shellows Cross	North Essex CFMP, Blackwater and Chelmer	2	
A46	Colemans Farm	North Essex CFMP, Lower Blackwater	3	<b>LOW.</b> Overall flood risk is deemed to be appropriately managed and is not expected to increase significantly into the future. Localised consideration of flood risk should be given to the site and surrounding areas through the planning process
B1	Slough Farm	North Essex CFMP, Mid Colne and Stour	3	

**Table 2.1:** Impacts of Catchment Flood Management Plan policies on the MLP sites

## 2.9 River Basin Management Plans (RBMPs) (2015)

- 2.9.1 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.
- 2.9.2 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
  - A programme of measures and actions needed to achieve the objectives
- 2.9.3 The release of RBMP's operates over a six-year cycle with the current 2015 versions forming an update to the initial 2009 documents. It is anticipated further updates will be released towards the end of 2021 and as such, this should be taken account of in future planning decisions.
- 2.9.4 River Basin Management Plans align with the EA River Basin Districts (RBDs) with parts of Essex falling within the Anglian<sup>31</sup> and Thames<sup>32</sup> RBMPs.
- 2.9.5 RBD's are divided into sub-catchment areas to facilitate management, with Essex forming the Combined Essex area within the Anglian FRMP and parts of the South Essex, Upper Lee, and the Roding, Beam and Ingrebourne areas within the Thames FRMP.
- 2.9.6 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 from Waste Water:** 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

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<sup>31</sup> Anglian River Basin Management Plan (December 2015);

<https://www.gov.uk/government/publications/anglian-river-basin-district-river-basin-management-plan>

<sup>32</sup> Thames River Basin Management Plan (December 2015);

<https://www.gov.uk/government/publications/thames-river-basin-district-river-basin-management-plan>

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.

2.9.7 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.

2.9.8 The current status, issues and objectives for waterbodies can be found and downloaded from the EA Catchment Data Explorer website<sup>33</sup>.

2.9.9 The relevant key issues applying to MLP site and the impact upon them is detailed in Table 2.2. Areas within wider sites have been grouped together to aid the display of information.

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<sup>33</sup> Environment Agency Catchment Data Explorer; <https://environment.data.gov.uk/catchment-planning/>

## Essex Minerals Local Plan: Strategic Flood Risk Assessment Addendum

MLP ID	MLP Site Name	RBD; Area	Operational Area; Catchment	Current Status (catchment)	Relevant Key Issues (operational area)	Site Impacts
A3	Bradwell Quarry	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (6); Physical modifications (8); Pollution from towns, cities and transport (3)	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
A4	Bradwell Quarry					
A5	Bradwell Quarry					
A6	Bradwell Quarry					
A7	Bradwell Quarry					
A9	Broadfield Farm	Anglian; Combined Essex	Chelmer; Ter	Moderate	Pollution from rural areas (48); Physical modifications (20); Pollution from towns, cities and transport (23)	Significant catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A13	Colchester Quarry	Anglian; Combined Essex	Colne Essex; Roman River	Moderate	Pollution from rural areas (31); Physical modifications (21); Pollution from towns, cities and transport (19)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A20	Sunnymead	Anglian; Combined Essex	Colne Essex; Sixpenny Brook	Bad	Pollution from rural areas (31); Physical Modifications (21); Pollution from towns, cities and transport (19)	Overall classification has deteriorated since monitoring began. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against. Opportunities to help improve status through site restoration should be explored
A22	Little Bullocks Farm	Thames; Roding Beam and Ingrebourne	Roding Beam and Ingrebourne; Upper Roding (to Crispey Brook)	Poor	Pollution from rural areas (33); Physical modifications (40); Pollution from towns, cities and transport (47)	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 (31); Physical modifications (21); Pollution from towns, cities and transport (19)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A38	Blackley Quarry	Anglian; Combined Essex	Chelmer; Ter	Moderate	Pollution from rural areas (48); Physical Modifications (20); Pollution from towns, cities and transport (23)	Significant catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against
A39	Blackley Quarry					
A40	Shellows Cross	Anglian; Combined Essex	Chelmer; Roxwell Brook	Poor	Pollution from rural areas (48); Physical Modifications (20); Pollution from towns, cities and transport (23)	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
A46	Colemans Farm	Anglian; Combined Essex	Blackwater; Blackwater (Combined Essex)	Moderate	Pollution from Rural areas (6); Physical modifications (8); Pollution from towns, cities and transport (3)	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
B1	Slough Farm	Anglian; Combined Essex	Colne Essex; Salary Brook	Moderate	Pollution from rural areas (31); Physical modifications (21); Pollution from towns, cities and transport (19)	Average catchment issues. Potential pollution from contaminated site runoff and operational vehicles should be mitigated against

**Table 2.2:** Summary of River Basin Management Plan key issues and impacts on the MLP sites

## **2.10 Flood Risk Management Plans (FRMPs) (2015)**

- 2.10.1 Flood Risk Management Plans explain the risk of flooding from rivers, the sea, surface water, groundwater and reservoirs and are a requirement of the Flood Risk Regulations 2009 (see section 2.13). They set out how Risk Management Authorities (RMA's) will manage flood and coastal erosion risks and should be used in conjunction with River Basin Management Plans (Section 2.9).
- 2.10.2 FRMP's align with the Environment Agency River Basin Districts and as such Essex is covered by the Anglian<sup>34</sup> and Thames<sup>35</sup> Flood Risk Management Plans.
- 2.10.3 Within each plan RBD's are divided into sub-areas. Essex constitutes the Combined Essex area within the Anglian FRMP and parts of the South Essex, Upper Lee and the Roding, Beam and Ingrebourne sub-areas within the Thames FRMP.
- 2.10.4 FRMPs also define Flood Risk Areas, which are wider areas where there are flood risks to significant numbers of people, based on both modelling and historic events. Within Essex there is one Flood Risk Area, the South Essex Flood Risk Area, which forms part of the Anglian FRMP.
- 2.10.5 The South Essex Flood Risk Area is 252km<sup>2</sup> and covers the main urban areas of Southend-on-Sea, Hadleigh, Rayleigh, Wickford, Basildon and Billericay. Within this area 18% of the population is considered at risk of flooding with 17% of those deemed at high risk.
- 2.10.6 None of the allocated sites that have been re-assessed as part of this addendum fall within the South Essex Flood Risk Area. 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.
- 2.10.7 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.
- 2.10.8 It should be noted that for Essex, SWMPs contain more localised information and detail than FRMPs. Further information on SWMPs can be found in Section 2.13.
- 2.10.9 The release of FRMP's operates over a 6-year cycle with the current 2015 versions forming updates to the initial 2009 documents. It is anticipated further updates will be released towards the end of 2021 and as such this should be taken account of in future planning decisions.

## 2.11 Essex and South Suffolk Shoreline Management Plan (SMP) (2010)

2.11.1 The Essex and South Suffolk SMP<sup>36</sup> 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.

2.11.2 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.

2.11.3 The SMP divides the coastal 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

2.11.4 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.
- **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 counterwalls to limit flooding to adjacent areas.

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<sup>34</sup> Anglian RBD Flood Risk Management Plan (December 2016);

<https://www.gov.uk/government/publications/anglian-river-basin-district-flood-risk-management-plan>

<sup>35</sup> Thames RBD Flood Risk Management Plan (December 2016);

<https://www.gov.uk/government/publications/thames-river-basin-district-flood-risk-management-plan>

<sup>36</sup> Essex and South Suffolk Shoreline Management Plan 2 (March, 2010); <http://eacg.org.uk/smp8.asp>



2.11.5 The Sunnymead site in Arlesford, assessed as part of this SFRA addendum, falls within the SMP Management Units for the Colne Estuary (Unit D). The overall intent for the management of this unit is to sustain and support the viability of communities, tourism and commercial activities while creating new intertidal habitats and focusing flood risk management on frontages where it is most needed. Further details on the impacts of SMP policies with regards to the Sunnymead site are provided in Table 2.3. It should be noted that the other 15 allocated sites are not affected by SMP policies.

2.11.6 In order to achieve the above intent for this unit it is proposed to maintain existing flood and erosion defences to the majority of the defended land, whilst also allowing coastal and estuarine processes to act in a less constrained manner by realigning defences that are under pressure and/or where the value of protected features is likely to justify continued maintenance.

MLP ID	MLP Site Name	SMP Unit and Policy	Impacts on Site
A3	Bradwell Quarry	N/A	None
A4	Bradwell Quarry	N/A	None
A5	Bradwell Quarry	N/A	None
A6	Bradwell Quarry	N/A	None
A7	Bradwell Quarry	N/A	None
A9	Broadfield Farm	N/A	None
A13	Colchester Quarry	N/A	None
A20	Sunnymead, Arlesford	Management Unit D: Colne Estuary PDZ: 6b / HtL	The current line will be held in epoch 1 (Now-2025). In epoch 2 (2025 – 2055), managed realignment by breach of the existing defence, while continuing flood defence to the railway line. Nominal impact on the site as 1km away from estuary.
A22	Little Bullocks Farm	N/A	None
A23	Little Bullocks Farm	N/A	None
A31	Maldon Road, Birch	N/A	None
A38	Blackley Quarry	N/A	None
A39	Blackley Quarry	N/A	None
A40	Shellows Cross	N/A	None
A46	Colemans Farm	N/A	None
B1	Slough Farm	N/A	None

**Table 2.3:** Impacts of Shoreline Management Plan policies on the MLP sites



## **2.12 Climate Change Allowances (2016)**

- 2.12.1 The NPPF (2019) requires climate change allowances to be included as part of any flood risk assessment to ensure future development is both, resilient and sustainable<sup>37</sup>.
- 2.12.2 The climate change values outlined in the original SFRA arose from Annex B of PPS25 and have subsequently been updated by the Environment Agency on behalf of DEFRA and the Department for Communities and Local Government (DCLG).
- 2.12.3 New values for both rainfall events and fluvial flooding events have been modelled using updated CO<sub>2</sub> emissions and scenario predictions. The results are categorised into upper end, higher central and central based on the likelihood of the scenarios occurring.
- 2.12.4 In Essex both the higher central and upper end values must be used to ensure that the range of uncertainty with regard to the magnitude of flow or rainfall changes is explored. This allows any potential impacts to the development or land use change as a consequence of the variance in climate change uncertainty to be understood by both planners and developers, ensuring the safest and most sustainable development.
- 2.12.5 Different values exist for different periods of time over the next century and those used should be chosen based on the lifetime of the proposed development.
- 2.12.6 The lifetime of a non-residential development depends on the characteristics of that development and will be specifically stated for Minerals sites as part of any planning permission. The lifetime value should also incorporate an appropriate allowance for restoration and post-operational usage to ensure flood risk is fully accounted for. Developers would be expected to justify why they have adopted a given lifetime for the development, for example, when they are preparing a site-specific flood risk assessment. The impact of climate change needs to be considered in a realistic way and developers, the local planning authority and Environment Agency should discuss and agree what allowances are acceptable.
- 2.12.7 Within Essex, the Development and Flood Risk Team at Essex County Council advise using the upper (residential) climate change allowances for non-residential developments. As such, this will need to be considered for all future planning applications relating to these sites.

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<sup>37</sup> National Planning Policy Framework (February 2019) Section 14

## Fluvial Climate Change Allowances

2.12.8 Fluvial climate change allowances apply to the peak flood flows in rivers. They apply to Flood Zones only and should be used where a development abuts or contains a watercourse or main river.

2.12.9 Climate change allowances are calculated by region. Essex covers both the Thames and Anglia areas with Table 2.4 showing the fluvial climate changes values for both. The upper end and higher central values shown highlighted in grey should be considered in line with the above guidance and lifetime of the proposed development.

Allowance Category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
<b>Upper End</b> Anglian <b>Thames</b>	25% <b>25%</b>	35% <b>35%</b>	65% <b>70%</b>
<b>Higher Central</b> Anglian <b>Thames</b>	15% <b>15%</b>	20% <b>25%</b>	35% <b>35%</b>
<b>Central</b> Anglian <b>Thames</b>	10% <b>10%</b>	15% <b>15%</b>	25% <b>25%</b>

**Table 2.4:** Regional fluvial climate change allowances<sup>38</sup> with the required values to use within Essex highlighted

## Surface Water Climate Change Allowances

2.12.10 Surface water climate change allowances apply to peak rainfall intensity and the subsequent surface water flooding that storms causes. They apply to runoff calculations and must be used to determine future greenfield runoff rates and storage volumes to ensure appropriate Sustainable Drainage Systems (SuDS) are utilised.

2.12.11 Table 2.5 shows the pluvial climate changes values for Essex. The upper end values shown in bold should be considered in line with the above guidance and lifetime of the proposed development.

<sup>38</sup> Government Guidance; Flood Risk Assessments and Climate Change Allowances (March 2020); <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-1> (Table1)

Allowance Category	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper End	10%	20%	40%
Central	5%	10%	20%

**Table 2.5:** Nationwide peak rainfall intensity climate change allowances<sup>39</sup> with the required value to use within Essex highlighted

### Coastal Climate Change Allowances

2.12.12 Coastal climate change is expressed as the amount of sea level rise for a given geographical area. Values are provided as rates per year, or how much the sea will rise year on year, and are given for specific time periods. Those further into the future have greater annual sea level rise rates than those closer to the present day.

2.12.13 Rates apply to developments adjacent to the coast and on estuaries. Where a development is within an area identified by the Environment Agency as being protected by coastal defences, climate change allowances should be used to assess potential defence overtopping.

2.12.14 The sea level rise value for a development will be the value for the year that is the design lifetime period after the year of construction. For example, a development with a lifetime of 50 years being built in 2025 will require the sea level rise to be calculated up to 2075.

2.12.15 It should be noted that Environment Agency models include sea level rise up to the year of their creation and as such this should be used and adjusted to reach the total sea level rise value. Cumulative totals for each epoch are provided within Table 2.6 to aid such calculations.

2.12.16 As such for the previous example the total sea level rise for the development, assuming a model year of 2020, will be; 4mm x 5 years (for the 1990 to 2025 epoch), plus 255mm (for the entire 2026 to 2055 epoch) plus 19 x 12mm (for the 2056 to 2085 epoch). This gives a total of 503mm of sea level rise above the model baseline sea level.

<sup>39</sup> Government Guidance; Flood Risk Assessments and Climate Change Allowances (March 2020); <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-2> (Table2)

2.12.17 These values do not take account of any changes that may result in wave heights due to increased water depths, nor changes to the frequency, duration or severity of storms. As such any coastal developments must include appropriate sensitivity testing to assess and understand these impacts. Further information on these factors can be found in Table 4 of the EA online guidance<sup>40</sup>.

	1990 to 2025	2026 to 2055	2056 to 2085	2086 to 2115
Rate of increase	4 mm/yr	8.5 mm/yr	<b>12 mm/yr</b>	<b>15 mm/yr</b>
Total cumulative rise across the entire epoch	140mm	255mm	360mm	450mm

**Table 2.6:** Anglian Region sea level increases given as the rate of rise per year within the epoch. Cumulative rise to the end of each epoch is provided to aid total increase calculations<sup>41</sup>

## 2.13 Additional Documents of Relevance

### Essex Local Flood Risk Management Strategy (LFRMS) (2018)

2.13.1 As Lead Local Flood Authority, ECC completed and published a Local Flood Risk Management Strategy (LFRMS) in 2018<sup>42</sup>. This 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.

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

2.13.3 SWMP's identify Critical Drainage Areas (CDA's), which are sub-catchments within the wider SWMP area that at higher risk. 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.

<sup>40</sup> Government Guidance; Flood Risk Assessments and Climate Change Allowances (March 2020):

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-4> (Table 4)

<sup>41</sup> Government Guidance; Flood Risk Assessments and Climate Change Allowances (February 2016):

<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances#table-3> (Table 3)

<sup>42</sup> Essex County Council Local Flood Risk Management Strategy (2018);

<https://flood.essex.gov.uk/media/1293/essex-local-flood-risk-management-strategy.pdf>

2.13.4 In Essex, the production of SWMP's has been divided into Tier 1 and 2 based on the flood risks of separate areas. To date ECC has completed reports for all Tier 1 areas, constituting a total of 10 SWMP's with over 90 CDA's.

2.13.5 The underlying modelling for all SWMPs was updated and standardised by ECC in 2019. This including recalculating the CDA extents to ensure better representation of the topographic and hydrological catchments.

2.13.6 Table 2.7 details whether any of the 16 existing and allocated MLP sites are within a SWMP or CDA area and the specific impact on that site.

### **Flood Risk Regulations (2009)**

2.13.7 The Flood Risk Regulations 2009<sup>43</sup> transpose the 2007 EC Floods Directive (2007/60/EC)<sup>44</sup> into UK law. They require Lead Local Flood Authorities (LLFA's) to prepare Preliminary Flood Risk Assessments (PFRA's) to identify significant areas of surface water and groundwater flood risk. Where such areas are highlighted, a Flood Risk Management Plan (FRMP) must be undertaken to produce mapping showing the associated risks and hazards.

2.13.8 Essex County Council published the Essex PFRA in 2011<sup>45</sup> and reviewed the document in 2017 in line with the requirements to update on a 6-year cycle. This review found no new changes to the assessment of risk as carried out in the 2011 report and all annexes of the 2011 PFRA have been updated to reflect this 2017 review. As such the PFRA (2011) should still be considered during all relevant planning policy and development decisions along with the 2017 addendum.

2.13.9 The Flood Risk Regulations also require all EU member states to produce Flood Risk Management Plans (FRMPs) for each river basin district. These are produced by the Environment Agency in England, more information on FRMPs covering Essex and the specific impacts on the 16 existing and allocated MLP sites can be found in Section 2.10.

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<sup>43</sup> Flood Risk Regulations (December 2009); <http://www.legislation.gov.uk/ukSI/2009/3042/contents/made>

<sup>44</sup> EC Floods Directive (October, 2007); <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32007L0060>

<sup>45</sup> Essex County Council PFRA (June 2011); [https://www.rochford.gov.uk/sites/default/files/evibase\\_98eb49.pdf](https://www.rochford.gov.uk/sites/default/files/evibase_98eb49.pdf)

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MLP ID	MLP Site Name	SWMP Information	Impacts on Site
A3	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
A4	Bradwell Quarry		
A5	Bradwell Quarry		
A6	Bradwell Quarry		
A7	Bradwell Quarry		
A9	Broadfield Farm	Site within Braintree District which has an SWMP (Braintree and Witham 2016) but not within modelled study area	None. Site not within close proximity of SWMP study area
A13	Colchester Quarry	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
A20	Sunnymead	Tendring District has no SWMP at the time of writing. One is currently being produced covering Clacton on Sea but the site is outside of this study area	None
A22	Little Bullocks Farm	Uttlesford has no SWMP at the time of writing with none currently being produced	None
A23	Little Bullocks Farm		
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
A38	Blackley Quarry	Sites within Braintree District which has an SWMP (Braintree and Witham 2016) but not within modelled study area	None. Site not within close proximity of SWMP study area
A39	Blackley Quarry		
A40	Shellows Cross	In Chelmsford District which has an SWMP (Chelmsford 2014) but site not within modelled area	None. Site not within close proximity of SWMP study area
A46	Colemans Farm	Within Witham study area of Braintree and Witham SWMP (2016) and within Witham CDA W7	A flood alleviation scheme upstream of the site was completed by ECC in 2019. This provides protection to properties but will provide some benefits to the site. As LLFA, ECC should be consulted as part of the planning process
B1	Slough Farm	Tendring District has no SWMP at the time of writing. One is currently being produced covering Clacton on Sea but the site is outside of this study area	None

**Table 2.7:** Impacts of Surface Water Management Plan and Critical Drainage Areas on the MLP sites

## **Climate Change Risk Assessment (CCRA) (2017)**

2.13.10 As required by the Climate Change Act, established in 2008, the Government must publish a Climate Change Risk Assessment (CCRA) every five years to evaluate the risks to the UK from the current and predicted impacts of climate change.

2.13.11 The purpose of the CCRA is to form the basis of climate change adaptation policy making over the next five years and identify risk and opportunities for businesses and infrastructure providers.

2.13.12 The latest 2017 CCRA<sup>46</sup> was informed by an evidence report produced by the Adaptation Sub-Committee (ASC) of the Climate Change Committee (CCC) and identifies six priority risk areas including flooding and coastal change. There is compelling evidence to suggest that climate change will lead to increased severity and frequency of rainfall events which means an increased risk of flooding from surface water and fluvial sources.

2.13.13 The report recommends more ambitious approaches to flood risk adaptation and to ensure there are:

- Long term strategies in place to address projected risk to people, communities and buildings and to;
- Deliver a more integrated approach in high-risk catchments through the use of more natural flood management to recognise wider environment enhancements such as carbon reduction and habitat creation.

2.13.14 At the time of writing, as shown in Table 2.7, 4 of the 16 existing and allocated MLP sites are situated in close proximity to an Essex County Council SWMP or CDA;

- Bradwell Quarry, Rivenhall
- Colchester Quarry, Fiveways
- Maldon Road, Birch
- Colemans Farm

2.13.15 Given their proximity to hydraulic catchments highly susceptible to surface water flood risk, consideration should be given to the potential delivery of Natural Flood Management (NFM) scheme/s as part of the operation and restoration of these sites.

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<sup>46</sup> Climate Change Risk Assessment 2017; <https://www.gov.uk/government/publications/uk-climate-change-risk-assessment-2017>



### 3 FLOOD RISK DATA AND INFORMATION

#### 3.1 Flood Zones (Rivers and the Sea)

- 3.1.1 Fluvial and coastal flood risk information is created and managed by the Environment Agency. Historically fluvial flood zones have been created and used to define the risk of flooding from rivers and the sea for the purposes of planning and development. The definition of each Flood Zone can be found in Table 3.1.
- 3.1.2 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<sup>47</sup>. 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.
- 3.1.3 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.

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 3.1:** Environment Agency Flood Zone definitions<sup>48</sup>

<sup>47</sup> Environment Agency Flood Zone maps; <https://flood-map-for-planning.service.gov.uk>

<sup>48</sup> Environment Agency Flood Zone definitions; <https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-zone-and-flood-risk-tables>



3.1.4 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<sup>49</sup> or to use in GIS via a WMS layer.

3.1.5 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.

### 3.2 Surface Water Flood Risk Areas

3.2.1 The responsibility for managing surface water flooding lies with 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.

3.2.2 The latest version of mapping detailing surface water flood risk is the Risk of Flooding from Surface Water (RoFSW) which directly replaced the previous Updated Flood Map for Surface Water (uFMfSW) mapping used in the previous SFRA. This is available to interrogate through an online viewer<sup>50</sup> or to use in GIS via a WMS layer.

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 3.2:** Environment Agency surface water flood risk area definitions<sup>51</sup>

<sup>49</sup> Environment Agency Risk of Flooding from Rivers and the Sea mapping; <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

<sup>50</sup> Environment Agency Risk of Flooding from Surface Water mapping; <https://flood-warning-information.service.gov.uk/long-term-flood-risk/>

<sup>51</sup> Environment Agency Flood Zone definitions; <https://www.gov.uk/guidance/flood-risk-and-coastal-change#flood-zone-and-flood-risk-tables>

- 3.2.3 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.
- 3.2.4 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.
- 3.2.5 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, the definitions of which are outlined in Table 3.2.
- 3.2.6 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.

### **3.3 Groundwater Flood Risk Areas**

- 3.3.1 Groundwater flood risk aligns directly with the underlying soils, geology and hydrogeological conditions and the British Geological Survey (BGS) have produced datasets to shows risks across the country.
- 3.3.2 The Environment Agency utilised this data to create the Areas Susceptible to Groundwater Flooding (ASStGWF) hazard maps showing the likelihood of groundwater flooding which is issued to LLFA's as the body responsible for the management of groundwater flooding. Maps have a spatial resolution of 50m and are updated bi-annually. They are available online to use in GIS via a WMS layer.
- 3.3.3 A detailed assessment of the county-wide groundwater flood risk is outside of the scope of this addendum, however the hazard maps have been reviewed on a site-specific basis to establish respective susceptibility to groundwater sources for each of the 16 existing and allocated MLP sites. The results of the assessment can be found in Section 6.

## **4 FLUVIAL FLOOD RISK**

### **4.1 Introduction**

- 4.1.1 This section defines the fluvial Flood Zones and highlights the fluvial flood risk using the information detailed in Section 3.1. Appendices 4a, 5a and 6a show the 16 existing and allocated MLP sites with the Flood Zone extents.
- 4.1.2 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.
- 4.1.3 Where fluvial 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 during operation and restoration.
- 4.1.4 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.
- 4.1.5 None of the 16 existing and allocated MLP sites fall within areas protected by existing EA flood defences.

### **4.2 Fluvial and Coastal Flood Risk**

- 4.2.1 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.
- 4.2.2 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.

4.2.3 Fluvial and coastal flooding tends to involve high depths of water with high velocities near main river channels which decrease with distance. Water 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.

#### **Existing fluvial hydraulic models**

4.2.4 The available Environment Agency county-wide fluvial and tidal/coastal models relevant to this SFRA can be found in Appendix 3. These model extents have been incorporated into the aforementioned Fluvial Flood Zone extents.

4.2.5 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. 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.

#### **Other Main Rivers and Major Watercourses**

4.2.6 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 addendum. 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**.

4.2.7 Where an existing and allocated MLP site contains or borders Flood Zones 2 or 3, and work has not yet started, further site-specific modelling and flood risk information will need to be provided in the form of an FRA to ensure that the updated climate change allowances are incorporated in any relevant planning decisions.

- 4.2.8 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.

### **4.3 Fluvial Flood Defences**

- 4.3.1 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.
- 4.3.2 None of the assessed minerals sites exist within an area shown as being protected by Environment Agency flood defences. The areas benefitting from defences are showing in Appendices 4a, 5a and 5c.

### **4.4 Effects of Climate Change on Fluvial Flood Risk**

- 4.4.1 The current guidance on fluvial climate change allowances is detailed in Section 2.12.8 and states a 35% and 65% increase for the Anglian region; and a 35% and 70% increase for the Thames region, over the next 50-100 years for the higher central and upper end scenarios respectively. This constitutes a significant increase from the previous 20% required by the superseded Planning Policy Statement 25 PPS25).
- 4.4.2 As such predicted flow volumes and associated flood depths are greater, which increases risk and reduces usable space where potential developments contain or abut a main river.
- 4.4.3 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 assure appropriate development, sustainability and the minimising of flood risk.

### **4.5 Effects of EA Policy on Fluvial Flood Risk**

- 4.4.4 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 2.10 of this report.

## 5 FLOOD RISK FROM OTHER SOURCES

### 5.1 Surface Water Flood Risk

- 5.1.1 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.
- 5.1.2 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.
- 5.1.3 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.
- 5.1.4 Records of historic flooding events and sewer flooding have been included in the sequential test and site-specific assessments in Section 6 and Appendix 2 respectively.
- 5.1.5 Surface water flood risk is determined using the Environment Agency Risk of Flooding from Surface Water (RoFSW) mapping. Further details on this data source can be found in Section 3.2 of this report.
- 5.1.6 Appendices 4b, 5b and 6b show the 3.33%, 1% and 0.1% AEP extents for all the existing and allocated MLP sites. Due to the resolution of the model used to create the mapping and the assumptions it contains this mapping cannot be used to determine flood risk to specific buildings. As such it should be used only to highlight where surface water flood risk may be relevant to a site and whether further investigations or specific mitigation measures may be required.
- 5.1.7 The RoFSW mapping has been used to inform the risk of surface water flooding to all 16 of the existing and allocated MLP sites, further details of which can be found in Section 6.

## 5.2 Groundwater Flooding

- 5.2.1 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.
- 5.2.2 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.
- 5.2.3 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.
- 5.2.4 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.
- 5.2.5 The risk of flooding from groundwater is determined using the Environment Agency Areas Susceptible to Groundwater Flooding (AStGWF) mapping. Further details on this data source can be found in Section 3.3 of this report.
- 5.2.6 Appendices 4c, 5c and 6c show the existing and allocated MLP sites with the AStGWF mapping. Due to the resolution of the model used to create the mapping (1km grids) and the assumptions it contains, this mapping cannot be used to determine flood risk to specific sites. As such it should be used only to highlight where groundwater flood risk may be relevant to a site and whether further investigations or specific mitigation measures may be required.
- 5.2.7 This mapping has also been used to inform the sequential testing of all 16 existing and allocated MLP sites (further details of which can be found in Section 6 of this addendum).



## 6 SEQUENTIAL TEST RESULTS

- 6.0.1 A Strategic Flood Risk Assessment (SFRA) is a planning tool used to support the strategic spatial planning process and highlight flood risk at potential development locations. It considers all sources of flooding and the impacts of climate change and should be used to inform local planning policies surrounding flood risk and sustainability. In addition, the SFRA provides information to allow potential development sites to be subjected to the sequential and exception tests, as required by the NPPF<sup>52</sup>.
- 6.0.2 This addendum does not constitute a full SFRA or a replacement of the existing Minerals Local Plan SFRA (2012) which must still be used in conjunction with this document. The development vulnerability classifications and sequential and exception test approaches were transferred from the PPS to the NPPF and as such the details of these contained within the SFRA remain relevant.
- 6.0.3 This addendum provides an update on policy and legislation changes since the previous 2012 MLP SFRA. It also summarises the results of the sequential test assessments of all 16 existing and allocated MLP sites (Table 6.3) and further site-specific assessments of medium and high-risk sites (Appendix 2).
- 6.0.4 Minerals sites fall within the less vulnerable and water compatible vulnerability classifications so do not meet the threshold required to undertake an exception test.
- 6.0.5 It should be noted that a 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.
- 6.0.6 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 through the planning process to ensure risk is appropriately mitigated.

### 6.1 Minerals Local Plan Site Assessment Methodology

- 6.1.1 To re-assess the flood risk for the 16 existing and allocated MLP sites the following methodology was employed. Further details on the data utilised to undertake this can be found in Section 4;

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<sup>52</sup> National Planning Policy Framework (February 2019), Paragraph 157



1. Determine the percentage of the site within each Flood Zone using GIS software. All sites that contain over 95% of the site area within Flood Zone 1 are considered to be low risk.
2. All sites with over 2% within Flood Zone 3 are considered to be high risk and are subjected to further site-specific assessment, with mapping and recommendations provided for each (Appendix 2).
3. All sites with between 1% and 2% within Flood Zone 3 or over 5% in Flood Zone 2 are classified as medium risk.
4. All sites are assessed against surface water flood risk 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. Low risk sites with high risks of surface or ground water flooding, or those containing a mapped watercourse<sup>53</sup>, are reclassified as medium risk. Site specific mapping and recommendations to reduce flood risk are provided for all medium risk sites.

6.1.2 Following this approach all existing and allocated MLP sites are given an overall flood risk classification which has been used to visually represent the site on mapping to aid initial risk analysis. Table 6.1 below details the categories and symbology used.

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

**Table 6.1:** Minerals Local Plan site risk categories and mapping symbology

<sup>53</sup> For the purposes of the analysis a mapped watercourse is defined as one shown on the EA DRN 'Watercourse' GIS layer

## 6.2 Site Assessment Findings

- 6.2.1 A total of 16 sites were subjected to the assessment process with 3 found to be high risk, 1 to be medium risk and 12 to be low risk. No overall flood risk classifications were provided in the previous SFRA but changes and updates to the original findings are summarised in Table 6.2.
- 6.2.2 Re-assessment has highlighted the presence of surface water flow paths within several of the 16 existing and allocated MLP sites. Potential mitigation measures are not provided as part of the sequential test results (Table 6.3) but recommendations are included within the further site-specific assessments for the high and medium risk sites (Appendix 2).
- 6.2.3 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.
- 6.2.4 The complete tabulated results of the updated sequential test assessments can be found in Table 6.3. The overall flood risk classification of each site is indicated by the text colours in line with the mapping symbology listed in Table 6.1. A map showing the colour classified sites can be found in Appendix 1.
- 6.2.5 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 Appendix 2.
- 6.2.6 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 granted.

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MLP ID	MLP Site Name	Risk Rating	Updates and Changes to 2012 SFRA Assessment Findings
A3	Bradwell Quarry	Low	No notable changes
A4	Bradwell Quarry	Low	The previous study identified the site is within the 'Shallow' and 'Deep' areas of the Updated Flood Map for Surface Water (uFMfSW) surface water flood mapping. This has been updated to the latest Risk of Flooding From Surface Water (RoFSW) mapping with a flow path identified
A5	Bradwell Quarry	Low	The original SFRA determined the entire site to be within FZ1. This study has updated this to identify that very small areas encroach into FZs 2 and 3, though these are insignificant. This study also identifies that the access route is at increased risk of GW flooding relative to the rest of the site
A6	Bradwell Quarry	Medium	This study identified the presence of a watercourse running through the site and assigns a Medium risk rating due to the potential for flooding from it
A7	Bradwell Quarry	Low	The previous study identifies the site is within the 'Shallow' and 'Deep' area of the uFMfSW surface water flood mapping. This has been updated to the latest RoFSW mapping with several flow paths identified
A9	Broadfield Farm	Low	This study has identified a watercourse and SW flooding areas just outside of the site boundary that may have an impact on the site
A13	Colchester Quarry	Low	The previous study identifies the site is within the 'Shallow' area of the uFMfSW surface water flood mapping. This has been updated to the latest RoFSW mapping with several flow paths identified
A20	Sunnymead	Low	The previous study identifies the site is within the 'Shallow' area of the uFMfSW surface water flood mapping. Using the updated RoFSW mapping the risk of SW flooding has been reduced
A22	Little Bullocks Farm	High	The reassessment has identified slight changes to the % of the site within FZ's, though the areas within FZ2 and 3 does not change significantly. The previous study identifies the site is within the 'Shallow' and 'Deep' areas of the uFMfSW surface water flood mapping. This has been updated to the latest RoFSW mapping with several flow paths identified
A23	Little Bullocks Farm	Low	No notable changes
A31	Maldon Road, Birch	High	The reassessment has identified slight changes to the % of the site within FZ's, though the areas within FZ2 and 3 does not change significantly. The previous study identifies the site is within the 'Shallow' and 'Deep' areas of the uFMfSW surface water flood mapping. This has been updated to the latest RoFSW mapping with several flow paths and areas of SW flood risk identified
A38	Blackley Quarry	Low	The previous study identifies the site is within the 'Shallow' area of the FMfSW surface water flood mapping. This has been updated to the latest RoFSW flood mapping with a flow path identified
A39	Blackley Quarry	Low	The previous study identifies the site is within the 'Shallow' and 'Deep' areas of the uFMfSW surface water flood mapping. This has been updated to the latest RoFSW mapping and the risk of SW flooding has been found to be reduced
A40	Shellows Cross	Low	The previous study identifies the site is within the 'Shallow' and 'Deep' areas of the uFMfSW surface water flood mapping. This has been updated to the latest RoFSW mapping and it has been found that the access road is at an increased risk of SW flooding
A46	Colemans Farm	High	The reassessment has identified slight changes to the % of the site within FZ's, though the areas within FZ2 and 3 does not change significantly. The previous study identifies the site is within the 'Shallow' and 'Deep' areas of the uFMfSW surface water flood mapping. This has been updated to the latest RoFSW mapping with a large area identified as being at risk during the 0.1% AEP event
B1	Slough Farm	Low	The previous study identifies the site is within the 'Shallow' area of the uFMfSW surface water flood mapping. This has been updated to the latest RoFSW mapping and it has been found that the access road is at an increased risk of SW flooding

**Table 6.2:** Changes to flood risk information for the MLP sites since the production of the previous SFRA

## 7 GUIDANCE FOR FUTURE DEVELOPMENTS

7.0.1 The provision of specific guidance concerning future developments is outside of the scope of this addendum and should be considered during a full update of the SFRA. However, the following general recommendations are given until such an update is completed;

1. All updated drainage guidance such as the **CIRIA SuDS Manual (C753)** and the latest version of the **ECC SuDS Designs Guide (2016)**<sup>54</sup> should be consulted during the consideration of all planning applications. Please note that the Essex SuDS Design guide is due to be updated imminently in Spring 2020 and should be consulted when assessing all major developments going forward. For more information please contact the SuDS Team at [suds@essex.gov.uk](mailto:suds@essex.gov.uk).
2. The recently completed **ECC Green Infrastructure (GI) Strategy (2019)**<sup>55</sup> should also be considered during the assessment of all future planning applications in relation to these sites including their restoration. The strategy aims to enhance, protect and create an inclusive and integrated network of high-quality green infrastructure in Essex. Please contact the Land Operations and Sustainability and Resilience Team at Essex County Council in the first instance at [environment@essex.gov.uk](mailto:environment@essex.gov.uk).
3. The impact of climate change on fluvial flood defences has not been considered in this addendum report. Where potential development locations benefit from such a defence, detailed site-specific investigations and modelling should be undertaken to assess the risks of overtopping.

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<sup>54</sup> ECC SuDS Design Guide (2016): [https://flood.essex.gov.uk/media/1277/suds-guide\\_april-2016.pdf](https://flood.essex.gov.uk/media/1277/suds-guide_april-2016.pdf)

<sup>55</sup> Green Essex: [https://consultations.essex.gov.uk/rci/green-essex-strategy/supporting\\_documents/GE\\_Exec\\_Summary\\_250419%201%201.pdf](https://consultations.essex.gov.uk/rci/green-essex-strategy/supporting_documents/GE_Exec_Summary_250419%201%201.pdf)

## Essex Minerals Local Plan: Strategic Flood Risk Assessment Addendum

MLP Ref	Site Name	Application Number	District	Size (ha)	Fluvial FZ %			SW Flood Risk	GW Flood Risk	Sequential Test information and flood risk comments
					1	2	3			
A3	Bradwell Quarry	ESS/07/16/BTE	Braintree	9.2	100	0	0	Low	Low	Sequential Test not required. Minimal, isolated surface water (SW) flooding areas. Majority of site in <25 groundwater (GW) flood risk area, remainder of site has no data.
A4	Bradwell Quarry	ESS/07/16/BTE	Braintree	25.2	100	0	0	Low	Low	Sequential Test not required. Minimal, isolated SW flooding areas with small flow path to NW of site. Majority of site in <25 GW flood risk area, remainder of site has no data.
A5	Bradwell Quarry	ESS/03/18/BTE	Braintree	35	>99	<1	<1	Medium	Low	Sequential Test not required. Isolated SW flow paths present across site. Access route crosses multiple watercourses. All site within <25% GW flooding risk band or has no data, access route is within 25-50% risk band.
A6	Bradwell Quarry		Braintree	37.5	100	0	0	Medium	Low	Sequential Test not required. Watercourse present running through entire site. All site within <25% GW flooding risk band or has no data.
A7	Bradwell Quarry	ESS/44/18/BTE/SPO	Braintree	94.9	100	0	0	Medium	Low	Sequential Test not required. SW flow paths present through centre of site, patchy SW flooding across entire site. All site within <25% GW flooding risk band.
A9	Broadfield Farm	ESS/19/17/BTE	Braintree	93.4	100	0	0	Low	Low	Sequential Test not required. Some SW flow paths present just outside site boundaries. Watercourse to west of site. All site within <25% GW flooding risk band.
A13	Colchester Quarry	ESS/23/14/COL	Colchester	15.3	100	0	0	Low	Low	Sequential Test not required. Small SW flow path crossing western edge of site. All site within <25% GW flooding risk band.
A20	Sunnymead,	ESS/17/18/TEN	Tendring	61.9	100	0	0	Low	Low	Sequential Test not required. No SW flow paths present. All site within <25% GW flooding risk band.
A22	Little Bullocks Farm		Uttlesford	6.9	90	6	4	Medium	Low	Sequential Test applied. Multiple SW flow path present across site during multiple AEP events. Western part of site is within <25% GW flood risk band, majority of site is within 25-50% band.
A23	Little Bullocks Farm		Uttlesford	5.5	100	0	0	Low	Low	Sequential Test not required. No SW flow paths present. All site within <25% GW flooding risk band.
A31	Maldon Road, Birch		Colchester	25	92	4	4	High	Medium	Sequential Test applied. Watercourse present within entire length of site. 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. Majority of site is within 50-75% GW flood risk band.
A38	Blackley Quarry	ESS/46/16/CHL	Chelmsford	22.7	100	0	0	Low	Low	Sequential Test not required. Sporadic SW flooding with flow path to south of site during 0.1% AEP event. All site within no GW flooding data area.
A39	Blackley Quarry	ESS/07/16/BTE	Chelmsford	21	100	0	0	Low	Low	Sequential Test not required. Minimal, isolated SW flooding areas. Majority of site in <25 GW flood risk area, remainder of site has no data.
A40	Shellows Cross	ESS/46/19/CHL/SO	Chelmsford	16.2	100	0	0	Medium	Low	Sequential Test not required. Section of access road at risk of SW flooding during all SW events. All site within <25% GW flooding risk band or has no data.
A46	Colemans Farm	ESS/39/14/BTE	Braintree	54.5	90	8	2	Low	Medium	Sequential Test applied. Multiple watercourses present. Large area of site affected by 0.1% AEP SW event. Majority of site within >75% GW flood risk band.
B1	Slough Farm		Tendring	11.6	100	0	0	Low	Low	Sequential Test not required. Section of access road at risk of SW flooding during all SW events. All site within <25% GW flooding risk band, access route is within 25-50% band.

**Table 6.3:** Summary information for the 16 MLP sites with high risk sites shown in red and medium risk site in orange.