Level 2 Strategic Flood Risk Assessment

Level 2 Strategic Flood Risk Assessment
Report Version 1 - DRAFT

Thurrock Council

Project number: 60689110

February 2026

Delivering a better world

Quality information

Prepared by	Checked by	Verified by	Approved by
Lauren Lewis Apprentice Eleanor Kingsley Graduate Civil Engineer Amy Phiri Civil Engineer	Sarah Littlewood Associate	WORKING DOCUMENT NOT YET APPROVED FOR ISSUE	WORKING DOCUMENT NOT YET APPROVED FOR ISSUE

Revision History

Revision	Revision date	Details	Authorized	Name	Position
01	February 2026	Draft Report			

Distribution List

# Hard Copies	PDF Required	Association / Company Name
N	Y	Thurrock Council

Prepared for:

Thurrock Council
Civic Offices,
New Road,
Grays,
Essex
RM17 6SL

Prepared by:

AECOM Limited
Midpoint, Alencon Link
Basingstoke
Hampshire RG21 7PP
United Kingdom

T: +44 (0)1256 310200
aecom.com

Table of Contents

Tables

1. Introduction

1.1 Background

1.1.1 Thurrock Council is currently preparing documents that will form part of the Local Plan and set the vision for future development across the Borough up to 2040. Thurrock Council faces the challenge of meeting the need for new development within areas already identified to be at risk of both river (fluvial) and tidal flooding associated with a number of different watercourses including the Thames, Mardyke and Stanford Brook. Furthermore, parts of Thurrock regularly experience localised flooding from surface water generated by heavy rainfall, elevated groundwater, and surcharge of existing drainage systems.

1.1.2 The NPPF[1] and associated PPG[2] for Flood Risk and Coastal Change emphasise the active role LPAs should take to ensure that flood risk is assessed, avoided, controlled, mitigated and managed effectively and sustainably throughout all stages of the planning process.

1.1.3 The NPPF outlines that Local Plans should be supported by a Strategic Flood Risk Assessment (SFRA) and LPAs should use the findings to inform strategic land use planning.

1.1.4 A Level 1 Strategic Flood Risk Assessment (SFRA) was prepared for Thurrock Council in July 2024 which provides a strategic overview of the risk of flooding from all sources across the Borough now and in the future, taking account of the impacts of climate change.

1.1.5 Thurrock Council are required to use the Level 1 SFRA to apply the Sequential Test to their potential development sites, and steer development towards those sites at lowest risk of flooding, before sites at greater risk are considered.

1.1.6 Within Thurrock, a number of development sites under consideration by the Council remain within areas at risk of flooding, and therefore a Level 2 SFRA is required to consider further the risks of flooding to specific development locations and to begin to consider whether sites could pass the Exception Test (described further in Section X).

1.1.7 Furthermore, since the Level 1 SFRA was published, a number of new datasets have been published by the Environment Agency as part of the National Flood Risk Assessment (NaFRA2) which are of importance to the understanding of flood risk in Thurrock.

1.1.8 This Level 2 SFRA draws on the latest available datasets and information from NaFRA2 as well as data produced during the preparation of the Level 1 SFRA. An assessment of the flood risk posed to each site has been undertaken, and recommendations provided of how the risks can be mitigated and managed.

1.2 Level 2 SFRA and Exception Test

1.2.1 It is set out within Paragraph 177 of the NPPF that, following the application of the sequential test by the Council, if it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the Exception test may have to be applied.

1.2.2 The need for the Exception Test depends on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in Annex 3 of the NPPF.

1.2.3 Table 2 of the PPG flood risk and coastal change (reproduced in Table 1-1), identifies where the Exception Test is required based on Flood Zone and development vulnerability classification.

[1] National Planning Policy Framework, July 2021 https://www.gov.uk/government/publications/national-planning-policy-framework--2
[2] Planning Practice Guidance – flood risk and coastal change, August 2022 https://www.gov.uk/guidance/flood-risk-and-coastal-change

Table 1-1 Flood Risk Vulnerability and Flood Zone 'Incompatibility' (PPG Table 2)

	Flood Risk Vulnerability Classification	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Flood Zone	1	✓	✓	✓	✓	✓
	2	✓	✓	Exception Test Required	✓	✓
	3a †	Exception Test Required †	✓	×	Exception Test Required	✓
	3b *	Exception Test Required *	✓*	×	×	×

✓ – Exception Test is not required × – Development should not be permitted

† – In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* – In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood
- result in no net loss of floodplain storage
- not impede water flows and not increase flood risk elsewhere

1.2.4 To pass the Exception Test it should be demonstrated that:

a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and

b) 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.

1.2.5 Both elements of the Exception Test should be satisfied for development to be allocated or permitted.

1.2.6 The purpose of this Level 2 SFRA is to consider further the risks of flooding to specific development locations under consideration by Thurrock Council and to begin to consider whether sites could pass part b) the Exception Test.

1.3 Report Structure

1.3.1 This Level 2 SFRA is structured as follows:

- Section 1: Introduction
- Section 2: Datasets and Methodology
- Section 4: Summary & Next Steps
- Appendix A: Borough wide mapping
- Appendix B: Site Proformas – Residential Sites (30 No.)
- Appendix C: Site Maps – Employment Sites (47 No.)

2. Datasets & Methodology

2.1 Datasets

2.1.1 A range of national datasets and local datasets have been used in the Level 2 SFRA. Datasets have been obtained from the Defra Data Services Platform, the Environment Agency, Thurrock Council and Anglian Water.

2.1.2 The Environment Agency and Thurrock Council have been consulted to agree the datasets that should be used to assess the risk of flooding from all sources.

2.1.3 Table 2-1 identifies the datasets and information that have been used in the preparation of this Level 2 SFRA.

2.1.4 Thurrock Council provided a GIS shapefile of 166 development sites. These sites have been analysed against the flood risk datasets in Table 2-1.

Table 2-1 Datasets

Name	Description	Type	Source	SFRA Map
Main River	Statutory Main Rivers Map is a spatial (polyline) dataset that defines statutory watercourses in England designated as Main Rivers by the Environment Agency. Watercourses designated as 'main river' are generally the larger arterial watercourses. The Environment Agency has permissive powers, but not a duty, to carry out maintenance, improvement or construction work on designated main rivers. All other open water courses in England are determined by statute as an 'ordinary watercourse'. On these watercourses the Lead Local flood Authority or, if within an Internal Drainage District, the Internal Drainage Board have similar permissive powers to maintain and improve.	GIS Shapefile	Environment Agency https://environment.data.gov.uk/dataset/25dde009-ba7d-40de-8380-c5c3bb32ccdc	Level 2 Proformas
Watercourses	OS Open Rivers provides a comprehensive dataset of Great Britain's River Network, which approximately indicates the central alignment of the watercourse. Inland and tidal rivers are represented by a series of connected link and node features which are assigned with river name and flow direction.	GIS Shapefile	https://www.data.gov.uk/	Level 2 Proformas
Spatial Flood Defence Layer	Shows flood defences currently owned, managed or inspected by the Environment Agency. Typically, these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.	GIS Shapefile	Defra Data Services Platform https://environment.data.gov.uk/dataset/8e5be50f-d465-11e4-ba9a-f0def148f590	Level 2 Proformas
Flood Map for Planning (rivers and sea) Flood Zones 2	Land at present day risk of flooding from rivers and sea, ignoring the benefits of defences. Flood Zone 2 is land having between 0.1% - 1% (1 in 100 to 1 in 1000) annual probability of flooding from rivers or between 0.1% - 0.5% (1 in 200 to 1 in 1000) annual probability of flooding from the sea and accepted recorded flood outlines.	GIS Shapefile	Defra Data Services Platform https://environment.data.gov.uk/dataset/04532375-a198-476e-985e-0579a0a11b47	Level 2 Proformas
Flood Map for Planning (rivers and sea) Flood Zones 3	Land at present day risk of flooding from rivers and sea, ignoring the benefits of defences. Flood Zone 3 is areas shown to be at 1% (1 in 100) or greater annual probability of flooding from rivers or 0.5% (1 in 200) of greater annual probability of flooding from the sea.	GIS Shapefile	Defra Data Services Platform https://environment.data.gov.uk/dataset/04532375-a198-476e-985e-0579a0a11b47	Level 2 Appendix B Proformas
Flood Map for Planning Flood Zones plus Climate Change	Shows how the combined extent of Flood Zones 2 and 3 could increase with climate change over the next century, ignoring the benefits of any existing flood defences. The mapping assumes no changes to flood defences or land-use that could occur in future. The effects of climate change on flood risk in the future could be different to those currently considered.	GIS Shapefile	Defra Data Services Platform https://environment.data.gov.uk/dataset/59065c43-257e-4867-8798-fd2366156a6b	Level 2 Appendix A
Rivers and Sea 3.3% defended flood risk extents - present day	This dataset shows the extent of land at risk of flooding during the 3.3% annual exceedance probability (AEP) or chance of flooding each year. Defended products take into account the presence of flood defences and assume that they operate in the way they were intended (or designed) to function. This does not include any asset failure (or removal) scenarios. This dataset is used by Thurrock Council to define Flood Zone 3b Functional Floodplain.	GIS Shapefile	Defra Data Services Platform https://environment.data.gov.uk/dataset/56fb30ae-f20d-490a-9149-a94f3e640261	Level 2 Appendix B Proformas
Rivers and Sea 3.3% defended flood risk extents - climate change	This dataset shows the extent of land at risk of flooding during the 3.3% annual exceedance probability (AEP) or chance of flooding each year, taking into account the possible effects of climate change. Defended products take into account the presence of flood defences and assume that they operate in the way they were intended (or designed) to function. This does not include any asset failure (or removal) scenarios.	GIS Shapefile	Defra Data Services Platform https://environment.data.gov.uk/dataset/b9418b89-aa59-4153-91dd-470f473152dd	NA

Name	Description	Type	Source	SFRA Map
Flood Map for Planning (rivers and sea) Water Storage Areas	Areas that act as a balancing reservoir, storage basin or balancing pond. Their purpose is to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel. It may also delay the timing of a flood peak so that its volume is discharged over a longer time interval. Water storage areas do not completely remove the chance of flooding and can be overtopped or fail in extreme weather conditions. In Thurrock, Water Storage Areas are defined as Flood Zone 3b Functional Floodplain.	GIS Shapefile	Defra Data Services Platform https://environment.data.gov.uk/dataset/86ca7c80-d465-11e4-afe1-f0def148f590	Level 2 Appendix B Proformas
Rivers and Sea defended and undefended flood risk extents - present day	Extent of land at risk of flooding to a defined AEP or chance of flooding each year: Undefended: 0.1% AEP (1 in 1000) Rivers/Sea; Undefended: 1% AEP (1 in 100) Rivers/ 0.5% AEP (1 in 200) Sea; Defended: 0.1% AEP (1 in 1000) Rivers/Sea; Defended: 1% AEP (1 in 100) Rivers/ 0.5% AEP (1 in 200) Sea.	GIS Shapefile	https://environment.data.gov.uk/dataset/bb486190-bb9c-4eb0-a4b2-c9bd63ca86ec	Level 2 Appendix B Proformas
Rivers and Sea defended and undefended flood risk extents - climate change	Extent of land at risk of flooding to a defined AEP or chance of flooding each year taking into account the possible effects of climate change: Undefended: 0.1% AEP (1 in 1000) Rivers/Sea; Undefended: 1% AEP (1 in 100) Rivers/ 0.5% AEP (1 in 200) Sea; Defended: 0.1% AEP (1 in 1000) Rivers/Sea; Defended: 1% AEP (1 in 100) Rivers/ 0.5% AEP (1 in 200) Sea.	GIS Shapefile	https://environment.data.gov.uk/dataset/610d6830-0637-4f5b-b6ce-61f5fa5635d3	Level 2 Appendix B Proformas
Recorded Flood Outlines	GIS layer which shows all Environment Agency records of historic flooding from rivers, the sea, groundwater and surface water. Each individual Recorded Flood Outline contains a consistent list of information about the recorded flood. The Recorded Flood Outlines take into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding. It includes flood extents that may have been affected by overtopping, breaches or blockages. Any flood extents shown do not necessarily indicate that properties were flooded internally.	GIS Shapefile	Defra Data Services Platform https://environment.data.gov.uk/dataset/8c75e700-d465-11e4-8b5b-f0def148f590	Level 1 SFRA
Flood Warning Areas	Geographical areas where flooding is expected to occur and where the Environment Agency provide a Flood Warning Service. They generally contain properties that are expected to flood from rivers or the sea and in some areas, from groundwater.	GIS Shapefile	Defra Data Services Platform https://environment.data.gov.uk/dataset/87e5d78f-d465-11e4-9343-f0def148f590	Level 1 SFRA
Bedrock and superficial geology	Generalised digital geological map data based on BGS's published poster maps of the UK.	GIS shapefile	British Geological Survey Open Data	Level 1 SFRA
Records of sewer flooding	Records of internal and external sewer flooding incidents reported by Anglian Water for 5 digit post code areas in Thurrock.	MS Excel Workbook	Anglian Water	Level 1 SFRA
Postcode Boundary	GIS layer of post code areas. Used to map the Anglian Water sewer flooding records which are reported by 5 digit post code area.	GIS Shapefile	Thurrock Council	Level 1 SFRA
Risk of flooding from surface water flood extents (3.3% AEP, 1% AEP, 0.1% AEP)	GIS layers showing the extent of flooding from surface water that could result from a flood with a 3.3% (1 in 30 year), 1% (1 in 100 year) and 0.1% (1 in 1000 year) chance of happening in any given year. This is not suitable for identifying whether an individual property will flood but is useful to identifying areas susceptible to surface water flooding and key flow paths.	GIS Shapefile	Defra Data Services Platform	Level 2 SFRA Appendix B Proformas
Areas of Critical Drainage	GIS layers showing Areas of Critical Drainage as defined in the Thurrock Council Surface Water Management Plan and Local Flood Risk Management Strategy. These are areas with known and modelled surface water flood risk.	GIS Shapefile	Thurrock Council	Level 2 SFRA Appendix A
Susceptibility to groundwater flooding	Dataset which shows where there is the potential for groundwater flooding but does not give any indication of the probability that it will occur. Susceptibility is classified into three categories: Potential for groundwater flooding to occur at surface; Potential for groundwater flooding of property situated below ground level; Limited potential for groundwater flooding to occur.	GIS shapefiles	British Geological Survey	Level 2 SFRA Appendix B Proformas

Name	Description	Type	Source	SFRA Map
Infiltration SuDS Suitability dataset	Dataset which gives a preliminary indication of the suitability of the ground for infiltration SuDS. These are drainage systems that allow surface water to infiltrate to the ground, such as soakaways, infiltration basins, infiltration trenches and permeable pavements. The mapping allows consideration of subsurface permeability, depth to groundwater, presence of geological floodplain deposits, presence of artificial ground, ground stability, potential for pollutant attenuation, and the Environment Agency's source protection zones.	GIS Shapefile	British Geological Survey	Level 1 SFRA
Risk of Flooding from Reservoirs mapping	Flood extents for all large, raised reservoirs in the event that they were to fail and release the water held on a "dry day" when local rivers are at normal levels, and on a "wet day" when local rivers had already overflowed their banks.	GIS Shapefiles	Defra Data Services Platform https://environment.data.gov.uk/dataset/c66ee97f-49d2-454e-9a19-d48a47bd22ad	Level 2 SFRA Appendix B Proformas
Tidal Overtopping Modelling Outputs	As part of the Level 1 SFRA, modelling was undertaken to assess flooding from overtopping of the tidal flood defences along the River Thames during the 0.5% AEP event for the year 2125 (upper end climate change scenario). Mapping of the flood depths and flood hazards (refer to Section 2.2).	GIS ASCII Grid	Level 1 SFRA	Level 2 SFRA Appendix B Proformas
Tidal Breach Modelling Outputs	As part of the Level 1 SFRA, modelling was undertaken to assess the residual risk of tidal flooding as a result of breaches in the tidal flood defences along the River Thames. 21 breach locations were modelled along the Thames tidal frontage. The results were combined into a composite flood depth and hazard maps for a range of scenarios (refer to Section 2.2). Within the Level 2 SFRA reference has been made to the 0.5% AEP event for the year 2125 (upper end climate change scenario) and the 0.1% AEP for the year 2125 (upper end climate change scenario).	GIS ASCII Grid	Level 1 SFRA	Level 2 SFRA Appendix B Proformas

2.2 Modelling Outputs

2.2.1 In order to determine the risk of flooding from the Thames Estuary, the scope of the Level 1 SFRA included modelling of overtopping and breach in the tidal defences throughout the study area for the 0.5% and 0.1% AEP events for both the present day (2025) and for 2125, taking account of climate change.

2.2.2 The following outputs were produced from the hydraulic modelling: maximum flood depth grids, maximum flood hazard grids and maximum water level grids.

2.2.3 Flood 'hazard' categorises the danger to people for different combinations of flood water depth and velocity. The derivation of these categories is based on the methodology set out by Defra in their Flood Risk Assessment Guidance for New Development FD2320/TR2[3] using the following equation:

*2.2.4 Flood Hazard Rating = ((v+0.5) *D) + DF Where v = velocity (m/s), D = depth (m), DF = debris factor*

2.2.5 The resulting values are grouped into hazard ratings as shown in Table 2-2.

Table 2-2 Flood Hazard Categories

Flood Hazard		Description
Low	HR < 0.75	Caution – Flood zone with shallow flowing water or deep standing water
Moderate	0.75 ≥ HR ≤ 1.25	Dangerous for some (i.e., children) – Danger: flood zone with deep or fast flowing water
Significant	1.25 > HR ≤ 2.0	Dangerous for most people – Danger: flood zone with deep fast flowing water
Extreme	HR > 2.0	Dangerous for all – Extreme danger: flood zone with deep fast flowing water

2.3 Sites to Assess

2.3.1 Of the 166 sites provided by Thurrock Council, 77 have been identified as located either fully or partially within the Flood Map for Planning Flood Zones including climate change. These 77 sites have been assessed in the Level 2 SFRA.

2.3.2 30 sites are proposed for residential use which is defined as More Vulnerable. These sites require the Exception Test. Site assessments are presented in Appendix B.

2.3.3 47 sites are proposed for employment use. Specific details about the use are not known and therefore they are assumed to be Less Vulnerable. The Exception Test is not required for Less Vulnerable sites; however, these sites have been included in the Level 2 SFRA for completeness. Mapping for these sites us presented in Appendix C.

2.3.4 The remaining sites are in Flood Zone 1. Development located in these sites should follow the recommendations for managing and mitigating flood risk set out in the Level 1 SFRA.

2.4 Proforma

2.4.1 A proforma has been prepared for the 30 residential development sites following the format shown in Table 2-3. These are presented in Appendix B (residential sites). The proforma provides a summary of the flood risk to the site, along with recommendations to manage and mitigate the risk.

[3] Defra and Environment Agency (2005) FD2320/TR2 Flood Risk Assessment Guidance for New Development.

Table 2-3 Proforma Format

Proforma Field	Description
AECOM Reference	Unique reference assigned by AECOM during site analysis.
Thurrock Reference	As provided by Thurrock Council (GIS shapefile of sites).
Site Name	As provided by Thurrock Council (GIS shapefile of sites).
Neighbourhood	As provided by Thurrock Council (GIS shapefile of sites).
Site Area	Area in hectares.
Vulnerability Classification	Classification based on proposed use in accordance with Annex 3 of the NPPF. Residential has been assigned More Vulnerable. All employment uses are assumed Less Vulnerable as specific details of use are not known.
Flood Zone 2	Flood Map for Planning (Rivers and Sea) Flood Zone 2
Flood Zone 3a	Flood Map for Planning (Rivers and Sea) Flood Zone 3
Flood Zone 3b	Flood Zone 3b defined from 'Rivers and Sea 3.3% defended flood risk extents - present day' and Flood Map for Planning (Rivers and Sea) Water Storage Areas.
Future Flood Zones	Flood Map for Planning Flood Zones plus Climate Change.
Flood Warning Area	Name of Flood Warning Area in which the site is located.
Recorded Flood Outlines	Dates of recorded flood event that affect the site.
Proximity to nearest Watercourse	Distance in m. Based on Detailed River Network mapped in Level 1 SFRA.
Sewer Flooding Records	5 digit post code area in which site is located. Number of sewer flooding records recorded in that post code area.
Defended rivers and sea – climate change	Proportion of site shown to be at risk of flooding from this dataset.
0.1% AEP, 1% AEP, 3.33% AEP	Proportion of site shown to be at risk of flooding from this dataset, to be used for indicative and comparative purposes only.
0.1% plus CC, 1% AEP plus CC, 3.33% plus CC	Proportion of site shown to be at risk of flooding from this dataset, to be used for indicative and comparative purposes only.
Critical Drainage Areas	Reference number for CDA in which the site is located (if applicable).
Bedrock Geology	Name of bedrock geology underlying the site, based on BGS mapping.
Superficial Geology	Name of superficial geology underlying the site, based on BGS mapping.
BGS Susceptibility Summary	Category present for the area in which the site is located.
BGS Infiltration SuDS Suitability	Category present for the area in which the site is located.
Tidal Breach Assessment	Maximum flood level (mAOD) during Breach 0.5% AEP 2125 and the breach location that this corresponds to. If N/A then the site is not at risk from overtopping during this event.
Tidal Overtopping	Maximum flood level (mAOD) during Overtopping 0.5% AEP 2125. If N/A then the site is not at risk from overtopping during this event.
Residual risk of flooding from reservoirs	Proportion of site shown to be at risk of Flooding from Reservoirs in the Event of a Breach or Failure (when river levels are normal and when there is also flooding from rivers).
Flood Risk Summary	
An overview of the risk of flooding to the site now and in the future (as a result of the impacts of climate change) based on the information within the proforma.	
Site Specific Recommendations	
Recommendations for how development could be delivered on the site to meet the requirements of part b of the Exception Test (where required) i.e., that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible reduce flood risk overall. Recommendations are made in line with the development management measures presented within the Level 1 SFRA and typically address the following: Applying the sequential approach within the development site; Setting back development from the edge of watercourses; Finished floor levels; Floodplain compensation storage; Access and egress arrangements; Flood warning and evacuation procedures; Surface water management and considerations for SuDS; Further investigation of groundwater levels.	

3. Summary and Next Steps

3.1 Summary

3.1.1 Site assessments for 77 sites have been prepared within this Level 2 SFRA, and site specific recommendations have been made for each to determine how development could satisfy part b) of the Exception Test. These are presented in Appendix B. A summary of the findings is presented below.

Tilbury Flood Storage Area

3.1.2 The following sites are located in the Tilbury Flood Storage Area:

- 60864 Land east of Dock Road and south of Marshfoot Road (ACM_008), proposed for employment use.
- 60967 Land south of Marshfoot Road, Tilbury (ACM_019), proposed for employment use.
- 61059 Tilbury Football Club, Chadfields, Tilbury RM18 8NL (ACM_093), proposed for residential use.

3.1.3 As noted in the Level 1 SFRA, this area was engineering to store water in times of flooding and is therefore defined as Flood Zone 3b. It is also registered under the Reservoirs Act (1975) and will be maintained and operated as a category C Reservoir and Flood Storage Area (FSA) with capacity to store surface water floodwaters during a 0.1% AEP (1 in 1000 year) event. The Level 1 SFRA states that this area should be *safeguarded* as a flood storage area.

3.1.4 Only Water Compatible development is permitted in Flood Zone 3b. Essential Infrastructure may be considered, subject to the Exception Test.

3.1.5 More Vulnerable and Less Vulnerable development is not appropriate within these three sites. **These sites should not be taken forward by Thurrock Council.**

Residential Sites

3.1.6 Table 3-1 provides a summary of the key risks and constraints for each of the residential sites assessed in Appendix B.

Table 3-1 Summary of Residential Sites

ACM Ref	ID	Name	High Level Constraints
ACM_040	60459	Rippleside Metalworks, Thames Road, Grays	Not shown to be at risk of overtopping. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_041	60474	Car Park, Coronation Road, East Tilbury	Not shown to be at risk of overtopping. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_049	60844	Land south of Aveley	Development of the site should take consideration of the ordinary watercourses that pass through the site and a natural floodplain maintained. Modelling of these watercourses may be required to determine the design flood levels in this area.
ACM_050	60847	East Tilbury	Not shown to be at risk of overtopping. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_051	60851	East Tilbury 2	At risk of flooding from overtopping. Finished floor levels should be set above design flood level. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_052	60853	Land at the Mardyke Valley Golf Club, South Road, South Ockendon	Development should be set back from the Mardyke and designed around watercourses on site, deculverting where possible. Finished floor levels should be set above the design flood level.

ACM_054	60856	Land northeast of Corringham	Development proposals for the site should be designed around the natural surface water flowpaths and existing watercourses on the site. Development must be set back from ordinary watercourses and works near these watercourses will require consent from Thurrock Council as the Lead Local Flood Authority.
ACM_057	60882	Land Adjacent And To The Rear Of The George And Dragon East Tilbury Road Linford Essex	Development should be set back from watercourse and opportunities taken to restore natural edge of floodplain. Not shown to be at risk of overtopping. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_059	60888	Land at Wharf Road, Stanford-le-Hope	Development is not permitted in Flood Zone 3b. Detailed modelling of the ordinary watercourse would be required to determine a suitable area to be retained as floodplain and to determine the design flood level for the site. Development should be located outside the design flood extent.
ACM_061	60910	Land at East Tilbury Road, Linford	Development is not permitted in Flood Zone 3b. Detailed modelling should be undertaken to determine a suitable area to be retained as floodplain and to determine the design flood level for the site. Development should be located outside the design flood extent. Not shown to be at risk of overtopping. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_062	60911	Medebridge Road, South Ockendon	Detailed modelling should be undertaken to determine the risk of flooding from the ordinary watercourses and the design flood levels for the site. Development should be located outside the design flood extent. Development should be set back from the Main River and Ordinary Watercourses and opportunities should be explored for riverside restoration.
ACM_064	60913	West Horndon (approximate - see Site Location Plan)	Development is not permitted in Flood Zone 3b. This area (18%) should be retained as floodplain. Development should be avoided in Flood Zone 3a and Flood Zone 2 as built development will reduce the capacity of the floodplain to store floodwater. Should development be proposed in the floodplain, compensation storage will need to be provided to offset any loss of storage. Finished floor levels for residential development will need to be set above the modelled flood level for the design event (1% AEP plus climate change allowance), including a freeboard allowance.
ACM_070	60939	Gobions Park, East Tilbury	Detailed modelling should be undertaken to determine the risk of flooding from the Main River and the design flood levels for the site. Development should be located outside the design flood extent. Not shown to be at risk of overtopping. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_071	60940	Land north of Stanford Le Hope	Development is not permitted in Flood Zone 3b. This area should be retained as floodplain. Detailed modelling should be undertaken to determine the risk of flooding from the Main River and associated ordinary watercourses and the design flood levels for the site. Development should be located outside the design flood extent.
ACM_083	61011	Land at Manor Road	Not shown to be at risk of overtopping. Not shown to be at residual risk from the River Thames.
ACM_093	61059	Tilbury Football Club, Chadfields, Tilbury RM18 8NL	**Development is not permitted in Flood Zone 3b. This part of the site (51%) should be safeguarded for flood storage. This site is not considered suitable for residential development.**
ACM_101	61093	Crown Court, Newton Road, Tilbury	Not shown to be at risk of overtopping. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_102	61094	Land rear of 2 North View Avenue, Tilbury	Not shown to be at risk of overtopping. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_103	61097	Alexandra Court Sheltered Housing complex, Alexandra Road, Tilbury	Not shown to be at risk of overtopping. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.

ACM_109	61106	Alexandra Court sheltered housing complex	Not shown to be at risk of overtopping. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_119	61124	Whitwell Court, Fairview Chase, Stanford le Hope	Development should be avoided in Flood Zone 3a and Flood Zone 2, as built development will reduce the capacity of the floodplain to store floodwater. Stanford Brook floodplain at residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_124	61143	Land Adjacent 94 Fobbing Road, Corringham	Detailed modelling should be undertaken to determine a suitable area to be retained as floodplain along the Fobbing Common Sewer / Manorway Fleet, and to determine the design flood level for the site. Development should be avoided in the fluvial design flood extent (1% AEP including climate change allowance).
ACM_126	61147	Land Adjoining Tamarisk Road, South Ockendon	Development proposals for the site should be designed around the natural surface water flowpaths on the site.
ACM_128	61151	Portland Lodge, Brentwood Road, Bulphan	Detailed modelling will be required for the Mardyke to determine the design flood level for the site (1% AEP including climate change). In order that proposed development does not increase the risk of flooding to surrounding area, the footprint of the building should be similar to that already in place. Any increase in built footprint within the modelled flood extent would require floodplain compensation storage to be provided on a level for level and volume for volume basis, which is unlikely to be feasible within a site of this size.
ACM_129	61152	Judds Farm, Harrow Lane, Bulphan	Detailed modelling will be required for the Mardyke to determine the design flood level for the site (1% AEP including climate change). In order that proposed development does not increase the risk of flooding to surrounding area, the footprint of any buildings proposed in the floodplain will need to be similar (or ideally less than) that already in place. Any increase in built footprint within the modelled flood extent would require floodplain compensation storage to be provided on a level for level and volume for volume basis. Finished floor levels for residential development will need to be set above the fluvial design flood level (1% AEP including climate change).
ACM_134	61169	Land Part Of Little Thurrock Marshes, Thurrock Park Way, Tilbury, Essex	Development is not permitted in Flood Zone 3b. The course of the Chadwell New Sewer through the site should be retained and safeguarded and steps taken to restore land to provide a more natural watercourse and floodplain. Not shown to be at risk of tidal overtopping. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_135	61171	Grays Shopping Centre, High Street, Grays	Not shown to be at risk of tidal overtopping. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_136	61172	Car Parks Crown Road And Darnley Road, Grays	The site is not at residual risk of tidal flooding from the Thames (during the 0.5 AEP including upper end climate change allowance), however, the local area to the north and west is at risk and this should be considered when developing proposals for the site.
ACM_138	61187	Land adjacent and rear of George and Dragon Public House	Development should be set back from the watercourse and steps taken to restore land to provide a more natural watercourse and floodplain. Not shown to be at risk of tidal overtopping. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.
ACM_142	61209	Development Land East Of Caspian Way And North And South Of London Road, Purfleet, Essex	Parts of the site and local area are at risk of flooding through overtopping of defences further to the southern east of the site. Floodwater then makes its way through the local area and ponds on the site. Finished Floor Levels for residential accommodation should be set above the modelled flood level including a freeboard. At residual risk from the River Thames. Safe place of refuge should be designed above extreme flood level.

3.2 Future Updates

3.2.1 SFRAs are intended to be living documents which are kept up to date as information on flood risk management changes.

3.2.2 The Environment Agency SFRA guidance states that in order to remain up to date, it may be necessary to update a SFRA to incorporate any changes to:

- the predicted impacts of climate change on flood risk;
- flood products, for example surface water mapping, flood map for planning;
- detailed flood modelling - such as from the Environment Agency or LLFA;
- the local plan, spatial development strategy or relevant local development documents;
- local flood management schemes;
- flood risk management plans;
- local flood risk management strategies; and
- national planning policy or guidance.

3.2.3 In addition, the SFRA may also need to be reviewed after any significant flood event.

3.2.4 It is noted that future changes to modelling, planning guidance, or climate change impacts may alter the level of risk posed to a specific site. The most up-to-date flood risk data must be used throughout the planning process to inform ongoing site planning and development design.

Appendix A Figures

Figure 1A – 1F Future Flood Zones

Figure 2A – 2F Areas of Critical Drainage

Appendix B Proformas – Residential Sites

ACM Ref	ID	Name
ACM_040	60459	Rippleside Metalworks, Thames Road, Grays
ACM_041	60474	Car Park, Coronation Road, East Tilbury
ACM_049	60844	Land south of Aveley
ACM_050	60847	East Tilbury
ACM_051	60851	East Tilbury 2
ACM_052	60853	Land at the Mardyke Valley Golf Club, South Road, South Ockendon
ACM_054	60856	Land northeast of Corringham
ACM_057	60882	Land Adjacent And To The Rear Of The George And Dragon East Tilbury Road Linford Essex
ACM_059	60888	Land at Wharf Road, Stanford-le-Hope
ACM_061	60910	Land at East Tilbury Road, Linford
ACM_062	60911	Medebridge Road, South Ockendon
ACM_064	60913	West Horndon (approximate - see Site Location Plan)
ACM_070	60939	Gobions Park, East Tilbury
ACM_071	60940	Land north of Stanford Le Hope
ACM_083	61011	Land at Manor Road
ACM_093	61059	Tilbury Football Club, Chadfields, Tilbury RM18 8NL
ACM_101	61093	Crown Court, Newton Road, Tilbury
ACM_102	61094	Land rear of 2 North View Avenue, Tilbury
ACM_103	61097	Alexandra Court Sheltered Housing complex, Alexandra Road, Tilbury
ACM_109	61106	Alexandra Court sheltered housing complex
ACM_119	61124	Whitwell Court, Fairview Chase, Stanford le Hope
ACM_124	61143	Land Adjacent 94 Fobbing Road, Corringham
ACM_126	61147	Land Adjoining Tamarisk Road, South Ockendon
ACM_128	61151	Portland Lodge, Brentwood Road, Bulphan
ACM_129	61152	Judds Farm, Harrow Lane, Bulphan
ACM_134	61169	Land Part Of Little Thurrock Marshes, Thurrock Park Way, Tilbury, Essex
ACM_135	61171	Grays Shopping Centre, High Street, Grays
ACM_136	61172	Car Parks Crown Road And Darnley Road, Grays
ACM_138	61187	Land adjacent and rear of George and Dragon Public House
ACM_142	61209	Development Land East Of Caspian Way And North And South Of London Road, Purfleet, Essex

Appendix C Mapping – Employment Sites

ACM_REF	T ID *(from sites layer)*	SiteName
ACM_003	60850	West Thurrock Works, Stoneness Road
ACM_004	60854	Land East of Tilbury2
ACM_005	60859	Arterial Hub, Land north of Arterial Road
ACM_007	60862	Land at Goshem's Farm East Tilbury
ACM_008	60864	Land east of Dock Road and south of Marshfoot Road
ACM_009	60869	Former Paper Mills Site, London Road, Purfleet
ACM_011	60879	Land at Goshems Farm (Mott North)
ACM_012	60880	Land East of Ship Lane, Aveley
ACM_013	60881	sandy lane
ACM_017	60929	Thames Industrial Park
ACM_018	60943	-
ACM_019	60967	land south of Marshfoot Road, Tilbury
ACM_020	60968	Red House Farm
ACM_021	60969	Land at Blue House Farm
ACM_022	60976	Land at Great Garlands Farm
ACM_023	60981	Land South of A13 and North of A1306 Arterial Road West Thurrock
ACM_024	60984	Thames Enterprise Park
ACM_025	60988	Tongue Land, London Gateway
ACM_026	60989	land off Burnley Road, West Thurrock, Essex, RM20 3ED
ACM_029	61010	Thurrock Shopping Park
ACM_030	61027	Medebridge Road, Grays, Essex, RM16 5TZ
ACM_031	61029	Land north of the A13
ACM_032	61053	Land at Little Thurrock located between Churchill Road and Thurrock Park Way, Grays
ACM_033	61054	Bretts Farm, Marshfoot Road, Grays, RM17 6HH
ACM_034	61055	Mardyke Meadows
ACM_035	61057	Titan Truck Park, Stoneness Road, RM20 3AG
ACM_036	61073	Land Adjacent to A1306 and Junction 31 of M25, Purfleet-on-Thames, Essex
ACM_143	T52	East of Quarry Road
ACM_144	T14a	Eastern end of Manor Way Industrial Estate
ACM_145	T07a	Thames Ind. Park, East Tilbury
ACM_146	T07b	Thames Ind. Park, East Tibury
ACM_147	T05b	South of Ocean Boulevard and West of Atlantic Avenue (LG873)
ACM_148	T05c	South of Ocean Boulevard and East of Atlantic Avenue (LG1301)
ACM_149	T05a	East of UPS
ACM_150	T05d	North of Ocean Boulveard and East of Atlatic Avenue (LG784)
ACM_151	T05j	South of Manor Way House
ACM_152	T05g	West of Baltic Avenue (LG715)

ACM_153	T05k	Eastern Edge of London Gateway Logistics Park
ACM_154	T05h	West of Ocean Boulevard (LG576)
ACM_155	T05i	Between Baltic Avenue and Ocean Boulevard
ACM_156	T05l	South East Corner of London Gateway Logistics Park
ACM_157	T06b	Masterplan Plot B
ACM_158	T06a	Masterplan Plot A
ACM_159	T06d,e	Masterplan Plot D&E
ACM_160	T06f	Masterplan Plot F
ACM_161	T06g,h,j,k,l,m,n,p,q,r,s	Masterplan Plots G,H,J,K,L,M,N,P,Q,R,S
ACM_162	-	Masterplan Plot C