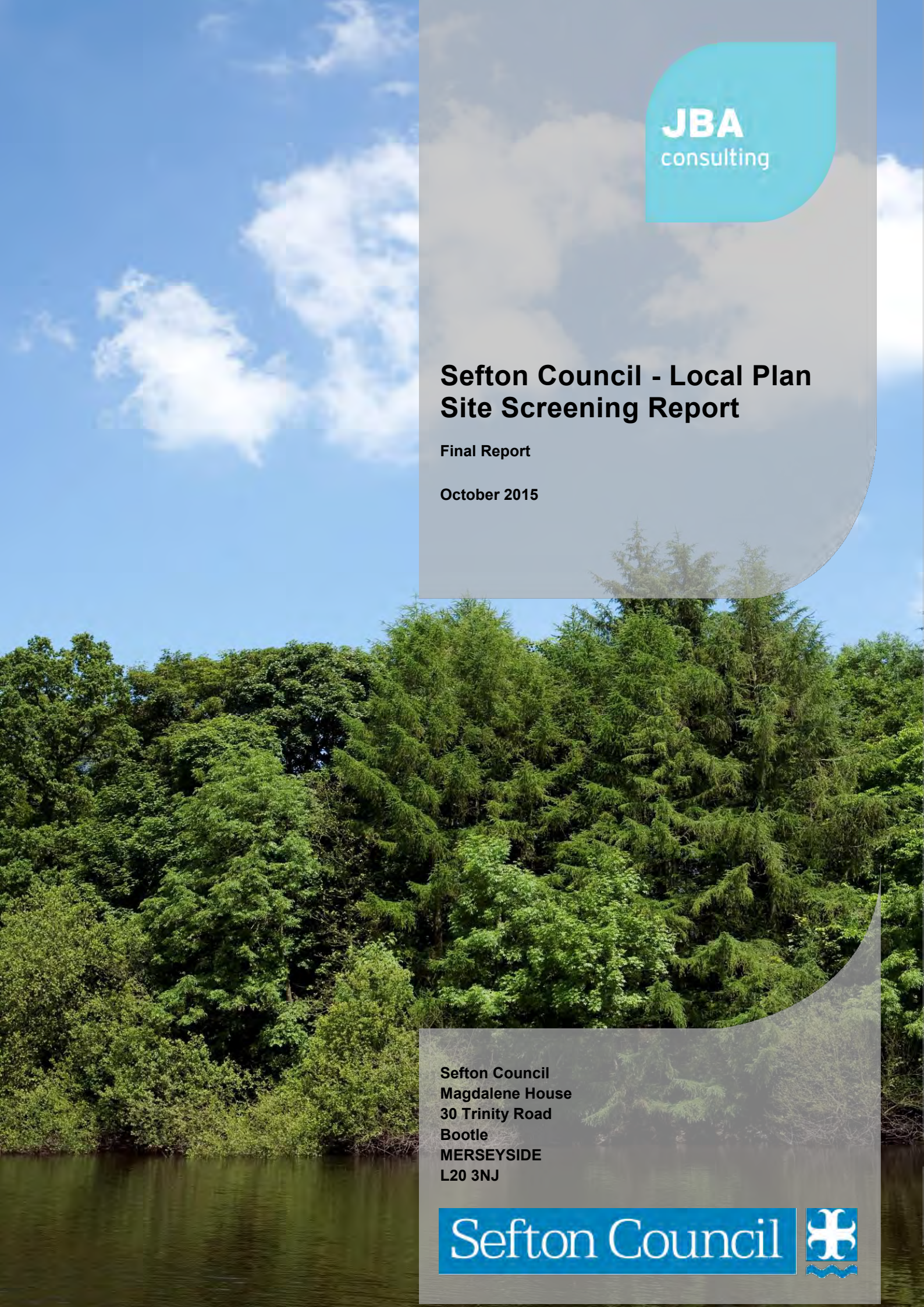

Sefton Council - Local Plan Site Screening Report

Final Report

October 2015

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Contract

This report describes work commissioned by Mr Stuart Bate, on behalf of Sefton Council, by a letter dated 10/10/2014. Sefton Council's representative for the contract was Miss Andrea O'Connor. Mike Williamson of JBA Consulting carried out this work.

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Purpose

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Acknowledgements

JBA would like to thank all Council staff for their time and commitment to providing data and discussing the issues identified during the course of this study.

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1 Introduction

The purpose of this assessment is to support Sefton Council with the preparation of their Local Plan. This report provides a detailed assessment of all pertinent sources of flood risk on sites allocated through the draft Local Plan. The allocated sites are comprised mainly of residential and employment uses and are considered necessary for the council's wider sustainability objectives. There are also several gypsy and traveller sites, and other sites, allocated.

The assessment provides a comprehensive review of all types of flood risk for all allocated sites in the local authority area whilst also providing advice on any further work required, in addition to assessing the suitability of Sustainable Drainage Systems (SuDS) for the allocated sites.

Paragraph 100 of the National Planning Policy Framework[1] says that Local Plans should consider flood risk from all sources and that "Local Plans should apply a sequential, risk based approach to the location of development to avoid where possible flood risk to people and property and manage any residual risk, taking into account the impacts of climate change, by applying the Sequential Test [and]; if necessary, applying the Exception Test;…':

1.1 Background

JBA Consulting was commissioned in September 2015 by Sefton Council (hereafter referred to as the Council) to undertake a review of the flood risk posed to development sites allocated as part of the Council's Local Plan. This review has been prepared in accordance with current best practice as set out in the National Planning Policy Framework[2] (NPPF) and the accompanying Flood Risk and Coastal Change Planning Practice Guidance[3] (FRCC-PPG).

The Council's draft Local Plan was submitted to the Secretary of State on 3rd August 2015. The Plan is supported by a 2013 Strategic Flood Risk Assessment (SFRA) and a Sustainability Appraisal which included an assessment of flood risk issues, including the Sequential Test. A Flood Risk Technical Paper (2015) also supported the Local Plan.

1.2 Scope and Objectives

The Council's brief was to review surface water and other local flood risks that affect the proposed housing, employment and gypsy and traveller allocations to support the preparation of the Sefton Local Plan. The draft Local Plan proposes 45 Housing Allocations, 10 Employment Allocations, 1 Mixed Use Allocation (for both housing and employment), and 4 Gypsy and Traveller Allocations. There are also 2 areas allocated as safeguarded land to be permanently developed only following the adoption of the next Local Plan, 1 for recreation and leisure uses.

The main objectives, as set out in the Council's Brief, are:

- To undertake a review of surface water flood risk affecting the allocated sites, including a 1 in 100 plus climate change scenario provided from the Council's Surface Water Management Plan;
- To assess whether a proportion of any allocated site should remain undeveloped due to flood risk issues (and what proportion this is likely to be);
- To indicate any further work that may be necessary; and
- To assess whether proposed site allocations are likely to be suitable for SuDS (and if so what type).

To review flood risk, the Environment Agency's Flood Map for Planning has been used to assess fluvial and tidal risk whilst the updated Flood Map for Surface Water (uFMfSW), also owned by the Environment Agency, has been used to assess surface water flood risk, along with depth and hazard to people outputs produced from the Sefton Surface Water

1 https://www.gov.uk/government/news/planning-reforms-will-deliver-local-growth-with-community-support--2

2 http://planningguidance.planningportal.gov.uk/blog/policy/achieving-sustainable-development/delivering-sustainable-development/10-meeting-the-challenge-of-climate-change-flooding-and-coastal-change/

3 http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/

Management Plan (SWMP), published in 2011. Checks as to whether an allocated site falls within a local Critical Drainage Area (CDA), devised through the Sefton SWMP 2011 and SFRA 2013, have also been carried out as has the suitability of land for the use of infiltration SuDS, again using an indicative dataset developed through the SFRA.

Assessment of a surface water climate change scenario has been based on the 1 in 100 year event plus 30% rainfall depth and hazard information produced in the Sefton SWMP. Groundwater risk has been assessed using the Environment Agency's Areas Susceptible to Groundwater Flooding (AStGWF) dataset. This dataset assess the susceptibility of groundwater emergence, not the likelihood of groundwater flooding occurring. Note that this dataset consists of 1 km squares and is considered indicative of groundwater emergence susceptibility rather than any robust identification.

This assessment will deliver a detailed assessment of flood risk whilst also providing the evidence required to inform site Flood Risk Assessments or to facilitate the application of the Exception Test, where fluvial and / or tidal flood risk exists, and informing the sequential approach to site acceptability and layout, in terms of avoiding and reducing flood risk, and the design of possible mitigation measures. This assessment should not however be regarded as having carried out the Exception Test without the evidence for sustainability benefits and site-specific Flood Risk Assessments.

Paragraph 101 of the National Planning Policy Framework says that the aim of the Sequential Test is to steer new development to areas with the lowest probability of flooding, and online Planning Practice Guidance provides more information about this process.

As the Sequential Test has already been carried out for the allocated sites, as part of the Sustainability Appraisal, it is assumed that any sites within a fluvial / tidal flood zone cannot be relocated to Flood Zone 1 due to the associated social and economic benefits of their location.

This assessment will help to establish whether the requirements of the Exception Test can be met, if it is needed. In order to pass the Exception Test the NPPF (Para 102) states:

a. *"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*
b. *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.*

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

Part a of the Exception Test is for evaluation by the Council. Part b should be undertaken as part of a site-specific Flood Risk Assessment. This review summarises the requirements for a site-specific Flood Risk Assessment and also summarises the likelihood of satisfying the requirements of the Exception Test. Thus this review informs the Local Plan. Site-specific Flood Risk Assessments (FRAs) would support individual planning applications, not just where the Exceptions Test is required but also for sites where national or local planning policy requires a Site FRA to be submitted with the planning application.

The Exception Test process makes it possible to identify areas where development can proceed safely, rather than being seen as an opportunity to situate inappropriate development in flood risk areas. It is a useful planning tool that can help to justify the acceptability of the residual risks remaining after mitigation measures have been applied.

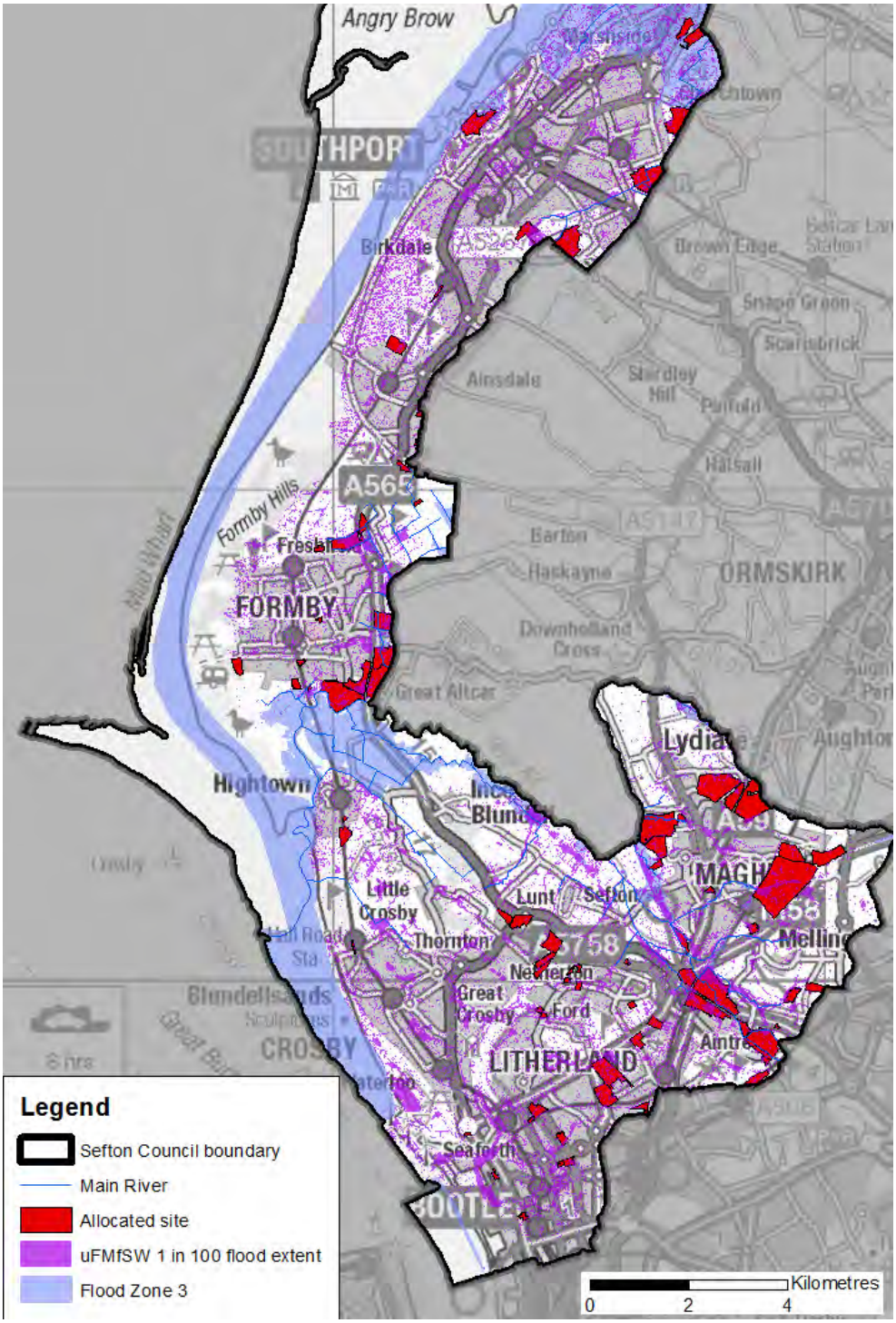
At the planning application stage, for any sites where the Exception Test is required, this should be carried out by the developer, alongside the Council, as part of a site-specific FRA, undertaken as part of a planning application. The FRA should show that the second part of the test can be satisfied on development, and should outline the case for the first part of the test.

1.3 Study Area

The study area covers all allocated sites which are spread throughout the local authority area of Sefton.

The main source of flood risk to the sites comes from surface water though there is also risk from tidal sources and fluvial flooding from the River Alt, Whams Dyke and Boundary Brook in Formby, Whinney Brook in Maghull, and Captains Watercourse in Southport. Figure 1-1 shows the sites in relation to the 1 in 100 year surface water flood event outline from the uFMfSW and Flood Zone 3 of the Flood Map for Planning.

Figure 1-1: Study Area



2 Surface Water Drainage and Development

The National Planning Policy Framework sets out national planning policy including for flood risk from all sources.

The Ministerial Statement of December 2014[4] announced the government's expectation that Sustainable Drainage Systems (SuDS) will be provided in new developments wherever possible. The statement continues to explain that the Local Planning Authority should consult the Lead Local Flood Authority on the management of surface water to help ensure that minimum operation standards are appropriate and that clear arrangements are in put in place for ongoing maintenance over the lifetime of the development. This applies to major developments of 10 dwellings or more, or equivalent non-residential or mixed use. More information is provided in the government's on-line Planning Practice Guidance[5] which also refers to Defra's 2015 'Non-statutory technical standards for sustainable drainage systems'.[6]

When proposed major developments come forward, opportunities for developing an Integrated Water or Drainage Management Strategy across development site boundaries should be explored, and a catchment led approach should be adopted. This approach has been recognised in the consultation paper by Defra, 'Making Space for Water'[7]. An integrated approach to controlling surface water drainage can lead to a more efficient and reliable surface water management system as it enables a wider variety of potential flood mitigation options to be used. In addition to controlling flood risk, integrated management of surface water has potential benefits, including improved water quality and a reduction of water demand through grey water recycling.

Integrated drainage systems may be considered suitable for catchments where other development is being planned or constructed, and where on-site measures are set in isolation of the systems and processes downstream.

Surface water drainage assessments are required where proposed development may be susceptible to flooding, including from surface water drainage. The online PPG para 079 states that new development should only be considered appropriate in areas at risk of flooding if priority has been given to the use of sustainable drainage systems. Additionally, and more widely, when considering major development, as defined in the Town and Country Planning (Development Management Procedure) (England) Order 2015, sustainable drainage systems should be provided unless demonstrated to be inappropriate.

The potential impact upon areas downstream of the development, including the impact on a receiving watercourse, also needs careful consideration.

The specific requirements for surface water drainage systems in Sefton will need to be discussed with the Lead Local Flood Authority; the Council's Flood and Coast Erosion Risk Management team, including drainage engineers, the Environment Agency and United Utilities. Local Plan policy EQ8 'Managing Flood Risk and Surface Water' sets out Sefton's requirements.

A FRA should then conclude with an assessment of the scale of the impact, and the recommended approach to controlling surface water discharge from a proposed development.

2.1 Sustainable Drainage Systems (SuDS)

Development has the potential to cause an increase in impermeable area, an associated increase in surface water runoff rates and volumes, and consequently a potential increase in downstream flood risk due to overloading of sewers, watercourses, culverts and other drainage infrastructure.

Managing surface water discharge from new development is therefore crucial in managing and reducing flood risk to new and existing development downstream. Carefully planned

4 https://www.gov.uk/government/speeches/sustainable-drainage-systems

5 http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/

6 https://www.gov.uk/government/publications/sustainable-drainage-systems-non-statutory-technical-standards

7 http://www.look-up.org.uk/2013/wp-content/uploads/2014/02/Making-space-for-water.pdf

development can also play a role in reducing the amount of properties that are directly at risk from surface water flooding.

The Flood and Water Management Act (FWMA), 2010, transferred the adoption and maintenance of SuDS to Sustainable Drainage Systems Approval Bodies (SABs) to be established by Lead Local Flood Authorities (LLFAs), under Schedule 3 of the Act. This designation of a SAB however has since been removed following lengthy consultation, with the December 2014 Ministerial Statement stating that the planning system will be responsible for delivering on SuDS. The statement also gives provisions for major applications of 10 or more residential units or equivalent commercial development to require sustainable drainage within the development proposals in accordance with the guidance and Defra's 2015 non-statutory technical standards.

The system proposed by government builds on the existing planning system, which developers and local authorities are already using. Policy changes to the planning system can also be introduced relatively quickly ensuring that flood risk benefits from sustainable drainage systems can be brought forward as part of planning application proposals.

National Planning Practice Guidance and the Local Plan Policy EQ8 state that planning applications that fail to deliver SuDS above conventional drainage techniques could be rejected and sustainable drainage should form part of integrated design secured by detailed planning conditions so that the SuDS to be constructed must be maintained to a minimum level of effectiveness. Maintenance options must clearly identify who will be responsible for SuDS maintenance and set out a minimum standard to which the sustainable drainage systems must be maintained.

The runoff destination should always be the first consideration when considering design criteria for SuDS including the following possible destinations in order of preference:

1. To the ground;
2. To surface water body;
3. To a surface water sewer;
4. To combined sewer

Effects on water quality should also be investigated when considering runoff destination in terms of the potential hazards arising from development and the sensitivity of the runoff destination.

The non-statutory technical standards for sustainable drainage systems[8] (2015) set out appropriate design criteria based on the following:

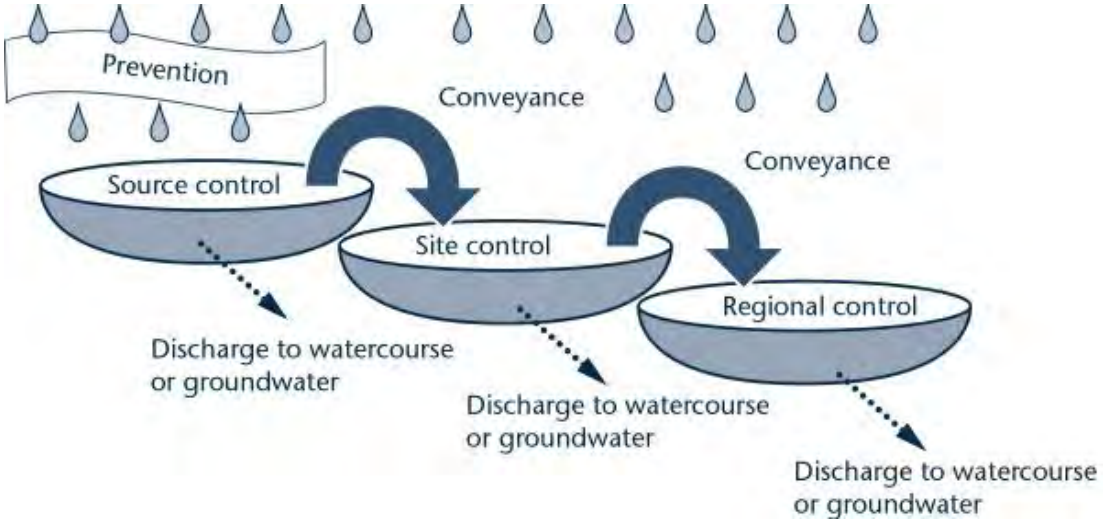
5. Flood risk outside the development
6. Peak flow control
7. Volume control
8. Flood risk within the development
9. Structural integrity
10. Designing for maintenance considerations
11. Construction

CIRIA has also produced a number of guidance documents relating to SuDS that should be consulted by the LPA and developers.

Many different SuDS techniques can be implemented. As a result, there is no one standard correct drainage solution for a site. In most cases, a combination of techniques, using the Management Train principle (see Figure 2-1), will be required, where source control is the primary aim.

8 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/415773/sustainable-drainage-technical-standards.pdf

Figure 2-1: SuDS Management Train Principle[9]



The effectiveness of a flow management scheme within a single site is heavily limited by land use and site characteristics including (but not limited to) topography; geology and soil (permeability); and available area. Potential ground contamination associated with urban and former industrial sites should be investigated with concern being placed on the depth of the local water table and potential contamination risks. The design, construction and ongoing maintenance regime of any SuDS scheme must be carefully defined as part of a site-specific FRA. A clear and comprehensive understanding of the catchment hydrological processes (i.e. nature and capacity of the existing drainage system) is essential for successful SuDS implementation.

9 CIRIA (2008) Sustainable Drainage Systems: promoting good practice – a CIRIA initiative

3 Flood Risk Screening of Proposed Sites

3.1 Outline Methodology

The assessment of flood risk to allocated sites within the draft Local Plan will entail the following:

- Surface flooding assessment of allocated sites using:
- The Environment Agency's third generation updated Flood Map for Surface Water (uFMfSW) including area (ha) and percentage area coverage of proposed site footprints within the following event outlines:
- 1 in 30 year,
- 1 in 100 year,
- 1 in 1000 year (can be used as indicator of effects of climate change).
- The outputs from the Council's SWMP (2011) including:
- Flood depth - assessment of the average and the maximum flood depth at each site for each return period (1 in 30, 1 in 100, 1 in 100 + 30% (climate change)),
- Flood hazard - assessment of flood hazard to people (already defined through the Council's SWMP) for each return period (1 in 30, 1 in 100, and 1 in 100 + 30% (climate change)).
- Identification of whether a site is located within a Local Critical Drainage Area (CDA), delineated as part of the Council's 2013 SFRA. Within the CDAs of Sefton it is recommended, by the Council's 2011 SWMP and 2013 SFRA, that the threshold for requiring a flood risk assessment based on area, which is currently 1 ha in the NPPF and Technical Guidance, be reduced to at least 0.5 ha. The Local CDAs do not fall within the scope of footnote 20 to para 103 of the NPPF.
- Indicative suitability of infiltration SuDS, as identified in the Council's 2013 SFRA. The suitability of areas for infiltration SuDS, assessed in the SFRA, did not take account of groundwater levels but used a matrix of drift geology and solid geology data, obtained via the Environment Agency, to assess general permeability which then helped to identify the overall indicative suitability. For example, where potentially permeable drift overlies potentially permeable solid geology then the land was classified as potentially having a Very High suitability for infiltration SuDS.
- Fluvial / tidal flood risk assessment using:
- Flood Zones 2 and 3(a) outlines, from the Environment Agency's Flood Map for Planning, to calculate area and percentage coverage of each flood zone within each site,
- Flood Zone 3b (functional floodplain), as designated in the Council's 2013 SFRA, to calculate area and percentage coverage of Flood Zone 3b within each site.
- Identification of the risk of groundwater emergence based on the Environment Agency's Areas Susceptible to Groundwater Flooding (AStGWF).
- Review of defence information including the Environment Agency dataset Risk of Flooding from Rivers and Sea map (RFRS) which indicates residual risk of fluvial and / or tidal flooding, based on defence failure or overtopping.
- Assessment of Green Infrastructure opportunities.
- Assessment of mitigation options and recommendations on site layouts, including access and egress considerations, in order for development to proceed safely.

3.1.1 Flood Risk Screening

The screening approach of flood risk to sites involved the use of the GIS software package ArcGIS to derive the information outlined in Section 3.1 for each site.

Table 3-1 lists the data used in the screening exercise.

Table 3-1: Geographical Flood Risk Screening Data

Data Source	Output

Data Source	Output
Flood Zone 1 (EA Flood Map for Planning)	Area and percentage coverage
Flood Zone 2 (EA Flood Map for Planning)	Area and percentage coverage
Flood Zone 3a (EA Flood Map for Planning)	Area and percentage coverage
Flood Zone 3b (the Council's 2013 SFRA)	Area and percentage coverage
Updated Flood Map for Surface Water 1 in 30 year event outline	Area and percentage coverage
Updated Flood Map for Surface Water 1 in 100 year event outline	Area and percentage coverage
Updated Flood Map for Surface Water 1 in 1000 year event outline	Area and percentage coverage
SWMP depth grid for 1 in 30 year event	Maximum / average depth
SWMP depth grid for 1 in 100 year event	Maximum / average depth
SWMP depth grid for 1 in 100 year + climate change event	Maximum / average depth
SWMP hazard grid for 1 in 30 year event	Maximum / average hazard to people category
SWMP hazard grid for 1 in 100 year event	Maximum / average hazard to people category
SWMP hazard grid for 1 in 100 year + climate change event	Maximum / average hazard to people category
Local Critical Drainage Areas (the Council's 2013 SFRA)	Is the site within a Local CDA?
Indicative infiltration SuDS suitability (the Council's 2013 SFRA)	Indicative infiltration SuDS suitability classification
Areas Susceptible to Groundwater Flooding	Percentage risk of groundwater emergence

3.2 Flood Risk Screening

The Council provided 80 sites for the strategic assessment of flood risk. This includes 16 non-allocated sites. For the sites allocated through the draft Local Plan, there are 45 sites allocated for housing, 10 sites for employment, 1 mixed use site of housing and employment, 1 preferred option site, 2 safeguarded land sites, 1 recreation and leisure site and 4 traveller and Gypsy sites.

24 sites have been identified at being at risk from fluvial and / or tidal flooding. 4 sites are at risk from Flood Zone 3b with 19 sites at risk from Flood Zone 3a and also 20 sites at risk from Flood Zone 2. All but 1 site are at some risk from surface water flooding and 53 sites are within a Local Critical Drainage Area, defined by the Council's 2013 SFRA. In terms of the updated Flood Map for Surface Water, the 1 in 30 year event is considered to be high risk, the 1 in 100 to be medium risk and the 1 in 1000 year event to be low risk. 22 sites are at high surface water flood risk and 77 are at medium risk.

Each site is associated with some form of flood risk, whether that be fluvial, tidal or surface water.

Table 3-2 provides a quantitative assessment of fluvial / tidal and surface water flood risk (based on the uFMfSW outlines) at all the proposed sites provided for assessment by the Council.

Table 3-2: Proposed Sites Identified at Fluvial / Tidal and Surface Water Flood Risk (based on uFMfSW outlines)

Site Ref.	Fluvial / Tidal Flood Zone Coverage (%)	Updated Flood Map for Surface Water Coverage (%)

	1	2	3a	3b	30 year	100 year	1000 year
HC5.1	100	0	0	0	0	0	0
HC5.2	100	0	0	0	0	0	0
HC5.3	14	86	0	0	0	0	0
HC5.4	86	0	14	0	0	0	0
MN2.1	79	11	10	0	0	3	3
MN2.10	100	0	0	0	0	13	6
MN2.11	100	0	0	0	0	20	8
MN2.12	53	35	12	0	60	10	5
MN2.13	100	0	0	0	0	4	2
MN2.14	100	0	0	0	3	5	4
MN2.15	100	0	0	0	0	1	4
MN2.16	100	0	0	0	4	35	7
MN2.17	100	0	0	0	0	14	5
MN2.18	69	8	23	0	14	9	2
MN2.19	96	3	2	0	0	0	18
MN2.2	14	9	77	0	0	10	2
MN2.20	100	0	0	0	0	15	4
MN2.21	100	0	0	0	0	16	11
MN2.22	100	0	0	0	0	13	4
MN2.23	100	0	0	0	0	0	1
MN2.24	100	0	0	0	0	3	1
MN2.25	100	0	0	0	0	11	3
MN2.26	100	0	0	0	0	19	9
MN2.27	100	0	0	0	5	12	3
MN2.28	100	0	0	0	0	10	7
MN2.29	100	0	0	0	0	9	7
MN2.3	1	0	99	0	0	5	6
MN2.30	100	0	0	0	0	4	8
MN2.31	100	0	0	0	1	29	13
MN2.32	100	0	0	0	0	11	9
MN2.33	100	0	0	0	0	29	7
MN2.34	100	0	0	0	0	20	5
MN2.35	100	0	0	0	0	6	4
MN2.36	100	0	0	0	0	22	4
MN2.37	100	0	0	0	0	46	11
MN2.38	100	0	0	0	0	5	4
MN2.39	100	0	0	0	0	13	5
MN2.4	46	7	47	0	0	19	7
MN2.40	100	0	0	0	0	1	7
MN2.41	100	0	0	0	0	12	4
MN2.42	100	0	0	0	0	10	15
MN2.43	100	0	0	0	0	35	9
MN2.44	100	0	0	0	0	9	3
MN2.45	100	0	0	0	0	6	13
MN2.46	86	4	2	7	0	16	6
MN2.47a	100	0	0	0	0	22	14
MN2.47b	100	0	0	0	0	30	14
MN2.47c	100	0	0	0	0	16	13
MN2.48	17	64	19	0	0	39	23
MN2.49	41	9	8	42	0	22	6
MN2.5	100	0	0	0	0	19	10
MN2.50	100	0	0	0	0	15	7
MN2.51	100	0	0	0	0	20	14
MN2.52	100	0	0	0	0	15	11
MN2.53	100	0	0	0	0	32	15
MN2.54	100	0	0	0	0	3	4
MN2.6	100	0	0	0	31	12	7
MN2.7	100	0	0	0	0	42	7
MN2.8	100	0	0	0	0	18	5
MN2.9	100	0	0	0	0	15	7
MN8.1	100	0	0	0	0	12	5

Site Ref.	Fluvial / Tidal Flood Zone Coverage (%)				Updated Flood Map for Surface Water Coverage (%)		
	1	2	3a	3b	30 year	100 year	1000 year
MN8.2	100	0	0	0	3	1	5
SMP	39	20	42	0	0	21	8
SR4.49	53	47	0	0	3	37	9
AS10	100	0	0	0	0	20	8
AS12	95	1	3	0	2	12	4
AS14	90	1	9	0	2	6	8
AS15	100	0	0	0	0	56	17
AS17	43	49	5	3	0	39	11
AS18	70	30	0	0	0	49	12
AS19	100	0	0	0	0	24	7
AS21	99	0	1	0	0	22	4
AS22	100	0	0	0	0	27	8
AS23	100	0	0	0	0	18	10
AS25	100	0	0	0	0	15	4
AS26	94	2	1	3	8	11	7
AS27	39	33	27	0	0	22	8
AS28	83	7	10	0	1	16	9
AS29	100	0	0	0	0	1	4
AS30	98	2	0	0	0	16	3
Any discrepancy in total percentage area coverage is due to rounding to whole numbers for ease of viewing.							

4 Detailed Review of Proposed Sites

4.1 Methodology

As all sites have been identified, from the screening exercise, to be at some level of flood risk. The following flood risk review tables have been produced, for each site, to summarise the results of the screening exercise. As per the Council's brief, these tables assess whether any proportion of the site should remain undeveloped; whether any further work may be required; and whether the site is suitable for certain types of SuDS.

These tables should further guide the Council in determining the likelihood that the site could remain safe if developed and the appropriate mitigation required in order to do so.

4.2 Flood Risk Review Tables

All flood risk review tables are provided on the following pages.

Predicted Flood Depths and Hazards

It must be noted that quoted flood depths and hazards have been extracted from the outputs of the Council's 2011 SWMP. The flood risk review tables in this section quote the maximum flood depth and maximum flood hazard that could occur on each site, assuming the information is available. The reader should refer to the Council's 2011 SWMP for further information regarding the depth and hazard information quoted in this report

Any site-specific Flood Risk Assessments (FRA) should investigate depths and hazards further through appropriate flood modelling and hydrology calculations.

SuDS and Local CDAs

The 'Indicative SuDS Suitability (infiltration)' column provided in the tables is based on indicative analysis carried out in the Council's 2013 SFRA, as discussed in Section 3.1. The SuDS recommendations have been provided at a strategic level, using this indicative information combined with knowledge of specific SuDS systems. Any FRA will have to carry out site-specific investigations on the suitability of SuDS. However, it is recommended that this is considered at an early stage in the development process as considerable land take may be required, impacting on achievable developable yields. The type of SuDS adopted can influence the layout of a site thus should therefore be considered at the development design stage. It is also important that United Utilities are consulted at an early stage especially for those sites situated within or partially within Local CDAs.

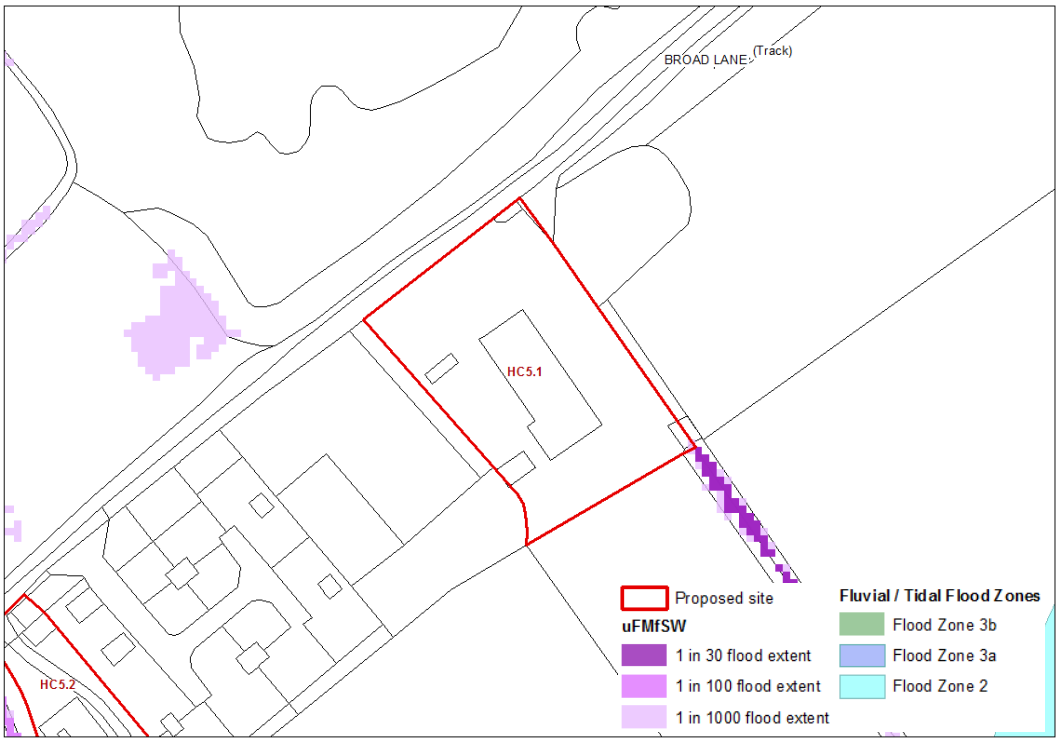
The Local CDAs were defined by the Council as part of their 2011 SWMP and 2013 SFRA. The Local CDAs do not fall within the scope of footnote 20 to para 103 of the NPPF, as explained in Section 3.1.

Mitigation Recommendations

Mitigation recommendations have been made at a strategic scale using available information. It is important to note that although mitigation measures have been discussed for individual sites, it does not mean they have been assessed to show that they do not increase flood risk elsewhere. Any FRA should carry out these investigations and compare a range of techniques.

It must also be kept in mind that strategically planned development has the potential to reduce flood risk to the wider community rather than just within the boundaries of the individual site. The most appropriate mitigation solution may be located outside of the site boundary and collective support by other proposed developments may be required. This has been highlighted in the flood risk review tables, where possible, in relation to nearby open spaces or green infrastructure. What is not desirable is a piecemeal approach to development where individual development sites focus on their own site-specific flood risk issues, applying a range of techniques, which may not fit within the wider vision of the community.

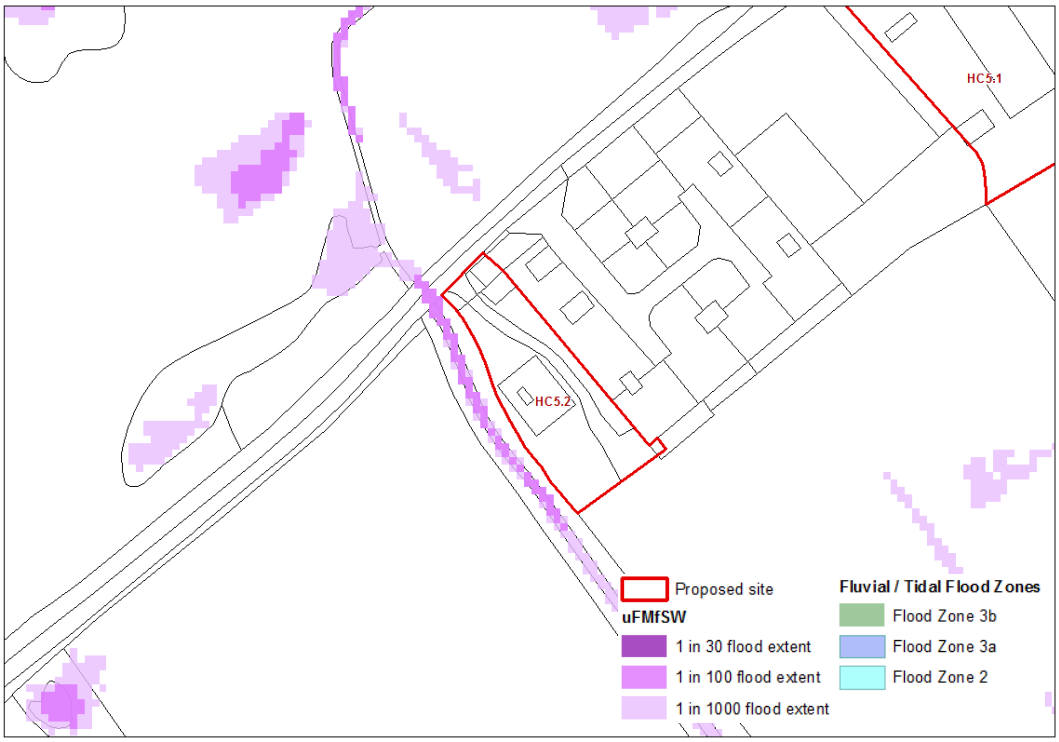
Site	HC5.1 - Land north east of Red Rose Traveller Park, Broad Lane, Formby
Area	0.4 ha
Proposed Use	Traveller



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	0%		0.1%
SWMP Max Depth	Area not covered by SWMP			
SWMP Average Depth	Area not covered by SWMP			
SWMP Max Hazard	Area not covered by SWMP			
SWMP Average Hazard	Area not covered by SWMP			
SWMP Climate Change	Area not covered by SWMP			
Local CDA	No			
Indicative SuDS Suitability (Infiltration)	Predominantly very low			
Groundwater	Susceptibility to groundwater emergence >= 50% <75%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	None required			
FRA & Mitigation Options	This site has been allocated as a permanent site for the traveller and Gypsy community. As there is virtually zero risk, based on the available data, and the site area is less than 1 ha, this site may be permitted without the requirement for a FRA. This site is considered to have a high susceptibility to groundwater emergence though as there is virtually no risk of surface water flooding, according to the uFMfSW, then it is unlikely that there would actually be any groundwater flooding to any appreciable depth, and therefore it is also unlikely that the consequences of such flooding would be significant.			
Recommendations & Further Work	No substantive issues.			
Existing FRA Available for Site? (Information Provided by the Council)	No			

Site	HC5.1 - Land north east of Red Rose Traveller Park, Broad Lane, Formby
Council's comment	None

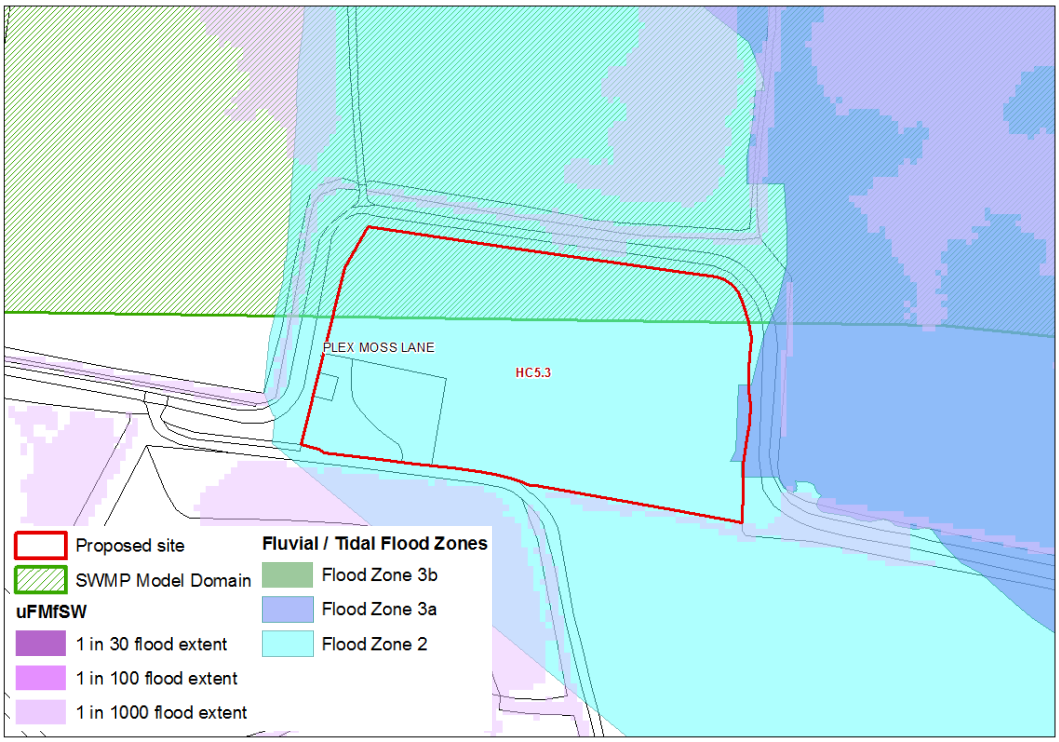
Site	HC5.2 - Land south west of Red Rose Traveller Park, Broad Lane, Formby
Area	0.2 ha
Proposed Use	Traveller



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	0.1%		0%

SWMP Max Depth	Area not covered by SWMP
SWMP Average Depth	Area not covered by SWMP
SWMP Max Hazard	Area not covered by SWMP
SWMP Average Hazard	Area not covered by SWMP
SWMP Climate Change	Area not covered by SWMP
Local CDA	No
Indicative SuDS Suitability (Infiltration)	High
Groundwater	Susceptibility to groundwater emergence >= 50% <75%
Historical Incidents	None on site
Defended	No
SuDS Requirements	None required
FRA & Mitigation Options	This site has been allocated as a permanent site for the traveller and Gypsy community. As there is virtually zero risk, based on the available data, and the site area is less than 1 ha, this site may be permitted without the requirement for a FRA. This site is considered to have a high susceptibility to groundwater emergence though as there is virtually no risk of surface water flooding, according to the uFMfSW, then it is unlikely that there would actually be any groundwater flooding to any appreciable depth, and therefore it is also unlikely that the consequences of such flooding would be significant.
Recommendations & Further Work	No substantive issues.
Existing FRA Available for Site? (Information Provided by the Council)	No
Council's comment	None

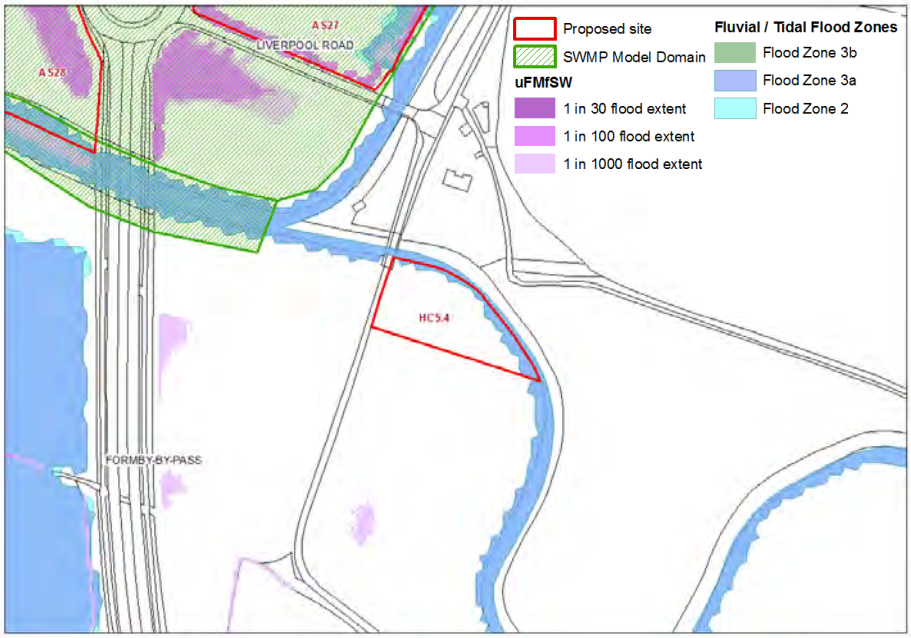
Site	HC5.3 - Land at Plex Moss Lane, Ainsdale
Area	1 ha
Proposed Use	Traveller



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	14%	86%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	0%		0.1%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0 m	0.4 m		0.4 m
SWMP Average Depth	0 m	0.06 m		0.07 m
SWMP Max Hazard	None	Significant		Significant
SWMP Average Hazard	None	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	No			
Indicative SuDS Suitability (Infiltration)	Very low			
Groundwater	Susceptibility to groundwater emergence >= 50% <75%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	Owing to the absence of ground investigations and percolation tests to date, a fully attenuated surface water system has been appraised at this outline planning stage. However, opportunities for SuDS should be fully investigated at detailed design stage.			
FRA & Mitigation Options	Attenuation requirements for the 1 in 30 year and 1 in 100 year design events including climate change are estimated to be 7 m3 and 12 m3 respectively. As these attenuation volumes are relatively small, it is anticipated that the drainage system could be designed to provide sufficient storage for the 1 in 100 year design event including climate change. Attenuation storage is likely to be accommodated beneath ground level in storage tanks or oversized pipes. Owing to the availability of open space on site, an attenuation pond could be utilised. However, as groundwater depths could be shallow in this area, a fully sealed system is likely to be required.			
Recommendations & Further Work	The ARFQ for this assessment only requires the FRA to address Part 2 of the Exception Test. It is assumed that Part 1 of the Exception Test is to be covered by Sefton Council in the draft Local Plan. Mitigation measures including FFLs and safe access and egress			

	should ensure that the proposed Gypsy and Traveller allocation at Plex Moss Lane, Ainsdale will be safe for the lifetime of the development. Minimal increase in impermeable areas, along with surface water management measures provided in the Outline Drainage Strategy should ensure that flood risk is not increased elsewhere following development of the site. Taking into account the mitigation measures outlined above, and in combination with effective on site surface water management, it is considered that development of the proposed allocation site passes Part 2 of the Exception Test.
Existing FRA Available for Site? (Information Provided by the Council)	Yes
Council's comment	FRA completed - see Examination Library.

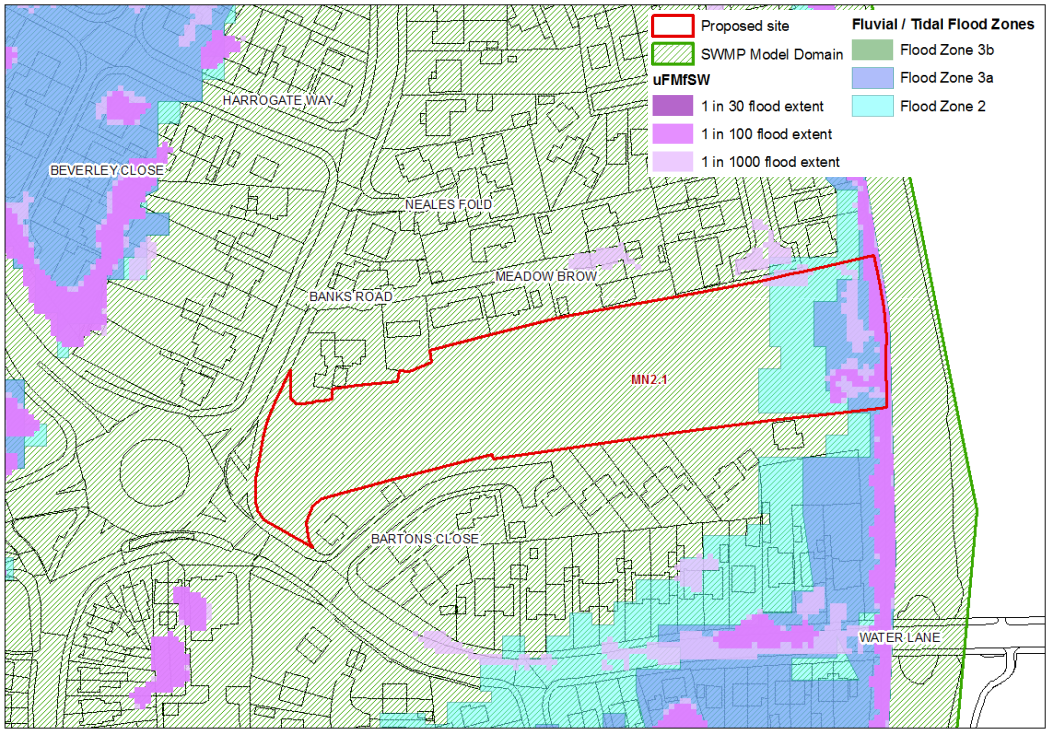
Site	HC5.4 - Land at New Causeway, Ince Blundell
Area	0.4 ha
Proposed Use	Traveller



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	86%	0%	14%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	0%		0%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0 m	0 m		0 m
SWMP Average Depth	0 m	0 m		0 m
SWMP Max Hazard	None	None		None
SWMP Average Hazard	None	None		None
SWMP Climate Change	N\A			
Local CDA	No			
Indicative SuDS Suitability (Infiltration)	Predominantly moderate			
Groundwater	Susceptibility to groundwater emergence <=75%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	None required			
FRA & Mitigation Options	14% of this site is within Flood Zone 3a, though this is confined to the northern boundary along the River Alt. This site has been allocated as a transit (non-permanent) site for the traveller and Gypsy community. As the site is transit (non-permanent) then it may fall within the more vulnerable category of Table 2 of the FRCC planning practice guidance rather than the highly vulnerable category. This would mean the site would be subject to the Exception Test, however if the site is categorised as highly vulnerable then the site cannot be permitted. The vulnerability category would need to be confirmed by the EA. Either way the Council may look to move the boundary away from the watercourse and out of Flood Zone 3a. It may be possible to do this without reducing the site footprint and therefore still being able to deliver capacity. This site is considered to have a high susceptibility to groundwater emergence though as there is no risk of surface water flooding, according to the uFMfSW, then it is unlikely that there would actually be any groundwater flooding to any appreciable depth, and therefore it is also unlikely that the consequences of such flooding would be significant.			

Site	HC5.4 - Land at New Causeway, Ince Blundell
Recommendations & Further Work	Consider altering the boundary to remove it from Flood Zone 3a. Check site boundary with developer, explore options of shifting the site to the south and out of the flood zone. Failing this, confirm vulnerability with EA and subsequent FRA requirements.
Existing FRA Available for Site? (Information Provided by the Council)	No
Council's comment	Gypsy and traveller pitches would be sited outside Flood Zone 3a.

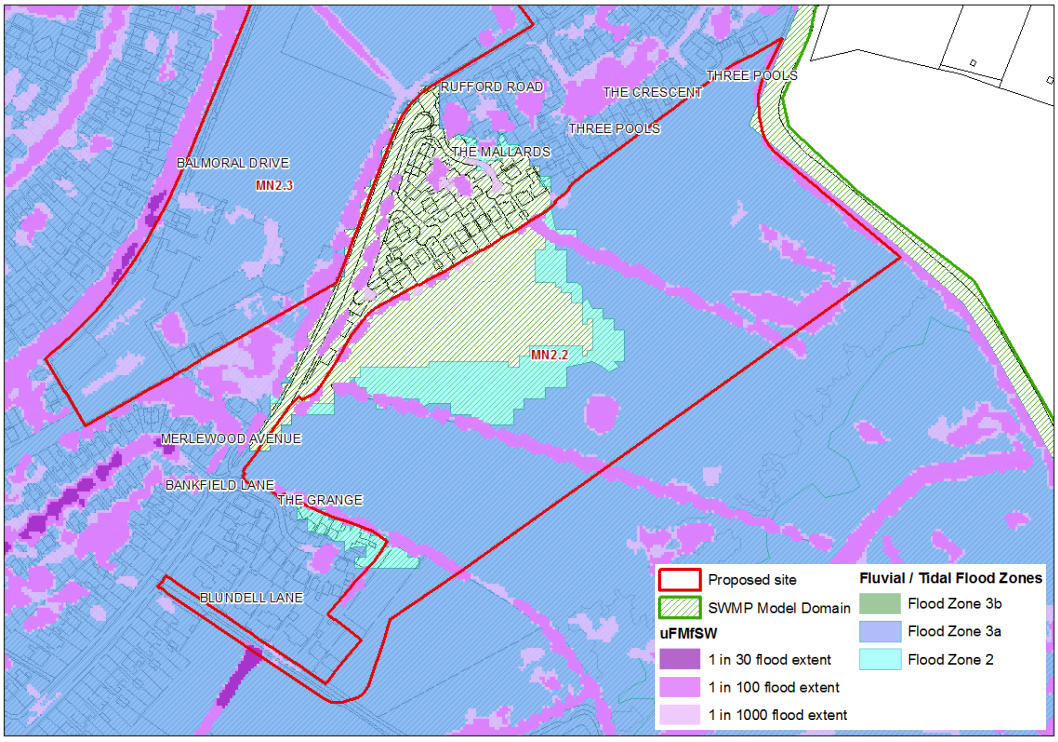
Site	MN2.1 - Bartons Close, Southport
Area	1.04 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	79%	11%	10%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	3%		3%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0 m	0.78 m		0.89 m
SWMP Average Depth	0 m	0.04 m		0.05 m
SWMP Max Hazard	None	Significant		Significant
SWMP Average Hazard	None	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	Very low			
Groundwater	Susceptibility to groundwater emergence >= 25% <50%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	There may not be a requirement for SuDS at this site			
FRA & Mitigation Options	10% of this site is within Flood Zone 3a, though this is confined to the far eastern boundary along the Three Pools Waterway. This site has been allocated for housing and as such falls within the more vulnerable category of Table 2 of the FRCC planning practice guidance. This means the site would be subject to the Exception Test as part of a site-specific FRA. Surface water risk is also within the same area of the site meaning it should not be onerous on the developer to ensure this area is kept free from development and preferably retained as open space. Ideally the area within Flood Zone 2 should also be left open. This would still leave 79% of the site available for development.			
Recommendations & Further Work	FRA required as site area is over 1 ha and part is in Flood Zones 2 and 3. Ideally leave the far eastern area of the site (11% of the site footprint) as open space either as amenity grassland, parkland or woodland.			
Existing FRA Available for Site?	No			

Site	MN2.1 - Bartons Close, Southport
(Information Provided by the Council)	
Council's comment	Area benefits from defences so the risk is considered to be low. Site FRA has been commissioned.

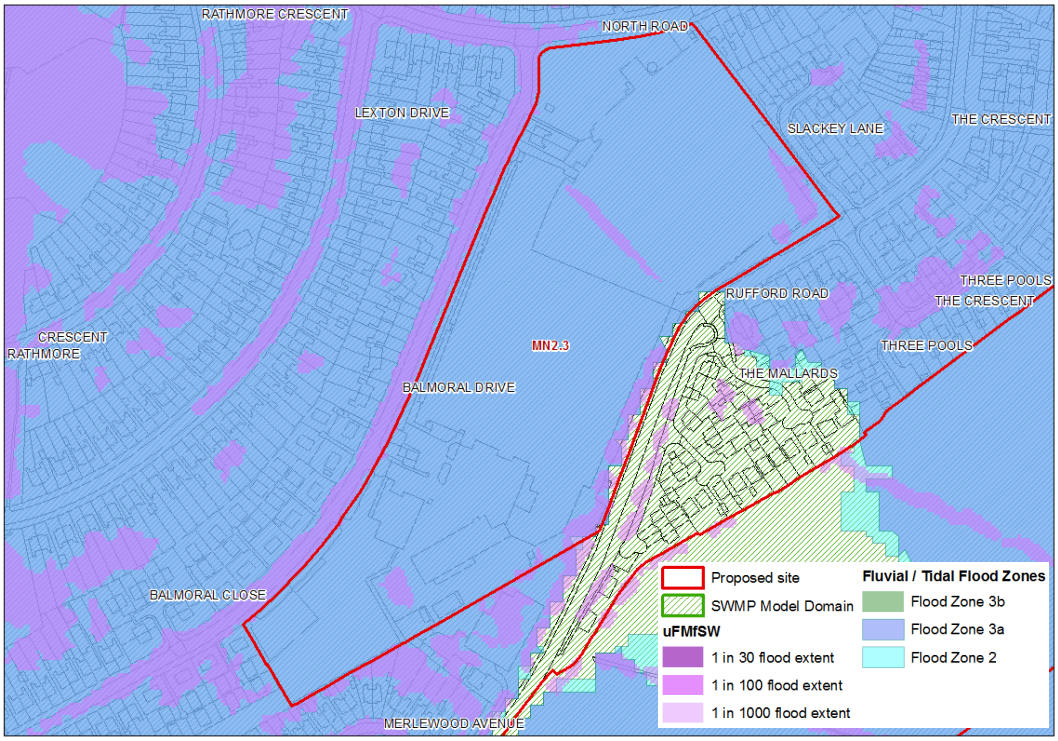
Site	MN2.2 - Land at Bankfield Lane, Southport
Area	9 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	14%	10%	77%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	10%		2%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0.21 m	0.98 m		0.99 m
SWMP Average Depth	0.03 m	0.05		0.06
SWMP Max Hazard	Moderate	Extreme		Extreme
SWMP Average Hazard	Moderate	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	Very low			
Groundwater	Susceptibility to groundwater emergence < 25%			
Historical Incidents	There are a couple of historic surface water flood incidents on Blundell Lane in the south west of the site			
Defended	Coastal defences including secondary earth embankment. RFRS map shows residual tidal risk as being low.			
SuDS Requirements	As the indicative suitability for infiltration SuDS is considered to be very low then amenity detention basins to store water on the surface could be an option. Ornamental ditches for the linear areas and ponds for the other areas may also be considered.			
FRA & Mitigation Options	77% of this site is within tidal Flood Zone 3a, therefore it would be difficult to tailor site layout to avoid development within this zone. As the site has been allocated for housing and as such falls within the more vulnerable category of Table 2 of the FRCC-PPG, the Exception Test would be required. As this site has been allocated it is assumed the first part of the Exception Test has been passed and there are wider sustainability benefits for the community by allocating this site for housing, as set out in the Flood Risk Technical Paper. To satisfy the second part of the			

Site	MN2.2 - Land at Bankfield Lane, Southport
	Exception Test, it must be shown that the development will be safe for its lifetime without increasing flood risk elsewhere and where possible reducing risk. A FRA should inform on the second part of the Exception Test. This should assess wider safety issues such as flood warnings and evacuation issues along with resistance and resilience measures for individual properties and detailed modelling assessing the effects of development in the floodplain on areas upstream and downstream of the site. Surface water risk is also apparent on the site, though occurs mostly within Flood Zone 3a.
Recommendations & Further Work	Detailed FRA required to inform on the second part of the Exception Test (which may require detailed tidal and breach modelling) and investigation into SuDS options.
Existing FRA Available for Site? (Information Provided by the Council)	Yes. Site FRA is part of developer representations; See http://www.sefton.gov.uk/planning-building-control/planning-policy/developer-representations-allocated-sites.aspx
Council's comment	Area benefits from defences so the risk is considered to be low. FRA completed - see developer representation at http://www.sefton.gov.uk/planning-building-control/planning-policy/developer-representations-allocated-sites.aspx The Environment Agency have withdrawn their objection to this site. See Examination Library. (Original objection submitted at Publication stage and can be found on the Council website http://www.sefton.gov.uk/planning-building-control/planning-policy/statutory-consultees-and-other-organisations.aspx).

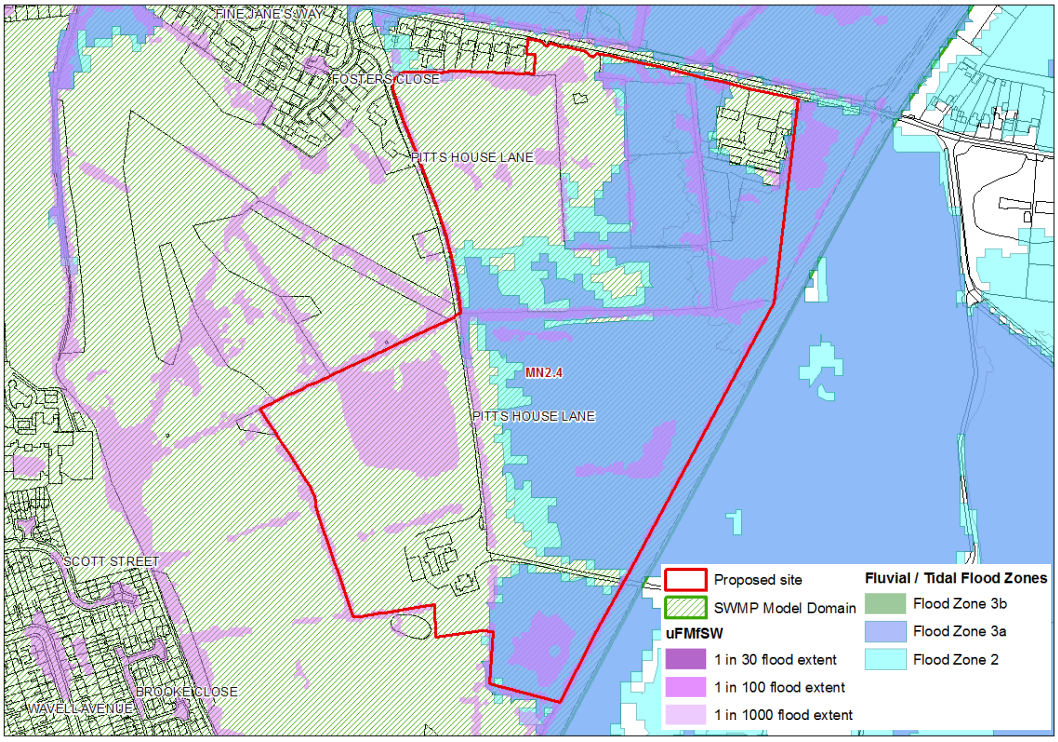
Site	MN2.3 - Former Phillip's Factory, Balmoral Drive, Southport			
Area	6 ha			
Proposed Use	Housing			



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	1%	0%	99%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	5%		6%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0.13 m	1.47m		1.47 m
SWMP Average Depth	0.03 m	0.05 m		0.05 m
SWMP Max Hazard	Moderate	Extreme		Extreme
SWMP Average Depth	Moderate	Moderate		Moderate
SWMP Climate Change	There is no impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >= 25% <50%			
Historical Incidents	None on site			
Defended	Coastal defences including secondary earth embankment. RFRS map shows residual tidal risk as being low.			
SuDS Requirements	As the indicative suitability for infiltration SuDS is considered to be high then SuDS techniques such as soakaways, swales or filter drains to allow water to soak away naturally to the groundwater table.			
FRA & Mitigation Options	Virtually the whole site footprint is within tidal Flood Zone 3a. As the site has been allocated for housing and as such falls within the more vulnerable category of Table 2 of the FRCC-PPG, the Exception Test would be required. As this site has been allocated it is assumed the first part of the Exception Test has been passed and there are wider sustainability benefits for the community by allocating this site for housing, as set out in the Flood Risk Technical Paper. To satisfy the second part of the Exception Test, it must be shown that the development will be safe for its lifetime without increasing flood risk elsewhere and where possible reducing risk. A FRA should inform on the second part of the Exception Test, including whether there is a need for wider safety issues such as flood warnings and evacuation, resistance and resilience measures for individual properties and detailed			

Site	MN2.3 - Former Phillip's Factory, Balmoral Drive, Southport
	modelling of offsite effects if required by the Environment Agency. Surface water risk is also apparent on the site, though this is minimal compared to the tidal risk.
Recommendations & Further Work	It is unlikely that a residential development would be permitted. Recommend redevelopment of existing structures taking account of the tidal risk through FRA or demolition and opening up of the site for greenspace.
Existing FRA Available for Site? (Information Provided by the Council)	Yes
Council's comment	Area benefits from defences so the risk is considered to be low. FRA completed - see Examination Library. The Environment Agency have indicated that they are prepared to withdraw their objection to this site.

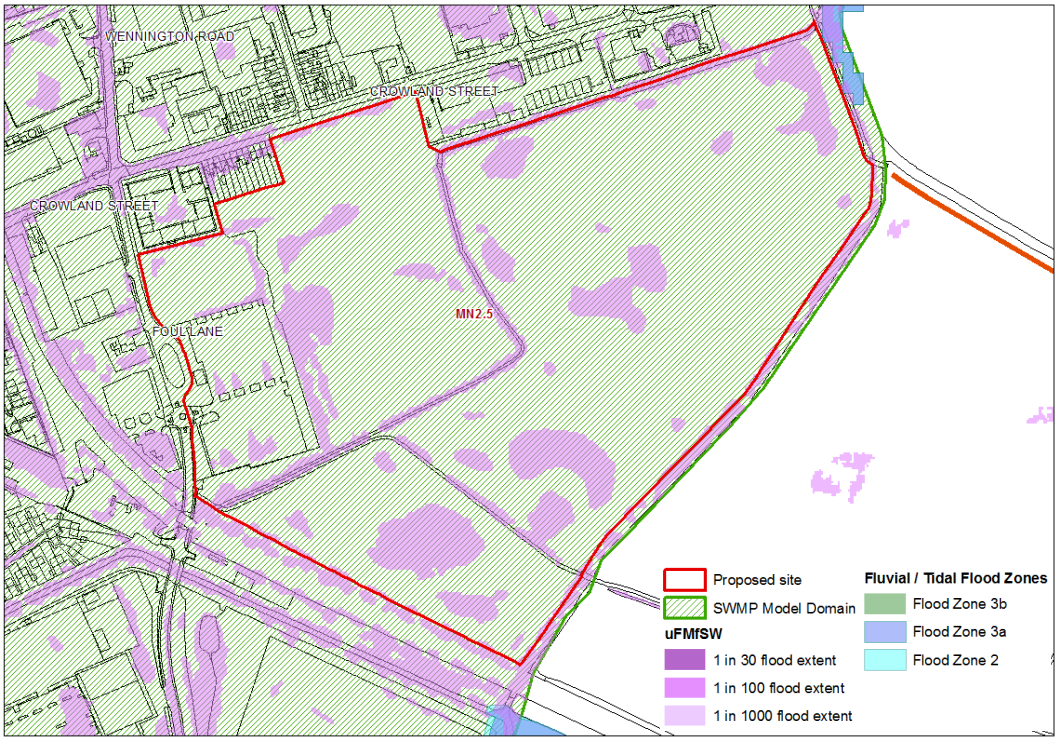
Site	MN2.4 - Land at Moss Lane (Churchtown South)
Area	18.4 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	46%	7%	47%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	19%		7%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0 m	1.12 m		1.17 m
SWMP Average Depth	0 m	0.06 m		0.08 m
SWMP Max Hazard	None	Significant		Significant
SWMP Average Hazard	None	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	No			
Indicative SuDS Suitability (Infiltration)	Very low			
Groundwater	Susceptibility to groundwater emergence >= 75% for western half of the site though no risk for the eastern half			
Historical Incidents	None on site			
Defended	Coastal defences including secondary earth embankment. Fluvial defence along Three Pools Waterway. RFRS map shows residual risk as being low with only a small proportion of the site at risk, to the south of Pool House Farm.			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be very low. There are several large areas that may benefit from surface water storage amenity ponds. Green roofs could be used on a number of houses to prevent rainwater from reaching the ground. However, maintenance of the green roofs may cause a problem for home owners.			
FRA & Mitigation Options	As nearly half of the site is within tidal Flood Zone 3a, the Exception Test would be required as stipulated in Table 2 of the FRCC-PPG. As this site has been allocated it is assumed the first part of the Exception Test has been passed and there are wider sustainability benefits for the community by allocating this site for housing. The part of the site, within Flood Zone 1, is largely at risk from surface water, which, as discussed above, may be best mitigated through the formation of amenity ponds.			

Site	MN2.4 - Land at Moss Lane (Churchtown South)		
Recommendations & Further Work	A detailed FRA would be required to inform on the likelihood of passing the second part of the Exception Test.		
Existing FRA available for site? (Information provided by Sefton Council)	Stage 1 Flood Risk Appraisal – Churchtown, Southport 25 July 2013		
From preliminary review - does current data match FRA? (Y/N)	Site area	Fluvial/tidal flood risk (based on EA flood outlines)	Surface water flood risk (based on EA flood outlines)
	N	N	N
Preliminary comments on available FRA	• According to the FRA the site area is 0.23 ha, however the current red line boundary equates to 18.4 ha. • The FRA uses the superseded FMfSW. The uFMfSW indicates a greater extent of surface water flood risk across the site. • The majority of the site is now within Flood Zone 3a (rather than Flood Zone 1 as indicated in the FRA). This suggests an update to the Flood Map for Planning and the need for an updated FRA (taking all sources of flood risk into account). • The FRA states that flooding issues are present which need to be addressed; however no mitigation measures were proposed.		
Council's comment	Area benefits from defences so the risk is considered to be low. A new FRA has been commissioned by the developer in the light of the recent changes to the Environment Agency Flood Maps.		

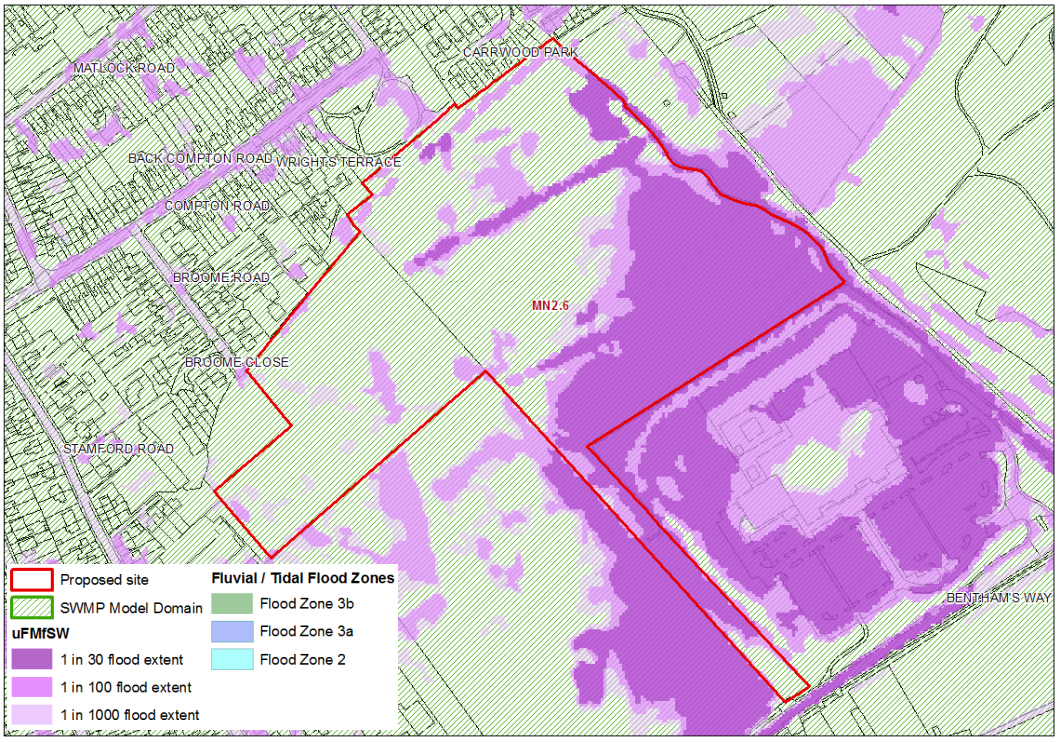
Site	MN2.5 - Land at Crowland Street, Southport
Area	25.9 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	15%		7%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0 m	1.37 m		1.43 m
SWMP Average Depth	0 m	0.06 m		0.09 m
SWMP Max Hazard	None	Extreme		Extreme
SWMP Average Hazard	None	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	No			
Indicative SuDS Suitability (Infiltration)	Very low			
Groundwater	Susceptibility to groundwater emergence >= 25% <50%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be very low. There are several large areas that may benefit from surface water storage amenity ponds. Green roofs could be used on a number of houses to prevent rainwater from reaching the ground. However, maintenance of the green roofs may cause a problem for home owners.			
FRA & Mitigation Options	22% of this site is at overall risk from surface water flooding, however there is no risk from the 1 in 30 year high risk event. The SWMP max hazard rating is extreme for the 1 in 100 event which indicates deep, fast flowing water which can cause extreme danger to people. It may be difficult for the developer to entirely avoid the areas at risk as they are spread across the majority of the site. Construction of amenity ponds is an option for the large 'ponded' areas, such as in the south of the site. The FRA should investigate safe access and egress routes for the new			

Site	MN2.5 - Land at Crowland Street, Southport
	development with consultation with Emergency Planning. A suitable Emergency Plan should be in place for this site for when flooding occurs.
Recommendations & Further Work	A FRA is required to investigate the SuDS options in terms of both suitability and cost effectiveness.
Existing FRA Available for Site? (Information Provided by the Council)	No
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within public open space or within the residual area of the site.

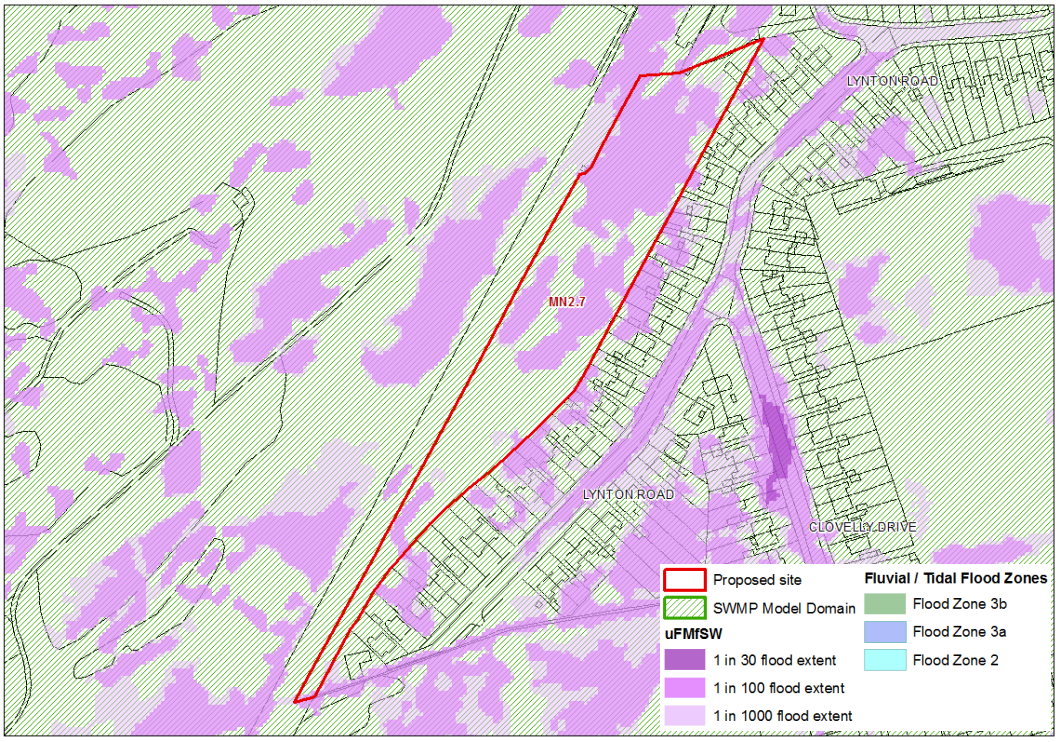
Site	MN2.6 - Land adjacent to Dobbies Garden Centre, Benthams Way, Southport
Area	8.7 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	31%	12%		7%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	1.05 m	1.27		1.34
SWMP Average Depth	0.2 m	0.18 m		0.21 m
SWMP Max Hazard	Extreme	Significant		Significant
SWMP Average Hazard	Moderate	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	Very low			
Groundwater	Susceptibility to groundwater emergence >= 75%			
Historical Incidents	One incident in the north of the site			
Defended	No			
SuDS Requirements	Although SUDS options have not been investigated as part of this study, it is possible that attenuation could be provided in basins developed from the existing Ordinary Watercourses or in an offline attenuation pond located in the area to remain undeveloped. These features would also provide significant ecological benefits and added pubic/resident amenity value. However, as groundwater depths could be shallow in this area, fully sealed systems are likely to be required. Even if attenuation basins could provide sufficient storage for the 1 in 100 year climate change runoff volume, the capacity of the piped drainage system connecting the developed area is likely to be designed to a 1 in 30 year standard. It is therefore recommended that additional storage should be provided within the developed area to accommodate the estimated exceedance volume of 500 m^3 to limit offsite impacts. This could be			

Site	MN2.6 - Land adjacent to Dobbies Garden Centre, Benthams Way, Southport
	achieved by landscaping and making best use of available green space to contain exceedance flows in swales. Use of raised kerbs could also provide some storage within internal road areas. These approaches can be used to allow certain areas of the site to flood to shallow depths when the capacity of the onsite drainage network is exceeded.
FRA & Mitigation Options	The ARFQ for this study requires that the proportion of the site that should remain undeveloped due to flood risk issues is to be identified. Based on available uFMfSW flood mapping, up to 51% of the site is at risk of surface water flooding. The Site FRA indicates the 30% of the site which should not be developed due to a combination of return period and anticipated depth of surface water flooding.
Recommendations & Further Work	Master planning and subsequent detailed design for the proposed housing development should take into account SWMP 1 in 100 year surface water mapping to ensure that FFLs are at least 300 mm above predicted flood depths. In addition to the surface water management measures provided in the Outline Drainage Strategy, this should ensure that flood risk is not increased elsewhere following development of the site.
Existing FRA Available for Site? (Information Provided by the Council)	Yes
Council's comment	FRA completed - see Examination Library. The recommendation in the FRA in relation to developable area has been accepted by the Council. The capacity for this site as indicated in MN2 will be revised downwards.

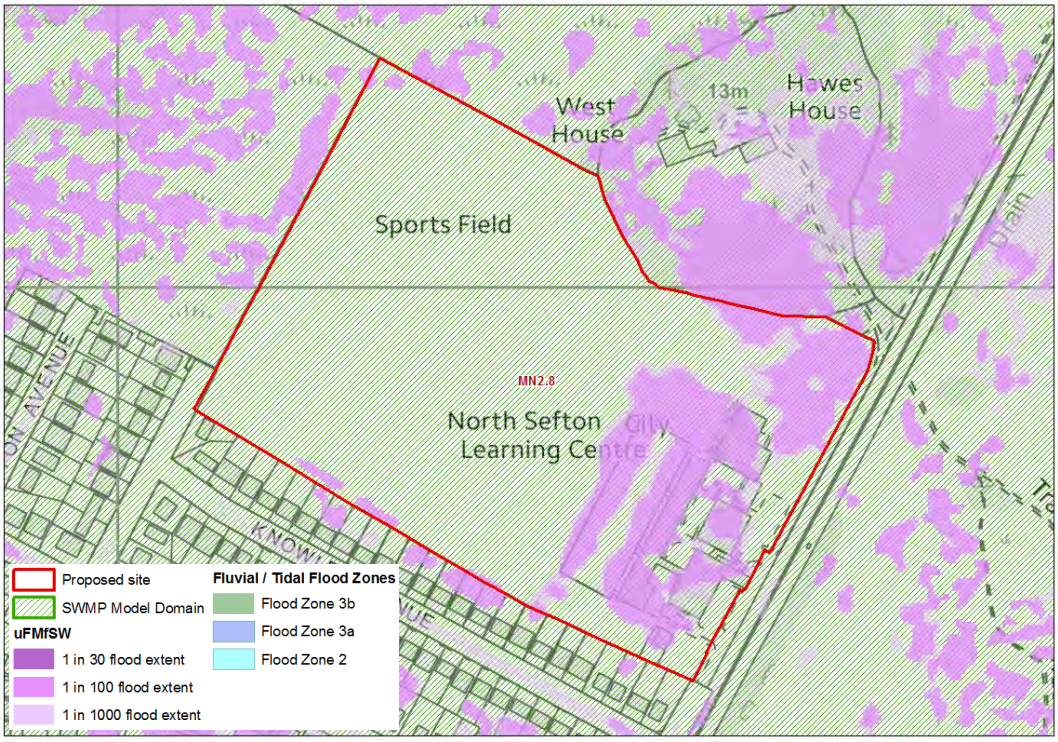
Site	MN2.7 - Land at Lynton Road, Birkdale
Area	1.5 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	42%		7%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0 m	0.38 m		0.41 m
SWMP Average Depth	0 m	0.11 m		0.13 m
SWMP Max Hazard	None	Significant		Significant
SWMP Average Hazard	None	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >= 75%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	There are large ponded areas in the northern half of the site that would require attention. However, due to the size of the site, above ground detention ponds or rain gardens may not be feasible as housing yields could be significantly reduced. Underground SuDS facilities may prove expensive and green roofs may be unfeasible for residential buildings due to maintenance issues.			
FRA & Mitigation Options	Site is more than 1 ha so would require a site FRA. Nearly half of this site as at risk from surface water and is also situated within a Local CDA. A FRA would be required to assess SuDS options. The FRA should investigate safe access and egress routes for the new development with consultation with Emergency Planning. A suitable Emergency Plan should be considered for use during flood events.			

Site	MN2.7 - Land at Lynton Road, Birkdale
Recommendations & Further Work	A FRA is required to investigate the SuDS options in terms of both suitability and cost effectiveness.
Existing FRA Available for Site? (Information Provided by the Council)	No
Council's comment	FRA required for this site at application stage. A reduced developable area has already been assumed for this site due to site shape and ecological constraints. It is anticipated that any mitigation measures can be contained within the residual area of the site.

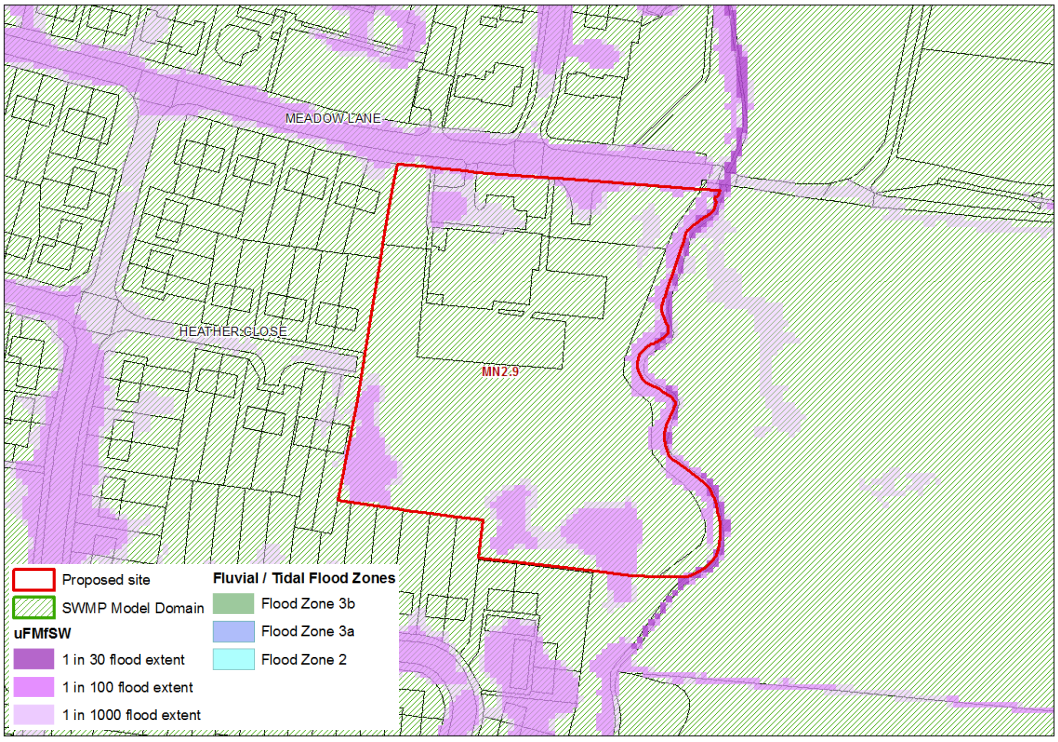
Site	MN2.8 - Former Ainsdale Hope School, Ainsdale
Area	9.2 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	18%		5%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0 m	0.72 m		0.76 m
SWMP Average Depth	0 m	0.05 m		0.07 m
SWMP Max Hazard	None	Significant		Significant
SWMP Average Hazard	None	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >= 75%			
Historical Incidents	1 incident at the North Sefton City Learning Centre			
Defended	No			
SuDS Requirements	There are large ponded areas in the eastern third of the site that would require attention. A rain garden or soakaway could mitigate the risk in the far eastern corner. The remaining risk occurs on and around the current building.			
FRA & Mitigation Options	Site is over 1 ha so Site FRA is required. The FRA should investigate different SuDS options. Much depends on the proposal for the current Learning Centre building and whether the current structure is to remain. Current drainage systems for the building would need to be assessed were the building to remain. Were this building to be demolished then this part of the site could be incorporated into the SuDS area recommended for the eastern corner.			
Recommendations & Further Work	FRA required to assess SuDS options. Infiltration SuDS should be possible.			

Site	MN2.8 - Former Ainsdale Hope School, Ainsdale
Existing FRA Available for Site? (Information Provided by the Council)	No
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within public open space or within the residual area of the site.

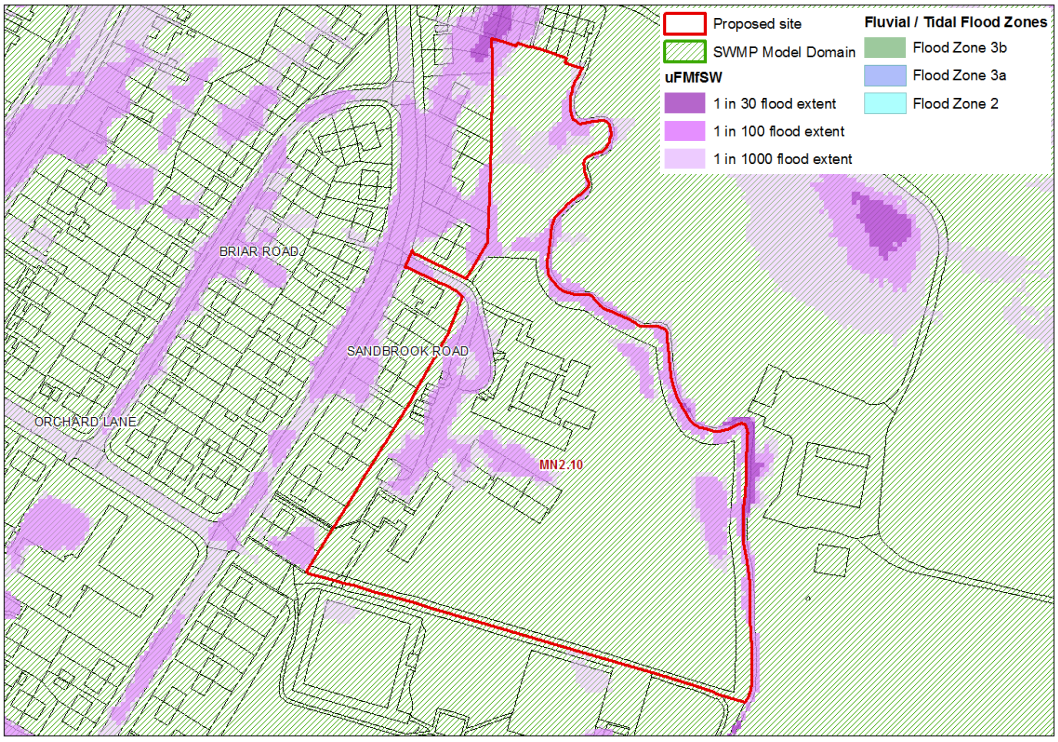
Site	MN2.9 - Former St John Stone RC Primary, Meadow Lane, Ainsdale
Area	1.37 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	15%		7%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0 m	1.05 m		1.07 m
SWMP Average Depth	0 m	0.07 m		0.08 m
SWMP Max Hazard	None	Extreme		Extreme
SWMP Average Hazard	None	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >= 75%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be high therefore infiltration SuDS such as rain gardens or soakaways may be appropriate.			
FRA & Mitigation Options	A FRA would be required as the site is over 1 ha and this would be required to investigate SuDS options. Much of the risk is confined to the outer boundaries of the site. Safety of access and egress would need to be assessed in the FRA as the site is bordered by a watercourse to the east and access from Meadow Lane is restricted during a 1 in 100 year event (uFMfSW). Surface water modelling may be required to account for access to and from Meadow Lane during a 100 year event.			
Recommendations & Further Work	FRA required to assess SuDS options and safe site access and egress.			

Site	MN2.9 - Former St John Stone RC Primary, Meadow Lane, Ainsdale
Existing FRA Available for Site? (Information Provided by the Council)	No
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within the public open space requirement for the site or within the residual area of the site.

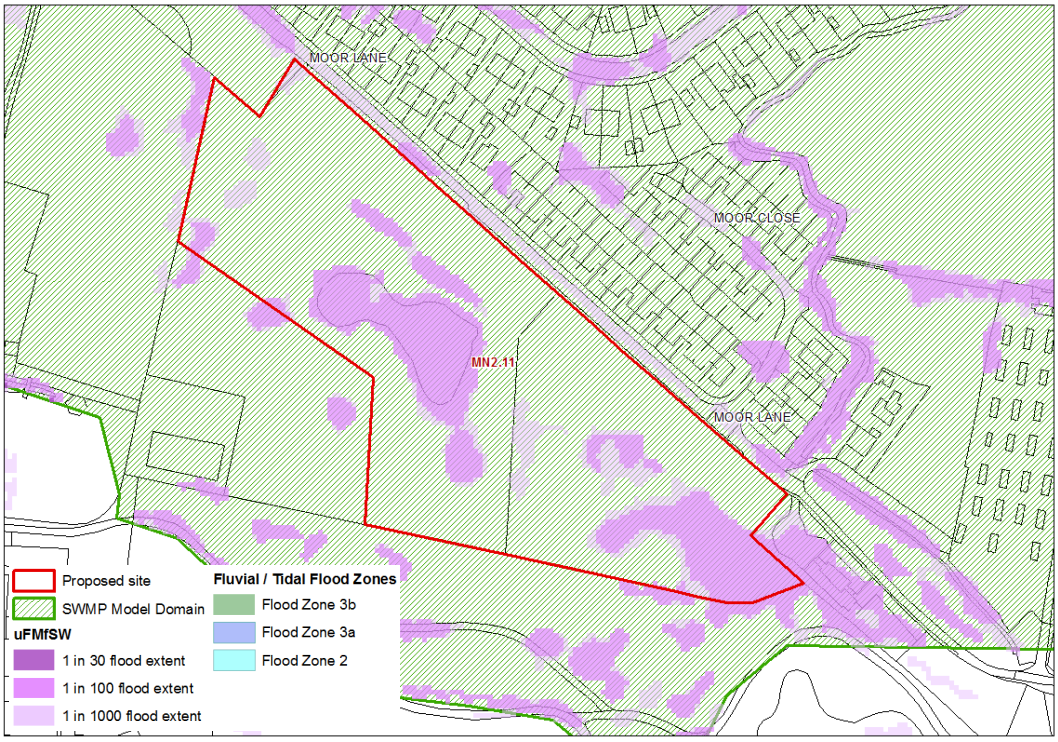
Site	MN2.10 - Land at Sandbrook Road, Ainsdale
Area	2.61 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	13%		6%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0.19 m	0.85 m		0.87 m
SWMP Average Depth	0.05 m	0.06 m		0.07 m
SWMP Max Hazard	Moderate	Significant		Significant
SWMP Average Hazard	Moderate	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >= 75%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be high therefore infiltration SuDS such as rain gardens or soakaways may be appropriate.			
FRA & Mitigation Options	Site is over 1 ha so Site FRA is required. Much of the surface water flood risk occurs around existing infrastructure therefore current drainage operations may require assessment as part of a FRA. Further options for SuDS can provide relief to the existing drainage system. Development should be restricted by an 8 m easement buffer of the Main River (Sandy Brook) along the eastern boundary. This buffer area could also account for any surface water flooding along the watercourse. The scale of the FRA much depends on whether the existing roads / buildings are to remain. 87% of the site remains developable were the risk from a 1 in 100 year event to be mitigated through appropriate SuDS.			

Site	MN2.10 - Land at Sandbrook Road, Ainsdale
Recommendations & Further Work	FRA required to assess SuDS options and existing drainage systems.
Existing FRA Available for Site? (Information Provided by the Council)	No
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within the public open space requirement for the site or within the residual area of the site.

Site	MN2.11 - Land south of Moor Lane, Ainsdale
Area	2.62 ha
Proposed Use	Housing

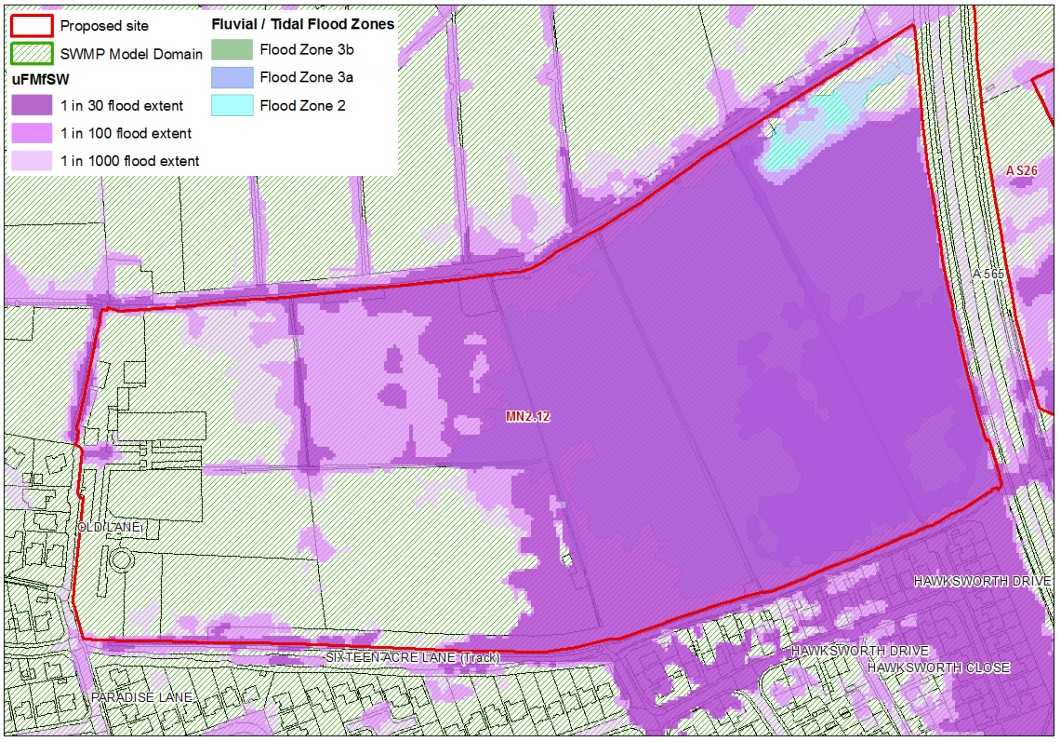


Flood Zone	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	20%		8%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0 m	0.67 m		0.72 m
SWMP Average Depth	0 m	0.09 m		0.11 m
SWMP Max Hazard	None	Significant		Significant
SWMP Average Hazard	None	Moderate		Moderate

SWMP Climate Change	There is no significant impact from climate change
Local CDA	Yes
Indicative SuDS Suitability (Infiltration)	High
Groundwater	Susceptibility to groundwater emergence >= 50% <75%
Historical Incidents	None on site
Defended	No
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be high therefore infiltration SuDS such as rain gardens or soakaways may be appropriate.
FRA & Mitigation Options	There appears to be an existing wetland area in the centre of the site which should ideally be kept free of development and used to retain surface water. There are several other ponds in the vicinity of the site indicating a high water table in the area. A FRA should assess the SuDS options whilst also investigating the locations of safe access and egress points. Moor Lane, bordering the northern boundary of the site acts as a flood flow route during the 1 in 1000 year event therefore alternative access points may be required.
Recommendations & Further Work	FRA required to assess SuDS options.

Site	MN2.11 - Land south of Moor Lane, Ainsdale
Existing FRA Available for Site? (Information Provided by the Council)	No
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within public open space or within the residual area of the site.

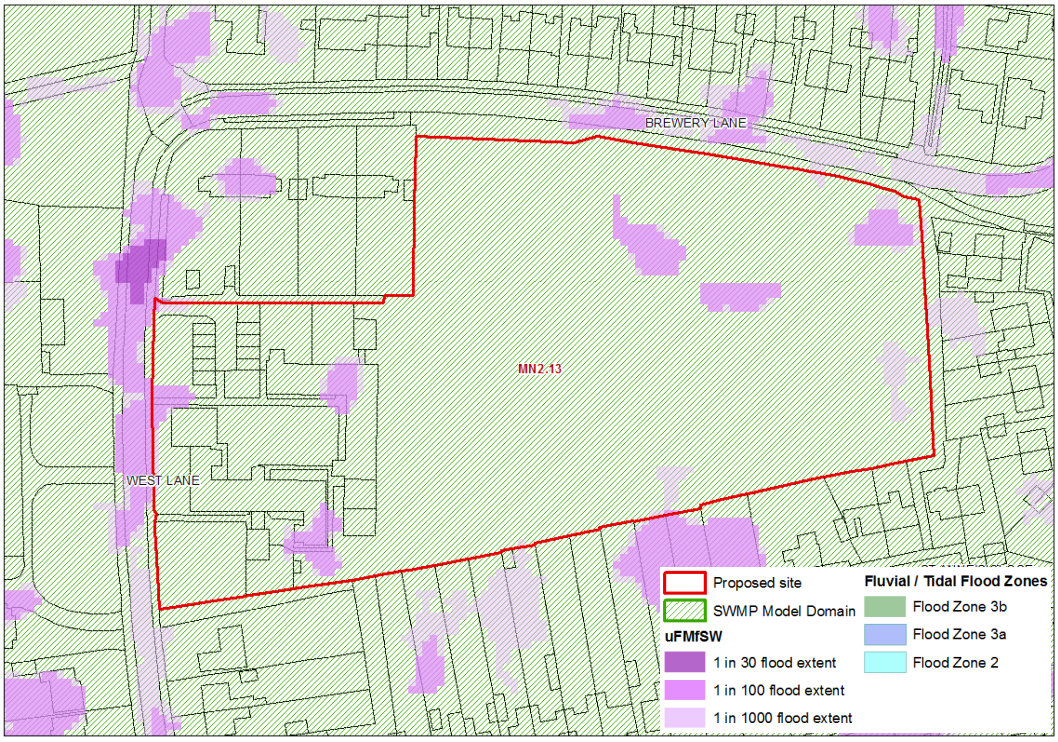
Site	MN2.12 - Land north of Brackenway, Formby
Area	13.69 ha
Proposed Use	Housing



Flood Zone	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
	53%	35%	12%	0%
Surface Water (uFMfSW)	High Risk	Medium Risk		Low Risk
	60%	10%		5%
SWMP Max Depth	1 in 30	1 in 100		1 in 100 +CC
	1.6 m	1.67 m		1.7 m
SWMP Average Depth	0.2 m	0.23 m		0.26
SWMP Max Hazard	Extreme	Extreme		Extreme
SWMP Average Hazard	Moderate	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >=75%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be high therefore infiltration SuDS such as rain gardens or soakaways may be appropriate.			
FRA & Mitigation Options	The risk from surface water flooding at this site is very high with 60% of the site at risk from the uFMfSW 1 in 30 year event and SWMP max flood depths >1.5 m. The SWMP max hazard is extreme for each return period. Overall, 75% of this site is at some level of risk of surface water flooding. This site is at risk from fluvial flooding to the north and south of the site with a watercourse running along each boundary. There are also several drains running across the site. This means that just under half of the site is at fluvial flood risk. The Exception Test would be required due to the site being within Flood Zone 3a.			

<table>
<tr><th>Site</th><th colspan="3">MN2.12 - Land north of Brackenway, Formby</th></tr>
<tr><td>Recommendations & Further Work</td><td colspan="3">FRA required to further assess risk - this is currently being assessed by JBA on the Council's behalf.</td></tr>
<tr><td>Existing FRA Available for Site? (Information Provided by the Council)</td><td colspan="3">Formby, The Acres
Flood Risk Assessment
June 2015</td></tr>
<tr><td rowspan="2">From preliminary review - does current data match FRA? (Y/N)</td><td>Site area</td><td>Fluvial/tidal flood risk (based on EA flood outlines)</td><td>Surface water flood risk (based on EA flood outlines)</td></tr>
<tr><td>Y</td><td>Y</td><td>Y</td></tr>
<tr><td>Preliminary comments on available FRA</td><td colspan="3">The assessment of surface water flood risk in the FRA is based upon the Sefton Council SWMP flood maps which match the uFMfSW.
The FRA proposed flood mitigation measures including raising Finished Floor Levels to a minimum of 600 mm above the 1% plus climate change AEP flood level, raising ground levels, developing flood storage areas, improving existing flood defences and restoring land drains.</td></tr>
<tr><td>Council's comment</td><td colspan="3">Site FRA and detailed modelling have been submitted by the developer, the FRA as representations (see http://www.sefton.gov.uk/planning-building-control/planning-policy/developer-representations-allocated-sites.aspx). These are currently being appraised. The site is subject to a detailed site specific policy in the Local Plan (MN6). It is envisaged that the development of this site will deliver flood risk benefits to the wider area.</td></tr>
</table>

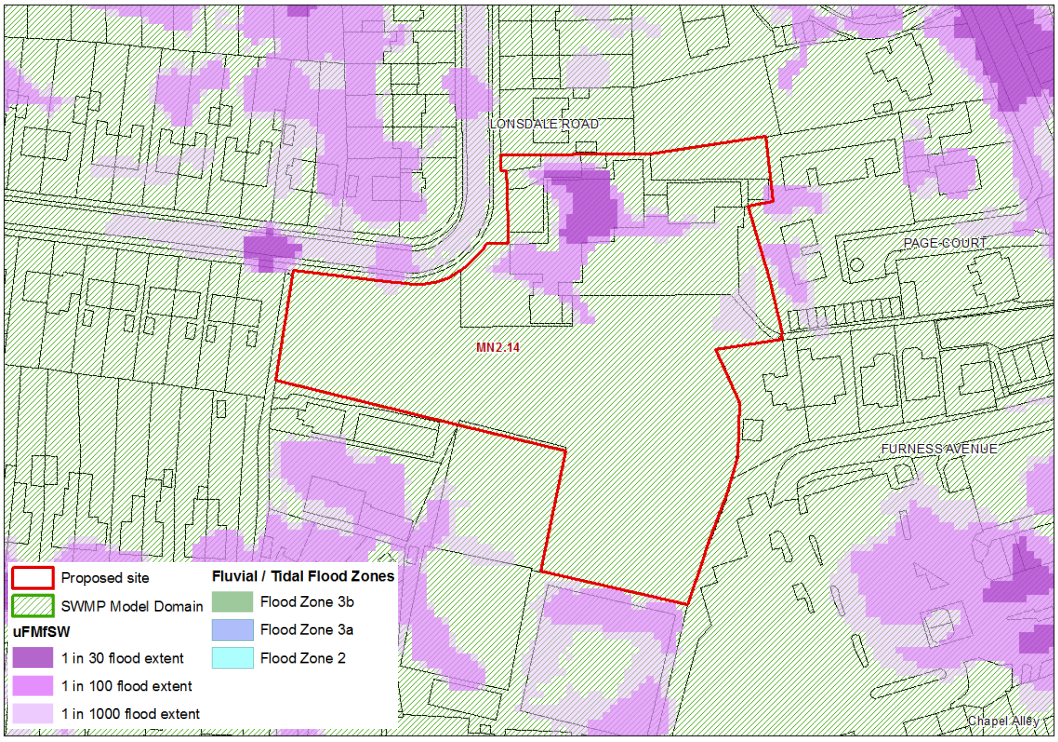
Site	MN2.13 - Land at West Lane, Formby
Area	1.92 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	4%		2%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0.1 m	0.24 m		0.25 m
SWMP Average Depth	0.04 m	0.04 m		0.04 m
SWMP Max Hazard	Moderate	Moderate		Moderate
SWMP Average Hazard	Moderate	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >=75%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be high therefore infiltration SuDS such as rain gardens or soakaways may be appropriate.			
FRA & Mitigation Options	A FRA would be required to investigate SuDS options. Much of the risk is confined to small pockets spread over the site which could be dealt with through infiltration SuDS such as soakaways or rain gardens. Site access should be investigated as West Lane and Brewery Lane are shown to be at risk in places.			
Recommendations & Further Work	FRA required to assess SuDS options and safe site access and egress.			
Existing FRA Available for Site? (Information Provided by the	No			

Site	MN2.13 - Land at West Lane, Formby
Council)	
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within public open space or within the residual area of the site.

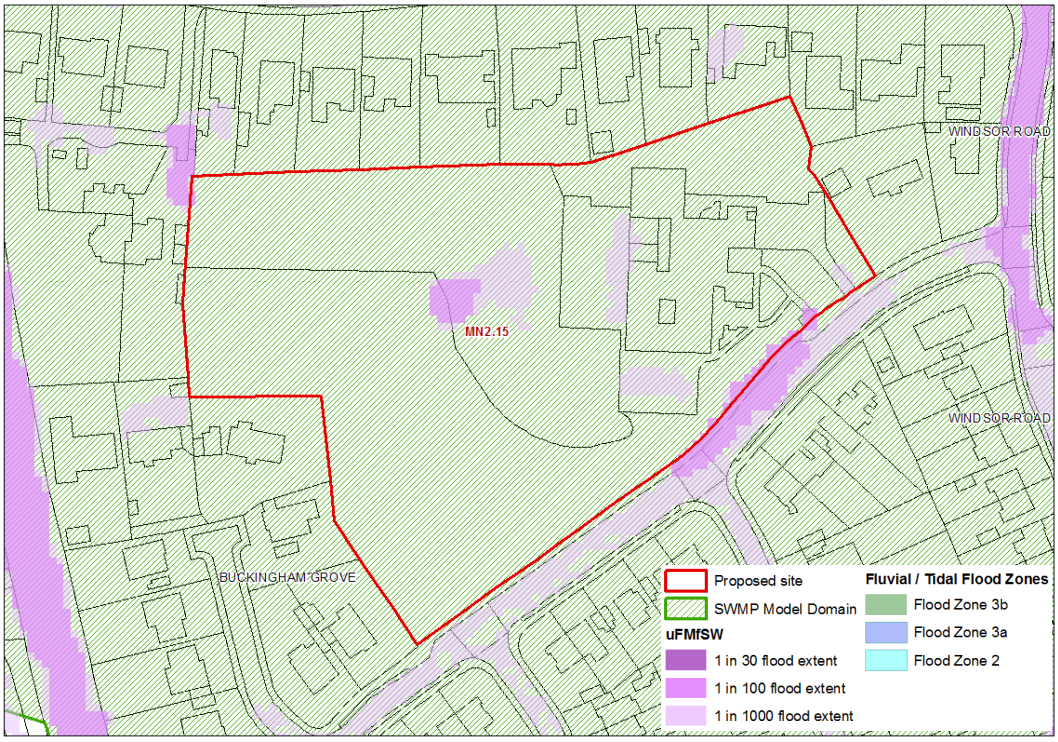
Site	MN2.14 - Former Holy Trinity School, Lonsdale Rd, Formby
Area	0.95 ha
Proposed Use	Housing



Flood Zone	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
	100%	0%	0%	0%
Surface Water (uFMfSW)	High Risk	Medium Risk		Low Risk
	3%	4%		5%
SWMP Max Depth	1 in 30	1 in 100		1 in 100 +CC
	0.17 m	0.21 m		0.21 m
SWMP Average Depth	0.04 m	0.04 m		0.05 m
SWMP Max Hazard	Moderate	Moderate		Moderate
SWMP Average Hazard	Moderate	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >=75%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be high therefore infiltration SuDS such as rain gardens or soakaways may be appropriate.			
FRA & Mitigation Options	A FRA is required to assess the surface risk. The surface water risk is confined to the area covering the existing school therefore the scale of remedial works required depends on whether the current structure is to remain. Were this building to be demolished then this part of the site should ideally be left open with appropriate mitigation. A most likely more expensive solution may be underground drainage or storage tanks or alternatively permeable paving could be used were this area to be a communal car park.			
Recommendations & Further Work	FRA required to assess SuDS options and safe site access and egress.			

Site	MN2.14 - Former Holy Trinity School, Lonsdale Rd, Formby
Existing FRA Available for Site? (Information Provided by the Council)	No
Council's comment	The northern part of the site now has planning permission for 42 dwellings (ref DC/2015/00333).

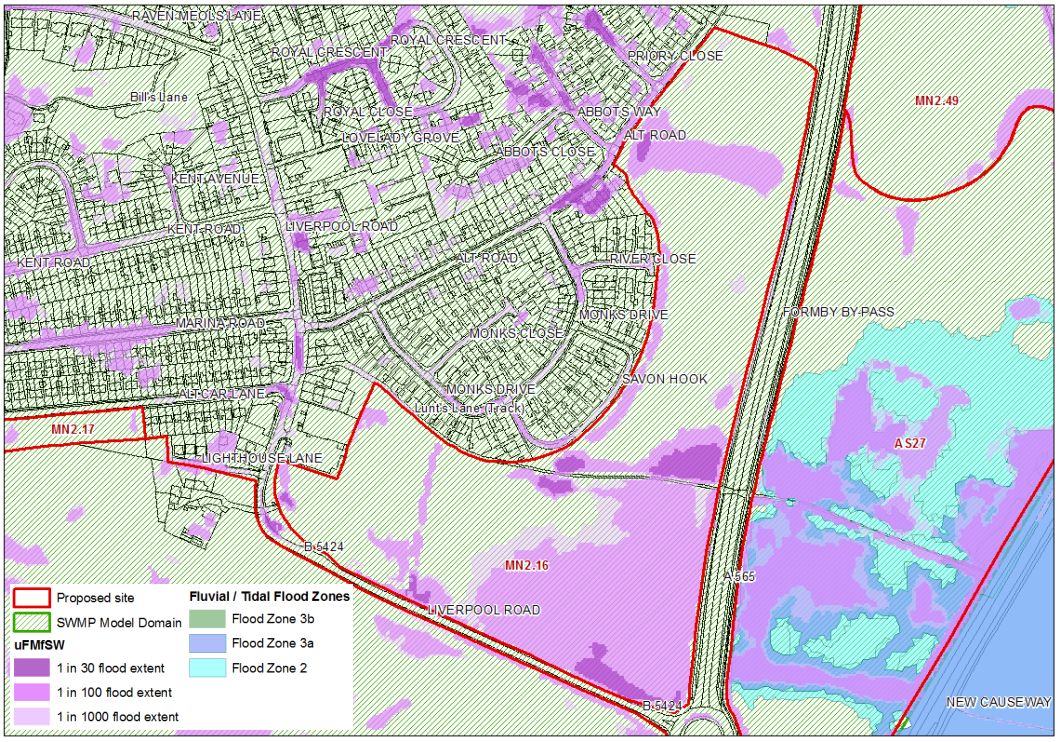
Site	MN2.15 - Formby Professional Development Centre, Park Road
Area	1.58 ha
Proposed Use	Housing



Flood Zone	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
	100%	0%	0%	0%
Surface Water (uFMfSW)	High Risk	Medium Risk		Low Risk
	0%	1%		4%
SWMP Max Depth	1 in 30	1 in 100		1 in 100 +CC
	0 m	0.31 m		0.32 m
SWMP Average Depth	0 m	0.03 m		0.03 m
SWMP Max Hazard	Moderate	Moderate		Moderate
SWMP Average Hazard	Moderate	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >=75%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be high therefore infiltration SuDS such as rain gardens or soakaways may be appropriate.			
FRA & Mitigation Options	A FRA should look at SuDS options. Safe access and egress should also be investigated as Park Road to the south is partly at risk from the uFMfSW 1 in 100 year event.			
Recommendations & Further Work	FRA required to assess SuDS options and safe site access and egress.			
Existing FRA Available for Site? (Information Provided by the Council)	No			

Site	MN2.15 - Formby Professional Development Centre, Park Road
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within the residual area of the site.

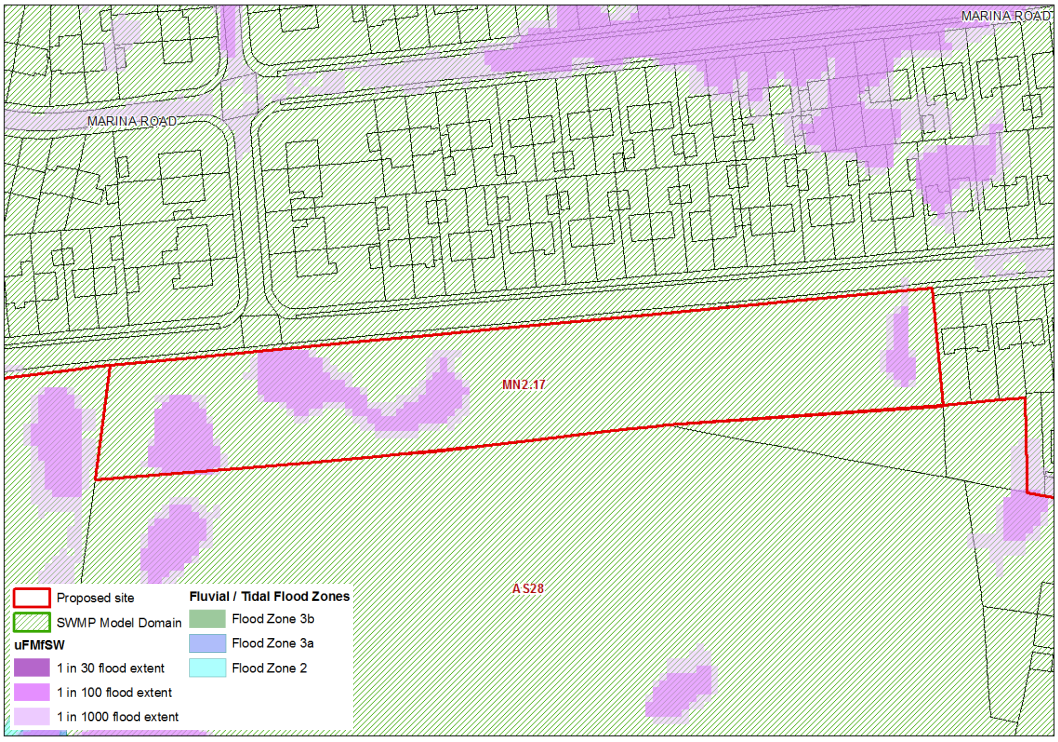
Site	MN2.16 - Land at Liverpool Road, Formby
Area	14.21 ha
Proposed Use	Housing



Flood Zone	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
	100%	0%	0%	0%
Surface Water (uFMfSW)	High Risk	Medium Risk		Low Risk
	4%	35%		7%
SWMP Max Depth	1 in 30	1 in 100		1 in 100 +CC
	0.51 m	1.05 m		1.09 m
SWMP Average Depth	0.05 m	0.11 m		0.14 m
SWMP Max Hazard	Significant	Extreme		Significant
SWMP Average Hazard	Moderate	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >=75%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be high therefore infiltration SuDS such as rain gardens or soakaways may be appropriate.			
FRA & Mitigation Options	A FRA would be required as the site is over 1 ha and this would be required to investigate options for surface water storage for the area of the site at risk. The largest area to the south should ideally be partly retained as open space and potentially converted to a wetland which may have environmental and social benefits. The current drainage ditches should be retained to help deal with the risk. Underground storage tanks with piped inflows would likely increase costs. SuDS options modelling may be required to assess the best and most cost effective option.			
Recommendations & Further Work	FRA required to assess SuDS options including detailed surface water modelling of preferred options. Recommendation for wetland creation.			

<table>
<tr><th>Site</th><th colspan="3">MN2.16 - Land at Liverpool Road, Formby</th></tr>
<tr><td>Existing FRA available for site? (Information provided by Sefton Council)</td><td colspan="3">FRA - Proposed Residential Development, Land North of Liverpool Road, Formby
July 2013</td></tr>
<tr><td rowspan="2">From preliminary review - does current data match FRA? (Y/N)</td><td>Site area</td><td>Fluvial/tidal flood risk (based on EA flood outlines)</td><td>Surface water flood risk (based on EA flood outlines)</td></tr>
<tr><td>N</td><td>Y</td><td>Y</td></tr>
<tr><td>Preliminary comments on available FRA</td><td colspan="3">According to the FRA the site area is 12.1 ha, however the current red line boundary equates to 14.2 ha.
The FRA used the local SWMP flood maps. The uFMfSW matches the SWMP flood map in the 1 in 30 and 1 in 100 year event.
The FRA states that flooding issues are present which need to be addressed. Mitigation measures include raising Finished Floor Levels 600 mm higher than the 1% plus climate change AEP flood level.
An updated FRA will be required due to the change in red line boundary (taking all sources of flood risk into account).</td></tr>
<tr><td>Council's comment</td><td colspan="3">FRA required for this site at application stage. The developer has previously submitted a planning application to develop the majority of this site, which included SuDS, but subsequently withdrew this. The housing capacity of the site has been derived from the withdrawn application (ref S/2013/0905).</td></tr>
</table>

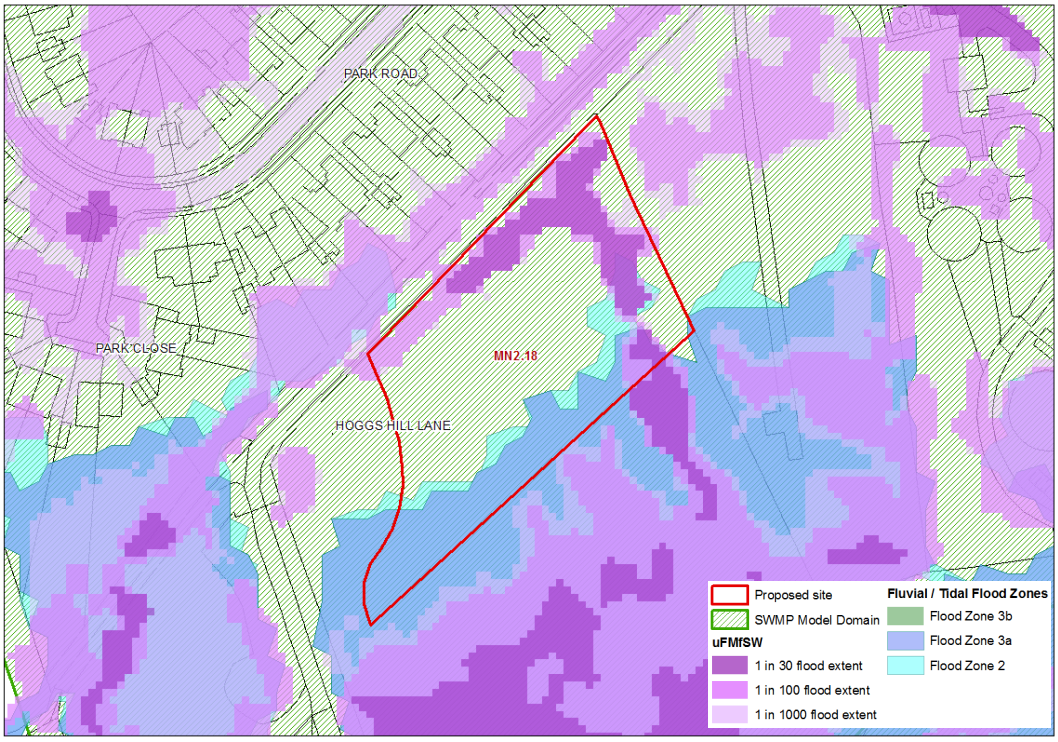
Site	MN2.17 - Land at Altcar Lane, Formby
Area	0.72 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	14%		5%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0.14 m	0.30 m		0.31 m
SWMP Average Depth	0.03 m	0.06 m		0.06 m
SWMP Max Hazard	Moderate	Moderate		Moderate
SWMP Average Hazard	Moderate	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >=75%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be high therefore infiltration SuDS such as rain gardens or soakaways may be appropriate.			
FRA & Mitigation Options	A FRA would be required to assess surface water risk. As the site is relatively small, above surface storage may not be feasible. Green roofs could be an option though maintenance issues may cause a problem for home owners. Underground tank storage is another option though this is likely to cost more. Use of soakaways or permeable paving for car parking are other more cost effective options though these may lead to a reduction in housing yields on the site.			
Recommendations & Further Work	FRA required to assess SuDS options.			

Site	MN2.17 - Land at Altcar Lane, Formby
Existing FRA Available for Site? (Information Provided by the Council)	No
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within the residual area of the site.

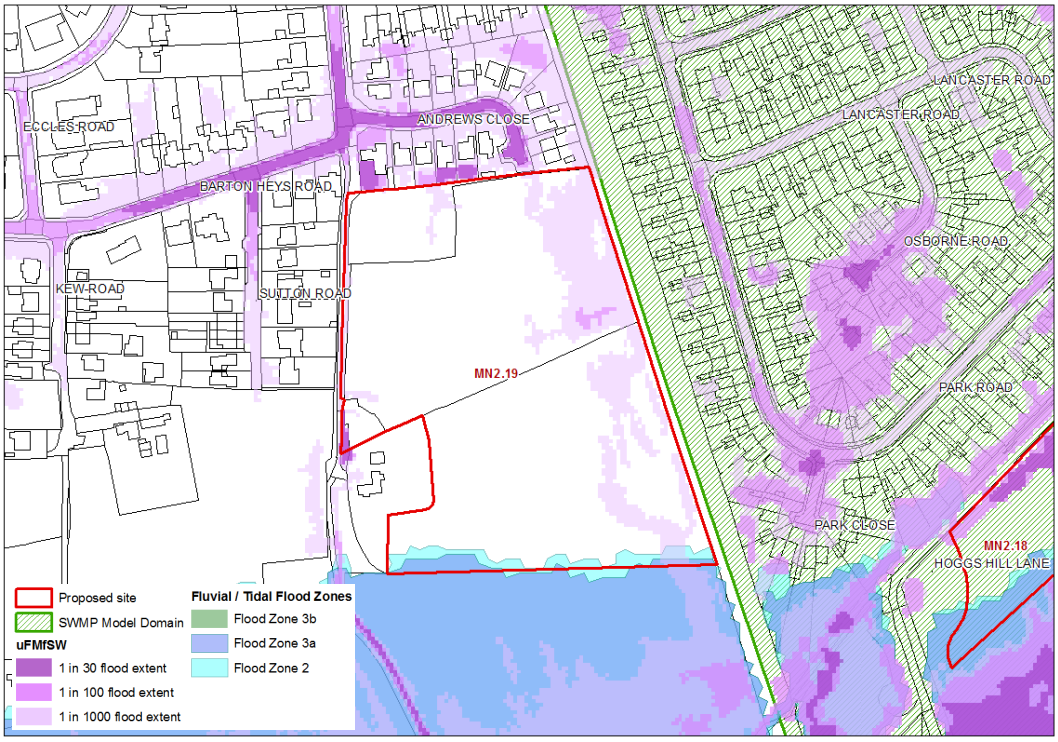
Site	MN2.18 - Powerhouse site, Phase 2, Hoggs Hill Lane, Formby
Area	0.57 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	69%	8%	23%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	14%	9%		2%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0.59 m	0.73 m		0.73 m
SWMP Average Depth	0.09 m	0.07 m		0.07 m
SWMP Max Hazard	Significant	Significant		Significant
SWMP Average Hazard	Moderate	Moderate		Moderate
SWMP Climate Change	There is no impact from climate change			
Local CDA	No			
Indicative SuDS Suitability (Infiltration)	Moderate			
Groundwater	Susceptibility to groundwater emergence >=75%			
Historical Incidents	None on site			
Defended	Natural dune systems act as coastal defences, also manmade coastal defence embankments			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be moderate. SuDS will be required to deal with the surface water risk though options will need to be investigated			
FRA & Mitigation Options	Site FRA required as part of site is in Flood Zones 2 and 3. As the site is within tidal Flood Zone 3a, the Exception Test would be required, as stipulated in Table 2 of the FRCC-PPG, as part of a FRA. As this site has been allocated it is assumed the first part of the Exception Test has been passed and there are wider sustainability benefits for the community by allocating this site for housing. The area of this site within Flood Zone 3a should ideally be retained as open greenspace. This would rule out an approximate 20 - 30 m strip along the southern boundary of the site from development. 14% of the site is within the high risk uFMfSW 1 in 30 year flood outline.			

Site	MN2.18 - Powerhouse site, Phase 2, Hoggs Hill Lane, Formby
	A further 9% of the site is within the medium risk uFMfSW 1 in 100 year outline. Much of this surface water risk is outside of the tidal flood zones, covering the eastern and northern boundaries. The FRA should include detailed surface water modelling to explore options for surface water mitigation though due to the small size of the site it may be difficult to accommodate the surface water above ground. Any above ground SuDS such as soakaways, rain gardens or amenity ponds are therefore likely to be ruled out. Underground tank storage may be an option though likely to be more expensive. Green roofs are also an option though there may be associated maintenance issues for the home owner.
Recommendations & Further Work	A FRA would be required to inform on the likelihood of passing the second part of the Exception Test and assessing SuDS options through detailed surface water modelling.
Existing FRA available for site? (Information provided by Sefton Council)	No
Preliminary comments on available FRA	• There is an existing FRA for MN2.18 (Powerhouse, Hoggs Hill Lane, Formby – FRA. April 2013), however the site boundary indicates an adjacent site to MN2.18 Phase 2. • An FRA will be required.
Council's comment	FRA required for this site at application stage.

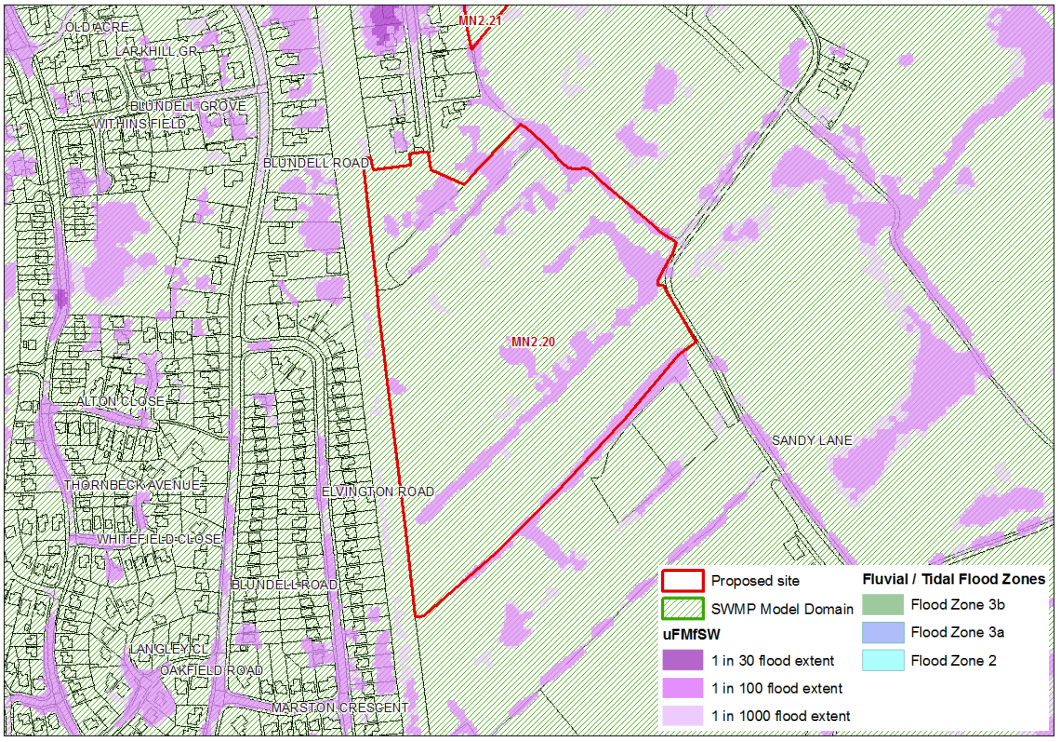
Site	MN2.19 - Land at Andrews Close, Formby
Area	3.34 ha
Proposed Use	Housing



Flood Zone	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
	96%	3%	2%	0%
Surface Water (uFMfSW)	High Risk	Medium Risk		Low Risk
	0%	0%		18%
SWMP Max Depth	1 in 30	1 in 100		1 in 100 +CC
	0 m	0.86 m		0.98 m
SWMP Average Depth	0 m	0.27 m		0.32 m
SWMP Max Hazard	None	Significant		Significant
SWMP Average Hazard	None	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	No			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >=75%			
Historical Incidents	None on site			
Defended	Natural dune systems act as coastal defences, also manmade coastal defence embankments			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be high therefore infiltration SuDS such as rain gardens or soakaways may be appropriate.			
FRA & Mitigation Options	Part of the site is within tidal Flood Zone 3a. The Council should consider adjusting the southern boundary to remove this risk. Pulling the boundary northwards by approximately 10 m should achieve this though may impact on housing yields. Surface water risk is predominantly confined to the eastern part of the site and is mainly of low risk (uFMfSW 1 in 1000 year event). The max depth and hazard outputs from the SWMP only cover the eastern boundary. Green roofs are also an option however there are associated maintenance issues for the home owner.			

<table>
<tr><th>Site</th><th colspan="3">MN2.19 - Land at Andrews Close, Formby</th></tr>
<tr><td>Recommendations & Further Work</td><td colspan="3">FRA required to assess tidal and surface water risk. FRA should investigate SuDS options for mitigating the 1 in 1000 year surface water flood event.</td></tr>
<tr><td>Existing FRA available for site? (Information provided by Sefton Council)</td><td colspan="3">Stage 1 Flood Risk Assessment – Marsh Farm, Formby
26 July 2013</td></tr>
<tr><td rowspan="2">From preliminary review - does current data match FRA? (Y/N)</td><td>Site area</td><td>Fluvial/tidal flood risk (based on EA flood outlines)</td><td>Surface water flood risk (based on EA flood outlines)</td></tr>
<tr><td>N</td><td>Y</td><td>N</td></tr>
<tr><td>Preliminary comments on available FRA</td><td colspan="3">According to the FRA the site area is 0.12 ha, however the current red line boundary equates to 3.3 ha.
The FRA used the Sefton Council SFRA Areas Susceptible to Surface Water Flooding Map and superseded FMfSW. The uFMfSW indicates a greater flood risk across the site compared to the SFRA.
The FRA stated potential for development on the northern part of the site which lies within Flood Zone 1. It did not recommend any flood mitigation measures.
An updated FRA will be required due to the change in red line boundary (taking all sources of flood risk into account).</td></tr>
<tr><td>Council's comment</td><td colspan="3">FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within the residual area of the site.</td></tr>
</table>

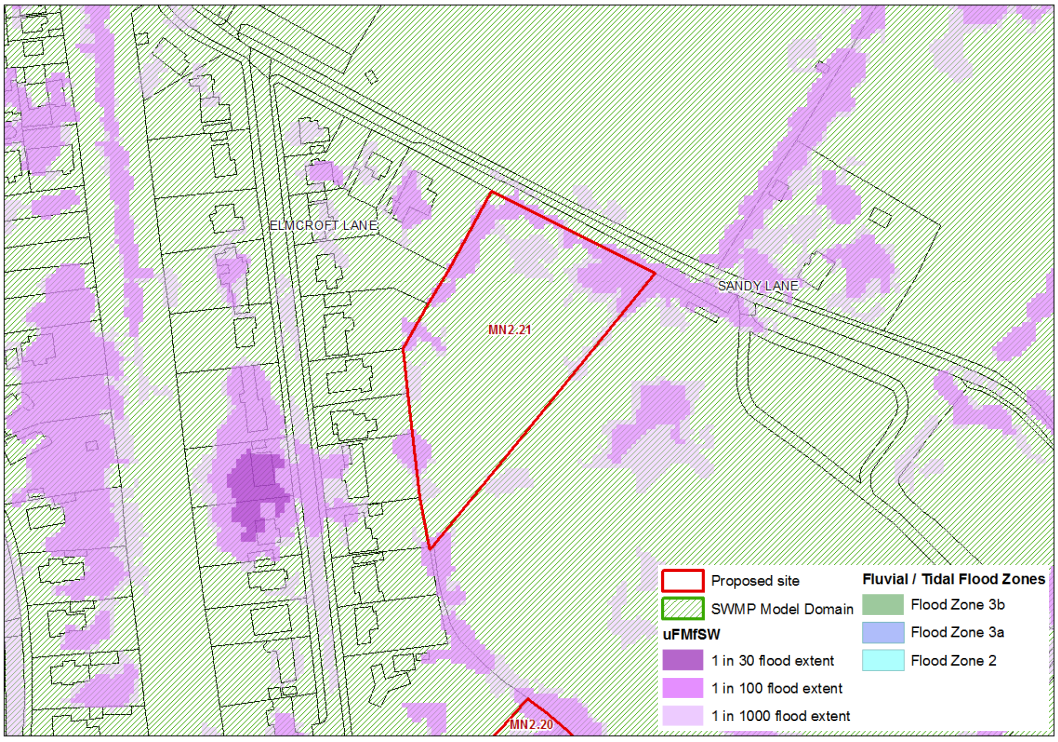
Site	MN2.20 - Land at Elmcroft Lane, Hightown
Area	6.48 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	15%		4%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0 m	1.05 m		1.06 m
SWMP Average Depth	0 m	0.06 m		0.07 m
SWMP Max Hazard	None	Significant		Significant
SWMP Average Hazard	None	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	No			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >= 50% <75%			
Historical Incidents	None on site			
Defended	Natural dune systems act as coastal defences, also manmade coastal defence wall			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be high therefore infiltration SuDS such as rain gardens or soakaways may be appropriate.			
FRA & Mitigation Options	A FRA would be required to investigate the surface water risk from, in particular, the uFMfSW 1 in 100 year event. With SWMP max depths >1 m on the site and SMWP max hazard rating of significant, this risk should preferably be dealt with through appropriate SuDS. As the indicative infiltration SuDS suitability is classed as high and the site is large, it should be possible to incorporate infiltration SuDS such as soakaways, rain gardens, permeable paving for pavements and patio areas into the site layout. Due to the sporadic coverage of the risk, the types of SuDS used will depend on the final site layout. The different types of SuDS techniques should be assessed during the site design stage.			

Site	MN2.20 - Land at Elmcroft Lane, Hightown
Recommendations & Further Work	FRA required to assess SuDS options at the site design stage.
Existing FRA Available for Site? (Information Provided by the Council)	No
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within public open space or the residual area of the site.

Site	MN2.21 - Land at Sandy Lane, Hightown
Area	0.73 ha
Proposed Use	Housing

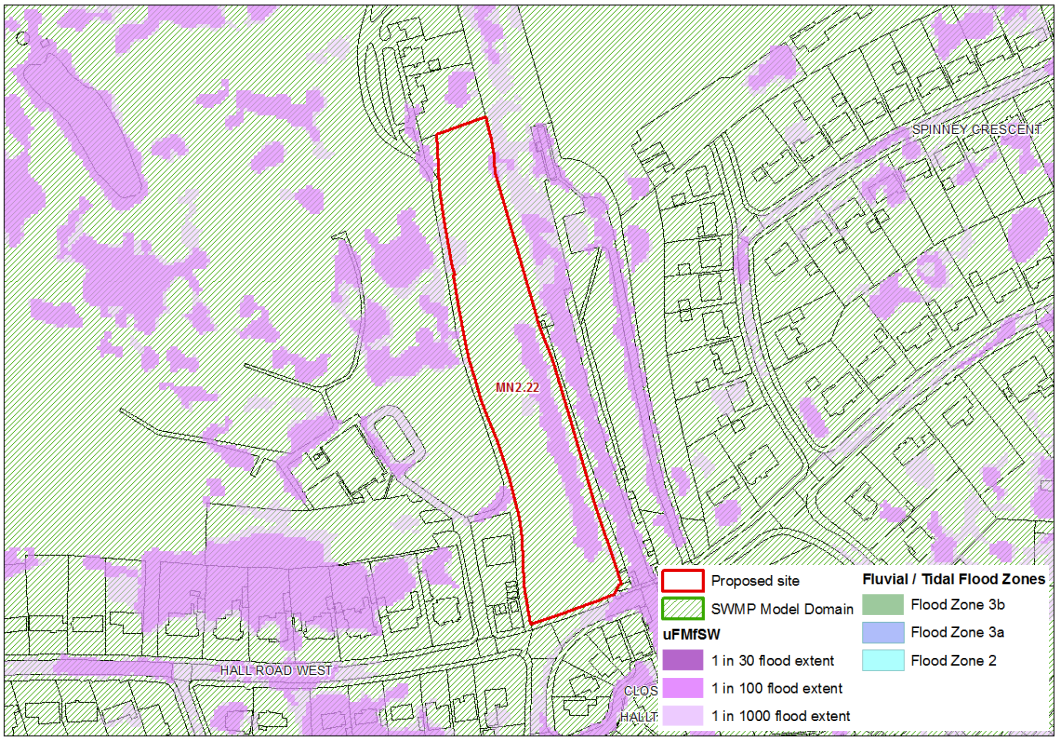


Flood Zone	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
	100%	0%	0%	0%
Surface Water (uFMfSW)	High Risk	Medium Risk		Low Risk
	0%	16%		11%
SWMP Max Depth	1 in 30	1 in 100		1 in 100 +CC
	0 m	0.5 m		0.51 m
SWMP Average Depth	0 m	0.07 m		0.08 m
SWMP Max Hazard	None	Significant		Significant
SWMP Average Hazard	None	Moderate		Moderate

SWMP Climate Change	There is no significant impact from climate change
Local CDA	No
Indicative SuDS Suitability (Infiltration)	Very low
Groundwater	Susceptibility to groundwater emergence >= 25% <50%
Historical Incidents	None on site
Defended	Natural dune systems act as coastal defences, also manmade coastal defence wall
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be very low. Retention basins would likely provide the most appropriate form of mitigation
FRA & Mitigation Options	Even though the site is <1 ha in size, is not subject to fluvial / tidal risk and is not within a CDA, a FRA should still be carried out to investigate the surface water risk. Retention basins or ditches could be an option. The FRA should also ensure safe access and egress with access to Sandy Lane obstructed by the uFMfSW medium risk event.
Recommendations & Further Work	Site FRA should be requested to assess SuDS options and safe site access and egress.
Existing FRA Available for Site? (Information	No

Site	MN2.21 - Land at Sandy Lane, Hightown
Provided by the Council)	
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within public open space or the residual area of the site.

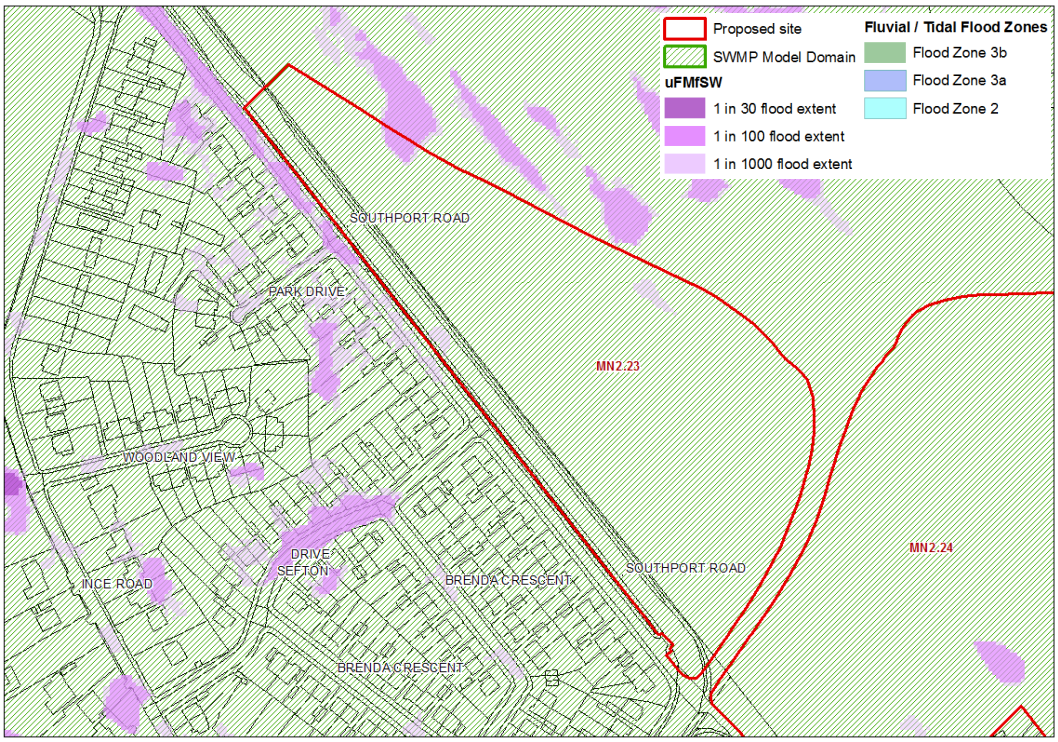
Site	MN2.22 - Land at Hall Road West, Crosby
Area	1.09 ha
Proposed Use	Housing



Flood Zone	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
	100%	0%	0%	0%
Surface Water (uFMfSW)	High Risk	Medium Risk		Low Risk
	0%	14%		4%
SWMP Max Depth	1 in 30	1 in 100		1 in 100 +CC
	0 m	0.5 m		0.57 m
SWMP Average Depth	0 m	0.05 m		0.06 m
SWMP Max Hazard	None	Significant		Significant
SWMP Average Hazard	None	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	No			
Indicative SuDS Suitability (Infiltration)	High			
Groundwater	Susceptibility to groundwater emergence >= 75%			
Historical Incidents	None on site			
Defended	Natural dune systems act as coastal defences, also manmade coastal defence wall			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be high therefore infiltration SuDS such as rain gardens or soakaways may be appropriate.			
FRA & Mitigation Options	The linear nature of the risk area and the high suitability for infiltration SuDS suggests the incorporation of swales or filter drains along the eastern boundary of the site. Access to the site could safely, in terms of flood risk, be gained from Hall Road West on the southern boundary.			
Recommendations & Further Work	FRA required to assess SuDS options and safe access and egress routes.			
Existing FRA Available for Site? (Information	No			

Site	MN2.22 - Land at Hall Road West, Crosby
Provided by the Council)	
Council's comment	FRA required for this site at application stage. A reduced developable area has already been assumed for this site due to site shape. It is anticipated that any mitigation measures can be contained within the residual area of the site.

Site	MN2.23 - Land at Southport Old Road, Thornton
Area	3.9 ha
Proposed Use	Housing

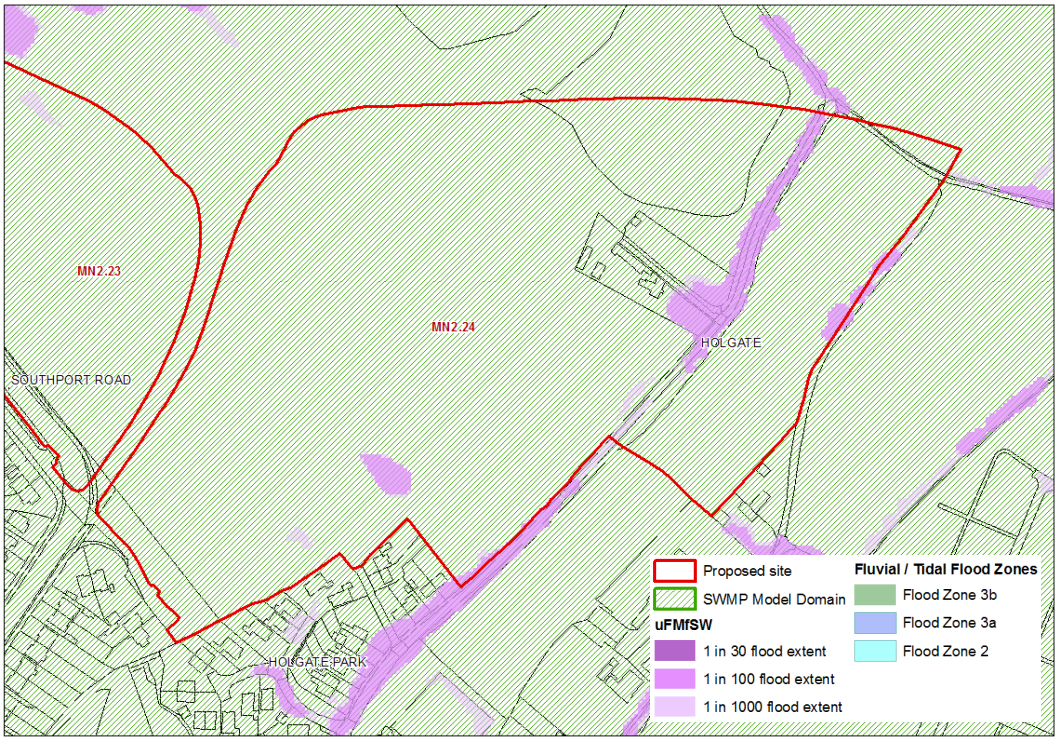


Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	1%		1%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0 m	0.21 m		0.24 m
SWMP Average Depth	0 m	0.02 m		0.03 m
SWMP Max Hazard	None	Moderate		Moderate
SWMP Average Hazard	None	Moderate		Moderate

SWMP Climate Change	There is no significant impact from climate change
Local CDA	No
Indicative SuDS Suitability (Infiltration)	Low
Groundwater	No risk
Historical Incidents	None on site
Defended	No
SuDS Requirements	Small ponds, open greenspace
FRA & Mitigation Options	Site FRA required as site is over 1 ha. The risk on this site is minimal. A FRA is still required due to the size of the site. The small areas at surface water risk may be left as open greenspace or used for amenity ponds.
Recommendations & Further Work	FRA required to assess site safety.
Existing FRA Available for Site? (Information Provided by the Council)	No

Site	MN2.23 - Land at Southport Old Road, Thornton
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within public open space or within the residual area of the site.

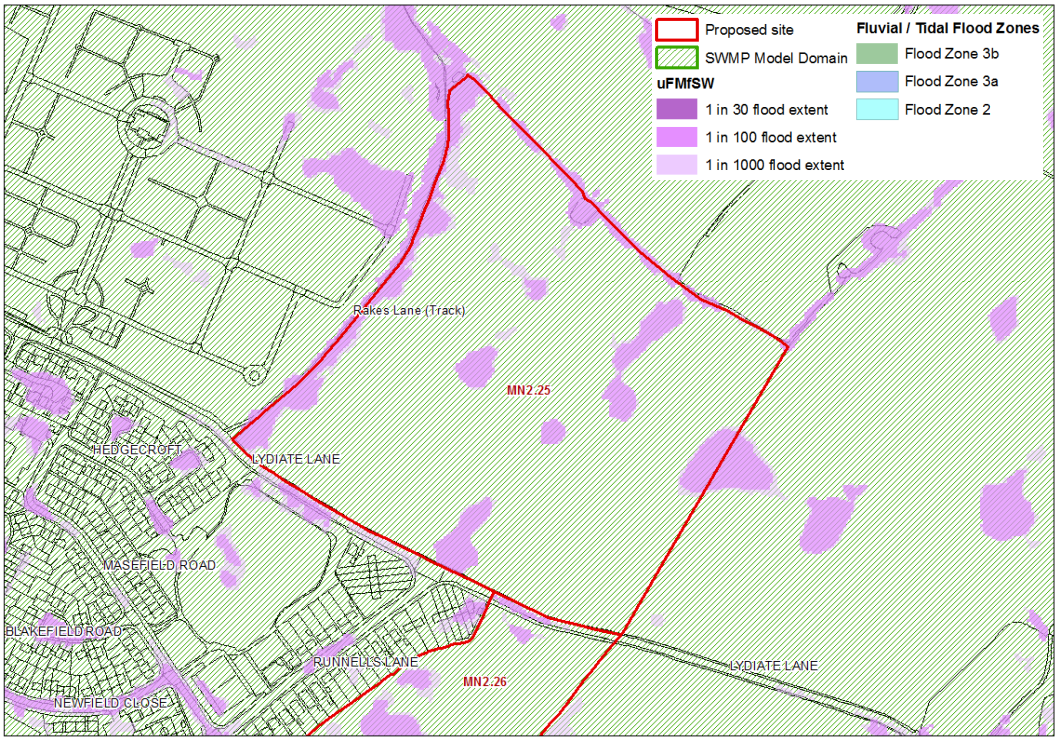
Site	MN2.24 - Land at Holgate, Thornton
Area	8.4 ha
Proposed Use	Housing



Flood Zone	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
	100%	0%	0%	0%
Surface Water (uFMfSW)	High Risk	Medium Risk		Low Risk
	0%	1%		1%
SWMP Max Depth	1 in 30	1 in 100		1 in 100 +CC
	0 m	0.62 m		0.64 m
SWMP Average Depth	0 m	0.03 m		0.03 m
SWMP Max Hazard	None	Moderate		Moderate
SWMP Average Hazard	None	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	Western half of the site is low and the eastern half is very high			
Groundwater	Susceptibility to groundwater emergence <25%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	Majority of the surface water risk is gathered in the eastern half of the site therefore infiltration Suds such as soakaways, filter strips / drains along the road could be used, given the linear shape of the risk area.			
FRA & Mitigation Options	Site FRA required as site is over 1 ha. The majority of the surface water risk occurs along the Holgate road in the eastern half of the site. As this area is considered to have a very high suitability for infiltration SuDS, it is recommended that filter drains or swales are installed along the sides of the road. There is a further pocket of risk in the western half of the site where infiltration is poor. This risk could be dealt with through an amenity pond. A FRA should assess these SuDS options.			
Recommendations & Further Work	FRA required to assess SuDS options.			
Existing FRA Available for Site? (Information Provided by the Council)	No			

Site	MN2.24 - Land at Holgate, Thornton
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within public open space or within the residual area of the site.

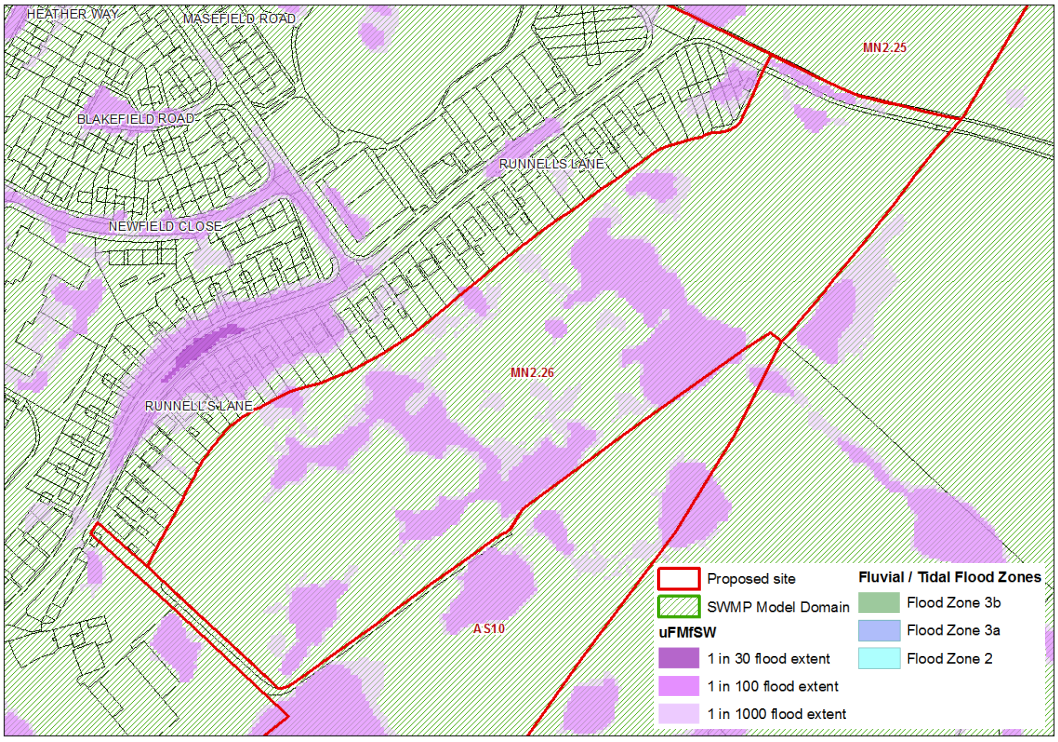
Site	MN2.25 - Land at Lydiate Lane, Thornton
Area	10.3 ha
Proposed Use	Housing



Flood Zone	**Flood Zone 1**	**Flood Zone 2**	**Flood Zone 3a**	**Flood Zone 3b**
	100%	0%	0%	0%
Surface Water (uFMfSW)	**High Risk**	**Medium Risk**		**Low Risk**
	0%	11%		3%
SWMP Max Depth	**1 in 30**	**1 in 100**		**1 in 100 +CC**
	0 m	1.28 m		1.33 m
SWMP Average Depth	0 m	0.05 m		0.06 m
SWMP Max Hazard	None	Extreme		Extreme
SWMP Average Hazard	None	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	No			
Indicative SuDS Suitability (Infiltration)	Approximately 70% of the site, from the western boundary, is considered very high with the remaining 30% in the east considered low.			
Groundwater	Susceptibility to groundwater emergence <25%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	The western 70% of the site is suitable for infiltration SuDS such as filter drains along Rakes Lane. The ponded areas in the approximate eastern third of the site could be mitigated through amenity ponds.			
FRA & Mitigation Options	Site FRA required as site is over 1 ha. The majority of the surface water risk occurs along Rakes Lane along the north western boundary and in ponded areas across the site. A FRA should look at SuDS options such as filter drains, ditches or swales along Rakes Lane and amenity / retention ponds for the isolated ponded areas. A more cost effective option may be to install vegetated soakaways or rain gardens. Due to the nature of the hazard and the >1 m flood depths derived from the SWMP, it is crucial that such SuDS options are incorporated into the early site design. The Council may wish to consider reducing their proposed housing capacities in order to incorporate SuDS.			

Site	MN2.25 - Land at Lydiate Lane, Thornton
Recommendations & Further Work	FRA required to assess SuDS options.
Existing FRA Available for Site? (Information Provided by the Council)	No
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within public open space or within the residual area of the site.

Site	MN2.26 - Land south of Runnells Lane, Thornton
Area	5.3 ha
Proposed Use	Housing



Flood Zone	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
	100%	0%	0%	0%
Surface Water (uFMfSW)	High Risk	Medium Risk		Low Risk
	0%	19%		9%
SWMP Max Depth	1 in 30	1 in 100		1 in 100 +CC
	0 m	0.76 m		0.80 m
SWMP Average Depth	0 m	0.07 m		0.09 m
SWMP Max Hazard	None	Significant		Significant
SWMP Average Hazard	None	Moderate		Moderate
SWMP Climate Change	There is no significant impact from climate change			
Local CDA	Yes			
Indicative SuDS Suitability (Infiltration)	Very high			
Groundwater	Susceptibility to groundwater emergence <25%			
Historical Incidents	None on site			
Defended	No			
SuDS Requirements	The indicative suitability for infiltration SuDS is considered to be very high therefore infiltration SuDS such as rain gardens or soakaways may be appropriate.			
FRA & Mitigation Options	Site FRA required as site is over 1 ha. The surface water risk is spread out in nature. The surface water risk areas may be best mitigated through sympathetically landscaped soakaways or rain gardens, taking advantage of the perceived high infiltration capacity on site, also reinforced by low risk of groundwater emergence. The FRA should consider SuDS options at the early stages of site design. Safety of site access and egress should also be investigated with Lydiate Lane appearing to be the only point of access.			
Recommendations & Further Work	FRA required to assess SuDS options and safe access and egress to Lydiate Lane. FRA should be carried out alongside the site design process.			

Site	MN2.26 - Land south of Runnells Lane, Thornton
Existing FRA Available for Site? (Information Provided by the Council)	No
Council's comment	FRA required for this site at application stage. It is anticipated that any mitigation measures can be contained within public open space or within the residual area of the site.