CUMBRIA MINERALS AND WASTE LOCAL PLAN

STRATEGIC FLOOD RISK ASSESSMENT

June 2018

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1.0 Introduction

Background information

1.1 Cumbria County Council adopted the Cumbria Minerals and Waste Local Plan (CMWLP) in September 2017. Part of the supporting evidence for the CMWLP was a Strategic Flood Risk Assessment produced by the council in February 2015 to assess the flood risk of the proposed Site Allocations. A further Addendum Report issued in March 2016 considered the supplementary sites brought forward in response to the Preferred Options consultation as part of the local plan preparation.

1.2 Now that the CMWLP is adopted, the SFRA needs updating to take into account which of the proposed Site Allocations made it in to the adopted plan and which were deleted. This revised document will therefore provide an up-to-date SFRA for the current CMWLP as adopted, and will form part of the Evidence Base for ongoing monitoring and eventual review of the CMWLP.

1.3 As well as reflecting the current status of the adopted CMWLP, this document will take into account any changes in national planning policy and guidance; relevant legislation, or local flood risk data that may affect the soundness of the adopted CMWLP policies and/or impact on the way planning applications are determined.

Purpose and objectives

1.4 An SFRA must be carried out when preparing the Local Plan as it will assess the potential impacts that the proposed Minerals and Waste site allocations may have on current and future flood risk. This requirement is outlined in paragraph 100 of the National Planning Policy Framework (NPPF) (2012). As noted above, this SFRA now combines the two SFRA reports issued during preparation of the CMWLP and confirms the current flood risk status of the Site Allocations included in the adopted CMWLP.

1.5 There are two levels of Strategic Flood Risk Assessments – Level One and Level Two. A Level One SFRA is the minimum assessment to be carried out by all local planning authorities and helps identify the flood risk across the development area and can help to assist with identifying the most suitable location of proposed sites for allocation. A Level Two assessment is undertaken where proposed development falls within higher flood risk areas and the Exception Test (as set out in the NPPF) needs to be applied to ensure the sites are compatible with the flood risk at their location and will not negatively impact on surrounding sites.

1.6 The key aims and objectives of this SFRA are:

- to understand the extent and severity of flood risk across Cumbria from all sources and to use the information to try to direct development away from the areas at highest risk;

- to demonstrate that the potential flooding risk associated with the Site Allocations in the adopted CMWLP have been fully considered;
- to assist in the preparation, monitoring and review of appropriate planning policies for the management of flood risk and site allocations;
- to identify site-specific requirements in relation to the provision of Flood Risk Assessments;
- to identify site-specific measures required to reduce flood risk on sites;
- to inform the Development Control stage when planning applications are submitted to determine appropriate mitigation; and
- to meet the obligations set out in the National Planning Policy Framework and the associated Planning Practice Guidance.

2.0 Policy Framework

2.1 This chapter provides a summary of the key planning and flood risk legislation and policy documents that have been used to inform the preparation of the adopted Minerals and Waste Local Plan (MWLP).

European Floods Directive and Flood Risk Regulations 2009

2.2 The European Floods Directive (2007/60/EC) came into force on 26 November 2007. This Directive required Member States to carry out a Preliminary Flood Risk Assessment by December 2011, which identified the river basins and associated coastal areas at risk of flooding. Following this, flood risk maps were to be drawn up by 2013 and flood risk management plans to be written by 2015, which focus on prevention, protection and preparedness. In order to ensure that this work is co-ordinated with flood risk management plans and river basin management plans, it should be carried out alongside the requirements of the Water Framework Directive.

2.3 The Flood Risk Regulations were enacted in December 2009 to implement the European Floods Directive. These Regulations require Cumbria County Council to prepare the following documents:

- A Preliminary Flood Risk Assessment Report
- Surface Water Management Plan (the necessity of this is determined by the Lead Local Flood Authority)

2.4 In June 2011, the county council produced a Preliminary Flood Risk Assessment (PFRA) that provides a high level overview of flood risk from local flood sources (including surface water, groundwater, ordinary watercourses and canals). The data was gathered from a variety of sources including: Cumbrian district authorities; Environment Agency; Cumbria Fire Services; Cumbria Highways; and United Utilities. The result of this study was that there are no 'Significant Flood Risk Areas' in Cumbria.

2.5 PFRAs are to be reviewed every six years and an Addendum to the 2011 PFRA was published in 2017. The 2011 PFRA can be found on the council's website (http://www.cumbria.gov.uk/planning-environment/flooding/sub.asp) and the 2017 Addendum on the gov.uk website (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/698399/PFRA_Cumbria_County_Council_2017.pdf)

2.6 Completion of the Cumbria lead local flood authority Surface Water Management Plan (SWMP) in 2013 added further detail to the outputs than were available for the PFRA in 2011. This information was used in flood risk assessment chapters of the Local Flood Risk Management Strategy (LFRMS) published in 2015. Frequent updates of flood mapping available from the Environment Agency have refined understanding of the flood risk in areas identified in the SWMP.

2.7 There was significant flooding in the Copeland, South Lakeland and Eden districts of Cumbria over the summer and autumn of 2012 and in December

2015 the county was devastated by flooding from 'Storm Desmond'. Over 6000 properties were flooded internally with extensive damage to transport and utility infrastructure. Although surface water and ordinary watercourses were notable contributors to the flooding, the dominant source was from Main Rivers.

2.8 The PFRA Addendum confirms there are no identified 'Significant Flood Areas'. Therefore the county council has no duty to develop Flood Hazard Maps, Flood Risk Maps or a Flood Risk Management Plan to comply with the Flood Risk Regulations 2009.

Pitt Review and Flood and Water Management Act 2010

2.9 Following the floods of summer 2007, Sir Michael Pitt was instructed to undertake a review, in order to determine what could be learnt from these events. As part of this review, a number of recommendations were made in order to improve the way similar future events could be managed if they occurred. The 92 recommendations addressed issues with: prediction; warning of flooding; prevention; emergency management; resilience; and recovery.

2.10 Paragraph 6.7 of the Pitt Review states that "upper tier and unitary authorities should be given the new co-ordinating responsibilities and hence become accountable for managing local flood risk". In order to develop this, and the recommendations, the Flood and Water Management Act came into force in April 2010.

2.11 One of the outcomes of the Flood and Water Management Act is that Cumbria County Council was designated as a Lead Local Flood Authority. This means that the county council has responsibility for managing floods from local sources (e.g. ordinary watercourses, surface water and groundwater) in its administrative area within Cumbria.

2.12 The key responsibilities of Cumbria County Council as a Lead Local Flood Authority are:

- To develop and maintain a Local Flood Risk Management Strategy for Cumbria. This must be done by working in partnership with local bodies and communities through public consultation and joint working. The county council's Local Flood Risk Management Strategy was published in 2015.
- To maintain a register of assets, which are structures or features that are considered to have a significant effect on flood risk in the area. To record and investigate significant floods in Cumbria and publish a report of any findings. To date, the County Council has published 83 detailed reports on flooding affecting whole communities. Another 588 flood incidents have been investigated and reports are being produced.
- To establish an approval body to assess and monitor the design, building and operation of Sustainable Drainage Systems (SuDS). The County Council became a Statutory Consultee on drainage matters for new 'major'development to Planning Authorities from April 2015.

- To work with stakeholders and organisations in emergency planning and recovery when a flood event occurs. The County Council is a member of the Cumbria Resilience Forum Flooding sub-Group.
- To deal with applications for the alteration, removal or replacement of structures or features from ordinary watercourses. Since this duty was enacted in April 2012, the County Council has provided over 1330 consents for this work.

2.13 Cumbria LLFA receives quarterly updates to flood risk mapping issued by the Environment Agency. Since 2013, this suite of maps provides the best information available for the assessment of surface water, Ordinary Watercourse and groundwater flooding. It quickly superseded much of the risk assessment available from the SWMP. It is recognised that a review of the Cumbria SWMP will be required to inform bespoke surface water flood risk assessment for Cumbria, including climate change, in the next major update of the LFRMS. A review of the Cumbria SWMP is planned by 2019. This will be a key resource for complete review of the LFRMS in 2021.

The National Flood and Coastal Erosion Risk Management Strategy for England

2.14 This national strategy was written by the Environment Agency and was published in May 2011. Whilst the majority of the strategy focusses on the role of bodies such as the Environment Agency, Lead Local Flood Authorities and Internal Drainage Boards, there is reference made to the links between preparing Local Plans with reducing flood risk.

2.15 The key message is that the use of land should be effectively managed to avoid increasing flood risk and worsening coastal erosion. This should be done by ensuring that new developments take flood and coastal erosion into account and are safe from, do not increase and, where possible, reduce risk over their lifetime. Local planning authorities should work with Lead Local Flood Authorities and the Environment Agencies in the production of Local Plans in order to achieve this. SuDS should be used in all new developments and, where appropriate, re-developments. The design and layouts of such developments should be done in such a way that reduces the risk to life and damages from flooding and coastal erosion. The use of Strategic Flood Risk Assessments in plan preparation will assist the work of Lead Local Flood Authorities.

Water Framework Directive and Water Environment Regulations

2.16 In October 2000, the Water Framework Directive (2000/60/EC) came into force to commit all European Union Members to improving the quality of all water bodies by 2015. Each country is required to: protect and improve the ecological conditions of water bodies; promote the use of water as a natural resource; conserve habitats and species that depend directly on water; mitigate the effects of floods and droughts; seek to reduce pollutants to water bodies and groundwater; and aim to achieve at least ‘good’ status for all water bodies by 2015 (or if this is not possible, by 2021 or 2027).

2.17 The Directive was transposed into UK legislation through The Water Environment (Water Framework Directive) (England and Wales) Regulations 2003. The delivery of this has been tasked to the Environment Agency in England and the Scottish Environment Protection Agency in Scotland. Both of these organisations are producing river basin management plans to aid this delivery. These management plans seek to identify issues facing the water environment in the river basins and identifies actions to address them. The management plans will be updated every six years. Cumbria is covered by three different management plans:

- North West River Basin Management Plan (Environment Agency);
- Northumbria River Basin Management Plan (Environment Agency); and
- Solway Tweed River Basin Management Plan (Scottish Environment Protection Agency).

2.18 All Local Plan documents should seek to continue to protect and enhance all river basins. Local planning authorities should work with the Environment Agency to ensure that the Local Plan effectively takes into account the objectives of these management plans through the adoption of appropriate policies. This could include reducing the physical impacts of development on water bodies and promote the use of SuDS in proposed developments.

National Planning Policy Framework and Planning Practice Guidance

2.19 There are 12 core planning principles identified in the NPPF; two of these make reference to flood risk. One of the core planning principles is to "support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change", whilst another core planning principle is to recognise "that some open land can perform many functions (e.g. flood risk mitigation)".

2.20 Section 10 of the NPPF provides a focus on meeting the challenge of climate change, flooding and coastal change. Within this, it provides guidance on what local planning authorities should do in order to address these challenges. With regard to flood risk, local planning authorities are required to adopt proactive strategies that take flood risk fully into account, and they should also take into account the long term effects of flood risk. Such planning policies and strategies should be developed to manage flood risk from all sources, and local planning authorities should work with the relevant flood risk management bodies (e.g. Environment Agency, Lead Local Flood Authority, etc.) in their preparation.

2.21 When allocating land for development, local planning authorities should always seek to avoid placing inappropriate development in areas at high risk of flooding. This should be done by applying the Sequential Test and, where necessary, the Exception Test. Local planning authorities should also seek to safeguard land that is currently required, or will be required in the future, for flood management purposes. Where possible, all new development should be encouraged to reduce the causes and impacts of flooding.

2.22 The Planning Practice Guidance (PPG) was introduced in March 2014 to provide technical support to the NPPF. Together, these documents set out the Government's national planning policies and guidance for development.

2.23 PPG chapter 7 covers flood risk and coastal change. This is a broad area including: the definition of flood risk and flood risk zones; detailing the Sequential Test and Exception Test processes; how flood risk should be addressed in planning applications; the involvement of the Lead Local Flood Authority; how the causes and impacts of flooding could be reduced; how flood risk should be considered in the preparation of Neighbourhood Plans; and considerations that must be given to proposed development in Coastal Change Management Areas.

2.24 Chapter 7 also provides guidance that is more relevant to the process of preparing the Cumbria Minerals and Waste Local Plan.

- Section 2 identifies how flood risk should be taken into account when a Local Plan is prepared. All local planning authorities should prepare Local Plan policies whilst giving regard to SFRAs. Minerals and Waste authorities should give particular attention to sand and gravel workings as they are often located in functional floodplains. When creating policies, local planning authorities should seek to identify any potential benefits associated with the restoration and afteruse of minerals and waste sites in reducing flood risk. (Ref.ID:7-008-20140306)
- Section 3 provides guidance on what local planning authorities should do in preparing an SFRA. This includes liaison with the Environment Agency and Lead Local Flood Authority, and identification of areas at risk of surface water flooding and the functional floodplain. (Ref.ID:7-011-20140306)
- Sections 6 and 8 refer to the use of Sequential and Exception Tests in preparing Local Plan documents. The Sequential Test should be used to ensure that land allocated for development is in the lowest flood risk areas. (Ref.ID: 7-019-20140306). The Exception Test is to be used where land is allocated for essential development in areas of higher flood risk. In order for these allocations to be acceptable, two conditions must be met; the wider sustainability benefits to the community must outweigh the flood risk and it must be proven that the development will be safe for its lifetime without increasing flood risk elsewhere and, where possible, reduce flood risk overall. (Ref.ID:7-028-20140306).

2.25 In March 2018 government consulted on a new draft NPPF (and updated planning practice guidance) which proposes a number of changes that are likely to come into force later this year. Chapter 14 deals with climate change, flooding and coastal change. Relevant to flood risk management are clarification that plans should have regard to the cumulative impacts of flood risk, rather than just to or from individual development sites (para.155); clarify policy on the exception test that may need to be applied when considering development in locations at risk of flooding (para.158 -162); adding a new paragraph to incorporate the Written Ministerial Statement of 18 December 2014 on sustainable drainage systems (SuDS) in major developments (para.163).

Localism Act

2.26 The Localism Act was enacted in November 2011 and sets out a series of measures that seek to achieve a shift in power away from Central Government to local authorities and communities. One of the requirements of the Localism Act is for local planning authorities to undertake a Duty to Co-operate with other local authorities and key stakeholders on a range of issues – including flooding. This means that in the preparation of a Local Plan, officers should engage with bodies in order to effectively plan for and deal with cross-boundary issues. During preparation of the adopted CMWLP the council did meet with officers from the Environment Agency to discuss the issues and proposed wording of Policies DC19 Flood Risk and DC20 Water Environment.

Adopted Cumbria Minerals and Waste Local Plan (CMWLP)

2.27 In September 2017 the council adopted its CMWLP. The adopted plan comprises three main sections – Part 1 Strategic Policies; Part 2 Development Control Policies; Part 3 Site Allocations Policies – plus the Policies Map.

2.28 Policy DC19 (Flood Risk) requires all proposed minerals and waste management developments to be located, wherever possible, in areas with the lowest probability of flooding (Flood Zone 1). The need for a site-specific FRA is identified and the policy states that considerations will include the hierarchy of drainage options, reduction and/or attenuation of surface water run-off and the minimising of discharge to public sewers. The requirement to meet the Exception Test is also specified. Proposals are to incorporate sustainable drainage systems unless they can be demonstrated to be inappropriate.

2.29 Policy DC20 (Water Environment) states that proposals should demonstrate they would have no unacceptable adverse effects on the water environment, both within the application site and its surroundings. Proposals that minimise water use and include sustainable water management will be favoured.

2.30 Policy DC10 (Criteria for landfill and landraise) refers to the need for applicants to demonstrate that proposals for new or extended inert waste landfill do not conflict with the county council's culverting policy as the Lead Local Flood Authority.

2.31 Policy SP17 (Section 106 planning obligations) states that the county council will seek S106 agreements to provide necessary infrastructure, including flood and surface water management schemes.

2.32 All the Site Allocations in the adopted CMWLP have been assessed for flood risk during preparation of the plan, having regard to the SFRA published in February 2015 and the Addendum published in 2016.

3.0 Sustainable Management of Flood Risk

Overview

3.1 National guidance and legislation seeks to ensure that development is sustainable and minimises the impact it has on the environment. One aspect of this is to ensure that proposed development does not exacerbate flood risk in an area and, if possible, it should seek to reduce localised flood risk. Such prevention and enhancement should be designed to last for at least the lifetime of the proposed development.

3.2 When developments are proposed, applicants should seek to embed SuDS in the design, in order to reduce the potential impact of the development on surface water discharges. A Flood Risk Assessment will need to accompany the planning application where its size/use/location meets the requirements set out below. Applicants are encouraged to contact Cumbria County Council for pre-application advice on this matter.

Sustainable Drainage Systems (SuDS)

3.3 SuDS are used on development sites to manage rainfall on hard surfaces. A Sustainable Drainage System is an alternative to traditional underground, piped systems and it replicates the natural drainage of the site before the development occurred. This typically soft engineering approach, can be used on any development site to: reduce flood risk (to the site and neighbouring areas); reduce pollution; and provide landscape and wildlife benefits.

3.4 Any SuDS design should capture rainfall and allow as much as possible to evaporate or soak into the ground close to where it falls. Where this is not possible, the rest of the rainfall should be directed to the nearest watercourse to be released at the same rate and volume as before the erection of the development.

3.5 SuDS may improve the sustainable management of water for a site by:

- reducing peak flows to watercourses or sewers and potentially reducing the risk of flooding downstream;
- reducing volumes and the frequency of water flowing directly to watercourses or sewers from developed sites;
- improving water quality over conventional surface water sewers by removing pollutants from diffuse pollutant sources;
- reducing potable water demand through rainwater harvesting;
- improving amenity through the provision of public open space and wildlife habitat;
- replicating natural drainage patterns, including the recharge of groundwater so that base flows are maintained.

3.6 The appropriate application of a SuDS scheme to a specific development is heavily dependent upon the topography and geology of the site (and its surrounds). Careful consideration of the site characteristics must be undertaken to ensure the future sustainability of the adopted drainage system.

3.7 There are many different ways that SuDS can be incorporated into a development and the most commonly found components of a SuDS system are described below:

- Pervious surfaces – surfaces that allow inflow of rainwater into the underlying construction or soil
- Green roofs – vegetated roofs that reduce the volume and rate of runoff and remove pollution
- Filter drain – linear drains consisting of trenches filled with a permeable material, often with a perforated pipe in the base of the trench to assist drainage, to store and conduct water; they may also permit infiltration
- Filter strips – vegetated areas of gently sloping ground designed to drain water evenly off impermeable areas and to filter out silt and other particulates
- Swales – shallow vegetated channels that conduct and retain water, and may also permit infiltration; the vegetation filters particulate matter
- Basins, ponds and wetlands – areas that may be utilised for surface runoff storage
- Infiltration devices – sub-surface structures to promote the infiltration of surface water to ground; they can be trenches, basins or soakaways
- Bio-retention areas – vegetated areas designed to collect and treat water before discharge via a piped system or infiltration to the ground
- Pipes and accessories – a series of conduits and their accessories normally laid underground that convey surface water to a suitable location for treatment and/or disposal (these techniques should only be considered where other SuDS techniques are not practicable).

Flood Risk Assessments

3.8 A Flood Risk Assessment (FRA) helps to ensure that any proposed development is sustainable and includes all the mitigation measures necessary to contribute to the safety of the scheme. It will need to be submitted with a planning application when a proposed development meets one of the following criteria (as set out in the footnotes to Section 10 of the NPPF):

- Proposals of 1ha or greater in Flood Zone1
- All proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency)
- Where proposed development or change of use to a more vulnerable class may be subject to other sources of flooding

3.9 If a planning application for a proposed development needs to be accompanied by a FRA the developer should be aware that the objectives of a FRA are to:

- identify whether a proposed development is likely to be affected by current or future flooding from any source;
- identify whether or not a proposed development will increase flood risk elsewhere;
- identify whether the measures proposed to deal with predicted flood risk effects are appropriate;
- allow the Local Planning Authority to identify if the application of the Sequential Test is necessary; and
- whether the proposed development will be safe.

3.10 The FRA is required to contain certain details and address a number of issues, including:

- a description of the proposed development and details about the proposed location;
- details about the potential flood hazards on the proposed development site;
- the probability of a flood event occurring on the proposed development site;
- the potential effects of climate change on the proposed development site;
- a detailed description of the development proposals, including an explanation of how the proposed site layout takes the flood risk into account; and
- the identification of any potential off site impacts and proposed mitigation measures.

3.11 For minerals and waste schemes in particular, FRAs should also meet the following requirements:

- for minerals sites only, establish baseline hydrogeological conditions within and surrounding a site;
- identify the potential impacts that the proposed development may have upon groundwater and surface water processes (and conditions) within and surrounding the site, throughout the anticipated lifetime of the operation;
- identify the likely impact that these potential changes to existing flow regimes may have on water resources, sensitive environments and existing or planned development within adjoining areas;
- minimise the potential impact upon the environment and adjoining areas through the use of appropriate mitigation techniques, including (for example) the application of SuDS;
- monitor groundwater and surface water conditions (i.e. water levels and water quality) throughout the lifetime of the operation;
- maximise the potential benefits to be gained post cessation from mineral extraction, for example the creation of parks, nature reserves or voids for landfill; and

- the operator should ensure that there is a dedicated emergency response plan in place during times of flood to ensure that public (worker) safety is not compromised.

3.12 Further information and up-to-date guidance on the preparation and contents of a Flood Risk Assessment can be found in Chapter 7 of the Planning Practice Guidance, including a Site-specific FRA checklist (ID ref: 7-068-20140306).

Sequential Test and Exception Test

3.13 Where the site location of a proposed development has not been assessed through a development plan, is a departure from the development plan or where the site is located in Flood Zones 2 or 3, the planning officer will carry out a Sequential Test on the planning application. In certain circumstances, it will also be carried out when the proposed site location is located in Flood Zone 1.

3.14 The purpose of a Sequential Test is to locate development in areas of lower flood risk. The planning officer will assess if there are more suitable and practical locations for the proposed development. The Sequential Test will look at the likelihood of flooding from all sources on the proposed location site and the effect of potentially increasing flood risk elsewhere.

3.15 If the development cannot be accommodated in an area of lower flood risk, the planning officer will carry out an Exception Test to allow the officer to determine if the development can be permitted. There are two criteria set out in the NPPF that the development must meet before permission could be granted. These criteria are:

- the applicant must demonstrate that their development provides wider sustainability benefits to the community that outweigh flood risk, informed by a Strategic Flood Risk Assessment; and
- a site-specific FRA 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, reduce flood risk overall.

Flood Risk vulnerability and flood zone compatibility

3.16 The Planning Practice Guidance sets out the flood risk vulnerability classification, identifying what type of development is acceptable in each flood zone (see Table 1).

Flood Zone	**Flood Risk Vulnerability Classification**				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a	Exception Test required	✗	Exception Test required	✓	✓
Zone 3b	Exception Test required	✗	✗	✗	✓

Table 1: Flood Risk Vulnerability Classification

3.17 PPG also provides definitions of the vulnerability classifications. The definitions are extensive, so for the purpose of this document, the summary below only includes references to development that could be affected by the Cumbria Minerals and Waste Local Plan.

- Essential infrastructure
  - essential transport infrastructure
  - essential utility infrastructure
  - wind turbines
- Highly vulnerable
  - installations requiring hazardous substances consent
- More vulnerable
  - landfill
  - sites used for waste management facilities for hazardous waste
- Less vulnerable
  - waste treatment facilities (except for those classified as 'more vulnerable')
  - minerals working and processing (except sand and gravel workings)
  - water treatment works that do not need to remain operational during times of flood
  - sewage treatment works (if adequate measures to control pollution and manage sewage during flooding events are in place)
- Water compatible
  - water transmission infrastructure and pumping stations
  - sand and gravel working
  - amenity open space, nature conservation and biodiversity

4.0 Assessment

Overview

4.1 A considerable amount of knowledge exists with respect to flood risk within Cumbria, including:

- Historical river flooding information;
- Information relating to localised flooding issues (surface water, groundwater and/or sewer related), collated in consultation with the Council and the Environment Agency;
- Detailed flood risk mapping;
- Environment Agency Flood Zone Maps;
- Topography (LiDAR).

4.2 All of this data has been sourced from the relevant team within the county council and also from the Environment Agency, forming the core dataset that has informed the SFRA process.

4.3 All the Site Allocations in the adopted CMWLP have been considered by the Environment Agency, United Utilities and the Lead Local Flood Authority. Comments are included in Table 2.

Table 2: Assessment of Sites

Site ref	Site name	Flood Zone	Proposed site use	Relevant comment from spring 2013 consultation	Lead Local Flood Authority Response	EA FRCM Response
AL3	Oldside, Workington	1	Waste treatment and management facility	Little or no flood risk	1% probability of marine flooding alongside coast and dock areas	Site is located in Flood Zone 1
AL8	Lillyhall Waste Treatment Centre	1	Waste treatment and management facility	Little or no flood risk	Minimal surface water flood risk	No additional comment
AL18	Port of Workington	1/3	Waste treatment and management facility; and Safeguard existing port and rail infrastructure		1% probability of marine flooding alongside coast and dock areas	Site is partly in Tidal Flood Zone 3. Tidal events in December 2013 and January 2014 were observed but there are no records of any significant flooding, The River Derwent and Soapery Beck, designated Main Rivers, flow through the site.
AL32	Siddick Potential Rail Sidings	3	Safeguarding area for a potential railhead		Some areas of the site at risk of surface water flooding (1% probability)	Site is located in Tidal Flood Zone 3. Tidal events in December 2013 and January 2014 were observed and there was some erosion close to the railway embankment.
AL37	Lillyhall HWRC	1	Household Waste Recycling Centre	Little or no flood risk	Very small area of surface water flood risk (1%) on northern fringe of site	No additional comment
AL38	Innovia Rail Sidings, Wigton	1	Safeguarding of existing rail sidings		Minimal surface water flood risk	Wiza Beck, Main River flows through the site
AL39	Silloth Port	1/3a	Safeguarding of existing wharves		Minimal risk from surface water flooding but the western side of the site is at risk (1%) from coastal flooding - Zone 3.	Site is partially located in Tidal Flood Zone 3

BA26	Barrow Port and Rail Sidings, Barrow	3a	Safeguarding of existing railheads and wharves		Isolated small areas of surface water flood risk (1%) away from dock areas. Potential for marine flooding (1% Zone 3) on southern and western fringes of site alongside Walney Channel.	Site in Flood Zone 3 tidal
CA11	Willowholme Industrial Estate, Carlisle	3	Waste treatment and management facility		Minimal risk from surface water flooding, but his site is wholly within Flood Zone 3 (fluvial flooding)	Site is wholly in Flood Zone 3, but is located in area benefitting from defences as part of Caldew and City Centre Flood Alleviation Scheme. Site has confluence of Main Rivers - Caldew and Eden - to north, River Eden to the west and Parham Beck to south. Refer to Carlisle City Council level 2 SFRA final report for breach/ overtopping analysis.
CA30	Kingmoor Road Recycling Centre, Carlisle	1	Waste treatment and management facilities		Small areas of surface water flood risk (1%) in northern part of site	Sluggish drainage around site. Ponding water.
CA31	Kingmoor Park East, Carlisle	1	Waste treatment and management facility	Zone 1 little or no flood risk	Minimal risk of surface water flooding in railway sidings area. Small area in the centre of site to the south of Kingmoor Park Road with risk of surface water flooding (1%)	There are 3 designated main rivers in this site area. Cargo Beck Tributary North, Cargo Beck Tributary south and Cargo Beck. Surface water from Cargo Beck and tributary south passes through Kingmoor Park northern and southern flood storage ponds respectively. The WCML culvert restricts flows to 3 cumecs. Surface water from Kingmoor Park east of the WCML must be managed upstream of this restriction otherwise flooding will occur. Flood Map shows the natural

						flooding that would occur and only where there is a minimum of 3km^2 catchment upstream. Hence for this site there may be known flood problems that are not reflected by Flood Zones. Rockcliffe Beck is over 3km^2 and an indicative flood constraint is reflected. Flood is known to occur within Kingmoor Park Sidings Nature reserve as a result of undersized culvert and debris build up on upstream side of redundant on railway branch line.
CO11	Bridge End Industrial Estate, Egremont	1	Waste treatment and management facility	Zone 1 little or no flood risk. United Utilities have an easement in place, which allows for a water main to cross the site	Minimal risk of surface water flooding	No additional comment
CO32	Land adjacent to Sellafield	1	Treatment, management, storage and/or disposal of Low Level Waste	Zone 1 little or no flood risk. Solid radioactive waste disposal must be in line with Environment Agency guidance published in Feb 2009. The site is on a major aquifer and an Outer Groundwater Source Protection Zone, where a risk assessment would be needed, and the Agency would normally object if this shows that active long term site management is essential to prevent long term groundwater pollution. The Agency would take account of the long term plans for Sellafield site. United Utilities has a service reservoir installation within the site and there is a public right of way that is used to service the apparatus.	Minimal risk of surface water flooding	No additional comment

CO35	Low Level Waste Repository, near Drigg	1 (and 2/3)	Treatment, management, storage and/or disposal of Low Level Waste	A very small section of land at the southern boundary of the site is affected by Zone 2 and 3 flooding – this will not impact on operations at the site	Minimal risk of surface water flooding. Southern tip of site has 1% risk of flooding from River Irt	Small section of site within Flood Zone 3
CO36	Sellafield site	3a	Treatment, management, storage and/or disposal of Low Level Waste	The River Calder flows through the site and its flood risk is satisfactorily managed	Minimal risk of coastal flooding. Some risk of localised flooding (probability 1%) alongside watercourses within and adjacent to site	No additional comment
SL1B	Kendal Fell Quarry, Kendal	1	Household Waste Recycling Centre	Zone 1 little or no flood risk It is important to establish the relationship with the water table and active or passive dewatering	Small area of surface water flood risk (1%) in northern tip of site	No additional comment
M5	High Greenscoe Quarry	1	Area of search (mudstone)	Zone 1 little or no flood risk.	Minimal risk of surface water flooding	No additional comment
M6	Land between Overby & High House Quarries	1	Area of Search (sand and gravel)	Little or no flood risk		No additional comment
M8	Cardewmires Quarry, near Dalston	2/3a	Area of Search (sand and gravel)	Although the quarry lies in flood zones 2 and 3a, the extraction of sand is water compatible	Most of this site lies within fluvial flood Zone 3 and has a surface water flood risk of 1% probability over a small area in the southern half of the site	The Wampool River is a designated main river which passes through site. Currently the river is diverted to the south and southwest of the western lagoon as deposits are mined out elsewhere. Stability of the lagoon side has been flagged up as a possible flood risk concern. The site is mainly within Flood Zone 3 (fluvial flooding) from Wampool River
M10	Silvertop Quarry, Brampton	1	Area of Search (limestone)	Zone 1 little or no flood risk	Minimal risk of surface water flooding	Minor surface water issues

M11	Kirkhouse sand and gravel quarry, Brampton	1, 2 and 3	Area of Search for sand and gravel extraction. Inert landfill within existing quarry. Secondary aggregates production in existing quarry.	No comment	The majority of the site is located within Flood Zone 1. However, Milton Beck flows through the north of the site, which is located within Flood Zones 2 and 3. No objection in principle to the allocation. However, any proposals coming forward will need to be supported by an adequate level of assessment at the planning application stage.	Nearest sewer approximately 500m away.
M12	Roosecote Quarry, Barrow	1	Preferred Area (sand and gravel)	Zone 1 little or no flood risk	Minimal risk of surface water flooding	No additional comment
M15	Peel Place Quarry, Holmrook	1	Area of Search (sand and gravel)	Zone 1 little or no flood risk	Minimal risk of surface water flooding	No additional comment
M16	Land adjacent to Holmescales Quarry, near Kendal	1	Area of Search (high specification roadstone)	Small areas of surface water flood risk (1%) within site		No additional comment
M18	Stamphill, Long Marton, Appleby	1 (and 2/3)	Preferred Area (gypsum)	Small finger of zone 2/3 cuts into north part of site, but this does not form part of extraction area and could be avoided	Minimal risk of surface water flooding	Small section of site within Flood Zone 3
M24	Derwent Howe Slag Bank, Workington	1 (and 3)	Mineral Safeguarding Area for its resource of secondary aggregate	Great majority of site lies within Zone 1, little or no flood risk. Part of site important for protection against coastal flooding	Minimal risk from surface water flooding but risk of coastal flooding (1% probability) on shoreline	Small section of site within Flood Zone 3
M27	Roosecote Quarry, Barrow in Furness	1	Preferred Area for sand and gravel extraction.	Minimal risk of Surface Water flooding.	The site is located in Flood Zone 1. No objection in principle to the allocation. However, any proposals	There is a rising main from Rampside skirting the terminal, which must be taken into account. We believe that this site may be a SSSI site, but not

					coming forward will need to be supported by an adequate level of assessment at the planning application stage.	confirmed. There is also a private Pumping Station from the gas terminal on the outside of the perimeter of the site.
M30	Roan Edge Quarry, New Hutton	1	Area of Search (high specification roadstone)	Zone 1 little or no flood risk	Minimal risk of surface water flooding	No additional comment
M34	Kingmoor rail sidings, Carlisle	1 (and 2/3)	Safeguarding of existing rail sidings		Sparse areas at risk of surface water flooding (1%) but northern tip of this site is within flood Zone 3 of Rockcliffe Beck (1% probability of fluvial flooding)	From north to south a number of designated main rivers pass under the West Coast Main Line and the sidings via a series of culverts that restrict the flow through. Flood Map shows the natural flooding that would occur and only where there is a minimum of 3km^2 catchment upstream. Hence for this site there may be known flood problems that are not reflected by Flood Zones. Rockcliffe Beck is over 3km^2 and an indicative flood constraint is reflected.
M35	Shap Beck Quarry rail sidings, Shap	1 (and 2/3)	Safeguarding of existing rail sidings		Potential (1% probability) for small areas of surface water flooding throughout site, particularly alongside Shap Beck	Small section of site within Flood Zone 3
M36	Shapfell Quarry rail sidings, Shap	1 (and 2/3)	Safeguarding of existing rail sidings		Small areas of surface water flood risk (1%). Northern tip lies within Flood Zone 3 of Force Beck	Extreme northwest tip lies within Flood Zone 3 of Force Beck
M37	Shap Blue Quarry rail sidings, Shap	1	Safeguarding of existing rail sidings		Minimal surface water flood risk	No additional comment
M38	Kirkby Thore gypsum , rail sidings	1	Safeguarding of existing rail sidings		Minimal surface water flood risk	Minor surface water issues

5.0 Conclusions and Recommendations

5.1 There is a clear requirement for Cumbria County Council to allocate waste management facilities and mineral extraction sites for the sustainability and economic needs of the county.

5.2 A considerable proportion of Cumbria is at risk of flooding, including sites allocated in the Minerals and Waste Local Plan. The flood risk arises from a number of sources including river flooding, coastal flooding, localised surface water runoff, sewer and groundwater flooding.

5.3 A collation of potential sources of flood risk has been carried out in accordance with the NPPF, developed in close consultation with both the Lead Local Flood Authority and the Environment Agency. The county has been broken down into zones of 'high', 'medium' and 'low' probability of flooding in accordance with the NPPF, providing the basis for the application of the Sequential Test.

5.4 Of the 33 Site Allocations in the adopted CMWLP, nineteen are wholly within Flood Zone 1; nine are partially in FZ1 but include sections within FZ2 or FZ3; five are wholly in FZ2 or FZ3. The principle of the majority of these sites would therefore pass the Sequential Test in relation to fluvial flooding. However, in accordance with national guidance, there is a need to consider the susceptibility of sites to other sources of flood risk; for example, a site which is entirely located within Flood Zone 1 may be prone to surface water flooding.

5.5 The majority of the sites will in any case have some susceptibility to surface water flooding. It is expected that any applicant would need to provide details of the use of sustainable drainage systems (SuDS) and be aware of this vulnerability on site. However, this is something that would be taken into account in more detail through the planning application process, where the Lead Local Flood Authority and the Environment Agency would be consulted to outline site specific issues and resolutions.

5.6 The Site Allocations included in the adopted CMWLP have been assessed in accordance with the requirements of the NPPF and PPG and are deemed appropriate for the development proposed. Policy DC19 of the adopted CMWLP re-iterates the requirements of the NPPF and PPG to ensure that all development proposals, whether on Site Allocations or non-allocated sites, are accompanied by site-specific FRA appropriate to the scale, nature and location of the development.

5.7 A planning solution to flood risk management should be sought wherever possible, steering vulnerable development away from areas affected by flooding, in accordance with the Sequential Test. Where other planning considerations must guide the location of development and the Sequential

Test cannot be satisfied, the developer must demonstrate within their submitted FRA that the Exceptions Test can be met.

5.8 The policies in the adopted CMWLP aim to reduce the potentially adverse impacts mineral extraction and waste management activities can have on groundwater, surface water, river and coastal conditions, and to ensure that appropriate mitigation measures are secured when required.

5.9 This SFRA has been produced based on current understanding of flood risk and existing available flood risk information. It will form part of the Evidence Base used to guide the ongoing monitoring and review of the adopted CMWLP. It is therefore important that the SFRA is reviewed and updated at regular intervals in light of any changes in flood risk information and emerging national policy guidance.