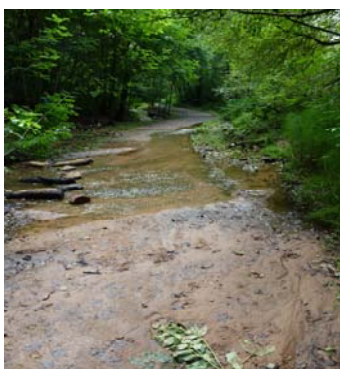
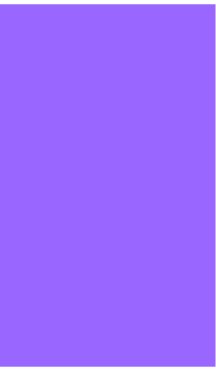


Local Flood Risk Management Strategy

Strategic Environmental Assessment Scoping Report – Environmental Baseline Report



Local Flood Risk Management Strategy SEA Environmental Baseline

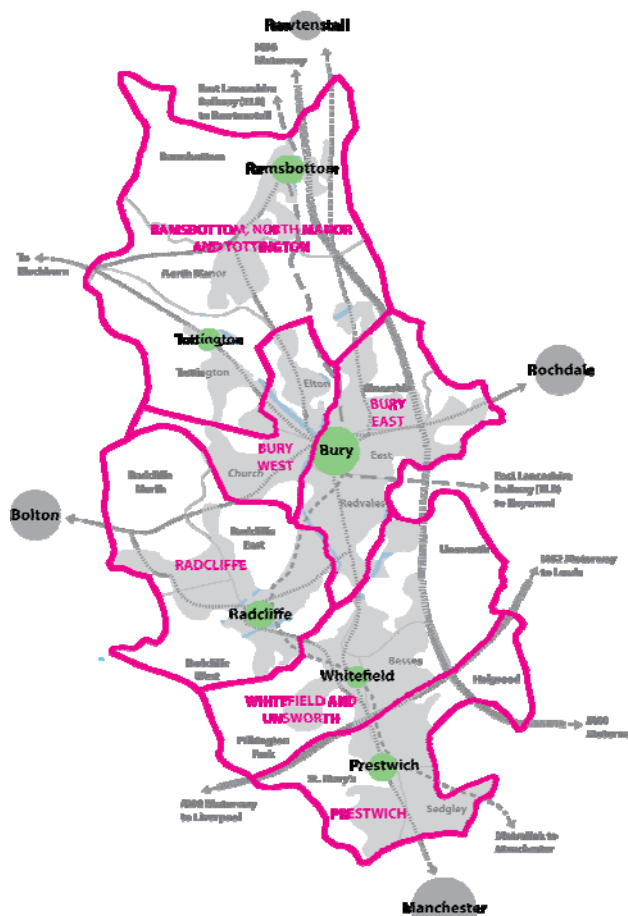
The collection and review of baseline information is a crucial part of the SEA process. It is essential to gather sufficient baseline information on the current and likely future state of the environment in order to be able to adequately predict and assess the significant effects of a plan.

The data collected to characterise the evidence base for the SEA of the strategy has been derived from numerous secondary sources and no new investigations or surveys have been undertaken as part of the scoping process.

The information presented in this Scoping Report represents an outline of the evidence base by environmental topics. It may be necessary to collect further data against which to assess the potential environmental effects of the LFRMS with regard to monitoring requirements.

1 Introduction

1.1 The Borough of Bury is located in the North West of England, situated within the Greater Manchester metropolitan area. As an integral part of Greater Manchester, Bury has an important role to play in accommodating the spatial priorities for the North West region. Bury also has strong links with parts of Lancashire located, towards the north, via the M66 corridor and Irwell Valley. Bury is bounded to the south by the authorities of Manchester and Salford, to the east by Rochdale, to the west by Bolton and to the north by Rossendale and Blackburn and Darwen.



1.2 Bury benefits from good transport links with the rest of Greater Manchester and beyond, which has led to the Borough's attractiveness as a commuter area. The M60, M62 and M66 motorways run through the Borough, which provide access to the regional and national motorway network, along with easy access to Manchester Airport. The Borough also benefits from the Metrolink, which runs from Bury town centre, travelling through the south of the Borough to Manchester City Centre, Altrincham and Salford Quays.

1.3 The Borough lies broadly within the valley of the River Irwell to the north of Manchester City Centre. The landscape and urban character in the north of the Borough derives from the traditional industrial role of the area, with many stone built terraces and traditional industrial buildings surrounded by the upland areas of the West Pennine Moors. Towards the south of the Borough, the built environment epitomises nineteenth and early twentieth century suburban Manchester and contains gentler, lower lying countryside. Towards the middle of the Borough lies the two main towns of Bury and Radcliffe, which both have their origins in industries such as textiles, paper and engineering.

1.4 Within Bury, there are 50 Sites of Biological Importance (SBIs), of which five are designated as Local Nature Reserves. There is also one Site of Special Scientific Interest within the Borough at Ash Clough near Radcliffe. Furthermore, approximately 60% of the Borough is classed as open land and the majority of this has been designated as Green Belt since the 1980's. This

also includes areas of moorland fringe and a network of river valleys and corridors. The existing Green Infrastructure broadly encompasses:

- The Upper Irwell Valley;
- The Roch Valley;
- Irwell Bank (i.e. along the River Irwell between Bury and Radcliffe);
- The Lower Irwell Valley;
- Urban Fringe areas; and
- The urban area; where smaller scale assets such as areas of open space and trees etc. contribute towards the wider network.

2. Baseline Information

Population and Human Health

Population

- 2.1 One of the most significant risks of local flooding is that which it poses to the health and well being of local communities. The Borough has a population of 185,100¹. There was an overall population increase of 1.6% over the ten year period from mid 2000 to mid 2010 and the population is forecast to increase by a further 8.5% over the period mid-2010 to mid-2020, which equates to an additional 15,800 people².

Key Environmental Issues

- 2.2 The main areas of environmental concern for the Borough are the potential increased demand for water resources and pressure on the County's sewerage systems due to local population growth, an ageing population and increased single occupancy homes, particularly in smaller towns with less developed infrastructure. Another area of concern relates to development pressure linked to population growth, which may result in residential, business and community developments being built in areas at risk of flooding.

Life Expectancy

- 2.4 Average life expectancies within the Borough increased during the period 2008 -2010 and are above the regional average.
- 2.5 The Department of Health has a target of increasing the life expectancy at birth in England to 78.6 years for men and 82.5 years for women by 2010 (based on figures for 2009-2011).

Table 1 – Life Expectancy

	Male	Female
Bury	77.5	81.2
GM	76.4	80.8
NW	77.0	88.1
UK	78.5	82.5

Source: ONS Life Expectancy

Mortality Rates

- 2.6 Mortality rates in the Borough increased in 2008 – 2010 and remain above the national average.

Table 2 – Mortality Rates

	All persons	Male	Female
All cancers	104	108	101
All circulatory diseases	110	110	110
All causes	114	112	117

Source: Annual Monitoring Report, 20102

¹ Source: ONS 2011 Census

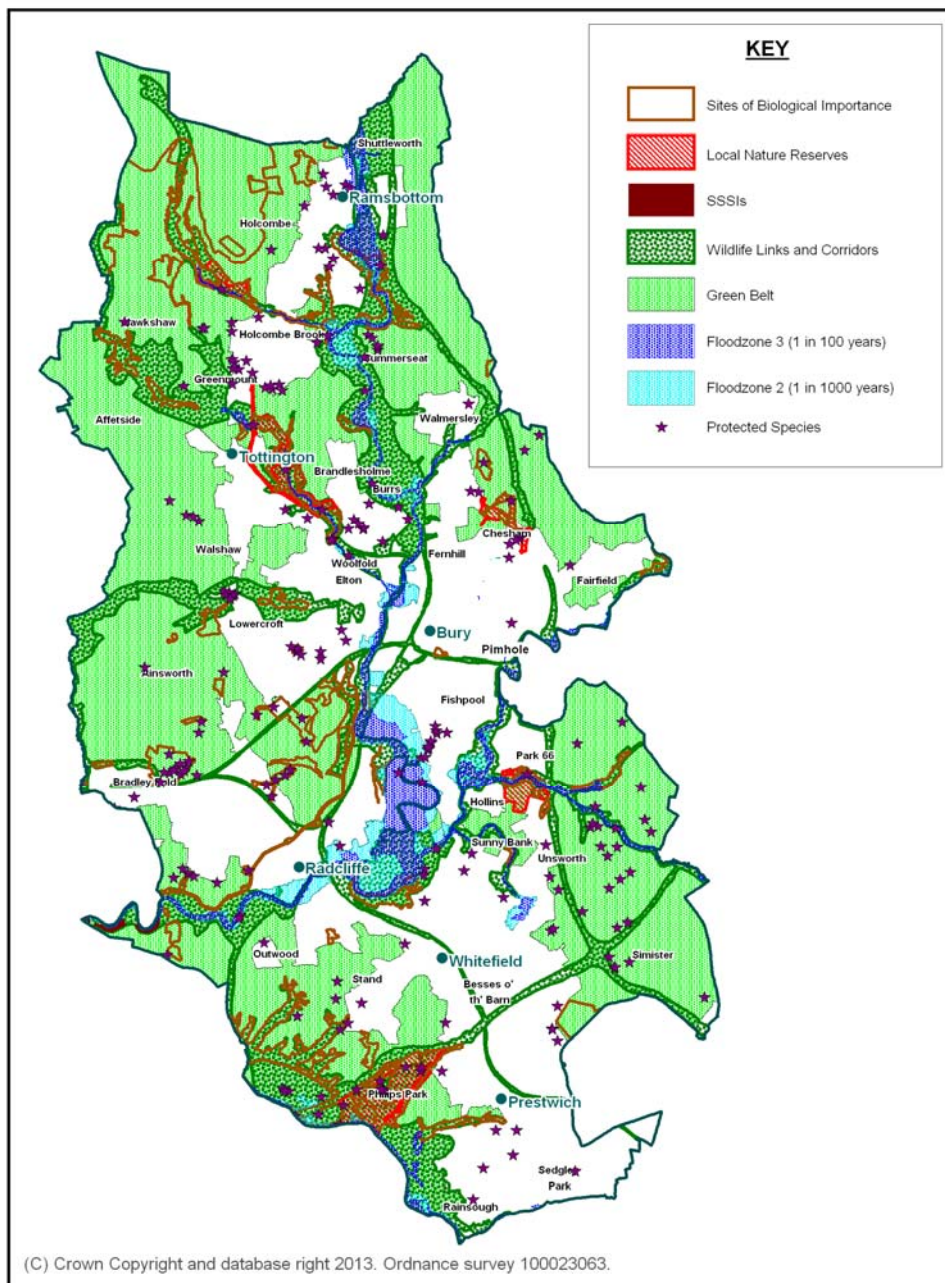
² Source: ONS 2010-based population projections. Population change is based on the indicative projected population for 2010 used in the 2010-based projections, rather than the mid-2010 population estimate.

Key Environmental Issues

- 2.7 A robust assessment of the risk associated with specific diseases is impractical for this level of plan making. However, the risk of disease arising as a result of flooding events would be unlikely to be significant.

Biodiversity, Flora and Fauna

- 2.8 There are many different types and scales of nature conservation designation in the Borough, including local and national designations.



- 2.9 The quality of the natural environment in the Borough provides the opportunity to enhance local quality of life.

- 2.10 About 12% of the Borough's land (1220 ha) is managed primarily for recreation, Many sites designated for their nature conservation or landscape and historical interest are also used for recreation. It is therefore necessary to

maintain public access to such sites in terms of quality of life and improving levels of physical activity, but the environmental pressures associated with this recreation must be avoided or minimised.

Table 3 – Designated Sites

Designated areas	Net change in area		Total	
	Ha.	% change	Ha.	Number of sites
Sites of Special Scientific Interest (SSSI)	No change	No change	6.0	1
Sites of Biological Importance Grade A	+ 0.6	+ <0.1%	750.6	18
Sites of Biological Importance Grade B	No change	0%	128.1	21
Sites of Biological Importance Grade C	No change	0%	44.3	11
Local nature reserves	+ 0	0%	163.4	5

Table 4 – Conservation Management

3 Total Sites	Sites where positive conservation management is being achieved	
	Number of sites	Percentage
50	8	16%

- 2.11 In addition to protecting wildlife sites in the Borough, the LFRMS has potential to improve biodiversity on the ground, either through creating new biodiversity areas or restoring existing ones, as well as linking up biodiversity sites as part of plans for improving green infrastructure.
- 2.12 Under the Conservation of Habitats and Species Regulations 2010 (the “Habitats Regulations”) (SI No. 2010/490) there is a legal requirement to assess whether there are any likely significant effects of plans and/or programmes on Natura 2000 (SACs and SPAs) and Ramsar Sites. This will be undertaken as part of the LFRMS HRA process.

Key Environmental Issues

Biodiversity in the Borough is increasingly under pressure. Changing agricultural, flood and river-management practices, urban expansion, road development, mineral extraction, pollution, water abstraction, impoundment and climate change have all had and/or are having an adverse effect on the biodiversity environment. There has been a steady decline in the areas that can be defined as semi-natural habitats of wildlife importance. Those areas that have survived are often small and have a fragmented distribution.

Soil, Geology and Geomorphology

Soil

- 2.13 The type of soil and underlying geology influence the likelihood of surface and groundwater flooding within an area. In addition, due to the difference in soil structures vulnerability to erosion varies.
- 2.14 Soil erosion is an increasing problem throughout the UK, for example through inappropriate land management or agricultural practices. Floodwater can also remove soil from areas, for example through surface water flash flooding. Detailed information on soil quality in Bury does not appear to be available, however the most productive agricultural land is located
- 2.15 The loss of good quality agricultural land, flooding and subsequent erosion is likely to give rise to pollution pathways from potential sources of pollution to other environmental receptors.

Geology and Geomorphology

- 2.16 The geology of the Borough has had a significant impact on its topography, soil structure and vegetation. Geological structure, catchment shape, valley topography, land use, soil and drift cover can all influence the rate and magnitude of groundwater response to flooding.
- 2.17 The main geology comprises Upper Carboniferous rocks (created 325 to 286 million years ago), which can be sub-divided into the Namurian (formally Millstone Grit) series and the Westphalian (formally coal measures) series. The Namurian rocks comprise coarse-grained buff coloured sandstone and gritstones and form the high ground in the north of the Borough. In the south of the Borough younger Westphalian series of shales, siltstones and sandstones, which are generally softer and have been eroded, overlie these Namurian rocks. In the extreme south of the Borough younger Permo-Triassic Red sandstones and Marls overlie the Westphalian and Namurian.
- 2.18 LFRMS measures could alter the extent or duration of flooding and therefore have implications for soil quality and geology. Impacts could then effect other environmental receptors that fall under other SEA topics such as biodiversity, water and human health.

Key Environmental Issues

Climate change is likely to exacerbate many of the pressures that soils already face, for example, hotter, drier conditions make soils more susceptible to wind erosion, coupled with intense rainfall incidents that can wash soil away. Diffuse pollution from agricultural and urban land is one of the key pressures affecting water quality, as contaminated eroded soils pose a risk to waterbodies in the Borough.

Water

Water Framework Directive

- 2.19 The LFRMS needs to ensure that, by improving drainage and reducing flood risk, the requirements of the WFD are considered at all stages in the Strategy, and that there are no adverse impacts on water quality or the hydrological

regime of aquatic habitats. It also needs to ensure that drinking water quality, groundwater and human health are protected.

- 2.20 One of the key objectives under the WFD, is the requirement to prevent deterioration in status and achieve at least Good Ecological Status in water bodies.
- 2.21 The quality status of water bodies in terms of the WFD, is dependant upon various underlying factors. Any activity which has the potential to impact on ecology will need consideration in terms of whether it could cause deterioration in the ecological or potential status of a water body.
- 2.22 With this in mind, an SEA objective has been developed that assesses whether the LFRMS is likely to have an impact on the chemical or ecological status or potential of water bodies.
- 2.23 To monitor this, an assessment of chemical status is required in water bodies where priority substances and other specific pollutants are known to be discharged in significant quantities. If a water body is labelled as 'does not require assessment' it is because these pollutants are not discharged into this water body in significant quantities.
- 2.24 For water bodies that have been designated as heavily modified or artificial they are classified according to their ecological potential rather than status, which considers whether actions to mitigate the impact of physical modification are in place to the extent that could reasonably expected. The results of the mitigation measures assessment are cross-checked with data from biological assessments.

Table 5 – Water Quality

Waterbody	Current Ecological Quality	Current Chemical Quality
River Irwell (Roch to Croal)	Moderate status	Does not require assessment
Whittle Brook	Good status	Does not require assessment
River Croal (including Bradshaw Brook)	Moderate potential	Does not require assessment
River Roch (Spodden to Irwell)	Moderate potential	Good
Kirklees Brook	Moderate potential	Does not require assessment
Irwell/Manchester Ship Canal (Kearsley to Irlam Locks)	Moderate potential	Fail
River Irwell (Rossendale STW to Radcliffe)	Moderate status	Good
Manchester, Bolton and Bury Canal	Moderate potential	Does not require assessment
Elton Feeder (Manchester, Bolton and Bury Canal)	Moderate potential	Does not require assessment

- 2.25 The LFRMS will need to consider whether any flood risk management measures will lead to adverse impacts on the water bodies within the Borough and

whether the LFRMS can contribute to delivering some of the mitigation measures set out within the river basin management plans. The environmental assessment will consider the possible changes to the water bodies within the Borough resulting from proposed management options.

Key Environmental Issues

- 2.26 Water resources within the Borough are likely to be under increasing pressure from a growing population and increased demand for waste water treatment and drinking water. In addition increased flood risk could affect water supply or treatment facilities, resulting in the loss of service or contamination of water supplies. Consequently, strategic flood risk management measures proposed by the LFRMS will need to consider these as the Strategy progresses.

The LFRMS needs to ensure that, by improving drainage and reducing flood risk in the Borough, there are no adverse impacts on the water environment. It must address issues that may impinge on water quality or the hydrological regime of aquatic habitats. It also needs to ensure that drinking water quality, groundwater and human health are protected. This will involve a coordinated partnership approach to flood and water management from all key partners and stakeholders and a commitment to the delivery of the LFRMS.

Air

- 2.27 Assessment of air quality in Bury has shown that the Council is unlikely to meet the national annual mean objective for nitrogen dioxide along the main roads and the motorways in the Borough. The main local source of this pollutant is road transport and the area of predicted exceedence has been declared an Air Quality Management Area (AQMA).
- 2.28 However, there is no potential for the LFRMS objectives and actions to influence issues that affect air quality e.g. emissions or generation of particulate matter.

Climatic Factors

- 2.29 The UK Climate Impacts Programme (UKCIP) has carried out modelling that shows detailed climate probability for each 25km² of land in the UK. The latest (UKCP09) projections confirm that the UK is likely to experience:
- Hotter drier summers;
 - Warmer/wetter winters
 - Sea level rises;
 - More weather extremes
- 2.30 Increased precipitation will increase the risk of surface water flooding, which may be exacerbated by blockages in culverts, gutters and drains (sometimes due to inadequate maintenance).
- 2.31 Expected changes in the climate may have major impacts on the built infrastructure, such as roads, sewers, railways and buildings, and could cause damage to trees, plants and crops. People's health could be affected by high temperatures, higher pollen levels and more or different pests.

- 2.32 In the longer term it is likely that there will also be changes to where and how people live and work, and changes to the way we care for the elderly and children.
- 2.33 The LFRMS should consider the implications of climate change with respect to its broad aim of helping local communities to become more resilient and adaptable these changes. This includes reducing the vulnerability to the impacts of climate change through:
- Providing wildlife corridors;
 - Ensuring that drainage systems can cope with changing rainfall patterns/intensity;
 - Taking a precautionary and risk-based approach to developing in the floodplain;
 - Ensuring adequate future water supply and demand management;
 - Designing buildings and urban areas to cope with new climate extremes; and
 - Increasing urban green space;
- 2.34 The LFRMS should assist the Borough in becoming better adapted to the impacts of climate change, particularly in relation to flood risk. However, there may also be opportunities through LFRMS measures, to improve the resilience of biodiversity to climate change, for example by creating or improving flood storage areas for wildlife potential.
- 2.35 Opportunities to link up green and blue infrastructure and improve its resilience to climate change impacts should also be explored in the LFRMS.

Key Environmental Issues

Climate change increases the risk of fluvial and pluvial flooding within the Borough, in terms of the magnitude, extent and duration of flood risk. Measures to adapt to the flood risk impact of climate change is likely to put pressure on other environmental features e.g. increased demand for flood defences and canalisation can impact adversely on important species and their habitat.

Material Assets

- 2.36 The term 'material assets' is not defined in the SEA Directive. For the purposes of this SEA the term is used in relation to buildings and infrastructure in the Borough that could potentially be affected by flooding. However the LFRMS should also consider whether any of its policy themes or other elements could potentially increase demand for mineral resources or lead to an increase in waste production, for example during scheme construction at a later date.
- 2.37 For the purposes of this SEA, material assets has been split into the categories of (a) critical infrastructure, (b) housing, (c) economy, (d) agriculture and landuse (e) mineral resources, (e) waste management and (f) transport infrastructure.

Critical Infrastructure

- 2.38 The UK Climate Change Risk Assessment shows that flooding as a result of climate change is likely to pose an increase threat to critical UK infrastructure. As a result, transport networks, water supplies and sewage treatment, energy supplies, hospital and schools will all face a higher risk.
- 2.39 The LFRMS will need to manage flood risk to critical infrastructure and material assets within the Borough. The implementation of LFRMS measures has the potential to disrupt critical transport infrastructure, utilities or access to community care facilities. The location of critical infrastructure may influence the range of available LFRMS management options and measures. The location of LFRMS related infrastructure, if any new build is required, will also need to consider access to and use of critical infrastructure.
- 2.40 Like many Boroughs, Bury has a considerable amount of infrastructure that is critical to the health, safety and accessibility of the population. Table 6 does not provide an exhaustive list of the Borough's critical infrastructure but is intended to provide an overview of infrastructure types.

Table 6 – Critical Infrastructure

<ul style="list-style-type: none"> • Fairfield Hospital • Ambulance Stations • Day Care Centres • Fire & Rescue Centres • Medical Centres • Mental Health Service • Police Stations • Schools • Waste Management Infrastructure • Electricity Pylons
--

Housing

- 2.41 There are currently 3235 properties located within the Environment Agency's flood zones.

Table 7 – Properties at Risk of Flooding

	No. of Properties
Flood Zone 2	1,870
Flood Zone 3a	1,365
Flood Zone 3b	0

Source: AMR 2012

Economy

- 2.42 The impact of the LFRMS on the Borough's economy will be assessed principally through an assessment of flood risk to critical infrastructure and places of work with large numbers of employees.

Agriculture and Land Use

- 2.43 The most common soil type found within the Borough is slowly permeable, seasonally wet, acid, loamy and clayey soils. Although other soil types are also present, such as:
- Very acid, loamy upland soils with a wet peaty surface (Holcombe Moor);
 - Freely draining very acid sandy and loamy soils (south eastern side of the Borough);
 - Naturally wet, very acid sandy and loamy soils (south Prestwich); and
 - Loamy and clayey floodplain soils with naturally high ground water (adjacent to the River Roch).
- 2.44 LFRMS measures may change the frequency and extent of flooding, leading to consequent changes in the suitability of land for certain uses, for example by affecting its versatility, productivity, soil quality and mineral resource. For instance, construction activities or increasing the seasonal period during which soil is waterlogged could lead to impacts such as these.

Minerals Resources

- 2.45 Much of the Borough is covered in drift deposits both glacial and more recent, apart from in the extreme northern upland margins of the Borough. The glacial deposits comprise mostly cohesive glacial drift although there are extensive glacial sand and gravel deposits in the Pilsworth, Whitefield and Prestwich areas. Recent river terrace and alluvial deposits occur along the courses of the Rivers Irwell and Roch.
- 2.46 The extraction of minerals for use in construction and manufacturing is important to the national economy. Whilst coal, building stone and brick clay have been extensively mined in Bury in living memory, at present only aggregates (crushed stone) and sand are quarried.
- 2.47 The GM Minerals Plan refers to the current mineral workings at Fletcher Bank Quarry (crushed rock) and Pilsworth South Quarry (sand). Areas of search are identified within Bury for sand, gravel and sandstone/gritstone (see GM Minerals Plan Section 5, Policy 2 and associated maps³). In addition, mineral safeguarding areas are identified within Bury for sandstone, sand and gravel and brick clay with shallow coal (see GM Minerals Plan Section 6, Policy 7 and associated maps).
- 2.48 At the end of their life, mineral sites can offer opportunities for restoration for the benefit of the environment, local communities or the economy. Quarries can present opportunities to act as agricultural reservoirs or flood water storage.
- 2.49 The LFRMS will need to look at whether the LFRMS measures could coordinate with restoration plans, nature conservation plans and green infrastructure provision. The LFRMS will also need to take account of flood risk to the Minerals Safeguarding Areas and the transport networks connected with them.

Waste Management

³ <http://www.gmineralsplan.co.uk/index.html>

2.50 Total waste arising in Bury comprise the following breakdown:

Table 8 – Waste Arisings – 2010/2011

Management type	Amount of waste collected by Bury Council (tonnes)	Percent
Land filled	48,332	65.8%
Recycled / composted	25,099	34.2%
Total waste arising	73,431	

2.51 Bury Council is a waste collection authority, and waste collected by Bury Council is dealt with by the Greater Manchester Waste Disposal Authority.

2.52 The LFRMS will need to consider flood risk to existing facilities, proposed changes to existing facilities and proposed new waste management facilities, including the sewerage network. Inundation of sites that contain contaminated land could potentially release and spread contaminants into the environment through floodwater.

Transport Infrastructure

2.53 The development of a well functioning, reliable transport network plays a crucial role in supporting wider economic prosperity and competitiveness, enabling healthy social interaction and reducing carbon emissions. Flooding of transport links can cause significant economic and social disruption as well as potential pollution to the natural environment, for example through highway runoff containing winter salt, fuel spillages, litter or other contaminants.

2.54 A number of key routes pass through the Borough including the M60, M62, M66, A56, A58 and the Metrolink. Access to and along these routes is critical for population health (access to hospitals) as well the economy.

Key Environmental Issues

There are several material assets and critical infrastructure (homes, businesses, roads, railway lines, and energy and water infrastructure) located within floodplains or at risk from surface water flooding.

The Historic Environment

2.55 The historic environment includes archaeological remains, historic structures like buildings and bridges, historic parks and gardens and the historic landscapes and townscapes all around, including hedgerows, boundaries, ditches and culverts.

2.56 Some of the heritage assets are protected by designation – Scheduled Ancient Monuments, Listed buildings and Conservation Areas. Some archaeological

remains and historic structures are directly linked to the issues of water management and flood control. For example mills, canals and navigations, bridges, fish ponds and pumping and sewage infrastructure from the 19th century.

2.57 The issues that arise that the LFRMS might need to address can be divided into four areas.

- *The impact of flooding on heritage assets.*
Flooding damage to structures, such as buildings, bridges, culverts, sluices to historic settlements, to archaeological sites and to palaeo-environmental survival.
- *The role of historic structures within water and flood management*
The degree to which flooding and its control might be impacted by the management of historic structures.
- *The impact of historic structures on water management*
The degree to which the historic environment might inform or constrain the options available, such as bridge maintenance or adaptation , conservation areas, and listed or scheduled structures astride steams.
- *Impact of flood prevention and mitigation on the historic environment.*
The physical impact of structures and construction on the heritage, buildings archaeological sites and palaeo-environmental remains. The impact of flood structures on the setting of buildings, towns and monuments.

Cultural Heritage Assets

2.58 Table 9 details the designated heritage features in Bury. All heritage assets, whether designated or not, will require attention when developing and implementing the LFRMS. The LFRMS should ensure that the most important heritage assets are protected from the impacts of flooding.

2.59 The LFRMS should ensure that the most important heritage assets are protected from the direct impact of works and where appropriate the indirect effects on setting. The LFRMS should seek to ensure those heritage assets not meriting preservation but impacted by direct works are properly recorded before their loss.

Table 9 – Heritage Features

Number of nationally listed buildings	Grade I	4
	Grade II*	8
	Grade II	225
	Total	237
Number of listed buildings at risk		5
Number of Conservation Areas		12
Conservation area character appraisals completed		6
Number of conservation areas at risk		4
Number of scheduled ancient monuments		4

Source: AMR, 2012

Historic Landscape Character

- 2.60 Historic Landscape character is the degree to which any place reflects within its character the historic processes that have led it to the present state. In particular the patterns of roads, tracks, paths, property boundaries, woods and field boundaries will together reflect a history of that place.
- 2.61 The LFRMS may be able to utilise aspects of the historic environment in relation to flood control, in particular identifying areas of the landscape that have historically been used to accept flood water.
- 2.62 The LFRMS may be able to reflect historic landscape character as an influence on scheme design, for example utilising orientation and patterns of existing drainage.

Landscape and Visual Amenity

- 2.63 Bury's landscape character is influenced by factors such as its underlying geology and geomorphology, settlement pattern, land use and management, biodiversity and industrial evolution, all of which combine to help create the environment we are familiar with today.
- 2.64 Natural England's National Landscape Character Assessment (2005) identified three broad landscape types covering the Borough. They are:
- Southern Pennines
 - Manchester Pennine Fringe
 - Manchester Conurbation
- 2.65 The landscape of the north of the Borough around Ramsbottom is characterised by the distinctive upland features of the South Pennines. The geology is predominately sandstone and millstone grit which is reflected in the building materials used historically in the local area. To the west the villages of Affetside and Ainsworth are located on high ground between the towns of Bolton and Bury.
- 2.66 The centre of the Borough, categorised by Natural England as 'Pennine Fringe' is characterised by the valleys of the River Irwell and River Roch, which supported the area's early industrial development. However the main feature of this area is the urban development spreading from main roads.
- 2.67 The landscape in the south of the Borough, being nearer to Manchester City Centre, has been much modified. The Irwell Valley here includes large areas of post-industrial open space but its small tributary valleys include relic ancient woodland.

Key Environmental Issues

This risk is likely to be greater for those landscapes and heritage assets that are located within or in close proximity to a floodplain.

