Water

Submitted to:

Milton Keynes Council,
Civic Offices,
1 Saxon Gate East,
Central Milton Keynes,
MK9 3EJ.

Submitted by :

AECOM,
Scott House,
Alençon Link,
Basingstoke,
Hampshire,
RG21 7PP.

Telephone:
+44(0)1256 310 200
Fax:
+44(0)1256 310 201

Milton Keynes Council Local Flood Risk Management Strategy

Strategic Environmental Assessment

Environmental Report

Prepared by: Penelope Pickerin
Graduate Consultant

Checked by: Simon Keys
EIA Project Manager

Approved by: Jon Robinson
Operations Director – Water

Rev No	Comments	Checked by	Approved by	Date
0	Draft Report for Comment	Simon Keys	Jon Robinson	15.04.2015

AECOM, Scott House, Alençon Link, Basingstoke, Hampshire, RG21 7PP, United Kingdom.
Telephone: 01256 310 200 Website: http://www.aecom.com

47072190 Milton Keynes LFRMS

Limitations

AECOM Infrastructure & Environment UK Limited ("AECOM") has prepared this Report for the sole use of the **Milton Keynes Council** ("Client") in accordance with the Agreement under which our services were performed [**47072190 November 2014**]. No other warranty, expressed or implied, is made as to the professional advice included in this Report or any other services provided by AECOM. This Report is confidential and may not be disclosed by the Client nor relied upon by any other party without the prior and express written agreement of AECOM.

The conclusions and recommendations contained in this Report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by AECOM has not been independently verified by AECOM, unless otherwise stated in the Report.

The methodology adopted and the sources of information used by AECOM in providing its services are outlined in this Report. The work described in this Report was undertaken between **November 2014** and **April 2015** and is based on the conditions encountered and the information available during the said period of time. The scope of this Report and the services are accordingly factually limited by these circumstances.

Where assessments of works or costs identified in this Report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

AECOM disclaim any undertaking or obligation to advise any person of any change in any matter affecting the Report, which may come or be brought to AECOM's attention after the date of the Report.

Certain statements made in the Report that are not historical facts may constitute estimates, projections or other forward-looking statements and even though they are based on reasonable assumptions as of the date of the Report, such forward-looking statements by their nature involve risks and uncertainties that could cause actual results to differ materially from the results predicted. AECOM specifically does not guarantee or warrant any estimate or projections contained in this Report.

Unless otherwise stated in this Report, the assessments made assume that the sites and facilities will continue to be used for their current purpose without significant changes.

Copyright

Table of Contents

List of Appendices

List of Tables

List of Figures

List of Abbreviations

Abbreviation	Definition
AWS	Anglian Water Services
BAP	Biodiversity Action Plan
BGDB	Bedford Group of Drainage Boards
CFMP	Catchment Flood Management Plan
CRoW	Countryside rights of way
DCLG	Department for Communities and Local Government
DECC	Department of Energy and Climate Change
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EH	English Heritage
EIA	Environmental Impact Assessment
FCERM	Flood and Coastal Erosion Management
IDB	Internal Drainage Board
LDF	Local Development Framework
LEP	Local Enterprise Partnership
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
LNR	Local Nature Reserve
LRF	Local Resilience Forum
MKMMM	Milton Keynes Multi Modal Model
NE	Natural England
NPPF	National Planning Policy Framework
NVZ	Nitrate Vulnerable Zone
RBD	River Basin District
RMA	Risk Management Authority
SEA	Strategic Environmental Assessment
SI	Statutory Instrument
SPZ	Source Protection Zone
SuDS	Sustainable urban Drainage Systems
SWMP	Surface Water Management Plan
uFMfSW	updated Flood Map for Surface Water
UKCP09	UK Climate Projections 2009
UWWTD	Urban Waste Water Treatment Directive
WFD	Water Framework Directive
WwTW	Waste water Treatment Works

Executive Summary

Background

Milton Keynes is a Borough in the south-east of England which covers approximately 308km^2 and is bordered by the regions of Aylesbury Vale, Central Bedfordshire, Bedford and South Northamptonshire. The South of the Borough is dominated by the urban area of Milton Keynes whereas the north of the Borough is more rural in character and comprises a number of agricultural land uses. The Borough has a population of approximately 255,700 (2013) with the majority of the population living in the rapidly expanding urban environment.

The Flood and Water Management Act (2010)[1] was enacted by the Government in response to the 2007 flooding and the recommendations of The Pitt Review[2]. The Act gave both unitary and county councils, as Lead Local Flood Authorities (LLFAs), new responsibilities for leading and coordinating the management of local flood risk; namely the flood risk arising from surface water, groundwater and smaller watercourses and ditches, known as ordinary watercourses. This includes a statutory duty to develop, maintain, apply and monitor a strategy for the management of local flood risk.

Milton Keynes Council, as LLFA, is working to produce a Local Flood Risk Management Strategy (LFRMS) under the Flood and Water Management Act. The aim of a LFRMS is to guide the management of local flood risk, reflecting local circumstances such as the level of risk and the potential impacts of flooding. A LFRMS (herein 'the Strategy') must assess local flood risk, set out objectives for managing local flooding and determine the costs and benefits associated with the implementation of such measures.

The Strategic Environmental Assessment (SEA) process, culminating in the preparation of this Environmental Report will inform the preferred long-term flood risk management Strategy through the identification of likely significant impacts upon the environment, resulting from the implementation of the Strategy.

Strategic Environmental Assessment

A SEA is undertaken to identify the significant effects that plans, programmes and strategies may have on the environment. The SEA framework therefore increases the consideration of environmental issues in to decision-making processes and planning. The application of the SEA process to flood management plans and programmes is not legally required in every case, however adopting the SEA approach is strongly encouraged by the Department for Environment, Food and Rural Affairs (Defra) to enable a strategic approach to managing flood risk.

A Scoping Report precedes this Environmental Report. During the scoping phase, the environmental baseline of Milton Keynes was determined. Subsequently, the environmental impacts (both adverse and beneficial) which may arise from the implementation of the Strategy were determined. A range of receptors were considered including: biodiversity, climate, cultural heritage, human health, material assets, geology and soil, landscape and water. Topics scoped out of the report included; air and population. Air was scoped out of the assessment due to the fact that the Strategy objectives and/or measures were not envisaged to give rise to activities which emit greenhouse gases or pollutants. If specific measures or actions are proposed which may have an impact upon air quality, additional assessments would be required beyond the scope of an SEA. Similarly, 'population' was scoped out as whilst there is the potential for some individuals to be affected by the implementation of the Strategy it is unlikely that the wider population will be significantly affected. Effects relating to the topic areas that are linked to population such as flood risk, human health, and material assets have been scoped in to this assessment.

The Scoping Report was subject to statutory consultation with the Environment Agency (EA), Natural England (NE), and English Heritage (EH). The report was also distributed internally at Milton Keynes Council.

1 Flood and Water Management Act (2010) http://www.legislation.gov.uk/ukpga/2010/29/section/1
2 The Pitt Review (2008) http://webarchive.nationalarchives.gov.uk/20100807034701/http://archive.cabinetoffice.gov.uk/pittreview/_/media/assets/www.cabinetoffice.gov.uk/flooding_review/pitt_review_full%20pdf.pdf?bcsi_scan_E956BCBE8ADBC89F=M4BVl8trkORl5rFSWDV0wujV8GSBAAAA8j9LtQ==&bcsi_scan_filename=pitt_review_full%20pdf.pdf

The Environmental Report documents the SEA process, the environmental baseline, associated legislation and policy, the consultation responses and conducts an assessment of Strategy objectives against a set of SEA objectives in order to determine the effects of the Strategy upon the environment.

Milton Keynes LFRMS

The purpose of the Strategy is to set out Milton Keynes Council's approach to managing flood risk from local sources (i.e. surface water, ordinary watercourses and groundwater) in both the short and longer term, with proposals for sustainable actions that will help Milton Keynes Council to manage flood risk in a way that delivers the greatest benefit to residents, businesses and the environment. It also outlines how the Council will work with others to manage all sources of flooding within Milton Keynes and neighbouring catchments.

The Strategy is a high-level, statutory document which outlines the approach taken to limit the impacts of local flooding within Milton Keynes Council's administrative area. The strategy promotes greater collaborative efforts between organisations responsible for managing local flood risk including that of Risk Management Authorities (RMAs). The Strategy does not include proposals or details of site specific measures; however some of the objectives and associated action plans could lead to such measures in the future and may require further assessment through other assessment frameworks such as an Environmental Impact Assessment (EIA) governed by the Town and Country Planning (EIA) Regulations 2011 which applies the EU Directive 'on the assessment of the effects of certain public and private projects on the environment'[3] (otherwise known as the EIA Directive),in to the English planning system[4].

Assessment Results

In order to measure the likely environmental impacts of implementing the Strategy upon the environment, the Strategy objectives were 'tested' against a number of SEA objectives.

This SEA has shown that Milton Keynes' LFRMS is likely to have beneficial impacts upon the environment in both the short and long term (beyond the life of the strategy). This is due to the proactive, holistic, sustainable approach of the Strategy which has the primary aim of outlining the approach Milton Keynes Council as LLFA will take to manage local flood risk in both the short and long term, with proposals for actions that will help to manage the risk in a way that delivers the greatest benefit to its residents, business and the environment. Each of the Strategy objectives is predicted to fulfil the environmental objectives identified within the SEA framework with a beneficial outcome either directly or indirectly (bar those shown to have neutral or no relationship).

The majority of the Strategy objectives are likely to have indirect beneficial impacts upon the environment as they relate to strategic sustainable flood risk management measures rather than individual actions which would potentially have a larger effect 'on the ground'.

The benefits of implementing the Strategy are perhaps best demonstrated by the 'do nothing' alternative assessment which demonstrates the adverse impacts upon the environment through the failure to implement the Strategy. In the short term this would leave local communities, assets and infrastructure at an increased risk of flooding. It is likely that this risk would increase over time as a result of climate change and associated impacts upon flood frequency and magnitude.

As a result of these findings the SEA does not put recommendations forward for the improvement of the Strategy. Similarly, as the SEA has determined that no adverse impacts will result from the implementation of the Strategy, no mitigation measures have been put forward at this stage.

3 EIA Directive (2014). http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32014L0052
4 EIA Planning Practice Guidance. http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/legislation-covering-environmental-impact-assessment/

1 Introduction

Milton Keynes Council, as LLFA, is working to produce a Local Flood Risk Management Strategy (LFRMS) under the Flood and Water Management Act. The Flood and Water Management Act (2010) was enacted by the Government in response to the 2007 flooding and the recommendations of The Pitt Review. The Act gave both unitary and county councils, as Lead Local Flood Authorities (LLFAs), new responsibilities for leading and coordinating the management of local flood risk; namely the flood risk arising from surface water, groundwater and smaller watercourses and ditches, known as ordinary watercourses. This includes a statutory duty to develop, maintain, apply and monitor a strategy for the management of local flood risk.

The aim of a LFRMS is to guide the management of local flood risk, reflecting local circumstances such as the level of risk and the potential impacts of flooding. Milton Keynes' LFRMS (herein 'the Strategy') must assess local flood risk, set out objectives for managing local flooding and determine the costs and benefits associated with the implementation of such measures.

The Strategic Environmental Assessment (SEA) process, culminating in the preparation of this Environmental Report will inform the preferred long-term flood risk management Strategy through the identification of likely significant impacts upon the environment, resulting from the implementation of the Strategy.

1.1 Strategic Environmental Assessment

Article 1 of the European Directive (2001/42/EC) on the assessment of the effects of certain plans and programmes on the environment (the SEA Directive) states that the preparation of a SEA will '*provide for a high-level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development*'[5]. More simply a SEA is undertaken to identify the significant impacts that plans, programmes and strategies may have on the existing and future environment, and therefore heightens the consideration of environmental issues in decision-making processes. The SEA process ensures that environmental considerations inform the development of objectives and measures of the Strategy, whilst mitigating against any adverse environmental impacts and highlighting areas of environmental and socioeconomic opportunity. Additionally the SEA process identifies how the Strategy can contribute to the achievement of wider environmental objectives, including Water Framework Directive (WFD) objectives[6].

1.2 Structure of the Environmental Report

This Environmental Report documents the SEA process of Milton Keynes Council's LFRMS. The purpose of this Environmental Report is to inform the preferred long-term Strategy through the identification of the likely significant effects of the implementation of the Strategy on relevant environmental receptors. The SEA Directive lists the content that is required in the Environment Report (Annex I), and these requirements have been reproduced in Table 2-1 below.

5 SEA Directive (2001) http://ec.europa.eu/environment/eia/sea-legalcontext.htm
6 Water Framework Directive 2000 http://ec.europa.eu/environment/water/water-framework/index_en.html

Table 2-1: SEA Environmental Report Requirements	
Environmental Report Requirements	**Report Section**
(a) an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes;	Section 4
(b) the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme;	Section 6 and Appendix C
(c) the environmental characteristics of areas likely to be significantly affected;	Section 6, 7 and Appendix C
(d) any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC (The Birds Directive) and 92/43/EEC (The Habitats Directive);	Section 6, 7 and Appendix C
(e) the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation;	Section 4,5, 6 and Appendix C
(f) the likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors;	Section 8
(g) the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme;	Section 9
(h) an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information;	Section 8, 7, 3 and 2.
(i) a description of the measures envisaged concerning monitoring in accordance with Article 10;	Section 9
(j) a non-technical summary of the information provided under the above headings.	Executive Summary

2 Consultation

Stakeholder engagement is essential in developing an acceptable Strategy which engages all parties. The SEA Directive imposes the following requirements for consultation:

- Authorities which, because of their environmental responsibilities, are likely to be concerned by the effects of implementing the plan or programme, must be consulted on the scope and level of detail of the information to be included in the Environmental Report. These authorities are designated in the SEA Regulations as the Consultation Bodies for England and Wales;
- Consultation Bodies must be consulted on the draft plan or programme and the Environmental Report, and must be given an early and effective opportunity within appropriate time frames to express their opinions;
- Other EU Member States must be consulted if the plan or programme is likely to have significant effects on the environment in their territories; and,
- The Consultation Bodies must also be consulted on screening determinations on whether an SEA is needed for plans or programmes.

As is the case with Milton Keynes' LFRMS, local flood risk management strategies, plans and programmes may require a statutory SEA as recommended by the Department for Environment, Food and Rural Affairs (Defra).

Acknowledging the above requirements, the SEA scoping report was consulted upon by the following statutory bodies:

- The Environment Agency (EA);
- English Heritage (EH); and,
- Natural England (NE).

The consultation period lasted for duration of 5 weeks ending the 23rd February 2015. The Scoping Report was also circulated internally within Milton Keynes Council.

Comments and recommendations on the Scoping Report from statutory consultees have been acknowledged and addressed in this Environment Report. Further consultation including public consultation will commence upon the Environmental Report alongside the Strategy.

2.1 Development from the Scoping Report

Consultation responses were received from statutory consultees and where possible every effort has been made to incorporate these comments into the Environmental Report. Appendix A provides a detailed review of the consultation feedback and the subsequent alterations made.

2.2 Dealing with Uncertainties

As noted within the SEA Directive:

'An SEA need not be done in any more detail, or using any more resources, than is useful for its purpose. The Directive requires consideration of the significant environmental effects of the plan or programme, and of reasonable alternatives that take into account the objectives and the geographical scope of the plan or programme'.

It is not often deemed appropriate or practicable to predict the effects of an individual project-level proposal in the degree of detail that would normally be required for an EIA within the bounds of an SEA. The objectives of the SEA and the Strategy

itself are high-level and the Strategy does not include proposals or detail of site specific measures for management of local flood risk that can be assessed within the SEA. Whilst some uncertainty remains, a certain level of detail is known and provided within the Strategy's Action Plan.

The Strategy's Action Plan draws on all available plans and guidance and considers all elements of flood risk management, including flood alleviation schemes, maintenance activities, strategies and studies, community engagement and asset improvements. The delivery timescales included in the Action Plan are indicative and their delivery is subject to viability, feasibility, funding availability and community buy-in. If a scheme is listed in the Action Plan it is not a guarantee that the measures will be delivered, it is an indication of where Milton Keynes Council intends to invest if funding becomes available. The Action Plan differentiates between short and long term initiatives. The Strategy is a living document and the associated Action Plan will be updated annually to reflect work that has been completed, any change in funding status or priorities and new schemes that could be delivered.

Due to uncertainty, the SEA will provide an assessment at a level of detail that is commensurate with the nature of the Strategy objectives, which recognises the uncertainty in spatial and technical scope and hence considers generically how the Strategy could lead to options and activities which in turn lead to significant environmental effects.

3 Strategic Environmental Assessment

3.1 The Purpose of Strategic Environmental Assessment

A SEA is an iterative, systematic, publicly accountable framework with an overarching aim of integrating environmental considerations within policy development at the earliest opportunity whilst providing an 'audit trail' of option development and environmental mitigation.

A SEA involves the identification and evaluation of the potential environmental impacts of high-level decision-making (e.g. a plan, programme or strategy). By addressing strategic level issues, the SEA aids the selection of the preferred options, directs individual schemes towards the most environmentally appropriate solutions and locations and helps to ensure that resulting schemes comply with legislation and other environmental requirements. Impacts should not just be considered on a direct basis but should encompass temporary, permanent, positive, negative, secondary, cumulative and synergistic impacts over a range of timescales and probabilities. Receptors to such impacts include: human health, biodiversity, water, climatic factors, material assets, cultural heritage (architecture and archaeological heritage), landscapes, and the interrelationships between the above.

The SEA Directive is transposed into UK law through the following:

- The Environmental Assessment of Plans and Programmes Regulations 2004 (Statutory Instrument 2004 No.1633);
- The Environmental Assessment of Plans and Programmes Regulations (Northern Ireland) 2004 (Statutory Rule 2004 No. 280);
- The Environmental Assessment of Plans and Programmes (Scotland) Regulations 2004 (Scottish Statutory Instrument 2004 No. 258), and,
- The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004 (Welsh Statutory Instrument 2004 No. 1656 (W.170)).

The methodology for undertaking this assessment will follow Communities and Local Government's (CLG) Guidance on SEA[7].

3.2 Stages in the SEA Process

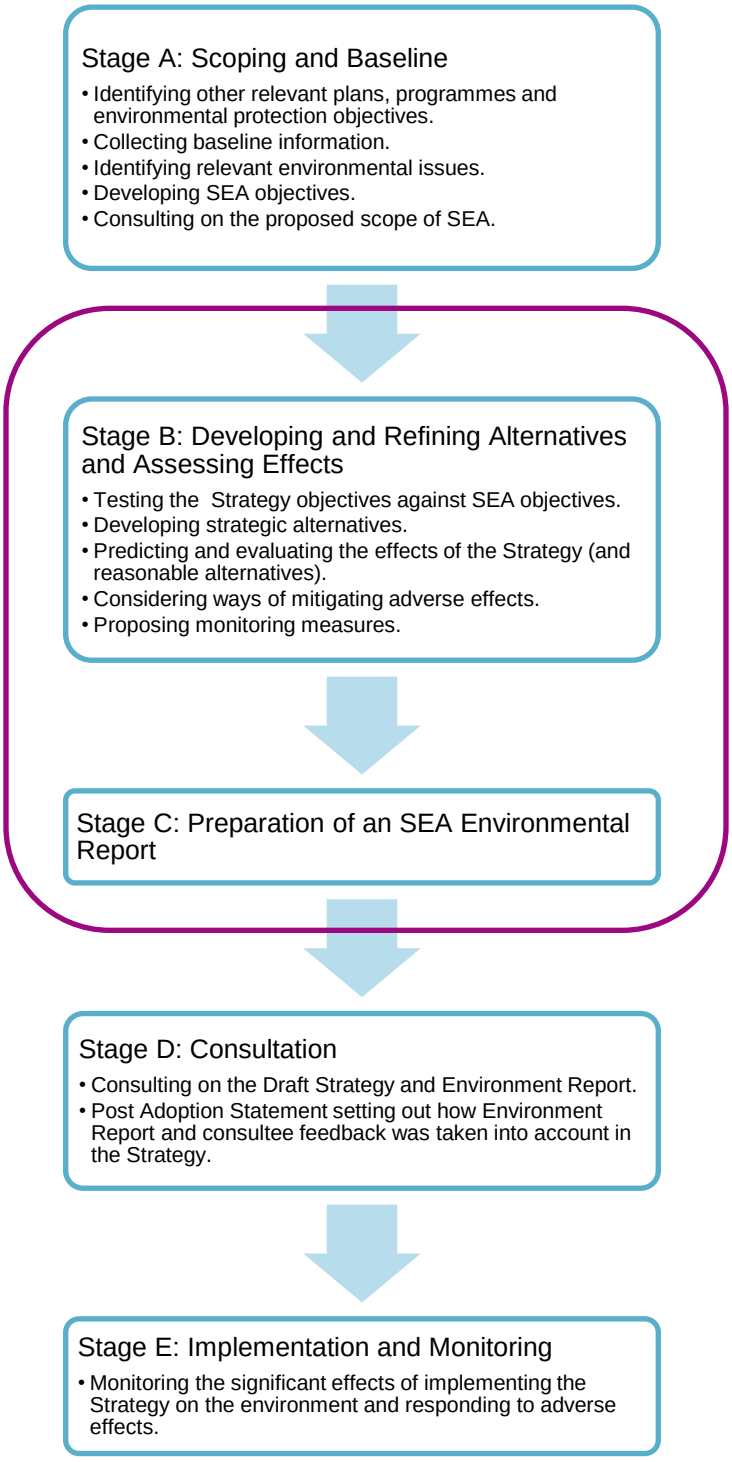
The CLG Guidance on SEA identifies five key stages in the SEA process as set out in Figure 3-1.

The stages below are intended to be valid for all plans and programmes to which the Directive implies, irrespective of their geographical scope. Stage A and the associated tasks were carried out in the Milton Keynes LFRMS SEA Scoping Report.

This Environmental Report documents Stages B and C of the process. Stage D will occur next wherein both the draft LFRMS and Environmental Report will undergo consultation and the feedback from such consultation will be used to further develop the Strategy. Stage E 'Implementation and Monitoring' will occur over the lifetime of the Strategy in order to ensure continual improvement.

7 CGL Guidance on SEA https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7657/practicalguidesea.pdf

Figure 3-1: Stages of the SEA Process.



4 The Milton Keynes Council's LFRMS

4.1 Overview

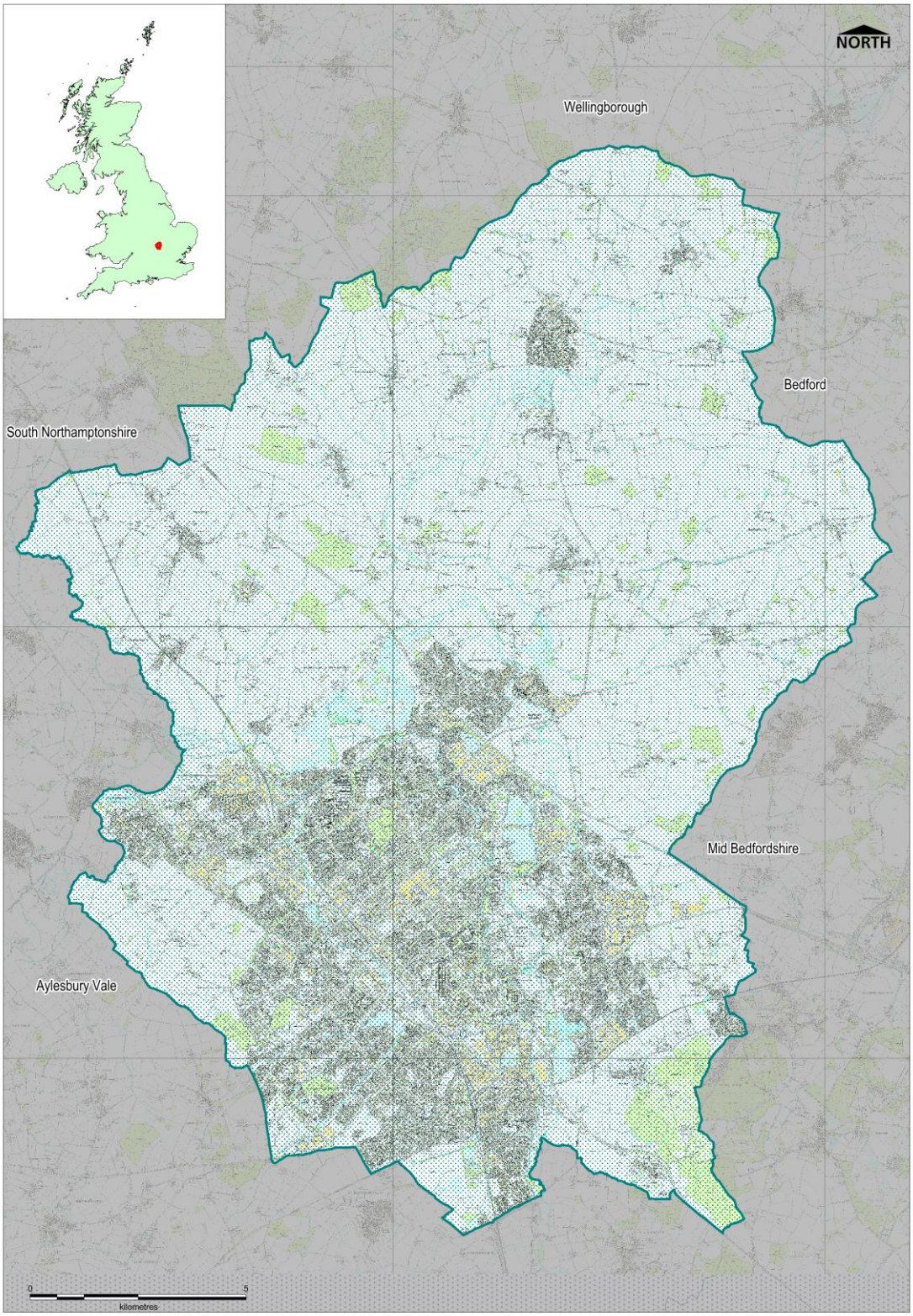
The Flood and Water Management Act (2010) requires the Environment Agency to prepare a National Flood and Coastal Erosion Strategy[8]. This describes what needs to be done by a range of organisations (including local authorities) to reduce the risk, and manage the consequences of flooding and coastal erosion

The National Flood and Coastal Erosion Strategy identified Milton Keynes Council as a designated LLFA. As a LLFA, Milton Keynes Council is required by the Flood and Water Management Act (2010) to produce an LFRMS which must be maintained, applied and monitored.

Milton Keynes is a Borough in the south-east of England which covers approximately 308km^2 and is bordered by the regions of Aylesbury Vale, Central Bedfordshire, Bedford and South Northamptonshire (Figure 4-1). The South of the Borough is dominated by the urban area of Milton Keynes whereas the north of the Borough is more rural in character and comprises a number of agricultural land uses. The Borough has a population of approximately 255,700 (2013) with the majority of the population living in the rapidly expanding urban environment.

8 National Flood and Coastal Erosion Strategy https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-management-strategy-for-england

Figure 4-1: Study Site Map



4.2 Technical Scope of a LFRMS

To determine the scope of the SEA it is important to consider the technical scope of the Strategy and what it aims to achieve.

The purpose of the Strategy is to set out Milton Keynes' approach to managing flood risk from local sources (i.e. surface water, ordinary watercourses and groundwater) in both the short and longer term, with proposals for sustainable actions that will help Milton Keynes Council to manage the risk in a way that delivers the greatest benefit to residents, businesses and the environment. It also outlines how the Council will work with others to manage all sources of flooding within Milton Keynes and neighbouring catchments.

Flood risk in Milton Keynes arises from a number of sources including surface water, groundwater, sewers and fluvial sources (Figure 4-2). In some instances, more than one of these sources may combine to cause a flooding event as shown in Figure 4-3. Prior to the development of Milton Keynes there was regular flooding of the Great Ouse, River Ouzel and Loughton Brook., as shown in Figure 4-2. However, upon development there were significant changes to the characteristics of the catchment, for instance increased runoff from impermeable surfaces is now managed through a system of balancing lakes which have be shown to reduce flood water levels as a result of storing water and hence delaying flood peak water levels.

Figure 4-2: Watercourses in Milton Keynes

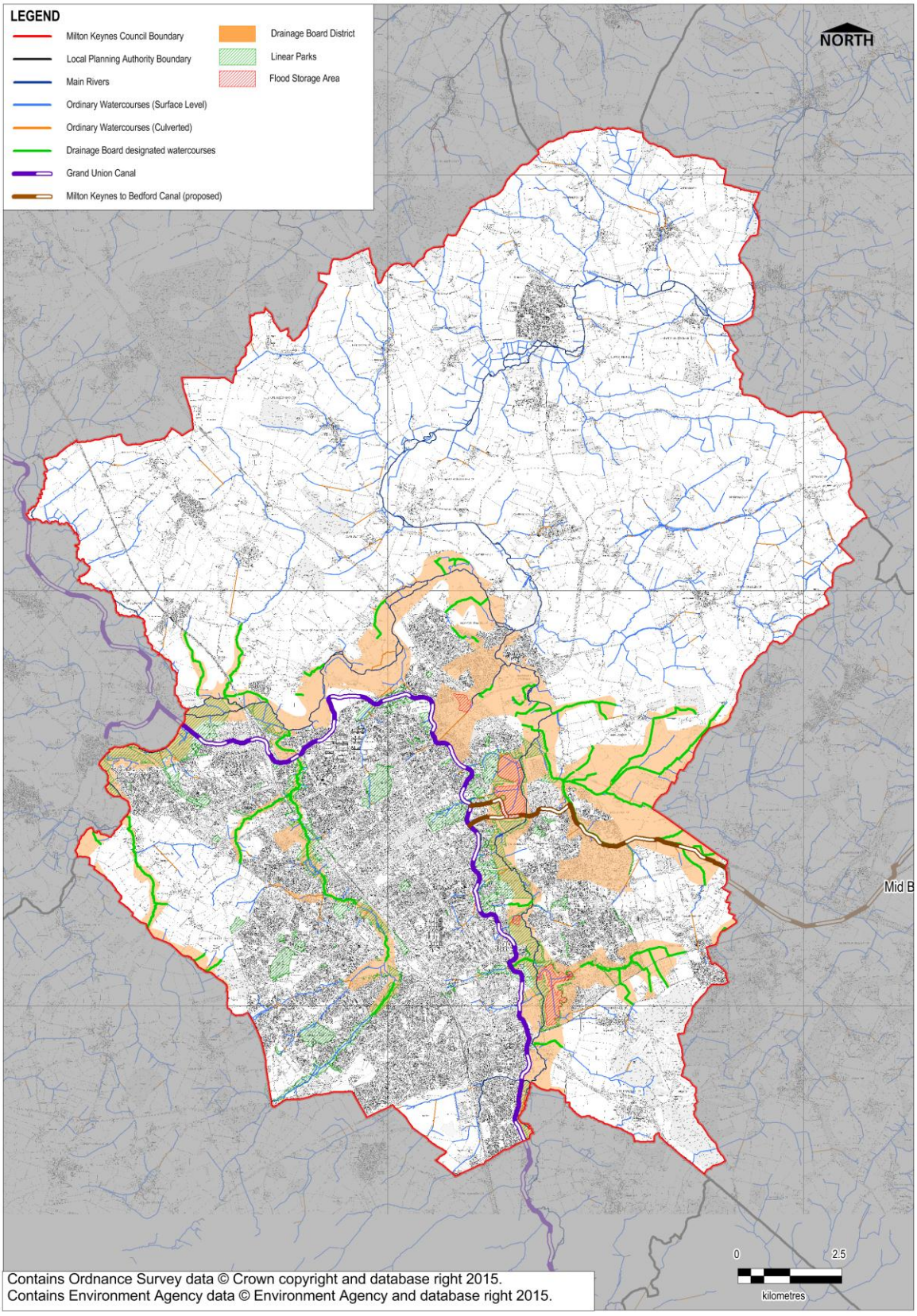
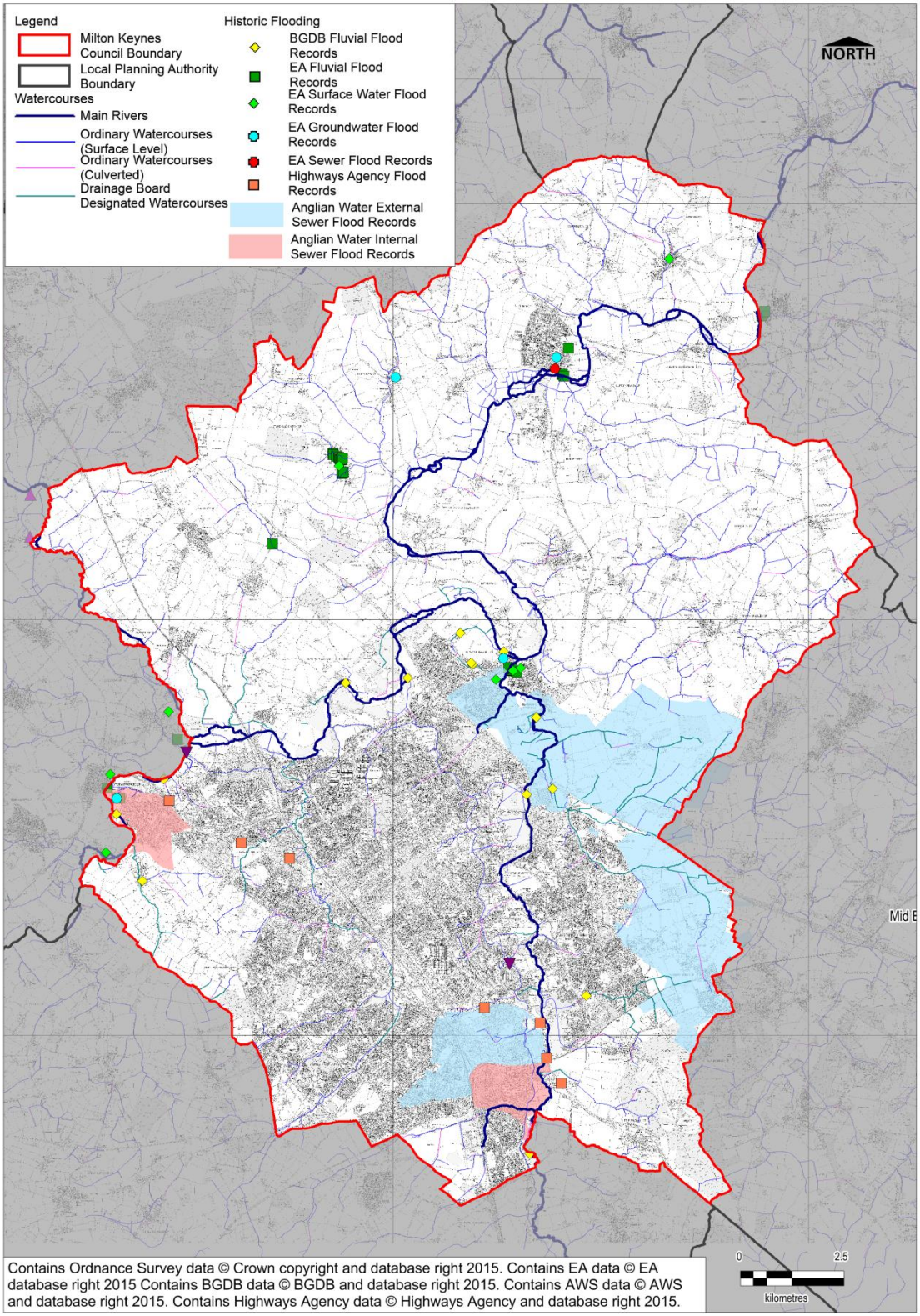


Figure 4-3: Historic Flood Events in Milton Keynes



Previous assessments have highlighted historic surface water flooding in areas of Milton Keynes such as Stoke Goldington due to local geology, being located within a topographic hollow and as a result of run off from nearby fields[9]. Surface Water Flooding has been experienced in Milton Keynes in Newport Pagnell, Stoke Goldington, Lavendon, Passenham, Cosgrove and Old Stratford. There has also been historic sewer flooding incidents in Fenny Stratford and Stony Stratford along with groundwater flooding in Newport Pagnell, Ravenstone, Olney and Stony Stratford.

The Strategy acknowledges that it is not possible to prevent all flooding; however, in accordance with the National Strategy for Flood and Coastal Erosion Risk Management, the Strategy will include the following:

- Information on flood risk in Milton Keynes, highlighting where problems have already occurred, or where areas fall in risk categories;
- Clarification of which authority is responsible for what in relation to the prevention and management of flooding;
- Detail on the measures that will be undertaken to manage flood risk;
- Clarification on how work is prioritised;
- Measures that communities can undertake to improve flood resilience, as it is not possible to stop all flooding; and,
- Consideration on funding flood risk and investment planning.

4.3 Relationship between the SEA and LFRMS

The SEA process, culminating in the preparation of this Environmental Report, will inform the preferred long-term Strategy through the identification of the likely significant effects of the implementation of the Strategy on relevant environmental receptors. For instance if an objective from the Strategy does not correspond with and facilitate the delivery of an SEA objective such as the protection of human health and wellbeing, the SEA process would put forward recommendations to ensure human health did not suffer adversely as a result of implementing the Strategy.

4.4 Relationships with other Flood and Water Management Plans

The LFRMS forms a key document within Milton Keynes' suite of flood risk management plans, programmes and strategies alongside wider flood and water management and environment plans, including:

Anglian River Basin Management Plan (2014)[10]

The Anglian RBMP is concerned with the pressures faced by the water environment in the Anglian River Basin District and the actions that will address them. Whilst considerable progress has been made in protecting river basin assets in recent years there are a number of challenges which remain including point source and diffuse pollution, physical modification of water bodies and water abstraction.

Anglian FRMP Scoping Report (2014)[11]

The Anglian FRMP Scoping Report was produced in July 2014 and outlines the flood risk planning which is currently underway across the river basin and provides information relating to the consultation process and which stakeholders would lead on these consultations. Ultimately the overarching aims of the FRMP will be to manage flood risk across the river basin in a way which protects and improves the environment whilst minimising the effect of flooding upon people's lives and will outline significant flood risk, receptors and consequences of flooding across Milton Keynes.

Milton Keynes Outline Water Cycle Study (2008)[12]

The Outline Study assessed the impact of proposed growth targets for Milton Keynes on the water cycle infrastructure and water environment of the area. The study informed and provided an evidence base for the initial stages of the development of Milton Keynes' Local Development Framework (LDF) whilst providing a justification for the planning on new infrastructure in

9 As found by the January 2008 report undertaken by WSP
10 River Basin Management Plans https://www.gov.uk/government/collections/river-basin-management-plans
11 Anglian FRMP (2014)
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/326127/LIT_9966_Anglian_FRMP_Scoping_Report.pdf
12 Milton Keynes Outline Water Cycle Study (2008). http://www.milton-keynes.gov.uk/planning-policy/documents/Milton_Keynes_Outline_WCS_Final_Report.pdf

Anglian Water Service's strategic business planning. Opportunities were also available for relevant stakeholders and risk management authorities to identify and suggest mitigation measures for potential water environment impacts.

Great Ouse Catchment Flood Management Plan (CFMP) (2009)[13]

The Great Ouse CFMP provides an overview of the flood risk posed across the river catchment and the recommended ways of managing such risk both now and in the future. The Great Ouse CFMP considers all sources of inland flooding and accounts for the likely impacts of climate change, land use management and sustainable development. The Great Ouse CFMP will be superseded by the forthcoming Anglian River Basin District FRMP, due to be published in late 2015.

Milton Keynes Updated Level 1 Strategic Flood Risk Assessment (2014)

The purpose of the updated Level 1 SFRA is to collate and analyse the most up to date flood risk information for all sources to provide an overview of flood risk issues across the Milton Keynes study area. This will be used by Milton Keynes Council to inform the preparation of the Local Plan for Milton Keynes (Plan:MK) including the application of the Sequential Test. It is also intended that the revised Level 1 SFRA will also assist prudent decision-making on flood risk issues by Development Management Officers on a day-to-day basis.

Additional Plans, Programmes and Strategies

In addition to the above flood risk plans and assessments, there are a number of other plans, programmes and strategies which must be considered when determining the impact of implementing a Strategy upon environmental receptors.

The Milton Keynes Core Strategy (2013)

The Milton Keynes Core Strategy[14] contains guidance and policies on a number of environmental receptors. The Core Strategy will be reviewed and updated by Plan:MK which will include a number of policies in regards to the protection and enhancement of the historic environment which mirror the aim of the long-term Spatial Vision for Milton Keynes. Relevant Core Strategy policies include:

- **CS18** relates to healthier and safer communities and mentions the requirement to work with the Council's Emergency Planning department to prevent and respond to emergency situations, inclusive of flood risk management;
- **CS19** highlights key environmental protection objectives which should be facilitated to maximise the benefits derived from biodiversity; and,
- Additionally, when the Core Strategy is reviewed and updated by Plan:MK this plan will comprise a number of similar policies including those related to the provision of social infrastructure and quality of life.

Additionally, the Core Strategy reinforces the aims and objectives of the Local Plan in regards to the extension of green infrastructure across the area and states that 'The linear parks will be extended along the Broughton, Caldecotte and Loughton Brooks into the city extensions, and along the Ouse and Ouzel valleys to the north. These multi-purpose open spaces will provide extended leisure routes, strategic flood management, enhanced wildlife habitats and new sports provision. This will help to provide the population with opportunities for healthier lifestyles.

In regards to material assets, the Core Strategy highlights that one of the key 'drivers of change' is *the 'delivery of infrastructure to accommodate growth – major infrastructure (such as roads and schools) should be in place before developments have been completed'.*

The Buckinghamshire and Milton Keynes Biodiversity Partnership

The Buckinghamshire and Milton Keynes Biodiversity partnership consists of approximately 50 organisations including local authorities, statutory agencies, charities and local organisations working together for the benefit of wildlife across

13 Great Ouse Catchment Flood Management Plan (2009) https://www.gov.uk/government/publications/great-ouse-catchment-flood-management-plan
14 Milton Keynes Council Core Strategy (2013) http://www.milton-keynes.gov.uk/planning-and-building/planning-policy/core-strategy-2013

Buckinghamshire and Milton Keynes. The Buckinghamshire and Milton Keynes Biodiversity Action Plan (BAP)[15] was produced in 2000 by the Buckinghamshire Nature Conservation Forum and revised in 2009.

The BAP describes how biodiversity will be protected and enhanced in Buckinghamshire and Milton Keynes over the next ten years. The BAP is split into 'Habitat Action Plans' which contain targets which contribute to the delivery of the UK BAP[16]. Targets fall into four overall categories including: Maintaining Extent, Achieving Condition, Restoration of Degraded Habitat and the Creation of New Habitat[17].

Milton Keynes Council's Corporate Plan (2012-2016)

Milton Keynes Council's Corporate Plan (2012-2016)[18] aims to establish exemplar projects which will further distinguish Milton Keynes as a leading Smart City with a low carbon economy.

Milton Keynes Council's Low Carbon Living Strategy (2010) and Action Plan (2012)

The Council's Low Carbon Living Strategy and Action Plan shows how communities across Milton Keynes can reduce greenhouse gas emissions and therefore contribute to the mitigation of global climate change through:

- The integration of sustainability and carbon reductions into the planning and delivery of the Council aims and objectives;
- A reduction in the authority's carbon footprint; and,
- A demonstration of community leadership in tacking climate change and sustainability issues including reducing the overall carbon footprint of Milton Keynes[19].

The Heritage, Museums and Archives Strategy

The Heritage, Museums and Archives Strategy sets out the vision, plan, programmes and projects which have been identified by stakeholder engagement and public consultation as strategically vital for the future of Milton Keynes inclusive of residents, businesses and visitors[20].

Milton Keynes Health and Wellbeing Board

The board brings together key stakeholders and commissioners of services across the NHS, public health, social care and children's services. The board's main aims are to improve wellbeing, reduce early deaths and tackle major diseases and to reduce health inequalities.

Local Plan (2005)

Milton Keynes Council has developed a number of policies to protect and enhance the landscape of Milton Keynes. For instance the Local Plan (2005) includes policies regarding the protection, enhancement and extension of the green infrastructure, and aims to prevent inappropriate development arising which may adversely impact upon the landscape and other environmental features. The Local Plan also includes objectives which relate to the preservation and enhancement of the natural environment inclusive of land, soil and geology.

Milton Keynes Council's Public Open Space Management Framework (2013-2023)

In 2013, Milton Keynes Council developed a Public Open Space Management Framework (2013-2023) which identified the key actions required in order to achieve a high quality, sustainable and viable public open space in Milton Keynes. This framework will identify all public open space, set quality standards and commit to meeting them.

15 Milton Keynes Biodiversity Action Plan (2009) http://www.buckinghamshirepartnership.co.uk/partnership/bmkbp/biodiversity_action_plan.page
16 UK Biodiversity Action Plan http://jncc.defra.gov.uk/default.aspx?page=5155
17 http://www.buckinghamshirepartnership.co.uk/biodiversity/biodiversity-action-plan/
18 Milton Keynes Council's Corporate Plan (2012-2016) http://www.milton-keynes.gov.uk/your-council-and-elections/council-information-and-accounts/strategies-plans-and-policies/corporate-plan-2012-16
19 http://www.milton-keynes.gov.uk/environmental-health-and-trading-standards/mk-low-carbon-living/low-carbon-living-strategy-and-action-plan
20 Milton Keynes heritage, Museums and Archives Strategy 2014-2023

Milton Keynes Green Infrastructure Plan (2008)

In 2008, The Landscape Partnership developed a Green Infrastructure Plan for Milton Keynes which had the aim of 'providing a framework for the development of a strategic network of opens spaces and access links for existing and future residents of Milton Keynes'. Additionally the plan identified assets which require enhancement to address deficits in provision which will ultimately enhance access to, and enjoyment of, green spaces across Milton Keynes[21.]

Milton Keynes Surface Water Management Plan (Upcoming)

Milton Keynes Council is currently developing a Surface Water Management Plan (SWMP). The SWMP will outline the preferred surface water management strategy in Milton Keynes. In this context surface water flooding describes flooding from sewers, drains, groundwater, and runoff from land, ordinary watercourses and ditches that occurs as a result of heavy rainfall.

The SWMP study has been completed in consultation with the Milton Keynes Flood Risk Partnership to understand the causes and effects of surface water flooding and to agree the most cost effective way of managing surface water flood risk for the long term. The Milton Keynes Local Flood Risk Partnership consists of the RMAs that operate within Milton Keynes, particularly Anglian Water Services (AWS), the Bedford Group of Drainage Boards (IDB) and the Environment Agency. Further details of RMA roles and responsibilities are provided within the LFRMS.

The SWMP also establishes a starting point for a long-term action plan to manage surface water and will influence future capital investment, maintenance, public engagement and understanding, land-use planning, emergency planning and future developments.

4.5 Aims, Objectives and Measures

The purpose of the Strategy is to set out Milton Keynes' approach to managing flood risk from local sources (i.e. surface water, ordinary watercourses and groundwater) in both the short and longer term, with proposals for sustainable actions that will help Milton Keynes Council to manage the risk in a way that delivers the greatest benefit to residents, businesses and the environment. It also outlines how the Council will work with others to manage all sources of flooding within Milton Keynes and neighbouring catchments.

4.6 Draft Strategy Objectives and Measures

In order to steer the development of the LFRMS objectives, a review of the objectives set out in the National Strategy for Flood and Coastal Erosion Risk Management for England (Defra, Environment Agency 2011) has been conducted. In addition to the national objectives, the National Strategy also sets out six high-level principles by which it suggests that decisions relating to flood risk management and the processes by which they are taken should be guided.

The local objectives for Milton Keynes' LFRMS have therefore been developed in line with the five national objectives and the six guiding principles set out in the National Strategy. The five national objectives are to: understand the risks; prevent inappropriate development; manage the likelihood of flooding; help people to manage their own risk and improve flood prediction, warning and post-flood recovery.

The six guiding principles include: Community focus and partnership working; a catchment and coastal 'cell' based approach; sustainability; proportionate, risk based approaches; multiple benefits and beneficiaries should be encouraged to invest in risk management. Further guidance such as English Heritage's Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment Guidance was also consulted to ensure that LFRMS objectives and measures would deliver environmental protection across a wide range of receptors.

In accordance with this guidance, Milton Keynes Council have developed the following objectives to be delivered by their LFRMS:

Objective 1: Improve communications between asset owners and build on existing partnership working.

21 Milton Keynes Green Infrastructure Plan http://www.landscapeinstitute.org/southeast/projects/casestudy.php?id=182

- Measure 1.1: Clarify asset ownership where it is not clearly established
- Measure 1.2: Build on our knowledge about hydrological linkages in the catchment
- Measure 1.3: Develop linkages for maintenance programmes between Environment Agency (EA), Milton Keynes Council (MKC), Internal Drainage Board (IDB) and Anglian Water Services (AWS).
- Measure 1.4: Maintain the identity of MKC with neighbouring local authorities to ensure effective regional management of risk and sharing of mutual benefits

Objective 2: Ensure that drainage management is tailored to Milton Keynes unique drainage system

- Measure 2.1: Improve our understanding of the drainage capacity in the Milton Keynes urban area and its resilience to development
- Measure 2.2: Protect the effective maintenance of the current drainage system in the Milton Keynes urban area for resilience to future flood risks.

Objective 3: Improve understanding of food risk from all sources

- Measure 3.1: Improve understanding of surface water flood risk in the Milton Keynes Borough
- Measure 3.2: Improve understanding of Groundwater flood risk in the Milton Keynes Borough
- Measure 3.3: Develop a procedure for flood investigations under Section 19.

Objective 4: Make best use of resources for maximum protection from flooding

- Measure 4.1: Improve our understanding of thresholds/triggers for local flood events
- Measure 4.2: Investigate where new technologies can help lower risk
- Measure 4.3: Monitor external sources of funding for ongoing flood risk management
- Measure 4.4: Understand how we can work more effectively with landowners.

Objective 5: Help communities to become more resilient to flooding

- Measure 5.1: Development new communication tools
- Measure 5.2: Improve education about managed flooding in the public realm, e.g. linear parks
- Measure 5.3: Encourage formation of community groups and flood wardens
- Measure 5.4: Improve awareness of individuals influence on flood risk.

Objective 6: Ensure emergency planning is linked to our best understanding of the risks

- Measure 6.1: Maintain links with Local Resilience Forum (LRF)
- Measure 6.2: Ensure the protection of critical infrastructure is considered in wider flood management
- Measure 6.3: Ensure finding of ongoing studies and SWMP is communicated with Emergency planning.

Objective 7: Ensure future development does not have a negative impact on flood risk and lowers the risk where possible

- Measure 7.1: Improve our understanding of how the provision of SuDs will lower the risk of flooding
- Measure 7.2: Ensure that planning policy addresses Sustainable Drainage requirements in Milton Keynes Borough
- Measure 7.3: Investigate ways to manage urban creep (e.g. engage with residents in flooding hotspots about paving driveways).

5 Sustainability

5.1 Introduction

Sustainability as defined by the Brundtland Report[22] is '*development which meets the needs of current generations without compromising the ability of future generations to meet their own needs'* and encompasses social justice, environmental responsibility and economic viability. This section of the report includes an outline review of the relevant plans, programmes and policies that inform the SEA and the Strategy.

5.2 Review of Relevant Plans, Programmes and Strategies

Consideration of the context in which the Strategy is being prepared involves two steps. Firstly, plans and programmes considered relevant to the Strategy must be identified. Secondly, these must be reviewed with the aim of establishing their implications for the Strategy and SEA (e.g. the opportunities they create or the constraints they present).

For practical reasons the identification of plans and programmes cannot result in an exhaustive or definitive list. The number of plans and programmes has been limited to the plans that are most relevant to the topic area and the implementation of the Strategy to provide an overview of the objectives and targets that are most likely to influence the development of the Strategy. These plans and programmes are listed and described in Appendix B.

The National Planning Policy Framework (NPPF)[23] and associated Planning Practice Guidance sets out how planning should contribute to sustainable development and is relevant to the majority of environmental topics. The Government is committed to protecting and enhancing the quality of the natural and historic environment, in both rural and urban areas. A high level of protection should be given to most valued townscapes and landscapes, wildlife habitats and natural resources. Those with national and international designations should receive the highest level of protection.

Legislation and guidance of particular relevance is listed below:

International

- EU Floods Directive (2007/60/EC)[24] on the assessment and management of flood risks;
- EU Water Framework Directive (2000/60/EC);
- The Habitats Directive (92/43/EEC)[25]; and,
- The Birds Directive 2009/147/EC (codified version of 79/409/EEC)[26].

National

- Flood Risk Regulations (2009) (SI 3042);
- Flood and Water Management Act (2010);
- National Flood and Coastal Erosion Risk Management Strategy for England (2011);
- Future Water – The Government's Water Strategy for England (Defra, 2008)[27];

22 Brundtland Report 1987 http://conspect.nl/pdf/Our_Common_Future-Brundtland_Report_1987.pdf
23 National Planning Policy Framework (2012) https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf
24 EU Floods Directive (2007/60/EC) http://ec.europa.eu/environment/water/flood_risk/index.htm
25 Council Directive 92/43/EEC on the conservation of natural habitats and of wild flora and fauna accessible via: http://ec.europa.eu/environment/nature/legislation/habitatsdirective/
26 Council Directive 2009/147/EC on the conservation of wild birds (codified version of 79/409/EEC) accessible via: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2010:020:0007:0025:EN:PDF

- Water Act 2003[28];
- National Infrastructure Plan (2010)[29;]
- The Wildlife & Countryside Act (1981) as amended (most notably by the Countryside and Rights of Way (CRoW) Act[30] (2000);
- National Planning Policy Framework (2012);
- Securing the Future: UK Government Sustainable Development Strategy (2005)[31];
- UK Biodiversity Action Plan[32];
- National Heritage Protection Plan[33]; and,
- Conservation of Habitats and Species Regulations (2010)[34.]

Regional

- Great Ouse Catchment Flood Management Plan;
- Anglian River Basin Management Plan; and,
- Anglian Flood Risk Management Plan Scoping Report.

Local

Plan, programmes and policies of local importance are outlined in Section 4.4.

5.3 Water Framework Directive (WFD) Assessment

The European Water Framework Directive (WFD) (2000/60/EC), which was transposed into UK law in 2003 by the Water Environment (WFD) (England and Wales) Regulations, represents a strategic planning process to manage, protect and enhance the condition of water bodies. It establishes a framework for the protection of water bodies including terrestrial ecosystems and wetlands directly dependent on them. Plans and strategies which could influence water body condition should consider WFD objectives. Although a formal WFD assessment is not a statutory requirement of the Strategy, WFD requirements are being considered as part of the SEA process, including where opportunities to improve WFD status exist.

5.4 Identification of Key Themes

The main themes and objectives from the policies, plans and programmes review that are considered relevant to the Strategies are presented below:

- Reduce and manage the risks of flooding;
- Adapt and mitigate the impacts of climate change;
- Promote a strong and diverse economy;
- Promote sustainable, healthy and safe communities;
- Protect and enhance the quality, extent and character of open and green spaces, natural environments and waterways;
- Conserve flora and fauna and their habitats;
- Halt overall biodiversity loss; and,

27 Future Waterhttp://www.official-documents.gov.uk/document/cm73/7319/7319.pdf?bcsi_scan_AB11CAA0E2721250=0&bcsi_scan_filename=7319.pdf
28 The Water Act (2003)http://www.legislation.gov.uk/ukpga/2003/37/contents
29 HM Treasury, 2010: National Infrastructure Plan. Available at: http://www.hm-treasury.gov.uk/ppp_national_infrastructure_plan.htm
30 Wildlife and Countryside Act http://www.jncc.gov.uk/page-1377
31 Securing the Future https://www.gov.uk/government/publications/securing-the-future-delivering-uk-sustainable-development-strategy
32 UK Biodiversity Action Plan http://jncc.defra.gov.uk/default.aspx?page=5155
33 National Heritage Protection Plan http://www.english-heritage.org.uk/professional/protection/national-heritage-protection-plan/
34 Conservation of Habitats and Species Regulations (2010) http://www.legislation.gov.uk/uksi/2010/490/contents/made

- Improve water quality so all Heavily Modified water bodies achieve 'Good Ecological Potential' as set out in the WFD;
- Provide an efficient, effective and robust transport system;
- Protect cultural, architectural and archaeological heritage assets including conservation areas and built heritage; and,
- Promote sustainable growth.

The themes and objectives identified will provide an input into the process of identifying key issues and opportunities in the development and refinement of the SEA objectives.

6 SEA Baseline Information

6.1 Introduction

The collection of baseline information forms an essential part of the SEA process. It is important to obtain sufficient baseline information on the current and likely future state of the environment in order to enable the Strategy's effects upon the environment to be adequately predicted and evaluated. Where possible, data should be collected which shows either a spatial or temporal trend. This allows for a more informed judgement of the current situation in terms of the environmental baseline of certain areas relative to others.

The SEA Directive states that the baseline data within the Environment Report should include:

- Relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme;
- The environmental characteristics of areas likely to be significantly affected; and,
- Any existing environmental considerations which are relevant to the plan or programme including European sites for nature conservation.

The SEA Directive outlines aspects of the environment that must be considered as individual topics. However, if there are unlikely to be any significant effects upon a particular environmental receptor, as a result of the Strategy, it is possible to scope the topic out of the assessment.

6.2 Summary of Flood Risk in Milton Keynes

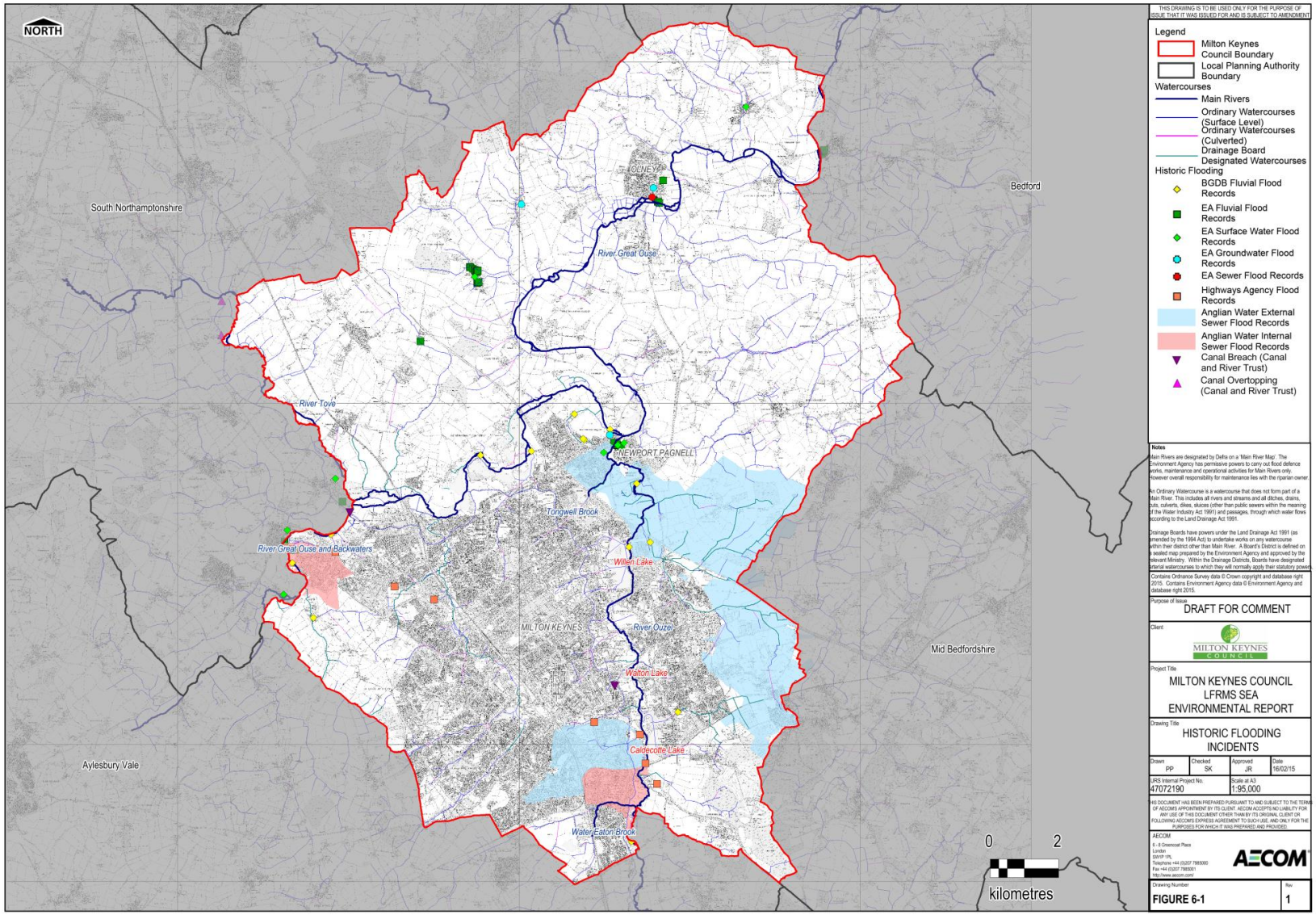
Milton Keynes lies within the Anglian river basin district. The Anglian river basin district spans from Lincolnshire in the north to Essex in the south and Northamptonshire in the west to the East Anglian Coast. The district comprises small to medium sized towns and cities, there are no extensive metropolitan areas and the district is predominantly rural with the majority of the land surface occupied by agriculture or horticulture[35]. Rural land management is a source of diffuse pollution from nutrients, sediments and pesticides. Sewage treatment works and other intermittent discharges from the sewerage network also increase nutrient levels. Run-off and drainage from urban areas can also contain a range of pollutants whilst physical modification of waterbodies is a key issue within the district. Milton Keynes falls within the Upper Ouse and Bedford Ouse catchment as defined by the Anglian RBMP. The RBMP states that there are 94 river water bodies in the catchment and 5 lakes, in 2009 26% of water bodies were of good ecological status or potential, by 2015 this figure is expected to rise to 29%. Key actions for this catchment include the implementation of eel passage systems, the delivery of a River Ouse Strategic Partnership to develop partnerships and relationships with farmers and land owners and the management of invasive species such as Giant Hogweed.

Flood Risk in Milton Keynes is associated with a number of sources including surface water runoff; sewer and highway networks; groundwater; fluvial (main river and ordinary watercourse); artificial sources (canals and reservoirs) and a combination of any of these sources, as shown previously in Figure 4-3 and as reproduced in Figure 6-1. Flood incidents are typically shown to occur alongside the River Great Ouse and Ouzel floodplains yet are not always attributable to fluvial flooding. Other areas which are shown to have experienced historic flooding include Stoke Goldington and the western extent of the Milton Keynes Council's administrative boundary such as Stony Stratford. Information relating to historic flooding outlined within this Strategy was originally collated during the preparation of the 2008 Strategic Flood Risk Assessment from a number of stakeholders and RMAs such as the Environment Agency, Highways Agency, Bedford Group of Internal Drainage Boards, Canal and River Trust, and Anglian Water Services.

35 Anglian River Basin Management Plan (2009)
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/309814/River_Basin_Management_Plan.pdf

Main rivers, sewers and artificial sources are not considered to be ‘local’ sources of flooding. Consequently they do not fall under the responsibility of Milton Keynes Council and the scope of this Strategy. However, these sources are considered to be significant within Milton Keynes and can combine with local sources to create a flood event. Therefore a brief summary of all flood sources is provided below.

Figure 6-1: Historic Flooding Incidents



6.3 Surface Water (Pluvial) Flooding

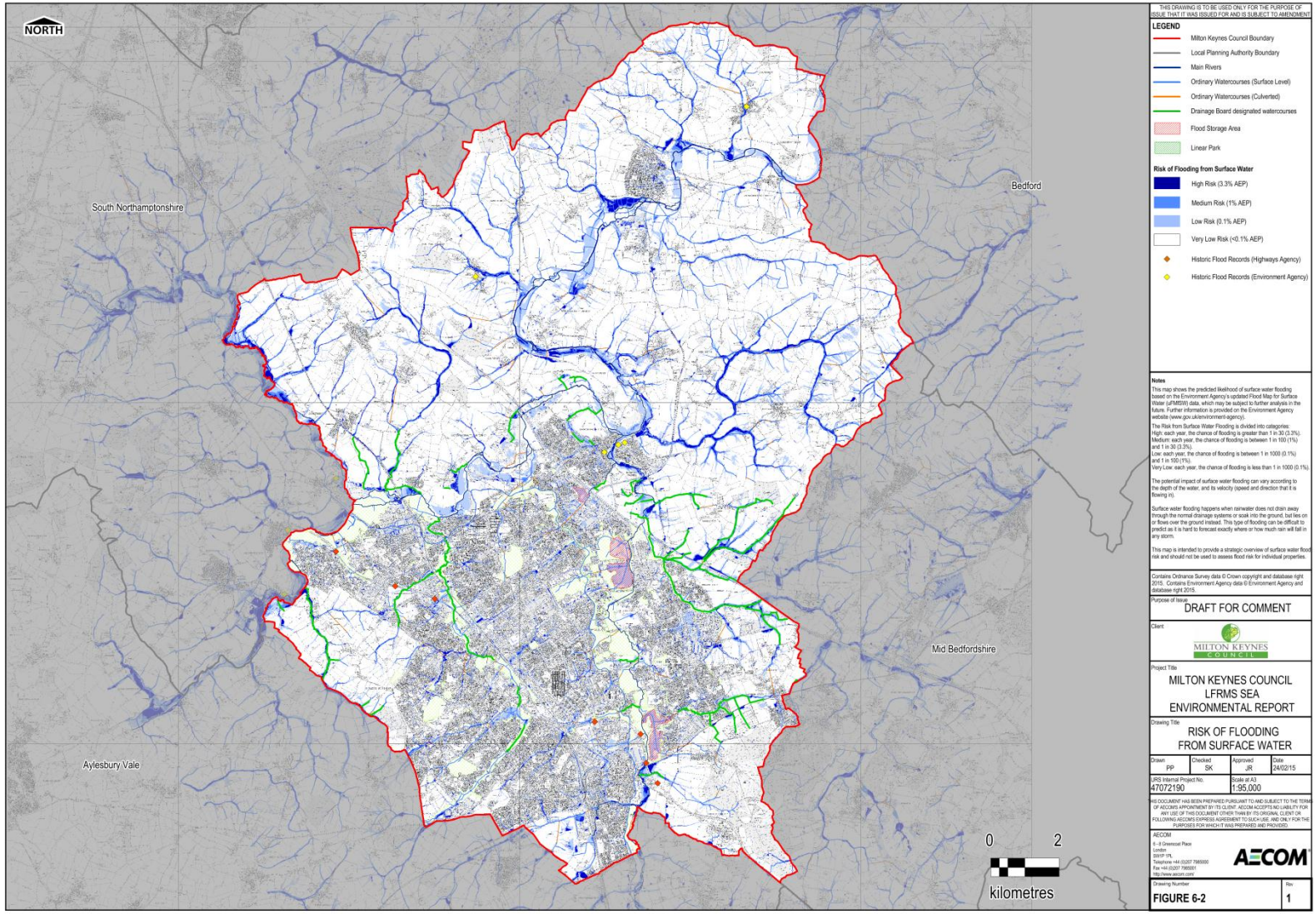
Surface water flooding usually occurs when high intensity rainfall generates runoff which flows over the surface of the ground and ponds in low lying areas, before the runoff enters a watercourse or sewer. It can be exacerbated when the ground is saturated and/or when watercourses or road drainage systems have insufficient capacity to cope with the additional surface water runoff.

The Updated Flood Map for Surface Water (uFMfSW) shown in Figure 6-2 demonstrates that surface water flooding is widespread across Milton Keynes with surface water shown to pond in natural low points within the fluvial floodplains of the River Great Ouse and the River Ouzel. Similarly, within the more urbanised areas of Milton Keynes, surface water flood risk is concentrated along smaller, ordinary watercourses.

The Environment Agency surface water flood risk records demonstrate a cluster of flooding incidents near Newport Pagnell. At Newport Pagnell, a large area of residential land to the west of the Bury Ground adjacent to Lakes Lane is shown to be at low to medium risk of surface water flooding. Surface water is shown to collect behind railway embankments, such as in the north western part of the Borough where tributaries of the River Tove flow across the route of the railway line.

Highway Agency flooding records show two clusters of surface water flooding in the south (Fenny Stratford) and south west (surrounding Bradwell Abbey) of Milton Keynes.

Figure 6-2 Risk of Flooding from Surface Water.



6.4 Groundwater Flooding

Groundwater flooding occurs as a result of water rising up from underlying aquifers or from water flowing from springs. This tends to occur after long periods of sustained heavy rainfall and can be sporadic in both location and time often lasting longer than fluvial or pluvial flooding.

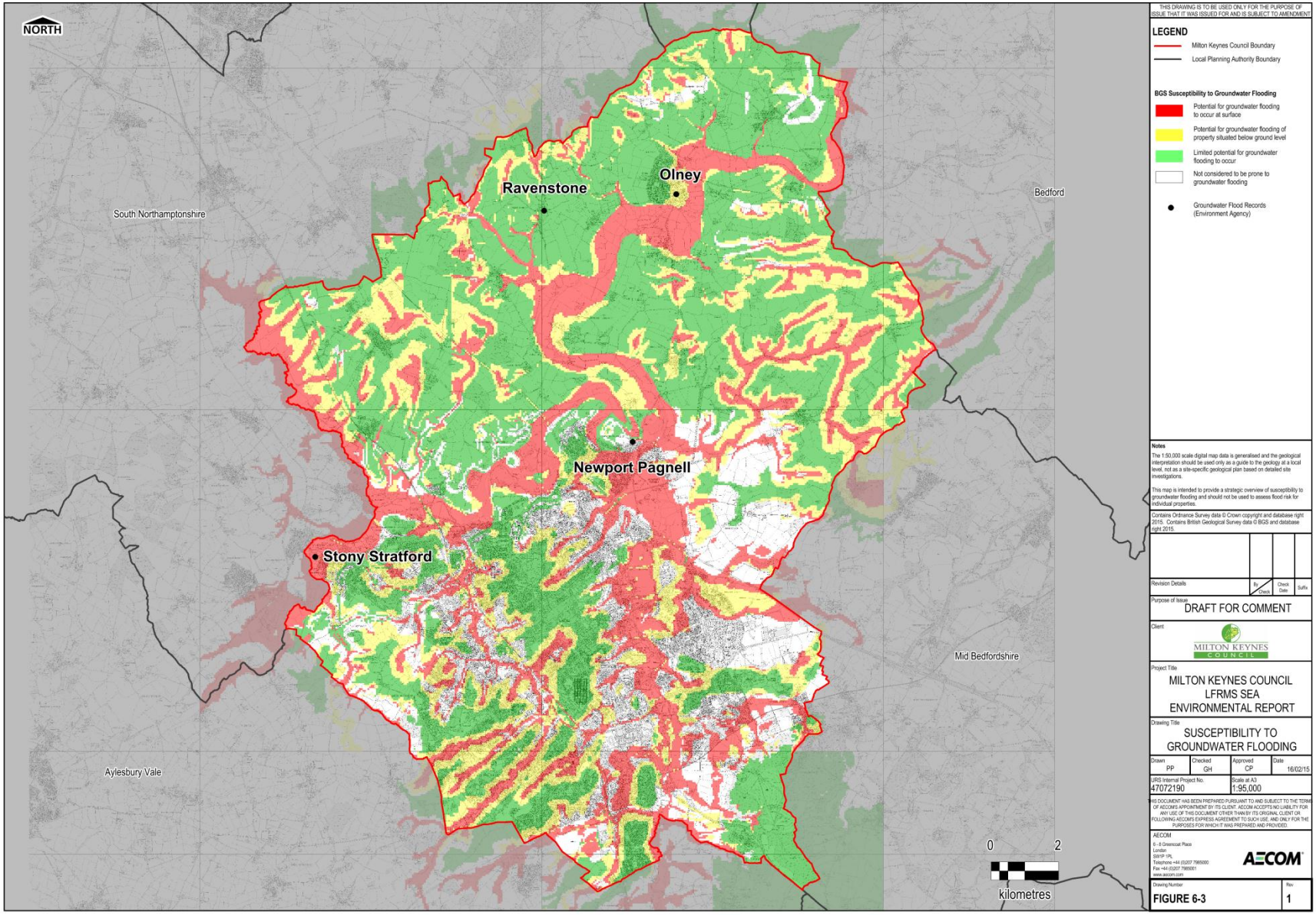
High groundwater levels may not always lead to widespread groundwater flooding; however, they have the potential to exacerbate the risk of surface water flooding and flooding from rivers by reducing rainfall infiltration capacity, and to increase the risk of sewer flooding through sewer/groundwater interactions.

The areas of Milton Keynes which are susceptible to groundwater flooding are shown in Figure 6-3. Similarly to surface water, the risks of groundwater flooding are generally confined to fluvial floodplains. Along and adjacent to the watercourses throughout the Milton Keynes study area, there is an increased potential for groundwater flooding to occur due to the higher permeability of River Terrace Deposits and Alluvium and associated high groundwater levels in adjacent areas.

In the north of Milton Keynes the underlying geology is predominantly limestone or the Kellaways Formation and Oxford Clay Formation. Consequently, there is a limited potential for groundwater flooding to occur. However, the Environment Agency holds groundwater flood records at Raventstone, Olney, Newport Pagnell and Stony Stratford.

The bedrock geology of the central and southern parts of Milton Keynes is predominantly Oxford Clay which is relatively impermeable. As a result, areas which sit directly on the clay are not considered to be at risk from groundwater flooding. Where areas sit on other bedrock formations other than Oxford Clay such as Rutland, Great Oolite and Kellaways formations, ground water flood risk varies with some areas shown to be at risk of ‘at surface’ groundwater flooding. The Environment Agency holds two records of groundwater flooding at Stony Stratford and Newport Pagnell. A large proportion of the residential area of Newport Pagnell is shown to be at risk of groundwater flooding which also has the potential to occur ‘at the surface’. Other residential areas shown to be at risk of groundwater flooding ‘at the surface’ include Bletchley and Fenny Stratford.

Figure 6-3: Areas at Risk of Groundwater Flooding



6.5 Flooding from Ordinary Watercourses

Ordinary watercourses include every river, stream, ditch, drain, cut, dyke, sluice, sewer (other than a public sewer) and passage through which water flows, above ground or culverted, which is not designated as a main river. Ordinary watercourses in Milton Keynes include:

- Loughton Brook;
- Broughton Brook;
- Calverton Brook;
- Caldecotte Brook;
- Chicheley Brook; and,
- Springhill Brook.

Typically, areas of flood risk attributable to ordinary watercourses are typically associated with tributaries of main rivers such as the Great Ouse. However, there are more isolated instances of fluvial flood risk as a result of ordinary watercourses in areas such as Loughton (from Loughton Brook) and areas to the south of Bletchley.

The Bedford Group of Internal Drainage Boards' (BGDB) flood records are distributed over a wider area than the Environment Agency flood records which are more concentrated around the Great Ouse. The BGDB records are typically associated with flooding of the Great Ouse and Blackwater tributaries. Other BGDB fluvial flood records include those in close proximity to Newport Pagnell, Willen Lake and between Walton and Caldecotte Lake.

The Bedford Group of Drainage Boards (BGDB) is a consortium comprising the Buckingham and River Ouzel Internal Drainage Board (IDB) which operates within the Milton Keynes Borough, as well as the Bedfordshire and River Ivel IDB and the Alconbury and Ellington IDB.

The Bedford Group of Drainage Boards is responsible for:

- Managing water levels in the watercourses designated to each IDB.
- Manage and reduce the risk of flooding within the IDB's district.
- Permissive powers to:
  - undertake maintenance on ordinary watercourses within their district; and
  - supervise all matters relating to the drainage of land within their districts.
- Byelaws securing the efficient working of the drainage systems.

6.6 Main River (Fluvial) Flooding

River flooding occurs when water levels rise as a result of high or intense rainfall which flows into them, resulting in watercourses overflowing or bursting their banks. A main river is defined by the Environment Agency on its Main River Map36 and is usually a larger river or stream. Main rivers within Milton Keynes include (as shown in Figure 6-4):

- The Great Ouse;
- The River Ouzel;
- Water Eaton Brook;
- Tongwell Brook; and,
- The River Tove.

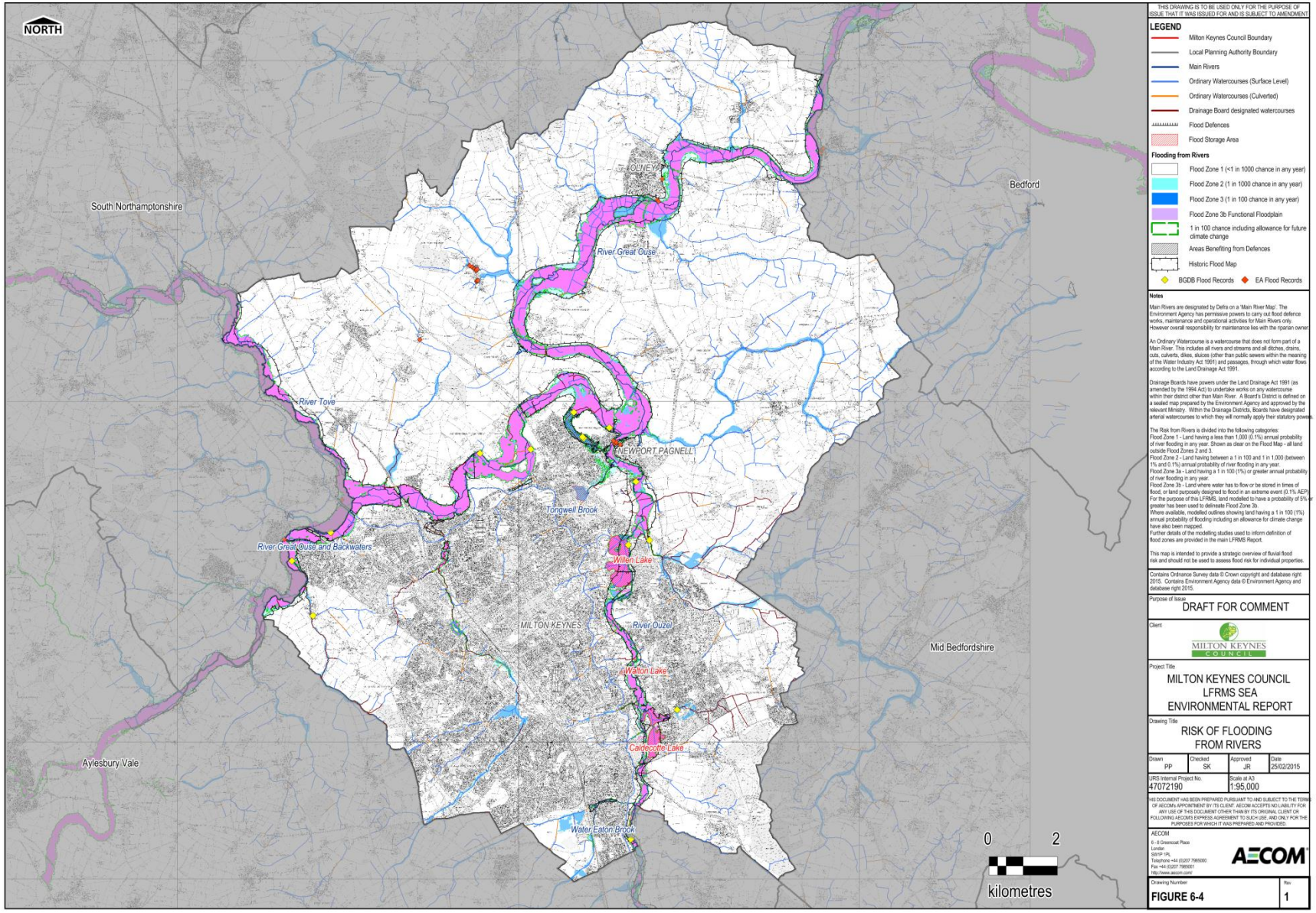
36 Environment Agency website: https://www.gov.uk/government/organisations/environment-agency

The majority of Milton Keynes is considered to be within Flood Zone 1. However, there are a number of fluvial flood records throughout Milton Keynes. Environment Agency records demonstrate a cluster of fluvial flood records at both Newport Pagnell and Olney (associated with the Great Ouse), and at Stoke Goldington associated with tributaries of the Great Ouse.

There are no large residential areas which appear to be at risk of fluvial flooding however there are smaller settlements which are located within flood zones 2 and 3 such as small areas of Walton (flood zone 3); Newport Pagnell (flood zone 2) and Stoke Goldington (flood zone 3).

Figure 6-4 shows fluvial flood zones for Milton Keynes.

Figure 6-4 Fluvial Flood Zones for Milton Keynes



6.7 Sewer Flooding

Sewer flooding usually coincides with heavy rainfall, and may occur if the amount of rainfall exceeds the capacity of the sewer system, the system becomes blocked and/or water surcharges (i.e. rises above the ground) due to high water levels in the receiving watercourse.

On the whole, separate surface water sewers are designed to cope with the vast majority of storms. However, in locations with combined sewers (foul and surface water), rainfall can be so heavy that it overwhelms the combined sewer. Foul sewer flooding also occurs where surface water drainage has been incorrectly connected to the foul sewer (which is not designed to convey the large volumes of water during a storm). When this happens, sewage can overflow from manholes and gullies and flood land, rivers and gardens. It is difficult to disassociate sewer flooding from surface water runoff (for which Milton Keynes are responsible for as LLFA).

Anglian Water Services AWS DG5 Flood Register for the study area identifies that there has been 2 properties affected by internal flooding in the areas of Fenny Stratford and Stony Stratford. External flooding has affected 1 property in each of the four areas:

- Denbigh North;
- Bletchley;
- Woburn Sands; and,
- Moulsoe/Southern Newport Pagnell.

South-east of Olney there is an isolated incident of sewer flooding held by the Environment Agency.

6.8 Artificial sources

Artificial sources include any water bodies not covered under other categories and typically include canals, lakes and reservoirs. In Milton Keynes the Grand Union Canal presents a flood risk due to breach or overtopping.

There are eleven impounding reservoirs/storage areas situated within Milton Keynes that may present a flood risk due to failure or overtopping of the structures. These are:

- Caldecott Lake
- Willen Lake
- Simpson Balancing Reservoir
- Furzton Balancing Lake
- Tongwell Lake
- Bradwell Lake
- Loughton Lake
- Foxcote (Buckinghamshire County)
- Wakefield Lodge (Northamptonshire County)
- Towcester Flood Storage Reservoir (Northamptonshire County)
- Foscott (Buckinghamshire County)

6.9 Summary of Baseline Information

During the scoping phase, data was collected for each of the ‘scoped-in’ topics’ to determine the significance of the potential impacts arising as a result of the implementation of the Strategy. Where possible, data was collected which showed both

spatial and temporal trends. This approach facilitated a more informed judgement of the current situation in terms of an environmental baseline, especially comparatively across areas. The SEA Directive outlines aspects of the environment that must be considered. However, if there is unlikely to be any significant effects upon a particular environmental receptor as a result of the Strategy it is possible to scope the topic out of the assessment

The following SEA topics are considered unlikely to be significantly affected by the Strategy and it is therefore proposed to scope them out of the assessment:

Population - Although there is the potential for some individuals to be affected by the implementation of the Strategy it is unlikely that the wider population will be significantly, directly affected. Effects relating to topic areas that are linked to population, such as flood risk, human health and material assets have been scoped in to this assessment.

Air - The Strategy does not include objectives or measures that are envisaged to give rise to activities that emit greenhouse gases or other pollutants. The effects upon air quality have therefore been excluded. However, if specific measures or plans were proposed which may have an adverse impact upon air quality further assessments such as an EIA may be required.

Therefore the following receptors have been 'scoped in' to the SEA Scoping Report: biodiversity, climate, cultural heritage, human health, landscape, material assets, geology and soil, water and the interrelationships between these receptors. During the scoping stage, data was collected for each of the scoped in topics to determine the significance of the potential impacts arising as a result of the implementation of the Strategy. The baseline data collected during the scoping stage is provided in Appendix C and a summary of the baseline data is provided in Table 6-1.

Text formatted as italic refers to likely future conditions.

Table 6-1: Summary of Milton Keynes Environmental Baseline

Biodiversity
– 49% of all of Northamptonshire's reedbed habitat is located in Milton Keynes, 88% of which is not protected by nature conservation designations; – 23% of all of the County's floodplain grazing marsh is located within Milton Keynes, none of which is located within a conservation area; – 23% of the County's lowland wood-pasture is located within Milton Keynes, none of which is protected; – Milton Keynes has three SSSIs located either entirely or partially within the administrative boundary of Milton Keynes Council. These three SSSIs include Howe Park Wood, Oxley Mead and Yardley Chase (Howe Park and Oxley Mead SSSI are entirely within the boundary); – There are four SSSIs within1km of the Milton Keynes administrative boundary and these include Mill Crook SSSI, Salcey Forest SSSI, Kings and Bakers Wood and Heaths SSSI, and Wavendon Heath Ponds; – Milton Keynes has a Local Nature Reserve, the 'Blue Lagoon'; – Milton Keynes has 200 Local Wildlife Sites; and, – 18 wildlife corridors (inclusive of woodland, railway corridors, grid road corridors and wetland habitats)[37]. *Climate change has the potential to adversely impact upon biodiversity through a number of mechanisms such as an increased incidence and magnitude of extreme weather events leading to the flooding of habitats. There is also the potential for habitat loss and fragmentation across Milton Keynes.* *However, as a result of international and national legislation which is supported by local policy such as the Buckinghamshire and Milton Keynes BAP, it is highly likely that measures will be put in place to protect ecosystems and the flora and fauna they contain. As a result of plans and programmes such as the Biodiversity Opportunity Areas project it is likely that biodiversity and nature conservation will in fact be enhanced in the future.*
Climate

37 Open Space and Natural Environment Plan:MK Topic Paper.

Milton Keynes CO_2 emissions per person are higher than the average for the South East of England due to high levels of greenhouse gas emissions resulting from industry and commerce. However, domestic CO_2 emissions are relatively low due to a modern housing stock[38].

UK Climate Projections (UKCP09) assumes the following for the South East of England under a medium emissions scenario for 2080:

- An increase in mean winter temperature of approximately 3˚C;
- An increase in mean summer temperature of approximately 3.9˚C;
- An increase in winter mean precipitation of 22%; and,
- A decrease in summer mean precipitation of 23%[39.]

A Local Climate Impacts Profile Report[40] was produced for Milton Keynes in 2010 which showed a worst case scenario wherein the future warmest day temperatures may increase by 12.8˚C by the 2080s. This is higher than the summer mean daily maximum temperature projected across the South East of England which is projected to be 11.5˚C. Extreme weather events such as flooding and heatwaves are also predicted to accompany these rising temperatures[41.]

The projected future climate of Milton Keynes has been discussed above. Generally a warming trend will be experienced with altered precipitation patterns and an increased frequency of extreme weather events. However, early identification of these projections along with a Strategy which aims to mitigate and adapt to such changes should limit the most adverse climate change impacts which could affect Milton Keynes' population.

Cultural Heritage

Milton Keynes has the following heritage assets:

- 1,100 Listed Buildings;
- 27 Conservation Areas – the largest being Wolverton;
- 50 Scheduled Ancient Monuments; and,
- 3 Registered Parks and Gardens.

Only three of the heritage assets listed refer to 'New Town assets'; the Shopping Building, the former bus station in Central Milton Keynes and the houses at Cofferidge Close, Stony Stratford.

There are six heritage assets within Milton Keynes which are identified as being at risk on the 2014 Heritage at Risk Register: five scheduled monuments and one grade II* listed building.

The Buckinghamshire and Milton Keynes Historic Towns Project[42] provides information relating to the historic environment of Milton Keynes and focuses on areas such as Newport Pagnell, Olney and Bletchley and Fenny Stratford which have shown to be areas of historic flooding. Information dates back to the Medieval period (1066-1536) for the majority of areas and the Anglo Saxon period for Newport Pagnell and Olney. Newport Pagnell is therefore one of the earliest towns in the county referred to in the Domesday Book as a Borough. Olney's first historical reference dates back to 979 and is therefore one of the earliest documented settlements in the county and has evidence of a substantial Roman settlement to the north of the town at Ashfurlong.

The Heritage Strategy has the overarching aim of Milton Keynes becoming renowned as 'world class 'for heritage by 2023 and delivering the vision of 'heritage at the heart of Milton Keynes and a force for social, economic and cultural vitality'. Alongside the heritage strategy, Plan:MK will also provide protection and enhancement of heritage assets. The LFRMS will also act to protect Milton Keynes' heritage through the prevention of flooding which may affect the quality of heritage assets. As a result, due to the high level of protection afforded to heritage assets, it is likely that the cultural heritage value of Milton Keynes will in fact increase over time. Flood alleviation and mitigation measures do have the potential to adversely impact upon heritage

38 Low Carbon Living Strategy and Action Plan http://www.milton-keynes.gov.uk/environmental-health-and-trading-standards/mk-low-carbon-living/low-carbon-living-strategy-and-action-plan
39 UKCP09. South East England Keys Findings. http://ukclimateprojections.metoffice.gov.uk/22292
40 Local Climate Impacts Profile Report http://www.usea.org.uk/images/news_images/Milton%20Keynes%20LCLIP.pdf
41 Climate Change and Sustainability Topic Paper – Plan:MK. http://www.milton-keynes.gov.uk/planning-and-building/planning-policy/plan-mk
42 The Buckinghamshire and Milton Keynes Historic Project http://www.buckscc.gov.uk/media/1914822/historic-towns-report.pdf

through changing landscape and flood regimes, however it is more likely that beneficial impacts upon heritage as a result of flood risk mitigation measures will arise.

Human Health

Milton Keynes has a growing population and is home to 255,700 people. Whilst the number of young people is increasing and there is major inward migration of working age individuals into Milton Keynes, the population is ageing faster than the national average. This has led to increasing demands upon healthcare systems.

On average, the health of the Milton Keynes population is better than the national average. However, there are wide gaps in health outcomes between the most and the least affluent. The national index of multiple deprivation shows a continuing trend of increasing inequalities since 2004. For example, educational attainment and vehicle ownership is high whilst unemployment is low in Milton Keynes and has the fifth lowest level of fuel poverty in England and Wales. However, nearly 20% of the population is affected by poverty and crime, which is higher than the national average and a concern amongst residents[43].

In the near future it is unlikely that the health and wellbeing of the Milton Keynes population will change dramatically (either beneficially or adversely). However in the longer term it is hoped that health statistics will further improve as a result of the requirements and policies of frameworks such as the Joint Strategic Needs Assessment.

Milton Keynes healthcare providers should be aware of the challenges faced to health and wellbeing as a result of climate change, particularly in relation to flooding incidents which may increase in both magnitude and frequency in the future as a result of a changing climate.

Landscape

Open spaces are seen as highly important in Milton Keynes, providing an important role in flood mitigation and nature conservation. In 2006 to 2007 a Draft Landscape Character Assessment was undertaken for Milton Keynes, this assessment is currently being updated and finalised[44]. In summary, Milton Keynes is located within the national landscape character area known as the 'Bedfordshire and Cambridgeshire Claylands' which comprise areas of undulating 'upland plateau' intersected by the shallow river valleys of the Ouse and Ouzel.

As aforementioned, Plan:MK contains a Topic Paper specifically related to Open Spaces and the Natural Environment. In the plan Milton Keynes is described as having a high quality landscape with a well-connected framework of green space which is predominantly managed by the Milton Keynes Park Trust.

Across the Borough, public open space covers approximately 3,200ha (129ha per 1000 population), one of the highest amounts of open space per resident across local authorities. Milton Keynes Council is responsible for managing 1,200ha of this open space which is mainly located in the south of the Borough.

The landscape quality of Milton Keynes is widely acknowledged by key stakeholders and seen to derive multiple benefits from flood alleviation and nature conservation to recreational and leisure benefits.

The Local Plan, Core Strategy and most recently Plan:MK all endeavour to prevent inappropriate development and to maintain and enhance the landscape of Milton Keynes. Specifically in regards to flooding, the role that the landscape plays in regards to flood alleviation is seen as a vital asset. In the future, climate change impacts are likely to increase the incident and magnitude of flooding; therefore it is likely that such landscapes will become increasingly important and therefore protected. Conversely, it is likely that development pressures will increase over time thereby putting the landscape of Milton Keynes at risk. In this instance sustainable development which has a sympathetic design and does not increase flood risk/impose upon nature conservation efforts must be ensured.

Material Assets

Flood Defences

Milton Keynes was designed so that the majority of the natural floodplain is within linear parks. As a result there are few properties lying with flood zones 2 and 3. Areas where there are properties within flood zones 2 or 3 may benefit from the presence of flood defences such as Newport Pagnell, Belvedere Farm, Walton Hall and Caldecotte Mill.

Surface Water Management Assets

43 Milton Keynes Joint Needs Assessment 2012/13
http://www.mkiobservatory.org.uk/Download/Public/1026/DOCUMENT/10265/JSNA%2012-13%20Executive%20Summary.pdf
44 Draft Landscape Character Assessment http://www.milton-keynes.gov.uk/planning-and-building/planning-policy/draft-landscape-character-assessment

Milton Keynes has a number of assets which provide surface water management benefits such a network of balancing lakes which accommodate for the increasing runoff from urban areas.

Prior to the development of Milton Keynes there was regular flooding of the Great Ouse, River Ouzel and Loughton Brook. The Milton Keynes Drainage Study (Halcrow 2000) found that water levels for a 1 in 100 year storm at Newport Pagnell would be lower than they were prior to the development of Milton Keynes, due to storage provided by the balancing lakes on the River Ouzel and by their role in reducing flood peak water levels. The linear lakes are designed to flood occasionally to protect Milton Keynes; therefore they are not available as public open space.

The principal balancing lakes on the Ouzel are the Caldecotte and Willen Lakes which have control gates to regulate the flow in the Ouzel. They were built to compensate for increased flows in Broughton Brook and increased discharge from the sewage treatment works, as well as increased run off flows in the Ouzel.

Water and Water Infrastructure

Regionally, water supply is resourced from two main sources; surface water abstraction (60%) and groundwater abstraction (40%). Anglian Water Services provides clean and waste water services to Milton Keynes. Milton Keynes is predominantly served by a separate sewerage system which largely drains to Cotton Valley Wastewater Treatment Works (WwTW) located to the east of Milton Keynes. Older outlying towns and villages have combined systems draining to various WwTW such as those at Olney and Hanslope.

Milton Keynes' Water Cycle Study completed in 2008 outlined a number of sewer capacity issues across the area such as Land East of the M1, rural areas including Hanslope and the Central Area – North East[45].

Waste and Waste Infrastructure

The efficiency of Milton Keynes' waste management systems has greatly improved in recently years, largely as a result of the implementation of the revised Waste Strategy in 2011. Household recycling rates have increased from 52% in 2010/11 to 53.5% in 2012/13, despite a plateau in recycling rates both nationally and locally. Overall waste volumes have decreased and further improvements to recycling rates are expected upon the Milton Keynes Waste Recovery Park becoming operational.

Transport and Transport Infrastructure

Congestion of road systems is becoming more apparent, partially as a result of a high number of commuter journeys, 61.7% of which are single occupancy. Over the space of 4 years between 2009/10 and 2013/14, journey times have increased by 7%. In a bid to enhance the sustainability of Milton Keynes' road network a number of assessments and strategies have been undertaken by the Council such as a review of parking standards.

In recent years, a greater proportion of journeys have been made by more sustainable options such as by rail or on foot (a 5% increase) whilst there has been a slight decrease in cycling, the reasoning behind which is unknown.

In a bid to assist with the planning of growth and the associated pressures upon highways networks, the Milton Keynes Multi Modal Model (MKMMM) Transport Model has been devised which can aid decision making by allowing to forecast future transport demands[46].

Information and Communications Technology

Telecommunications has become a key area of partnership for Milton Keynes' council in recent years. For instance, the provision of high speed broadband is an increasingly important factor for businesses when deciding upon their location and therefore has the potential to impact upon the economic growth of the area. As a result, the Borough has been working to roll out broadband infrastructure across the area in a bid to facilitate the aim of having 86% of premises with access to superfast broadband by the end of 2014. Additionally, the Borough is working to ensure that high speed broadband access and digital infrastructure is available for all new developments[47].

Development pressures and climate change and associated extreme weather events such as flooding are likely to increase the stresses placed on Milton Keynes' material assets. However, it is likely that the future condition of material assets will improve in line with the requirements of new developments and policies such as Plan:MK. It is likely that water infrastructure and assets will be enhanced to meet the requirements of future developments and are likely to implement the use of sustainable urban drainage systems (SuDS). Waste infrastructure is also likely to see improvements in line with the aim of enhancing recycling rates whilst it is likely that transport networks will be expanded to meet increased demand. In regards to

45 Milton Keynes Water Cycle Study
46 Transport and Travel Topic Paper – Plan:MK
47 Provisions of Physical and Social Infrastructure – Plan:MK

communications, it is very likely that the number of individuals which have access to high speed digital services will increase in the coming years and is essential for continued economic growth of the Borough.
Geology and Soil
The type of soil and underlying geology influence the likelihood of surface and groundwater flooding in an area. In addition, vulnerability to soil erosion varies depending on soil structures. Presence of contaminated land is also crucial in identifying potential risks in the area. Mapping of both contaminated land sites and geology can be found in Milton Keynes' Council Contaminated Land Strategy. The bedrock geology of the area comprises broadly from the Lower Jurassic Lias Group to the outcrop of the Woburn Sands Formation from the Lower Cretaceous. The bedrock in the south of Milton Keynes consists mostly of mudstone from the Oxford Clay Formation, and sand and mudstone of the Kellaways Formation. In the far south eastern corner there is an outcrop of the Woburn Sands Formation. To the north of Milton Keynes, the underlying geology consists of Great Oolite Group comprising Sandstone, Limestone and Agrillaceous rocks. Towards the north west is the Lias Group comprising of Mudstone, Siltstone and Ironstone. The superficial geology of the area consists of Glacial Till to the west and shows River Terrace Deposits, Alluvium and Head along the fringes of the major watercourses namely the rivers Ouzel and the Great Ouse and their tributaries[48]. There are a number of potentially contaminated sites distributed throughout Milton Keynes, many of which have the potential to cause land contamination as demonstrated by Milton Keynes' Contaminated Land Strategy. *Impacts resulting from climate change are likely to be complex, since climate, geology, soils, topography, drainage and vegetation are inter-related. Climate change is likely to lead to an increase in frequency and severity of extreme weather events (such as flooding and increased surface water runoff), which in turn may lead to increased soil erosion and degradation of land and/or protected sites.* *There is also concern about the gradual degradation of both the countryside and urban environment through changing farming practices, drainage of wetlands, increased pressure from transport and the need for new housing and other development. The majority of Milton Keynes bar Milton Keynes city is agricultural land interspersed with settlements. Future flood events may cause damage to agricultural land which could have consequences for the rural economy.* *Climate change may result in extreme weather events such as flooding. Such flooding could increase pollution by mobilising contaminants over a wider area.*
Water
Please see Section 6-2 to 6-8.

6.10 Likely Influence of the Strategy

The following subheadings detail how the Strategy may influence each receptor 'scoped in' to the SEA and how each receptor may be affected by a failure to implement the strategy, i.e. 'likely impact without implementation of the strategy'.

Biodiversity: Implementation of the Strategy may lead to the construction of flood management infrastructure, changing land use, changes in flood risk and changing water levels. These changes have the potential to adversely affect nature conservation efforts, leading to biodiversity loss and the alteration of landscape features.

However, beneficial impacts could include new opportunities for habitat creation or the improvement of existing habitats. Subsequently this could lead to the preservation of biodiversity, including that of designated species and habitats and the development of new/enhanced landscape features. Failure to capitalise upon the potential advantages the Strategy may result in habitat and biodiversity loss along with the inundation of landscape features.

Climate: Whilst the implementation of the Strategy will not directly influence climate, climatic factors have been scoped into the assessment in order for a comprehensive and holistic assessment to be undertaken. Implementing the Strategy will potentially mitigate against a number of climate change impacts such as an increasing number of extreme weather events such as flooding. A failure to implement the Strategy will leave the area vulnerable to climate change and associated impacts.

Cultural, Architectural and Archaeological Heritage: Delivery of Strategy objectives may lead to the construction of additional flood management infrastructure such as tidal defences, which may change land use, alter flood regimes, change

48 Milton Keynes Level 1 SFRA 2014

water levels and alter landscape features. The implementation of new infrastructure provides a potential for enhanced landscape features if approached appropriately and could enhance the culture and aesthetics of the local area. Failure to implement the strategy may result in a reduced quality of heritage sites as a result of flooding and its associated effects including erosion and weathering.

Human Health: The Strategy will aim to work collaboratively with various stakeholders to reduce flood risk and its associated impacts upon the population. Public awareness will also be improved and aid in flood risk preparedness. Failure to implement the Strategy has the potential to expose communities to poor health and wellbeing as a function of stress and anxiety over flooding concerns and the aftermath of flooding. More immediately after a flood event human health can be affected acutely through exposure to compromised water or through drowning.

However, the delivery of the strategy objectives may affect public access to recreational features, goods and public services that can make a material difference to their quality of life. As a result, access must remain a consideration when implementing local flood risk management plans, programmes and strategies.

Materials Assets: The Strategy aims to manage, and where possible limit, the flood risk to critical infrastructure and material assets. The future implementation of the Strategy has the potential to disrupt transport infrastructure, waste management facilities, utilities such as water and access to healthcare in the form of hospitals and healthcare centres. In a bid to fulfil the overarching aim of the LFRMS/FRMP the location of such vital infrastructure may influence the strategy's deliverance, especially in the instance of the development of new infrastructure.

Ultimately the Strategy aims to protect Milton Keynes' material assets, infrastructure and services. Therefore failure to implement the LFRMS could result in a loss or temporary cessation of integral systems.

Geology and Soil: By implementing the Strategy any flood and water management infrastructure which is implemented is ensured to be sustainable and will therefore protect/enhance soil resources in the area. Similarly the Strategy, which aims to reduce the magnitude and incidence of flooding, will further protect soil resources by preventing soil erosion which may arise as a result of flooding. It is possible that there are areas of contaminated land within Milton Keynes. If this is the case, a reduction in flooding incidents has the potential to reduce the mobilisation of pollutants and hence protect soil quality in the area. Failing to implement the Strategy could result in soil erosion and pollution.

Landscape: The implementation of the Strategy may result in the construction of flood risk management infrastructure. This is likely to change flood frequency, water levels and may adversely affect landscape value and heritage. However, the Strategy will also provide opportunities for enhancement of the local landscape through sympathetic landscape design. In addition the accessibility of such landscapes may improve and enhance the health and wellbeing of local residents who may benefit form cultural ecosystem services. Failure to implement the strategy could result in a compromised landscape and heritage due to flooding and its associated impacts.

Water: Construction and changes in water levels/flow as a result of implementing Strategy actions have the potential to contaminate waters and alter flood frequency. This could lead to chemical, physical and biological changes in both ground and surface waters. Such changes may affect a waterbodies' ability to achieve and/or maintain a good ecological potential and may pose health risks to sensitive species and/or habitats. It is however, more likely that the delivery of the Strategy objectives will benefit water quality through the minimisation of flooding. Failure to implement the Strategy could result in compromised water quality and resources within Milton Keynes.

7 SEA Approach

7.1 SEA Objectives

The aim of this SEA process is to determine the environmental effects which may result from the implementation of Milton Keynes' LFRMS. In order to determine the effects that the LFRMS may have, a number of SEA Objectives have been devised. These Objectives (derived from the EA objectives included within the SEA Report for the National Flood and Coastal Erosion Risk Management Strategy for England) will be used to 'test' whether the objectives of the Strategy are in line with SEA objectives which have the overall aim of protecting and enhancing the various elements of the environment.

This section of the report sets out the SEA objectives and the approach used for the assessment of the Strategy objectives, actions and alternatives. The SEA topics, associated key environmental impacts, associated SEA objectives and potential indicators are demonstrated below in Table 7-1.

Table 7-1 Proposed SEA Topics, Key Environmental Issues, SEA Objectives and Potential Indicators for the SEA Assessment.

SEA Topic	Key Environmental Issue	SEA Objectives	Potential Indicator
Biodiversity	– Milton Keynes has a number of diverse yet potentially sensitive habitats and species, whose resilience and vulnerability to local flooding will differ; – These habitats comprise a number of SSSIs and locally designated nature conservation areas such as the Blue Lagoon LNR; – There is the potential for future habitat loss and fragmentation; – There is the potential for habitat creation, enhancement of alteration as a function of flood reduction measures associated with the delivery of the Strategy; and, – There is the potential for negative impacts to arise on statutory and non-statutory ecological sites as a result of flooding and flood reduction measures.	**Conserve and enhance biodiversity, wildlife corridors and habitats**	– Area of habitat created, enhanced or altered as a result of flood reduction measures – Negative impacts on statutory and non-statutory ecological sites as a result of flooding and flood reduction measures.
Climate	– Milton Keynes CO_2 emissions per person are higher than the average for the South East of England as a result of industry and commerce; – Domestic CO_2 emissions are relatively low due to a modern housing stock; – UK Climate Projections suggest that the South East of England will experience a warming trend with changes in precipitation and a greater frequency of extreme weather events; – Locally Milton Keynes has conducted a LCIP which projected more extreme climate change impacts such as a summer mean daily maximum temperature of 12.8 ˚C (compared to 11.5˚C as projected for the South East of England by the UKCP09); – The impacts of climate change on local communities, infrastructure and assets must be mitigated for or adapted to; – Construction activities associated with flood alleviation works could lead to increased greenhouse gas emissions for a temporary period; – There is the potential for increased flood levels and surface water runoff and subsequently flooding as a result of more intense/extreme rainfall events	**Manage and mitigate the future effects of climate change in new and existing development**	– Number of SuDS schemes adopted into existing and future developments which are adoptable and/or have maintenance regimes secured for the lifetime of the development – Predicted future local flood risk with climate change

	associated with climate change; and, – Most proposed measures have the potential to have a positive impact in mitigating against the effects of climate change.		
Cultural Heritage	– There are six heritage assets within Milton Keynes which are identified as being at risk on the 2014 Heritage at Risk Register, five scheduled monuments and one grade II* listed building; – By 2023 it is hoped that Milton Keynes will be renowned as 'world class for heritage'; – Potential threats to heritage assets include climate change and associated impacts such as increased extreme weather events and flooding; and, – Flood alleviation measures have the potential to adversely impact the environment; however it is more likely that heritage assets will benefit from the implementation of flood alleviation and mitigation measures.	**Conserve and enhance the historic environment, heritage assets and their settings** Would the proposed measure reduce the number of heritage assets at risk of flooding? Would the proposed measures adversely affect the significance of a heritage asset?	– Number/area/percentage of designated heritage assets at risk of local flooding – Number/area/percentage of Conservation Areas which have changed as a result of the Strategy – Number/percentage of listed buildings on the 'at risk' register at risk from flooding – The area of historic archaeological potential at risk
Human Health	– Access to the natural environment is essential to protect/enhance human health and wellbeing (yet can pose threats) as highlighted by the Millennium and National Ecosystem Assessment; – Generally the health of Milton Keynes is more favourable than the national average however there are inequalities amongst subsets of the population; – Health may improve in line with a number of health-related plans, programmes and strategies delivered by Milton Keynes Council and partners yet may face further challenges from external factors such as climate change and its associated impacts including flooding; – Flooding can have immediate impacts upon human health and/or can result in health complaints 'post-flood' such as stress and anxiety; – Flooding can limit access to healthcare; and, – Flood alleviation measures have the potential to protect human health.	**Protect and enhance human health and wellbeing**	– Number of flood incidents reported – Number of properties / businesses at risk of flooding – Number of flood related injuries/fatalities – Number of measures located in areas with an above average number of elderly people or level of deprivation
Material Assets	– Milton Keynes was designed so that the majority of the natural floodplain is within linear parks, therefore there are few properties lying within flood zones 2 and 3 in the new areas of Milton Keynes. Areas where there are properties within flood zones 2 or 3 may benefit from	**Minimise the risk of flooding on existing and future key assets, infrastructure, homes and businesses**	– Number of residential and non-residential properties at risk of flooding from local sources – Number/severity/duration of incidents leading to unplanned disruption or damage to

	the presence of flood defences; – A Water Cycle Study recently conducted for Milton Keynes highlighted a number of sewer network capacity issues across the Borough; – Waste management systems in Milton Keynes has seen an enhancement in recent years yet are experiencing a plateau in recycling rates; – Milton Keynes' unique road network is becoming increasingly congested and is largely a result of single occupancy commuter traffic; – There is growing concern regarding the increasing pressure on flood defences and surface water management assets along with the flood risk which may result from their failure. Future management and monitoring of such assets is also a concern; – The method of transport chosen by residents is becoming more sustainable yet the number of cycle journeys has reduced; and, – The Borough Council aims to have 86% of premises with access to superfast broadband by the end of 2014 and will ensure that all new developments have access to high speed broadband and digital infrastructure in a bid to attract businesses and investors and thereby facilitate economic growth amongst the Borough.		essential infrastructure and service provision – 'Number of SuDS schemes adopted into existing and future developments which are adoptable and/or have maintenance regimes secured for the lifetime of the development – Number of new developments permitted in areas of flood risk
Geology and Soil	– There are a number of potentially contaminated sites distributed throughout Milton Keynes, many of which have the potential to cause land contamination; – Sites of contaminated land represent a significant environmental problem due to dispersal of pollutants during a major local flood event; and, – Loss of fertile, productive agricultural soils may occur during intense spells of rainfall or as a result of unsuitable or lack of appropriate mitigation measures; and, – Soil erosion may arise as a result of intense rainfall events.	**Protect and enhance best quality soil, agricultural land and geodiversity**	– Area of agricultural land lost due to the need for flood defence – Area of county land falling under Environmental Stewardship agreements – Number of recorded pollution incidents – Risk of potential flooding in relation to contaminated sites
Landscape	– Flooding has the potential to impact upon the landscape of Milton Keynes; and, – Development pressures may put the Milton Keynes' landscape at future risk.	**Protect, conserve and enhance the quality, character and availability of the landscape including open spaces and natural resources**	– Number/area of open spaces at significant risk of local flooding, identified using site specific surface water or ordinary watercourse flood modelling – Number of measures that include

			enhancements to open spaces and recreational areas – Area of enhanced landscape and green infrastructure as a result of flood reduction measures
Water	– There are a wide range of flooding sources within Milton Keynes; – Climate change is likely to result in an increasing number and magnitude of flood events; – Nutrient enrichment is the main water quality concern within the catchment; – There are a number of main rivers and ordinary watercourses within Milton Keynes which have a history of flooding; and, – Other potential sources of flooding such as surface and groundwater have a number of associated historical flooding incidents.	**Protect and enhance the water quality and hydromorphology of watercourses, WFD waterbodies and groundwater.** **A reduction in the number of undesirable flooding events**	– WFD objectives achieved on watercourses where measures have been implemented – Environment Agency data regarding ecological and chemical status of waterbodies – Areas within flood zones 1, 2 & 3. – Number of flooding events recorded.

7.2 Proposed Methodology and Assessment Approach

Each objective of the Strategy will be 'tested' against the SEA objectives to determine whether the objectives of the Strategy will in fact deliver a sustainable approach to flood risk management.

This assessment will be conducted via the use of matrices which highlight the likely impacts of the Strategy objectives upon the environment. The impacts are determined by considering the following:

- Whether the impact is **adverse or beneficial**;
- The **magnitude** of the potential impact;
- Whether the impact is **secondary, cumulative and/or synergistic;**
- Whether the impact results **directly or indirectly** from the Strategy objectives and measures;
- The **spatial extent** (local, regional or national);
- The **timescale**
- Short term – expected in the next 1-5 years;
- Long term – expected in the next 5+ years; and,
- The **permanence** and **reversibility** (permanent or temporary & reversible or irreversible).

Table 7-2 shows the 'scores' which will be allocated to the Strategy objectives. Where it has been considered that 'no relationship' exists between the Strategy objective and SEA objective this does not mean that there is no potential for impacts to arise in the future. A score of no relationship indicates that further information would be required on how and where measures are to be developed (information which is not available at the strategic level).

Table 7-2 : Strategy objective impacts description

Type of Impact	Description
Direct	An impact on one or more SEA objective may occur as a primary function of the implementation of a particular Strategy objective – a primary beneficial or adverse impact.
Indirect	An impact on one or more SEA objective may occur as a secondary function of the implementation of a particular Strategy objective – a secondary beneficial or adverse impact.
Major positive (++)	Significantly beneficial to the SEA objective – Multiple opportunities for environmental improvement or resolves existing environmental issue.
Minor positive (+)	Partially beneficial (not significant) to the SEA objectives – Contributes to resolving an existing environmental issue or offers some opportunities for improvement.
No relationship / Neutral (N)	Neutral effect on the SEA objective and environment.
Uncertain (?)	Insufficient detail on the option or baseline – Cannot effectively assess the significance of the Strategy objective on the SEA objective.
Minor negative (-)	Partially undermines (not significantly) the SEA objective – Option would contribute to an environmental issue or reduce opportunities for improvement.
Major negative (- -)	Significantly undermines the SEA objective – Will significantly contribute to an environmental problem or undermine opportunity for improvement.

8 Assessment of Strategy Objectives and Alternatives

8.1 Introduction

This section assesses the Strategy objectives against the SEA objectives. Additionally an alternative 'do nothing' strategy is proposed and tested against the SEA objectives. Cumulative effects upon receptors are also considered, firstly as a result of implementing the various Strategy objectives and secondly as a result of implementing Strategy objectives alongside other plans, programmes and strategies.

The Strategy objectives are tested against the SEA objectives to:

- Ensure compatibility;
- Identify the nature of any potential environmental impacts (positive, negative or neutral); and,
- Identify the significance of any potential environmental impacts (major or minor).

As listed in Section 4.6 the Milton Keynes objectives are to:

- Objective 1: Improve communications between asset owners and build on existing partnership working.
- Objective 2: Ensure that drainage management is tailored to Milton Keynes unique drainage system
- Objective 3: Improve understanding of food risk from all sources
- Objective 4: Make best use of resources for maximum protection from flooding
- Objective 5: Help communities to become more resilient to flooding
- Objective 6: Ensure emergency planning is linked to our best understanding of the risks
- Objective 7: Ensure future development does not have a negative impact on flood risk and lowers the risk where possible

Each Strategy objective has a number of associated measures and actions as outlined by the Strategy's Action Plan. Due to the number of actions and their varying statuses it has been considered inappropriate to assess each individual action against each SEA objective. However, the actions and their potential impacts upon the environment will be considered when determining the overall impact each Strategy objective will have upon the environment.

The results of the assessment of Strategy objectives against SEA objectives can be found in Table 8-1

Table 8-1. Assessment of Strategy Objectives Against SEA Objectives.

			SEA Objectives								
			1	2	3	4	5	6	7	8	9
			Protect and enhance human health and wellbeing	Raise awareness and understanding of flooding and its dangers	Protect, conserve and enhance biodiversity, wildlife corridors and habitats	Protect and enhance the water quality and hydromorphology of watercourses, WFD waterbodies and groundwater	Promote sustainable flood risk management	Minimise the risk of flooding on existing and future key assets, infrastructure, homes and businesses	Manage and mitigate the future effects of climate change in new and existing development	Conserve and enhance the historic environment, heritage assets and their settings	Protect, conserve and enhance the quality, character and availability of open spaces and natural resources
Strategy Objectives	Objective 1: Improve communications between asset owners and build on existing partnership working	Short term	Indirect +	Indirect +	Indirect +	Indirect +	Direct +	Indirect +	Indirect +	Indirect +	Indirect +
		Long term	Indirect +	Indirect +	Indirect +	Indirect +	Direct +	Indirect +	Indirect +	Indirect +	Indirect +
	Objective 2: Ensure that drainage management is tailored to Milton Keynes unique drainage system	Short term	Indirect +	N	Indirect +	Indirect +	Direct +	Direct +	Indirect +	Indirect +	Indirect +
		Long term	Indirect +	N	Indirect +	Indirect +	Direct +	Direct +	Indirect +	Indirect +	Indirect +
	Objective 3: Improve understanding of food risk from all sources	Short term	Indirect +	Direct ++	Indirect +	Indirect +	Direct +	Indirect ++	Indirect +	Indirect +	Indirect +
		Long term	Indirect +	Direct ++	Indirect +	Indirect +	Direct +	Indirect ++	Indirect +	Indirect +	Indirect +
	Objective 4: Make best use of resources for maximum protection from flooding	Short term	Indirect +	Indirect +	Indirect +	Indirect +	Direct ++	Direct +	Indirect +	Indirect +	Indirect +
		Long term	Indirect +	Indirect +	Indirect +	Indirect +	Direct ++	Direct +	Indirect +	Indirect +	Indirect +
	Objective 5: Help communities to become more resilient to flooding	Short term	Direct +	Direct +	N	N	Direct +	Indirect +	Indirect +	N	N

		Long term	Direct +	Direct +	N	N	Direct +	Indirect +	Indirect +	N	N
	Objective 6: Ensure emergency planning is linked to our best understanding of the risks	Short term	Indirect ++	Indirect +	N	N	Indirect ++	Indirect +	Indirect +	N	N
		Long term	Indirect ++	Indirect +	N	N	Indirect ++	Indirect +	Indirect +	N	N
	Objective 7: Ensure future development does not have a negative impact on flood risk and lowers the risk where possible	Short term	Indirect +	N	Indirect +	Indirect +	Indirect ++	Direct ++	Indirect +	Indirect +	Indirect +
		Long term	Indirect +	N	Indirect +	Indirect +	Indirect ++	Direct ++	Indirect +	Indirect +	Indirect +

8.2 Assessment Summary

The assessment of the compatibility between SEA objectives and the Strategy objectives suggests that the majority of the Strategy objectives will have indirect, positive impacts upon the environment. None of the Strategy objectives are predicted to adversely impact upon the environment.

Below a brief summary of the compatibility between SEA and Strategy objectives is given.

Strategy Objective 1: *Improve communications between asset owners and build on existing partnership working.*

This objective was found to be highly compatible with SEA Objectives. The Strategy objective was found to have indirect positive impacts upon all SEA objectives bar 'Promoting sustainable flood risk management' which was seen to have minor, directly positively effects as communication and collaborative working is essential to sustainable flood risk management.

Largely, the influence of this objective upon SEA objectives and the environment is deemed to be indirectly beneficial as communications improve preparedness which in turn can reduce flood risk. A reduced flood risk is likely to benefit a number of receptors such as biodiversity, heritage, and landscape as highlighted within Table 8-1.

Strategy Objective 2: *Ensure that drainage management is tailored to Milton Keynes unique drainage system*

This strategy objective has direct positive impacts upon two SEA objectives:

- Promote sustainable flood risk management; and,
- Minimise the risk of flooding on existing and future key assets, infrastructure, homes and businesses

This is due to the fact that this objective will directly result in the promotion of sustainable flood risk management (likely through enhanced surface water management which may utilise SuDS) and the minimisation of flood risk as a result of such surface water management measures.

This Strategy objective was not found to relate to *raising awareness and understanding of flooding and its dangers* yet is predicted to have minor positive, indirect impacts upon the majority of remaining SEA objectives. This is due to the fact that improved drainage management is likely to reduce flooding and risks and subsequently protects a number of diverse environmental receptors.

Strategy Objective 3: *Improve understanding of food risk from all sources*

This objective is predicted to have two major impacts upon SEA objectives and the environment as follows:

- Raise awareness and understanding of flooding and its dangers **(Direct)**;
- Minimise the risk of flooding on existing and future key assets, infrastructure, homes and businesses **(Indirect)**.

These 'major impacts' arise as this Strategy objective mirrors the SEA objective of raising awareness and understanding of flood risks and its dangers. Similarly, improving understanding of flood risks is a vital to minimising the risk of flooding on existing and future key assets, infrastructure, homes and businesses. However, this objective remains indirect as whilst understanding and awareness can contribute to minimising flood risks it is merely one factor in doing so.

This strategy objective is predicted to result in a number of positive, minor and indirect impacts. This is due to the fact that an improved understanding of flood risk can enhance preparedness and therefore reduce risks and hence protect environmental receptors as presented within the assessment.

Strategy Objective 4: *Make best use of resources for maximum protection from flooding*

Largely this strategy objective is seen to have minor, indirect, positive impacts upon SEA objectives and the environment due to the fact that delivering cost-effective flood management activities is likely to reduce flooding, provide a higher level of protection over a wider area and subsequently reduce flooding impacts. Consequently a number of environmental receptors are likely to benefit from the delivery of this objective.

This Strategy objective is seen to have direct impacts upon the following two SEA objectives:

- Promote sustainable flood risk management; and,
- Minimise the risk of flooding on existing and future key assets, infrastructure, homes and businesses.

These impacts are seen to be direct, major, positive impacts as a cost-benefit approach is seen to be a sustainable method of flood risk management and is likely to deliver social, environmental and economic benefits. Similarly, this approach is likely to directly minimise the risk of flooding on existing and future key assets, infrastructure, homes and businesses.

Strategy Objective 5: *Help communities to become more resilient to flooding*

This objective was seen to be highly important and has the potential to deliver a number of direct, minor positive impacts:

- Protect and enhance human health and wellbeing;
- Raise awareness and understanding of flooding and its dangers; and,
- Promote sustainable flood risk management.

This is due to the fact that as communities become more resilient to flooding it is likely that their health and wellbeing will be improved, similarly they are likely to become increasingly aware of flood risks and associated dangers. Finally, community resilience is seen to be integral to sustainable flood risk management.

Indirect, minor yet beneficial impacts from the delivery of this objective include the minimisation of flood risk within the community (as a function of preparedness) and the positive influence of community resilience to flood risk in relation to managing and mitigating against the future effects of climate change upon flood risk in new and existing development.

This objective is not seen to be relevant to the following SEA Objectives:

- Protect, conserve and enhance biodiversity, wildlife corridors and habitats;
- Protect and enhance the water quality and hydromorphology of watercourses, WFD waterbodies and groundwater;
- Conserve and enhance the historic environment, heritage assets and their settings; and,
- Protect, conserve and enhance the quality, character and availability of open spaces and natural resources.

Strategy Objective 6: *Ensure emergency planning is linked to our best understanding of the risks*

This strategy objective is predicted to have major indirect beneficial impacts upon both the protection of human health and wellbeing along with the promotion of sustainable flood risk management. This is due to the fact that emergency planning is integral to sustainable flood risk management. Similarly, emergency planning is likely to contribute to the protection of human health and wellbeing.

Other minor, indirect benefits include raising awareness, minimising flood risk amongst the community and managing and mitigating against the effects of climate change.

This Strategy objective is shown to have no relationship within the following SEA Objectives:

- Protect, conserve and enhance biodiversity, wildlife corridors and habitats;
- Protect and enhance the water quality and hydromorphology of watercourses, WFD waterbodies and groundwater;
- Conserve and enhance the historic environment, heritage assets and their settings; and,
- Protect, conserve and enhance the quality, character and availability of open spaces and natural resources

Strategy Objective 7: *Ensure future development does not have a negative impact on flood risk and lowers the risk where possible*

This Strategy objective is highly compatible with the SEA Objective of 'Minimise the risk of flooding on existing and future key assets, infrastructure, homes and businesses'.

Indirect, minor yet positive impacts arising from this Strategy Objective relate to the following SEA Objectives:

- Protect and enhance human health and wellbeing;
- Protect, conserve and enhance biodiversity, wildlife corridors and habitats;
- Protect and enhance the water quality and hydromorphology of watercourses, WFD waterbodies and groundwater;
- Manage and mitigate the future effects of climate change in new and existing development;
- Conserve and enhance the historic environment, heritage assets and their settings; and,
- Protect, conserve and enhance the quality, character and availability of open spaces and natural resources.

The large number of indirect, minor, positive benefits arises as a result of the fact that this Strategy Objective relates to reducing flooding and flood risk which subsequently protects a number of environmental receptors considered within this assessment.

This Strategy Objective was found to have a neutral relationship with raising awareness and understanding of flood risks and its dangers.

8.3 Assessment of Alternatives

For each of the Strategy objectives a 'do nothing' alternative has been considered in order to show how the current state of the environment is likely to evolve without implementation of the Strategy. It is considered that existing maintenance regimes and the like (such as the proactive and reactive clearance of trash screens) will continue and land use and spatial planning methods would remain the same. It is also assumed that no attempts are made to enhance community awareness and education regarding flood risk; to improve methods of flood recording; flood risk studies are not carried out; the public are not informed on flood risk; flood risk management groups and authorities are not retained; and advice or funding for local schemes is not provided. These assumptions would result in a potential for an increased risk to property and communities. Due to threats such as climate change, the effect of failing to implement the Strategy upon the natural environment is uncertain. It is expected that habitat loss may occur due to inundation which will affect biodiversity; there will be increased pollution as a result of flooding events; and the natural, built and historic environment of Milton Keynes may be compromised as a result of flood damage.

Table 8-2 shows the results of a 'do nothing' approach upon the SEA objectives.

Table 8-2. A 'Do Nothing' Approach Compared Against SEA Objectives.

			SEA Objectives								
			1	2	3	4	5	6	7	8	9
			Protect and enhance human health and wellbeing	Raise awareness and understanding of flooding and its dangers	Protect, conserve and enhance biodiversity, wildlife corridors and habitats	Protect and enhance the water quality and hydromorphology of watercourses, WFD waterbodies and groundwater	Promote sustainable flood risk management	Minimise the risk of flooding on existing and future key assets, infrastructure, homes and businesses	Manage and mitigate the future effects of climate change in new and existing development	Conserve and enhance the historic environment, heritage assets and their settings	Protect, conserve and enhance the quality, character and availability of open spaces and natural resources
Strategy Objectives	Objective 1: Improve communications between asset owners and build on existing partnership working	Short term	Indirect -	Indirect -	Indirect -	Indirect -	Direct -	Indirect -	Indirect -	Indirect -	Indirect -
		Long term	Indirect -	Indirect -	Indirect -	Indirect -	Direct -	Indirect -	Indirect -	Indirect -	Indirect -
	Objective 2: Ensure that drainage management is tailored to Milton Keynes unique drainage system	Short term	Indirect -	N	Indirect -	Indirect -	Direct -	Direct -	Indirect -	Indirect -	Indirect -
		Long term	Indirect -	N	Indirect -	Indirect -	Direct -	Direct -	Indirect -	Indirect -	Indirect -
	Objective 3: Improve understanding of food risk from all sources	Short term	Indirect -	Direct --	Indirect -	Indirect -	Direct -	Indirect --	Indirect -	Indirect -	Indirect -
		Long term	Indirect -	Direct --	Indirect-	Indirect -	Direct -	Indirect --	Indirect -	Indirect -	Indirect -
	Objective 4: Make best use of resources for maximum protection from flooding	Short term	Indirect -	Indirect -	Indirect -	Indirect -	Direct --	Direct -	Indirect -	Indirect -	Indirect -
		Long term	Indirect -	Indirect -	Indirect -	Indirect -	Direct --	Direct -	Indirect -	Indirect -	Indirect -
	Objective 5: Help communities to become more resilient to flooding	Short term	Direct -	Direct -	N	N	Direct -	Indirect -	Indirect -	N	N

		Long term	Direct -	Direct -	N	N	Direct -	Indirect -	Indirect -	N	N
	Objective 6: Ensure emergency planning is linked to our best understanding of the risks	Short term	Indirect --	Indirect -	N	N	Indirect --	Indirect -	Indirect -	N	N
		Long term	Indirect --	Indirect -	N	N	Indirect --	Indirect -	Indirect -	N	N
	Objective 7: Ensure future development does not have a negative impact on flood risk and lowers the risk where possible	Short term	Indirect -	N	Indirect -	Indirect -	Indirect --	Direct --	Indirect -	Indirect -	Indirect -
		Long term	Indirect -	N	Indirect -	Indirect -	Indirect --	Direct --	Indirect-	Indirect-	Indirect -

8.4 Assessment Summary

The assessment of each of the Strategy objective 'do nothing' alternative scenarios against the SEA objectives concludes that a 'do nothing' approach is likely to have a detrimental effect upon the environment, this is due to the fact that all Strategy objectives under a 'do nothing' scenario are predicted to adversely affect the key receptors outlined by the SEA objectives, bar those which are predicted to have a neutral effect.

The alternative assessment predicts the inverse of the previous assessment wherein most impacts were deemed as indirect, minor, positive impacts; conversely the 'do nothing' scenario results in mainly minor, adverse indirect impacts. However, a number of Strategy objectives were deemed to have direct adverse impacts under a 'do nothing' scenario.

Direct, Major, Adverse Impacts

Direct adverse impacts were predicted to arise from three strategy objectives under a 'do nothing' approach as listed below.

- The failure to *improve understanding of food risk from all sources (Strategy Objective)* on *raising awareness and understanding of flooding and its dangers (SEA Objective);*
- The failure to *make best use of resources for maximum protection from flooding (Strategy Objective)* on *promoting sustainable flood risk management (SEA Objective); and,*
- The failure to *ensure future development does not have a negative impact on flood risk and lowers the risk where possible (Strategy Objective)* on *minimising the risk of flooding on existing and future key assets, infrastructure, homes and businesses (SEA Objective).*

These adverse impacts are typically related to sustainable flood risk management and in particular, education and awareness of communities and future sustainable development. A lack of awareness and education regarding flooding may limit a community's emergency preparedness and hence increase their risk to flooding. Failing to encourage sustainable development which provides a betterment to flood risk may place people at a direct risk of flooding.

Indirect, Major, Adverse Impacts

Three Strategy objectives were predicted to have an indirect, major adverse impact upon the environment as listed below:

- A failure to *improve understanding of food risk from all sources (Strategy Objective)* on *minimising the risk of flooding on existing and future key assets, infrastructure, homes and businesses (SEA Objective)*;
- A failure to *ensure emergency planning is linked to our best understanding of the risks (Strategy Objective) protect and enhance human health and wellbeing (SEA Objective)* and *promoting sustainable flood risk management (SEA Objective)*;
- A failure to *ensure future development does not have a negative impact on flood risk and lowers the risk where possible (Strategy Objective)* on *promoting sustainable flood risk management (SEA Objective)*.

These impacts highlight that without appropriate flood risk management solutions, local communities may continue to face the impacts of flooding. Similarly, if emergency flood risk plans are not devised, human health and wellbeing could be compromised. In addition, a failure to implement appropriate flood risk management measures in new development (or retrofitting old development) can exacerbate flood risks and impacts.

Indirect, Minor, Adverse Impacts

The majority of Strategy objectives under a 'do nothing' scenario were impacted by minor, adverse impacts. Ultimately this means that the benefits facilitated by the implementation of the Strategy, as seen in Table 8-1, are no longer apparent. These include but are not limited to:

- The protection and enhancement of human health and wellbeing;
- An improved understanding and management of flood risk and the likely effects relating to climate change;
- Improved communications between asset owners and collaborative working between stakeholders and risk management authorities;

- Cost-effective and resource efficient, flood and water management;
- Community resilience to flooding;
- The protection, conservation and enhancement of biodiversity, wildlife corridors and habitats;
- The protection and enhancement of the water quality and hydromorphology of watercourses, WFD waterbodies and groundwater;
- The promotion of sustainable flood risk management;
- Enhanced drainage management tailored towards Milton Keynes unique drainage system;
- The minimisation of the risk of flooding on existing and future key assets;
- The conservation and enhancement of the historic environment, heritage assets and their settings;
- Sustainable development which does not exacerbate flood risk;
- The protection, conservation and enhancement of quality, character and availability of open spaces and natural resources; and,
- The development of an informed emergency response plan.

8.5 Assessment of Cumulative Effects

Cumulative effects arise where several (perhaps insignificant) effects combine to create a significant impact; or where several individual effects of a plan have a combined effect, either adversely or beneficially.

Guidance on the principles of assessing cumulative effects recommends that the assessment:

- Focusses on the total effect of both direct and indirect effects on receptors (such as biodiversity, water, cultural heritage, etc.);
- Takes into account the nature and extent of the receptors, such as ecosystems and communities, rather than administrative boundaries;
- Takes into account the effects of proposals with the Strategy and those which may result from interaction with the effects of other plans, programmes or strategies; and,
- Is aware of and documents any uncertainties.

Given the number of plans, programmes and action plans being undertaken through other organisations, and their associated management activities for each environmental topic, there is potential for cumulative effects with the Strategy.

The information provided in the review set out in Appendix B was used as a basis for cumulative effects assessment. Professional judgment was also used to identify effects arising from these plans which may have cumulative effects with the Strategy. Particular attention was given to those effects which may be insignificant within individual plans, but cumulatively may be potentially significant.

It should be noted, however, that many of the relevant plans and programmes which have been reviewed in Appendix B are reported at a strategic level, and therefore do not directly relate to physical changes or actions ‘on the ground’. The level of risk and uncertainty associated with cumulative effects increases at a higher strategic level because the scale is broader and environmental issues are larger.

The level of uncertainty in predicting effects and determining significance is due to:

- Variation in natural systems and interactions across Milton Keynes and the wider environment;
- A lack of information or knowledge regarding cause-effect relationships; and,
- The inability of predictive models to accurately represent complex systems.

It has been concluded that where beneficial impacts have been identified, cumulative impacts may arise from other strategies, plans and/or programmes which has similar aims. Likewise, a failure to implement such strategies, plans and programmes may have adverse cumulative effects.

As well as being cumulative, effects may also be synergistic. For instance if two or more strategies, plans and/or programmes implement habitat restoration as part of their flood risk management efforts, the results may be greater than the sum of their parts, giving rise to green corridors, and therefore affording a wider range to flora and fauna.

8.5.1 Assessment Summary

At this stage of environmental assessment, and due to the high-level nature of this assessment (i.e. no site specific measures or on the ground activities have been presented), the assessment of potential cumulative impacts of the Strategy and other plans, programmes and action plans concludes that there is likely to be both a great deal of beneficial cumulative impacts with the potential for adverse cumulative impacts. These will be discussed in turn below, grouped by each SEA objective:

SEA Objective: Protect and enhance human health and wellbeing

It is likely that a number of Strategy outcomes will act cumulatively to protect and enhance human health and wellbeing. For instance, the reduction in flood incidents as a function of drainage management, cost-effective and resource efficient flood management measures and improved emergency planning will reduce the hazard posed by flood events and is therefore less likely to pose a threat to human health and wellbeing. Similarly, better informed, educated and aware communities will have a greater level of preparedness which will reduce their risks and vulnerability and enhance their resilience. Similarly, residents of new developments will be less likely to be exposed to flood risks as a function of improved flood and water management on site. The opportunity for retrofitting flood and water infrastructure such as SuDS will also act to protect human health and wellbeing through a reduced exposure to flood risks.

It is likely that these benefits may work synergistically, delivering outcomes of greater value than the sum of their parts. Similarly, other plans, programmes and strategies such as Milton Keynes Joint Strategic Needs Assessment (2013) are likely to work cumulatively with the Strategy to improve overall health and wellbeing of Milton Keynes residents.

SEA Objective: Raise awareness and understanding of flooding and its dangers

There are a number of plans and programmes (as outlined in Appendix B) related to flood risk which will cumulatively raise awareness and understanding of flood risk across a number of stakeholder groups from local residents to hydrologists and council members.

Within the Strategy itself, multiple objectives will cumulatively deliver the aim of raising awareness and understanding. For instance, improving communications between asset owners is likely to result in the sharing of information which is likely to lead to enhanced flood management practices. Similarly, by helping communities to become more resilient they will gain a broader knowledge of flood risk issues and management and therefore have a greater understanding of the dangers associated with flooding. One Strategy objective which will clearly facilitate a raised awareness and understanding throughout the community is Objective 3: Improve understanding of food risk from all sources.

SEA Objective: Protect, conserve and enhance biodiversity, wildlife corridors and habits

SEA Objective: Conserve and enhance the historic environment, heritage assets and their settings

SEA Objective: Protect, conserve ad enhance the quality, character and availability of open spaces and natural resources

None of the Strategy objectives specifically relate to biodiversity, cultural heritage or landscape. However, irrespective of this, there will be a number of indirect benefits arising from the Strategy upon these environmental receptors. For instance, improved drainage management and cost-effective, resource efficient flood management measures may reduce flood magnitude and/or extent and could therefore protect or enhance nature conservation areas and areas of landscape and/or heritage importance.

The benefits derived from the Strategy are likely to deliver cumulative effects alongside other plans, programmes and strategies as outlined in Appendix B such:

- Buckinghamshire and Milton Keynes Biodiversity Action Plan (2000);
- Milton Keynes Council Heritage, Museums and Archives Strategy (2014-2023); and,
- Plan:MK.

SEA Objective: Protect and enhance the water quality and hydromorphology of watercourses, WFD waterbodies, and groundwater

The delivery of the Strategy alongside other flood risk plans, programmes and strategies, is likely to cumulatively aid in the delivery of WFD objectives and general water quality improvements. Flooding has the potential to impact adversely upon water quality through various mechanisms such as diffuse pollution and sewer overflows. Consequently, a Strategy which aims to reduce flooding, in particularly through enhanced drainage management, is likely to contribute to improved water quality. Similarly, collaborative working may also benefit water quality through sharing of information and evidence of best practice.

SEA Objective: Promote sustainable flood risk management

Sustainability relates to social justice, environmental responsibility and economic viability. The Strategy objectives cover these triple bottom line outcomes comprehensively and are likely to work cumulatively to deliver a sustainable approach to flood risk management.

These broad, wide-ranging Strategy objectives are likely to complement objectives found in wider environmental plans, programmes and policies as follows, to further promote sustainable flood risk management:

- Milton Keynes Council Low Carbon Strategy and Action Plan (2010);
- Buckinghamshire and Milton Keynes Biodiversity Action Plan (2000);
- Milton Keynes Council Heritage, Museums and Archives Strategy (2014-2023); and,
- Milton Keynes Joint Strategic Needs Assessment (2013).

SEA Objective: Minimise the risk of flooding on existing, and future key assets, infrastructure, homes and businesses

The overarching aim of the strategy is to set out Milton Keynes' approach to managing flood risk from local sources (i.e. surface water, ordinary watercourses and groundwater) in both the short and longer term, with proposals for sustainable actions that will help Milton Keynes Council to manage the risk in a way that delivers the greatest benefit to residents, businesses and the environment.

Consequently, it could be argued that all the Strategy objectives which support this aim will work cumulatively to deliver this SEA Objective. Other cumulative impacts and effects are likely to arise from other plans, programmes and strategies alongside Milton Keynes' LFRMS which include the Milton Keynes upcoming SWMP, updated Level 1 SFRA and Water Cycle Study.

SEA Objective: Manage and mitigate the future effects of climate change in new and existing developments

Whilst the Strategy does not include any objectives relating directly to Climate Change, there are a number of objectives which are likely to contribute to the management and mitigation of climate change effects upon flood and water management. It is likely that these objectives will work cumulatively with other wider environmental plans such as the Milton Keynes Carbon Strategy to manage and mitigate future climate change implications.

9 Conclusions and Monitoring

9.1 Conclusion

This SEA has shown that the Milton Keynes LFRMS is likely to have beneficial impacts upon the environment in both the short and long term (i.e. beyond the life of the Strategy). Largely this is due to the proactive, holistic, sustainable approach of the Strategy which has the primary aim of minimising flood risk posed to Milton Keynes' residents, businesses, infrastructure and assets. Each of the Strategy objectives is predicted to fulfil the environmental objectives identified within the SEA framework with a beneficial outcome.

The majority of the Strategy objectives are likely to have indirect beneficial effects upon the environment as they relate to enhanced understanding and awareness of flood risk along with high-level flood risk management measures rather than individuals actions which would potentially have a larger effect 'on the ground'.

The benefits of implementing the Strategy are perhaps best demonstrated by the 'do nothing' alternative assessment which demonstrates the adverse impacts upon the environment through the failure to implement the Strategy. In the short term this would leave local communities and assets at an increased risk of flooding. It is likely that this risk would only heighten over time as a result of climate change and its associated impacts upon flood frequency and magnitude.

Whilst the assessment of cumulative impacts suggested that adverse impacts could arise over time, the resounding prediction was that a vast number of beneficial cumulative impacts would arise from implementation of the Strategy alongside other plans and programmes.

As a result of these findings, the SEA puts no recommendations forward for the Strategy.

9.2 Mitigation

As the SEA has determined no adverse impacts will result from the implementation of the Strategy no mitigation measures have been put forward at this stage. However measures for mitigation should be made at the site level through the EIA framework, to ensure mitigation of potential adverse effects is ensured.

9.3 Proposed Monitoring

The SEA Directive requires significant environmental effects resulting from the implementation of the Strategy to be monitored. Monitoring of the Strategy will drive continual improvement and enable the identification and management of any unforeseen adverse effects. Monitoring also enables the successes of the scheme to be determined and capitalised upon against environmental baselines.

Table 9-1 shows the SEA monitoring framework and the potential monitoring indicators for each SEA objective which could be implemented. Data required for the monitoring of the Strategy can be acquired from a number of sources including Milton Keynes Council, the Environment Agency, Natural England and English Heritage.

Table 9-1: Proposed indicators for monitoring the potential significant and uncertain environmental effects of the Strategy	
SEA Objective	**Potential Monitoring Indicator**
Human Health & Population	
1. Protect and enhance human health and wellbeing 2. Raise awareness and understanding of local flooding and its dangers	– Number of people with a reduced risk of flooding as a result of investment in flood risk management infrastructure. – Number of people with a reduced risk of flooding in deprived areas. – Number of community sessions attended (e.g. Ward Forums, Area Committees etc.) – Number of people attending the above sessions – Number of flood risk management communications campaigns – Number of projects and schemes that provide amenity benefits
Biodiversity	
3. Protect, conserve and enhance biodiversity, wildlife corridors and habitats	– Number of projects and schemes that provide amenity benefits – Area of habitat created, enhanced or altered as a result of flood reduction measures – Negative impacts on statutory and non-statutory ecological sites as a result of flooding and flood reduction measures. – Number of flood incidents reported – Number of properties / businesses at risk of flooding – Number of flood related injuries/fatalities – Number of measures located in areas with an above average number of elderly people or level of deprivation
Water	
4. Protect and enhance the water quality and hydromorphology of watercourses, WFD waterbodies and groundwater. 5. Promote sustainable flood risk management.	– Number of planning applications approved that incorporate SuDS – Number of projects and schemes that provide water quality improvements – Number of projects are schemes completed in partnership – Number of projects and schemes with external funding contributions – Number of projects and schemes that consider climate change impacts. – Number of projects and schemes where measures across the entire catchment are considered – Number of projects and partnerships where engagement has taken place with partners that operate within the catchment. – Number of studies completed that quantify local flood risk – WFD objectives achieved on watercourses where measures have been implemented – Number of residential and non-residential properties at risk of flooding from local sources – Number/severity/duration of incidents leading to unplanned disruption or damage to essential infrastructure and service provision – ‘Number of SuDS schemes adopted into existing and future developments which are adoptable and/or have maintenance regimes

	secured for the lifetime of the development – Number of new developments permitted in areas of flood risk – Consultation with the EA regarding ecological and chemical status of waterbodies
Material Assets	
6. Minimise the risk of flooding on existing and future key assets, infrastructure, homes and businesses. 7. Manage and mitigate the future effects of climate change in new and existing development.	– Number of properties, businesses and critical infrastructure with a reduced risk of flooding as a result of investment in flood risk management infrastructure. – Number of planning applications approved that incorporate resilient design. – Number of projects and schemes that provide green infrastructure. – Complete and maintain a robust asset register – Number of asset inspections completed – Number/severity/duration of incidents leading to unplanned disruption or damage to essential infrastructure and service provision – Number/scale/quality of SuDs schemes adopted into existing and future developments – Number of new developments permitted in areas of flood risk
Cultural, Archaeological and Architectural Heritage	
8. Conserve and enhance the historic environment, heritage assets and their settings	– Number/area/percentage of assets at risk of local flooding – Number/area/percentage of assets which have experienced flooding – Number/area/percentage of conservation areas at risk of flooding – Number of flood risk management measures implemented that conserve and enhance heritage assets – Number of assets with a reduced/increased risk of flooding as a result of investment in flood risk management infrastructure
Landscape and Townscape	
9. Protect, conserve and enhance the quality, character and availability of open spaces and natural resources	– Number/area of open spaces at significant risk of local flooding, identified using site specific surface water or ordinary watercourse flood modelling – Number of measures that include enhancements to open spaces and recreational areas – Areas of enhanced landscape and green infrastructure as a result of flood reduction measures
Climate	
10. Manage and mitigate the future effects of climate change in new and existing development	– Number of SuDS schemes adopted into existing and future developments which are adoptable and/or have maintenance regimes secured for the lifetime of the development – Predicted future local flood risk with climate change – Frequency of extreme events
Soils and geology	
11. Protect and enhance best quality soil, agricultural land and	– Area of agricultural land lost due to the need for flood defence – Area of county land falling under Environmental Stewardship

geodiversity	agreements – Sedimentation rates from Internal Drainage Boards – Number of recorded pollution incidents – Local of potential flooding in relation to contaminated sites

Appendix A.
Consultation Feedback

Consultation responses were received from statutory consultees. Responses and subsequent alterations are outlined below. Where possible, every effort has been made to incorporate the recommendations made.

Comments Received	Actions Taken
English Heritage	
"We are naturally pleased to see that cultural heritage has been scoped in and we welcome the comprehensive summary of the policy context for cultural heritage in sub-section 6.1. We concur with the environmental protection objections set out in sub-section 6.2 and are pleased to see the reference to the English Heritage advice Strategic Environmental Assessment, Sustainability Appraisal and The Historic Environment".	No action required
"In sub-section 6.3, reference could also be made to the National Planning Policy Framework definition of "historic environment"": "*All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora*"."	This definition has been added to Appendix C Section 3.
"We would like to see a fuller description of the historic development of Milton Keynes and its administrative area, which contains some older historic settlements, in this sub-section. There are, in fact, six heritage assets identified as being at risk on the 2014 Heritage at Risk Register, five scheduled monuments and one grade II* listed building. The Scoping Report should note that the Heritage at Risk Register does not include grade II buildings – has the Council undertaken a survey of grade II buildings to ascertain whether any are at risk? Although we believe that the Council is about to embark on the preparation of a local list the absence of this should be noted as a gap in the existing baseline. There should also be recognition of non-scheduled archaeological remains as identified on the relevant Historic Environment Record. Have there been any characterisation studies of Milton Keynes?"	Information related to heritage at risk has been added. In addition to this the Environmental Report notes that the at risk register does not include information relating to grade II listed buildings. The council has been consulted with as to whether they have undertaken a survey of grade II listed buildings to determine whether they are in fact at risk – Milton Keynes Council has drafted a local list yet this information is not publically available at this time. The Council has also been asked whether they have conducted a historic characterisation study – The council has confirmed that a study is available and consequently information has been added to relevant sections. An acknowledgment of non-scheduled archaeological remains has been made.
"We agree with the likely future conditions set out in sub-section 6.4 and the key environmental issues identified in sub-section 6.5 (with the exception of the reference to heritage at risk given the error explained above). We particularly welcome the recognition that flood prevention and alleviation measures can have adverse implications for heritage assets as well as benefits".	Please see above for actions taken in response to this comment.
"We welcome the SEA Objective for cultural heritage and the potential indicators in Table 12-1. We suggest two sub-objectives "*would the proposed measure reduce the number of heritage assets at risk of flooding?*" and "*would the proposed measures adversely affect the significance of a heritage asset?*". The "Potential Indicators" could include, if relevant, the area of historic archaeological potential at risk and should include percentages as well as numbers and areas for designated heritage assets and listed buildings on the "at risk" register".	Sub-objectives and measures have been included in line with this comment
Environment Agency	
"Section 3.1: Additional plans that may be relevant to the SEA include the upcoming	Reference and information

Comments Received	Actions Taken
Surface Water Management Plan".	pertaining to the upcoming SWMP has been added to Section 4.4 and Appendix B.
"Section 5.5 - Key Environmental Issues This could include the increase in flood levels and increased surface water run-off (and therefore surface water flooding) as a result of more intense/extreme rainfall events".	Information has been included within the key environmental issues section for climate with the Appendix C and also within Table 7-1.
"Section 5 (climate change), 9 (material assets) and 11 (water) Reference is made to flood risk both now and in the future. The 'baseline review' and 'likely future conditions' sections may be informed by the modelled flood risk outlines inclusive of climate change allowances (where this data is available)".	A map of the 100 year plus climate change event has been added and referenced in relation to climate change, material assets and water (Figure 6-4)
"Section 9.3 - Baseline Review This section has considered flood defences as a material asset, but does not appear to have identified surface water management infrastructure (balancing ponds etc.)".	Information relating to surface water management infrastructure has been added.
"Section 9 - Key Environmental Issues This section may wish to include the concern over increasing pressure on flood defence and surface water management assets and the flood risk that may result from failure to maintain these assets in the future".	Information relating to concerns over increasing pressures on flood defence and surface water management assets and future flood risk has been added to Appendix C and Table 7-1.
"Section 10 - Geology and Soil The geology within the bounds of the Milton Keynes Council area has been correctly identified. However, no mention of their sensitivity with respect to groundwater has been made in this or the following Chapter, such as aquifer designations, e.g. Principal Aquifers (which include Great Oolite Group or Woburn Sands Formation), or the presence of Source Protection Zones".	Information has been added to Appendix C relating to: – Aquifer designations; and, – Source protection zones
"Contaminated land should also be considered in the context of potentially affecting surface water and groundwater quality. Therefore, we would recommend that the final environmental issue in this Chapter 10 be amended to: *'The development of a LFRMS/FRMP and associated strategies for dealing with contaminated land should protect and enhance Milton Keynes' soil <u>and groundwater</u> resource'*. Any such impacts should be considered in Chapter 11".	This objective has been added to the Appendix under soil and geology. Further information relating to water quality has been added to the water section of Appendix C.
"Section 11.3.1 – Fluvial Flooding You may wish to obtain/include the modelled flood extents for the 1 in 100 year events inclusive of climate change allowances (where this is available)".	This has been included, please see Figure 6-4.
"Section 12 - Draft SEA Framework (Table 12-1) The potential indicators under 'Water' refer to the 'standard of coastal defence' and the 'area at risk of tidal flooding in a 1 in 200 year event'. We consider that this should refer to the standard of defence from fluvial flooding?"	This statement is no longer included within the table and better reflects the fluvial environment.
"In the 'Material Assets' section of the detailed Table 12-1 under potential indicators: Ideally this should read 'Number of SuDS schemes adopted into existing and future developments which are adoptable and/or have maintenance regimes secured for the lifetime of the development'".	This indicator has been updated, along with a further indicator related to climate change which also referenced SuDS.
"We support the use of Sustainable Drainage Systems (SuDS) where they do not present a risk to controlled waters. Infiltration SuDS need to meet the criteria in our Groundwater Protection: Principles and Practice (GP3) position statements G1 and G9 to G13. Which can be found here: <u>https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297347/LIT_7660_9a3742.pdf</u> We consider any infiltration SuDS greater than 2.0 m below ground level to be a deep	This information has been added to the Material Assets section of the environmental baseline in Appendix C.

Comments Received	Actions Taken
system and are generally not acceptable. All infiltration SuDS requires a minimum of 1.2 m clearance between the base of infiltration SuDS and peak seasonal groundwater levels. In addition, they must not be constructed in contaminated ground, where they could promote the mobilisation of contaminants and give rise to contamination of groundwater or surface waters".	
Natural England	
"The report has correctly identified three SSSIs that are either contained entirely or partially within the proposed plans administrative boundary. However the wording currently suggests that all of these sites are only partially within the plan boundary, which is not the case, as Howe Park and Oxley Mead SSSI are entirely within the boundary. Natural England strongly suggests that the paragraph is reworded to reflect this: "Milton Keynes has three SSSIs located either entirely or partially within the administrative boundary of Milton Keynes Council. These three SSSIs include Howe Park Wood, Oxley Mead and Yardley Chase".	Text has been reworded in line with this comment.
"Also there are four SSSIs that are adjacent to/in close proximity to the strategy boundary that Natural England would like to see taken into account for the purposes of this SEA, and included in the baseline section for national designations. This is because the LFRMS is likely to have hydrological impacts that cross administrative boundaries. These SSSIs are: mill Crook SSSI, Salcey Forest SSSI, Kings and Bakers Wood and Heaths SSSI, and Wavendon Heath Ponds (within 1km of the LFRMS boundary)".	Information relating to SSSIs in the local area has been added.
"Section 4.4 Likely Future Conditions: Natural England advises as well as future climatic influence on biodiversity identified in this section, habitat loss and fragmentation are also likely to affect biodiversity in the future".	Habitat loss and fragmentation has been acknowledged alongside climate change as a threat to biodiversity.
"Several bullet points for various SEA topics are not considered to be key environmental issues, or are not worded as such. Key environmental issues (identified by an assessment of baseline data and relevant objectives) should inform the objectives of the SEA, and be related to the identified, measurable indicators in order to assess the impact of the LFRMS on these objectives". Subsequently Natural England has proceeded to give examples of where the information in 'key environmental issues' sections may need to be reworded. These relate to: – Biodiversity; – Geology and Soils; – Landscape; and, – Water.	Text has been reworded to ensure that key environmental issues are identified appropriately. Subsequently information has been updated in Appendix C and Table 7-1.

Appendix B. Environmental Policy Review

Plan	Description	SEA Topics
International		
SEA Directive (2001) Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment	Contributes to the high-level environmental protection and the consideration of environmental issues in the preparation and adoption of plans and programmes with the intent of promoting sustainable development.	All
The Johannesburg Declaration of Sustainable Development (2002)	Commits the nations of the world to sustainable development.	All
Arhus Convention (1998) (Convention on Access to Information, Public Participation in decision –making and Access to Justice in environmental Matters)	Links environmental rights and human rights. Acknowledges that we owe an obligation to future generation. Establishes that sustainable development can be achieved only through the involvement of all stakeholders. Links government accountability and environmental protection. Focuses on interactions between the public and public authorities in a democratic context.	All
Convention on Biological Diversity (1992)	Sets the target to achieve by 2010 a significant reduction of the current rate of biodiversity loss. The Strategic Plan for Biodiversity 2011-2020, including Aichi Biodiversity Targets, forms the overarching framework on biodiversity.	Biodiversity
Bern Convention	The main aims of the Convention are: to ensure conservation and protection of wild plant and animal species and their natural habitats; to increase cooperation between contracting parties, and to regulate the exploitation of those species.	Biodiversity
The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention 1985	Contracting Parties work together to share research and conserve migratory species and their habitats by providing strict protection for endangered migratory species.	Biodiversity
The Habitats Directive (92/43/EEC)	Requires the protection of species and habitats of EU nature conservation designation. The Directive requires that development can only be allowed where it does not impact on important sites that protect habitats otherwise compensation measures must be put in place.	Biodiversity
The Birds Directive 2009/147/EC (codified version of 79/409/EEC)	Provides for the protection of all naturally occurring wild bird species and their habitats, with particular protection of rare species. The Directive requires that measures are taken to preserve, maintain or re-establish a diversity of habitats for all the	Biodiversity

Plan	Description	SEA Topics
	birds listed in Article I.	
Our life insurance, our natural capital: an EU biodiversity strategy to 2020 COM(2011) 244 final	Headline target is to halt the loss of biodiversity and the degradation of ecosystem services in the EU by 2020, and to restore them in so far as feasible, while stepping up the EU contribution to averting global biodiversity loss.	Biodiversity
The European Landscape Convention 2000 (signed 2006)	Promotes various actions at the landscape scale ranging from strict conservation through protection, management and improvement to creation.	Biodiversity, Material Assets and Cultural Heritage
EU Floods Directive (2007)	The aim of the Directive is to reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity.	All
Air Quality Directive (2008/50/EC) and Air Quality Standards Regulations (2010)	The Directive on ambient air quality and cleaner air merged most existing legislation in to a single directive and sets limits for concentrations of pollutants in outdoor air. The Air Quality Standards Regulations (2010) transpose into English law the requirements of Directives 2008/50/EC and 2004/107/EC on ambient air quality.	Air, Human Health, Biodiversity
The Industrial Emissions Directive (2010) Directive 2010/75/EU on Industrial Emissions (Integrated Pollution Prevention and Control)	Provides rules for the delivery of integrated prevention and pollution of pollution arising from industrial activities designed to prevent or, where not practical, reduce emissions into air, water and land as well as to prevent the generation of waste to achieve a high-level of protection of the environment. Emission limit values are set for substances harmful to air or water.	Not applicable
The Water Framework Directive (2000/60/EC)	Promotes an integral and coordinated approach to water management at the river basin scale. Also encourages protection of soil and biodiversity. It aims to: Prevent deterioration of aquatic ecosystems and associated wetlands; Promote the sustainable use of water; Reduce pollution of water; and introduce a co-ordinated approach to water management based on the concept of river basin planning.	Biodiversity, Water
The Drinking Water Directive (1998) Directive 98/83/EC on the quality of water intended for human consumption	Seeks to protect public health by reducing the risk of the contamination of water intended or human consumption. Member States to set values for water intended for human consumption.	Water
The Floods Directive (2007/60/EC) on the assessment and management of	Aims to reduce and manage the risks that floods pose to human health, environment, cultural heritage and economic activity.	Water, Human Health, Biodiversity, Cultural Heritage

Plan	Description	SEA Topics
flood risks	Requires Member States to undertake a preliminary assessment by 2011 to identify the river basins and associated coastal areas at risk of flooding. Where necessary flood risk maps are to be produced by 2013 with flood risk management plans focused on prevention, protection and preparedness being in place by 2015.	
Urban Wastewater Treatment Directive (1991)	Aims to protect the environment from the adverse effects of wastewater discharges through a requirement for the secondary treatment of urban wastewater.	Water
The Nitrates Directive (1991) Directive 91/676/EEC on nitrates from agricultural sources	Seeks reduction of water pollution caused or induced by nitrates from agricultural sources and prevent further pollution.	Water
The Waste Framework Directive (2008), Hazardous Waste Directive (1991) IPPC Directive (1996) and Landfill Directive (1999)	Aims to ensure that all necessary measures have been taken to ensure that waste is recovered or disposed of without causing harm to human health or the environment	Human Health
World Heritage Convention (1972)	Calls for the identification, protection, conservation, presentation and transmission to future generations of the cultural and natural heritage sites.	Cultural Heritage
The Convention for the Protection for the Architectural Heritage of Europe (The Granada Convention)	The main purpose of the Convention is to reinforce and promote policies for the conservation and enhancement of Europe's heritage. It also affirms the need for European solidarity with regard to heritage conservation and is designed to foster practical co-operation among the Parties. It establishes the principles of "European co-ordination of conservation policies" including consultations regarding the thrust of the policies to be implemented.	Cultural Heritage
The European Convention on the Protection of Archaeological Heritage (The Valetta Convention)	The revised Convention updates the provisions of a previous Convention (ETS No. 66) adopted by the Council of Europe in 1969. The new text makes the conservation and enhancement of the archaeological heritage one of the goals of urban and regional planning policies. It is concerned in particular with arrangements to be made for co-operation among archaeologists and town and regional planners in order to ensure optimum conservation of archaeological heritage. The Convention sets guidelines for the funding of excavation and	Cultural Heritage

Plan	Description	SEA Topics
	research work and publication of research findings. It also deals with public access, in particular to archaeological sites, and educational actions to be undertaken to develop public awareness of the value of the archaeological heritage.	
Adapting to Climate Change: Towards a European framework for Action (2009)	Promote strategies that increase the resilience to climate change of health, property and the productive functions of land, inter alia by improving the management of water resources and ecosystems. Framework for adaptation measures and policies to reduce the European Union's vulnerability to the impacts of climate change. The White Paper outlined the need for establishing a Clearing House Mechanism by 2011 that would enable exchanging information on climate risks, impacts and best practices between government, agencies and organisations working on adaptation policies.	Climate Change
National		
Flood Risk Regulations (2009) (SI 3042)	Sets duty on Environment Agency and lead local flood authorities to prepare preliminary assessment maps and reports for river basin districts and flooding. A further duty is to identify flood risk areas and prepare flood risk management plans.	All
UK National Heritage Protection Plan	The National Heritage Protection Plan (NHPP) sets out how English Heritage, together with partners in the heritage sector, will prioritise and deliver heritage protection from 2011 to 2015.	Cultural Heritage
Government White Paper: Heritage protection for the 21st Century	Aims to protect National Heritage in the 21st Century and capitalise upon the benefits which this heritage affords.	Cultural Heritage
Environmental Protection Act 1990	Protects the Environment from pollutions and wastes which have the potential to result in the declining quality of the natural environment.	All
Making Space for Water (2005)	Aims to protect people and property from the effects of flooding and where possible implement mitigation and adaptation measures which derive multiple benefits.	Water
Planning Policy Guidance: Flood Risk and Coastal Change	Advises developers as to how flood and water management should be considered when planning developments.	Water, Material Assets
Land Drainage Act (1991)	Stipulates the requirements for adequate land drainage and	Water, Material Assets

Plan	Description	SEA Topics
	associated responsibilities.	
Flood and Water Management Act (2010)	The Act Section 21 sets a duty on the Lead Local Flood Authority (LLFA) to maintain a register of structures or features, and a record of information about each of those structures or features, which, in the opinion of the authority, are likely to have a significant effect on flood risk in its area helping to improve our understanding and management of local flood risk. Section 30 allows the Environment Agency, LLFAs and Internal Drainage Boards (IDBs) to designate natural or artificial features that are important for flood or coastal erosion risk management. The effect of a designation is that a feature may not be altered, replaced or removed without consent. A new regulation will require all LLFA's to asses all drainage designs prior to construction to determine whether the design meets national sustainable drainage standards.	All
National Flood and Coastal Erosion Risk Management (FCERM) Strategy for England (2011)	Sets out a statutory framework that will help communities, the public sector and other organisations to work together to manage flood and coastal erosion risk. Aim is to ensure that flooding and coastal erosion risks are well-managed and co-ordinated. The strategy covers flooding from the sea, rivers, surface water, sewers, groundwater and reservoirs.	All
Guidance for risk management authorities on sustainable development in relation to their flood and coastal erosion risk management (Defra, 2011).	Provides guidance on how authorities can contribute towards achievement of sustainable development when exercising flood and coastal erosion risk management functions, as required by the Flood and Water Management Act (2000)	All
Appraisal of flood and coastal erosion risk management (Defra, 2009)	Sets out the principles that should guide decision-making on the sustainable management of flood and coastal erosion risk in England. In particular it emphasises the need to ensure that appraisals for all activity (whether strategic level plans or individual projects): • Give more consideration to 'risk management' and 'adaptation', as opposed to only 'protection' and 'defence'; • Are undertaken consistently, transparently, with value for money in mind and in a way that complies with the Treasury guidance on appraisal and evaluation in central Government (The Green Book);	All

Plan	Description	SEA Topics
	• Help achieve better social and environmental outcomes as part of sustainable development, both by considering a broader range of issues and by using a broader range of analysis techniques; • Adopt a risk-based approach, whilst considering impacts within the whole of a catchment or shoreline process area.	
Future Water – The Government's Water Strategy for England (Defra, 2008)	Recognises that poor surface water management can cause water quality problems. The Government vision for water policy and management is one where, by 2030 at the latest, we have: • Improved the quality of our water environment and the ecology which it supports, and continued to provide high-levels of drinking water quality from our taps. • Sustainably managed risks from flooding and coastal erosion, with greater understanding and more effective management of surface water. • Ensured a sustainable use of water resources, and implemented fair, affordable and cost reflective water charges. • Cut greenhouse gas emissions. • Embedded continuous adaptation to climate change and other pressures across the water industry and water users.	Water
Groundwater Protection Policy & Practice (EA, 2006)	Facilitates the protection of groundwater.	Water
Groundwater (England and Wales) Regulations (2009)	Seeks to prevent or limit the input of pollutants into groundwater.	Water
Water Act (2003)	Encourage more efficient use of water resources	Water
Groundwater Regulations (2009)	Outlines the authorities responsible for groundwater matters.	Water
Water Industry Act (1991)	An act which consolidates enactments relating to the supply and provision of water and sewerage services.	Water
Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 (SI 3242)	• Aims to improve water quality and promote the sustainable use of all UK waterbodies, including coastal waters, estuaries and all inland waterbodies; • It requires all UK river basins to reach 'good status' by 2015, through demanding environmental objectives, including chemical, biological and physical targets; • Charged the Environment Agency with production of River Basin Management Plans to be implemented by end of 2009;	Water, Biodiversity

Plan	Description	SEA Topics
	• Three types of UK water quality standards are being developed (a formal classification instrument should be completed in late 2007): Priority substances (and Priority Hazardous Substances); Specific Pollutants; and Physico-chemical pollutants.	
Water for Life White Paper (2011)	Recognises that water resources are already under pressure and that future changes such as climate change and demographic change, will exert further pressure. Government objectives include: • Paint a clear vision of the future and create the conditions which enable the water sector and water users to prepare for it • Deliver benefits across society through ambitious agenda for improving water quality, working with local communities to make early improvements on the health of our rivers by reducing pollution and tackling unsustainable abstraction • Work with water companies, regulators and other stakeholders to build understanding of the impact personal choices have on the water environment, water resources and costs; • Set out roles and responsibilities – including where Government will take a stronger role in strategic direction setting and assessing resilience to future challenges, as well as clear expectations on the regulators.	Water, Biodiversity
Strategic Framework and Policy Statement on Improving the Resilience of Critical Infrastructure to Disruption from Natural Hazards (2010)	Sets approach to managing risk to infrastructure: • Build a level of resilience into critical infrastructure assets that ensures continuity during a worst case flood event. • Considering the threat from current and future natural hazards in the design of new assets. • Increase the robustness and resilience of existing services or assets by building additional network connections. • Identifying key components and moving them out of harm's way. • Improved arrangements for sharing of information on infrastructure network performance and standards. • Enhancing skills and capabilities to respond to emergencies arising from natural hazards.	Material Assets
National Infrastructure Plan (2010)	The plan forecasts a 20% increase in congestion by 2025 and requires a change to how infrastructure is planned, coordinated and delivered with adaptation to provide security and resilience. Private sector capital is to be attracted and the cost of capital for projects needs to be reduced.	Material Assets

Plan	Description	SEA Topics
Consultation Draft Waste Management Plan for England (2013)	Aims to deliver the objectives of the revised Waste Framework Directive: to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such waste. There are comprehensive waste management policies in England, which taken together deliver the above objectives, the core of this policy is therefore to bring current policies under the umbrella of one national plan.	Material Assets
Safeguarding our Soils: A Strategy for England (2009)	Policy which acts to protect national soil resources in a bid to capitalise upon the vast amount of ecosystem services which it delivers.	Geology and Soils
Climate Resilient Infrastructure: Preparing for a Changing Climate (May, 2011	A strategic approach to adapting national infrastructure that can be replicated at the sub-regional and local level by local authorities and the new Local Enterprise Partnerships (LEPs) (see paragraph 3.4.6) is described.	Material Assets
The Carbon Plan (2011)	Outlines the government's approach to reducing greenhouse gas emissions and therefore minimising contributions to global climate change.	Climate Change
UK Climate Impacts Programme (2009)	Updated climate change projections based on three global emission scenarios provide forecasts for a climate and weather related impacts.	Material Assets
Climate Change: The Climate Change Act (2008)	Requires that the average annual emissions in the carbon budget period including the year 2020 (i.e. the third period, 2018-2022) are at least 34% below the 1990 baseline. This is a 34% reduction by 2020. The 2008 Planning Act placed a duty on local authorities to include policies on climate mitigation and adaptation.	Material Assets
National Adaptation Plan (2013)	Meets the requirements of the Climate Change Act (2008). Objectives have been developed to address the greatest risks and opportunities: • Increasing awareness; • Increasing resilience to current extremes; • Taking timely action for long-lead time measures; and • Addressing major evidence gaps.	Material Assets

Plan	Description	SEA Topics
The Wildlife & Countryside Act (1981) as amended (most notably by the Countryside and Rights of Way (CRoW) Act (2000)	Principal instrument for the protection of Sites of Special Scientific Interest and endangered wildlife within the UK. The CRoW Act aims for increased public access to the countryside and strengthens protection for wildlife.	Biodiversity
Biodiversity 2020: A Strategy for England's wildlife and ecosystem services (2011)	Ensures biodiversity considerations become embedded in all the main sectors of economic activity, public and private. It sets out the strategic direction for biodiversity policy for the next decade on land (including rivers and lakes) and at sea.	Biodiversity
Making Space for Nature: A Review of England's Wildlife Sites and Ecological Network (Defra, 2010)	Sets out five approaches to deliver a coherent, resilient ecological network: • improve the quality of current site by better habitat management; • increase the size of current wildlife sites; • enhance connections between, or join up, sites wither through physical corridors, or though 'stepping stones'; • create new sites; and • reduce the pressures on wildlife by improving the wider environment, including through buffering wildlife sites.	Biodiversity
The Natural Choice: Securing the Value of Nature. The Natural Environment White Paper. (HM Government, 2011)	Sets out the Government's plans to ensure the natural environment is protected and fully integrated into society and economic growth. Sets out four key aims: • protecting and improving our natural environment; • growing a green economy; • reconnecting people and nature; and • international and EU leadership.	Biodiversity
UK National Ecosystem Assessment (2011)	The first analysis of the UK's natural environment and the benefits it provides to society and economic prosperity. The assessment leads on from the Millennium Ecosystem Assessment (2005) analyses services provided by ecosystem against eight broad habitat types. The ecosystem services provided by these habitat types have been assessed to find their overall condition.	Biodiversity
Ancient Monuments and Archaeological Areas Act (1979)	Provides for nationally important archaeological sites to be statutorily protected as 'Scheduled Ancient Monuments' (now Scheduled Monuments).	Cultural Heritage

Plan	Description	SEA Topics
Planning (Listed Buildings and Conservation Areas) Act (1990)	Provides specific protection for buildings and areas of special architectural or historic interest	Cultural Heritage
The Historic Environment: A Force for Our future (2001)	Sets out the intention to protect the historic environment as in contribution to the economy.	Cultural Heritage
Climate Change and the Historic environment (2008)	Sets out English Heritage's current views on the implications of climate change for the historic environment. It recognises that adaptations and mitigation to address the causes and consequences of climate change can have a damaging effect on historic buildings, sites and landscapes.	Cultural Heritage
The UK Climate Change Programme (2006) and the Climate Change Act (2008)	A suite of new and established measures to reduce UK carbon emissions to 15-18% below 1990 levels by 2010. Also promotes anticipatory adaptation. The Climate Change Act legislates for climate change mitigation and adaption. It sets the requirements for the Climate Change Risk Assessment, the National Adaptation Programme and the Adaptation Reporting Power.	Biodiversity, Material Assets and Cultural Heritage
Countryside and Rights of Way Act (2000)	Provides for public access on foot to certain types of land, amends the law relating to public rights of way, increases protection for Sites of Special Scientific Interest and strengthens wildlife enforcement legislation as well as provides for the management of Areas of Outstanding Natural Beauty.	Biodiversity, Human Health
Conservation of Habitats and Species (2010)	Consolidates the various amendments made to the Conservation (Natural Habitats, &c.) Regulations 1994 in respect of England and Wales and promotes the conservation of designated species and their habitats.	Biodiversity
Marine and Coastal Access Act (2009)	Aims to protect and enhance the habitats and species in marine and coastal areas nationally.	Biodiversity
Waste Strategy for England (2007)	Promotes best practicable environmental option (BPEO), the waste hierarchy and the proximity principle. The strategy sets out an overall objective for England to achieve less waste, more material recovery, energy from waste and much less landfill.	Material assets
Healthy Lives: Healthy People: Our	Helping people live longer and reduce health inequalities.	Human Health

Plan	Description	SEA Topics
Strategy for Public Health in England (Department of Health, 2010)		
Natural Environment and Rural Communities Act (2006)	Promote and enhance biodiversity. The Act stresses that biodiversity conservation should not be viewed solely as an environmental issue, but a core component of sustainable development, which underpins economic development and prosperity and offers a range of quality of life benefits across a range of local authority service areas.	Biodiversity
National Planning Policy Framework (2012)	Sets out how planning should contribute to sustainable development. The Government is committed to protecting and enhancing the quality of the natural and historic environment, in both rural and urban areas. A high-level of protection should be given to most valued townscapes and landscapes, wildlife habitats and natural resources. Those with national and international designations should receive the highest level of protection. Development plan policies should take account of environmental issues such as the potential impact of the environment on proposed developments by avoiding new development in areas at risk of flooding, and as far as possible, by accommodating natural hazards and the impacts of climate change.	All
	Proactive strategies should be adopted to mitigate and adapt to climate change, taking full account of flood risk and water supply and demand considerations.	Biodiversity, Material Assets and Cultural Heritage
	The planning system should contribute to and enhance the natural and local environment by: • recognising the wider benefits of ecosystem services; • minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.	Biodiversity
	Heritage assets are an irreplaceable resource and should be conserved in a manner appropriate to their significance.	Cultural Heritage, Material Assets
	Access to high quality open spaces and opportunities for sport	Biodiversity, Human Health, Material

Plan	Description	SEA Topics
	and recreation can make an important contribution to the health and well-being of communities.	Assets and Cultural Heritage
	The planning system should contribute to and enhance the natural and local environment by: • preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability	Water
	Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere. 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 account of the impacts of climate change.	Biodiversity, Cultural Heritage, Material Assets, Water
Laying the Foundations: A Housing Strategy for England (DCLG, 2011)	Supports the delivery of new homes and improvement of social mobility.	Material Assets
Delivering Affordable Housing (DCLG, 2006)	Supports local authorities and others in delivering high quality affordable housing within mixed sustainable communities.	Not applicable
Planning Policy for Traveller Sites (DCLG, 2012)	Set out the following Government aims for traveller sites: • That local planning authorities should make their own assessment of need for the purpose of planning; • Ensure that local planning authorities work collaboratively to develop strategies to meet needs through the identification of land for traveller sites.	Not applicable
Securing the Future: UK Government Sustainable Development Strategy (2005)	This replaced an earlier strategy published in 1999 and aims to enable people to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations	All
Rural White Paper (2000) Our Countryside: The Future – A fair Deal for Rural England.	Promotes sustainable rural economies with the objective of maintaining and stimulating secure access to services and employment as well as conserving and enhancing rural landscapes.	Landscape, Biodiversity, Cultural Heritage.

Plan	Description	SEA Topics
Urban White Paper (2000) Our Towns and Cities: The Future – Delivering an Urban Renaissance	Seeks to encourage more sustainable and attractive urban areas to retain people in urban areas. Sets target of 60% of new homes to be on brownfield sites.	All
The UK Renewable Energy Strategy (DECC, 2009)	Promotes increased use of renewable electricity and heat as well as promotes a low-carbon economy, energy security to address climate change. Sets target of 15% of energy to be from renewable sources by 2020 with reduced CO_2 emissions by 750 Mt by 2030.	Material assets
Flooding and Historic Buildings (English Heritage, 2010)	This guidance is designed to assist those who live in, own or manage historic buildings that together with their historic fixtures and fittings are threatened by periodic flooding. Advice is provided on preventative measures to minimise flood damage as well as on the inspection, conservation and repair of historic buildings after flooding.	Cultural Heritage
Health and Social Care Act (2012)	Highlights internal structural changes within the NHS in a bid to better deliver healthcare services.	Human Health
Regional and Local		
Anglian River Basin Management Plan (2014)	The Anglian RBMP is concerned with the pressures faced by the water environment in the Anglian River Basin District and the actions that will address them. Whilst considerable progress has been made in protecting river basin assets in recent years there are a number of challenges which remain including point source and diffuse pollution, physical modification of water bodies and water abstraction.	All
Anglian Flood Risk Management Plan Scoping Report (2014)	The Anglian FRMP Scoping Report (produced in July 2014) outlines what flood risk planning is currently underway across the Anglian river basin district, the timing of specific consultations and which organisations will lead on these consultations. The main aim of the FRMP is to manage flood risk across the basin in a bid to protect and improve the environment whilst minimising that impact that flooding has on people's lives.	All
Great Ouse Catchment Flood Management Plan (2009)	The Great Ouse CFMP provides an overview of the flood risk posed across the river catchment and the recommended ways of managing such risk both now and in the future. The Great Ouse CFMP considers all sources of inland flooding and accounts for the	Water

Plan	Description	SEA Topics
	likely impacts of climate change, land use management and sustainable development. The Great Ouse CFMP will be superseded by the forthcoming Anglian River Basin District FRMP, due to be published in late 2015.	
Milton Keynes Council Core Strategy (2013)	The Core Strategy currently acts as the Borough's principal spatial plan and is currently being reviewed as part of the development of Plan:MK which will extend the strategic planning policy to at least 2031.	All
Milton Keynes Council Local Plan (2005)	The Local Plan sets out how Milton Keynes will be developed up until 2011, covering topics such as housing, employment and community facilities and will be replaced by Plan:MK.	All
Buckinghamshire and Milton Keynes Biodiversity Action Plan (2000)	This Local BAP outlines how the flora and fauna of Buckinghamshire and Milton Keynes is going to be protected and enhanced in the future.	Biodiversity
Milton Keynes Council Low Carbon Strategy and Action Plan (2010)	The plan demonstrates how the Milton Keynes community can reduce greenhouse gas emissions locally and tackle global climate change.	Climate Change
Plan:MK	Milton Keynes Council is beginning to develop the new local plan for the Borough, Plan:MK. Ultimately Plan:MK will cover a number of topics (as currently outlined by the topic papers which are currently being consulted upon) such as the natural environment, transport and infrastructure. The plan will focus on how these resources can be strengthened in the future to provide for Milton Keynes' growing population.	All
Milton Keynes Council Heritage, Museums and Archives Strategy (2014-2023)	The Strategy sets out a vision and plan of action in collaboration with various stakeholders to ensure the protection, enhancement and diversification of heritage and culture in Milton Keynes.	Cultural Heritage
Milton Keynes Joint Strategic Needs Assessment (2013)	Describes the current health and wellbeing of the Milton Keynes population and how human health and wellbeing can be protected and enhanced in the future.	Human Health
Milton Keynes Green Infrastructure Plan (2008)	The Green Infrastructure Plan highlights assets which should be retained and enhanced alongside assets which may need enhancement as a result of deficits in provision.	All

Plan	Description	SEA Topics
Milton Keynes Council Contaminated Land Inspection Strategy (2001)	A strategy which details how contaminated land inspections have/will be carried out. The strategy identifies areas of potential contaminated land and gives an overview of local soils and geology.	Soil and Geology
Milton Keynes Council Outline Water Cycle Study (2008)	The Outline Study assessed the impact of proposed growth targets for Milton Keynes on the water cycle infrastructure and water environment of the Borough. The study informed and provided an evidence base for the initial stages of the development of Milton Keynes' Local Development Framework (LDF) whilst providing a justification for the planning on new infrastructure in Anglian Water Service's strategic business planning. Opportunities were also available for relevant stakeholders and risk management authorities to identify and suggest mitigation measures for potential water environment impacts.	Water
Milton Keynes Council Level 1 Strategic Flood Risk Assessment	The purpose of the updated Level 1 SFRA is to collate and analyse the most up to date flood risk information for all sources to provide an overview of flood risk issues across the Milton Keynes study area. This will be used by Milton Keynes Council to inform the preparation of the Local Plan for Milton Keynes (Plan:MK) including the application of the Sequential Test. It is also intended that the revised Level 1 SFRA will also assist prudent decision-making on flood risk issues by Development Management Officers on a day-to-day basis.	Water
South East Midlands Local Enterprise Partnership – Infrastructure Investment Plan	This plan combines Local Investment Plans, Economic Development Plans and Infrastructure Delivery Plans for the Local Authorities across the area in a bid to identify the linkages between employment and housing growth and the infrastructure required to facilitate this growth.	All
Milton Keynes Surface Water Management Plan (Upcoming)	Milton Keynes Council is currently developing a Surface Water Management Plan (SWMP). The SWMP will outline the preferred surface water management strategy in Milton Keynes. In this context surface water flooding describes flooding from sewers, drains, groundwater, and runoff from land, ordinary watercourses and ditches that occurs as a result of heavy rainfall. The SWMP study has been completed in consultation with the Milton Keynes Flood Risk Partnership to understand the causes and effects of surface water flooding and agree the most cost effective way of managing surface water flood risk for the long	Water

Plan	Description	SEA Topics
	term. The Milton Keynes Local Flood Risk Partnership consists of the Risk Management Authorities that operate within the Borough, particularly Anglian Water Services (AWS), the Bedford Group of Drainage Boards (IDB) and the Environment Agency. Further details of the Risk Management Authority roles and responsibilities are provided within the LFRMS. The SWMP also establishes a starting point for a long-term action plan to manage surface water and will influence future capital investment, maintenance, public engagement and understanding, land-use planning, emergency planning and future developments.	

Appendix C. Environmental Baseline

Biodiversity

Whilst there are no internationally designated nature conservation sites in Milton Keynes, there are a wide range of important wildlife habitats throughout the Borough including floodplain grazing in the Ouse and Tove valleys; woodland such as alongside Yardley Ridge and Greensand Ridge and Healthand also on Greensand Ridge. These habitats are however rather sparse and fragmented, although the River Ouse and Ouzel do provide some connectivity in the form of green and blue infrastructure, a main objective for the Milton Keynes Green Infrastructure Plan.

The Buckinghamshire and Milton Keynes Biodiversity Partnership undertook a detailed mapping exercise of habitat types during 2010. The report concluded three key findings for the Milton Keynes administrative area:

- There is a diverse and extensive range of habitats, for instance 49% of all of Northamptonshire's reedbed habitat is located in Milton Keynes, 88% of which is not protected by nature conservation designations;
- 23% of all of the County's floodplain grazing marsh is located within Milton Keynes, none of which is located within a conservation area; and,
- 23% of the County's lowland wood-pasture is located within Milton Keynes, none of which is protected

The Buckinghamshire and Milton Keynes Biodiversity Partnership are working together to develop Biodiversity Opportunity Areas inclusive of Greensand Ridge, Milton Keynes City Area, Ouse Valley, Ouzel Valley, Whaddon Chase and Yardley Chase[49].

Appendix D shows national and local nature conservation designations.

National Designations

Sites of Special Scientific Interest

Milton Keynes has three SSSIs located either entirely or partially within the administrative boundary of Milton Keynes Council. These three SSSIs include Howe Park Wood, Oxley Mead and Yardley Chase (Howe Park and Oxley Mead SSSI are entirely within the boundary).

Howe Park Wood

Howe Park Wood is an ancient semi-natural woodland on the south-western outskirts of Milton Keynes and is one of the largest surrounding tracts surviving in the area. The woodland supports a wide range of woodland trees and shrubs as a result of the range of soils and drainage and the long history and low intensity of past management. There is also a diverse array of woodland plants indicative of a long history of traditional management.

In particular the wood is known to support a rich diversity of moths with almost 300 species recorded including the buff footman *(Eilima dephana),* the slender brindle *(Apanema scolopacina),* the sycamore (*Apateles aceris)* and the pinion streaked snout (*Schrankia costaestrigalis).*

The wood also contains the nationally scarce wood white (*Leptidea sinapsis)*, and nationally rare black hairstreak butterfly (*Strymonidia pruni)*, a Red Data Book species confined to fewer than 35 colonies between Oxford and Peterborough[50].

49 Open Space and Natural Environment Plan:MK Topic Paper.

Oxley Mead

Oxley mead is an ancient hay meadow located on the south-western edge of the City of Milton Keynes which is designated as a SSSI partially as a result of a large nationally rare grassland type community which extends over the majority of the site. Oxley Mead also comprises a number of uncommon and/or rarer species including: Meadow Brome *(Bromus commutatus)*; Common Mouse-ear *(Cerastium fontanum)*, Meadow Vetchling (*Lathyrus pratensis),* Tufted Vetch (*Vicia cracca)*, with Lady's Bedstraw, (*Galium verum)* and pignut (*Conopodium majus*[51]*).*

Yardley Chase

Yardley Chase is located in South Northamptonshire on the border of Milton Keynes. The variety of semi-natural habitat (including plantations of oak, mixed broadleaves and conifers), diversity of associated species and large total area makes Yardley Chase one of the most important sites for nature conservation in the East Midlands.

Uncommon flora and fauna includes certain species of Lepidoptera such as the wood-white *(Leptidea sinapsis)*, which is the largest known British population of the species and rare invertebrates including *(Procraerus tibialis).* This site forms part of a larger area of regional importance for the diversity of breeding birds[52].

In 2012, the Buckinghamshire and Milton Keynes Environmental Records Centre showed that the three SSSIs all currently meet Natural England's aim of bringing all SSSIs into Favourable or Unfavourable Recovering condition[53].

There are multiple areas of ancient woodland as shown in Appendix D.

There are also four SSSIs 1km of the Milton Keynes administrative boundary and these include Mill Crook SSSI, Salcey Forest SSSI, Kings and Bakers Wood and Heaths SSSI, and Wavendon Heath Ponds.

Mill Crook comprises 5.7ha of managed hay meadow situated on alluvial soils in the River Tove valley[54]. Salcey Forest is the largest ancient woodland in Northamptonshire and therefore supports a wide range of flora and fauna spanning 153ha[55]. Kings and Bakers Woods and Heaths span 212.8ha and represents the largest area of woodland in Bedfordshire, ground flora includes a number of rare or uncommon species nationally. Wavendon Heath Ponds includes several habitats representing areas of acidic mire and supporting plant communities uncommon throughout eastern England[56].

Local Designations

In addition to the nationally designated SSSIs there are a number of locally designated nature conservation areas within Milton Keynes and these include:

- A Local Nature Reserve, the 'Blue Lagoon';
- 200 Local Wildlife Sites; and,

50 http://www.english-nature.org.uk/citation/citation_photo/1006067.pdf
51 http://www.english-nature.org.uk/citation/citation_photo/2000053.pdf
52 http://english-nature.org.uk/citation/citation_photo/1004179.pdf
53 Open Space and Natural Environment Plan:MK Topic Paper.
54 http://www.sssi.naturalengland.org.uk/citation/citation_photo/1005498.pdf
55 http://www.sssi.naturalengland.org.uk/citation/citation_photo/1000479.pdf
56 http://www.english-nature.org.uk/citation/citation_photo/1001584.pdf

– 18 wildlife corridors (inclusive of woodland, railway corridors, grid road corridors and wetland habitats)[57].

Blue Lagoon Local Nature Reserve (LNR)

The Blue Lagoon LNR is located at the site of the former brickworks which were demolished in 1970. The site has now been landscaped into an attractive string of ponds and hills planted with woodland. Between the ponds and plantation areas wild plants have colonised[58].

Likely Future Conditions

Climate change has the potential to adversely impact upon biodiversity through a number of mechanisms such as an increased incidence and magnitude of extreme weather events leading to the flooding of habitats. Other threats to biodiversity include habitat loss and fragmentation.

However, as a result of international and national legislation which is supported by local policy such as the Buckinghamshire and Milton Keynes BAP, it is highly likely that measures will be put in place to protect ecosystems and the flora and fauna they contain. As a result of plans and programmes such as the Biodiversity Opportunity Areas project it is likely that biodiversity and nature conservation will in fact be enhanced in the future.

Key Environmental Issues

The nature of the impacts upon biodiversity associated with the future potential measures of the Strategy can be both adverse and beneficial. Therefore, the key environmental issues identified are:

– Milton Keynes has a number of diverse yet potentially sensitive habitats and species, whose resilience and vulnerability to local flooding will differ;
– These habitats comprise a number of SSSIs and locally designated nature conservation areas such as the Blue Lagoon LNR;
– Potential habitat loss and fragmentation;
– There is the potential for habitat creation, enhancement of alteration as a function of flood reduction measures associated with the delivery of the Strategy; and,
– There is the potential for negative impacts to arise on statutory and non-statutory ecological sites as a result of flooding and flood reduction measures.

57 Open Space and Natural Environment Plan:MK Topic Paper.
58 http://www.milton-keynes.gov.uk/leisure-tourism-and-culture/parks-and-open-spaces/blue-lagoon-local-nature-reserve

Climate

Milton Keynes CO_2 emissions per person are higher than the average for the South East of England due to high levels of greenhouse gas emissions resulting from industry and commerce. However, domestic CO_2 emissions are relatively low due to a modern housing stock.

UK Climate Projections (UKCP09) assumes the following for the South East of England under a medium emissions scenario for 2080:

- An increase in mean winter temperature of approximately 3˚C;
- An increase in mean summer temperature of approximately 3.9˚C;
- An increase in winter mean precipitation of 22%; and,
- A decrease in summer mean precipitation of 23%[59].

A Local Climate Impacts Profile Report[60] was produced for Milton Keynes in 2010 which showed a worst case scenario wherein the future warmest day temperatures may increase by 12.8˚C by the 2080s. This is higher than the summer mean daily maximum temperature projected across the South East of England which is projected to be 11.5˚C. Extreme weather events such as flooding and heatwaves are also predicted to accompany these rising temperatures[61].

Projected Future Climate Conditions

The projected future climate of Milton Keynes has been discussed above. Generally a warming trend will be experienced with altered precipitation patterns and an increased frequency of extreme weather events. However, early identification of these projections along with a Strategy which aims to mitigate and adapt to such changes should limit the most adverse climate change impacts which could affect Milton Keynes' population. Climate change is likely to result in an increased frequency and magnitude of extreme weather events, Figure 6-4 shows the 100 year plus climate change flood extent within Milton Keynes and demonstrates how a wider area of Milton Keynes will be affected by flooding in the future as a consequence of climate change.

Key Environmental Issues

The key environmental issues identified in regards to climate change in Milton Keynes include:

- Milton Keynes CO_2 emissions per person are higher than the average for the South East of England as a result of industry and commerce;
- Domestic CO_2 emissions are relatively low due to a modern housing stock;
- UK Climate Projections suggest that the South East of England will experience a warming trend with changes in precipitation and a greater frequency of extreme weather events;
- Locally Milton Keynes has conducted a LCIP which projected more extreme climate change impacts such as a summer mean daily maximum temperature of 12.8 ˚C (compared to 11.5˚C as projected for the South East of England by the UKCP09);

59 UKCP09. South East England Keys Findings. http://ukclimateprojections.metoffice.gov.uk/22292
60 Local Climate Impacts Profile Report http://www.usea.org.uk/images/news_images/Milton%20Keynes%20LCLIP.pdf
61 Climate Change and Sustainability Topic Paper – Plan:MK. http://www.milton-keynes.gov.uk/planning-and-building/planning-policy/plan-mk

- The impacts of climate change on local communities, infrastructure and assets must be mitigated for or adapted to;
- Construction activities associated with flood alleviation works could lead to increased greenhouse gas emissions for a temporary period;
- There is the potential for increased flood levels and surface water runoff and subsequently flooding as a result of more intense/extreme rainfall events associated with climate change; and,
- Most proposed measures have the potential to have a positive impact in mitigating against the effects of climate change.

Cultural Heritage

English heritage define the historic environment as: 'areas, buildings, features and landscapes with statutory protection (designated heritage assets), together with those parts of the historic environment which are locally valued and important (non-designated heritage assets) and also the historic character of the landscape, townscape and seascape'. Similarly, the NPPF defines the historic environment as: '*All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged, and landscaped and planted or managed flora'.*

The Buckinghamshire and Milton Keynes Historic Towns Project[62] provides information relating to the historic environment of Milton Keynes and focuses on areas such as Newport Pagnell, Olney and Bletchley and Fenny Stratford which have shown to be areas of historic flooding. Information dates back to Medieval times (1066-1536) for the majority of areas and the Anglo Saxon period for Newport Pagnell and Olney. Newport Pagnell is therefore one of the earliest towns in the county referred to in the Domesday Book as a Borough. Olney's first historical reference dates back to 979 and is therefore one of the earliest documented settlements in the county and has evidence of a substantial Roman settlement to the north of the town at Ashfurlong.

Milton Keynes' heritage assets are shown in Appendix D.

Heritage Assets:

Milton Keynes has the following heritage assets:

- 1,100 Listed Buildings;
- 27 Conservation Areas – the largest being Wolverton;
- 50 Scheduled Ancient Monuments; and,
- 3 Registered Parks and Gardens.

Only three of the heritage assets listed refer to 'New Town assets'; the Shopping Building, the former bus station in Central; Milton Keynes and the houses at Cofferidge Close, Stony Stratford.

There are, six heritage assets within Milton Keynes which are identified as being at risk on the 2014 Heritage at Risk Register, five scheduled monuments and one grade II* listed building:

- Group of ring ditches and enclosures at Tyringham and Filgrave (Scheduled Monument);
- Wood Farm moated site, Clifton Reynes (Scheduled Monument);
- St Martin's Church, Emberton (Scheduled Monument);
- Roman Site at Olney (Scheduled Monument);
- Orchard House, 67 and 69, High Street, Olney (grade II* listed building); and,
- Roman town of Magiovinium and Roman Fort Bletchley and Fenny Stratford/ Bow Brickhill (Scheduled Monument);

62 The Buckinghamshire and Milton Keynes Historic Project http://www.buckscc.gov.uk/media/1914822/historic-towns-report.pdf

It must be noted that the Heritage at Risk Register does not include grade II listed buildings. Similarly, there must be an acknowledgment for the potential of non-scheduled archaeological remains in Milton Keynes.

Likely Future Conditions

The Heritage Strategy has the overarching aim of being renowned as 'world class for heritage by 2023 and delivering the vision of 'heritage at the heart of Milton Keynes and a force for social, economic and cultural vitality'. Alongside the heritage strategy, Plan:MK will also provide protection and enhancement of heritage assets. The LFRMS will also act to protect Milton Keynes' heritage through the prevention of flooding which may affect the quality of heritage assets. As a result, due to the high level of protection afforded to heritage assets, it is likely that the cultural heritage value of Milton Keynes will in fact increase over time. Flood alleviation and mitigation measures do have the potential to adversely impact upon heritage through changing landscape and flood regimes, however it is more likely that beneficial impacts upon heritage as a result of flood risk mitigation measures will arise.

Key Environmental Issues

The environmental issues related to cultural heritage at Milton Keynes are as follows:

- Six heritage assets within Milton Keynes which are identified as being at risk on the 2014 Heritage at Risk Register, five scheduled monuments and one grade II* listed building;
- By 2023 it is hoped that Milton Keynes will be renowned as 'world class for heritage';
- Potential threats to heritage assets include climate change and associated impacts such as increased extreme weather events and flooding; and,
- Potential flood alleviation measures have the potential to adversely impact the environment; however it is more likely that heritage assets will benefit from the implementation of flood alleviation and mitigation measures.

Human Health

Milton Keynes has a growing population and is home to 255,700 people. Whilst the number of young people is increasing and there is major inward migration of working age individuals into Milton Keynes, the population is ageing faster than the national average. This has led to increasing demands upon healthcare systems.

On average, the health of the Milton Keynes population is better than the national average. However, there are wide gaps in health outcomes between the most and the least affluent. The national index of multiple deprivation shows a continuing trend of increasing inequalities since 2004. For example, educational attainment and vehicle ownership is high whilst unemployment is low in Milton Keynes and has the fifth lowest level of fuel poverty in England and Wales. However, nearly 20% of the population is affected by poverty and crime, which is higher than the national average and a concern amongst residents[63].

Milton Keynes' Joint Strategic Needs Assessment includes a number of policies which are aimed at improving the health of the Milton Keynes' population which include:

- To increase housing stock and reduce fuel poverty;
- To reduce inequalities in achievement among children and young people through additional support for specific vulnerable groups;
- Invest further in promoting physical activity to reduce existing health inequalities, and prevent future ill health, especially in children;
- Increase opportunities to prompt healthier lifestyles; and,
- To prevent disease and improve health outcomes in people in the early stage of disease.

Likely Future Conditions

In the near future it is unlikely that the health and wellbeing of the Milton Keynes population will change dramatically (either beneficially or adversely). However in the longer term it is hoped that health statistics will further improve as a result of the requirements and policies of frameworks such as the Joint Strategic Needs Assessment.

Milton Keynes healthcare providers should be aware of the challenges faced to health and wellbeing as a result of climate change, particularly in relation to flooding incidents which may increase in both magnitude and frequency in the future as a result of a changing climate.

Key Environmental Issues

The environmental issues related to human health in Milton Keynes are as follows:

63 Milton Keynes Joint Needs Assessment 2012/13
http://www.mkiobservatory.org.uk/Download/Public/1026/DOCUMENT/10265/JSNA%2012-13%20Executive%20Summary.pdf

- Access to the natural environment is essential to protect/enhance human health and wellbeing (yet can pose threats) as highlighted by the Millennium and National Ecosystem Assessment;
- Generally the health of Milton Keynes is more favourable than the national average however there are inequalities amongst subsets of the population;
- Health may improve in line with a number of health-related plans, programmes and strategies delivered by Milton Keynes Council and partners yet may face further challenges from external factors such as climate change and its associated impacts including flooding;
- Flooding can have immediate impacts upon human health and/or can result in health complaints ‘post-flood’ such as stress and anxiety;
- Flooding can limit access to healthcare; and,
- Flood alleviation measures have the potential to protect human health.

Landscape

Open spaces are seen as highly important in Milton Keynes, providing an important role in flood mitigation and nature and habitat conservation. In 2006 to 2007 a Draft Landscape Character Assessment was undertaken for Milton Keynes, this assessment is currently being updated and finalised[64]. In summary, Milton Keynes is located within the national landscape character area known as the 'Bedfordshire and Cambridgeshire Claylands' which comprise areas of undulating 'upland plateau' intersected by the shallow river valleys of the Ouse and Ouzel.

As aforementioned, Plan:MK contains a Topic Paper specifically related to Open Spaces and the Natural Environment. In the plan the Borough is described as having a high quality landscape with a well-connected framework of green space throughout the City which is predominantly managed by the Milton Keynes Park Trust.

Across the Borough, public open space covers approximately 3,200ha (129ha per 1000 population), one of the highest amounts of open space per resident across local authorities. Milton Keynes Council is responsible for managing 1,200ha of this open space which is mainly located in the South of the Borough.

Likely Future Conditions

The landscape quality of Milton Keynes is widely acknowledged by key stakeholders and seen to derive multiple benefits from flood alleviation and nature conservation to recreational and leisure benefits.

The Local Plan, Core Strategy and most recently Plan:MK all endeavour to prevent inappropriate development and to maintain and enhance the landscape of Milton Keynes. Specifically in regards to flooding, the role that the landscape plays in regards to flood alleviation is seen as a vital asset. In the future, climate change impacts are likely to increase the incident and magnitude of flooding, therefore it is likely that such landscapes will become increasingly important and therefore protected. Conversely, it is likely that development pressures will increase over time thereby putting the landscape of Milton Keynes at risk. In this instance sustainable development which has a sympathetic design and does not increase flood risk/impose upon nature conservation efforts must be ensured.

Key Environmental Issues

- Flooding has the potential to impact upon the landscape of Milton Keynes; and,
- Development pressures may put the Milton Keynes' landscape at future risk.

64 http://www.milton-keynes.gov.uk/planning-and-building/planning-policy/draft-landscape-character-assessment

Material Assets

Flood Defences

Milton Keynes was designed so that the majority of the natural floodplain is within linear parks. As a result there are few properties lying with Flood Zones 2 and 3. Areas where there are properties within Flood Zones 2 or 3 may benefit from the presence of flood defences such as:

- Newport Pagnell where there are several properties in Flood Zone 2 & 3 upstream of the Ouzel- Great Ouse confluence; and,
- Isolated properties along the Ouzel including Belvedere Farm (SP88603404), part of the Open University Campus at Walton Hall (SP88383707) and Caldecotte Mill (SP883704264).

The Environment Agency has permissive powers to carry out flood defence works, maintenance and operational activities for main rivers[65].

Surface Water Management Assets

Milton Keynes has a number of assets which provide surface water management benefits such a network of balancing lakes which accommodate for the increasing runoff from urban areas.

Prior to the development of Milton Keynes there was regular flooding of the Great Ouse, River Ouzel and Loughton Brook. The Milton Keynes Drainage Study (Halcrow 2000) found that water levels for a 1 in 100 year storm at Newport Pagnell would be lower than they were prior to the development of Milton Keynes, due to storage provided by the balancing lakes on the River Ouzel and by their role in reducing flood peak water levels. The linear lakes are designed to flood occasionally to protect Milton Keynes; therefore they are not available as public open space.

The principal balancing lakes on the Ouzel are the Caldecotte and Willen Lakes which have control gates to regulate the flow in the Ouzel. They were built to compensate for increased flows in Broughton Brook and increased discharge from the sewage treatment works, as well as increased run off flows in the Ouzel. Table C-1 shows the balancing lakes and reservoirs within Milton Keynes

As aforementioned, Milton Keynes Council intends to gain a better understanding of SuDS and to implement them wherever practicable in order to reduce flooding across the area. The Environment Agency supports the use of Sustainable Drainage Systems (SuDS) where they do not present a risk to controlled waters. Infiltration SuDS need to meet the criteria in the Environment Agency's Groundwater Protection: Principles and Practice (GP3) position statements G1 and G9 to G13[66]. The Environment Agency considers any infiltration SuDS greater than 2.0 m below ground level to be a deep system and is generally not acceptable. All infiltration SuDS require a minimum of 1.2 m clearance between the base of infiltration SuDS and

65 Milton Keynes Level 1 SFRA
66 Environment Agency. (2013). Groundwater Protection: principles and Practice (GP3)
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/297347/LIT_7660_9a3742.pdf

peak seasonal groundwater levels. In addition, they must not be constructed in contaminated ground, where they could promote the mobilisation of contaminants and give rise to contamination of groundwater or surface waters.

.

Table C-1: Balancing lakes and Reservoirs in Milton Keynes

Reservoir	Catchment	Type	Line	Capacity (m^3)	Catchment Area (Ha)	Notes
Willen	Ouzel	Wet	Off	943000	27700	Completed in 1977. Operation of control gates depends on flow increased upstream of the DA and downstream of Willen Lake. Flow in Broughton Brook also monitored.
Caldecotte	Ouzel	Wet	Off	570000	25500	Operation of control gates depends on flow increased upstream of the DA and downstream of Willen Lake. Flow in Broughton Brook also monitored.
Simpson	Ouzel	Wet / Dry	On	170000	525	Also known as Ashlands. Built prior to 1977. Operates on similar basis to Loughton.
Mount Farm	Ouzel	Wet	On	31500	262	-
Walton	Ouzel	Wet	Off	66000	279	-
Water Eaton	Ouzel	Wet / Dry	Off	3000	62	-
Tongwell	Tongwell Brook	Wet	Off	165000	529	Designed in 1973. Peak inflow is 38 cumecs. Peak outflow is 1.42 cumecs.
Bradwell Lake	Loughton Brook	Wet / Dry	On	235000	4030	Built in 1972. Overtops at time of high flows. DW looked at changes to high level outlet in 1979. Designed on basis of 100% and 70% run off.
Loughton (Tear Drop Lakes)	Loughton Brook	Wet / Dry	On	291000	2380	Built in 1977. Designed on basis of 100% and 70% run off.
Furzton	Loughton Brook	Wet / Dry	On		1886	Built after 1982. Design discharge determined to control flows downstream.
Lodge Lake	Loughton Brook		On	67000		Built in 1981. This was constructed to provide short term storage as a flood meadow. Necessary to deal with high flows arising from increased developed areas. Designed on basis of 100% and 70% run off.
Brick Kiln	Ouse	Wet / Dry	On		206	First to be constructed. Fissured limestone in base results in loss of stored water due to seepage.

Water and Water Infrastructure

Regionally, water supply is resourced from two main sources; surface water abstraction (60%) and groundwater abstraction (40%). Anglian Water Services provides clean and waste water services to Milton Keynes. Milton Keynes is predominantly served by a separate sewerage system which largely drains to Cotton Valley Wastewater Treatment Works (WwTW) located to the east of Milton Keynes. Older outlying towns and villages have combined systems draining to various WwTW such as those at Olney and Hanslope.

Milton Keynes' Water Cycle Study completed in 2008 outlined a number of sewer capacity issues across the area such as Land East of the M1, rural areas including Hanslope and the Central Area – North East[67].

Waste and Waste Infrastructure

The efficiency of Milton Keynes' waste management systems has greatly improved in recently years, largely as a result of the implementation of the revised Waste Strategy in 2011. Household recycling rates have increased from 52% in 2010/11 to 53.5% in 2012/13, despite a plateau in recycling rates both nationally and locally. Despite this, Milton Keynes recycling rate remains above the national average of 42%. Overall waste volumes have decreased and further improvements to recycling rates are expected upon the Milton Keynes Waste Recovery Park becoming operational.

The Milton Keynes Waste Strategy have a number of policies related to enhanced waste management practices and movement 'up the waste hierarchy' as introduced by the Waste Framework Directive (2008)[68].

Transport and Transport Infrastructure

Whilst Milton Keynes' transport network is unique comprising a planned grid road and redway network, the proposed growth of Milton Keynes has the potential to increase pressures on current transport systems.

Congestion of road systems is becoming more apparent, partially as a result of a high number of commuter journeys, 61.7% of which are single occupancy. Over the space of 4 years between 2009/10 and 2013/14, journey times have increased by 7%. In a bid to enhance the sustainability of Milton Keynes' road network a number of assessments and strategies have been undertaken by the Council such as a review of parking standards.

In recent years, a greater proportion of journeys have been made by more sustainable options such as by rail or on foot (a 5% increase) whilst there has been a slight decrease in cycling, the reasoning behind which is unknown.

In a bid to assist with the planning of growth and the associated pressures upon highways networks, the Milton Keynes Multi Modal Model (MKMMM) Transport Model has been devised which can aid decision making by allowing to forecast future transport demands[69].

Information and Communications Technology

Telecommunications has become a key area of partnership for Milton Keynes' council in recent years. For instance, the provision of high speed broadband is an increasingly important factor for businesses when deciding upon their location and therefore has the potential to impact upon the economic growth of the area. As a result, the Borough has been working to roll

67 Milton Keynes Water Cycle Study
68 Milton Keynes Waste Strategy (2013). https://www.milton-keynes.gov.uk/waste-recycling
69 Transport and Travel Topic Paper – Plan:MK

out broadband infrastructure across the area in a bid to facilitate the aim of having 86% of premises with access to superfast broadband by the end of 2014. Additionally, the Borough is working to ensure that high speed broadband access and digital infrastructure is available for all new developments[70].

Likely Future Conditions

Development pressures, climate change and associated extreme weather events which contribute to flooding (Figure 6-4) are likely to increase the stresses placed on Milton Keynes' material assets. However, it is likely that the future condition of material assets will improve in line with the requirements of new developments and policies such as Plan:MK. It is likely that water infrastructure and assets will be enhanced to meet the requirements of future developments and are likely to implement the use of sustainable urban drainage systems (SuDS). Waste infrastructure is also likely to see improvements in line with the aim of enhancing recycling rates whilst it is likely that transport networks will be expanded to meet increased demand. In regards to communications, it is very likely that the number of individuals which have access to high speed digital services will increase in the coming years and is essential for continued economic growth of the Borough.

Key Environmental Issues

The key environmental issues highlighted for material assets in Milton Keynes are identified as follows:

- Milton Keynes was designed so that the majority of the natural floodplain is within linear parks, therefore there are few properties lying within Flood Zones 2 and 3 in the new areas of Milton Keynes. Areas where there are properties within Flood Zones 2 or 3 may benefit from the presence of flood defences;
- A Water Cycle Study recently conducted for Milton Keynes highlighted a number of sewer network capacity issues across the Borough;
- Waste management systems in Milton Keynes has seen an enhancement in recent years yet are experiencing a plateau in recycling rates;
- Milton Keynes' unique road network is becoming increasingly congested and is largely a result of single occupancy commuter traffic;
- There is growing concern regarding the increasing pressure on flood defences and surface water management assets along with the flood risk which may result from their failure. Future management and monitoring of such assets is also a concern;
- The method of transport chosen by residents is becoming more sustainable yet the number of cycle journeys has reduced; and,
- The Borough Council aims to have 86% of premises with access to superfast broadband by the end of 2014 and will ensure that all new developments have access to high speed broadband and digital infrastructure in a bid to attract businesses and investors and thereby facilitate economic growth amongst the Borough.

70 Provisions of Physical and Social Infrastructure – Plan:MK

Geology and Soil

The type of soil and underlying geology influence the likelihood of surface and groundwater flooding in an area. In addition, vulnerability to soil erosion varies depending on soil structures. Presence of contaminated land is also crucial in identifying potential risks in the area. Mapping of both contaminated land sites and geology can be found in Milton Keynes' Council Contaminated Land Strategy.

The bedrock geology of the area comprises broadly from the Lower Jurassic Lias Group to the outcrop of the Woburn Sands Formation from the Lower Cretaceous. The bedrock in the south of Milton Keynes consists mostly of mudstone from the Oxford Clay Formation, and sand and mudstone of the Kellaways Formation. In the far south eastern corner there is an outcrop of the Woburn Sands Formation. To the north of Milton Keynes, the underlying geology consists of Great Oolite Group comprising Sandstone, Limestone and Agrillaceous rocks. Towards the North West is the Lias Group comprising of Mudstone, Siltstone and Ironstone. The superficial geology of the area consists of Glacial Till to the west and shows River Terrace Deposits, Alluvium and Head along the fringes of the major watercourses namely the rivers Ouzel and the Great Ouse and their tributaries[71].

Table C-2 presents the various geological units that are found within the study area in stratigraphic order. Aquifer designation where available is shown in bold. The Environment Agency defines Source Protection Zones (SPZ) around all major public and private water supply abstractions in order to safeguard groundwater resources from potentially polluting activities. The Environment Agency records of smaller abstractions have not been reviewed at this stage.

Table C-2: Geological Units of Milton Keynes.

Geological Unit		Rock Type	Thickness (metres)
Superficial Deposit	Alluvium **(Secondary B)**	Clay, Silt, Sand and Gravel	-
	River Terrace Deposits **(Secondary B)**	Sand and Gravel	-
	Head	Gravel, Sand and Clay	-
	Glacial Sand and Gravel	Sand and Gravel	-
	Till	Gravel, Sand, Clay & Silt	-
Bedrock Geology	Gault Formation	Mudstone	70-75
	Woburn Sands Formation **(Principal)**	Sand and Sandstone	0-120

71 Milton Keynes Level 1 SFRA 2014

Geological Unit		Rock Type	Thickness (metres)
	Kimmeridge Clay Formation	Mudstone and thin Limestone	Up to 30
	Oxford Clay Formation	Mudstone	c.70
	Kellaways Formation **(Secondary A)**	Sand and Mudstone	Up to 5
	Great Oolite Group **(Principal)**	Limestone, Mudstone and Clay	c. 23
	Cornbrash Formation **(Secondary A)**	Limestone	1 to 2
	Blisworth Clay Formation	Mottled Mudstone	c.1
	Blisworth Limestone Formation **(Principal)**	Limestone	c.11
	Rutland Formation **(Secondary B)**	Mudstone	2-4
	Whitby Mudstone Formation	Mudstone	up to 120
	Lias Group **(Secondary B)**	Mudstone, Ironstone and thin Limestone beds	Up to 76

There are a number of potentially contaminated sites distributed throughout Milton Keynes, many of which have the potential to cause land contamination as demonstrated by Milton Keynes' Contaminated Land Strategy.

Likely Future Conditions

Impacts resulting from climate change are likely to be complex, since climate, geology, soils, topography, drainage and vegetation are inter-related. Climate change is likely to lead to an increase in frequency and severity of extreme weather events (such as flooding and increased surface water runoff), which in turn may lead to increased soil erosion and degradation of land and/or protected sites.

There is also concern about the gradual degradation of both the countryside and urban environment through changing farming practices, drainage of wetlands, increased pressure from transport and the need for new housing and other development. The majority of Milton Keynes bar Milton Keynes city is agricultural land interspersed with settlements. Future flood events may cause damage to agricultural land which could have consequences for the rural economy.

Climate change may result in extreme weather events such as flooding. Such flooding could increase pollution by mobilising contaminants over a wider area.

Key Environmental Issues

The key environmental issues identified for Milton Keynes in regards to geology and soil include:

- There are a number of potentially contaminated sites distributed throughout Milton Keynes, many of which have the potential to cause land contamination;
- Sites of contaminated land represent a significant environmental problem due to dispersal of pollutants during a major local flood event;
- Loss of fertile, productive agricultural soils may occur during intense spells of rainfall or as a result of unsuitable or lack of appropriate mitigation measures;
- The development of a LFRMS and associated strategies for dealing with contaminated land should protect and enhance Milton Keynes' soil and groundwater resource; and,
- Soil erosion may arise as a result of intense rainfall events.

Water

The Borough of Milton Keynes is included in the Anglian River Basin District (RBD) which covers an area of 27,890 km^2. The Anglian RBD has been divided into a number of river catchments; Milton Keynes lies within the Upper and Bedford Ouse catchment which covers 3,000km^2. The major waterbody in the Borough of Milton Keynes is the River Ouse. The character of the land varies from gently rolling in the upper catchment to extensive river valley flood plain and meadows downstream which support a number of wetland sites. The land use is typically agricultural with major urban areas such as Milton Keynes. The catchment supports a wide range of uses from recreational activities to navigation and abstraction.

Nutrient enrichment is the main water quality concern within the catchment with both the River Great Ouse and River Ouzel being designated as Sensitive Areas (Eutrophic) under the Urban Waste Water Treatment Directive (UWWTD) and the majority of the catchment is designated as a Nitrate Vulnerable Zone (NVZ). Over 39% of the rivers within the catchment currently achieve at least good biological status[72].

Table C-3 demonstrates the current status of rivers in the Milton Keynes Council administrative boundary which have undergone classification under the WFD and have subsequently been assigned a WFD Status.

Table C-3: Milton Keynes' Main Rivers WFD Status

Water-body Name	Hydro-morphological Designation	Current Ecological Status	Current Chemical Quality	2015 Predicted Ecological Quality	2015 Predicted Chemical Quality	Overall Risk
The Great Ouse	Heavily Modified	Moderate Potential	Good	Moderate Potential	Good	At Risk
The River Ouzel	Heavily Modified	Moderate Potential	Good	Moderate Potential	Good	At Risk
Broughton Brook	Artificial	Good Potential	Does not require Assessment	Good Potential	Does not require Assessment	At Risk
Chicheley Brook	Not Designated A/HMWB	Moderate	Good	Good (By 2027)	High	-
The River Tove	Heavily Modified	Moderate Potential	Good	Moderate Potential	Good	At Risk

72 Anglian River Basin Management Plan
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/309814/River_Basin_Management_Plan.pdf

Fluvial Flooding

There are five designated main rivers in the study area, the approximate locations of which are shown below in Figure 6-1, information relating to which is given below:

The Great Ouse rises near Brackley in Northamptonshire and drains the vale which separates the Cotswolds and the Chiltern Hills. The catchment area of the Great Ouse is largely agricultural, with Newport Pagnell and Milton Keynes being the main urban areas. Within the study area, the Great Ouse flows in a northwest direction along the northern boundary of Milton Keynes. There are confluences with the River Tove at Wolverton and the River Ouzel at Newport Pagnell.

The River Ouzel flows north through the eastern side of Milton Keynes until its confluence with the Great Ouse at Newport Pagnell. As with the Great Ouse, the catchment of the Ouzel is largely rural. Leighton Buzzard and Milton Keynes are the main urban areas.

Water Eaton Brook is a tributary of the River Ouzel in Water Eaton in the south of Milton Keynes.

Tongwell Brook is a tributary of the River Ouzel which flows from Tongwell, south of the M1 to the eastern side of Newport Pagnell.

River Tove is a tributary of the Great Ouse which rises in Northamptonshire and flows for about 15 miles north and east of the town of Towcester before joining the Great Ouse between Cosgrove and Milton Keynes.

Figure 6-4 shows the flood zone areas within Milton Keynes inclusive of a 100 year event plus climate change.

There are also a number of Ordinary Watercourses in Milton Keynes which include:

Loughton Brook flows northeast from the Salden area towards Tattenhoe Park and then parallel to the A421 before flowing northwest parallel to the A5. The confluence of the Loughton Brook with the Great Ouse is at New Bradwell. The Loughton Brook catchment is almost entirely within the Designated Area of Milton Keynes. Loughton Brook is managed by the Internal Drainage Board (IDB) downstream of Fulmer Street and by the Parks Trust upstream of Fulmer Street.

Broughton Brook is a tributary of the River Ouzel on the eastern side of Milton Keynes, and is within the IDB area.

Calverton Brook is a tributary of the Great Ouse which flows through the village of Lower Weald on the western side of Milton Keynes within the IDB area.

Caldecotte Brook is a tributary of the River Ouzel. It flows west from Woburn Sands through the east side of Milton Keynes into Caldecotte Lake and is within the IDB area.

Chicheley Brook drains the area surrounding the village of Chicheley in the east of the Borough, and flows west to join the Great Ouse immediately to the north of Newport Pagnell.

Springhill Brook flows east through Neath Hill in the northern part of Milton Keynes town. It then becomes culverted for approximately 1.5km before joining the Tongwell Brook adjacent to Tongwell Lake.

Prior to the development of Milton Keynes there was regular flooding of the Great Ouse, River Ouzel and Loughton Brook. However, upon development there were significant changes to the characteristics of the catchment, for instance increased

runoff from permeable surfaces is now managed through a system of balancing lakes which have be shown to reduce flood water levels as a result of storing water and hence delaying flood peak water levels.

Figure 6-4 shows the risk of fluvial flood risk across the Borough.

Surface Water Flooding

Previous assessments have highlighted historic surface water flooding in areas of Milton Keynes such as Stoke Goldington due to run off flowing over fields and as a result of its location in a natural topographic hollow and local geology[73]. Surface Water Flooding has been experienced in Milton Keynes in the following locations:

Table C-4: Environment Agency Records of Surface Water Flooding.

Location	Date	Description
John Street, Newport Pagnell	Sep-92	Flooding from surface water drain surcharge.
Caldecote St, Newport Pagnell	Sep-92	Flooding from surface water drain surcharge.
Priory St, Newport Pagnell	Sep-92	Flooding from surface water drain surcharge.
Stoke Goldington	Jul-07	Pluvial. Excess surface water runoff. Drainage system overwhelmed. Source: Review of Summer 2007 Floods - Anglian Region.
Lavendon	Aug-08	Pluvial. Drainage system capacity exceeded. Source: Bedford Parish File.
Passenham	Jul-07	Pluvial. Excess surface water runoff. Drainage system overwhelmed. Source: Review of Summer 2007 Floods - Anglian Region.
The Green, Cosgrove	Apr-98	Water due to faulty drain rather than river flood.
Oxfield Park Drive, Old Stratford	Jul-04	Pluvial. Highway drainage system overwhelmed - lack of maintenance the cause. Source: Bedford Parish File.

Figure 6-2 shows the Environment Agency's Updated Flood Map for Surface Water.

Groundwater Flooding

73 As found by the January 2008 report undertaken by WSP

Table C-5 demonstrates the Environment Agency Records of Groundwater Flooding. Figure 6-3 shows the areas of Milton Keynes which are susceptible to groundwater flooding.

Table C-5 Environment Agency Records of Groundwater Flooding

Location	Date	Description
Mill Street, Newport Pagnell	Feb-03	Flooded basement due to high groundwater level. Source: GWCL Team Records.
Weston Road, Ravenstone	Apr-76	High water table. Source: Bedford Parish File.
War Memorial, Olney	Jun-69	Well overflow due to high water table. Source: Bedford Parish File.
High Street, Stony Stratford	Apr-98	Water entered through the ground. Wrack marks in garden.

Sewer Flooding

Anglian Water Services' DG5 Flood Register indicates that two properties in Fenny Stratford and Stony Stratford have experienced internal flooding in the past 10 years. External flooding has affected 1 property in the following four areas in the past 10 years: Denbigh North, Bletchley, Woburn Sands and Moulsoe / southern Newport Pagnell.

Reservoir Flooding

The Environment Agency dataset 'Risk of Flooding from Reservoirs' identifies areas that could be flooded if a large[74] reservoir were to fail and release the water it holds. The mapping shows that the following reservoirs could result in flooding in the Milton Keynes area:

- Caldecott Lake
- Willen Lake
- Simpson Balancing Reservoir
- Furzton Balancing Lake
- Tongwell Lake
- Bradwell Lake
- Loughton Lake
- Foxcote (Buckinghamshire County)

74 A large reservoir is one that holds over 25,000 cubic metres of water, equivalent to approximately 10 Olympic sized swimming pools.

- Wakefield Lodge (Northamptonshire County)
- Towcester Flood Storage Reservoir (Northamptonshire County)
- Foscott (Buckinghamshire County)

The areas shown to be at risk of flooding are constrained to the floodplain areas of the Loughton Brook, Great Ouse and River Ouzel, due to the natural topography of the area. Reservoirs in the UK have an extremely good safety record due to frequent inspection and maintenance where required. These reservoirs therefore present a managed risk.

Canal Flooding

The Grand Union Canal and Milton Keynes to Bedford canal cross the Milton Keynes study area. There have been two instances of breach incidents and two records of overtopping on the Grand Union Canal.

Record 1: The Ouse Aqueduct collapsed in 1808 and debris blocked the River Great Ouse, threatening Stony Stratford with the potential for a major flood. In the event the flood did not happen as the river found a course around the blockage;

Record 2: A breach incident occurred in the Wroughton Park area (SP8779836717) in 1971 caused by third party works involving the installation of pipes across the canal;

Record 3: In July 2007, heavy rainfall and high levels resulted in overtopping of the canal to the north of Grafton Regis just to the west of the Milton Keynes Borough boundary in South Northamptonshire. The River Tove surcharged past weir capacity and before flood paddles were raised; and,

Record 4: In January 2013 snow melt and a rapid rise in the level of the River Tove resulted in overtopping of the canal immediately to the west of Grafton Regis just to the west of the Milton Keynes Borough boundary in South Northamptonshire. Overtopping affected a kilometre length of towpath in this location.

Likely Future Conditions

- With increased development in the Milton Keynes area leading to an increase in impermeable surfaces, surface water flooding may increase, especially if appropriate infrastructure such as sustainable urban drainage is not implemented;
- The risk of flooding is exacerbated by climate change which may result in an increase in extreme weather events and a greater incidence of flooding as a result of flash floods;
- However, the implementation of various flood and water management plans, policies and procedures is likely to reduce the risks posed by flooding; and,
- This therefore has the potential to protect and enhance water quality, resources and associated infrastructure.

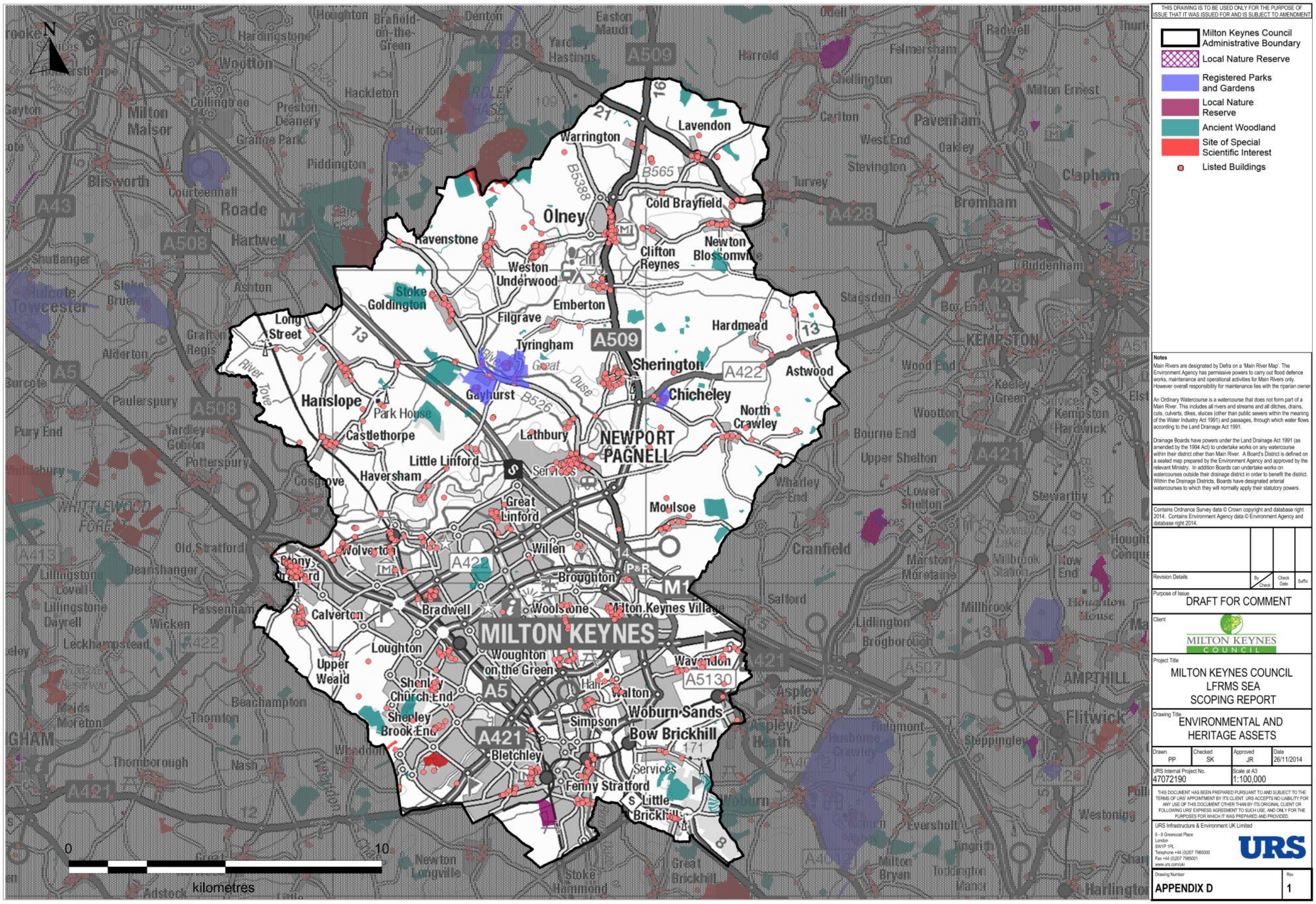
Key Environmental Issues

The key environmental issues identified are:

- There are a wide range of flooding sources within Milton Keynes;
- Climate change is likely to result in an increasing number and magnitude of flood events;
- Nutrient enrichment is the main water quality concern within the catchment;

- There are a number of main rivers and ordinary watercourses within Milton Keynes which have a history of flooding; and,
- Other potential sources of flooding such as surface and groundwater have a number of associated historical flooding incidents.

Appendix D
Nature Conservation and Cultural Heritage



THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT
Milton Keynes Council Administrative Boundary
Local Nature Reserve
Registered Parks and Gardens
Local Nature Reserve
Ancient Woodland
Site of Special Scientific Interest
Listed Buildings
Notes
Main Rivers are designated by Defra on a 'Main River Map'. The Environment Agency has permissive powers to carry out flood defence works, maintenance and operational activities for Main Rivers only. However overall responsibility for maintenance lies with the riparian owner.
An Ordinary Watercourse is a watercourse that does not form part of a Main River. This includes all rivers and streams and all ditches, drains, cuts, culverts, dikes, sluices (other than public sewers within the meaning of the Water Industry Act 1991) and passages, through which water flows according to the Land Drainage Act 1991.
Drainage Boards have powers under the Land Drainage Act 1991 (as amended by the 1994 Act) to undertake works on any watercourse within their district other than Main River. A Board's District is defined on a sealed map prepared by the Environment Agency and approved by the relevant Ministry. In addition Boards can undertake works on watercourses outside their drainage district in order to benefit the district. Within the Drainage Districts, Boards have designated arterial watercourses to which they will normally apply their statutory powers.
Contains Ordnance Survey data © Crown copyright and database right 2014. Contains Environment Agency data © Environment Agency and database right 2014.
Revision Details
Purpose of Issue
DRAFT FOR COMMENT
Client
MILTON KEYNES COUNCIL
Project Title
MILTON KEYNES COUNCIL LFRMS SEA SCOPING REPORT
Drawing Title
ENVIRONMENTAL AND HERITAGE ASSETS
Drawn PP
Checked SK
Approved JR
Date 26/11/2014
URS Internal Project No. 47072190
Scale at A3 1:100,000
URS Infrastructure & Environment UK Limited
URS
Drawing Number
APPENDIX D
Rev 1
0
10
kilometres
MILTON KEYNES
NEWPORT PAGNELL
Olney
Bletchley
Woburn Sands
Bow Brickhill
Fenny Stratford
Wolverton
Hanslope
Sherington
Chicheley
Lavendon
Cold Brayfield
Emberton
Moulsoe

About AECOM

AECOM (NYSE: ACM) is a global provider of professional technical and management support services to a broad range of markets, including transportation, facilities, environmental, energy, water and government. With approximately 45,000 employees around the world, AECOM is a leader in all of the key markets that it serves. AECOM provides a blend of global reach, local knowledge, innovation, and collaborative technical excellence in delivering solutions that enhance and sustain the world's built, natural, and social environments. A Fortune 500 company, AECOM serves clients in more than 100 countries and has annual revenue in excess of $6 billion.

More information on AECOM and its services can be found at www.aecom.com.

Scott House, Alencon Link, Basingstoke, Hampshire,
RG21 7PP.
(+44) 1256 310 200