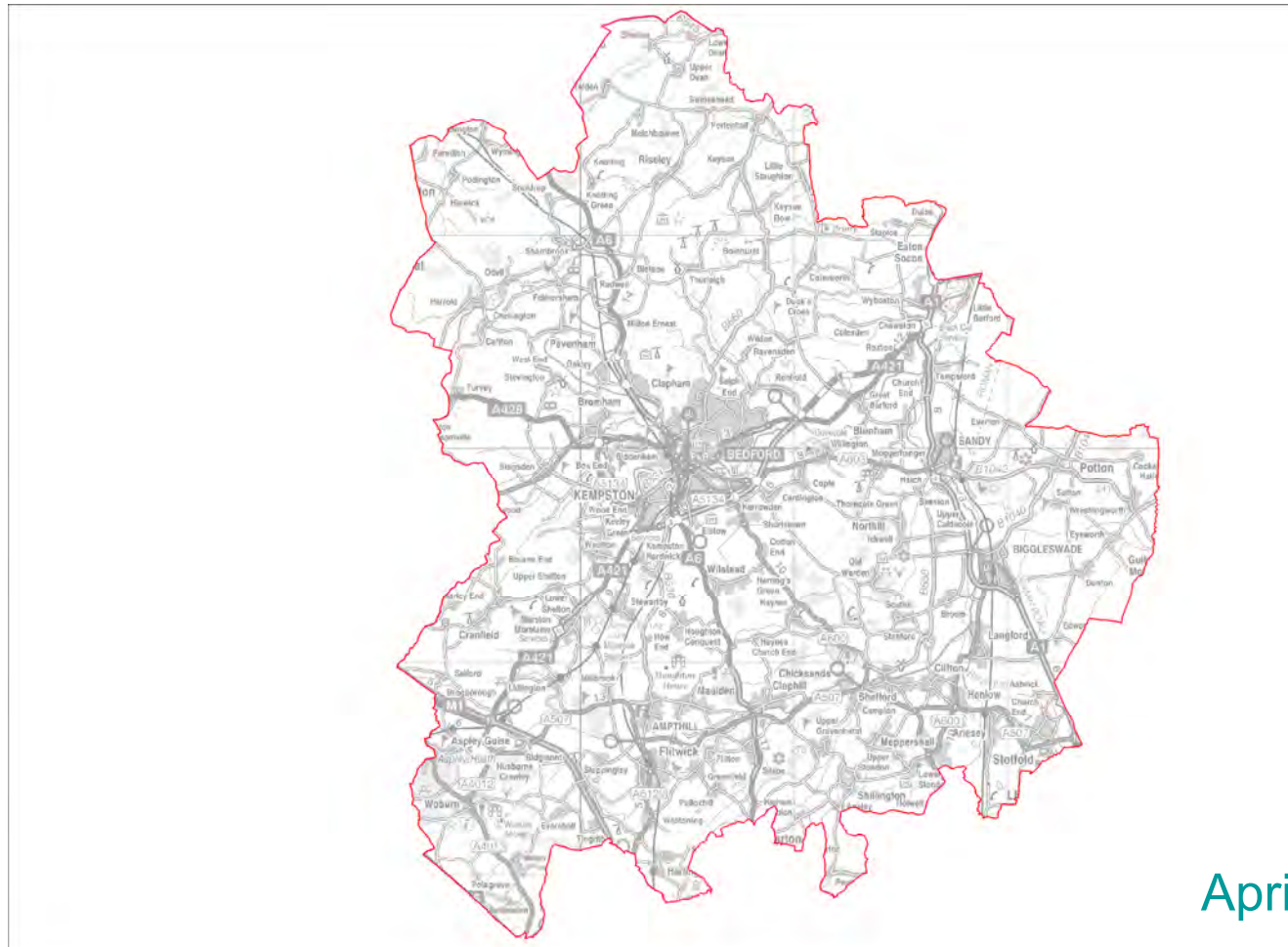


# Bedford Borough and Central Bedfordshire northern area detailed water cycle study

anglianwater

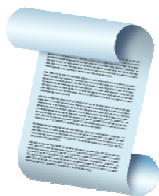


April 2012



Start

## Contents



- [Chapter 1 – Introduction](#)

Including how to use the document, the purpose of the water study, and why a water cycle study is needed

- [Chapter 2 – Planning](#)

This chapter sets the planning and development context across the study area. It identifies the baseline against which this water cycle study has been assessed and the future development scenario we have studied.

- [Chapter 3 – Wastewater](#)

This chapter reviews the water quality and wastewater treatment capacity in the study area and identifies if and where there may be water quality constraints to development. The chapter also reviews wastewater network infrastructure capacity and identifies where additional infrastructure would be required to support allocated developments, and how this infrastructure would be provided.

- [Chapter 4 - Water resources](#)

This chapter reviews the water resources environmental capacity in the study area and assesses the water resources capacity for future development. The chapter also reviews water network infrastructure capacity and identifies where additional infrastructure would be required, and how this infrastructure would be provided.

- [Chapter 5 – Flood risk management](#)

This chapter assesses how recent changes in policy will impact on developers and on planning authorities. The chapter also reviews the Great Ouse catchment flood management plan and identifies how the sub area policies may impact on strategic planning decisions.

- [Chapter 6 – Conclusions](#)

- [Appendix A – Data and evidence](#)

This appendix contains the supporting data and evidence referred to in the water cycle study

- [Appendix B - Linking the lakes](#)

This appendix contains the results of the linking the lakes project carried out under the water cycle study.

- [Appendix C – Demand management action plan](#)

### How to use this document

This document is prepared as an interactive document.

Each page has a navigation bar at the bottom of the page. This will allow to you move forward or backward by one page, to progress to the next chapter, or to return to the chapter start. There is also an icon which will take you to the contents page.

Some chapters contain a navigable map, and where this is the case, the navigation bar will contain a map icon which will return you to the map.

We recommend that this document is read in its entirety by clicking on the 'next page' icon for your first reading. When you are familiar with the documents contents then you will find the navigation bar useful to easily move between sections of the report.

# Chapter 1 - Introduction

## Important notice

### Policy and legislation

There are a number of policy areas where policy is still emerging or is being altered, or where new legislation is still being enacted. We have identified three areas where emerging policy or enactment of duties occurred during the drafting and publication of the final version of this report. It is the readers' responsibility to be aware of policy and legislative change, and to ensure that the information, data and conclusions published in this report are still relevant at the time of reading.

- As of 6th April 2012, Lead Local Flood Authorities (LLFA) have powers to consent works on ordinary watercourses. This is a further commencement of the Flood & Water Management Act 2010.

- Where we make references to planning policy statements (PPS), or national planning policy, these should be read alongside the National Planning Policy Framework which came into force on 27th March 2012, and which may supersede or revoke PPS in part or full.

## New data and information

### Chapter 3 – Bedford Waste Water Treatment Works

The flow figures used in the assessment may have changed since the report was written due to a new flow meter installed to meet the MCerts specification. The recordings from the new meter suggest that the flow is less than the value used in this reports water quality modelling, meaning that the urgency for updating the permit may have receded. Anglian Water Services are currently extending the STW and will consider a new permit which will provide capacity to at least 2021 when the need for further revision will be reviewed.

This document was prepared by Halcrow Group Limited on behalf of Bedford Borough Council and Central Bedfordshire Council. The following organisations comprised the steering group of this project and have formally approved the document for public release:

[Bedford Borough Council](#)

[Central Bedfordshire Council](#)

[Anglian Water Services Limited](#)

[The Environment Agency](#)

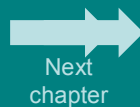
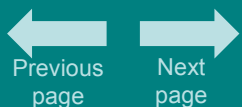
[The Bedford Group of Internal Drainage Boards](#)

Our thanks go to Renaissance Bedfordshire, the former local delivery vehicle for the Bedfordshire growth area, who managed the previous studies and the early stages of this project until it was wound up in March 2011.

Halcrow Group Limited has prepared this report in accordance with the instructions of their client for their sole and specific use. Any other persons who use any information contained herein do so at their own risk.

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Chapter 1 - Introduction



## Growth and development

Building new homes, and providing new employment land is not simply a matter of constructing the buildings themselves. To operate effectively as a home or business, and as part of a wider community, each building is also dependant on a range of services, and the infrastructure necessary to provide these. A critical component of this infrastructure is associated with water; the provision of clean water for drinking and washing; the safe disposal of waste water; and protection from flooding.

The addition of a small number of new homes or commercial properties may not represent a significant additional burden on existing water infrastructure. However when large numbers of houses or commercial properties are built, there is a risk that existing infrastructure will be overwhelmed, and both the environment and people's quality of life, will suffer.

There is a finite capacity within the environment, and it cannot simply provide more and more water to serve new development. Equally, there is a limit to the amount of waste water that can be safely returned to our rivers and the sea without having a detrimental impact on the environment. Furthermore, we know that extreme rainfall can overwhelm drains and overtop flood defences. Climate change is bringing fresh challenges as patterns of rainfall are predicted to change, with more intense rainfall events alongside longer periods between rainfall events. We must also make sure that climate resilient water infrastructure contributes to the shift to a low carbon economy that is essential if greenhouse gas emissions are to be reduced. Planning for water has to take into account these natural constraints, and factors such as the timing and location imposed by the development itself.



Figure 1.2 Artists impression of high quality new development



## Water cycle processes

The water cycle includes the processes and systems that collect, store, or transport water in the environment. Water cycle processes are both above and below ground level, and can be either natural or man-made. In an undeveloped area, the water cycle includes rainfall landing on the ground, where it is either transferred into above ground streams, rivers, wetlands, floodplains, and estuaries to the sea, or is absorbed into the soil, ending up in groundwater storage aquifers. The cycle is completed by evaporation from these systems back into the atmosphere.

In a developed area, the natural processes and systems are sometimes adapted for development or public health reasons. For example, water is taken from rivers, treated, and piped via water supply systems into urban areas. Wastewater produced by houses is collected in a below ground sewerage system, where it is transported to a wastewater treatment works before being discharged to the sea, rivers or to groundwater.

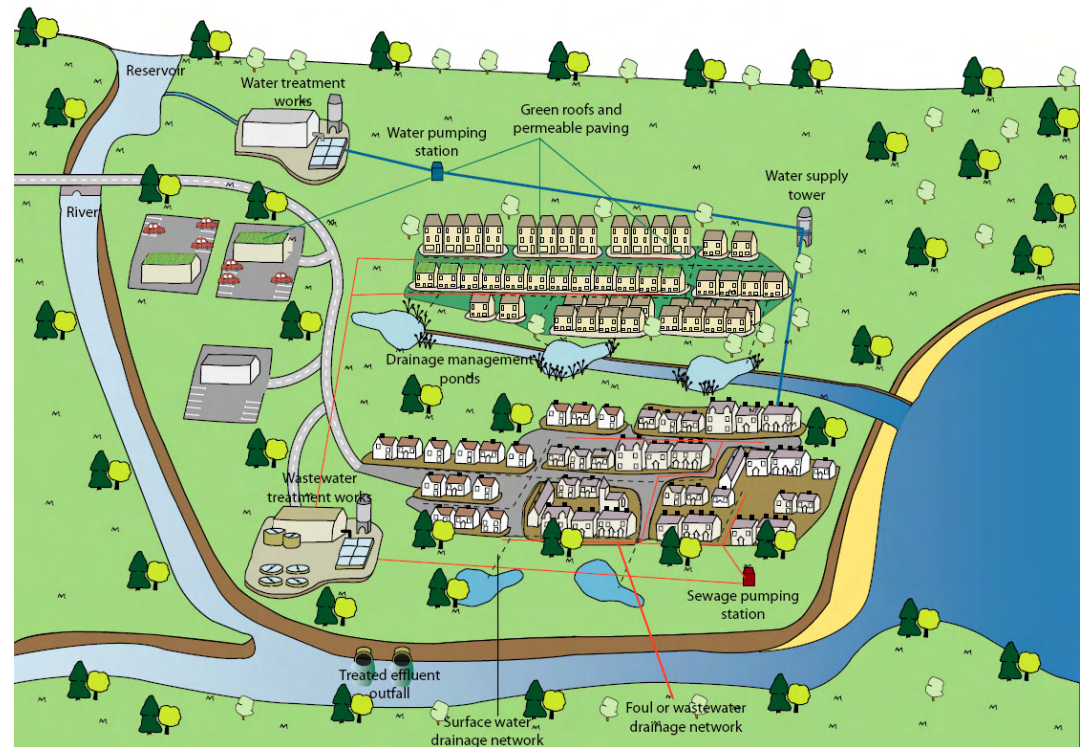


Figure 1.3a The urban water cycle

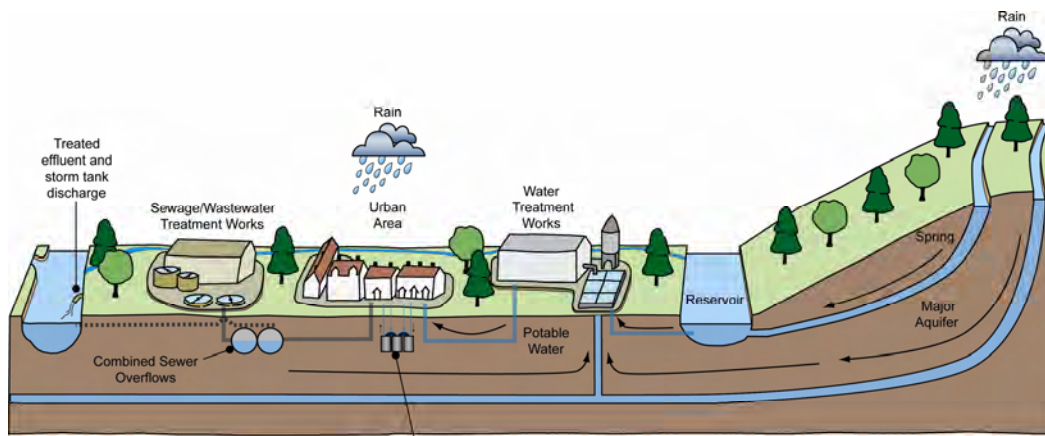


Figure 1.3b The urban water cycle schematic

The natural processes within the water cycle are extremely important for wildlife and ecology, and even man made systems can have biodiversity and wildlife interest. It is important that when building new homes, or even redeveloping existing areas we understand the impact on the natural environment. The image to the left shows how urban development interacts with the water cycle.

## The water cycle study guidance

In January 2009, the Environment Agency published [guidance](#) on undertaking water cycle studies. The guidance is to assist local authorities, developers and others involved in commissioning or carrying out a water cycle study. It provides non-prescriptive guidance on the purpose, scope and best-practice process for undertaking such studies. This water cycle study follows the four stage process outlined in the water cycle study guidance, and shown in the flow chart below. This report is the third in a three stage process, and is a detailed study to inform the development of and adoption of LDF development plan documents.

The guidance document is deliberately non-prescriptive; to ensure that aspects of the guidance that have been superseded by more recent policy documents are not strictly adhered to, and to allow planning authorities to implement the aspects of a water cycle study that are relevant to their objectives and constraints.

According to the WCS guidance, a detailed water cycle study works alongside the latter stages of the Core Strategy and development planning process, and will lead to a water cycle strategy which;

- identifies what water cycle management measures and infrastructure are required, and
- where and when they are needed;
- identifies who is responsible for providing the systems, and by what deadline, and;
- guides planners and developers on site specific requirements.

This report addresses these requirements by providing an environmental and infrastructure capacity assessment, and provides advice for planners and developers regarding the delivery of new infrastructure to support the sites identified in the site allocations and development management documents.

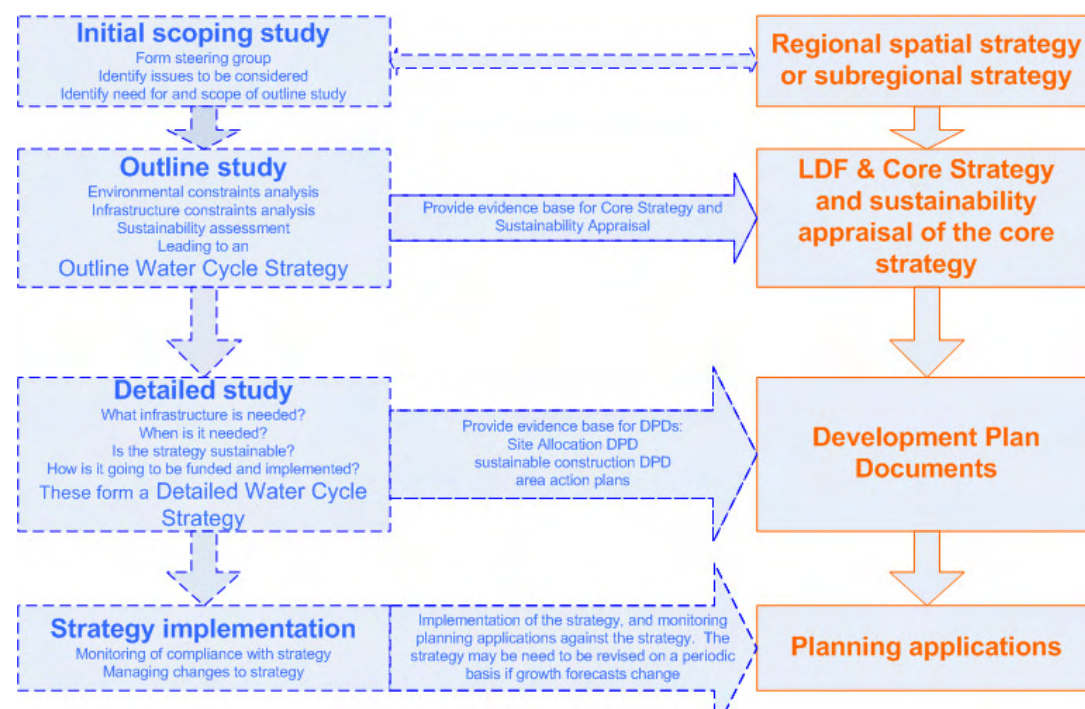
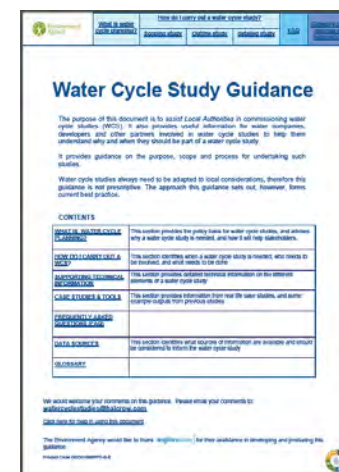


Figure 1.4 The water cycle study process



## The history of Bedford and Central Bedfordshire north area water cycle study

The [Bedford Borough and Mid Beds District Outline Water Cycle Strategy](#) (February 2009) presented a review of the key planning and economic development policies at national, regional and local levels as appropriate at that time. That document identified where these policies make specific reference to water infrastructure and water issues. The study considered how those policy documents provided the framework which will shape future growth patterns. Since the publication of the phase 1 water cycle study, there have been a number of changes to the development and administration of strategic planning and planning control, nationally, regionally, and locally to the study area. This document does not seek to repeat any information that is in the phase 1 water cycle study, but it instead reviews the current state of planning in the study area, and identifies any material changes since the outline water cycle study document was published.



## Outline water cycle study outputs

The outline water cycle study made a number of recommendations for the detailed water cycle:

- Look at the boundary of the outline WCS and confirm that this spatial area is appropriate for the detailed WCS;
- Ensure that growth and development does not compromise compliance with the Water Framework Directive, and is consistent with the spirit of the draft River Basin Management Plan;
- Complete any detailed assessments identified in this outline study;
- Establish minimum design standards to be applied to new developments to ensure a sustainable and integrated WCS;
- Provide a detailed framework for the sustainable provision of infrastructure including a timeline of requirements (the WCS);
- Help ensure that water cycle infrastructure will be funded and implemented;
- Inform supplementary planning documents (SPDs);
- Assess growth scenarios to inform the review of East of England Plan (to 2031);
- Develop guiding principles for the preparation of the Surface Water Management Plan; and
- Provide the basis for a financial mechanism for developer contributions, or a 'reasonable prospect' of infrastructure provision to link planning conditions.

## Detailed WCS requirements

A number of legislative and policy changes in both the water and planning sector required us to review these requirements during the planning of the detailed WCS, and revise this proposed scope. The revised scope agreed with the steering group was to deliver the following outputs:

1. Confirmation that water services infrastructure can be delivered within legislative and regulated environmental capacity (with specific reference to planning authorities' duties under the Water Framework Directive) for strategic sites;
2. Identification of water services infrastructure requirements required to deliver strategic sites including;
3. Identification of existing water services infrastructure capacity to accommodate 'quick win' development sites of a non-strategic scale;
4. Policy advice to planning authorities to support the preparation of DPDs. For example, if infrastructure or environmental mitigation measures are identified by the water cycle study as being necessary to offset the risk of development in a strategic site, the WCS will advise policy measures, agreed with the Environment Agency;
5. An action plan and policy advice to help ensure that demand for water from new homes can be managed to sustainable levels, and where possible, additional demand can be offset with other measures thereby ensuring water neutrality; and
6. A summary of changes in policy with respect to flood risk and surface water management and identify the implications of changing policy on planning authorities and developers.



## Study area

The phase 1 water cycle study extended to the spatial area of Bedford Borough and Mid Bedfordshire councils. In 2008 it was announced that Mid Bedfordshire would merge with the neighbouring district of South Bedfordshire to form a new unitary authority called Central Bedfordshire. The new council was formed on 1 April 2009.

Central Bedfordshire therefore has two LDF programmes, one for the north area (the former Mid Bedfordshire) and one for the south area (the former South Bedfordshire). The LDF for the Central Bedfordshire south area was a joint programme with Luton District Council which has now been withdrawn. The water cycle study for Luton and South Bedfordshire was published in June 2010, and can be obtained at <http://www.shapeyourfuture.org.uk/EvidenceStudies2.html>

The report is to support the LDF programme of Bedford Borough and Central Bedfordshire north area. The study area is shown in the map on the right of the page.

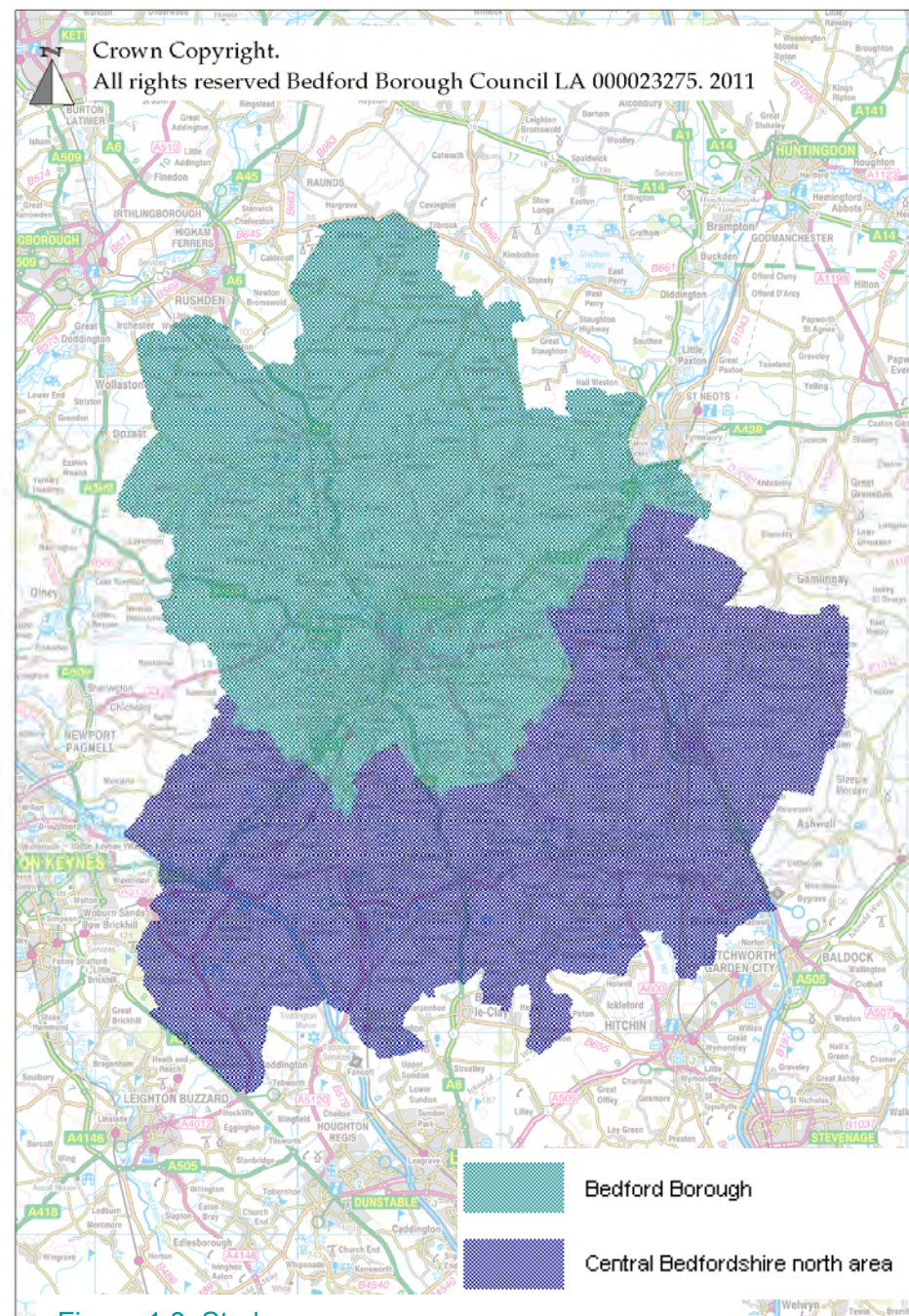


Figure 1.8 Study area

# Chapter two – planning

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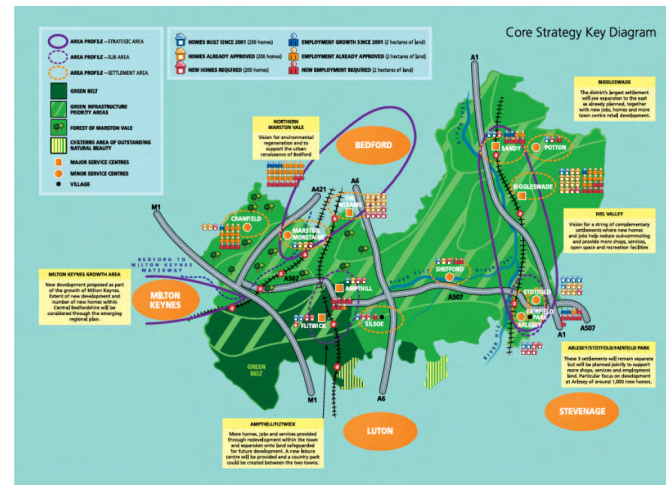
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[Chapter 2 – 18 Development map – area 5](#)

[Chapter 2 – 19 Development map – area 6](#)





## Bedford Borough strategic planning

The Bedford Borough Local Plan was adopted in 2002. The policies in the Local Plan are gradually being replaced by policies in the more up to date Bedford Development Framework.

The first two Development Plan Documents in the Bedford Development Framework, the Core Strategy and Rural Issues Plan and the Town Centre Area Action Plan, were adopted by the council in 2008.

The Core Strategy and Rural Issues Plan outlines the spatial vision for the borough 2001 - 2021. This includes focusing development within the Bedford Growth Area which is made up of Bedford, Kempston and the northern Marston Vale. In the plan period, 16,270 new dwellings will be provided in the growth area and 1,300 in the remainder of the borough (the rural policy area). In addition 16,000 new jobs will be created. Monitoring of permissions and completions shows that in quantitative terms the council has already identified sites to cater for the dwelling requirement to 2021. However, additional sites may be needed to accelerate the delivery of new homes. New sites will need to be allocated to provide space for employment growth.

The Town Centre Area Action Plan looks in greater detail at the policies and proposals required to bring about the regeneration of Bedford Town Centre. The plan identifies specific development opportunities and includes site specific policies to guide future development. The sites identified in the Town Centre Area Action Plan will help to meet the development requirements identified in the Core Strategy and Rural Issues Plan.

The council is currently working on an Allocations and Designations Plan. As well as identifying new sites for development, this plan will designate areas where specific protection policies are needed; for example to protect gaps between settlements and safeguard the network of important open space. The timetable for the completion of this plan is set out in the council's Local Development Scheme. For details of the Local Development Scheme and other planning documents mentioned above see Bedford Borough Council's web site [www.bedford.gov.uk/planning](http://www.bedford.gov.uk/planning).



Figure 2.2 Bedford Borough policy areas

## Bedford Borough character

A spatial portrait of the district is outlined below. This information is derived from the Bedford Borough Core Strategy and Rural Issues Plan (April 2008), and more detailed information on the local character can be found in this document and in the [Bedford Borough landscape character assessment](#) (August 2007)

As of April 2008, the borough had a population of 150,800 (as estimated in 2004) and covers an area of 476 square kilometres. The borough includes the county town of Bedford and also a large rural area. In addition to the town of Bedford and the neighbouring area of Kempston, the borough includes many villages. The largest of the villages is Bromham with a population of almost 5,000 people. Many of the rural parishes of the borough have several small settlements with a combined population of under 500 people. In total, approximately 66% of the population live in the Bedford/Kempston area, yet this accounts for only 8% of the land of the Borough as a whole.

The town of Bedford is located to the South of the Borough, other neighbouring smaller towns include Sandy and St Neots to the east, Rushden and Wellingborough to the north. The largest neighbouring towns are Milton Keynes to the west, Northampton to the north, Cambridge to the east and Luton to the south. The proximity of Luton airport and London further to the south create pressures and opportunities, and Bedford's position in the middle of the Oxford to Cambridge arc has the potential to stimulate economic growth through knowledge based industry. Bedford town centre has a potential regional role for shopping and employment, despite the continued growth of Milton Keynes and Northampton.

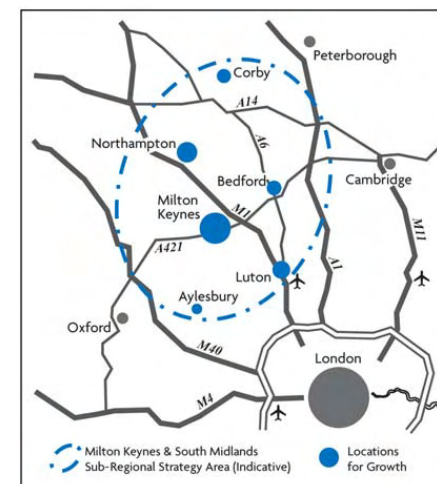


Figure 2.3 Bedford Borough regional context

Housing in the borough reflects the historic nature of the county town. Bedford has a Victorian core but significant expansion in the last fifty years has diversified the nature of housing available. The rural areas have developed at various rates, with the larger villages being located on the most popular transport routes. Between 1999 and spring 2006 house prices have doubled, with the average house price rising to £180,049. Neighbouring districts have higher house prices, with the exception of Wellingborough and East Northamptonshire. Despite the national trend for rising house prices, the market for new homes has been relatively weak with fewer homes being built than are planned or already have planning permission.

The borough prides itself on the wealth of open spaces within the urban areas and the attractive countryside that surrounds the rural villages. In the south of the borough however, there are areas of landscape degradation due to the legacy of brick making in the Marston Vale.

Through the designation of the Forest of Marston Vale the area has become a focus for landscape enhancement. The borough has eight nationally important Sites of Special Scientific Interest (SSSI) and seven designated Local Nature Reserves. The borough also contains 26 conservation areas, 1,363 listed buildings, 69 scheduled ancient monuments and 4 historic parks and gardens.

## Bedford Borough water environment

Covering approximately 1,200 km<sup>2</sup>, the Borough consists of the urban town of Bedford and is surrounded by large pockets of rural land. The underlying geology is predominantly Oxford Clay and Kellaways Beds with some small areas of Cornbrash and Great Oolite limestone formations. This geology results in poor infiltration across the majority of the region. The topography of the catchment is generally fairly flat with land rising in the North with lower land to the South. The River Great Ouse is one of the principal watercourses within the Bedford Borough administrative boundary. Passing through the centre of Bedford and many of the surrounding villages, the Great Ouse catchment extends from Northampton in the West to Suffolk in the East. In addition, the River Til, the Riseley and Pertenhall Brooks pose a risk to the North of Bedford. To the East of the Borough and village of Tempsford is the confluence of the Rivers Ivel and Great Ouse. The Great River Ouse and the River Ivel are designated as Main Rivers and the Environment Agency has powers and duties for the main rivers.

Clicking on the map to the right will take you to a map of the WCS catchment hydrology, and clicking on the map below will take you a map of the WCS catchment water related ecological features.

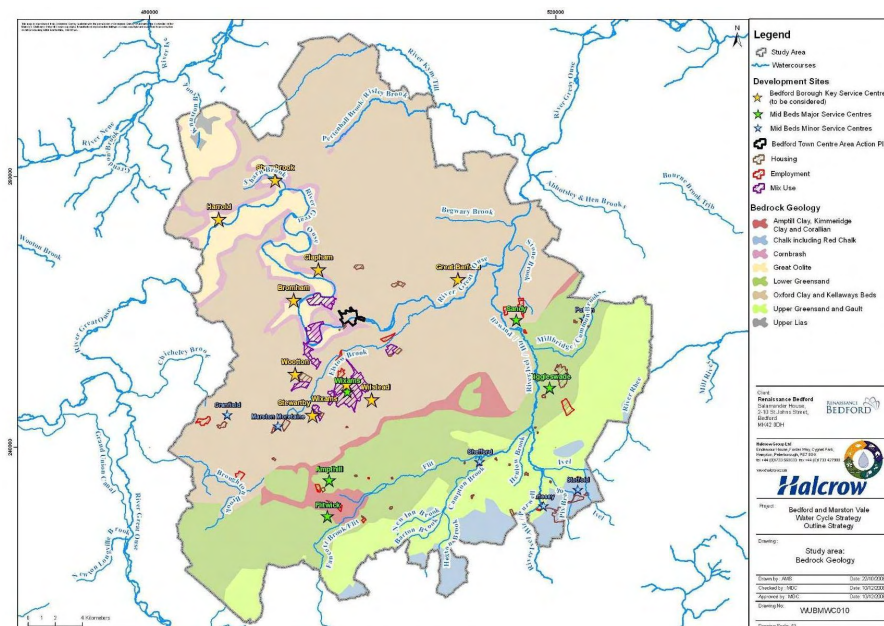


Figure 2.4 Link to Bedford Borough SUDS potential

The Bedford Group of Drainage Boards is responsible for several watercourses in Bedford Borough and some of these are key watercourses within the area, for example Elstow Brook. These watercourses and ditches are predominantly to the South of the Town Centre and in the rural areas of the Southern part of the Borough.

The Elstow Brook rises from the Greensand ridge, near Lidlington in the northern part of Central Bedfordshire, and flows through the Marston Vale and into the South of the Borough before discharging into the River Great Ouse near Willington. The Brook is a Category 1A (high risk) watercourse according to the Bedford Group of Drainage Boards' categorisation system and consequently maintenance operations on this watercourse are a priority for the Board as a flood risk mitigation measure.

Chapters 3 and 4 review the impact of development on water quality and water resources, and Chapter 5 looks at flood in the study area.

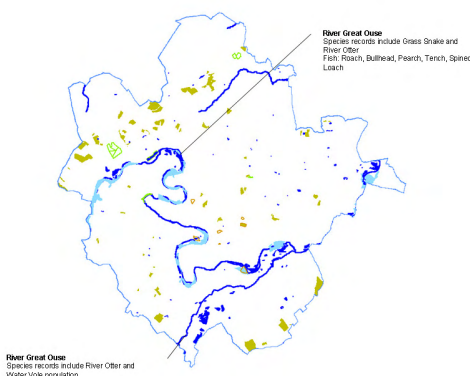
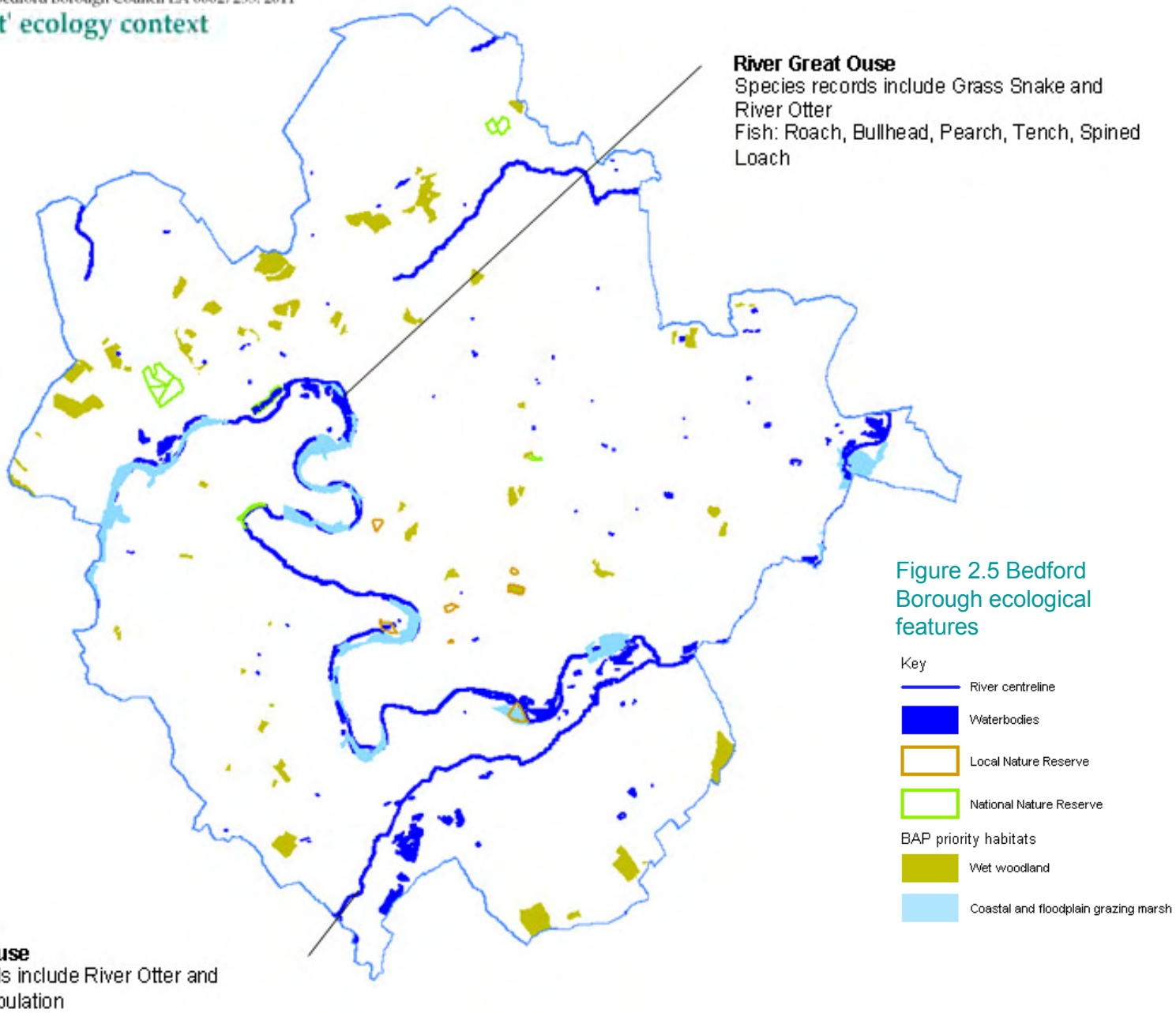


Figure 2.4 Link to Bedford Borough ecological features



Bedford Borough 'wet' ecology context



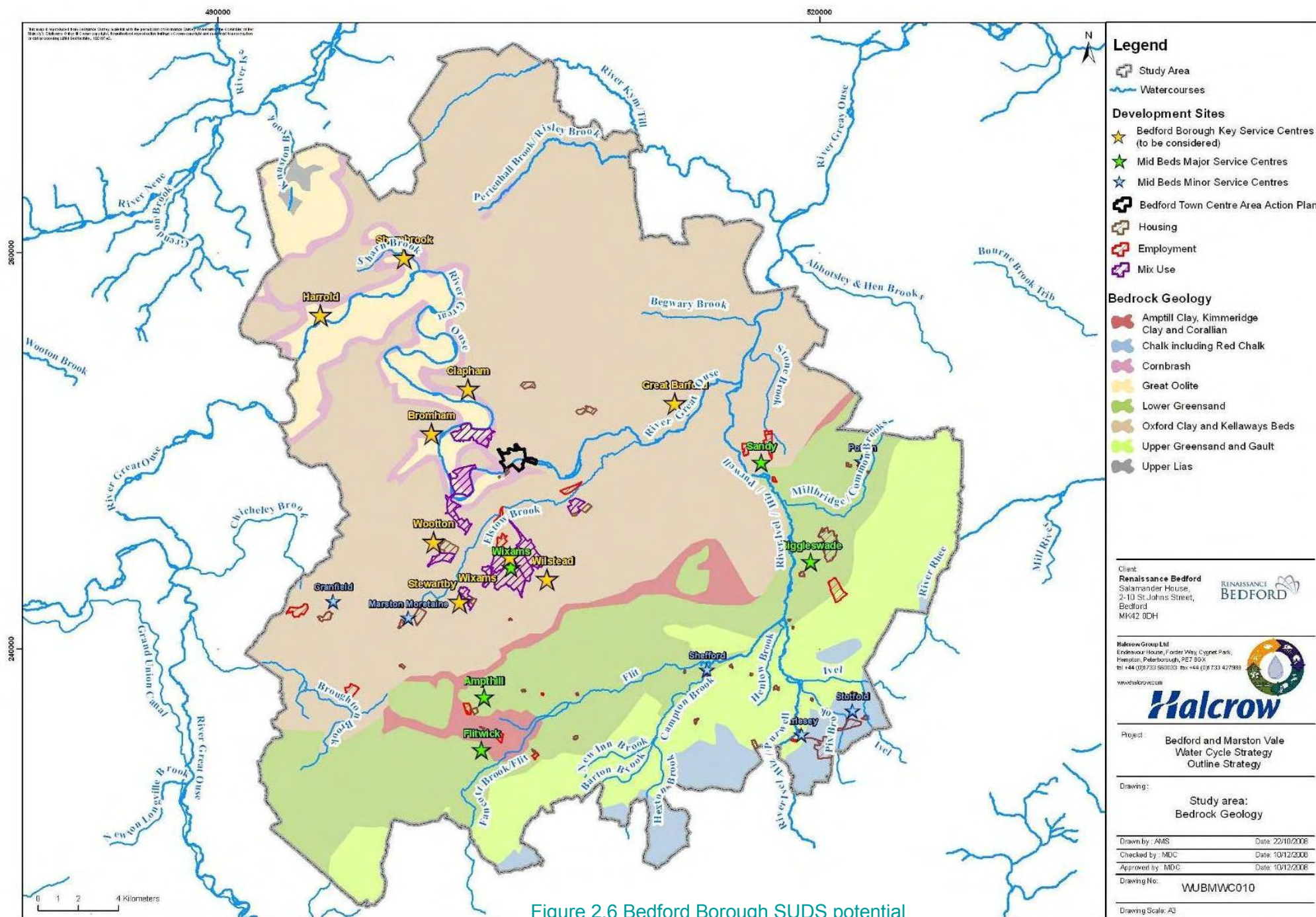


Figure 2.6 Bedford Borough SUDS potential



## Central Bedfordshire strategic planning

There are two Local Development Frameworks for Central Bedfordshire - one for the North area (former Mid Bedfordshire area) and a joint one for the South area (Luton and former South Bedfordshire area). The former relates to this study.

The Central Bedfordshire (North) Core Strategy and Development Management Policies Development Plan Document (DPD) was adopted by the Council in November 2009. It sets out the spatial vision, objectives and policies for the provision of housing, employment land and associated infrastructure, including the broad locations for proposed growth, to meet future development up to 2026. The Development Management policies provide the policy framework against which decisions on planning applications will be made.

The Core Strategy provides for a total of 18,000 new homes and 17,000 new jobs up to the year 2026. Of these, a large number have already been completed or have extant planning permission. The residual requirement of 5,000 new homes and 78 hectares of land for employment purposes has now been identified by the Council in the Site Allocations DPD (adopted April 2011).

The Core Strategy Policy CS1 sets out a hierarchy of settlements focusing additional growth at the larger settlements (known as “Major Service Centres” and “Minor Service Centres”) with limited development in the rural area. This hierarchy takes account of local sustainability credentials such as access to services and facilities (schools, shops and public transport links etc) and this is based on the current level of provision. The hierarchy provides a framework for the level and distribution of new development identified within the Site Allocations DPD, and helps to set the context for decisions on individual planning applications.

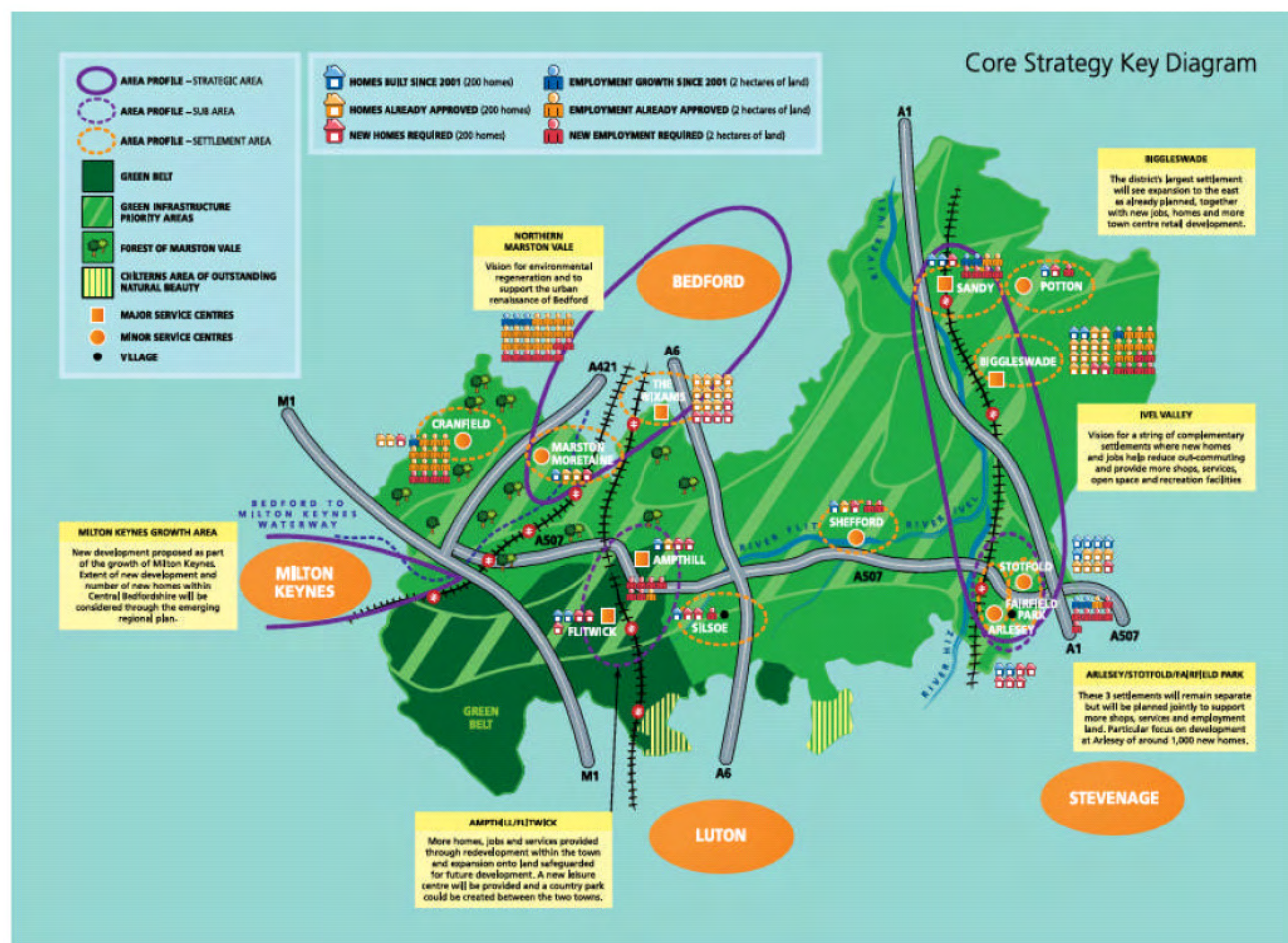


Figure 2.7 Central Bedfordshire Core Strategy key diagram

## Central Bedfordshire north area character

A spatial portrait of the district is outlined below. This information derives from the [Central Bedfordshire North Area core strategy](#) (published November 2009), and more detailed information the local character can be found in this document and in the [Mid Bedfordshire landscape character assessment](#) (August 2007)

As of 2009, Central Bedfordshire North Area had a population of around 132,200 and approximately 54,000 households. This is predicted to rise to around 144,000 by 2021. The age profile is changing – the population is getting older and more elderly people are relocating here. Currently people over 65 years of age make up 13.4% of the population. This will rise by around 20% up to 2021. At the same time young people are moving out of the area. There is a low proportion of ethnic minority groups compared to the national picture.

The main towns are Biggleswade (population 16,520), Flitwick (13,220), Sandy (11,610), and Ampthill (6,830), all of which have expanded with the building of modern estates (figures are ONS 2006 mid-year estimates). Stotfold had a population of 7,090 in 2006 but this is predicted to rise to 13,060 in 2011, making Stotfold the second largest settlement in Central Bedfordshire by 2011. Central Bedfordshire is one of the most rapidly growing districts in England – recent population growth is over double the national average. With substantial planned housing development population growth will continue.

Historically, the largest employment sectors in Central Bedfordshire have been agriculture and manufacturing. Both of these sectors have been in steady decline for some time, but agricultural employment is still higher than the national average and there is still a higher percentage of manufacturing jobs in Central Bedfordshire compared to the county and region. The Central Bedfordshire economy has key strengths, including: a high proportion of the population being economically active, high earnings, low unemployment, a mix of sectors, increasing jobs and numbers of businesses. However, there are also some relative weaknesses in the local economy which may well be challenged further if high growth continues in surrounding areas. These weaknesses include a lower proportion of service sector jobs compared to the County and Region, with particular under representation of the professional and financial services sector, and; low levels of economic self containment, with high levels of out-commuting.

Central Bedfordshire includes a varied and contrasting landscape and ecology. The Greensand Ridge is of high biodiversity value and comprises extensive woodlands, remnant heaths and acid grasslands, as well as open spaces for local people and visitors. Central Bedfordshire also contains examples of national priority chalk grassland (slopes of the Chilterns) and wetland habitats (e.g. Flitwick Moor). The Chilterns Area of Outstanding Natural Beauty is a national designation and covers a small part of the south of the district around Harlington and the Pegsdon Hills.

Central Bedfordshire is the most heavily wooded part of Bedfordshire mainly due to the Greensand Ridge. The Forest of Marston Vale is one of only 12 Community Forests throughout the UK and has made a significant impact in regenerating the local environment, whilst providing communities with access to green space.





## Central Bedfordshire north area water environment

Approximately 500 km<sup>2</sup>, Central Beds is a predominantly rural District interspersed by small towns and villages. The Greensand Ridge is the principal topographical feature within the District running from Ampthill to Sandy in a generally North-Easterly direction. Underlain by Lower Chalk in the South East, there are outcrops of Gault, Woburn Sands, West Walton, Ampthill Clay and Oxford Clay formations that run along the North West of the District. The impermeable nature of much of the bedrock suggests there is little potential for infiltration drainage methods to be successfully implemented across the District. Within Central Bedfordshire (North), there are three principal watercourses - the River Ivel, River Great Ouse and the River Great Ouse at Tempsford. The River Ivel rises in Hertfordshire and flows Northwards where it joins the River Great Ouse at Tempsford.

Clicking on the map to the right will take you to a map of the WCS catchment hydrology, and clicking on the map below will take you a map of the WCS catchment water related ecological features.

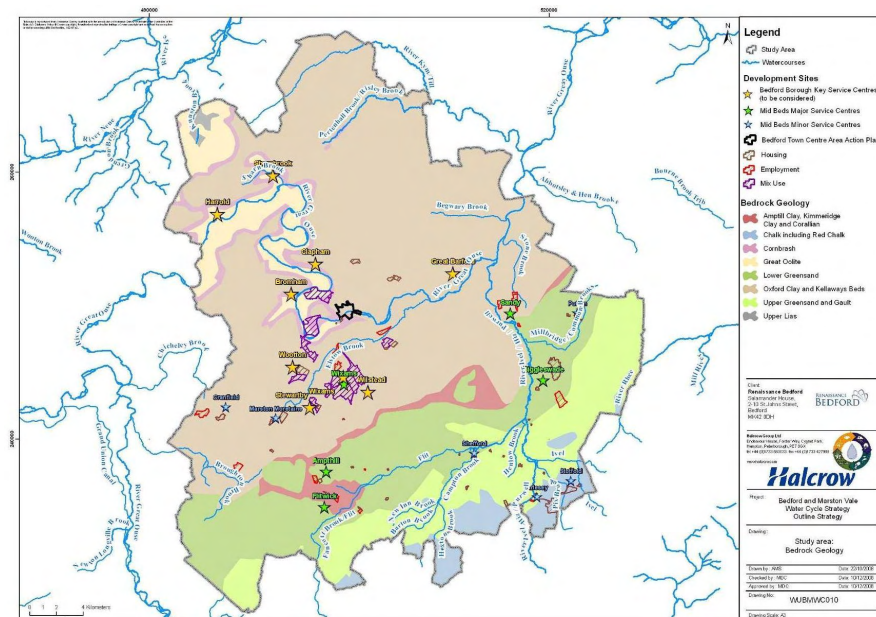


Figure 2.9a Link to Central Beds SUDS potential

The River Hiz flows in a Northerly direction towards Arlesey where it joins the River Ivel at Henlow. The River Flit flows North to merge with significant tributaries at Flitwick and Shefford before continuing in a North-Easterly direction as the River Ivel Navigation channel that discharges into the River Ivel at Langford. Where the watercourse is classified as a main river, it is administered by the Environment Agency. Where the watercourse is classified as an Ordinary Watercourse, the Bedford Group of Drainage Boards administers it.

The Pix Brook is also significant in the District and is a main tributary of the River Hiz. There are several smaller watercourses in the District that are maintained by the Bedford Group of Drainage Boards.

Chapters 3 and 4 review the impact of development on water quality and water resources, and Chapter 5 looks at flood in the study area.

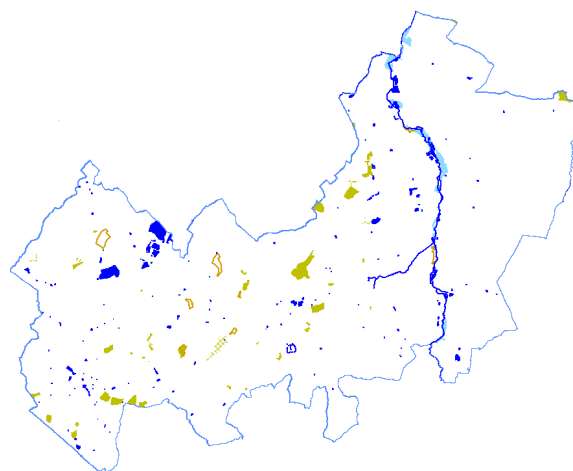
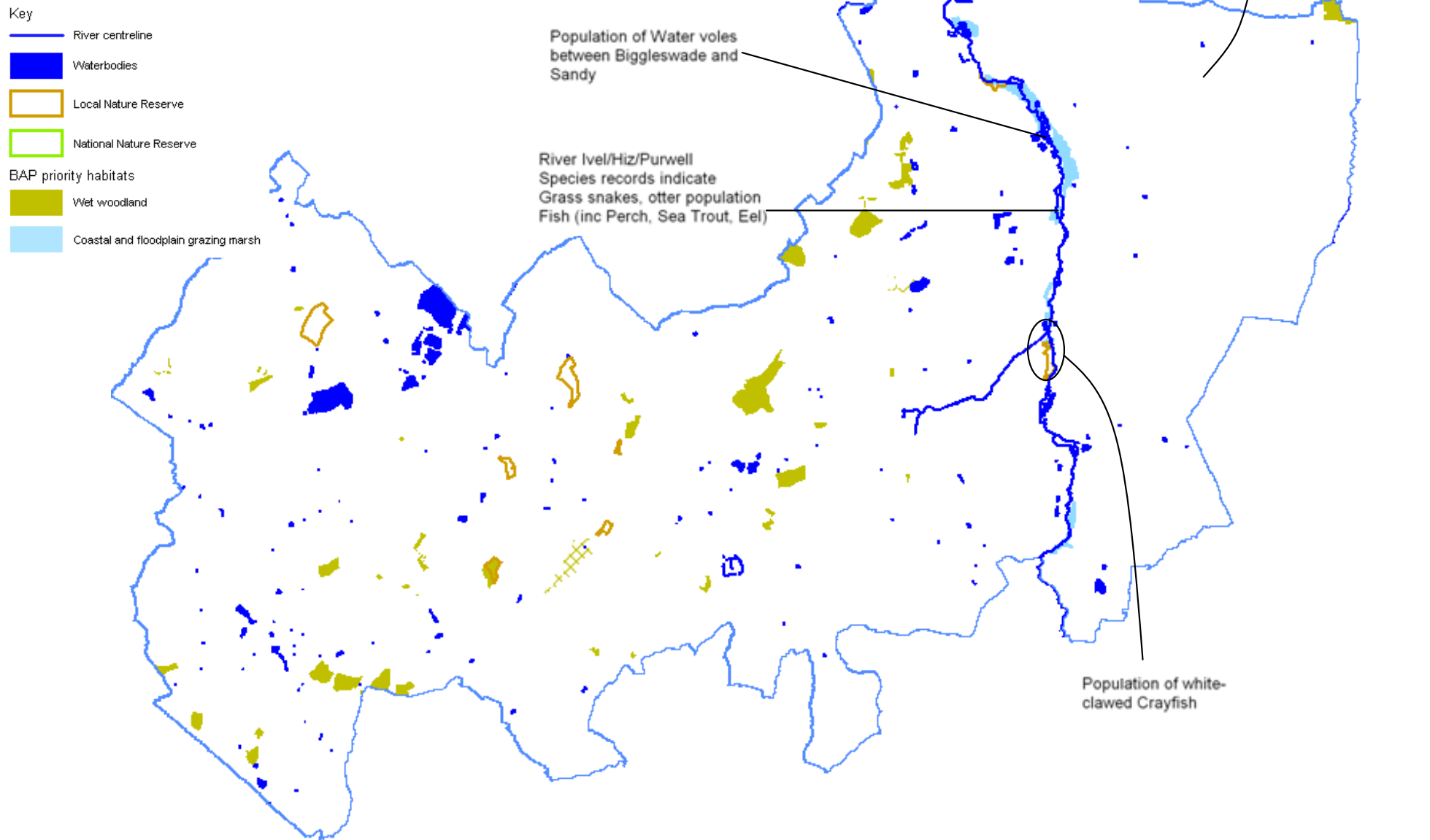


Figure 2.9b Link to Central Beds ecological features



## Central Bedfordshire North Area 'wet' ecology context

Figure 2.10 Central  
Beds ecological  
features





## Location and timing of development

The following pages identify where development has taken place since 2001, where development is committed to take place (referred to as commitments), and where sites are allocated for development in the Authorities Site Allocations and Development Management DPD (Central Bedfordshire North Area) and draft Allocations and Designations DPD (Bedford Borough).

The completed and committed housing data was provided by the Authorities in early 2011 and is based on data used in the April 2010 Annual Monitoring Reports.

The allocations data and information was provided by the local authorities in April 2011. For Central Bedfordshire this data is derived from the adopted Allocations and Development Management DPD. For Bedford Borough this data is based on the pre-submission Allocations and Designations DPD.

The progress of the Bedford Borough Allocations and Designations DPD can be viewed here [http://www.bedford.gov.uk/environment\\_and\\_planning/planning\\_town\\_and\\_country/planning\\_policy/bedford\\_development\\_framework/allocations\\_and\\_designations.aspx](http://www.bedford.gov.uk/environment_and_planning/planning_town_and_country/planning_policy/bedford_development_framework/allocations_and_designations.aspx)

The Central Bedfordshire Northern Area Allocations and Development Management DPD can be viewed here <http://www.centralbedfordshire.gov.uk/environment-and-planning/planning/ldf/ldf-north-area/site-allocations/default.aspx>

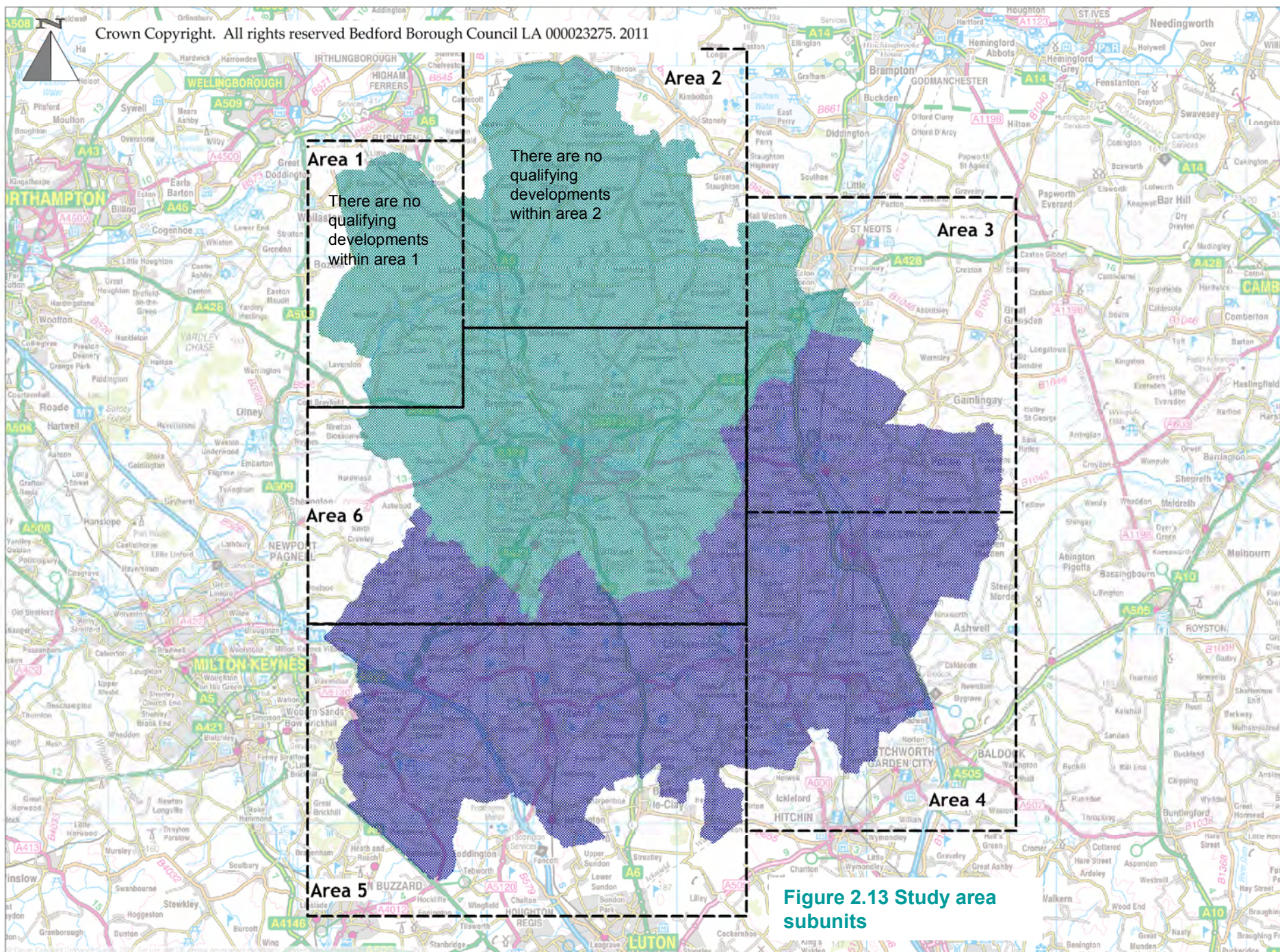
The housing analysis that underpins the water infrastructure assessments in this water cycle study is available in [Appendix A – Housing and water infrastructure analysis](#).

## Study area development map

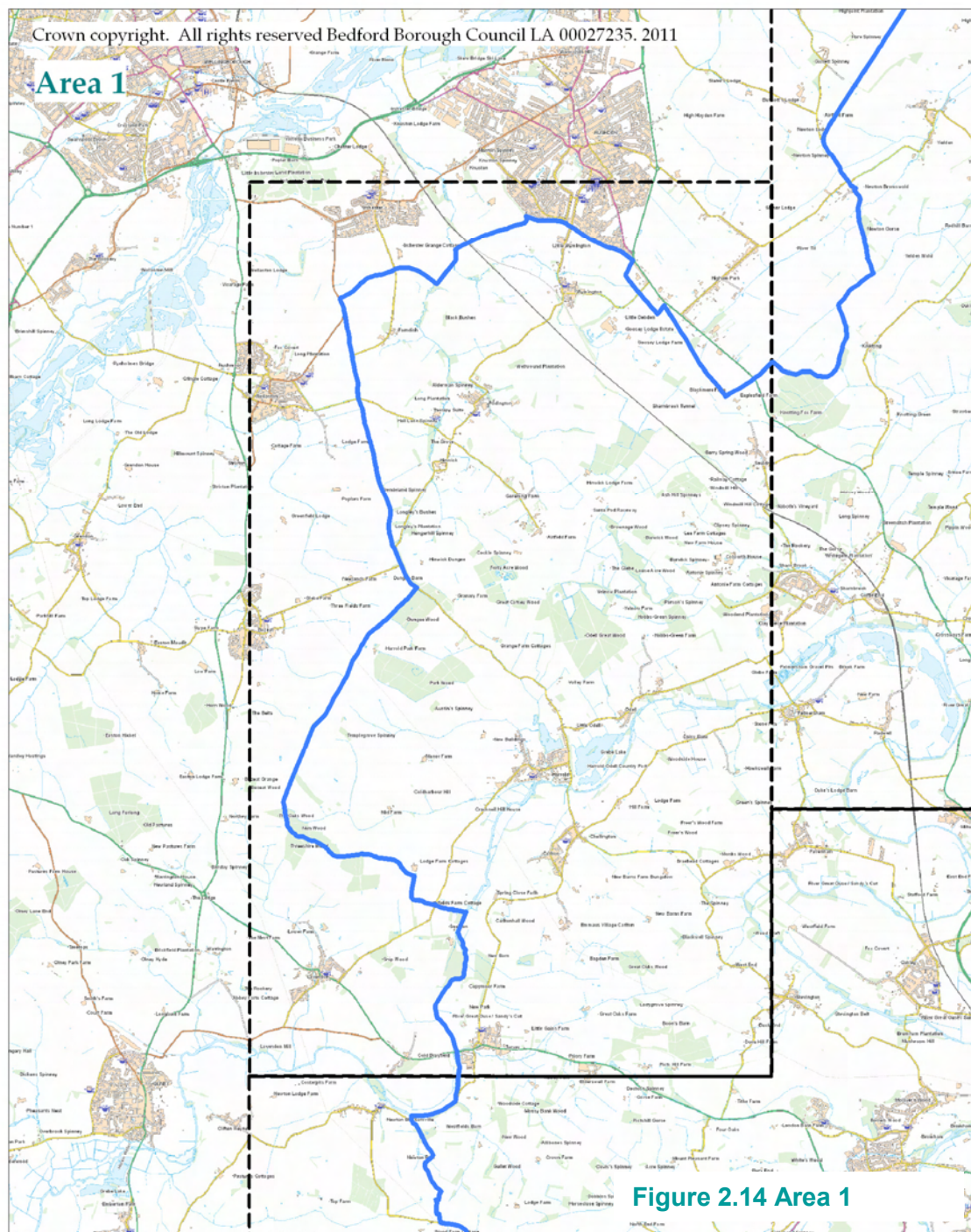
We have broken down the study into six discrete geographic areas for ease of assessment in this water cycle study. These areas are identified in the map to the right. You can access information about the development proposals in each of these sub areas by selecting the sub areas on the map. These sub areas remain consistent throughout this study.

You can return to the development map from any page by selecting 'map' from the bottom navigation bar as shown below.









**Figure 2.14 Area 1**



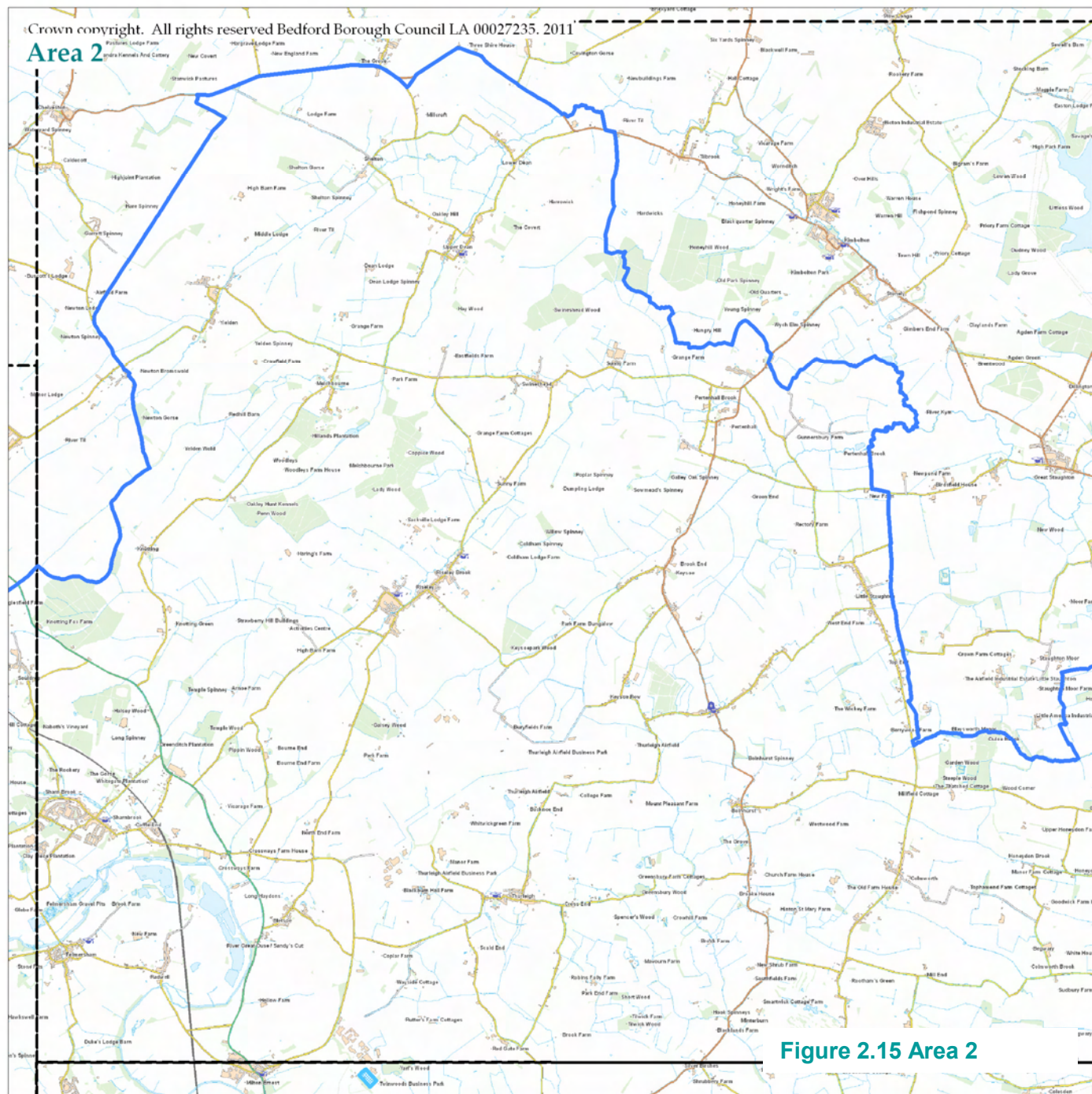


Figure 2.15 Area 2

## Area 3

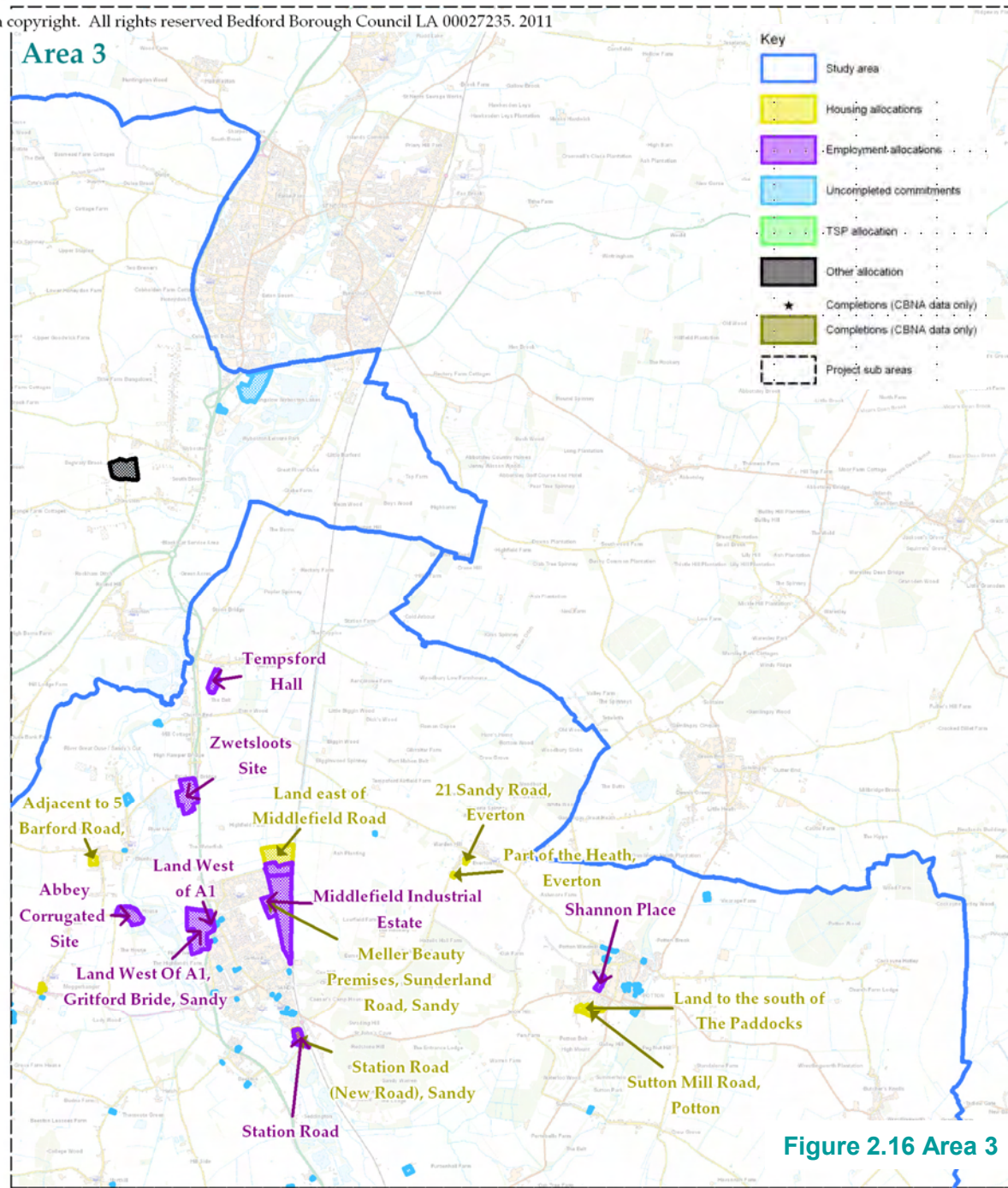
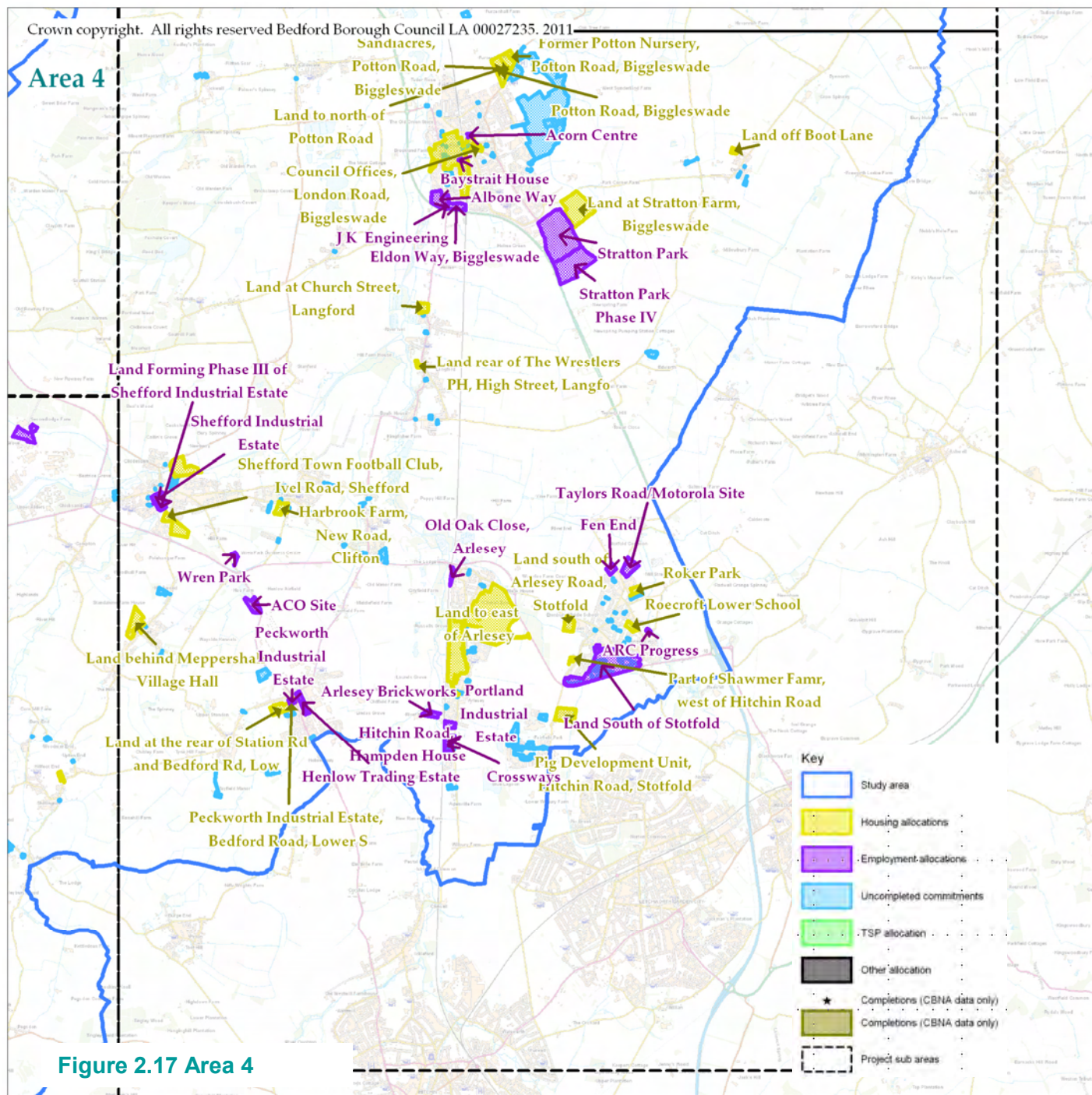


Figure 2.16 Area 3







## Area 5

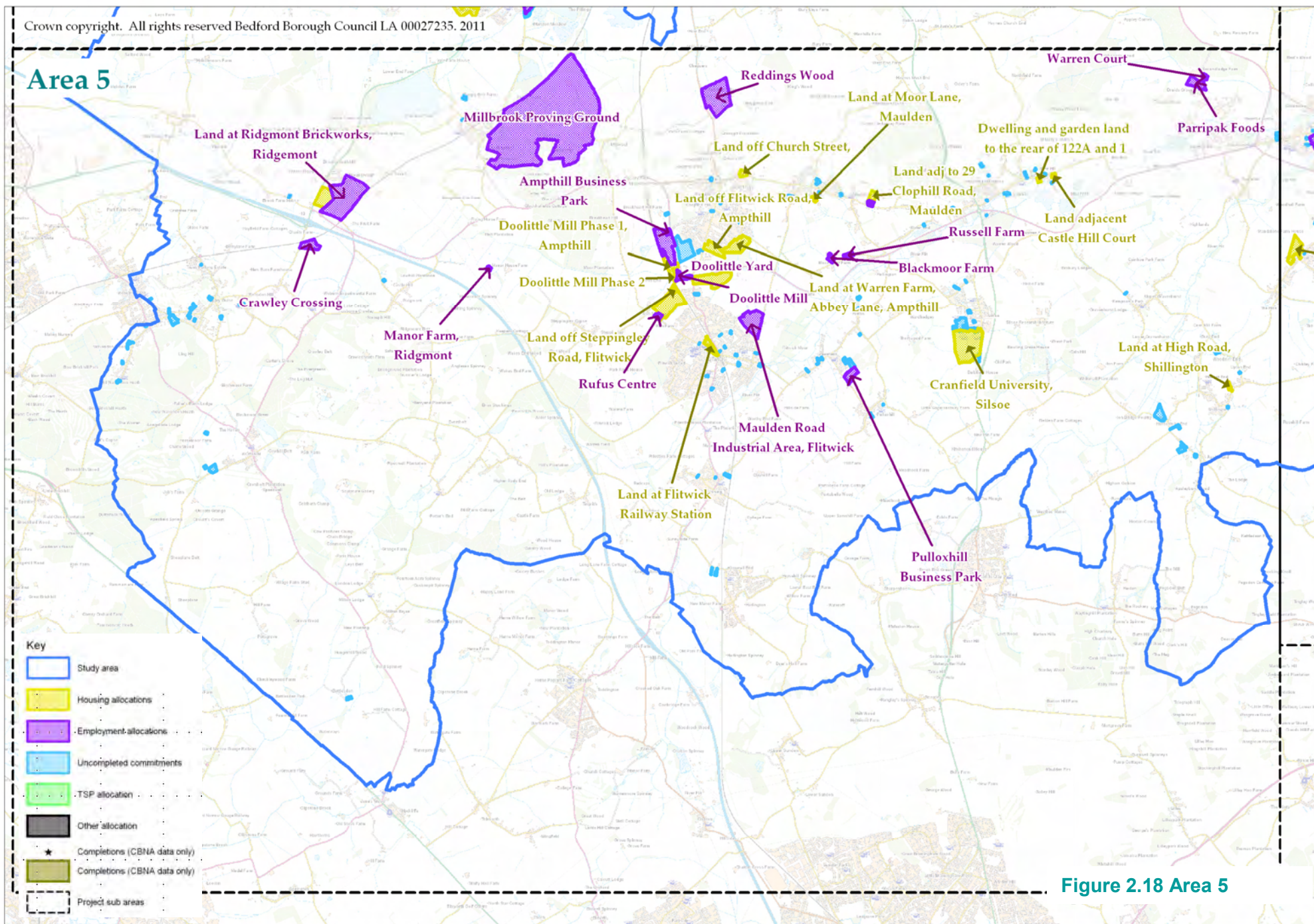
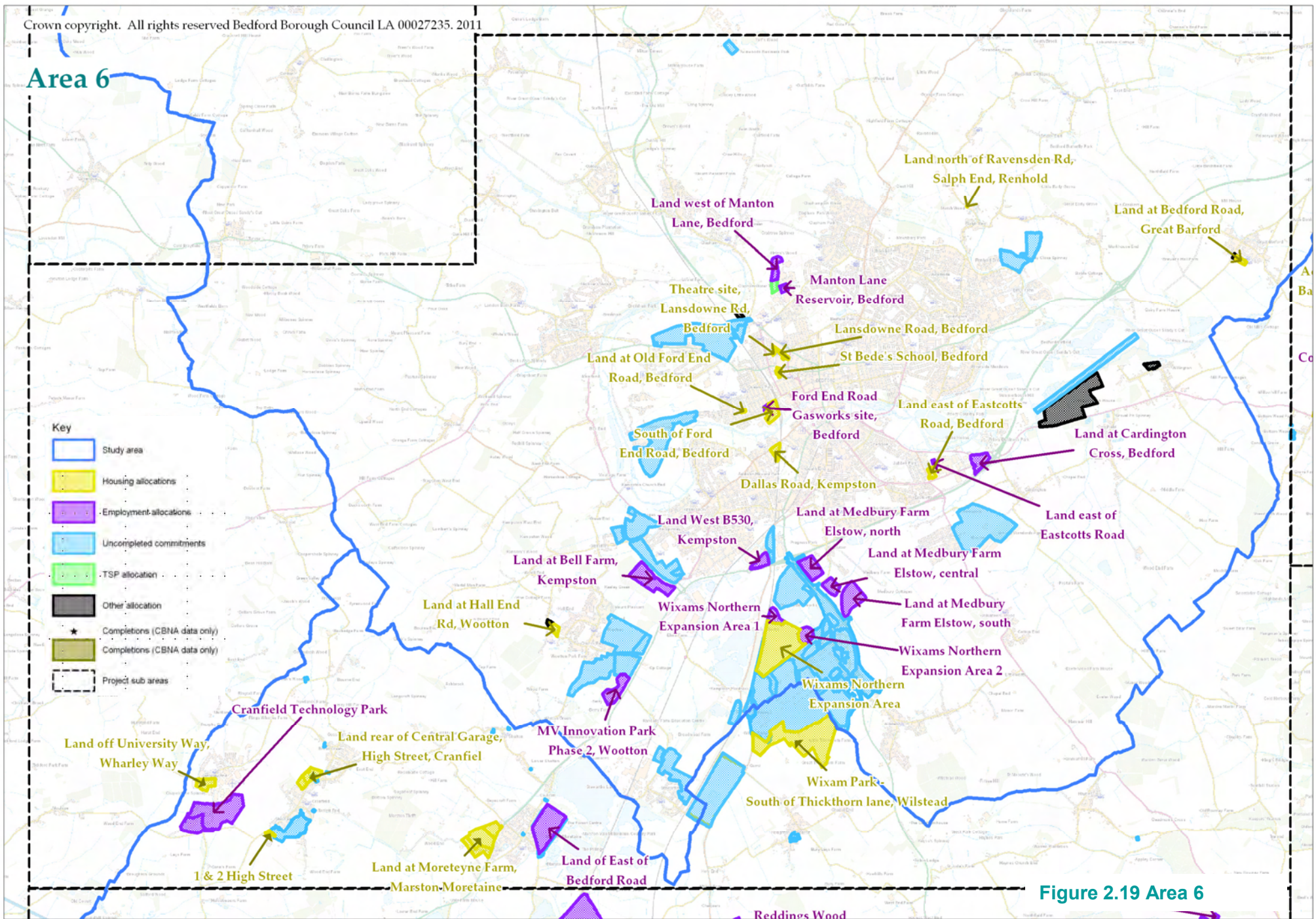


Figure 2.18 Area 5





### Figure 2.19 Area 6