London Borough of Bexley

Bexley Green Infrastructure Study

Evidence on Green Infrastructure, Open Space and Sports, Biodiversity and Metropolitan Open Land

Part 1: Chapters 1 to 5

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Chapter 1
Executive Summary

Purpose of this study

1.1 National Planning Practice Guidance[1] defines Green Infrastructure (GI) as:

> "A network of multifunctional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities. Green infrastructure is not simply an alternative description for conventional open space. As a network it includes parks, open spaces, playing fields, woodlands, but also street trees, allotments and private gardens. It can also include streams, canals and other water bodies and features such as green roofs and walls."

1.2 The incorporation of green infrastructure as part of new development has been identified by the Intergovernmental Panel on Climate Change (IPPC)[2] as having a wide range of climate benefits relating to both mitigating and adapting to climate change.

1.3 The overarching **aim** of the study was to provide the Council with a sound and robust evidence base to support the Local Plan. Through desk-based analysis, site assessments and consultation, the study aimed to develop a comprehensive understanding of existing GI assets, future demands, surpluses and deficiencies, and opportunities. The work additionally provides evidence and recommendations that will inform future strategies.

1.4 The integrated approach to assessing open space, playing pitches, MOL, biodiversity and geodiversity, urban greening and cemetery capacity has ensured that, while the strands of the study are independently robust, a holistic approach to Green Infrastructure planning is able to be supported.

Approach to the study

1.5 The method of the study reflects the requirements of the NPPF for all of the individual strands, whilst taking account of

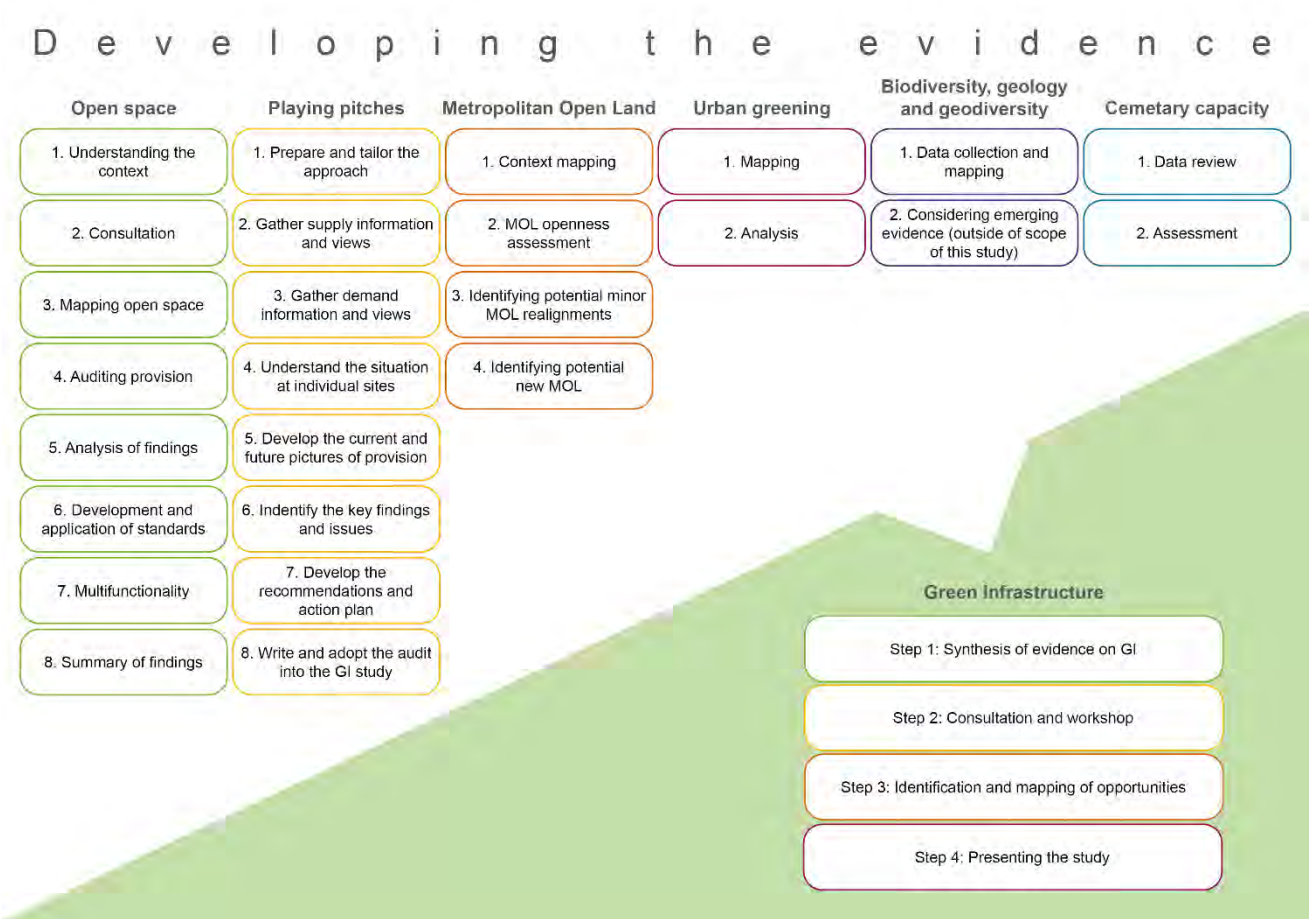
[1] Ministry of Housing, Communities & Local Government 2018 Planning Practice Guidance for the Natural Environment – Paragraph: 027 Reference ID: 8-027-2160211 https://www.gov.uk/guidance/natural-environment#para027

[2] IPCC (2018) Global Warming of 1.5°C.An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

best practice and relevant guidance for each individual evidence base. This includes Sport England's guidance on assessing the need for playing pitches and other sporting facilities. An overview of the various stages of the method of each of the components of the study is presented in **Figure 1.1**.

1.6 A considerable amount of consultation with Bexley residents and local stakeholders has informed this study.

Figure 1.1: Overview of method



Open space findings

The review of **all open space in the borough** (regardless of accessibility) revealed the following:

- The greatest quantity of open space in the borough is natural and semi-natural urban green space covering an area of 715 ha. This is followed by parks and gardens which cover an area of 375 ha. Overall (excluding sites with a primary typology of outdoor sports provision), there are 1,253ha of open space in the borough.
- Sidcup Geographic Region contains the greatest quantity of open space, followed by Belvedere with 311.1 ha and 259.6 ha respectively. In both of these areas, the majority is natural and semi-natural urban green space.
- Approximately 106ha of open space are not accessible to the public, the majority being natural and semi-natural urban green space.

The audit of the **publicly accessible open spaces** in Bexley identified the following:

- The greatest quantity of publicly accessible open space falls within the natural and semi-natural urban green space typology covering an area of 626.4 ha. This is followed by parks and gardens which cover an area of 375.0 ha (all are accessible).
- Sidcup Geographic Region contains the greatest quantity of publicly accessible open space, closely followed by Belvedere with 270.7 ha and 255.1 ha respectively. In both of these areas, the majority is natural and semi-natural urban green space.
- Welling Geographic Region lacks any natural and semi-natural urban green space and linear open spaces, but it does have the largest quantity of parks and gardens.
- Bexleyheath Geographic Region has the least amount of publicly accessible open space with 93.47ha, the vast majority of which is parks and gardens.
- Parks and gardens and cemeteries and churchyards scored consistently well in questions against the Green Flag Award's 'a welcoming place' criterion. Entrances, signage and access could be improved in all other typologies. Signage, although relatively consistent in design and size, was found to be too small and poorly placed in some instances; to the extent that at times signs were not noticeable.
- Some destination spaces are not well signposted from public transport hubs.
- Parks and gardens scored well against the Healthy, safe and secure theme. Amenity green spaces scored well in terms of having natural surveillance and feeling open and secure, but many sites did not have a good flow of people through the site to offer self-surveillance. Natural and semi-natural urban green spaces fared less well against this theme.
- Parks and gardens and cemeteries and churchyards scored consistently well in the Clean and well-maintained theme. A high number of sites did not have any planted areas at all. Grass areas were found to be in fair or good condition in most typologies – the exception being natural and semi-natural urban green spaces, but to some extent this is expected of these types of sites.
- A number of sites that were categorised as parks and gardens in the previous open space strategy (2008) have been re-categorised as amenity green spaces as a result of this audit. This is because they lack the range of facilities expected of this typology. This may be as a result of lack of maintenance over the intervening period and removal of facilities (such as benches, bins, planting).
- Conversely, some of the amenity green spaces, although small, have a good level of access and provision of basic facilities (including play areas).
- Footpaths could be improved in some sites, most notably in natural and semi-natural urban green spaces. The majority of buildings located within the borough's open spaces are considered to be in a 'good' or 'fair' condition, but in some cases it was not obvious whether they were in frequent use. A number of sites would benefit from footpath improvements and new footpaths to make sites more inclusive. There is potential for increasing access to and through linear open spaces.
- There is not much evidence of sustainable management practices within the borough's open spaces (this can be hard to identify) and not a lot of recycling bins were found. There was evidence of green waste composting on a large scale in one site. The council's term grounds contractor, who undertake grounds maintenance operations throughout the borough (including cleansing operations) do work to a specification that dictates that litter collected should be sorted and recycled at the Council's disposal site. In addition, all green waste generated from maintenance operations is taken the disposal site for processing.
- Whilst a good proportion of natural and semi-natural urban green spaces had evidence that natural features are being managed for nature conservation, less than half of the parks and gardens had evidence of this. There is very little evidence of this in other typologies.

- There are a good number of community groups actively involved the borough's open spaces. Only about 10% of the borough's open spaces had a permanent noticeboard, but where there was one, most were up to date.
- There is not a lot of public art within the borough's open spaces and very few show evidence of supporting programmes of cultural or community activities. In a diverse and changing borough, open spaces can provide opportunities for people of different cultures to come together.
- Quality and value varies throughout the borough, with lower quality and lower value sites more frequently occurring in the east of the borough, despite it enjoying greater levels of access to open space.
- There is **play provision** for all age groups in Bexley, the majority catering for the 5-11 age group. Most play equipment was found to be in good condition. This reflects the investment in play equipment by the Council in recent years.
- There are 48 other facilities for children and teenagers (or adults) across the borough. This includes ten green gyms, 20 MUGAs and a number of trim trails and wheels parks. All of these additional facilities were found to be in fair or good condition.
- The vast majority of allotment sites were found to be in 'good' condition with a smaller proportion in fair condition. No sites were identified as being in 'poor' condition, although some were noted to be declining. The 37 allotment sites support over 1,700 tenants.

The greatest deficiency in access to a range of open space hierarchies is within the following areas:

- Western sections of Erith, crossing over into Belvedere;
- The western half of Bexleyheath;
- The south western corner and central Welling;
- Western Sidcup;
- A small pocket east of Crayford Station; and
- A small pocket in Old Bexley.

Sections of communities in these areas do not have access to two or three levels of the open space hierarchy.

Two sites with no public access have the potential to provide open space access in areas of deficiency; most notably:

- Site 115: Wimpey Land, Dryden Road
- Site 90: Land at Perry Street

In quantitative terms, Bexleyheath, Erith and Welling have provision levels below the proposed standard. The eastern part of Erith Geographic Region has high levels of health and overall deprivation and childhood obesity and is an area of concern.

There are areas deficient in access to **allotments** in the north of the borough as well as in Sidcup and Welling Geographic Regions. Furthermore, while there is currently high demand for allotments in the borough, the high number (140) plots which are currently vacant in the Bexley suggests that there is likely to be a mismatch between the areas of demand and provision. The vast majority (26) of allotment sites were identified as being in 'good' condition. The remaining seven sites were identified as being in 'fair' condition with no sites identified as being in 'poor' condition. However, looking beyond the cultivated areas, some sites are scoring less well as a result of their access, signage and facilities.

In quantitative terms, provision in Belvedere, Bexleyheath and Erith is below the expected level of provision per head.

The majority of the borough's residents are within a catchment of a play space. The exceptions to this are:

- the north eastern corner of Belvedere;
- the north western and north eastern corners of Erith;
- the area to the north of Bexleyheath Station;
- southern parts of Bexleyheath Geographic Region into southern Crayford and Old Bexley Geographic Region; and
- Western Sidcup.

1.10 There is a good spread of play provision for all ages across the borough, but when measured against the standard of 10 square metres per child, provision is below the expected levels by a significant amount. Whilst not the lowest levels of provision in the borough, high childhood obesity levels coinciding with low per head play provision make this an area of concern both now and into the future as high levels of growth are expected here.

Playing pitches findings

1.11 Areas of formal sports provision in the borough make an important contribution to the GI network in the borough. Currently, many of these areas are of limited direct value to biodiversity in Bexley given their use for recreational activities and considering that they are mostly monoculture grassland. Direct benefits of this type of open space relate to health and wellbeing as well as alleviating flood risk by supporting the safe infiltration of surface water.

1.12 Overall it has been identified that outdoor sports facilities for various types of sports are at or close to capacity in the

borough. In general no excess in provision has been identified when considering the current and future demand in Bexley.

1.13 The evidence base includes a series of 12 general recommendations Sport specific recommendations can be found in the Sport Specific Action Plan (Appendix F of the Playing Pitch Strategy) and Site specific recommendations (Appendix G of the Playing Pitch Strategy**)**. The Site Specific Action plan also identifies the geographical area where the site is located.

Metropolitan Open Land findings

1.14 A review of the MOL in Bexley has demonstrated that 53.84ha of the total 643.1ha MOL in the borough displays Weak/No Openness. These are the areas where the Council might focus its consideration of land for potential release from the designation.

1.15 These areas lie within the following parcels:

- MOL1c (specifically the land at Crossness Sewage Treatment Works to the north of Eastern Way and the land at Tavy Bridge to the north of Yarnton Way);
- MOL3 (specifically the land at the grounds of East Wickham Infant and Nursery School and East Wickham Primary Academy);
- MOL4 (specifically the land to the south of Hillview Cemetery and the land by Bellegrove Road);
- MOL5 (specifically the land at Bexley Grammar School);
- MOL7 (specifically the land at Haberdashers' Aske's Crayford Academy); and
- MOL10 (specifically the land at Chislehurst and Sidcup Grammar School and the land at Hurstmere School).

1.16 A further 0.13ha is suggested for consideration to be added to MOL designation in Bexley through minor boundary amendments at:

- MOL6 (Land at Woodside Road including Martens Grove Park)
- MOL9 (Land at Shenstone Park)

1.17 Of the five areas subjected to detailed assessment, the land at Thamesmead Ecology Study (PotMOL1) is considered to have the greatest potential to be designated as MOL. This area of land would best meet the criteria for MOL set out in the London Plan. The designation of this area of land as MOL would add 5.01ha to the overall area of designation.

1.18 The areas of land considered at PotMOL2, PotMOL3, PotMOL4 and PotMOL5 are not considered to adequately fulfil the criteria for designating new MOL set out in the London Plan.

1.19 It is recommended that the borough considers these potential amendments on a case by case basis. Changes to MOL boundaries will need to be considered through the Local Plan making process making use of the assessment of openness alongside other evidence such the Council's Sustainability Appraisal and the appropriateness of existing uses within MOL. Any changes should also be considerate of the advantages and disadvantages of making changes to the extent of the designation in its current form.

1.20 It is also recommended that should further work to present an 'exceptional circumstances' case to make alterations to the borough's MOL boundaries be undertaken, that the need for an equivalent assessment of Green Belt should be considered. This approach will ensure that all reasonable alternatives have been considered as part of the plan making process.

Urban greening findings

1.21 The total coverage of green roofs in the borough increased from 8,721 m^2 in 2016 to 9,036m^2 in 2017. This represented an increase of 3.92%. The vast majority (78.08%) of green roofs in Bexley are categorised as extensive and have low management requirements, with a relatively small portion of categorised as intensive or biosolar.

1.22 Location data was made available for 13,185 street trees in Bexley. There are over 150 different species, the most prevalent of which is cherries.

1.23 There is an uneven spread of street trees between the six Geographic Regions. 46% of all mapped street trees are found in Sidcup. Crayford and Old Bexley has the lowest number of street trees at 842 (6%). The majority of mapped street trees are 'mature'.

1.24 Street trees only represent a portion of the boroughs overall tree stock and tree canopy. At a borough level, the canopy cover estimate for Bexley is 14.33% or 6,405ha. This is the fourth lowest canopy coverage out of the London Boroughs; although this figure needs to be used with caution as the mapping methodology has a stated accuracy of approximately 94%.

1.25 An increasing number of tree pests and diseases have been identified in the UK in recent years and Oak Processionary Moth (a threat to the various tree species including oak, birch and beech) has been identified in Bexley. A strategic approach to tree planting will be required across the borough to mitigate any potential tree losses driven by climate change and tree pathogens; extending to species diversity and selection. Ensuring GI is considered within areas of growth will ensure the configuration and design of transport links, public realm and residential development can

accommodate the healthy growth and development of trees for the future benefit of the borough's wildlife.

1.26 Whilst not publicly accessible, a considerable GI resource is comprised of domestic gardens. There are spatial variations in the number of domestic gardens across the borough. Often, this pattern is related to property type.

1.27 Collectively, front and back gardens in Bexley total 1,695 ha. London has a very high rate of paving over of front gardens. These hard surfaces increase the risk of flooding and contamination from spillages directly entering drains and polluting local watercourses.

Biodiversity, geology and geodiversity findings

1.28 This evidence base presents an overview of the ecological networks in Bexley comprising biodiversity and geodiversity assets. Consideration has been made for both designated and undesignated sites.

1.29 The borough has a range of distinctive natural landscapes shaped by geological processes. London's Geological sites are protected through their designation as Sites of Special Scientific Interest (SSSIs), Regionally Important Geological Sites (RIGS) or Locally Important Geological Sites (LIGS).

1.30 There are two **Sites of Special Scientific Interest** in the borough. There are also several SSSIs located just outside of the borough.

1.31 **Regionally Important Geological Sites** (RIGS) complement the SSSIs coverage and are the most important places for geology and geomorphology outside the statutory network. **Locally Important Geological Sites** (LIGS) are of local geodiversity interest.

1.32 There are three potential RIGS and one potential LIG in Bexley. This geological history is in evidence in several of the borough's open spaces.

1.33 Bexley has large areas of natural and semi-natural habitats comprising woodlands, grazing marsh, pasture, heathland and rivers which support a range of species. Furthermore, the borough's location within the Thames Gateway places it within a wider network of habitats that have been shown to support a diverse range of nationally important invertebrates[3]. The richness of Bexley's natural environment also includes private gardens, parks and open spaces and green 'wildlife' corridors along waterways and railways as well as on the River Thames and its tributaries.

1.34 There are four **Local Nature Reserves** (LNR) distributed throughout the borough, covering 130.02ha. Access to LNRs is more limited in the north east of the borough.

1.35 Local Wildlife Sites are known as **Sites of Importance for Nature Conservation** (SINCs) in London. Bexley has a rich and diverse network of designated SINCs. 60 sites in Bexley have been designated as SINCs, comprising a variety of habitats including ancient semi-natural woodland, mudflats, salt marsh, rivers, scrub and grassland.

1.36 In 2019 the Council commissioned a Partial Review of SINCs in Bexley. The Council now need to consider the nature conservation value of the 14 sites alongside other relevant evidence and advice, prior to determining an appropriate land use designation within the emerging new Local Plan.

1.37 In London, SINCs are divided into three grades.

- Sites of Metropolitan Importance, includes the best sites in London. Eight Metropolitan SINCs have been identified within London Borough of Bexley, covering approximately 927.30 hectares of land.
- Sites of Borough Importance. These are divided into two levels based on their quality, but all are important in the borough context. There are currently 17 Borough Grade I SINCs and 23 Borough Grade II SINCs designated within Bexley, covering approximately 400.65 hectares and 323.83 hectares of land, respectively.
- Sites of Local Importance, which provide the borough's residents with access to nature close to home. There are currently 12 designated Local SINCs in the borough, covering approximately 58.51 hectares of land[4].

1.38 Of the boroughs SINC sites, 21 (35%) were observed to have positive conservation management practices in place in the three years prior to March 2019[5].

1.39 Access to nature is increasingly seen as a key component of living in an urban environment. Localities where people are more than 1km walking distance from a publicly accessible wildlife Site of Metropolitan or Borough level Importance for nature conservation (SINC) are defined as 'Areas of Deficiency in Access to Nature (AoD). Local SINCs are therefore particularly important in or near areas otherwise deficient in nearby wildlife sites. There are several areas of

[3] Natural England (2013) National Character Area profile: Greater Thames Estuary
[4] London Borough of Bexley (2016) Sites of Importance for Nature Conservation Report
[5] Defra (2017) Single Data List - Proportion of local sites where positive conservation management is being or has been implemented

deficiency in access to nature in the borough. Bexley has 21 main pockets of AoD covering 11.95% of the borough.

1.40 Some areas of dense residential development are significantly lacking in access to sites designated for nature conservation. In areas such as this, other elements of the green network such as private gardens, street trees and amenity green space may benefit from ecological enhancement in order to increase ecological connectivity and provide wildlife 'stepping stones'.

1.41 There is some existing connectivity between the borough's SINCs. This is particularly the case for those sites which are located towards the borough's eastern boundary; many of which lie within the Green Belt. The Green Chain Walk also provides connection to out of borough sites on the western boundary.

1.42 Bexley has adopted 14 '**strategic green wildlife corridors'** with the intention of protecting connectivity between SINCs[6]. The corridors allow for connectivity particularly from east to west as well as north to south in certain places, notably in the area around the route of the Green Chain Walk from Thamesmead to Lesnes Abbey. Sites adjoining, or close to the River Thames will generally benefit from enhanced connectivity.

1.43 Bexley contains a number of habitats of national value known as **Habitats of Principal Importance** and regional value, known as **Priority Habitats**. Most priority habitats lie within SINCs.

1.44 Bexley contains several **regionally or nationally important species** including nine of 16 UK bat species and all three native newt species. Black Poplars and native bluebells are also found in Bexley. Lesnes Abbey also provides habitat for the only colony of lesser calamine remaining in London at Abbey Ponds. This species is nationally scarce and currently declining. Lesnes Abbey Wood contains what is possibly the only natural population of wild daffodils in London.

1.45 Species diversity is declining worldwide. In order to maintain and enhance biodiversity in the borough in the coming years it will be necessary to ensure existing habitats are resilient to the effects of climate change and form a 'coherent ecological network'. Provision of GI in the borough should be informed by the need for habitats to become bigger, better and more joined up; whilst also providing more habitats[7].

1.46 Where new development is coming forward, the potential for ecological enhancement can be considered at multiple scales and incorporated into the master planning process in order to ensure all opportunities are identified. Where development is most dense, requirements for green or brown roofs and multifunctional surface water storage with marginal planting provides a viable solution to develop better ecological resilience where space is at a premium. As the climate changes, habitat connectivity will also be key to ensure that the urban environment is more permeable and will allow species to easily move as conditions change. Identifying existing local connections within the borough and larger corridors which link to the surrounding landscape will help to ascertain which areas have the greatest potential to provide ecological benefit, whether publicly accessible or not. It will be important to set out opportunities for supporting the maintenance of existing, and creation of new, connections and links of these types in the borough. In this regard, appropriate design and incorporation of Bexley's greenways, rivers, railways and roads into new development will be an important consideration as growth proceeds in the borough.

Cemetery capacity findings

1.47 It has been calculated that there should be no new requirement for burial space before 2036. This assumes that trends remain static and there is enough space for burial of cremated remains.

1.48 However, there will likely be need for a new cemetery shortly after the growth period reviewed to 2036. The location of any new space provided will likely be determined by development cost and land availability rather than proximity to demand. There is no dedicated funding stream from central Government for cemeteries so funding falls to local authorities, which are expected to provide sufficient burial space for their residents. Using today's prices, a new cemetery is estimated to cost between £1.2m-£2m. In 2036 this would equate to £2.5m-£3.3m (based on 2.5% inflation). This does not include the cost of land.

Bexley's Green and Blue Infrastructure network

1.49 This element of the study looks at the wider green infrastructure network in Bexley through a series of maps layering up the information presented in each of the previous sections.

1.50 Green infrastructure is a multifunctional network that will secure benefits including, but not limited to, biodiversity; natural and historic landscapes; culture; building a sense of place; the economy; sport; recreation; local food production; mitigating and adapting to climate change; water

[6] LBB, (2016) SINC Report

[7] As set out in Lawton, J. (2010) 'Making Space for Nature: A review of England's Wildlife Sites and Ecological Network.' Submitted to Defra

management; and the social benefits that promote individual and community health and well-being.

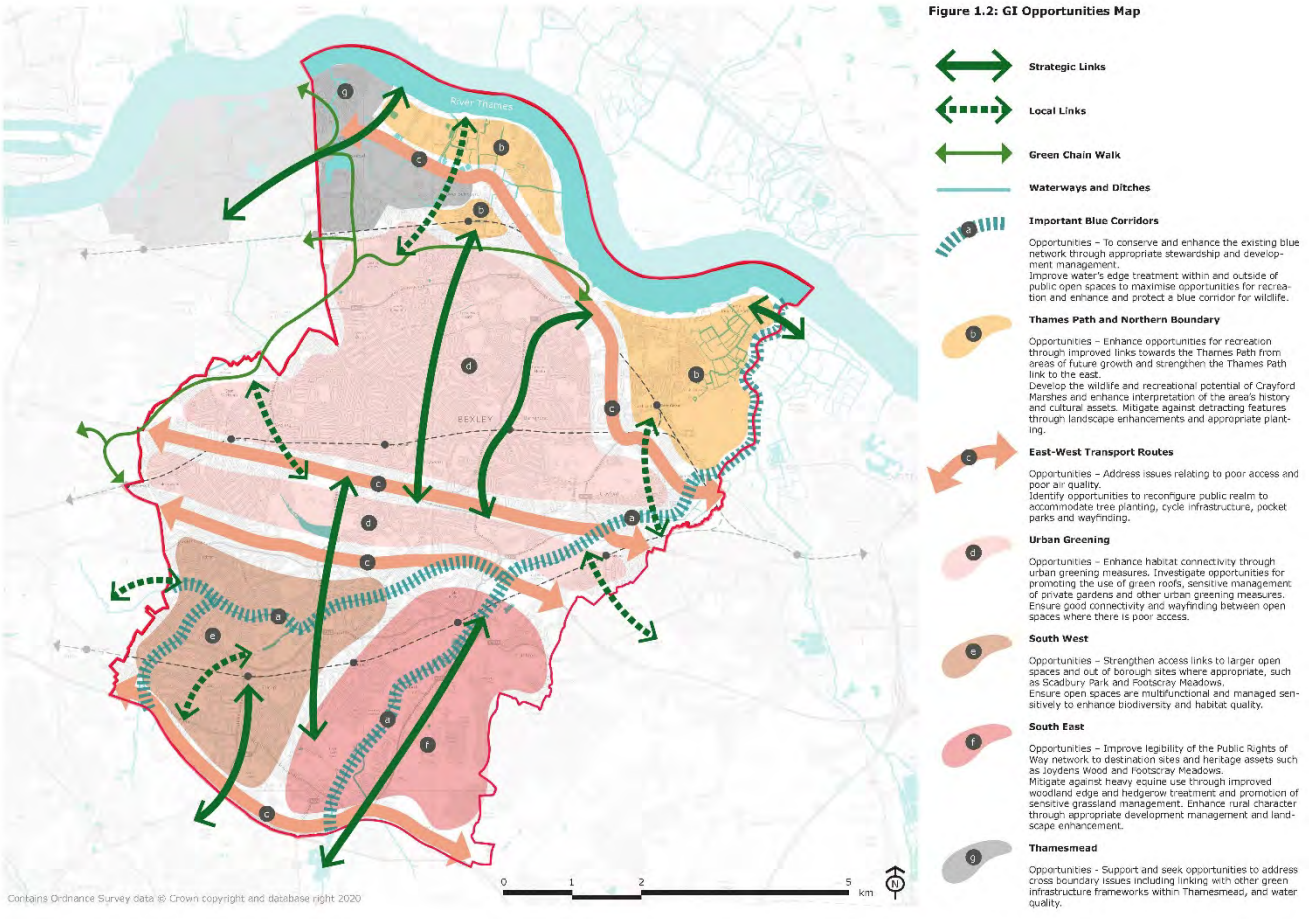
1.51 Alongside consideration of the evidence bases described previously, wider consideration of the GI network looked at the policy framework, a range of existing and emerging strategies as well as consideration of the drivers for GI in Bexley.

1.52 This included an assessment of the GI network through the lens of:

- Population, household and economic growth;
- Health and wellbeing;
- Climate change;
- Biodiversity;
- Landscape and historic environment; and
- The active travel network.

1.53 For each of these 'topics', a series of issues and opportunities have been identified. The study culminates in a GI opportunities map that sets out potential opportunities to strengthen and optimise the Bexley GI network. These are shown in **Figure 1.2**.

Finally, the study sets out ways in which GI can be embedded within Bexley's Local Plan.



2 Introduction

Chapter 2
Introduction

This chapter sets out the aims and objectives of this study. It also provides an overview of the document structure.

What is Green Infrastructure

2.1 National Planning Practice Guidance[8] defines GI as:

> "A network of multifunctional green space, urban and rural, which is capable of delivering a wide range of environmental and quality of life benefits for local communities. Green infrastructure is not simply an alternative description for conventional open space. As a network it includes parks, open spaces, playing fields, woodlands, but also street trees, allotments and private gardens. It can also include streams, canals and other water bodies and features such as green roofs and walls."

2.2 The definition within the London Environment Strategy provides additional detail on the benefits:

> *'London's **green infrastructure** is the network of parks, green spaces, gardens, woodlands, rivers and wetlands (as well as features such as street trees and green roofs) that is planned, designed and managed to:*
>
> - Promote healthier living
> - Lessen the impacts of climate change
> - Improve air quality and water quality
> - Encourage walking and cycling
> - Store carbon
> - Improve biodiversity and ecological resilience[9]

2.3 The incorporation of green infrastructure as part of new development has been identified by the Intergovernmental Panel on Climate Change (IPPC)[10] as having a wide range of climate benefits relating to both mitigating and adapting to

[8] Ministry of Housing, Communities & Local Government 2018 Planning Practice Guidance for the Natural Environment – Paragraph: 027 Reference ID: 8-027-2160211 https://www.gov.uk/guidance/natural-environment#para027

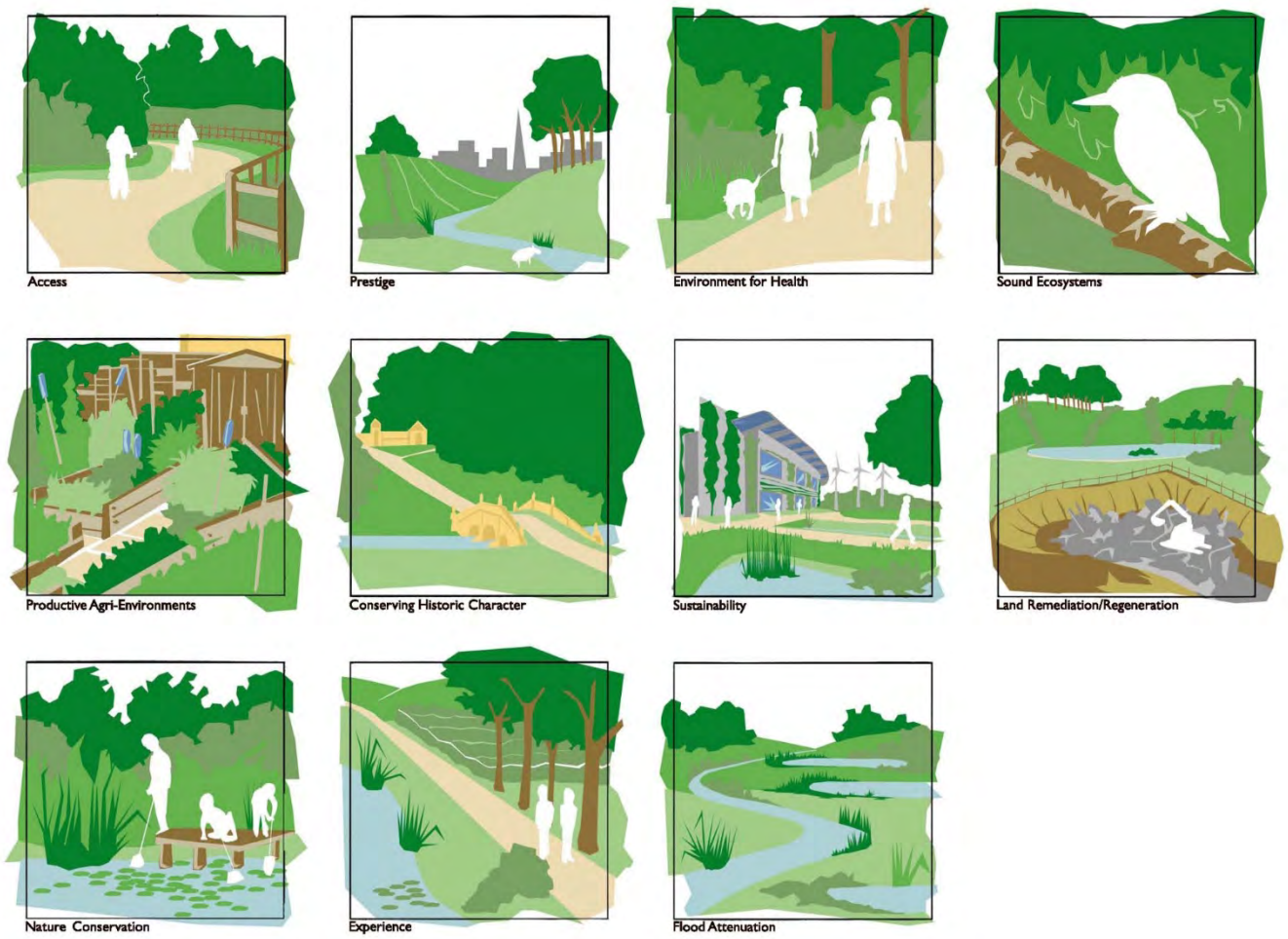
[9] Mayor of London (2018) London Environment Strategy

[10] IPCC (2018) Global Warming of 1.5°C.An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

climate change. Benefits relating to mitigation include carbon sequestration, reduced need for water treatment and reduced air pollution. Green infrastructure can also help to achieve climate change adaptation including reduced urban flooding and reduced heat island effect. Developing the green infrastructure network has been identified as one of a number of actions which could help limit Global Warming to 1.5°C above pre-industrial levels.

2.4 As illustrated in **Figure 2.1**, green infrastructure is multifunctional in that it delivers a range of benefits to people (both physical and mental wellbeing), biodiversity, landscape, reducing local temperatures, climate change adaptation and mitigation, and alleviating flood risk. The benefits of GI can be felt at a local, regional and national scale.

Figure 2.1: Multiple benefits of GI



Making the case for green infrastructure

Health and wellbeing (mental and physical)

Providing new and improved GI can help improve the safety and attractiveness of active travel (walking and cycling). This type of provision can also provide venues for outdoor recreation. As such GI provision can be linked to improved levels of physical activity in a given area, which in turn can result in health benefits. Furthermore, increasing levels of walking and cycling, and improved routes to public transport hubs, which are also likely to help promote modal shift, are likely to contribute to improved air quality by reducing reliance on travel by private vehicles.

Encouraging travel by more active modes and creating attractive 'green corridors' and networks of green space reduces the level of emissions of pollutants as well attracting people away from busy roads into cleaner areas. GI can also help to protect people from pollution, through dispersion and deposition. These processes relate to the speed and distance pollutants travel before they reach people and the ability of vegetation to remove a small amount of emissions from the air.

Being in regular contact with natural features helps to promote benefits in terms of mental health and wellbeing, development and maintenance of a healthy immune system, reduction of inflammatory based diseases, and a reduction in health inequalities experienced by lower socio-economic groups. GI also has benefits relating to improved levels of community cohesion considering that this type of provision can help to allow space for both formal and informal social interactions. This may include space for community food production, for an 'outdoor classroom', or for a 'green gym'.

Biodiversity

In addition to proving space for important habitats, GI also plays a key role in connecting areas of habitat thereby ensuring that the movement of organisms and essential biological processes can continue to function. GI can directly benefit biodiversity in number of different ways. This includes the provision of new habitats as well as buffering of existing habitats and increasing habitat connectivity.

Furthermore, GI that increases access to, or interpretation of nature can help to build long-term support for biodiversity conservation. This is particularly the case where access is provided to members of the public in a manner which prevents any degradation of biodiversity assets in a given area. GI can provide the added benefit of helping to alleviate recreational pressures at sensitive sites by providing alternative greenspace.

Economic growth

By helping to make attractive places for living and working, the incorporation of GI as part of new development can help to encourage inward economic investment in an area. Engagement with, and access to GI has also been shown to reduce stress amongst workforces, reduce days lost to industry through illness as well as improving productivity.

Landscape, historic environment and sense of place

Through appropriate design and location, the incorporation of new or improved elements of GI can help to restore degraded landscape character. This type of sensitive approach to GI delivery can also help to enhance the setting of historic environment assets.

GI provision also acts to provide a multifunctional landscape and helps to create a balance between the built and natural environment. GI also helps to lift the environmental and social value of an area through enhanced landscape quality.

Climate change adaptation and flooding

By creating biodiversity corridors, GI can support climate change adaptation through increased habitat connectivity and improved resilience of species populations to the effects of climate change. GI can also help to provide areas for flood storage, natural drainage routes, increased soil permeability, and rainfall interception which can reduce the risk and severity of flooding events.

Climate change mitigation

By providing safer and more attractive routes for active modes of travel such as walking and cycling, GI can help to encourage modal shift from motorised transport thereby limiting the associated emissions. By supporting the maintenance of larger areas of vegetation and soils, GI can also act as a carbon sink.

Study aims and objectives

2.5 The London Borough of Bexley commissioned LUC and Continuum Sport and Leisure to undertake a comprehensive Green Infrastructure (GI) study for the borough. The overarching **aim** of the study was to provide the Council with a sound and robust evidence base to support the Local Plan. Through desk-based analysis, site assessments and consultation, the study aimed to develop a comprehensive understanding of existing GI assets, future demands, surpluses and deficiencies, and opportunities. The work additionally provides evidence and recommendations that will inform future strategies. In developing this evidence, existing and emerging relevant strategies needed to be examined to ensure that all forms of GI are considered together in this comprehensive study.

2.6 The key **objectives** of the study were to develop a comprehensive evidence base in three 'parts':

- Playing pitches and outdoor sports facilities;
- Open space and Metropolitan Open Land (MOL); and
- Green infrastructure.

2.7 In drawing together these 'parts', additional evidence on biodiversity, geology and geodiversity has been incorporated, alongside consideration of urban greening features and an understanding of cemetery capacity in the borough.

Structure of this report

2.8 The remainder of the report is structured as follows:

- **Chapter 3** sets out the method used to develop each of the evidence bases included in this report. It goes on to describe how the individual strands of evidence have been considered to draw together a comprehensive understanding of the GI network.
- **Chapter 4** provides an overview of the current national, regional and local policy context that has framed this study. This chapter also highlights additional studies and strategies that have informed this work.
- **Chapter 5** sets the overall context for the study; exploring the various drivers for GI in the borough through a series of themes that affect or are affected by GI; including:
  - Population, household and economic growth
  - Health and wellbeing
  - Climate change
  - Landscape and historic environment; and
  - Active travel networks.
- **Chapters 6 to 11** present each of the six evidence bases individually; including:
  - **Chapter 6** Open space
  - **Chapter 7** Playing pitches
  - **Chapter 8** Metropolitan Open Land
  - **Chapter 9** Urban greening
  - **Chapter 10** Biodiversity, geology and geodiversity
  - **Chapter 11** Cemeteries
- **Chapter 12** considers all these elements of the GI network together, whilst also looking back at the context and key issues identified in **Chapter 5** to identify opportunities to strengthen and optimise the network to address some of the challenges that the Borough faces now and into the future.
- **Chapter 13** sets out recommendations on how GI could be embedded in Bexley's Local Plan. It also considers a number of existing and emerging measurable standards.

2.9 The report is supported by a range of appendices that provide additional detail on elements of the study. Appendix H includes a glossary of terms and abbreviations used in this report.

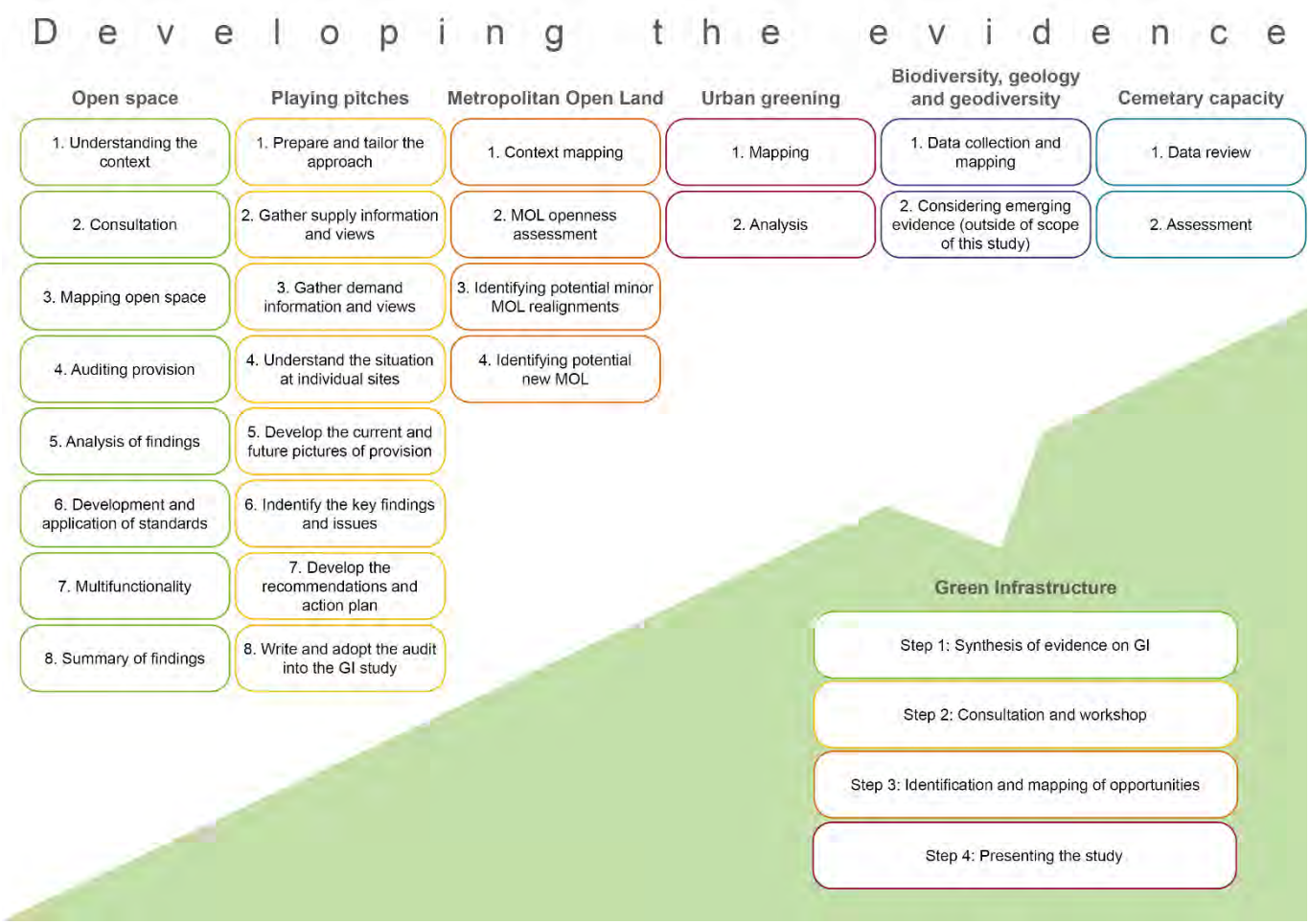
3 Methodology

Chapter 3
Methodology

This chapter sets out the method used to develop each of the evidence bases included in this study. It goes on to describe how the individual strands of evidence have been considered together to draw together a comprehensive understanding of the GI network.

3.1 **Figure 3.1** summarises the methodology used for this study. The method reflects the requirements of the NPPF. The integrated approach to assessing open space, playing pitches, MOL, biodiversity and geodiversity, urban greening and cemetery capacity has ensured that, while the strands of the study are independently robust, a holistic approach to Green Infrastructure planning is able to be supported.

Figure 3.1: Method overview



Open Space

3.2 The method for this assessment reflects the requirements of the NPPF and draws on the quality evaluation guidelines developed through the Green Flag Award initiative. The method is informed by the Mayor's Guidance on the preparation of open space studies. The approach incorporates eight broad tasks which are outlined in this section.

Step 1: Understanding the context

3.3 The 'need' for open space (and green infrastructure) was assessed by reviewing current population patterns, the socio-economic profile, demographic indicators, and future development and population forecasts.

3.4 A review of national, regional and local policy and guidance was completed, and this has been interpreted in terms of the relevance to the study in Chapter 4 of this report.

Step 2: Consultation

3.5 The Mayor's guidance on open space assessments recommends taking an inclusive approach to understanding demand and need. Community consultation is a useful way to inform the evidence base on need and demand including:

- Local people's attitudes to existing provision.
- Local expectations and needs which are currently 'invisible' because there is no current provision.
- A qualitative 'vision' for the type of open space facilities communities want to see in their areas.

3.6 An online public survey was identified as the best approach to gathering the public's views. Information gathered during the community consultation stage has been analysed to understand the community's demands and preferences. 788 responses were gathered in the 5 week period that the survey was live.

3.7 A number of internal and external stakeholders who are involved in the maintenance and management of elements of Bexley's open spaces were consulted. In order to comply with the Duty to Cooperate, consultation also included active engagement with neighbouring authorities.

Step 3: Mapping open space

3.8 The study brief highlighted that the 2008 open space GIS layer had not been maintained since the previous strategy was developed. This meant that some sites that had been lost were still included, and some new sites were not included. Fundamental to the establishment of quantity and accessibility standards is a robust and up-to-date baseline dataset.

3.9 Early desk-based work was undertaken to update this layer. The following data sources were used to refine the baseline dataset:

- 2008 Open Space GIS layer
- Greenspace Information for Greater London data
- Ordnance Survey MasterMap Greenspace
- Ordnance Survey Public Greenspace
- Ordnance Survey MasterMap
- Aerial photography (Bing, Google, ESRI)
- GiGL SINCs (where accessible)
- Internet searches for information on particular sites
- Council officer knowledge

3.10 The layer was checked by members of the Bexley Parks and Open Spaces team and Planning teams and verified on site during the quality audits.

3.11 Sites were assigned a draft typology based on information gleaned from the sources listed in paragraph 3.9. As a result of this review, some site typologies were changed (from their 2008 classification). Similarly, some site typologies were updated following verification on site.

Step 4: Auditing provision

3.12 An audit of current provision was undertaken gathering detailed information on all publicly accessible open spaces in Bexley. In order to prioritise audit efforts, the following typologies were not audited:

- Agricultural land.
- Open space associated with educational facilities.

3.13 The analysis presented in this report focuses on the **243 sites** that do not fall into the above categories.

3.14 Outdoor sports facilities have been audited as part of the evidence on playing pitches (presented in Chapter 7) and have only been included in the open space analysis where they are a secondary typology within a larger open space. Chapter 7 provides details on all outdoor sports facilities where sports provision is the primary typology, and the methodology used to develop the evidence on outdoor sports facilities in described later in this section.

An audit form was agreed, based around the Green Flag Award Assessment criteria, which enables detailed data to be gathered on each site, which can then be scored for both quality and value.

Step 5: Analysis of findings

3.16 An assessment of the existing quantity of provision has been provided for the whole of the Bexley as well as an assessment for each Geographic Region as shown in **Figure 3.2.** This was based on an amount of open space per 1,000 head of population.

3.17 The analysis differentiates between different levels of site access to enable an assessment of the levels of provision per head of publicly accessible open space. The provision per head was then compared to provision in surrounding boroughs (where current data is available).

3.18 The consultation results were reviewed to see if the local perception is that there is enough open space within the borough, or not.

3.19 The quantity figures are presented and analysed alongside information on the existing and future population within Bexley. This highlights the relative provision in each Geographic Region and establishes whether there is a spatial variance in provision across the borough. Future population figures have been used to establish the net reduction in open space provision per head as a result of population growth. Information on the locations of planned housing growth has also informed this analysis.

Step 6: Development and application of standards

3.20 This step draws together the information from the site audits and the consultation to develop locally appropriate standards for the quantity, quality, value and accessibility of open space in Bexley. For the purposes of this assessment, the borough has been divided into six Geographic Regions that align with the Core Strategy.

3.21 In order to review the distribution and accessibility of sites, a set of maps was produced, to identify accessibility catchments, and potential areas of deficiency to open space. The catchment buffers are guided by the standards set out in the Mayor's guidance. This mapping exercise highlighted the extent to which parts of Bexley are deficient in access to public open space.

3.22 To assess the quality and value of provision, each site was given a quality score and a value score, based on the audits and agreed scoring methodology.

3.23 Using the ideal of a known 'good quality' and 'well valued' site within Bexley, and an expectation of what facilities residents may reasonably expect within a certain type of site, a 'quality benchmark score' and a 'value benchmark score' were proposed.

Step 7: Multi-functionality

3.24 An assessment of functions that could be enhanced on each site was undertaken on site.

Step 8: Conclusions and recommendations

3.25 This final stage involved the translation of the findings of the assessment into priorities and principles for future policy within the emerging the Local Plan.

3.26 The study provides an understanding of deficiency and need in terms of quantity, quality/value and accessibility and is fundamental to informing policy.

Jump to Chapter 6: Open space evidence base

Playing Pitches

3.27 The Bexley Playing Pitch Audit is based on a supply and demand assessment of playing pitch facilities in accordance with Sport England's Playing Pitch Strategy (PPS) Guidance: An Approach to Developing and Delivering a PPS 2013: http://www.sportengland.org/facilities-and-planning/planning-for-sport/planning-tools-and-guidance/playing-pitch-strategy-guidance/

3.28 The Playing Pitch Audit approach for the sports of Football, Rugby, Hockey and Cricket is based on Sport England PPS Guidance. The approach comprises 10 steps (See **Figure 3.3**) which are grouped into the following five stages:

- Stage A: Prepare and tailor the approach (Step 1)
- Stage B: Gather information and views on the supply of and demand for provision (Steps 2 & 3)
- Stage C: Assess the supply and demand information and views (Steps 4, 5 & 6)
- Stage D: Develop the strategy (Steps 7 & 8)
- Stage E: Deliver the strategy and keep it robust and up to date (Steps 9 & 10)

3.29 Stages A to C were undertaken by Continuum Sport and Leisure. This work was finalised by the Council with the support of an internal consultant.

3.30 The outputs include an audit, recommendations and action plan. The audit has been developed and adopted into the GI Study. The audit will be kept robust and up to date.

Bexley Green Infrastructure Study

Figure 3.2 Geographic regions

Geographic regions

- Belvedere
- Bexleyheath
- Crayford and Old Bexley
- Erith
- Sidcup
- Welling

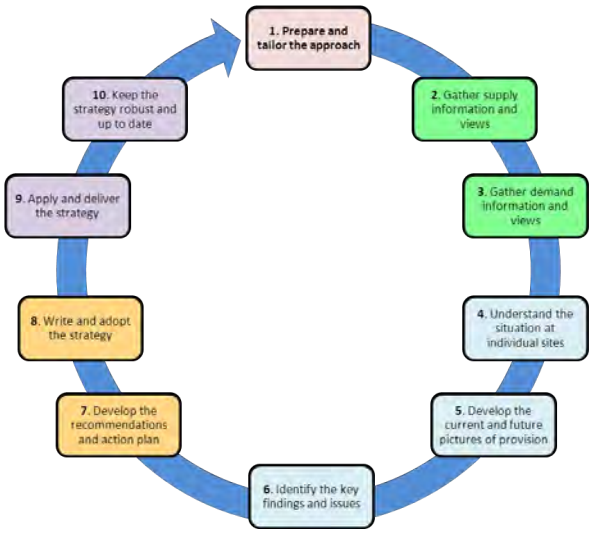
Map Scale @A3: 1:50,000

0 5 10 km

CB:DM EB:Manson D LUC FIG3_2_10228_Geographic_Regions_A3L 28/02/2020

Source: OS, LBB

Figure 3.3: The 10 steps to delivering a Playing Pitch Strategy



3.31 The audit includes lapsed and disused playing field sites. These are sites that formerly accommodated playing pitches but have not been used for formal or informal sports use within the last five years (lapsed) or longer (disused).

3.32 For other sports including netball, tennis, golf and bowls, a similar approach is adopted to assess need, following current Sport England guidance: 'Assessing Needs & Opportunities Guide for Indoor and Outdoor Sports Facilities' (ANOG) published by Sport England in July 2014: https://www.sportengland.org/facilities-and-planning/planning-for-sport/planning-tools-and-guidance/assessing-needs-and-opportunities-guidance/

3.33 The Playing Pitch Audit is for the whole borough, not just the Council. However, the Council has a lead role to play in understanding and planning for future demand, including highlighting the need to secure investment. The Playing Pitch Audit must consider the context of reducing budgets for local authorities that could, for example, result in a reduction of resources available to maintain playing pitches and ancillary facilities.

Aims and objectives

3.34 The aim of the Playing Pitch Audit is:

> 'to provide an assessment of the existing sports pitches and facilities, whilst identifying opportunities for retaining, reducing or removing this provision and prospects for new provision and partnerships.'

3.35 The objectives of the Playing Pitch Audit are:

- To provide the evidence base for Bexley's New Local Plan, 2020 – 2040 and provide an assessment of the future needs to guide spatial planning and more detailed infrastructure policies.
- To assess current and future provision and identification of areas where pitches / facilities need to be protected, enhanced or new provision required.
- To guide investment from all potential stakeholders, including National Sports bodies such as Sport England, National Governing Bodies and the private sector such as developers.

3.36 The above 3 objective's form the structure for the recommendations and action plans for individual sports and site-specific action plans for the Playing Pitch Audit.

3.37 As such:

Where new facilities are recommended to be provided, the Sport Specific Action Plans consider the spatial requirements, identifying (where possible) the location of these facilities in relation to the Geographic areas.

The strategy seeks to make sure that the right number of playing pitches and ancillary facilities of the right quality are in the right places (geographic areas). It advocates the protection of existing provision and recognises the benefits of multi pitch sites by:

- Protecting existing playing pitch sites in line with the evidence base.
- Securing tenure and access to sites through a range of solutions and partnerships.
- Seeking formal community use agreements for sites where there is a need.

Key partners working together in line with the evidence base to enhance the full potential of playing pitch assets and their long-term sustainability by:

- Recognising that an improvement in quality and ongoing maintenance can have an impact on the capacity of use.
- In times of public sector austerity, investment needs to be directed at sites which will provide the greatest impact and highest increase in participation. The Playing Pitch Audit aims to support projects and sports clubs that can, based on the evidence in the geographic areas, demonstrate sustainable long-term development, increase participation, and deliver against the wider strategic outcomes.
- Working in partnership with stakeholders to secure funding which could include developer contributions or Community Infrastructure Levy (CIL) Funding.

Study overview

3.38 The Playing Pitch Audit has been developed in partnership with a range of agencies and been overseen by a steering group made up of representatives from:

- Sport England
- England Hockey
- Kent County FA
- England Golf
- Bowls England
- LB Bexley Planning Department
- LB Bexley Sport and Leisure Team
- England and Wales Cricket Board
- Football Foundation on behalf of the FA
- London FA
- England Netball
- Rugby Football Union
- Lawn Tennis Association

3.39 In line with the Government's National Planning Policy Framework (February 2019) (see GI Study paragraph **4.4**), the Playing Pitch Audit assesses existing outdoor sports provision including pitches and infrastructure along with the future need for such provision (irrespective of whether it is in public, private or educational ownership and regardless of the nature and level of use).

3.40 The future picture of provision has been assessed based on potential changes in supply (both committed and planned projects within the borough and its travel catchment), forecast changes in the resident population informed by the targets for new housing in Bexley's adopted Growth Strategy 2020 to 2050, national trends in participation, and the development aspirations of the clubs based in the borough.

3.41 Understanding the needs of different pitch sports at a local level enables the London Borough of Bexley to provide appropriately to meet the needs of its communities. It is inevitable that the needs of communities change over time, just as the playing and participative requirements of individual sports change. The demand for these at a local level needs to be assessed and modelled to understand what this means in terms of actual pitch provision, otherwise the Council could be providing too much or too little, thinking they are addressing local needs.

3.42 It must also be understood that the Playing Pitch Audit represents a 'snap-shot' in time based upon the anticipated level of growth planned for Bexley. This means there will be proposals that come forward for the new Local Plan such as large residential developments that the Playing Pitch Audit has not taken into consideration.

3.43 It will be important for the Playing Pitch Audit to be kept live and up to date once it has been adopted with LB of Bexley and the members of the Steering Group ensuring:

- Progress with the Playing Pitch Audit recommendations and action plan;
- Monitoring and evaluation the outcomes of the Playing Pitch Audit; and
- Ensure that the Playing Pitch Audit is kept up to date.

3.44 Any review should be in accordance with Stage E of the Sport England PPS guidance (see **Figure 3.3**).

3.45 As a guide, if no review and subsequent update has been carried out within three years of the Playing Pitch Audit being adopted, then Sport England and the NGBs would consider the Playing Pitch Audit and the information on which it is based to be out of date. Ideally the Playing Pitch Audit should be reviewed on an annual basis from the date it is formally signed off by the steering group to keep it up-to-date and robust.

Jump to Chapter 7: Playing pitches evidence base

Metropolitan Open Land

3.46 Much like Green Belt planning policy guidance, there is no detailed planning policy guidance on how to undertake a review of MOL. The method employed in this Study was built on a comprehensive and clear understanding of the planning policy context behind the MOL designation, and experience of undertaking similar of studies of MOL, open spaces and Green Belt.

Step 1: Context and Mapping

3.47 The first task involved mapping the extent of existing MOL, Green Belt and other open spaces within Bexley and its neighbouring local authorities alongside relevant international, national and metropolitan open air facilities, green infrastructure, landscape, historic environment and ecological designations. This illustrated the pattern, functions and features of the borough's MOL, Green Belt and other open spaces. From this it was possible to divide the MOL in the borough into parcels for the purposes of assessment.

Step 2: MOL Openness Assessment

3.48 As discussed in Chapter 4 of this report which sets out the more detailed overview of the planning policy context for GI including MOL, the essential characteristics of Green Belts – openness and permanence – apply equally to MOL. Both characteristics apply to MOL Criterion 1, which requires the land designated as MOL to contribute to the physical structure of London by being clearly distinguishable from the built up area. It is the openness and permanence of designated land which allows that land to be clearly distinguishable from London's built up area. Furthermore, the openness of MOL is inherently linked to its diverse range of functions as space for significant sport, leisure, recreation and cultural activities (Criterion 2), space for protected species and habitats, landscapes and historic environments (Criterion 3) and connected spaces that form part of a wider green infrastructure network.

3.49 Open land is designated as MOL to protect open spaces for leisure, recreation, sport, the arts and cultural activities (Criterion 2), protect features or landscapes of either national or metropolitan value (Criterion 3) and protect green chains or links (Criterion 4). However, it is the contribution of openness to these facilities and features that is protected through MOL rather than the facilities and features themselves, i.e. there are other international, national, regional and local planning and environmental designations which protect such facilities and features. Therefore, the assessment of MOL focussed on drawing out variations in the contribution of land within MOL to its inherent openness.

3.50 The review of MOL was undertaken through a desk-based approach making use of aerial photography and Ordnance Survey basemaps. Each parcel of MOL was given a unique identifier, and using GIS, was assessed in terms of its openness.

3.51 The essential characteristic of openness is a combination of 'spatial' and 'visual' openness. To assess the existing spatial openness of MOL, consideration was given to the scale, form and density of built development in the MOL. To assess the existing visual openness of MOL, consideration was given to the role of topography, vegetation, buildings and linear features such as roads and railways in maintaining or screening open views of the wider MOL. As the assessment was undertaken it was important to recognise that while vegetation or landform can provide visual enclosure to development that lessens its visual impact, this does not diminish the spatial openness of the MOL. Therefore, the assessment placed a greater emphasis on the spatial openness of MOL than its visual openness. Visual openness can be assessed in greater detail when considering the harm caused by specific developments in specific locations within or adjacent to MOL.

3.52 **Table 3.1** sets out the criteria for rating MOL openness.

Table 3.1: MOL openness ratings

Strong Openness	Wholly open MOL free from buildings and structures that compromise openness.
Relatively Strong Openness	MOL free from significant buildings and structures which compromise openness.
Moderate Openness	MOL largely free from significant buildings and structures that compromise openness; however, some buildings and structures compromise openness or blur the lines between the built-up area and open land.
Relatively Weak Openness	MOL populated with significant buildings and structures that compromise openness and blur the lines between the built-up area and open land.
Weak / No Openness	MOL which is wholly developed by buildings and structures that compromise openness to an extent where there is no distinction between the built-up area and the MOL.

3.53 The output of the assessment was a map illustrating variations in the openness of MOL across the borough. The assessment also considered specific areas suggested by the Council for possible release from the MOL designation in terms of their contribution to openness.

3.54 Recommendations have been included in relation to which areas of MOL make the weakest contribution and might have the greatest potential for release from the MOL designation. It should be noted that exceptional circumstances must be appropriately demonstrated, for this land to be released from its designation.

Step 3: Minor MOL Realignments

3.55 As part of the assessment, consideration was given to the accuracy and robustness of the Council's existing MOL boundaries within Bexley. This step involved evaluation of whether the MOL boundaries are still fit for purpose in the borough, i.e. whether or not they follow readily recognisable, identifiable and defensible features that draw a clear distinction between the designated open land and the non-designated built-up area. Recommendations for minor adjustments to the MOL boundary have been made where appropriate.

Step 4: Potential for New MOL

3.56 In 1976 the GLDP described areas appropriate for designation as MOL as being not appropriately situated for inclusion in the Green Belt because they form *'islands embedded in the urban fabric or penetrating deeply into the urban area as green wedges.'* Furthermore, it was indicated that they should be '*safeguarded for predominantly open uses as much as Green Belt*'.

3.57 This original definition was subsequently supported by a more detailed definition using four criteria set out in the Strategic Planning Guidance for London in 1994, followed by further guidance on its designation in 1996 with the publication of RPG3:

> 'Where isolated pockets of Green Belt exist that are not part of a continuous pattern of open land surrounding London, authorities should consider whether it would be more appropriate to designate the land as MOL in recognition of its location and use, having regard to the guidance on MOL…'; and
>
> 'Although MOL may vary in size and primary function across London, particularly between inner and outer London, there is a need for greater consistency between boroughs and its designation. The designation of too small or more locally significant areas, for example, will devalue the strength of the designation as a whole. If the land does not serve a catchment area of strategic significance or draw visitors from several boroughs it may be more appropriate to propose and justify other local designations'.

3.58 This general approach has been carried forward into the current London Plan (adopted in 2011) and the new Draft London Plan which was recently submitted for EiP. The London Plan affords the same level of protection to MOL as to the Green Belt making paragraphs 135 and 139 of the NPPF, which set out the tests required to justify the designation of new Green Belt, as equally relevant to the designation of MOL. Policy 7.17 of the London Plan sets out the four criteria that open land should meet in order to be designated as MOL (as discussed in relation to the MOL openness assessment above).

3.59 Drawing on this policy and guidance, a high-level review of the existing pattern of open spaces within and adjacent to the borough was carried out with a view to identify strategic pockets and chains of open space which have the potential to be designated as new MOL. Where possible, this assessment was informed by the elements of the playing pitches and outdoor sports facilities and open space assessments that evaluate the catchments of open spaces. Only isolated pockets of Green Belt that are no longer contiguous with the open countryside are considered for designation as new MOL.

3.60 Following an initial high-level desk-based assessment, strategic pockets and chains of open space which have the potential to be designated as new MOL were assessed in terms of their ability to meet the criteria for MOL. This part of the assessment also considered land identified by the Council for inclusion as new MOL.

3.61 The output of the assessment has been presented in a table and supported by a map illustrating areas of open space that have the potential to be designated as MOL. A series of recommendations have been included regarding areas which might warrant further consideration for designation as MOL through the Local Plan process.

3.62 The analysis of MOL is presented in Chapter 8 of this report.

Jump to Chapter 8: MOL Evidence base

Urban Greening

Step 1: Mapping

3.63 At the outset of this study, there was very little mapped information relating to green roofs and other urban greening features in Bexley. As part of the public consultation undertaken for this study, there was an opportunity to map locations of existing urban greening features such as green roofs, green walls, rain gardens, SuDS and swales onto an online map.

3.64 Further details of green roofs in the London area have since been published via the https://livingroofs.org/ website which is supported by the Mayor of London and provides a map of green roofs in the Greater London area. It was therefore possible to use this resource to identify urban greening features in Bexley.

3.65 Information on Bexley's street tree network was obtained from Bexley's Parks and Open Spaces team. It was possible to undertake GIS analysis of this dataset to identify the range of species in the borough and identify gaps in the network at a strategic scale.

3.66 In addition, information was sought from Greenspace Information for Greater London (GiGL) who maintain a database of urban greening features in London. Additional mapping resources from the GLA were examined to get a more complete understanding of the green infrastructure network in Bexley. This included the London Tree Canopy Cover map and the London Green Cover map.

Step 2: Analysis

3.67 Data on urban greening features was mapped in GIS and analysed by Geographic Region.

Jump to Chapter 9: Urban greening evidence base

Biodiversity, Geology and Geodiversity

Step 1: Data collation and mapping

3.68 This assessment commenced with a data collation exercise, gathering GIS data from Natural England and Greenspace Information for Greater London. Information was analysed in GIS to develop an understanding of the quantity and condition (where possible) of geodiversity and biodiversity assets in the borough.

3.69 This analysis has been presented in maps and tables.

Step 2: Considering emerging evidence (outside of the scope of this study)

3.70 In 2019 the Council commissioned a Partial Review of SINCs in Bexley. The review includes the assessment of 14 sites consisting of existing SINCs, and potential new SINCs currently without SINC status. On-site surveys to inform the Partial Review of SINCs took place between August and October 2019 to determine whether sites were considered to be of SINC quality.

3.71 The Council now need to consider the nature conservation value of the 14 sites alongside other relevant evidence and advice, prior to determining an appropriate land use designation within the emerging new Local Plan.

3.72 The process by which London Boroughs should select and confirm SINCs in Great London has been developed by the London Wildlife Sites Board (LWSB). The boroughs should make use of the up to date and current evidence bases available (i.e. including site surveys completed in 2019) relating to habitats, species, etc. to support site selection, de-selection or changes to boundaries. From this position the borough should compile a set of recommendations on which sites should be accorded SINC status (and at which grade).

3.73 The survey data and recommendations are to be submitted to a local Site Selection Panel whose responsibility it is to provide independent, expert advice on the approach to surveys and evaluation and to validate any recommendations on SINC status. The relevant borough officer should then produce a schedule of proposed SINCs or changes to SINC based on the advice of the local Site Selection Panel. The LWSB will offer to review the site selection process undertaken by the borough to confirm that the process is

consistent with the guidance relevant to the process[11]. Any changes to SINC designations or boundaries will be included within an updated SINC Report.

Jump to Chapter 10: Biodiversity, geology and geodiversity evidence base

Cemeteries

Step 1: Data review

3.74 Data on the current provision and demand for cemetery space in the borough was provided by the Parks and Open Spaces Team.

Step 2: Assessment

3.75 The assessment looks at the current provision of cemeteries in Bexley and their ownership. It then moves on to describe the availability of burial space at Council managed cemeteries and considers the future demand by interrogating statistics around death and mortality rates and average burial rates in Bexley.

3.76 These factors are considered together to estimate the demand for burial space in Bexley now and into the future.

3.77 In addition, the assessment considers indicative costs for any future provision in the borough.

Jump to Chapter 11: Cemeteries evidence base

Bringing it all together: The GBI Network

3.78 Following completion of the individual evidence bases, the study drew together the information collated and looked at the coherence, quality and gaps in the GI network.

Step 1: Synthesis of evidence on green infrastructure

3.79 This stage commenced by reviewing all evidence developed in the individual strands of the study to date. A series of thematic maps were developed to understand the various functions of Bexley's GI network. Themes included:

- Population, household and economic growth
- Health and wellbeing
- Climate change
- Biodiversity
- Landscape and historic environment
- Active travel networks.

3.80 Much of this was undertaken in GIS, but the mapping work was supported by an examination of a range of relevant guidance and strategy documents.

3.81 Baseline data was collated to identify existing multi-functional corridors, key GI features, gaps and sensitivities and opportunities for the GI network in Bexley, with reference to the themes outlined above. Key GI assets and resources were identified by considering which elements contribute the most to the GI network with reference to all GI themes.

Step 2: Consultation and workshop

3.82 The maps developed in Step 1 were used to inform an in-house, round table discussion with planners, ecologists and landscape managers to identify opportunities and constraints for the Bexley GI network. Stakeholders were engaged through telephone and email discussions to explore particular elements of the network as well as gain a better understanding of the types of initiatives and strategies that are in place.

3.83 An early workshop was held with council stakeholders to explore the thematic maps and identify additional sources of information and key issues that needed to be examined.

Step 3: Identification and mapping of opportunities

3.84 Following the workshop, analysis of how the whole network fits together was undertaken. By reviewing the range of green infrastructure features, where an area has been identified as deficient in access to green space, the team identified whether any other existing green infrastructure features may be filling the gap or might have potential to fill the gap.

3.85 This drew on the desk-based analysis of other green infrastructure features (street trees, green roofs etc).

3.86 A key output from this stage was a schematic GI opportunity map and supporting text setting out areas of opportunity and potential interventions that could be considered to address deficiencies or create better connections.

[11] The London Wildlife Site Board (April 2019) Process for selecting and confirming Sites of Importance for Nature Conservation (SINCs) in Greater London

Jump to Chapter 12: The Bexley green and blue infrastructure network

Presenting the study

3.87 A draft report was presented to a workshop with internal stakeholders, all of whom were invited to comment on the emerging findings. As a result of this workshop, some of the opportunities were refined.

4 Planning Policy Context

Chapter 4
Planning Policy Context

This chapter provides an overview of the current national, regional and local policy context that has framed this study. This chapter also highlights additional studies and strategies that have informed this work.

4.1 This chapter outlines the key national, regional and local policies that have influenced the approach to this study. The context for the study has been set through the relevant adopted policies as well as those which are currently emerging; most importantly the draft new London Plan.

4.2 These should be considered when interpreting the study's findings. More details on the relevant policy context are provided in Appendix A.

National Policy

National Planning Policy Framework

4.3 The NPPF refers to GI on a number of occasions, including the requirement that plans, decisions and strategic policies should make sufficient provision for GI (paragraph 20); promote healthy and safe communities, including through the provision of safe and accessible green infrastructure (paragraph 91); planning for climate change, including through suitable adaptation measures such as green infrastructure (paragraph 150); conserving and enhancing the natural environment by maintaining and enhancing networks of habitats and green infrastructure (paragraph 171); and identifying opportunities to improve air quality or mitigate impacts, such as through green infrastructure provision and enhancement (paragraph 181).

4.4 The Framework also sets out guidance relating to features which might form part of the GI network; including that planning policies should plan positively for the provision of shared spaces and community facilities such as sports venues and open space (paragraph 92); up-to-date assessments of open space, sport and recreation facilities should support

planning policies (paragraph 96); and the circumstances in which open space can be developed on (paragraph 97).

4.5 As set out through paragraph 97 existing open space, sports and recreational buildings and land, including playing fields, should not be built on unless:

- an assessment has been undertaken which has clearly shown the open space, buildings or land to be surplus to requirements; or
- the loss resulting from the proposed development would be replaced by equivalent or better provision in terms of quantity and quality in a suitable location; or
- the development is for alternative sports and recreational provision, the benefits of which clearly outweigh the loss of the current or former use.

4.6 The NPPF also provides a mechanism by which local authorities can protect some open spaces under a 'Local Green Space' designation (paragraphs 99, 100 and 101) and sets out that these areas should be managed by policies which are consistent with those for Green Belt. This part of the NPPF also sets out high level criteria for this type of designation.

4.7 Biodiversity and geodiversity are addressed through paragraph 174 of the NPPF which states that components of local wildlife-rich habitats and wider ecological networks should be identified, mapped and safeguarded by plans. The conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species should also be promoted through plans.

Planning Practice Guidance

4.8 The national Planning Practice Guidance (PPG) encourages a strategic approach to incorporating green infrastructure into Local Plans though an evidence-based approach. The evidence should assess the current network and identify gaps in provision. The multiple benefits which green infrastructure can provide are highlighted through this guidance; notably relating to ecosystem services derived from natural systems and processes, for the individual, for society, the economy and the environment. Delivery of benefits relate to the creation of attractive, high quality environments; contribution to landscape character and ecological networks; opportunities for recreation and social interaction; climate mitigation and adaptation; and reductions in pollution.

Regional Policy

The London Plan

Planning for green space

4.9 The current adopted London Plan[12] states that areas of open space deficiency should be identified, and new open spaces are to be provided in places that are likely to experience substantial development – however, they must conform to GI strategies and deliver multiple benefits as per the text of Policy 7.18. This policy also states that open spaces can only be lost if an equal or better open space can be provided elsewhere within the local catchment area; although the definition of the term 'local catchment area' is left for the boroughs to determine. The London Plan also supports development proposals that strengthen links between public spaces and parks (Policy 7.5). In line with Policy 3.19, developments which would result in the net loss of sports and recreation facilities should be resisted.

4.10 Policy 5.13 states that sustainable urban drainage systems (SUDS) should be used at developments unless there are practical reasons for not doing so. Development should seek to achieve greenfield run-off rates and incorporate drainage in a manner to help promote objectives relating to water use efficiency and quality, biodiversity, amenity and recreation. Green roofs are highlighted in the supporting text of the policy as having potential to contribute to sustainable urban drainage by absorbing a proportion of surface water. This text cross refers to Policy 5.11 which sets out that major development proposals should be designed to include green roofs and walls. The incorporation of this type of planting should be used to help achieve a number of objectives including adapting to, and mitigating climate change, sustainable drainage and enhancement of biodiversity.

4.11 In addition to stating that boroughs should assess local green and open space to inform policy, the emerging policy of the draft new London Plan[13] (Policy G4 Open Space) states that losses of green space should be resisted in areas of deficiency. Where a loss would occur outside of areas of deficiency, compensatory provision should be made unless there is up to date evidence that this is not required. This requirement underpins the need for this study to identify any areas of open space deficiency in the borough. The draft new London Plan also has a requirement for Development Plans to include appropriate designations and policies so that deficiencies are addressed.

4.12 The draft new London Plan states that open space needs should be planned for in places which are likely to

[12] Mayor of London (2016) The London Plan

[13] Mayor of London (2019) The London Plan (Intend to Publish version)

experience substantial changes. Development Plans should also ensure that open space and green space remains publicly accessible. The draft new London Plan similarly supports the provision of well-connected and accessible public realm which is defined as including open spaces through Policy D7. In terms of sports facilities, Policy S5 states that existing sports and recreational land (including playing fields) and facilities should be retained unless certain criteria are met.

4.13 Policy G5 Urban greening of the draft new London Plan seeks to increase the quantity and functionality of green infrastructure in the built environment by assessing development projects submitted for approval. The policy states that the approach to this Urban Greening Factor is to be tailored to local circumstances to help ensure that development is delivered in a manner which will support appropriate levels of urban greening required to address local issues. Currently, in the absence of locally specific targets, the Mayor has recommended target scores for major developments which are predominately residential (0.4) and predominately commercial (0.3).

4.14 Policy SI13 Sustainable drainage continues the approach of trying to ensure that proposals achieve greenfield run-off rates. To achieve this, the policy states that there should be a preference for green over grey features. Drainage is to be incorporated to promote multiple benefits including increased water use efficiency, improved water quality, and enhanced biodiversity and urban greening.

Protecting, maintaining and enhancing open space

4.15 In addition, the current adopted London Plan states that Local Plan preparation should support the creation, protection and enhancement of GI and open spaces by producing green infrastructure strategies. GI and open spaces should be optimised for both their environmental and social qualities as set out in Policy 2.18.

4.16 The draft new London Plan continues to require that London's network of green and open spaces, and green features in the built environment are protected, planned, designed and managed as integrated components of green infrastructure; planned for through relevant strategies (Policy G1). Opportunities for cross borough collaboration should be identified as part of the approach to ensure green infrastructure is optimised. This policy also continues to support the use of strategic green infrastructure interventions to meet environmental and social challenges.

4.17 The adopted London Plan also addresses the protection of private green spaces which form part of the wider GI network. It states at Policy 3.5 that boroughs may introduce a presumption against development on back gardens or other private residential gardens where this can be justified locally.

4.18 Greater London Authority's (GLA's) Play and Informal Recreation Supplementary Planning Guidance[14] relates to Policy 3.6 in the currently adopted London Plan. This policy requires that audits should be undertaken in relation to existing play and informal recreation provision as well as an assessment of need. Furthermore, strategies on play and informal recreation should be produced to be supported by local planning policies. The emerging draft new London Plan, through Policy S4 (Play and informal recreation), continues to require audits of existing provision and need for such facilities, as well as the production of relevant strategies to be supported by local planning policies.

Metropolitan Open Land

4.19 The current adopted London Plan affords strong protection to MOL, supporting its current extent, its extension in appropriate circumstances and its protection from development having an adverse impact on its openness, advising that inappropriate development be refused except in very special circumstances. Policy 7.17 of the London Plan states that to designate land as MOL, boroughs need to establish that the land meets at least one of the following criteria:

- It contributes to the physical structure of London by being clearly distinguishable from the built up area
- It includes open air facilities, especially for leisure, recreation, sport, the arts and cultural activities which serve either the whole or significant part of London
- It contains features or landscapes of either national or metropolitan value
- It forms part of a Green Chain or link in the network of green infrastructure and meets one of the above criteria.

4.20 Policy 7.17 of the London Plan states that any alterations to the boundary of MOL should be undertaken by boroughs through the formal plan-making process, in consultation with the Mayor and adjoining authorities.

4.21 The supporting text to the London Plan MOL Policy 7.17 states:

- that appropriate development should be limited to small scale structures to support outdoor open space uses and minimise any adverse impact on the openness of MOL.

[14] Mayor of London (2012) Shaping Neighbourhoods: Play and Informal Recreation Supplementary Planning Guidance

- the importance of Green Chains and the need to designate them as MOL to acknowledge their London-wide importance.
- that development that involves the loss of MOL in return for the creation of new open space elsewhere will not be considered appropriate.

4.22 Draft Policy G3 in the Draft London Plan differs from the current adopted Policy 7.17 (2011) in the following ways:

- Draft Policy G3 states that 'development proposals that would harm MOL should be refused' as opposed to the adopted Policy 7.17 which makes reference to protecting the openness of MOL and contains supporting text which limits appropriate development to small scale structures to support outdoor open space. There is no definition of MOL harm; however, it can be assumed that this relates directly to impacts on the openness of MOL and the contribution of such openness to the features and facilities for which the MOL is designated.
- The fourth criterion for MOL designation has been rewritten to replace the phrase 'Green Chain or link' with 'strategic corridor, node or a link.' This change emphasises the strategic nature of designation and how isolated areas of MOL can form part of a strategic link.
- Draft Policy G3 continues to require alterations to the boundary of MOL to be undertaken through boroughs' Local Plans in consultation with the Mayor and adjoining authorities in line with national policy. However, the policy now also states that boundary changes should now ensure that the overall quantum of MOL is not reduced, and that the overall value of the land designated as MOL is improved, having regard to the four criteria for designating MOL.
- The supporting text to Draft Policy G3 states that any proposed changes to MOL boundaries which result in loss must be accompanied by thorough evidence which justifies that there are exceptional circumstances, consistent with the requirements of national policy.
- The supporting text to Draft Policy G3 also states that proposals to enhance access to MOL and to improve poorer quality areas such that they provide a wider range of benefits for Londoners that are appropriate within MOL will be encouraged.

The principles of National Green Belt policy applicable to MOL

4.23 Like the adopted London Plan Policy 7.17 (2011) the new Draft Local Plan Policy G3 (2019) ties the principles of national Green Belt policy (NPPF paragraphs 133-147) to London's MOL. The following paragraphs of this section set out the principles of national Green Belt policy that are directly applicable to MOL planning. These are that:

4.24 The essential characteristics of Green Belts are its openness and their permanence (paragraph 133).

4.25 Green Belts should only be established in exceptional circumstances, for example when planning for major urban extensions, and in proposing new Green Belt, local planning authorities must:

- demonstrate why alternative policies would not be adequate;
- set out the major change in circumstances the make the designation necessary;
- communicate the consequences for sustainable development; and,
- highlight the consistency of the new designation with strategic policies of neighbouring plan areas and the other objectives of the NPPF (paragraph 135).

4.26 Green Belt boundaries should only be altered in exceptional circumstances through the preparation or updating of plans and once redefined should endure beyond the plan period. Detailed amendments to Green Belt boundaries may be made through non-strategic policies, including neighbourhood plans where a need for changes has been established through strategic policies (paragraph 136).

4.27 Before concluding that exceptional circumstances exist to justify changes to Green Belt boundaries, the strategic policy-making authority should be able to demonstrate that it has examined fully all other reasonable options for meeting its identified need for development, including: maximising the use of suitable brownfield sites and underutilised land; optimising the density of development in line with national policy; and discussions with neighbouring authorities about whether they could accommodate some of the identified need for development (paragraph 137).

4.28 In reviewing Green Belt boundaries local planning authorities must take account of the need to promote sustainable patterns of development. If it is established that it will be necessary to release Green Belt land for development, plans should give first consideration to land which has been previously developed and/or is well-served by public transport. They should also set out ways in which the impact of removing land from the Green Belt can be offset through compensatory improvements to the environmental quality and accessibility of remaining Green Belt land (paragraph 138).

4.29 In defining Green Belt boundaries local planning authorities must:

- demonstrate consistency with Local Plan strategy, most notably achieving sustainable development;

- not include land which it is unnecessary to keep permanently open;
- safeguard enough non-Green Belt land to meet development needs beyond the plan period;
- define boundaries clearly, using physical features that are readily recognisable and likely to be permanent (paragraph 139).

4.30 When considering any planning application, local planning authorities should ensure that substantial weight is given to any harm to the Green Belt. 'Very special circumstances' will not exist unless the potential harm to the Green Belt by reason of inappropriateness, and any other harm, is clearly outweighed by other considerations (paragraph 144).

4.31 New buildings in the Green Belt are inappropriate, unless they are:

- buildings for agriculture and forestry;
- provision of appropriate facilities for outdoor sport, outdoor recreation, cemeteries and burial grounds and allotments; as long as the facilities preserve the openness of the Green Belt and do not conflict with the purposes of including land within it;
- the extension or alteration of a building provided that it does not result in disproportionate additions over and above the size of the original building;
- the replacement of a building, provided the new building is in the same use and not materially larger than the one it replaces;
- limited infilling in villages, and limited affordable housing for local community needs under policies set out in the Local Plan; and,
- limited infilling or the partial or complete redevelopment of previously developed land (brownfield land), whether redundant or in continuing use (excluding temporary buildings), which would not have a greater impact on the openness of the Green Belt and not cause substantial harm to the openness of the Green Belt, where the development would re-use previously developed land and contribute to meeting an identified affordable housing need (paragraph 145).

4.32 Other forms of development that are not inappropriate in the Green Belt, provided they preserve the openness of the Green Belt and do not conflict with the purposes of including land in Green Belt, are:

- mineral extraction;
- engineering operations;
- local transport infrastructure which can demonstrate a requirement for a Green Belt location;
- the re-use of buildings provided that the buildings are of permanent and substantial construction;
- material changes in the use of land (such as changes of use for outdoor sport or recreation, or for cemeteries and burial grounds); and development brought forward under a Community Right to Build Order or Neighbourhood Development Order (paragraph 146).

Biodiversity and geodiversity

4.33 The adopted London Plan, through Policy 7.19, states that plans should use the procedures in the Mayor's Biodiversity Strategy to identify and secure the appropriate management of sites of borough and local importance for nature conservation. Areas deficient in accessible wildlife sites should be identified through plans and opportunities to address these issues should also be identified. The policy also states that green corridors of strategic importance should be identified, protected and enhanced.

4.34 Policy 7.20 addresses geological conservation in London and requires that plans include clear goals for the management of identified geodiversity sites. European, national or regional conservation geodiversity sites should be clearly identified. Work should be undertaken with appropriate organisations to investigate additional sites that may be of value in the local area and these should also be protected through the plan.

4.35 Policy G6 of the draft new London Plan states that Sites of Importance for Nature Conservation (SINCs) should be protected. SINCs and ecological corridors should be identified to contribute to coherent ecological networks. The draft London Plan maintains the approach of identifying and addressing areas of deficiency in terms of access to nature and defines these as areas that are more than 1km walking distance from an accessible Metropolitan or Borough SINC. The protection and conservation of priority species and habitats that sit outside of the SINC network should be supported through plans and opportunities to create other habitats in an urban context should be identified.

4.36 The draft London Plan also contains policy that will address protection of sites with geological importance. Plans are required by Policy G9 to set out clear goals to manage identified sites for public access, appreciation and interpretation of geodiversity. Geological sites of European, national or regional conservation importance should also be clearly identified through the plan.

London Environment Strategy

4.37 The London Environment Strategy provides details on how the Mayor will address the protection and improvement of the environment in London in the future. The Strategy contains the aim for London to be the world's first National Park City, in which more than half of the city's area is green. The vision of the city as a National City Park is one where new growth helps to improve the quality and function of London's green infrastructure. This status was adopted on 22nd July 2019. This will allow for a greener, more connected, wildlife rich city with a high quality (and protected) core network of parks and green spaces. This approach is to help ensure the protection of the natural environment, and appropriate management of the network of green infrastructure to benefit all sectors of London's population.

London National Park City

In July 2019, London was declared the world's first National Park City. The concept behind the National Park City movement is to encourage individuals and public bodies to contribute towards making London 'greener, healthier and wilder' as set out in the London National Park City Charter.

Ambitions for London as a National Park City is that it will be:

- a city which is greener in the long-term than it is today and where people and nature are better connected;
- a city which protects the core network of parks and green spaces and where buildings and public spaces aren't defined only by stone, brick, concrete, glass and steel;
- a city that is rich with wildlife where every child benefits from exploring, playing and learning outdoors; and
- a city where all can enjoy high-quality green spaces, clean air, clean waterways and where more people choose to walk and cycle.[15]

4.38 In this environment all London residents will have opportunities to experience, enjoy and benefit from the city's natural capital. Objective 5.2 is set out to conserve and enhance wildlife and natural habitat's in the city. Objective 5.3 seeks to "value London's natural capital as an economic asset and support greater investment in green infrastructure".

4.39 Policy 5.1.1 of the strategy sets out to "protect, enhance and increase green areas in the city to provide green infrastructure services and benefits London needs now and, in the future,". Furthermore Policy 5.1.2 requires that the landscape and cultural value of London's green infrastructure is protected, conserved and enhanced.

4.40 That said, the strategy has limited power to prevent the redevelopment of private green space, such as residential back gardens. Proposals in the strategy, however, seek to identify solutions to this issue. Proposal 5.1.1.b identifies that "the London Plan includes policies that ensure any development outside the protected green space network, including gardens, does not lead to an overall loss of green cover". Furthermore, Proposal 5.1.1g states that "the Mayor will provide advice to householders about how gardens contribute to improving green infrastructure at a local level".

4.41 Improved access to green spaces in London is supported through Proposal 5.1.1c by "identifying those areas of the city which should be greener and developing green infrastructure programmes and projects" through this policy.

4.42 The London Environment Strategy also seeks to protect MOL as a part of the wider green infrastructure network in London; hence their consideration in this study alongside other elements of the GI network. Policy 5.1.1a specifically seeks to "protect the Green Belt, Metropolitan Open Land and publicly accessible green space."

4.43 The protection of a core network of nature conservation sites and promotion of net gain in biodiversity is required through Policy 5.2.1 of the strategy. Proposal 5.2.1.a refers to the London Plan's policies on the protection of SINCs and Regionally Important Geological Sites (RIGS) which will help to ensure that as many Londoners as possible can access wildlife-rich space.

4.44 Proposal 5.2.1b states that the Mayor will develop a biodiversity net gain approach for London as well as promoting wildlife-friendly landscaping in new developments and regeneration projects. The Mayor will, furthermore, "provide guidance and support on the management and creation of priority habitats, the conservation of priority species, and the establishment of wildlife corridors" as stated through Proposal 5.2.1c.

London-wide GI network

4.45 The London Green Infrastructure Task Force report states that London boroughs are to plan and manage GI assets due to their roles in land use planning, management of public areas and implementation of measures to promote public health. GI in the city should be informed by, and deliver the following five objectives:

- Promoting healthy living

[15] http://www.nationalparkcity.london

- Strengthening resilient living
- Encouraging active living
- Creating living landscapes
- Enhancing living space

The report calls for boroughs to be placemakers in which GI is central to the agenda.

All London Green Grid

4.47 The All London Green Grid (ALGG)[16] provides guidance on the functions and benefits that well-managed open space can deliver, and defines the 'GGA5 River Cray and Southern Marshes Area Framework'. This area includes parts of the boroughs of Bexley and Bromley. Where appropriate, the GI network within Bexley should join up with the proposed strategic corridors and links highlighted in the ALGG, including the Thamesmead Link, the River Shuttle Link and the Ridgeway Link. These corridors and links form part of the South East London Green Chain. The Green Chain is a long-established partnership between the London boroughs of Bexley, Bromley, Greenwich, Lewisham and Southwark, which supports an extensive and reasonably well connected network of parks and open spaces that are connected via the Green Chain Walk. This network is linked to several strategic walking routes which provide further opportunities for recreation and sustainable transport in the borough.

4.48 Seven strategic green infrastructure opportunities have been identified in the document within the framework area. These opportunities relate to areas entirely or partially within the borough:

- Conserve and improve the environmental and ecological value of Erith, Crayford and Dartford marshes, improving public access, pedestrian and cycle links;
- Conserve and enhance the rural character and intimate scale of the landscape between the A2 and A20, exploring opportunities to increase the flood storage capacity of the local floodplain;
- Maximise the potential of the River Cray corridor to create a high quality, accessible riverside environment, including strengthening connections of green spaces between the A206 and A2 and links to surrounding green spaces and countryside on the urban fringe, including the Chalk Link to the North Downs;
- Strengthen and enhance the landscape connections along the Thamesmead Link from Lesnes Abbey Wood to the Thames riverfront including Erith Marshes;
- Enhance the river character and recreational use of the River Shuttle Link and strengthen the connections between its open spaces, improving public access;
- Examine the feasibility of developing the South East London Green Chain as a regional park opportunity; and
- Promote and enhance the long distance South East London Green Chain footpath and links by improving accessibility into and through the area, particularly access from its edges.

Opportunity Area Planning Frameworks

4.49 The London Plan has identified two Opportunity Areas in Bexley at Thamesmead and Abbey Wood and Bexley Riverside. These areas offer scope for change and substantial growth in terms of new jobs and homes.

4.50 A planning framework is being prepared for the Thamesmead and Abbey Wood opportunity area. Public consultation on the draft Opportunity Area Planning Framework (OAPF) concluded on 10 March 2020.

4.51 The draft Thamesmead and Abbey Wood OAPF includes objectives for improving the environment, such as improving the quality, functionality and accessibility of existing green spaces; integrating more greenery into parts of the OA where possible; addressing flood risk; improving air quality and reducing exposure to poor air.

4.52 For the Bexley riverside opportunity area, the early stages of preparing a planning framework are currently ongoing.

Cemeteries

4.53 When considering the growing and changing population in the context of GI, it is also necessary to consider cemeteries. Cemeteries are not only for the deceased; they provide a place for family members and friends to visit to remember their loved ones. In addition to offering a functional value, many cemeteries and churchyards have wider benefits including heritage, cultural and landscape values. Cemeteries are also important in a historical context. The Commission for Architecture and the Built Environment (CABE) emphasise the need to identify burial space as important green space within urban boroughs and that cemeteries should be community spaces offering beauty and comfort to their visitors.

4.54 In addition, under section 1 of the Burials Act 1853 the Council is compelled to adopt the responsibility for all churchyards declared closed.

[16] Mayor of London (2012) Green Infrastructure And Open Environments: The All London Green Grid

4.55 In 2007, legislation was changed to allow London only burial authorities the power to disturb human remains in a grave where burial rights had been extinguished, and where the intention was to increase the space for interments in the grave[17].This involves lifting out remains from graves that are more than 75-years-old, burying them deeper in the same grave and then re-using the space on top.

4.56 Every individual cemetery has a finite capacity and therefore there is steady need for more of them. Indeed, many areas face a shortage of ground for burials. The need for graves, for all religious faiths, can be calculated from population estimates, coupled with details of the average proportion of deaths which result in a burial, and converted into a quantitative population-based provision standard.[18]

Local Policy

Bexley Growth Strategy

4.57 The context for future growth in the borough to be delivered through the Local Plan is set through the Bexley Growth Strategy[19] as adopted in December 2017. The strategy also identifies the issues which will need to be addressed through new planning policy.

4.58 The Bexley Growth Strategy sets out a high level of development to be delivered in the borough up to 2050 with 31,500 new homes to be provided. This will be supported by major transport improvements as well as the net delivery of 17,500 new jobs. New development is to be focussed within Opportunity Areas (as identified through the London Plan) and at, or in close proximity to, the existing district and major district centres of Sidcup, Welling, Crayford and Bexleyheath as well as at the new district and local centres at Abbey Wood, Belvedere and Slade Green.

4.59 With consideration for the high level of new development which is to be delivered in the borough, Theme 6 of the Council's growth themes for Bexley includes the need to "plan for the provision of appropriate levels of quality and accessible green and blue infrastructure … as an integral part of development." Paragraphs 2.6.6 to 2.6.22 set out the ambitions for green and blue infrastructure and biodiversity to be achieved as part of the new development required up to 2050 for the borough. These ambitions are:

- To improve access to open space and nature;
- Supporting maintenance and enhancement of blue infrastructure;
- Ensuring existing and new green infrastructure is maintained and enhanced to a high standard; and
- Protecting and enhancing biodiversity and strategic linear open spaces.

Bexley Core Strategy

4.60 The 2012 Bexley Core Strategy[20] addresses the protection of the borough's green infrastructure, including open spaces and waterways through Policy CS17. This includes the protection of Metropolitan Green Belt and MOL as well as the protection of significant linear open spaces, seeking opportunities to increase connectivity between the network of green spaces and habitats. This policy also states that opportunities for such provisions are to be sought within "new development to provide new open space and play space, and ensuring all new developments, where possible, make a positive and appropriate contribution to green infrastructure, and where appropriate, the public realm." Part of the approach to making sustainable use of Bexley's resources as set out through Policy CS09 includes the requirement to protect, enhance and promote green infrastructure in the borough to help to promote healthy lifestyles.

4.61 Through Policy CS18, the Core Strategy states that the Council will "protect and enhance its biodiversity and geological assets". Biodiversity enhancements and improved access to nature is to be supported, particularly in areas of deficiency. This is to include projects that help deliver the Open Space Strategy. Opportunities will also be sought to provide for greening of the built environment, including through green roofs and walls in new buildings.

4.62 Policy CS21 of the 2012 Bexley Core Strategy requires that services and infrastructure which are required to support the creation of a strong, cohesive and sustainable community in Bexley are provided and protected. Allotments, which form a part of environment and green infrastructure requirements, are included to be monitored, protected and delivered where a need is demonstrated.

4.63 There is no specific policy document or strategy for play space in the Bexley Core Strategy. However, as noted above Policy CS17 of the Core Strategy states that new development should "provide new open space and play space."

Bexley Obesity Strategy

4.64 The Bexley Obesity Strategy[21] aims to implement a sustainable whole system approach which encompasses 'Health in All Policies', to tackle obesity and help people to lose weight. This includes changes relating to wider

[17] London Local Authorities Act, 2007
[18] Bexley Open Space Strategy Technical Paper Section 11 (2008)
[19] London Borough of Bexley (2017) Bexley Growth Strategy
[20] London Borough of Bexley (2012) Bexley Core Strategy
[21] London Borough of Bexley (2019) Bexley Obesity Strategy

determinants of obesity such as the built environment. The Strategy sets five-year targets for a reduction in levels of excess weight for children and adults. The approach to addressing obesity includes the priorities of increasing the availability of healthier foods, creating an environment that inspires physical activity and addressing obesity in early years development. These priorities are supported by sub-objectives which might be influenced through GI provision including support for food growing and promotion of unstructured outdoor play.

Bexley System-wide Prevention Strategy

4.65 The draft document sets[22] out an ambitious system-wide prevention strategy for the Borough. The strategy seeks to improve health and wellbeing outcomes for residents; promote organisational and financial sustainability; meet the changing shape of demand for health and social services and reduce that demand; and improve and transform these services. The prevention strategy is structured across six themes:

- Giving children and young people the best start in life and throughout their lives (including preconception and in transition to adulthood);
- Improving outcomes for adults and older people;
- Embedding prevention in all policies and practice, and in Bexley's population health system;
- Creating healthy communities, workplaces and homes;
- Creating healthy environments, built, green and blue spaces; and
- Creating economic independence and a thriving local economy.

The Bexley Physical Activity Strategy is being written and is currently in draft format. The document is due for consultation in early 2020.

Connected Communities Strategy 2019 – 2023

4.67 The Bexley Connected Communities Strategy[23] sets out Bexley's plans for supporting and investing in community development up to 2023. The Strategy sets out the objectives of supporting cohesive, healthy, socially active and successful communities. This includes support for decreased social isolation and improved wellbeing for isolated or lonely residents, increased connections and reducing isolation, decreased mental health stresses, increased individual and community wellbeing and opportunities for individuals, neighbourhoods and businesses to be active citizens. Protection and enhancement of existing GI and the incorporation of new GI as development is delivered is likely to support positive outcomes in relation to these issues.

Thamesmead And Abbey Wood Supplementary Planning Document

4.68 The Thamesmead and Abbey Wood Supplementary Planning Document (SPD)[24] sets out the principles to guide future development within that Opportunity Area. As part of the objectives of the SPD, the principles of green infrastructure are to be promoted to achieve the enhancement of open spaces and the delivery of multi-functional open spaces. Furthermore, best use of the area's water assets is to be achieved in relation to the alleviation of flood risk and the promotion of surface and groundwater quality and improving biodiversity.

4.69 Strategic landscape connections and pedestrian routes /desire lines which make up a significant component of the green infrastructure in the area and lie within Bexley have been identified in the SPD. These include the Thames Path, Ridgeway and the north-south connection from Lesnes Abbey to Crossness. Principle TE1 seeks to protect open space in the Opportunity Area and supports the multi-functional use of open spaces where activities would not have a material impact on character, setting or ecology. Furthermore, Principle TE2 supports proposals which would enhance green spaces and connections and those which contribution to Green Grid projects. Specific policy has been included on the Thames Path (TT9) with emphasis to be placed upon softening the route's appearance and providing better integration and connections with surrounding areas. Biodiversity value along this path is also to be improved where possible.

Other relevant guidance and strategies

4.70 In addition to the relevant planning policy described above, there are also several other guidance and strategy documents which have informed the approach of this study. These are set out below, with a more complete overview provided in Appendix A:

- **Strategic Flood Risk Assessment (SFRA) for Bexley**[25] - assesses flood risk at the borough wide scale with consideration for the implications of climate change, and the review of flood risks from all possible sources;
- **The Port of London Authority (PLA) The Vision for the Tidal Thames**[26] - sets out a vision of the river up to

[22] London Borough of Bexley (2019) Draft Bexley System-wide Prevention Strategy
[23] London Borough of Bexley (2019) Connected Communities Strategy 2019-2023
[24] Borough of Bexley and Greenwich Council (2009) Thamesmead And Abbey Wood Supplementary Planning Document
[25] Wood on behalf of London Borough of Bexley (2019) Level 1 Strategic Flood Risk Assessment
[26] Port of London Authority (PLA) (2016) The Vision for the Tidal Thames

2035. Over the twenty-year period of the plan, the River Thames is to play a key role in transporting people and goods, providing a space for sport and recreation as well as a cultural hub.

- **Thames Estuary 2100 Plan**[27] - sets out a series of recommendations for flood risk management for London and the Thames Estuary up to and beyond 2100, amid increasing pressures from climate change and increased flood risk. Improved links between elements of green infrastructure networks has been highlighted as playing an important role in terms of flood mitigation and flood storage. This is in addition to benefits relating to habitat restoration and recreation.
- **Managing the Marshes Strategy**[28] - provides a vision for the future development of the marshes and a series of spatial plans for each of the major areas within them. The vision for the area sees support for strengthened linkages between the marshes, the River Thames and the surrounding neighbourhoods contributing to green infrastructure as new development in the area results in increased demand for open space.
- **Peabody's Green Infrastructure Strategy for Thamesmead** – includes land in the north west of the borough and extends into the neighbouring borough of Greenwich. The GI Strategy is currently being prepared with a vision of providing a living landscape for Thamesmead in which natural assets are properly recognised, valued and used, with strategic links provided to the wider area.
- **Estuary Edges Guidance –** sets out guidance on ecological design for softening the estuary 'edges' to encourage wildlife into the urban portion of the river.

[27] Environment (November 2012) Thames Estuary 2100 Plan

[28] London Borough of Bexley (2006) Managing the Marshes

5 The Bexley Context: Drivers for GI

Chapter 5
The Bexley Context: Drivers for GI

This chapter sets the overall context for the study; exploring the various drivers for GI in the borough through a series of themes that affect, or are affected by, GI.

5.1 For the purposes of analysis and presentation, the borough has been divided into six Geographic Regions. These areas are shown on **Figure 3.2**. Each topic explored below sets out the context and then identifies the key issues and opportunities that can influence or be influenced by GI.

Population, household and economic growth

GI can improve the aesthetic quality of an area, which supports inward investment, attracts businesses and customers.

New development can deliver GI gains. Reduced stress= less days lost.

A growing population

5.2 The population of Bexley has shown a pattern of sustained growth in recent years, with a 6.3% increase in population recorded between 2001 and 2011. GLA data shows the 2016 population was 244,800 and it is anticipated that this will increase by at least 14.4% to 275,000 by 2036[29] as shown in **Figure 5.1**. As the population grows and pressure on all types of infrastructure increases there is a need to enhance the performance and functionality of the GI network; extending to both capital investment and ongoing stewardship.

5.3 Bexley's Growth Strategy sets out an ambition to increase the density of development in some areas[30] where it can enhance economic viability, support public transport and social amenities and would aid regeneration and integration. Further understanding the nature of development and growth

[29] London Borough of Bexley (2017) Bexley Growth Strategy

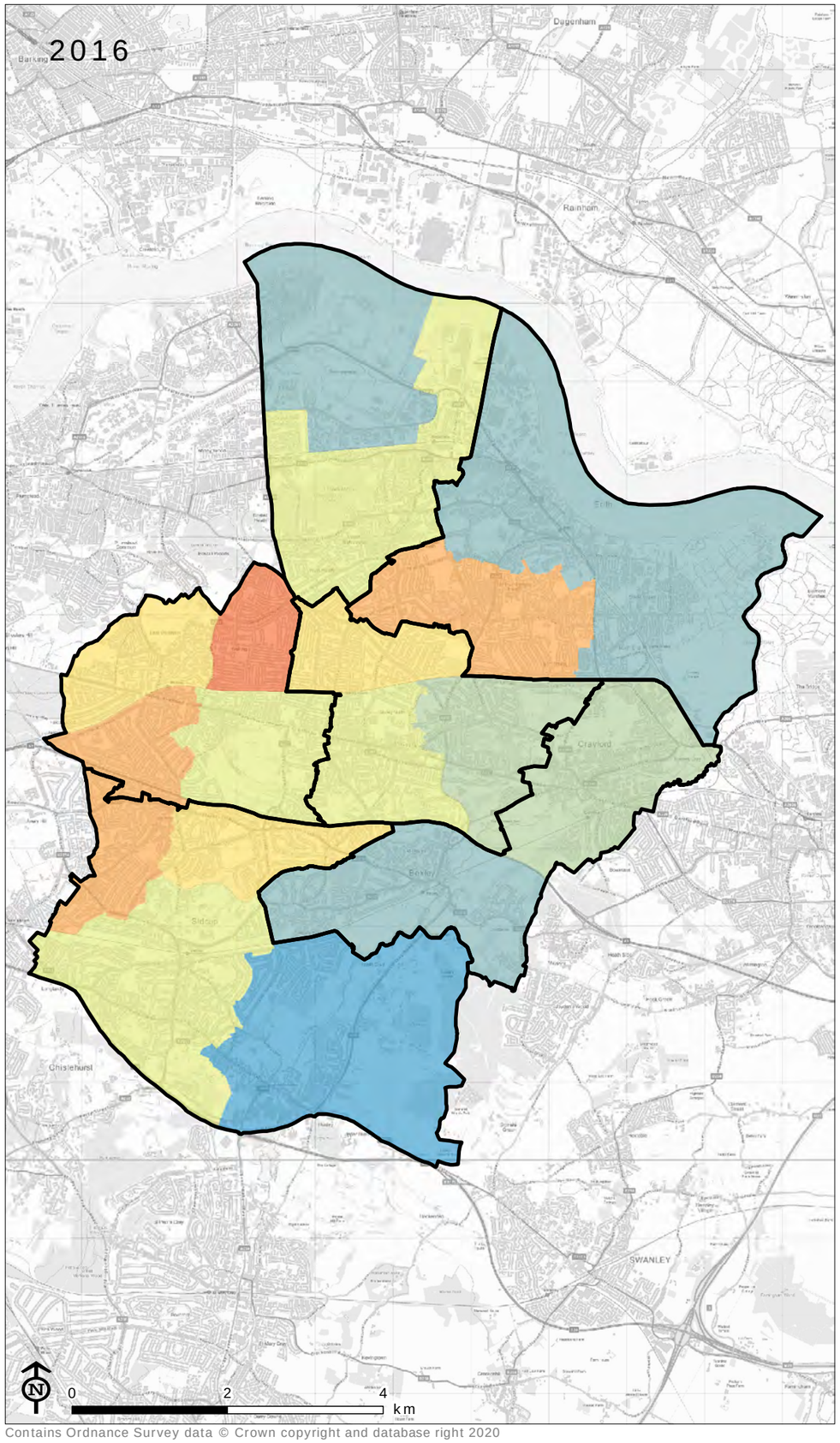
[30] London Borough of Bexley (2017) Bexley Growth Strategy

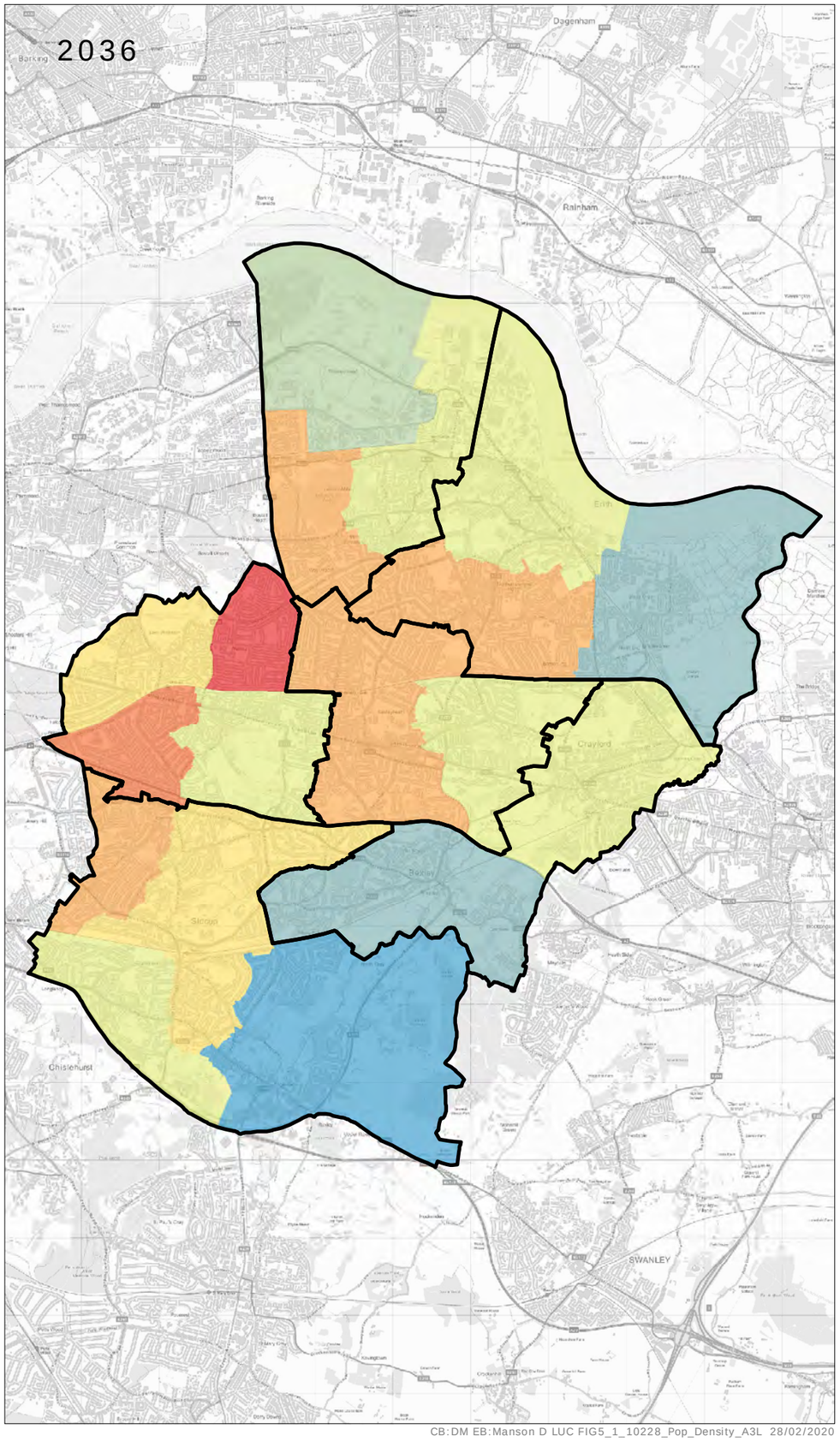
that is anticipated assists in identifying what enhancements may be required and where they will be needed. Population density in the borough was recorded at 4,012 people per km^2 in 2016, which far exceeds the national figure of 271 people per km^2 but is lower than the London average of 5,590 people per km^2 [31]. A comparison between 2016 population density and anticipated population density based on 2036 population growth indicates that population density will increase most in the north of the borough, notably in the wards of Erith, Thamesmead East, Lesnes Abbey and St Michael's; with Erith showing the largest growth by numbers of new residents and percentage increase.

[31] ONS (2017) Population Estimates for UK, England and Wales, Scotland and Northern Ireland

Bexley Green Infrastructure Study

Figure 5.1: Population density





Geographic regions

Population density (people/ha)

- 16.6 - 20.0
- 20.1 - 30.0
- 30.1 - 40.0
- 40.1 - 50.0
- 50.1 - 60.0
- 60.1 - 70.0
- 70.1 - 80.0
- 80.1 - 85.0

Map Scale @A3: 1:67,500

CB:DM EB:Manson D LUC FIG5_1_10228_Pop_Density_A3L 28/02/2020

Source: OS, GLA: https://data.london.gov.uk/dataset/projections/

5.4 It is expected that the borough will also see changes in how the population is distributed in the coming years. The central northern ward of Erith is expected to continue to experience the fastest rate of population growth in the borough (by volume and percentage). This ward has in recent years grown to be the most populous in the borough. In 2011 the north western wards of Belvedere, Erith and Thamesmead East had the largest populations in the borough with approximately 12,000 residents each. Population projections show that by 2020, along with Belvedere and Crayford, Erith will be home to more than 13,500 people. By 2030 Erith is expected to be by far the most populous ward in Bexley accommodating just over 19,000 residents, with Christchurch and Crayford following with approximately 15,000 residents each[32].

Issue: Areas of increased population density will significantly increase pressure on local recreational open spaces and such spaces may also need to store increased surface water run-off. In addition, there will be further pressure on the local transport network and potential for an increase in associated pollution.

Opportunity: Planning for GI allows existing open spaces to be reconfigured in the most appropriate manner and ensures new GI assets can perform multiple functions for maximum benefit. Functions include those which will likely be required as the local population increases in the borough. Namely flood risk mitigation, increased potential to promote physical activities and travel by active modes amongst residents and increased removal of air pollutants by vegetation.

A changing population

5.5 The population of Bexley is predominantly white British, currently making up around 77% of the total population[33]. However, the borough is becoming more diverse; black and ethnic minority groups are predicted to account for 30% of the population by 2045 (up 18% from the 2011 Census); with some ethnic groups predicted to more than double from the 2011 Census to 2050. International migration has been relatively stable over the past few decades with a peak between 2007 and 2012. 16.1% of the resident population was born abroad, with the top three migrant populations by country of birth being Nigeria, India and Ireland; although the two largest migrant populations to arrive in 2015/16 were from Romania and Poland. Internal migration has increased significantly in the past decade in the borough and has been one of the most significant types of population change in recent years[34]. The borough experiences a substantial amount of population churn which impacts relating to increased potential for social isolation and reduced community cohesion[35]. Children and young people (under 25) currently make up 31% of the population in Bexley, whilst those over 65 account for just 16%. As such, the borough currently displays a young age profile. However, demographic projections indicate an ageing population, with over 65s accounting for 22% of the population by 2050.

Issue: The borough is becoming increasingly diverse. Furthermore, while the local population currently displays a young age profile, it is expected that the percentage of older people is likely to substantially increase in the coming years.

Opportunity: There is a strong link between the design and management of the public realm and the development of a society where disparity is less prevalent. The changing demographic of the borough means the need for the GI network to provide social and wellbeing benefits will be even more important.

Well-connected, accessible open spaces provide the opportunity for social interaction. Improved social cohesion and communal areas incorporated into residential development can help foster the development of strong and resilient communities. Appropriate planning and design can ensure GI is delivered in a way that is inclusive, with access to natural landscapes and high quality open spaces for all. GI can help people build physical activity into their day-to-day lives. Social benefits should be considered wherever possible in the design and delivery of GI, but is most relevant to areas for recreation, open spaces, sports provision and sustainable transport routes.

Evidence suggests that certain socio-demographic groups are less likely to use the natural environment for physical activity, including people of black or ethnic minority origin, the elderly and those with long term illness or disability[36]. Several relevant inclusive design principles have come to the fore in recent years and have been incorporated into standards and best practice guidance. This includes the TfL guide Healthy Streets for

[32] GLA (2019) GLA Population and Household Projections. Online at: https://data.london.gov.uk/dataset/projections/
[33] GLA 2016-based Round of Demographic Projections. Local authority population projections - Housing-led ethnic group projections, November 2017.
[34] Office of National Statistics, Net Migration and Natural change by Region and Borough, 1994-95 to 2014-15
[35] LBB (2019) Local Plan Integrated Impact Assessment Scoping Report
[36] Natural England (2016) Links between natural environments and physical activity: evidence briefing

London (2017)[37] which aims to create streets that feel pleasant, safe and attractive and are accessible for all users. This is of relevance in Bexley as part the Greater London area.

Taking into account these design principles, GI should help to:

- ensure public spaces are welcoming and accessible for all;
- reflect the diversity of modern society as well as the history of the local area; and
- encourage social interaction and harmonious relations between different social groups; and
- support the improved legibility and safety of open spaces and the built environment with particular consideration for groups which are potentially more vulnerable such as older people.

Economic growth aspirations

5.6 Bexley currently has high rates of economic activity with 8,860 businesses recorded in 2017, providing 73,000 jobs. Bexley's five main town centres are generally considered to function well and meet the needs of the local community. The Belvedere Employment Area in Bexley is one of the largest concentrations of industrial activity in London[38]. Many of the borough's residents benefit from the rail links into central London, providing access to a wide range of employment opportunities. The borough is also in an advantageous position in relation to the River Thames and the council has set out an ambition to encourage the river as a transport corridor, especially for commercial freight[39].

5.7 Bexley is located within the Thames Gateway growth corridor, which extends between London and the Thames Estuary. Bexley's inclusion in the growth corridor is expected to result in improved connections and investment in infrastructure in the borough. The growth corridor which runs as far as north Kent and Essex is the focus of the eastward regeneration of the city of London. Much of the new development is to be delivered within Bexley's opportunity areas of Thamesmead and Abbey Wood and Bexley Riverside. Growth to be secured within the wider corridor has the aim of delivering at least 225,000 new jobs and 160,000 new homes.

5.8 The vision for the Thames Estuary area has been set by the Thames Estuary 2050 Growth Commission[40]. The Thames Estuary partners have set out the challenge to ensure that the benefits of economic growth which are achieved in the area are felt by a significant proportion of the community. The Growth Commission places the north of the borough within the 'City Ribbon' area which is identified as having potential to contribute to the growing of the cultural and creative industries sector. This area is also to accommodate significant projected population growth through the unlocking of opportunities for affordable housing while also successfully integrating future connectivity projects, including river crossings.

5.9 However, there are several factors that have limited economic growth in the borough. For instance, poor north-south connections limit employment opportunities in some areas, with many of the borough's employment areas having very low public transport accessibility and poor air quality due to industrial activities and major roads. The nature of growth in the borough has also resulted in larger centres and out of town locations acting as the major centres for retail activity, leading to changes of function in smaller and medium towns centres such Sidcup and Welling[41].

Issue: Economic growth in the borough has been limited by issues such as more limited north-south connections with many of the employment areas in Bexley having poor accessibility by public transport. The functions of smaller and medium towns centres such Sidcup and Welling have been impacted upon by the evolving role of the larger centres and out of town locations.

Opportunity: Specific evidence of the cost benefits and value of GI has become available in recent years. This has been recognised within the London Infrastructure Plan which highlights the potential of GI to be supportive of economic growth and competitiveness, for example through providing better value for money for flooding and transport solutions when compared to traditional infrastructure[42]. In addition, a recent report by Public Health England has highlighted the potential role of GI (alongside other measures) in improving and regenerating the High Street[43]. Reporting by the ONS and Defra identifies that close proximity of residential properties to areas of functional green space, such as a park or golf course, has a positive effect on property prices[44]. This is in addition to any potential for GI

[37] TfL and Mayor of London (2017) Healthy Streets for London
[38] LBB (2018) London Borough of Bexley Local Implementation Plan. Consultation Draft LIP3
[39] London Borough of Bexley (2017) Bexley Growth Strategy
[40] Thames Estuary 2050 Growth Commission (June 2018) Thames Estuary 2050 Growth Commission: 2050 Vision
[41] London Borough of Bexley (2017) Bexley Growth Strategy
[42] Mayor of London, Enabling Infrastructure: Green, Energy, Water and Waste Infrastructure to 2050.
[43] Public Health England (2018) Healthy High Streets, Good place-making in an urban setting
[44] ONS (2018) Estimating the impact urban green space has on property price

provision to result in increased levels of business revenue and creation and safeguarding of jobs[45].

With several regeneration projects currently ongoing in Bexley, including the High Streets at Sidcup and Abbey Wood, as well as the significant elements of growth to be achieved within the Thamesmead area, there will be further opportunities for Bexley to benefit from this as the Growth Strategy is realised. The economic case for GI potentially also opens up opportunities to fund the delivery and stewardship for GI. The formation of Business Improvement Districts throughout London has in some instances provided a funding mechanism through Levy contributions from businesses to fund projects to improve the local environment for the benefit of the local economy and community. Bexley has seen the formation of the Bexleyheath Business Improvement District in the Bexleyheath town centre, and there are likely to be further opportunities to promote the economic benefits of GI amongst the business community in the future.

Key infrastructure projects

5.10 The delivery of sustainable growth in the borough will be reliant in part on the implementation of major transport infrastructure which will provide strategic links to major regional and local centres. An overview of the growth aspirations for Bexley as set out in the Growth Strategy is shown in **Figure 5.2** Improvements to local transport infrastructure are also required in order to meet targets for increasing the use of sustainable modes of transport. The Elizabeth line service is set to commence towards the end of 2019. This service will run for more than 60 miles from Reading and Heathrow in the west through central tunnels across to Shenfield and Abbey Wood in the east which lies at the north western edge of the borough. The upgraded station at Abbey Wood is to provide access to Paddington, Heathrow or Reading once every five minutes once the full route opens. Land for a potential extension of Crossrail 1 from Abbey Wood towards Gravesend and Hoo Junction is currently safeguarded through Policy CS15 of the Bexley Core Strategy.

5.11 Key future transport improvements include a potential Crossrail extension towards Slade Green, Dartford and Ebbsfleet; a potential DLR extension from Gallions Reach through Thamesmead to Belvedere; and potential road-based river crossings from Belvedere towards Rainham and from Thamesmead towards Gallions Reach. Outside of the borough, within the Royal Borough of Greenwich, the Silvertown Tunnel is due to begin construction in 2020, providing an additional river crossing. Proposed areas for future growth included in the borough would seek to make use of these recent and future potential infrastructure improvements. This includes new local centres around a repositioned Slade Green station and the new Abbey Wood station. A new neighbourhood including a new town centre is also to be created in Belvedere focussed on a public transport interchange including a potential new Crossrail station[46].

5.12 Improvement of the public transport offer in the borough will also be achieved through the delivery of an uninterrupted segregated public transport corridor from North Greenwich to Slade Green. This route is to be delivered in stages and will pass through Abbey Wood and South Thamesmead. It will form the basis for a future bus rapid transit corridor with potential to be upgraded to a tram system. Improvements will improve the reliability and frequency of services and will help to make bus travel in Bexley more efficient, attractive and cost effective. New bus routes as part of any improvements might include Barking to Plumstead Common, Woolwich and Crayford. These new routes would pass through the borough via the proposed Gallions Reach Crossing and would improve north-south connectivity in the area[47].

5.13 Access to public transport in many areas of the borough is currently quite poor with no Underground, Overground, TfL Rail or Tram services anywhere in the borough. Most the borough is rated between 1a (very poor) and 1b (very poor) in terms of Public Transport Accessibility Levels. There are parts of the borough which are rated between 2 (poor) and 3 (moderate) along the main roads of the borough. However, only the town centre of Welling and the area around Abbey Wood station have been rated 4 (good), with small areas of Bexleyheath town centre rated 5 (very good) and 6a (excellent). There are no areas of the borough which have been rated 6b (best) in terms of access to public transport. The borough as a whole has been rated 1b[48]. Furthermore, a number of Bexley's rail stations are relatively remote from existing town centres, most notably at Belvedere and Bexleyheath. The GLA, LBB and TfL acknowledge that within Bexley, public transport is in need of improvement[49]. Anecdotally, it is understood that most homes in the borough are within 400m of a bus stop[50].

Issue: While infrastructure improvements, including public transport, are due to be undertaken in the borough, much of Bexley is currently rated poorly in terms of access to existing public transport provisions.

[45] The Land Trust (2018) The Economic Value of Our Green Spaces
[46] London Borough of Bexley (2017) Bexley Growth Strategy
[47] Steer Davies Gleave for London Borough of Bexley (2017) LB Bexley Development Infrastructure Funding Study
[48] Mayor of London (2015) London Area Profiles Online at: https://data.london.gov.uk/london-area-profiles/
[49] LBB (2019) Local Plan Integrated Impact Assessment Scoping Report
[50] Evidence of this has not been able to be sourced for this study to verify this.

Opportunity: The delivery of new transport infrastructure will present opportunities for the integration of new elements of green infrastructure in the borough. This type of provision will provide opportunities for improvement of the local active transport network where complementary but segregated green routes can be delivered. This type of provision is likely to have additional multiple indirect benefits including:

- Providing a landscape framework adjacent to critical transport infrastructure assets improvements including the strategic road network and railway corridors.
- Helping to mitigate local environmental issues such as fixation of particulates from motor transport and creation of sound barriers as new transport improvements occur.

Providing opportunities to support journeys that link foot, bicycle and public transport which will be of particular importance in areas of high deprivation where car ownership is likely to be lower.

Natural Capital Value

5.14 The economic value of health benefits that London residents get from the capital's public parks and green spaces has been set out in the Natural Capital Account for London[51]. The report details that the value of parks reflects their general amenity, benefit to health and opportunity for exercise, and the value of recreation.

5.15 The study calculated that approximately 19% of land in Bexley is open space which is comparable to the percentage for the whole of land London which is 20%. The findings of the report also show that boroughs with more public parks tend to derive lower benefits per hectare but spend less on maintaining these spaces. The study looked at the following:

- Recreational value – providing opportunities for **recreational** activities that people enjoy, including sporting activities and enjoyment of natural and cultural heritage;
- The value of parks in terms of avoided **health costs** through creation of opportunities for people to exercise, socialise, relax and enjoy being part of their community;
- Impact on **property** values – how much people are willing to pay to live close to public parks;
- Provision of other services such as **temperature regulation** and **carbon storage**.

5.16 **Table 5.1** below shows the value derived from open spaces within Bexley.

Table 5.1: Value of public parks in Bexley (value expressed in million £s)

Assets	Public Services Value	Household Value	Business Value	Total Value	*Percentage of Gross Asset Value*
Recreation		£397m		£397m	*2%*
Mental health	£42m	£107m	£61m	£209m	*11%*
Physical health	£62m	£159m	£90m	£311m	*17%*
Property		£899m		£899m	*49%*
Carbon				£10m	*1%*
Temperature		£17m		£17m	*1%*
Gross Asset Value	**£104m**	**£1,578m**	**£151m**	**£1,843m**	*100%*

[51] Greater London Authority, National Trust and Heritage Lottery Fund (October 2017) Natural capital accounts for public green space in London

Assets	Public Services Value	Household Value	Business Value	Total Value	*Percentage of Gross Asset Value*
Percentage	6%	86%	8%		

Opportunity: From each £1 spent by local authorities and their partners on public parks, residents in London enjoy at least £27 in value, with these types of open spaces resulting in improvements in physical and mental health which prevent £950 million per year in health costs.

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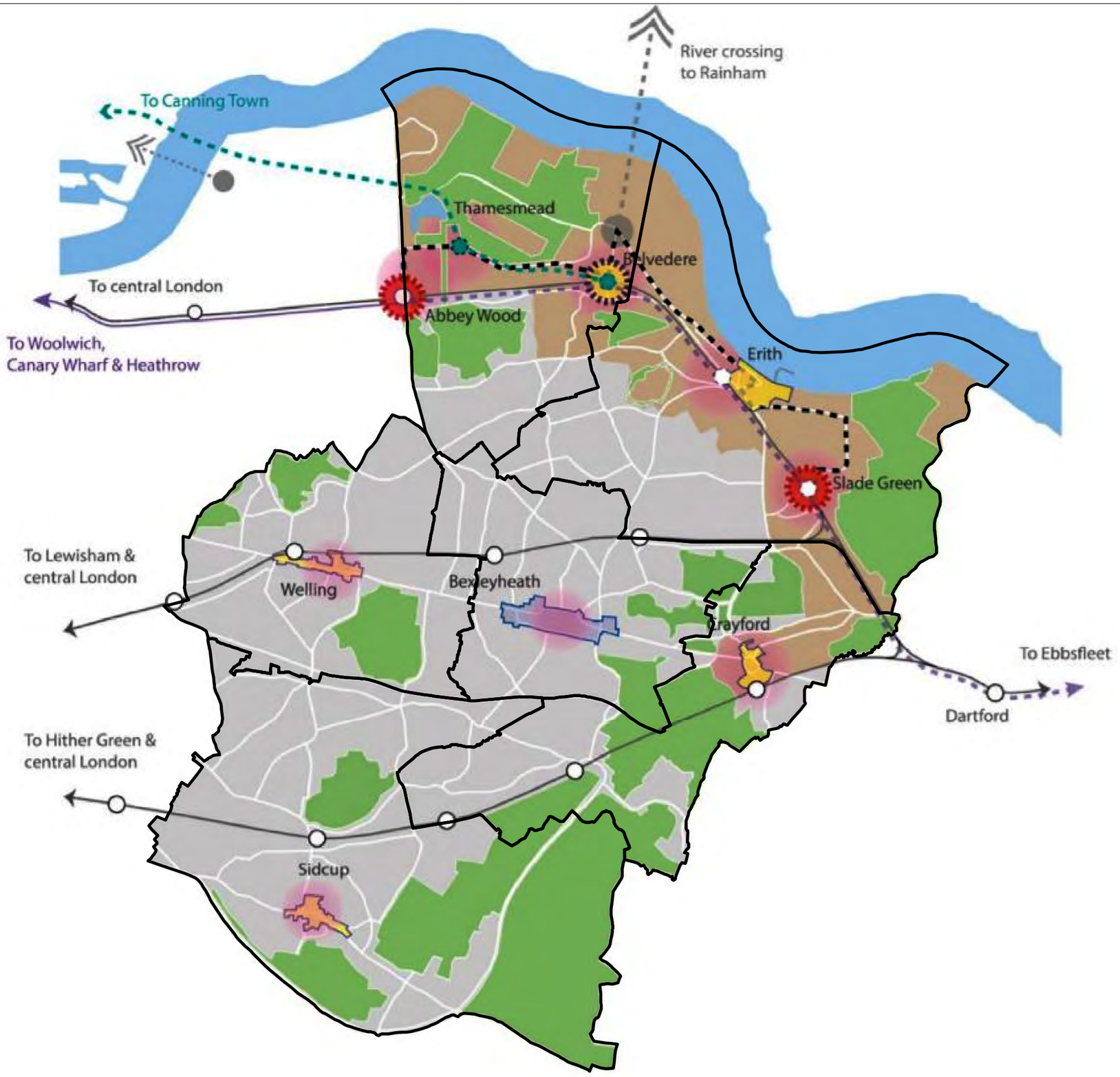
Figure 5.2: Planning for growth



Geographic regions

Opportunity Area

Metropolitain Open Land & Green Belt

River Thames

Focus of new development

Major District Centre

District Centre

NEW District Centre

NEW Local Centre

Railway line & Station

Crossrail & Station

Potential Crossrail Extension

Potential DLR Extension

Strategic Road Network

Potential Rapid Transit

Potential River Crossing

Map Scale @A3: 1:50,000

LUC

CB:DM EB:Manson D LUC FIG5_2_10228_Growth_Strategy_A3L 28/02/2020

Source: OS, LBB

Health and wellbeing

GI should be designed to deliver social benefits to local population (mental, physical health, shelter and shade, ameliorating poor air quality, a focus for social inclusion, community development and learning)

Deprivation and physical health

5.17 The English Indices of Deprivation 2019[52] are a measure of relative social issues and challenges faced by communities in England. Seven domains of deprivation are measured: Income Deprivation; Employment Deprivation; Health Deprivation and Disability; Education, Skills and Training Deprivation; Crime; Barriers to Housing and Services; and Living Environment Deprivation. Each domain contains a number of indicators. The seven domains are also combined to give a multiple deprivation score known as the Index of Multiple Deprivation (IMD). The IMD ranks each small area in England (called Lower-layer Super Output Areas (LSOAs)). Many of the most deprived parts of the borough are located in Belvedere, Erith and Sidcup geographic regions as shown in **Figure 5.3**.

The Health and Disability Deprivation Domain is shown in **Figure 5.4.**

Issue: The health of the Bexley population is generally better than the England average. This considered, issues of health disparities are present in the borough with life expectancy being 6.4 years lower for men and 5.1 years lower for women in the most deprived areas of Bexley when compared to those within the least deprived areas. Childhood obesity has also been identified as an issue within the borough, given that for pupils in Year 6, 24% of children are classified as obese or severely obese, which is worse than the average for England.[53] A snapshot of childhood obesity levels at both Reception and Years 6 ages is shown in **Figure 5.5.** The borough is also experiencing increasing rates of diabetes[54].

Data from Sport England's Active Lives Survey (published October 2019)[55] suggests that the percentage of Bexley adults who engage in regular physical activity is comparable with the London and national average (with 64.6% classified as active). In addition, 10.5% of Bexley adults are classed as not being active enough, whilst 24.9% are inactive.

Research from the Children's Active Lives Survey (published December 2018)[56] suggests that only 15.4% of Bexley's young people are being active 60 minutes or more every day (CMO guidelines), with more than 36% doing less than 30 minutes a day.

Opportunity: Social Return on Investment research suggests that for every £1 spent on sport and physical activity, at least £1.91 worth of benefits are generated – across health, reduction in crime, improved educational performance and social capital (e.g. volunteering)[57].

Mental health

5.19 Consultation undertaken as part of the development of the Health and Wellbeing Strategy has highlighted mental health to be of particular concern among the borough's population[58]. The proportion of young people (5-16) affected by mental health disorders is slightly lower in Bexley than the average for London and the average at a national level[59]. The overall suicide rate combined for males and females in Bexley is also slightly lower than the average for London and at a national level[60].

Issue: While the proportion of residents suffering directly from mental health disorders in Bexley is lower than the regional and national averages, mental health is a particular concern to local people.

Healthy New Towns

5.20 The Health New Towns initiative will explore new and innovative ways to tackle the biggest health and care challenges of the 21st century, such as obesity, dementia and social isolation.

[52] https://www.gov.uk/government/collections/english-indices-of-deprivation
[53] https://fingertips.phe.org.uk/profile/national-child-measurement-programme
[54] LBB (2019) Local Plan Integrated Impact Assessment Scoping Report
[55] https://www.sportengland.org/research/active-lives-survey/
[56] https://www.sportengland.org/research/active-lives-survey/active-lives-children-and-young-people/
[57] Davies, L. E.; Taylor, P.; Ramchandani, G. & Christy E. (2019) Social return on investment (SROI) in sport: a model for measuring the value of participation in England, *International Journal of Sport Policy and Politics*, [online published 24 April 2019] DOI: 10.1080/19406940.2019.1596967
[58] London Borough of Bexley. A Health and Wellbeing Strategy for Bexley
[59] Public Health England (2018) Local Authority Health Profile 2018: Bexley. Estimated prevalence of mental health disorders in children and young people: % population aged 5-16 (2015). Online at: https://fingertips.phe.org.uk/profile-group/mental-health/profile/mh-jsna/data#page/0/gid/1938132922/pat/6/par/E12000007/ati/101/are/E09000004
[60] Public Health England (2018) Local Authority Health Profile 2018: Bexley. Suicide rate (2015-17). Online at: https://fingertips.phe.org.uk/profile/health-profiles/data#page/1/gid/1938132701/pat/6/par/E12000007/ati/101/are/E09000004/iid/41001/age/285/sex/4

5.21 Thamesmead will be one of six Healthy New Towns implementing the learning from 'Putting Health into Place'. This will include setting out guidelines, practical tools, and demonstrating how new places that offer improved choices and chances for the community to live healthier lives can be created.

Opportunity: Access to green space can play a role in helping to improve mental health. Residents living in a green urban area will exhibit significantly lower levels of mental distress and higher levels of wellbeing. Furthermore, it has been shown that people who engage in regular physical activity in a natural environment experience additional benefit in terms of mental wellbeing than that which is experienced with similar levels of indoor physical activity[61].

The natural and built environment can have an impact on a population in terms of noise and light levels, building layouts and way-finding, access to nature, transport systems and information/communication devices. These factors all play an important role in mental wellbeing. GI has a critical role to play in relation to many of these factors and as such can be implemented to benefit the mental health of residents[62].

[61] Coon J. T., Boddy K., Stein K., Whear R., Barton J., Depledge M. H. (2011) Does Participating in Physical Activity in Outdoor Natural Environments Have a Greater Effect on Physical and Mental Wellbeing than Physical Activity Indoors? A Systematic Review. Environmental Science & Technology. 45(5):1761-72
[62] Landscape Institute (2015) Cities, green infrastructure and health

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Figure 5.3: Index of Multiple Deprivation (2019)

Geographic regions

IMD decile

- 0 - 10% (most deprived)
- 10 - 20%
- 20 - 30%
- 30 - 40%
- 40 - 50%
- 50 - 60%
- 60 - 70%
- 70 - 80%
- 80 - 90%
- 90 - 100% (least deprived)

Map Scale @A3: 1:50,000

LUC

CB:DM EB:Manson D LUC FIG5_3_10228_IMD_A3L 28/02/2020

Source: OS, MHCLG

Bexley Green Infrastructure Study

Figure 5.4: Health and Disability Deprivation (Index of Multiple Deprivation 2019)

Geographic regions

Health and disability deprivation decile

- 0 - 10% (most deprived)
- 10 - 20%
- 20 - 30%
- 30 - 40%
- 40 - 50%
- 50 - 60%
- 60 - 70%
- 70 - 80%
- 80 - 90%
- 90 - 100% (least deprived)

Map Scale @A3: 1:50,000

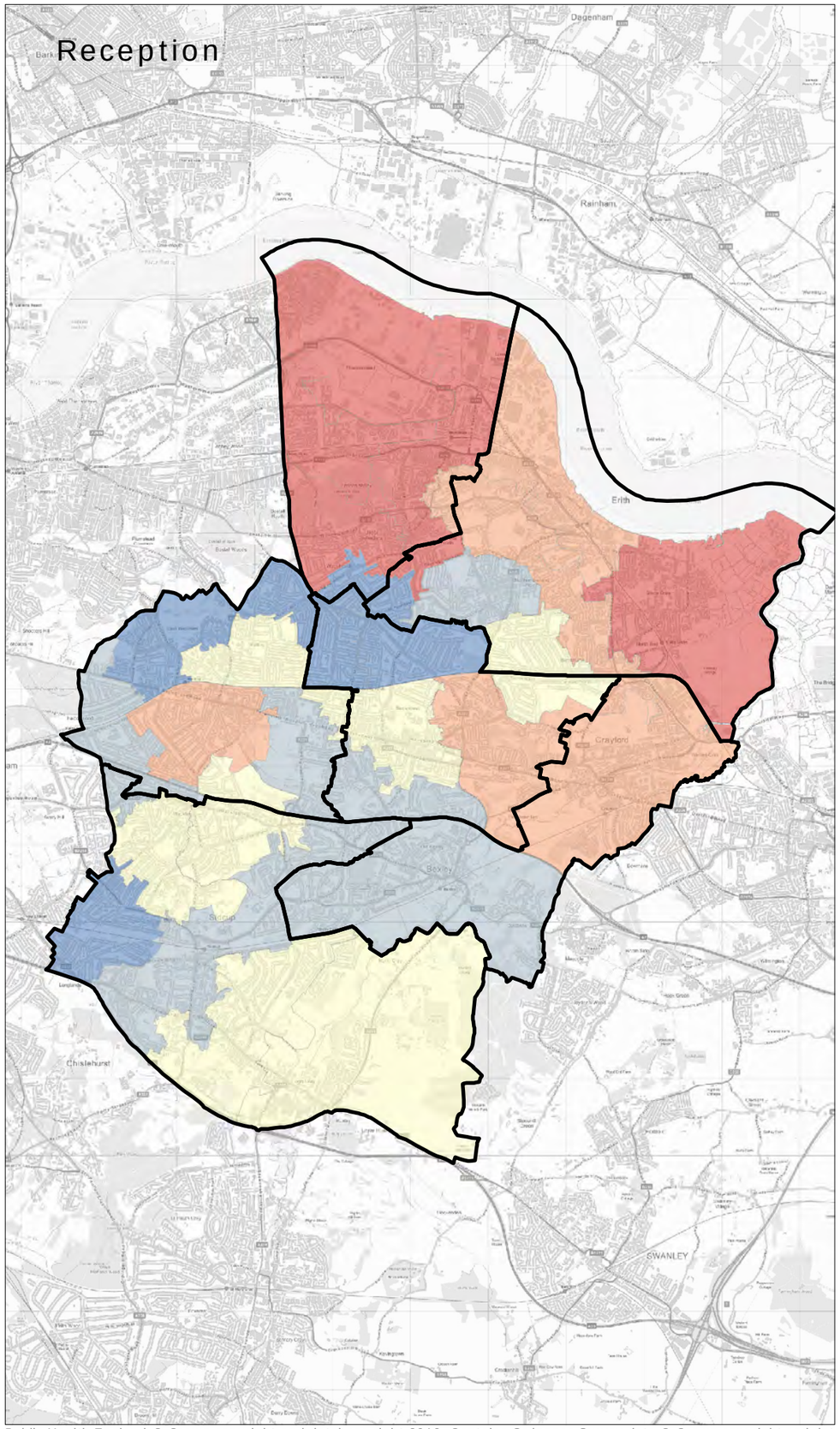
LUC

0 5 10 km

CB:DM EB:Manson D LUC FIG5_4_10228_Health_deprivation_A3L 28/02/2020

Source: OS, MHCLG

Reception



Year 6

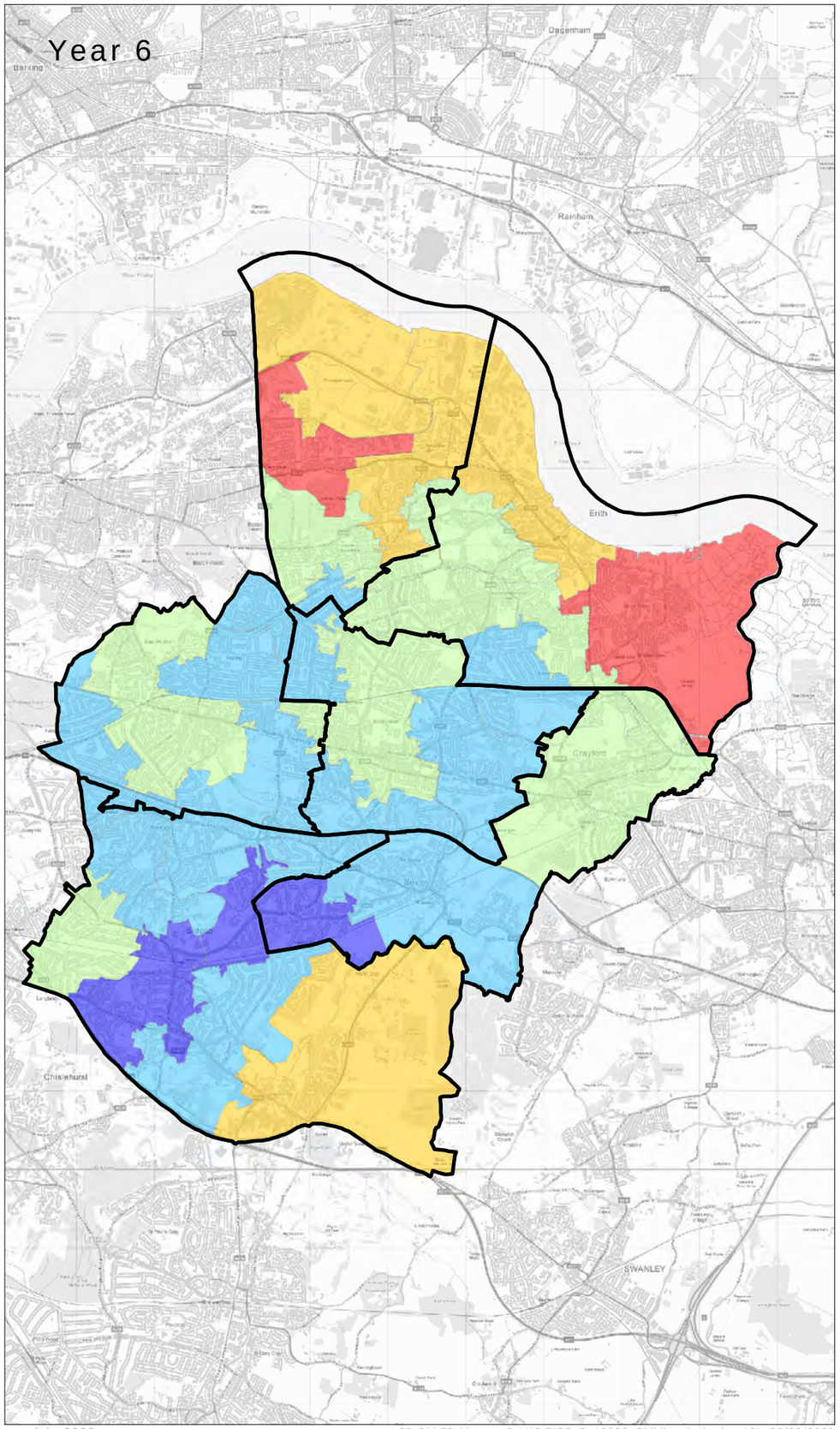


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Figure 5.5: Childhood obesity

Geographic regions

% Reception Obese 2015/16 to 2017/18

- 4.4 - 7.5
- 7.51 - 9.3
- 9.31 - 11.3
- 11.31 - 13.8
- 13.81 - 18.8

% Year 6 Obese 2015/16 to 2017/18

- 14.0 - 15.0
- 15.1 - 20.0
- 20.1 - 25.0
- 25.1 - 30.0
- 30.1 - 35.0

Map Scale @A3: 1:67,500

LUC

CB:DM EB:Manson D LUC FIG5_5_10228_Childhood_obesity_A3L 28/02/2020

Source: OS, Public Health England

Air quality

5.22 Poor air quality is a significant public health issue throughout large areas of the UK, caused by the presence of various types of air pollution, carbon monoxide, nitrogen dioxide, particulates and sulphur dioxide. The health effects of air pollution are still not fully understood[63], however, a recent study in London has shown links between higher air pollution exposures and reduced lung volume in children[64] and associations have been found between levels of air pollution and diagnosis of dementia[65]. Furthermore, poor air quality and pollution has been linked to shortened the life expectancy of those living in London and leads to up to 9,400 extra deaths per year; with the most recent estimates suggesting air pollution in London reduces life by about a year[66]. Residents that are particularly at risk include the young, elderly and those with existing illnesses such as respiratory problems.

5.23 The London Borough of Bexley Air Quality Management Variation Order came into effect in March 2007 as a result of mean air quality standards for nitrogen oxide and fine particulates not being achieved. The whole of the borough is now designated as an Air Quality Management Area[67]. Key policies in Bexley's revised Air Quality Action Plan will include encouraging cleaner transport by providing electric vehicle charging points and cycle parking; implementing Cycle Superhighways and Quietways; and enhancements to streetscapes, particularly Bexleyheath Town Centre and Yarnton Way[68].

5.24 Assessing the spatial distribution of areas of low air quality throughout Bexley helps to highlight where specific types of GI provision may best be prioritised and provide the best value for improving the quality of the local environment. This helps to identify key GI assets that are already functioning as a buffer for air pollution that need to be protected, and also opportunities for new provision in the form of tree planting, green walls or open space.

5.25 The Environment Bill does not include a legally binding target for achieving safe levels of $PM_{2.5}$ concentrations in line with World Health Organisation (WHO) guidelines. It only commits to setting the target before 31st October 2022. The WHO's annual mean guideline for PM2.5 is currently 10 $\mu g/m^3$.

5.26 The legal requirement for NO_2 in the UK stipulates that the annual average concentration of NO_2 must be no more than 40$\mu g/m^3$ across a whole year within all 43 reporting zones of the UK. Additionally, an hourly average concentration over 200µg/m3 must not be reached more than 18 times in a year[69].

Issue: Currently, the areas with the highest air pollution levels in the borough are found along the main transport corridors of the borough as shown in **Figure 5.6**. Most notably these include the A2 which passes through central Bexley from east to west; the A207/Watling Street/London Road which runs parallel to the A2 in places connecting Crayford to Welling; and the A2016/A206 which runs out of the borough towards Dartford from Thamesmead near the River Thames.

Annual mean NO_2 monitoring for the Borough for 2013 shows that figures for the A2 at Falconwood exceeded the legal limit[70]. Many of the roads which run between these routes and to the south of the borough towards the A20 also have poor air quality in their immediate vicinity. There is potential for future increases in non-residents travelling to Abbey Wood Station to access the Elizabeth line which could lead to further air quality issues along routes which serve the station[71].

5.27 Air pollution is less evident in the east of the borough reflecting the less developed character of the eastern edge of the borough which contains swathes of Green Belt. In the west of the borough there are pockets less affected by air pollution around Erith Marshes, Southmere Park, Lesnes Abbey, Danson Park and other open spaces. Lower levels of air pollution are also associated with the strategic green corridor which follows the River Shuttle; most notably around Bexley Woods.

Issue: Air Quality Focus Areas within the borough, previously identified by the GLA[72] as areas with most potential for improvements in air quality, include Belvedere West, Belvedere, Erith, Queens Road (Erith), Slade Green and Falconwood. Other key areas for

[63] King's College London - London Air Online at: http://www.londonair.org.uk/LondonAir/General/research.aspx

[64] Mudway et al. (2018) Impact of London's low emission zone on air quality and children's respiratory health: a sequential annual cross-sectional study. DOI: 10.1016/S2468-2667(18)30202-0, 10.1016/S2468-2667(18)30202-0

[65] Carey et al. (2018) Are noise and air pollution related to the incidence of dementia? A cohort study in London, England. DOI: 10.1136/bmjopen-2018-022404

[66] King's College London – London Air Online at: http://www.londonair.org.uk/LondonAir/General/research.aspx

[68] London Borough of Bexley (2017) LBB Air Quality Annual Status Report for 2016

[69] See the Air Quality Standards Regulations 2010 (SI 2010/1001), the Air Quality Standards (Scotland) Regulations (SSI 2010/204), the Air Quality Standards (Wales) Regulations 2010 (SI 2010/1433) and the Air Quality Standards Regulations (Northern Ireland) 2010 (SR 2010 No 188), as amended.

[70] LBB (2017) LBB Air Quality Annual Status Report for 2016

[71] LBB (2019 Local Plan Integrated Impact Assessment Scoping Report

[72] GLA (2013) Air Quality Information for Public Health Professionals – London Borough of Bexley

intervention are industrial areas and new large infrastructure projects, including roads.

Opportunity: Green spaces and urban greening features, such as green walls, trees and other vegetation have the capacity to reduce concentrations and exposure to particulates and gaseous pollutants. Air pollutants can be removed by vegetation by the process of deposition to leaf surfaces. The most effective vegetation type for removal of particulates is areas of woodland, whilst agricultural land is largely responsible for the removal of gaseous pollutants. The London i-Tree report estimates the value of removal of particulates ($PM_{10's}$ and $PM_{2.5's}$) by the capital's trees to be £63,268,423.00 and £1,149,480.00 respectively[73]. Deposition however is of a more limited benefit at a street scale.

Green infrastructure provided within a more urban environment at street-by-street scale is of benefit for urban air quality not for its ability to remove pollutants, but its ability to control their flow/ distribution. Dispersion of air pollutants can be more successfully achieved at a street scale through the incorporation of green infrastructure in an appropriate manner as to transport pollutants by the wind away from the source and allow for their 'dilution' by cleaner surrounding air. The effects and benefits cannot always be easily measured and vary significantly depending on local conditions meaning a 'one size fits all' approach will not be appropriate[74]. The current evidence base indicates, however, that features such as tree barriers next to roads can reduce concentrations of air pollution on the other side of the 'barrier' and improve air quality in the immediate local area[75].

Promotion of sustainable modes of transport and provision of high quality sustainable transport routes has the capacity to improve air quality at a local level by reducing the reliance on car travel. There is potential for GI to support this through improved connections, access, and pedestrian and cyclist friendly routes throughout the borough. This should be taken into account in planning and implementing new GI provision and also enhancing both the existing GI and transport networks. Rivers, large roads and other landscape features may present significant barriers for pedestrians and cyclists and may encourage the use of vehicles for short journeys. GI solutions such as enhancing the attractiveness of key routes to walkers and cyclists through the installation of vegetation, alongside other measures such as traffic calming, can help to promote their use. This should be planned alongside other measures such as path surfacing and signage and is a consideration where new development may be coming forward to ensure the existing linear features, such as the Bexley's river network, are used to best advantage.

Noise

5.28 Transport, construction and other activities which are often more prevalent in urban areas mean that noise can be a significant disrupting factor in towns and cities. It can have effects on health and wellbeing both physiologically and psychologically.

Issue: In Bexley the main areas affected by noise are found along the railway lines which pass through the borough from east to west, as well as the major road network as shown in **Figure 5.7**. It has also been identified that future increases numbers of non-resident commuters driving to Abbey Wood Station to access the Elizabeth line could lead to noise issues along routes which serve the station[76].

Opportunity: Vegetation can help to attenuate noise through absorption, dispersal and destructive interference of sound waves. Furthermore, soils can act to indirectly reduce noise through their absorptive capacity. However, some studies suggest people overrate the ability of vegetation to attenuate noise, suggesting there is also a psychological role[77] which GI assets may be able to play in terms of mitigating the effects of noise.

[73] Treeconomics London (2015) Valuing London's Urban Forest. Results of the London i-Tree Eco Project
[74] Mayor of London (2019) Using Green Infrastructure To Protect People From Air Pollution
[75] Air Quality Expert Group. (2018) Impacts of Vegetation on Urban Air Pollution. Prepared for: DEFRA; Scottish Government; Welsh Government; and DoE in Northern Ireland
[76] LBB (2019) Local Plsan Integrated Impact Assessment Scoping Report
[77] Parliamentary Office of Science and Technology (2017) Urban Green Infrastructure and Ecosystem Services

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Figure 5.6: Annual mean NO2 concentrations from LAEI 2016

Geographic Regions

Air quality focus area

Annual mean NO2 concentrations from LAEI 2016 in microgrammes per metre cubed

NO_2 ($\mu g/m^3$)

- < 16
- 16 - 19
- 19 - 22
- 22 - 25
- 25 - 28
- 28 - 31
- 31 - 34
- 34 - 37
- 37 - 40 ← Limit
- 40 - 43
- 43 - 46
- 46 - 49
- 49 - 52
- 52 - 55
- 55 - 58
- > 58

This map is based on the NO2 emissions and ground level concentrations published as part of the LAEI 2016.

Sourced: https://data.london.gov.uk/dataset/laei-2016---borough-air-quality-data-for-llaqm

Map Scale @A3: 1:47,500

N

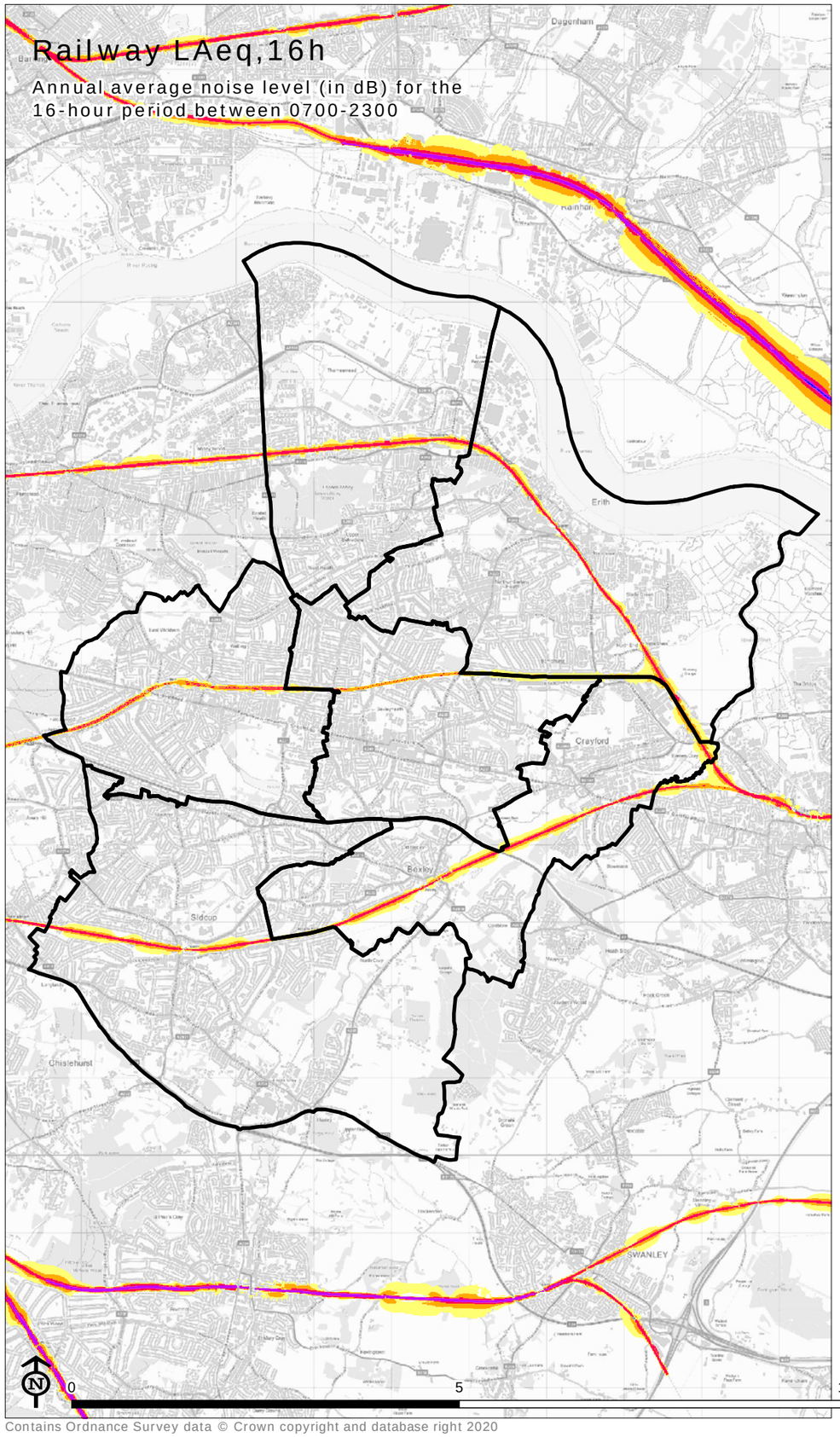
0 5 10 km

CB:DM EB:Manson D LUC FIG5_6_10228_r1_Air_Quality_A3L 28/02/2020

Source: OS, LBB, London Datastore: https://data.london.gov.uk/dataset/laei-2016---borough-air-quality-data-for-llaqm

Railway LAeq,16h

Annual average noise level (in dB) for the 16-hour period between 0700-2300



Major roads LAeq,16h

Annual average noise level (in dB) for the 16-hour period between 0700-2300

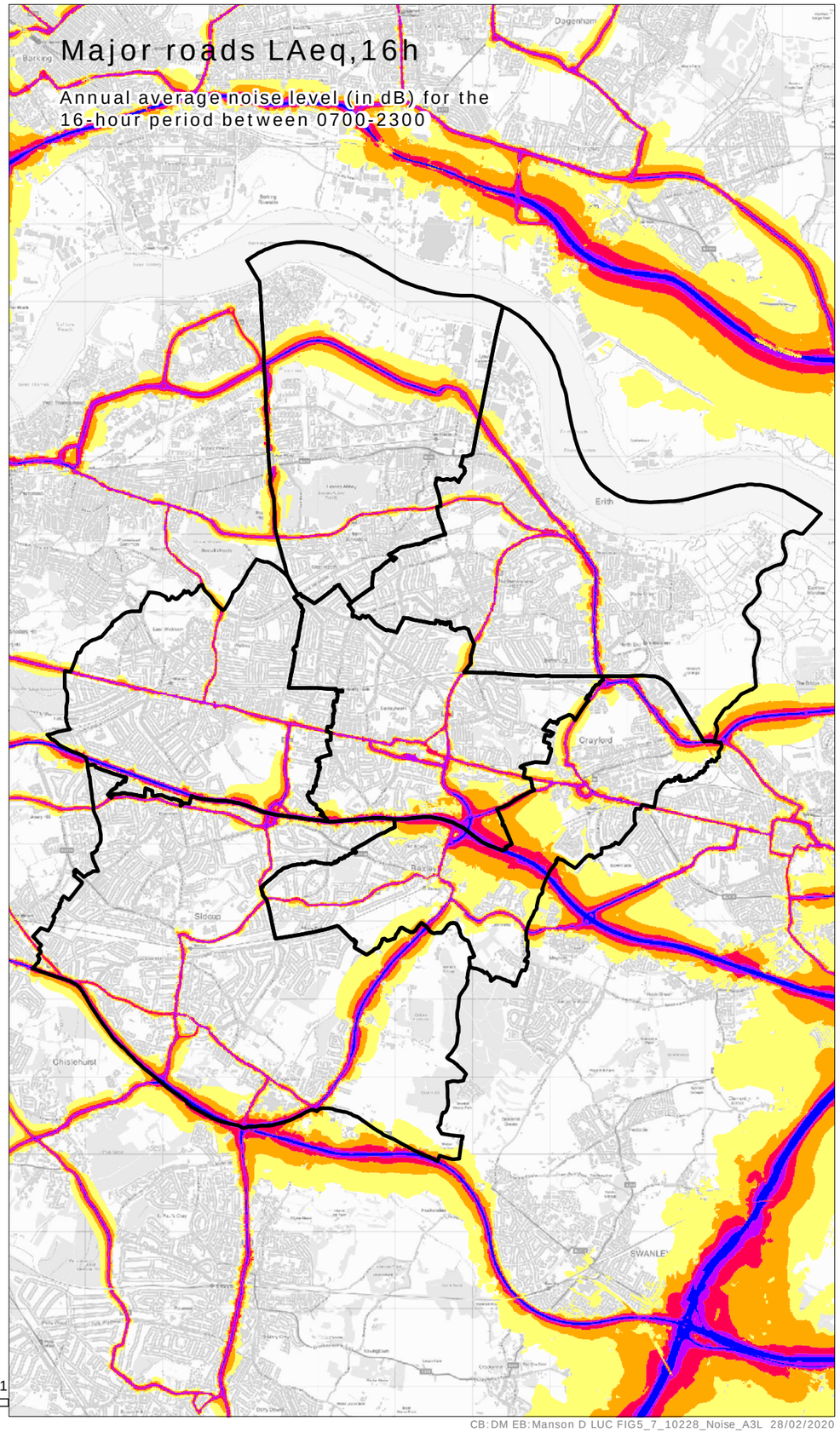


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Figure 5.7: Noise

Geographic regions

Noise class (dB)

- 55.0-59.9
- 60.0-64.9
- 65.0-69.9
- 70.0-74.9
- >=75.0

Map Scale @A3: 1:67,500

LUC

CB:DM EB:Manson D LUC FIG5_7_10228_Noise_A3L 28/02/2020

Source: OS, DEFRA

Climate change

GI should take account of, and integrate with, natural processes and systems, ensuring floodplains are restored where possible, and contributing to climate adaptation.

Vegetation and soils can also provide a carbon sink. Land management options likely to increase carbon storage/reduce carbon emissions include tree planting, conversion of arable farmland to semi-natural habitat (requires less soil disturbance and no fertiliser inputs), and preservation of peatland soils.

GI can help to combat the urban heat island effect that is expected to worsen under climate change. Green links and biodiversity corridors can provide climate change adaptation by increasing the connectivity and resilience of species populations. GI can help to reduce flood risk by providing areas for flood storage, natural drainage routes, increased soil permeability, and rainfall interception.

Warming cities

5.29 By the end of the 21st century, all areas of the UK are projected to be warmer, more so in summer than in winter consistent with future warming globally. The UK Climate Projections (UKCP) uses probabilistic projections to provide low, central and high changes across the UK corresponding to 10%, 50% and 90%. These are averaged to give a range of seasonal average warming between then the 10% and 90% probability levels. By 2070, in the high emission scenario, this range amounts to 0.9°C to 5.4°C in summer, and 0.7°C to 4.2°C in winter.

5.30 Hot summers in the UK are expected to become more common. The summer of 2018 was the equal-warmest summer of those recorded for the UK along with 2006, 2003 and 1976. Climate change has already increased the chance of seeing a summer as hot as 2018 to between 12-25%. With future warming, hot summers by mid-century could become even more common, near to 50%[78].

Issue: Higher temperatures as a result of climate change may have a range of impacts. Heat waves, even when short in duration, can impact on human health, and can damage certain types of infrastructure such as railway tracks, while prolonged periods of high temperatures increase demands on water resources and are likely to affect the availability of certain foods.

Changes in climate including changes in average temperatures can also impact biodiversity by favouring invasive species. In addition, there is an increased risk of fires in open spaces, which has been experienced locally, with fires just outside the borough on both Woolwich Common and Dartford Heath during the summer of 2018.

Within urban areas, increases in temperature are exacerbated by the 'urban heat island effect', whereby the concentration of built development retains heat, resulting in a cumulative effect on overall temperatures. The issue has been identified as one of the key risks in the coming decades by the International Panel on Climate Change. Previous studies have shown average night time temperatures in London to be approximately 4^0C higher in the city centre than the surrounding rural areas[79], with records indicating temperature differences of up to 10^0C have been reached during heatwaves[80].

Opportunity: The incorporation of vegetation into the built environment can reduce temperature and provide shade in public open spaces. In addition, trees can indirectly reduce energy demands for heating and cooling in buildings by providing shade to block incoming solar radiation and shelter from wind, depending on their orientation. London's i-Tree assessment estimates energy related cost savings provided by trees to be as much as £315,477 million annually, with the reduced demand from fossil-fuel power plants estimated to result in a reduction of up to 882 metric tons of carbon emissions[81].

Flooding

5.31 Climate change can contribute to increases in local flood risk in several ways. Rising sea or river levels may cause increased flood risk inland due to interactions with drains, rivers and small watercourses. In addition, more intense rainfall events may increase surface water run-off, with subsequent additional risk of sewerage overflow and potential for damage to property and people. As development occurs in the borough the proliferation of hard surfacing and paving has the potential to increase surface water run-off.

5.32 The majority of Bexley benefits from flood defences including the low-lying land which has been reclaimed from the Thames estuary floodplain and is defended by the Thames tidal flood defences; a series of large embankments along the tidal frontage. Several tributaries which flow from the River

[78] Met Office (2019) UK Climate Projections: Headline Findings
[79] GLA (2018) Urban Heat Island in London
[80] http://climatelondon.org/climate-change/heatwaves/
[81] Treeconomics London (2015) Valuing London's Urban Forest. Results of the London i-Tree Eco Project

Thames including those which pass to the east of Erith Marshes and the canal which flows into Southmere also benefit from existing flood defences.

Issue: Of the total area of the borough, 657ha (10%) is at 'high risk' of flooding and 923ha (14%) is at 'medium risk 'of flooding[82]. Large rainfall events have previously caused fluvial and surface water flooding in the Borough, for instance in 2013/14 and 2016[83]; with flood risk generally being concentrated in the eastern and northern parts of the borough as shown in **Figure 5.8**. It is expected that raising of the current defences will be required in the future to keep up with climate related flood risk, and Crayford Marshes has previously been identified as being potentially important for future tidal storage[84]. The flood risk area measures set out in the Thames River Basin District Flood Risk Management Plan[85] for the borough include maintaining a strategy to ensure SuDs are incorporated in new developments and promoting the interception of roof runoff into gardens to be achieved by encouraging the use of green and permeable coverings in gardens.

Although the open space network currently helps to reduce surface water run-off, an integrated approach to surface water management throughout the borough will be required going forward to further reduce the risk of localised flooding events. Areas at risk of surface water flooding are shown in **Figure 5.9**. This will be especially important where built development is due to become denser, with an associated increase in hard surfacing.

Opportunity: It is recognised that GI can help mitigate the effects of possible flooding events and promote the borough's resilience to the effects of such events. This may comprise strategic water storage and smaller scale interventions such as incorporating swales within built development. In many cases good design can also provide benefits for recreation. Further benefits may be achieved through the incorporation of woodland and street trees in areas of developments of higher densities. If well located, these elements can make a substantial contribution to alleviating flood risk.

5.33 The GLA has produced the SuDS Opportunity Mapping Tool[86] to identify the potential for SuDS within a given area. While the tool has not been produced to identify definitive solutions in terms of flood risk, it identifies locations at which green roofs are a feasible option for addressing flood risk and locations where GI solutions are the dominant option for solutions to this issue.

Opportunity: The tool identifies Bexleyheath Town Centre and parts of Crayford as having a high number of sites with potential to incorporate green roofs as a solution to flood risk. Much of the area to the west of the borough was identified as having a high number of sites at which GI options are the dominant option to address flood risk. Importantly, high growth areas within the Thamesmead and Bexley Riverside Opportunity Areas, where there may be risk of flooding from the River Thames and its tributaries, were also identified as having a high number of sites at which GI options are the dominant option to address flood risk.

5.34 The Sustainable Drainage Design and Evaluation Guide[87] has been produced by London Borough of Bexley to promote the idea of integrating SuDS into the fabric of development. Available landscape spaces as well as the construction profile of buildings are to be used to help deliver sustainable drainage solutions at new development in Bexley. In effect, the borough is split into two by the railway line. To the north the waters drain into the Erith Marshes and the River Thames and to the south drainage occurs at the River Cray and its tributaries.

Opportunity: Considering its geology, the guide notes that much of the borough is suitable for infiltration, with exceptions in areas of the marshes and along the River Cray. Opportunities have been identified to make use of SuDS to reduce the speed of water flowing off the hills in the north of the borough.

Water quality

5.35 The potential for climate change to result in more intense rainfall during the summer months and a wetter winter season in the UK is likely to affect the borough's water quality. Currently, water quality in London's rivers is assessed as 'moderate' to 'poor' with only a small number of water bodies classed as 'good'[88].

5.36 Surface water run off can cause sewer overflow to the detriment of water quality in the Thames and its tributaries.

[82] Mayor of London (2018) London Regional Flood Risk Appraisal
[83] LBB (2017) Preliminary flood risk assessment. Addendum by London Borough of Bexley.
[85] Environment Agency (2016) Thames River Basin District Flood Risk Management Plan 2015-2021
[86] Mayor of London (December 2018) SuDS Opportunity Mapping Tool
[87] London Borough of Bexley (2018) Sustainable Drainage Design and Evaluation Guide
[88] Defra and Environment Agency (2015) Thames river basin district River basin management plan

The potential for rainwater to carry hydrocarbons, metals, dust, litter and organic materials into watercourses as it washes the urban streets and buildings poses a threat to the water quality at local watercourses.

5.37 The recent Road Runoff Water Quality Study[89] has highlighted the extent to which London's roads are harming London's rivers. The Environment Agency, Transport for London (TfL) and the Greater London Authority (GLA) funded the development of a new model, which uses numbers of vehicles and types to predict the amount of pollution deposited on roads and the degree of damage to rivers. The study has identified those roads that have the greatest potential to contribute towards pollution in London's rivers to help identify the best locations for interventions to address this issue. The mapping shown in **Figure 5.10** highlights the following roads as the most polluted:

- 5% most polluted:
  - A220 (Gravel Hill).
- 10% most polluted:
  - King Harolds Way;
  - A2 (East Rochester Way);
  - A221 (Danson Road);
  - A222 (Chiselhurst Road);
  - A223 (Edgington Way);
  - A223 (North Cray Road);
  - A2041 (Knee Hill); and
  - A2041 (Harrow Manorway).
- 20% most polluted:
  - Erith Road;
  - Foots Cray Lane;
  - Long Lane;
  - London Road leading to Roman Way and Crayford Road;
  - A2 east of Bourne Road;
  - A206 (Bostal Hill);
  - A211 (Sidcup Hill);
  - A222 (Elm Road); and
  - A223 (Bourn Road and Bexley High Street)

Issue: As is the case across much of London many of the water bodies in the borough display 'moderate' or 'poor' water quality. The borough also contains a number of roads which are amongst the 5% and 10% most polluting for rivers in London. There is potential for climate change and the delivery of new development which proliferates the area of impermeable surfaces in the plan area to exacerbate existing water quality issues. These types of effects may result as sewer overflow increases and increased surface water run off occurs resulting in increasing numbers of harmful materials entering local water bodies.

Opportunity: The provision of GI allows for precipitation to be intercepted by vegetation (trees and shrubs). Plant root systems promote infiltration and water storage in the soil. Soil erosion can be slowed in this manner providing protection for soil from the impact of rain. The net effect is to help slow the progress of stormwater to the drainage system and limit the potential for overflow which might otherwise adversely impact water quality at water bodies. The approach to GI provision which would help to address water quality in the borough is expected to be similar to the approach to flooding given that these issues are by and large intertwined[90].

The Integrated Impact Assessment (IIA) Scoping Report[91] identifies that opportunities relating to addressing water quality in Bexley include appropriate integrated water management (IWM) interventions for new developments. IWM is defined by the Global Water Partnership[92] as the coordinated development and management of water, land and related resources in order to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. In addition to benefits relating to the appropriate management of water quality, water quantity and flooding, IMW supports the incorporation GI provision and is likely to result in positive outcomes relating to enhanced biodiversity, improved public spaces and places, health and wellbeing, and mitigating and adapting to climate change. The IIA Scoping Report identifies SuDS and rainwater harvesting as opportunities to incorporate IWM measures. These types of improvements should inform the early design process of new development.

[90] Treeconomics London (2015) Valuing London's Urban Forest. Results of the London i-Tree Eco Project

[91] London Borough of Bexley (2019) Local Plan Integrated Impact Assessment Scoping Report

[92] Global Water Partnership (2019) Addressing Water in National Adaption Plans

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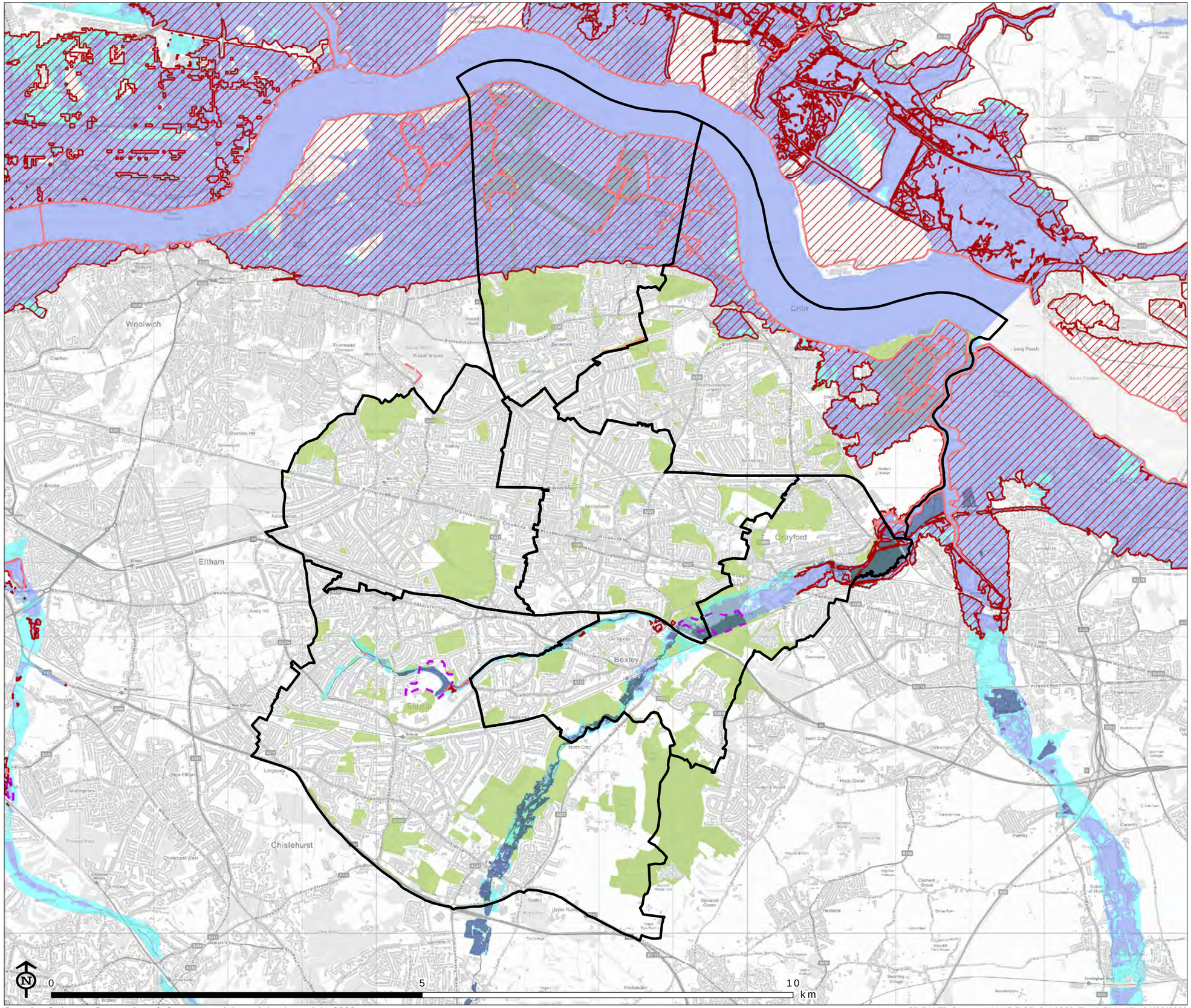
Figure 5.8: Flood risk (rivers and seas)



Geographic Regions
Defences
Areas benefiting from flood defences
Flood storage areas
Flood zone 2
Flood zone 3
Flood zone 3b (5%) annual probability flood extent
Open space

Map Scale @A3: 1:50,000

LUC

CB:DM EB:Stenson_K LUC FIG5_8_10228_Flood_Risk_A3L 04/03/2020

Source: OS, Environment Agency, LBB, Wood PLC

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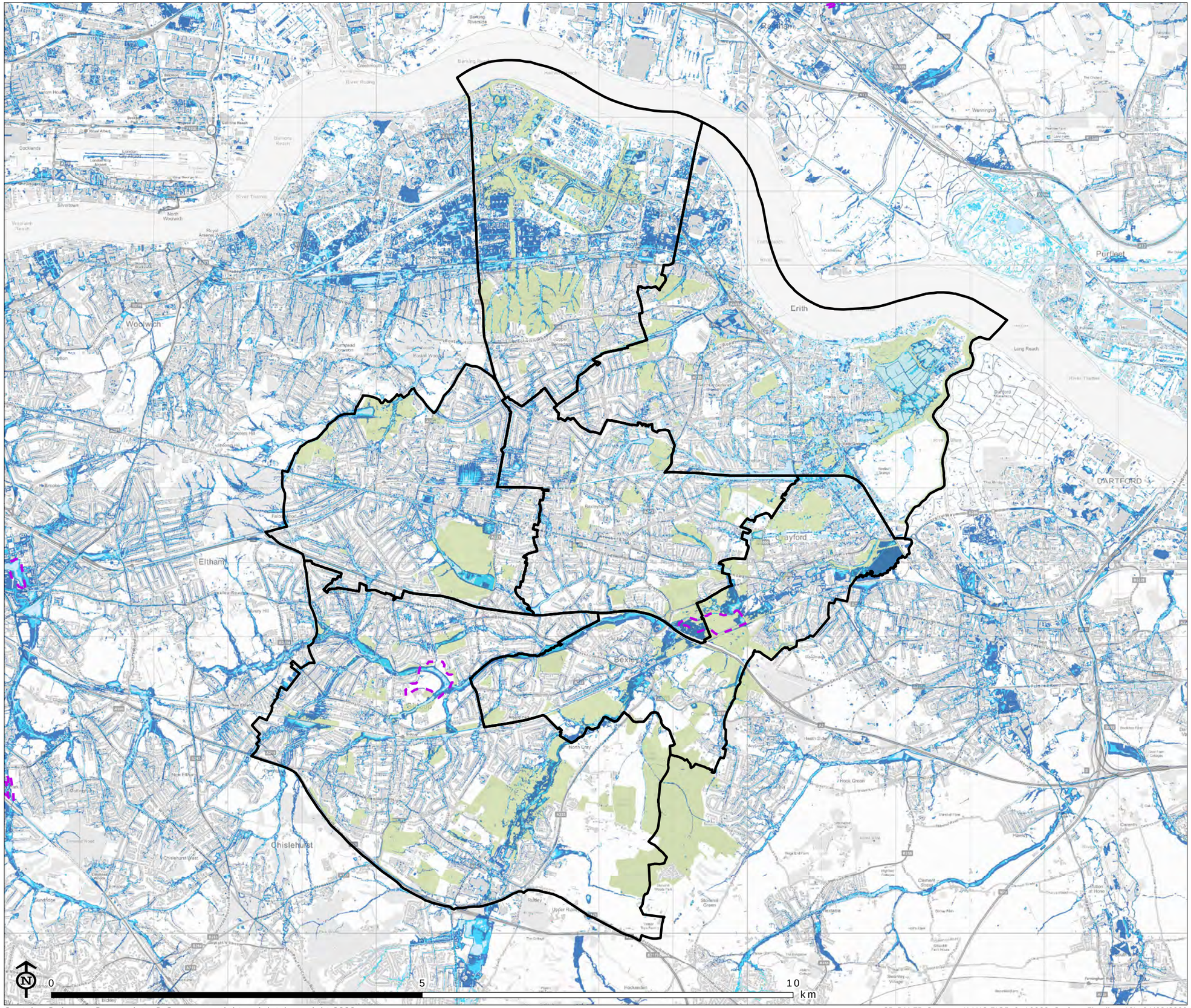
Figure **5**.9: Surface water flooding



Map Scale @A3: 1:50,000

CB:DM EB:Stenson_K LUC FIG5_9_10228_Surface_Flooding_A3L 04/03/2020

Source: OS, Environment Agency, LBB

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Figure 5.10: Road Runoff Water Quality

Bexley boundary

Road runoff

5% most polluted roads

10% most polluted roads

20% most polluted roads

Less polluted roads

Sourced from https://www.london.gov.uk

Map Scale @A3: 1:50,000

0 5 10 km

CB:DM EB:Stenson_K LUC FIG5_10_10228_Road_Runoff_A3L 13/02/2020

Source: OS, Thames21 and Middlesex University for The Mayor of London, Environment Agency and Transport for London (TfL).

Biodiversity

GI should maintain and enhance biodiversity to deliver net gain for biodiversity, provide connectivity to increase ecological resilience in the face of climate change.

5.38 Biodiversity is the variety of all life on Earth: genes, species and ecosystems. It includes all species of animals and plants, and the natural systems that support them. It can be used more specifically to refer to all of the species in one region, such as Bexley. Biodiversity matters because it supports the vital benefits humans get from the natural environment. It contributes to the economy, health and wellbeing, and it enriches our lives.

5.39 The loss of biodiversity is a matter of the highest concern. Since we are totally dependent on the natural richness of our planet for our food, energy, raw materials, clean air and clean water, it is generally recognised that halting the loss of biodiversity is of great importance. Any further losses may undermine not only the natural environment, but also our economic and social goals. Demonstrating the value of biodiversity provided by green infrastructure in urban areas can help decision-makers to maximise the efficient use of natural capital.[93]

5.40 Biodiversity is important for people; most of us enjoy seeing flowers, hearing birdsong and being in natural places, and there is clear evidence that contact with nature is beneficial to our physical and mental wellbeing. Biodiversity also provides economic and functional benefits, such as pollination, flood risk reduction and local climate amelioration. These functional benefits will become increasingly important as climate change leads to more frequent extreme weather events.

5.41 A wide range of European, national, regional and local legislation, policy and guidance has a bearing on biodiversity conservation. Action for biodiversity in Bexley can contribute to London-wide and national targets for priority species and habitats. These priorities and targets are, therefore, an important factor in setting our local priorities.

5.42 The UK Biodiversity Action Plan has been replaced by national biodiversity strategies for England, Wales and Scotland. Biodiversity 2020: a strategy for England's wildlife and ecosystem services (DEFRA 2011)[94] has moved away from the habitat- and species-based approach and clearly-defined targets of a biodiversity action plan, and concentrates instead on landscape-scale conservation, with an overall target of halting biodiversity loss by 2020. National priority habitats and species are defined in the list of Habitats and Species of Principal Importance in England[95], identified under Section 41 of the Natural Environment & Rural Communities Act 2006[96].

5.43 Priority habitats[97] and species[98] in London have been identified by the London Biodiversity Partnership. There are London action plans in place for the habitats and a few of the species. The London Environment Strategy sets targets for the areas of priority habitats to be created and enhanced in London by 2025 and 2050.

Table 5.2: London Environment Strategy targets

Habitat	By 2025	By 2050
Species-rich woodland	20 ha	200 ha
Flower-rich grassland	50 ha	250 ha
Rivers and stream enhancement	10 km	40 km
Reedbeds	5 ha	30 ha

5.44 Many plant and animal species receive some degree of protection under European Union and United Kingdom laws. Some species are fully protected; it is an offence to kill, injure, capture or disturb them or to damage their places of shelter. Others receive only partial protection. Bexley is a densely populated outer-London borough, with significant potential for further growth. It nevertheless supports a surprising diversity of wild plants and animals in a range of habitats[99].

5.45 The borough is densely populated, however, it also contains large areas of natural and semi-natural habitats comprising woodlands, grazing marsh, pasture, heathland and rivers which support a range of species. Locally designated biodiversity sites (SINCs) are linked in the borough by a network of strategic green corridors. While the borough

[94] Biodiversity 2020: A strategy for England's wildlife and ecosystem services (DEFRA 2011)

[95] Habitats and Species of Principal Importance in England (Secretary of State for Environment, Farming & Rural Affairs 2010)

[96] Natural Environment and Rural Communities Act 2006

[97] London's BAP priority habitats (London Biodiversity Partnership

[98] London's BAP priority species (London Biodiversity Partnership)

[99] LBB, Protected species and planning in Bexley: https://www.bexley.gov.uk/sites/default/files/2020-05/Protected-species-and-planning-in-Bexley.pdf

contains several nationally and locally designated biodiversity sites, it contains several areas of deficiency in terms of access for residents to nature which cover 11.95% of its area.

Issue: As development and climate change occurs further pressures on the biodiversity network are likely to result. These pressures are likely to result through direct habitat loss or fragmentation and as disturbance results from increasing levels of human activities in the plan area. Climate change can impact on biodiversity in the borough by changes in average temperature and temperature spikes, increases in the frequency of extreme weather events, changes in the volume of rainfall and number of flood events, increasing levels of carbon dioxide and increased completion from invasive species.

Opportunity: As highlighted earlier in this section green infrastructure provision can play an important role in terms of helping to mitigate and adapt to climate change. Benefits relating to regulation of temperature and flood resilience as well as air and water quality will help to limit the potential for adverse impacts on local species.

Green infrastructure can also act to provide food and shelter for the different species in urban locations. It can also help to reconnect disjoined animal and plant populations and habitats, providing support for ecosystem functions. The delivery of new development which achieves an appropriate design in the borough is likely to provide opportunities for incorporation of new or enhancement of existing green infrastructure and green corridors. Improvements of this type will allow increased habitat space as well as for connections of green areas and links between urban areas and the surrounding natural environment.

Jump to Chapter 10: Biodiversity, geology and geodiversity evidence base

Landscape and historic environment

GI should contribute to the management, conservation and enhancement of the local landscape (and historic landscape), with new development respecting/enhancing landscape character and quality.

5.46 Bexley falls into three of Natural England's National Character Areas (NCA) as shown in **Figure 5.11**. These are:

- NCA 81 Greater Thames Estuary;
- NCA 113 North Kent Plain; and
- NCA 112 Inner London.

Bexley is included within four Natural Character Areas as part of Natural England's *'London's Natural Signatures: The London Landscape Framework'*[100]. These include:

- 14 Lower Thames Floodplain;
- 19 South London Pebbly Sands;
- 20 River Cray Valley;
- 21 Lower North Downs Dip Slope.

5.48 The River Cray and River Shuttle are main rivers in the borough. The Cray is largest tributary of the Darent which it meets just to the east of the borough. The catchment of these rivers is highly urbanised and they flow through numerous artificial channels and culverts, most notably within the upper catchment. Within the middle and lower reaches, where the River Cray flows through several the borough's open spaces, for instance at Hall Place and Foots Cray Meadows, it generally has a more natural character. In such areas the rivers are able to provide a wider range of habitats, and water vole has been recorded in the borough. Due to the surrounding land use, all of the borough's rivers are vulnerable to pollution incidents and physical modifications to the rivers have limited their ecological value[101]. There are currently flood storage areas identified along the River Cray at Hall Place Gardens and along the River Shuttle at Sidcup Golf Club.

5.49 Much of the length of both rivers is identified as a strategic green corridor. In places, good pedestrian and cycle access to the river network is limited and where culverted and canalised the ecological value is restricted due to lack of marginal vegetation and meanders. As a chalk stream, the River Cray is a valuable landscape feature, and where conditions are favourable it can support a range of species.

5.50 There are 23 Conservation Areas designated in Bexley as shown in **Figure 5.12**. These are mostly within the southern half of the borough, with concentrations around New Eltham, Sidcup and Bexley. In many instances, elements of the GI network are integral to the setting and landscape quality of the borough's Conservation Areas. Key landscape views, areas of grassland, trees and good pedestrian access within and through such areas may be essential to conserving their inherent landscape value.

5.51 There are 115 Listed Buildings in Bexley (see **Figure 5.12**). Notable Grade I listed buildings (of exceptional interest) include the garden wall and gate piers at Hall Place; Danson Park Mansion; The Red House; and Crossness Pumping Station.

5.52 There are numerous locally listed features ranging from Public Houses, World War II shelters, private houses, stone stiles and mile posts. Several locally listed features are also located within some of the borough's open spaces including the wall of the kitchen garden and ice house at Lamorbey Park; the Kitchen garden wall at Sidcup Place; and the ice well at Danson Park.[102]

5.53 As shown in **Figure 5.12**, there are four Scheduled Monuments located within or partly within Bexley including:

- The remains of Lesnes Abbey located within Lesnes Abbey Wood site;
- Howbury Moated site, which is set back from a Public Right of Way at Slade Green;
- Hall Place, located within Hall Place Gardens; and
- Faesten Dic, a Medieval territory marking earthwork located within Joydens Wood which lies mostly within Dartford Borough.

5.54 There are four Grade II Registered Historic Parks and Gardens in Bexley (see **Figure 5.12**). These are Lamorbey Park, Danson Park, Hall Place and Footscray Place. The historic Red House and surrounding garden, previous home of William Morris a prominent member of the British Arts and Crafts Movement, is close to Danson Park. Alongside other sites of historic interest within Bexley, this site draws many visitors from outside the borough.

Issue: Much of the character in Bexley is influenced by its highly urbanised nature. However, a less developed and more natural quality is displayed along the River Cray and the River Shuttle and much of these rivers fall within strategic green corridors. The river network in the

[100] Natural England (2011) London's Natural Signatures: The London Landscape Framework
[101] Environment Agency (2014) A summary of information about the water environment in the Darent management catchment
[102] London Borough of Bexley (2018) Locally listed buildings and structures in the London Borough of Bexley, of architectural or historic interest

borough has been culverted and canalised in places which has reduced its ecological value. The character of heritage assets (including Conservation Areas, Listed Buildings, Scheduled Monuments and Registered Historic Parks and Gardens will potentially be vulnerable as development occurs in the borough.

Opportunity: Landscape character, and historic and cultural landscape features may influence the design and implementation of enhancements to open space and the wider GI network. Historic features within open space enhance a site's value and significance; often providing a focal point and draw to the site from within the borough and beyond. In addition, having regard for local character also helps to conserve the distinctiveness of different areas throughout the borough. This can be used to ensure the quality and condition of existing GI assets is maintained or improved.

It is also valuable to understand the distribution of different landscape types and sites which may be considered of particular importance to the local community; helping to highlight areas that have the potential to act as 'hubs' or local destinations. This in turn enables the identification of sustainable transport links that may benefit from strengthening, and also any special qualities that require consideration when proposing GI interventions such as planting, access infrastructure or new open space.

Bexley Green Infrastructure Study

Figure 5.11: Landscape character

Geographic Regions

National Character Area

- 81: Greater Thames Estuary
- 111: Northern Thames Basin
- 112: Inner London
- 113: North Kent Plain

Map Scale @A3: 1:50,000

LUC

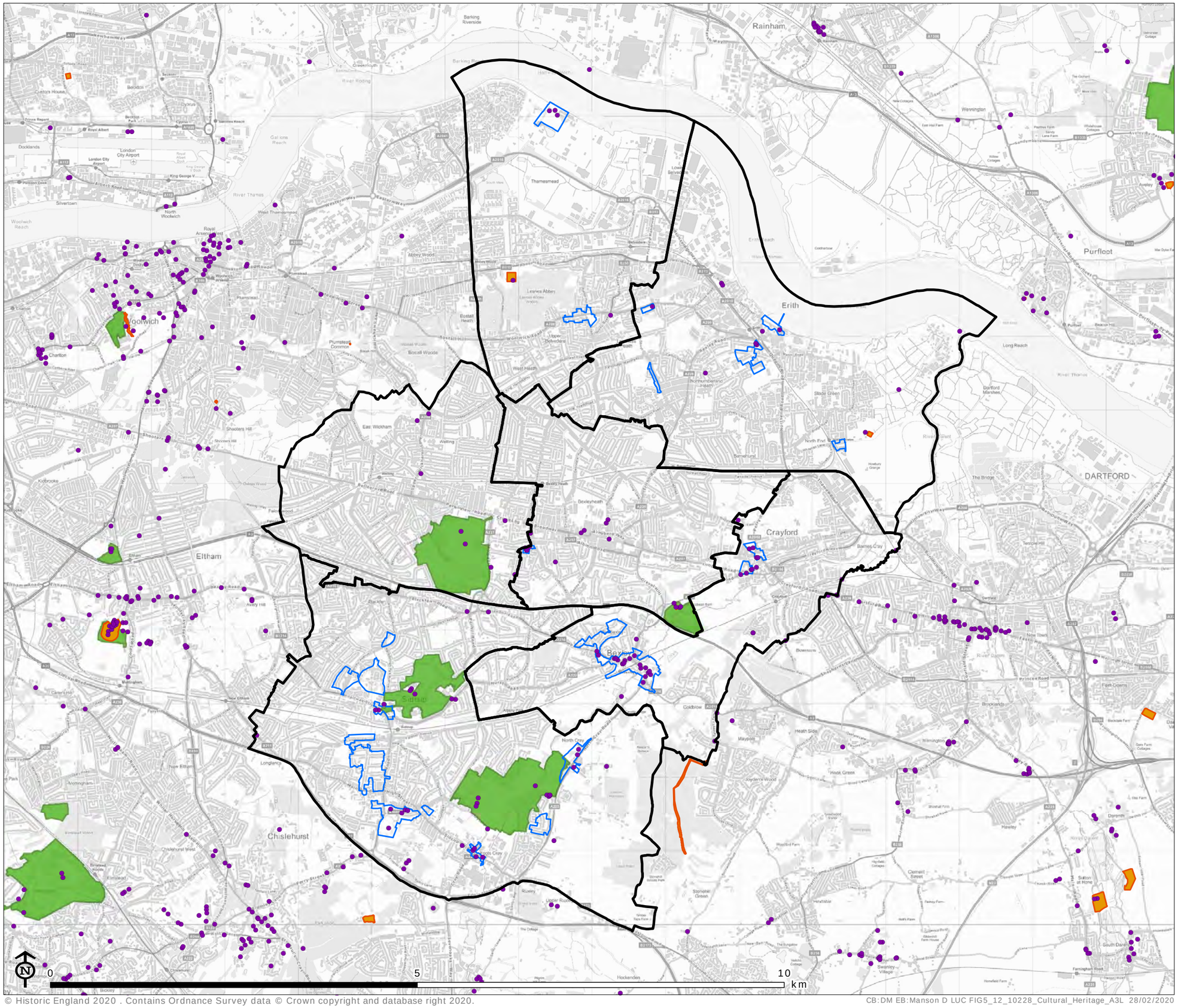
0 5 10 km

CB:DM EB:Manson D LUC FIG5_11_10228_Landscape_Character_A3L 28/02/2020

Source: OS, LBB, NE

Bexley Green Infrastructure Study

Figure 5.12: Cultural heritage



- Geographic Regions
- Conservation Areas
- Listed Buildings
- Scheduled Monuments
- Registered Parks and Gardens

Map Scale @A3: 1:50,000

CB:DM EB:Manson D LUC FIG5_12_10228_Cultural_Heritage_A3L 28/02/2020

Source: OS, LBB, Historic England

Active travel network

GI should include linear features and high quality off-road access routes for pedestrians and cyclists.

5.55 Bexley has 1.17 cars or vans per household, this compares to 0.82 London-wide[103]. The private car is the main mode of transport for Bexley residents, accounting for 57% of journeys[104].

Issue: Bexley has a lower proportion of sustainable transport users when compared to London wide figures. This includes walking (24% Bexley, 33% London wide) and cycling (1% Bexley, 3% London wide).

Opportunity: Where new development is provided (particularly at locations which are more accessibility to essential services) the delivery or enhancement of green infrastructure may allow for the incorporation of new walking and cycling routes to encourage journeys to be made by these modes of transport.

5.56 Transport for London's (TfL) analysis on the potential for cycling indicates that 238,000 daily trips within Bexley are potentially cycleable. Current cycle trips only account for 1% of this potential total at 3,500[105]. Similar analysis indicates there is potential for the current number of walking trips per day to increase by an additional 68,000 trips[106]. Transport for London trajectories for increasing the proportion of journeys made by sustainable modes of transport sets an increase for Bexley from 42% in 2013/4-2015/6 to 46% in 2021 and 63% by 2041.

Issue: According to the Bexley Public Rights of Way and Access Improvement Plan, over two-thirds of journeys made within the borough are less than 5 kilometres in length.

Opportunity: The short distance of many of the journeys being made regularly in the borough means that there is potential to promote modal shift where suitable infrastructure is available to residents. This includes journeys made by more active modes of transport where new green infrastructure provisions or enhancements allow for dedicated walking and cycling routes.

5.57 The transport objectives for the borough are set out in the Local Implementation Plan (LIP3)[107]. These objectives support the London Mayor's overall objective of increasing the sustainable transport mode share. The objectives set for Bexley are to encourage as much movement as possible to use sustainable modes of transport; to provide good networks for pedestrians and cyclists particularly in growth areas and linking them to the communities beyond; and to support more reliable and faster bus services through bus priority measures with segregation from other traffic as much as possible.

5.58 Cycle route proposals were developed as part of Bexley's 'Mini Holland' submission to the Mayor of London in 2013 and Bexley has outlined a potential healthy streets network for cyclists.

Issue: Key roads that would be used for strategic links tend to be less favourable and often have narrower footways, higher traffic flows, and suffer with issues of speed and reliability with the bus service.

Opportunity: Many of the borough's existing roads have an advantageous layout in terms of accommodating cyclist and pedestrians and are considered relatively healthy, with wide footways and low traffic flows.

5.59 Tourist attractions in Bexley play a role in terms of their economic value to the borough. Whilst no figure is available for Bexley specifically, heritage tourism alone makes a £20.2 billion contribution to national GDP and brings tens of thousands of visitors to Bexley every year[108]. The accessibility of distinct destinations in the borough is important in terms of helping to secure improved visitor numbers. **Figure 5.13** shows the location of Bexley's key distinctive destinations. These are visitor attractions and destinations that reflect local character and heritage and add to the overall sense of place. Given the number of visitors that are drawn to these locations, connectivity to public transport and opportunities to access them via walking and cycling are critical if a modal shift away from car usage in the borough is to be achieved.

[103] 2011 Census data on car availability per household
[104] London Borough of Bexley (2018) LBB Local Implementation Plan. Consultation Draft LIP3
[105] TfL and Mayor of London (2017) Analysis of Cycling Potential 2016
[106] TfL and Mayor of London (2017) Analysis of Walking Potential 2016
[107] London Borough of Bexley (2018) LBB Local Implementation Plan. Consultation Draft LIP3
[108] London Borough of Bexley (2017) Bexley Growth Strategy

Issue: Tourist attractions in Bexley play an economic role for the borough attracting numerous visitors to the area. With a high proportion of these journeys likely to be undertaken by private vehicle this source of contribution to the local economy is likely to have detrimental impacts in terms of congestion, climate change, air quality and noise pollution.

Opportunity: Many of the distinctive destinations are well related to sustainable transport links (most notably railway stations) in the Borough. This is demonstrated by considering the high number which fall within or are well related to the sustainable growth areas in Bexley (defined as areas within 800m of a town centre or train station, or with a PTAL of 3 or greater). Some of these destinations are located in close proximity to each other, particularly towards Slade Green. Improved signage from key public transport nodes may help to increase the number of journeys being undertaken by sustainable modes to these locations. Improved signage may also help to result in increasing numbers of combined trips being taken to the destinations which are in close proximity to each other.

5.60 83 Bexley schools have travel plans and an increase in active travel to school by cycle and scooter has been recorded over the past five years. However, the proportion of journeys which are undertaken by foot all the way to schools in Bexley has decreased in this time period and car use is still significant[109].

5.61 Long-term interventions up to 2041 to support sustainable transport improvements and the objectives of the LIP3 include the following:

- DLR extension from Gallions Reach through Thamesmead to Belvedere;
- Extension of Elizabeth line east of Abbey Wood to Ebbsfleet;
- Public transit corridor from North Greenwich to Slade Green;
- Road based river crossings – Belvedere to Rainham and Thamesmead to Gallions Reach;
- River passenger services;
- Bus priority measures; and
- Schemes which include active travel connectivity improvements at Yarnton Way/Eastern Way, at Thames Road/Perry Street, at Thames Road/Crayford Way and at Bexley Road/Brook Street.

Issue: Car use still accounts for a high proportion of journeys being made to schools in the borough. It is noted that a number of sustainable transport improvements are proposed in the plan area through the LIP3. This is likely to help increase the number of journeys being made by more sustainable modes.

Opportunity: Active travel can play a significant role in reducing obesity and improving the overall health and wellbeing of Bexley's residents. There are additional benefits in terms of air quality and reduced noise pollution. However, a coherent active travel network is required to support this. The delivery of new green infrastructure as development occurs in the plan area provides an opportunity to support a connected active travel network in the borough. Away from the streets of the borough, there are plenty of existing opportunities for walking as follows:

- Parks and green spaces
- Walking networks around Thamesmead plus the canal network in North Thamesmead
- PRoW including promoted routes like the Green Chain
- Thames Path and the marshes

The segregation of these routes from roads means that they are potentially safe for users of active transport. Ensuring that active travel networks are legible and safe will be of particular importance if increasing number of younger students are to make use of active transport networks to travel to school.

5.62 The Public Rights of Way (PRoW) network within the borough is relatively limited, covering less than 61km[110]. In accordance with the Bexley Rights of Way and Access Improvement Plan, the PRoW network can be divided into urban paths and those which pass through open and remote spaces, such as Erith and Crayford Marshes.

Bexley's urban PRoWs are mainly alleyways between adjacent streets so 56% of PRoWs in Bexley are less than 99m in length.

[109] LBB (2018) LBB Local Implementation Plan. Consultation Draft LIP3

[110] Bexley Rights of Way Improvement Plan https://www.bexley.gov.uk/sites/default/files/2020-10/Rights-of-Way-and-Access-Improvements-Plan.pdf

5.64 The PRoWs within the open spaces are generally longer. In the east of the borough, the network stretches from Foots Cray and Upper Ruxley in the southeast, through Upper College Farm, along the River Cray, and through Braeburn Park, Churchfield Wood and Crayford Marshes to Darent Industrial Park in the northeast, save for one section around the A226 (Crayford Road). There are also several joined-up routes within the northwest of the borough, including the Thames Path around the Erith Reaches and into the Erith Marshes.

5.65 The Thames Path follows the River Thames from its source in the Cotswolds, through London. The Thames Barrier to Crayford Ness section covers more than nine miles and passes across Bexley and Greenwich Boroughs via Woolwich, Thamesmead and Erith. National Cycle Network Route 1 (NCN1) follows parts of the Thames Path within Bexley although there are places where the cycle route follows the road network to the south instead. This is notably the case around Crossness Sewage Treatment Works where Route 1 passes out of Thamesmead and follows Yarnton Way before travelling northwards by Belvedere rail station towards the Thames Path again

5.66 The route is accessible by public transport and links to other signed walks, such as the Green Chain Walk and Capital Ring networks.

5.67 The Green Chain provides a connected walking route from the west of the borough at Shooters Hill to the area of the Erith Reaches, specifically to Erith rail station (albeit a section of this travels through Greenwich Borough at Oxleas Wood). The route does not rely on defined PRoWs but the wider PRoW network does provide access to the Green Chain Route. The route also links the Thames Path to Lesnes Abbey.

5.68 There are several other walking routes in Bexley, which are set out in the Bexley Rights of Way and Access Improvement Plan (Map 5.2). Together these add to the walking offer within the borough. These provide a mixture of relatively short circular routes. Many of the routes in the borough also link to much longer, London-scale routes (such as the Capital Ring and London Loop walks). Access to many of the longer walking routes from within Bexley is heavily dependent on the PRoW network and public highway.

5.69 Within Bexley the National Cycle Network (NCN) largely follows Thames Path apart from Erith section that is on-road.

5.70 There are a number of quieter routes for cyclists, but these are intersected by busier roads and do not offer a direct option for cyclists, nor any significant degree of priority over motorised vehicles. There are cycling measures in the borough such as cycle lanes on the carriageway, cycle tracks and cycle crossings but they do not form a coherent network and experienced and confident cyclists are likely to remain on the carriageway.

5.71 Similarly, the provision of bridleways and byways open to all traffic (BOAT), both of which can be used by cyclists, is fragmented and fails to provide a joined-up network. The Bexley Rights of Way and Access Improvement Plan identifies a network for use by cyclists, however, even with the inclusion of these bridleways and BOATs, this network lacks sufficient direct and prioritised routes.

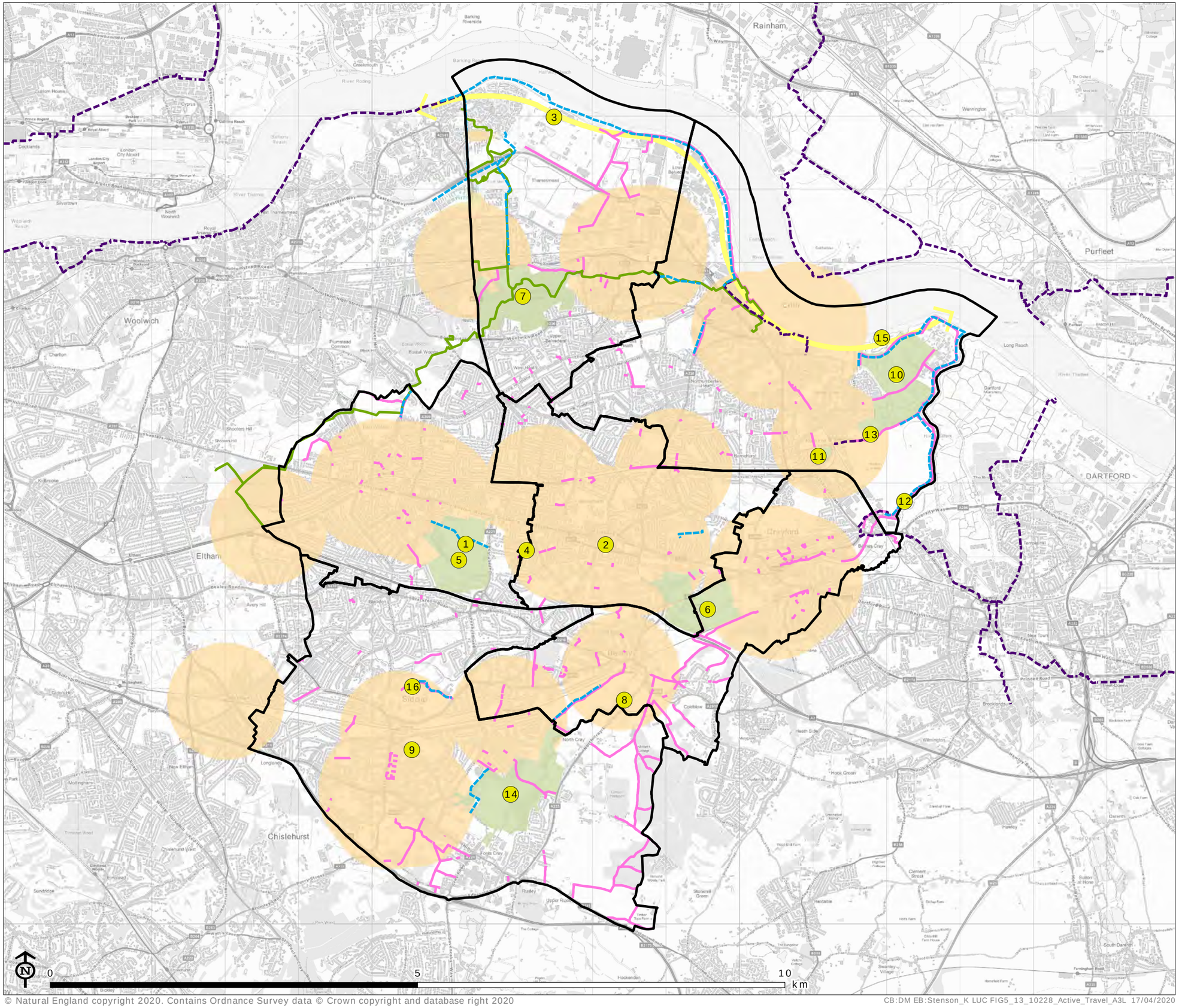
Issue: It is likely that this lack of a coherent network which provides direct and prioritised cycle links, is partly responsible for the relatively low levels of cycling in Bexley.

Opportunity: As new development occurs in the plan area it is should be designed to ensure that green infrastructure provision allows for new cycling routes as well as supporting the improved connectivity, legibility and safety of the existing network. Improvements may include new signage and it may be appropriate to ensure that segregated routes are provided in certain locations, particularly where the public highway accommodates higher volumes of vehicular traffic.

5.72 The active travel network is shown in **Figure 5.13**.

Bexley Green Infrastructure Study

Figure 5.13: Active travel network



- Geographic Regions
- Open space
- Sustainable growth area
- Cycle route
- Key off road cycle route
- Green chain walk
- Public Rights of Way
- Thames path
- Distinctive destinations

1: Danson House

2: Broadway Shopping Centre

3: Crossness Pumping Station

4: Red House, National Trust

5: Danson Park

6: Hall Place Gardens

7: Lesnes Abbey Woods

8: Gothic Bath House

9: Bird College of Dance, Music and Theatre Performance

10: Crayford Marshes

11: Skate park at Howbury Lane Open Space

12: Crayford Creek

13: Slade Green moat

14: Foots Cray Meadows

15: Petrified forest

16: Rose Bruford College of Theatre and Performance

Map Scale @A3: 1:50,000

LUC

CB:DM EB:Stenson_K LUC FIG5_13_10228_Active_Travel_A3L 17/04/2020

Source: OS, LBB, Natural England, Sustrans