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Lee Valley Regional Park Strategic Planning Evidence Base

Prepared by LUC
March **December** 2018



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March 2018

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1 Introduction

- 1.1 The Lee Valley Regional Park and the Lee Valley Regional Park Authority were created in 1967 through the Lee Valley Regional Park Act 1966. The Act sets out the duty of the Authority to “develop, improve, preserve and manage the park as a place for the occupation of leisure, recreation, sport, games or amusements...for the provision of nature reserves and for the provision and enjoyment of entertainment of any kind” (Section 12 (1)).
- 1.2 The current Lee Valley Regional Park Plan was adopted in April 2000. It consists of two parts:
 - Part one: Strategic Policy Framework outlines the policies and objectives for the Regional Park, providing the strategic policy framework for its future use and development.
 - Part two: Consists of particular proposals for the future use and development of individual sites and areas that collectively form the totality of the Regional Park.
- 1.3 The Authority is also preparing Area Proposals for the future use and development of individual sites and areas that collectively form the totality of the Regional Park. Area Proposals have been adopted by the Authority for five areas; proposals for Areas 6, 7, and 8 have yet to be adopted.
- 1.4 The new Strategic Policies replace those included in Part One of the Park Plan (2000). The Authority will apply the policies to guide development and land use change within and adjacent to the Park in collaboration with the Riparian Authorities. The policies will therefore provide greater certainty for developers and landowners and help the LVRPA in its role as a statutory consultee on development plans and planning applications. The policies will also inform the Park’s own Area Proposals and any development within or outside these areas put forward by the Authority itself.
- 1.5 This document sets out the evidence base, covering the range of environmental, social and economic aspects of the Park, which underpin and inform the strategic policies. The aim is to support new policies with ‘adequate, up-to-date, relevant and proportionate evidence’ in accordance with para. 158 of the NPPF.
- 1.6 The evidence base comprises up to date information on the key features of the Park and the strategic planning issues in relation to:
 - Visitor numbers and visitor management (Section 2)
 - Sport and Recreation (Section 3)
 - Biodiversity (Section 4)
 - Community, health and well-being (Section 5)
 - Landscape and Heritage (Section 6)
 - Environment (Section 7)
 - Ecosystem Services (Section 8)
- 1.7 Implicit within this work is recognition that the Regional Park is a multi-functional area where individual parcels of land include different uses and functions. This is a defining characteristic which makes the development of spatial solutions a challenge. However, the Area Proposals will help to address these issues.

2 Visitor numbers and visitor management

- 2.1 Visitor data was obtained from the Lee Valley Regional Park Authority. Data on frequency of visits, age, mode of transport and Borough from which visitors travel from is derived by the Authority from bookings information (venues only) and survey data. It should be noted there are some limitations to this data. Firstly, figures identified below are likely to misrepresent the percentage of children as they cannot be interviewed alone due to safeguarding issues. Secondly, sample sizes are relatively small in relation data derived from surveys meaning that accuracy of data described is limited. This is particularly true in relation to parklands where data is unobtainable from bookings information. Thirdly, accuracy of visitor numbers is limited further by potential 'miscounts' by electronic counters located around the Park. There are 67 counters in total and multiple entrances create complications in accurately counting visitors, particularly within Parklands. As such, comparisons drawn between parklands and venues within this section should be treated as a rough guide only.

Overview of visitor numbers

- 2.2 The purpose of the Lee Valley Regional Park is defined in the Park Act as "...a place for the occupation of leisure, recreation, sport, games or amusements or any similar activity, for the provision of nature reserves and for the provision and enjoyment of entertainments of any kind."¹
- 2.3 The Park's current vision is to provide 'A world class leisure destination', attracting visitors from London, Essex, Hertfordshire and further afield. Its status as a visitor destination is reflected in its designation as one of the nine Strategic Cultural Areas in London in the most recent London Plan. Strategic cultural areas are those areas identified by the Mayor as containing major clusters of visitor attractions and is linked to Policy 4.6 which states:
- "The Mayor will and boroughs and other stakeholders should support the continued success of London's diverse range of arts, cultural and professional sporting and entertainment enterprises and the cultural, social and economic benefits that they offer to residents, workers and visitors."*²
- 2.4 Visitor numbers to the Park have increased by 46% over the last five years; with over 6.5 million visitors to the Park in the year 2015-2016 (see **Figure 2.1**).³ The recent increase in Park visitors may partly be explained by visitors to 2012 Olympic Venues owned by the LVRPA and run by the Lee Valley Leisure Trust. These venues include the Lee Valley White Water Centre, Lee Valley VeloPark and Lee Valley Ice Hockey and Tennis Centre. Each legacy venue has grown its programme of events in recent years, thereby encouraging more people taking part in activities. However, investment and growth of events within parklands has also influenced visitor numbers. For example, investment in the River Lee Valley Country Park has resulted in the opening of natural play sculpture trail and improved facilities at the Bittern Information Point (BIP) such as extended opening hours and café facilities. The River Lee Country Park also holds a number events and activities and monthly Ranger led walks. An increase in youth and schools visits has also contributed to visitor number increase.⁴ More information on events can be found in Section 5 of this report.
- 2.5 In 2015 venues accounted for 35% of visits to the Park (2.35 million visits). Therefore, the majority of visits (65%) were to the wider parklands and open spaces (See **Figure 2.2**).

¹ Section 12(1) Lee Valley Regional Park Act 1996

² Mayor of London (2016). The London Plan. P158

³ Visitor data from the Lee Valley Regional Park Authority

⁴ Visitor data from the Lee Valley Regional Park Authority

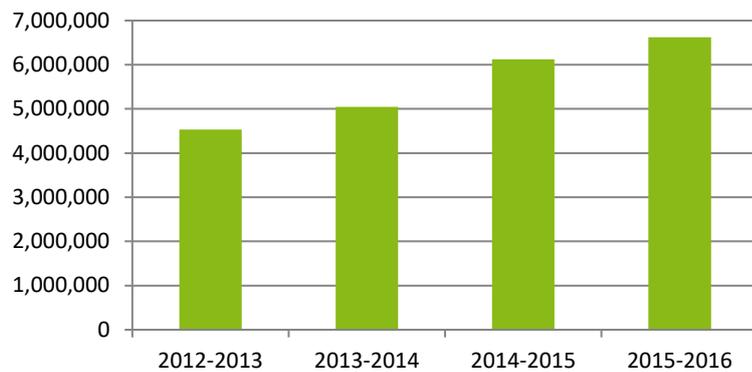


Figure 2.1: Visitor numbers to the Lee Valley Regional Park including built venues

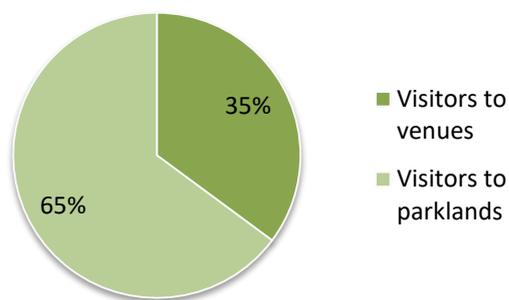


Figure 2.2: Visits to the Park broken down by venues and parklands

Age profile of visitors

- 2.6 Over a quarter of visitors to the Park are aged over 55 (30%). A small proportion of visitors are aged 16-24 (5%). The age profile of other visitors is evenly spread (see **Figure 2.6**).
- 2.7 The age profile changes when broken down into venues and parklands. Greater numbers of those aged over 55 (37%) are visiting the parklands compared with venues (see **Figure 2.3** and **Figure 2.5**). In contrast, a larger proportion of those aged 16-25 are visiting venues compared with parklands, with this cohort accounting for 3% of visits to Parklands. This would indicate that Parklands may have limited attractiveness to young people, although it should be noted that some visitors will be aged under the age of 15. **Figure 2.4** shows the age profile of visitors to venues only including the 0-15 cohort, indicating that venues in the Park are attractive to children.
- 2.8 It should be noted that **Figures 2.3, 2.4, 2.5** do not include those aged under 15 for the reasons above.
- 2.9 It should also be noted that the age profiles shown below do not take account of Lee Valley WaterWorks Centre, Lee Valley Camping & Caravan Park Edmonton and the Lee Valley Campsite Dobbs Weir as data on age was not available for these particular venues.

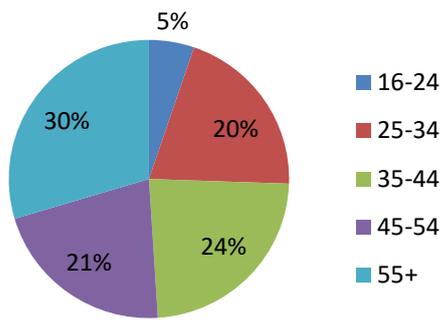


Figure 2.6: Age profile of visitors to LVP including venues and parklands

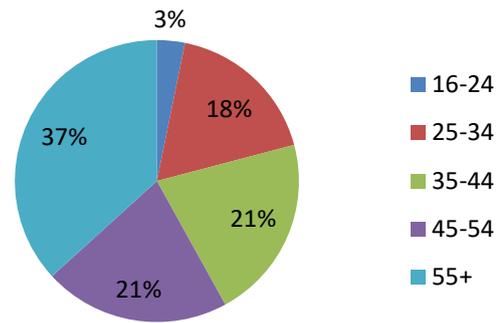


Figure 2.3: Age profile of visitors to parklands only

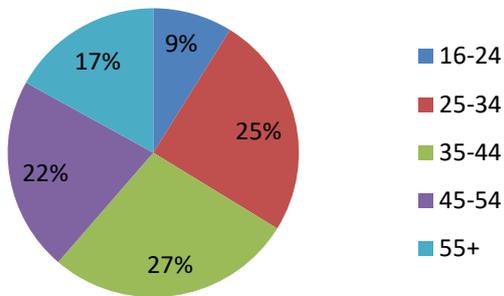


Figure 2.5: Age profile of visitors to venues only

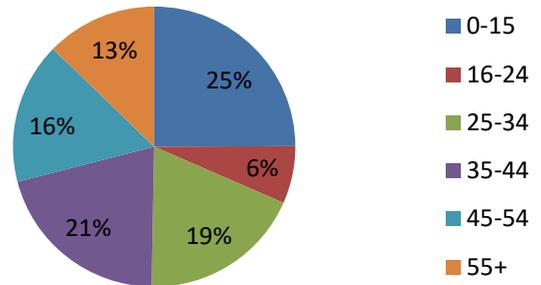


Figure 2.4: Age profile of visitors to venues only including 0-15 cohort

Frequency of visits to the Park

2.10 Survey data suggests that a large number of visits to the Park are repeat visits (see **Figure 2.7**). Only 21% of survey respondents indicated that they were on a first time visit to a particular site. **Figure 2.7** and **Figure 2.9** show frequency of visits broken down by venues and parklands. They show that more regular visits (once a week) are made to venues compared with parklands.

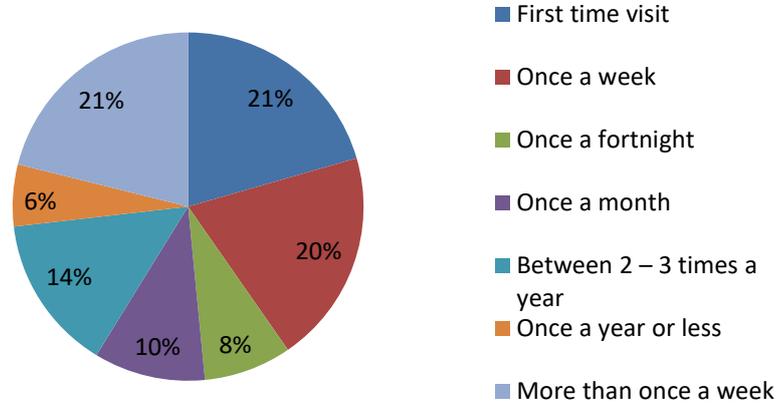


Figure 2.8: Visitor frequency including venues and parklands

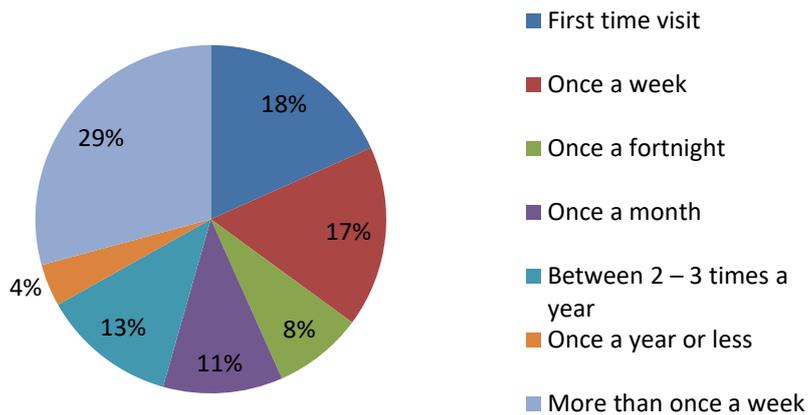


Figure 2.7: Visitor frequency (parklands only)

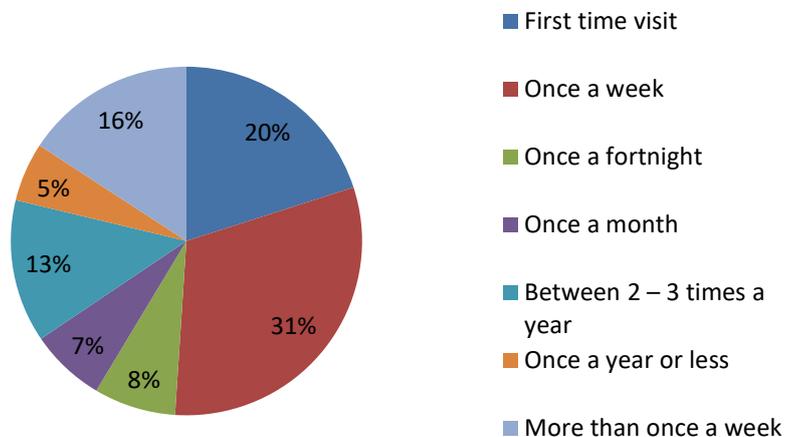
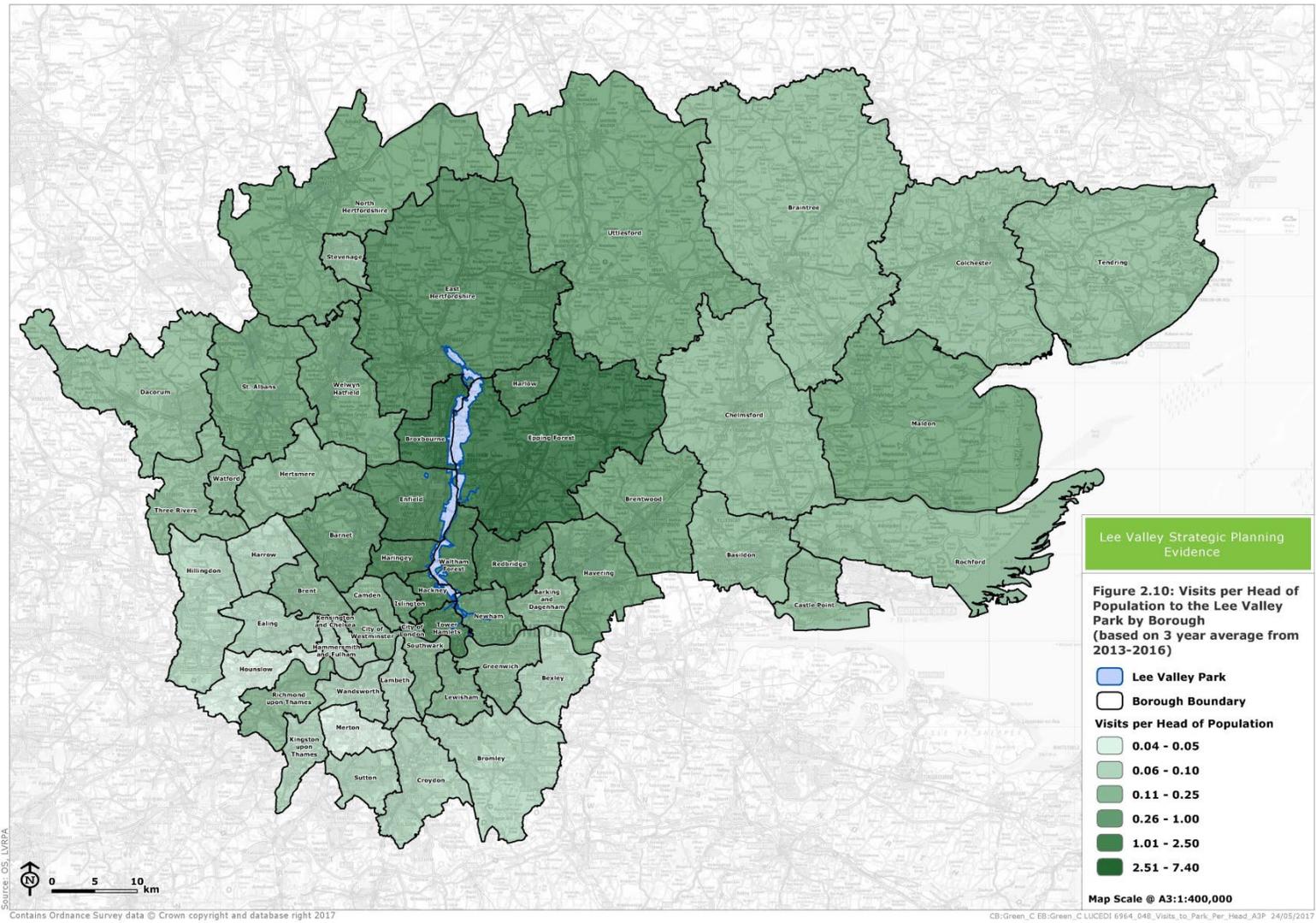


Figure 2.9: Visitor frequency (venues only)

Spatial differences in visitor numbers

- 2.11 **Figure 2.10** shows the number of visits to the park per head of population from the Riparian Authorities, other London Boroughs and Essex and Hertfordshire. These are based on a three year average from 2013-2016. By virtue of proximity, the majority of visits come from the Riparian Authorities. However, the number of visits per head also varies between the Riparian Authorities. For example, there are fewer visits from some of the London Riparian boroughs compared with Epping Forest District and Broxbourne. These variations may reflect the accessibility and amenity value of those areas of the Park near to the Riparian Authorities. For example, access to the Park in parts of Enfield is limited by the industrial uses at the edge of the Park. There are also land uses here within the Park that have little or no amenity value, such as the two large reservoirs.
- 2.12 Although visits to the Park have increased in recent years, there is scope to increase visitor numbers. **Figure 2.10** shows that there are no more than 2.5 visits per head per year from the Riparian Boroughs. This number is relatively low taking into account that many visits are repeat visits (see **Figure 2.8** above). However it should be noted that the potential to increase visitor numbers in some areas is limited by ownership considerations and security.

Figure 2.10: Annual Visits per Head of Population to the Lee Valley based on 3 year average from 2013-2016



Accessibility and Transport

- 2.13 Transport and accessibility affects the use of the park and visitor numbers in different locations. **Figure 2.12** shows the main entrance points into the Park (for vehicles, cyclists and pedestrians). In many areas there are large distances between entrance points in the Park, which limits accessibility from surrounding areas. Described below in more detail is accessibility in terms of the three main forms of transport servicing the Park.

Rail

- 2.14 The London Liverpool Street to Cambridge rail line runs along the western edge of the park, with five or more trains per hour with good connections to Stratford and Central London. The stations serving the south of the Park along this route are Stratford, Lea Bridge Road, Clapton, Tottenham Hale, Northumberland Park, Angel Road, Ponders End, Brimsdown and Waltham Cross. The stations serving the north of the Park are Cheshunt, Broxbourne, Rye House, St. Margarets, Ware and Roydon. The proposed four-tracking between Coppermill Junction and Broxbourne Junction alongside Crossrail 2 is likely to improve frequency along this route further (see **Figure 2.13**).
- 2.15 The eastern side of the Park is less well served by rail. In the north only Roydon Station provides suitable entry with two trains stopping every hour. The south of the Park is better served, with Lea Bridge station and Stratford providing good connected services.
- 2.16 The south of the valley is traversed by a number of additional railway lines, with services provided by London underground and the Docklands Light Railway. Many of the stations lie some distance from the Park's boundaries and in spite of signage, entry to the Park is often difficult to locate, especially for visitors who are new to the area.
- 2.17 Despite the good rail links, visitors by rail make up only 4% of journeys to the Park (see **Figure 2.11**). This may reflect the fact that access from many rail stations to the Park can be unclear and uninviting.

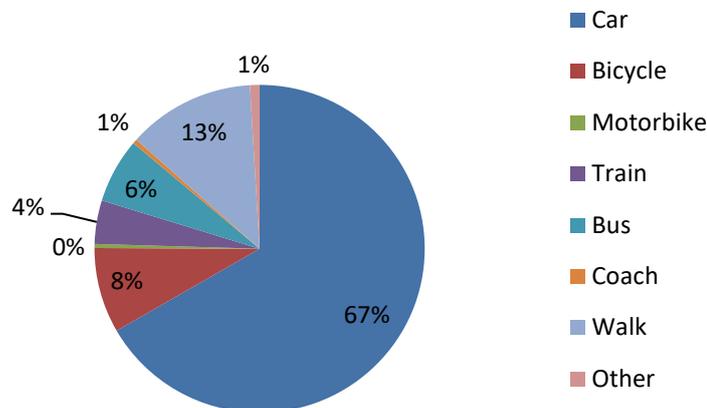


Figure 2.11: Mode of travel to the Park 2015-16

Figure 2.12: Existing Access by All Modes

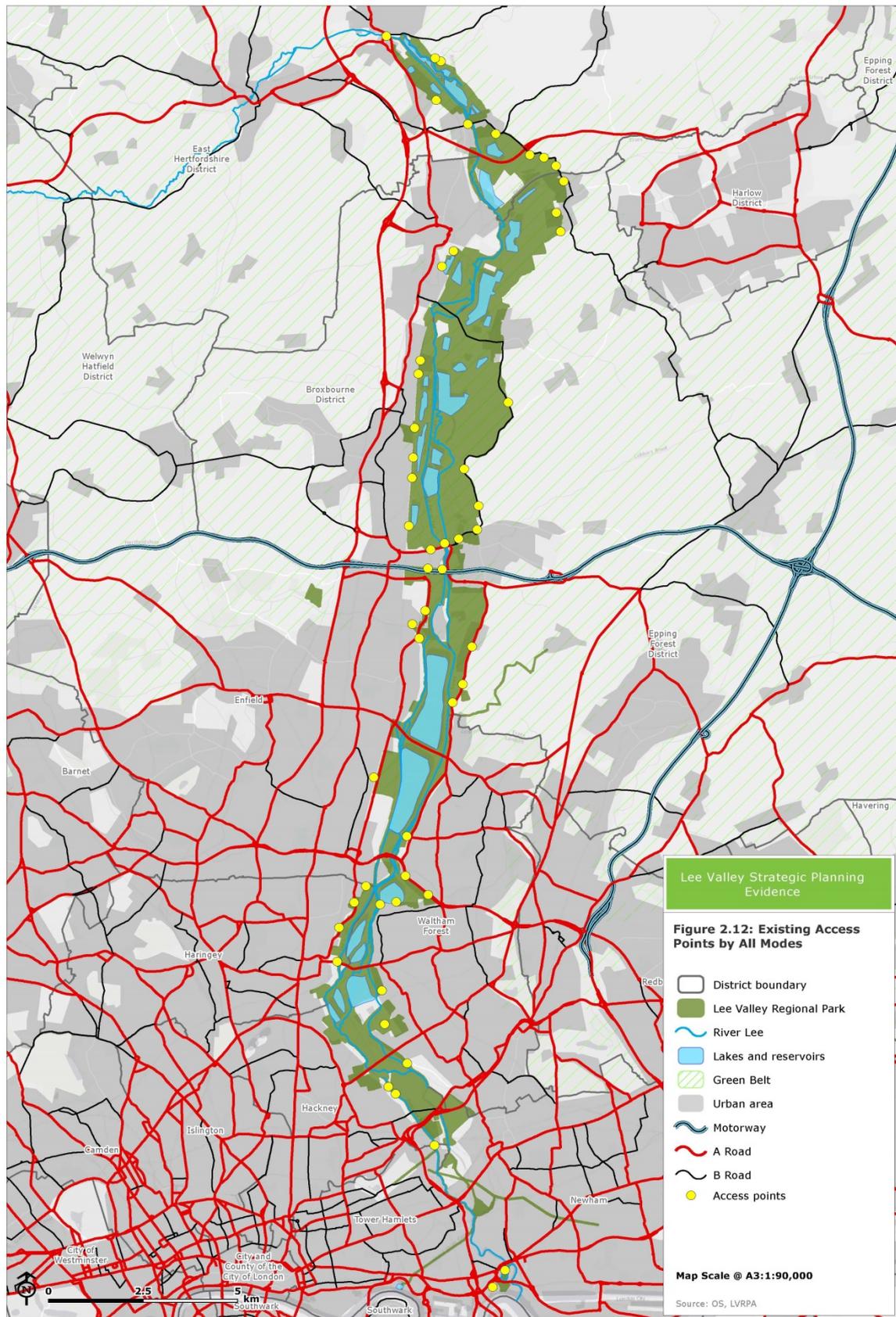
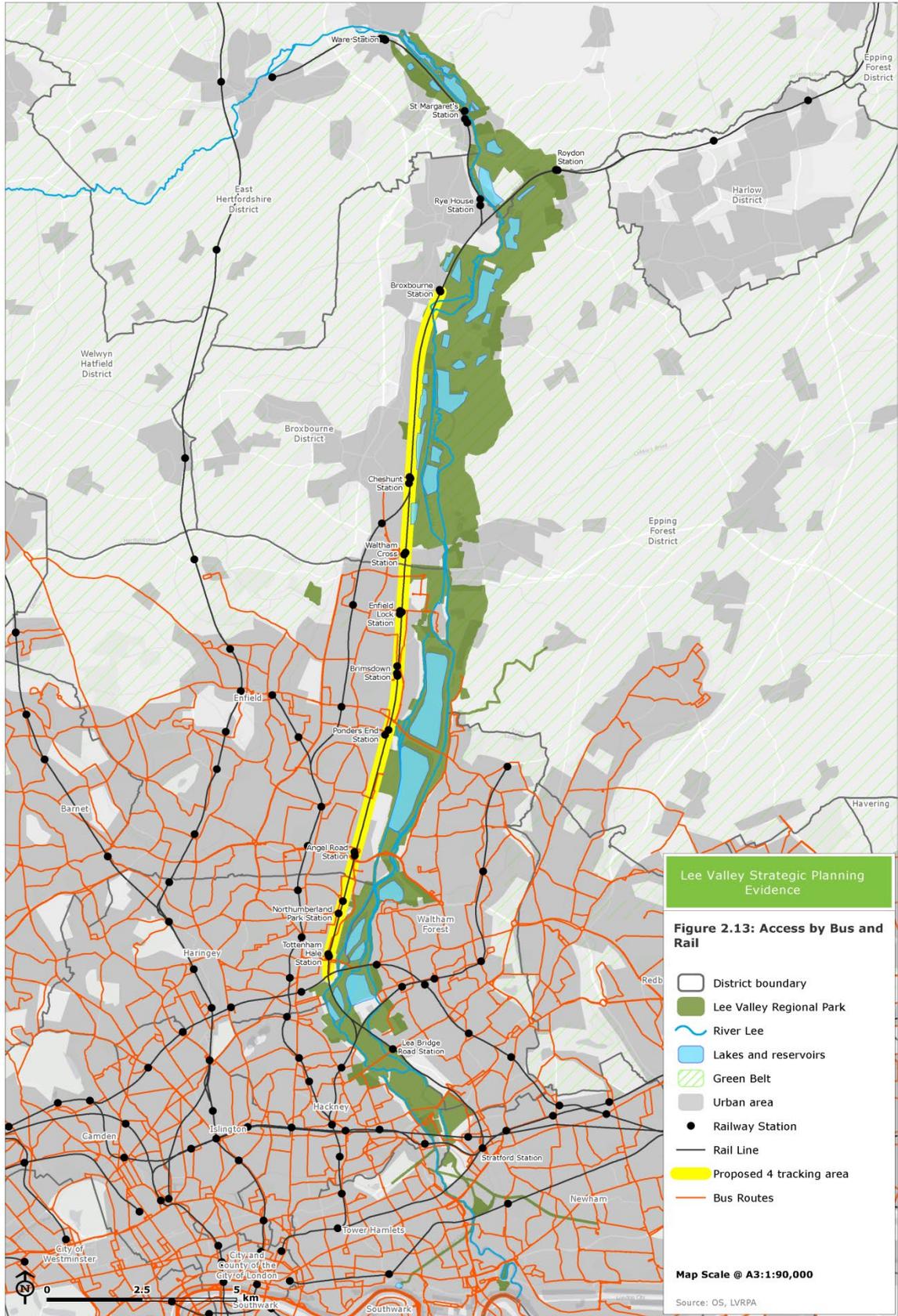


Figure 2.13: Access by Bus and Rail



Bus

- 2.18 Within London an extensive bus network serves the venues although beyond the M25 motorway the network is considerably reduced. (see
- 2.19 **Figure 2.13**) Most of the Park's facilities are accessible by one or more bus services. However, bus stops are not always located in close proximity to all facilities and in the north of the Park, bus services tend to be lower frequency with longer waiting times, thereby reducing convenience for visitors. Bus services make up only 6% of trips to the Park.

Car

- 2.20 The vast majority of journeys to the Park are made by Car (67%) (See **Figure 2.11**). This reflects overall reasonable access by car for the Park (see **Figure 2.14**). This access is supported by a number of car parks located throughout the Park at entrances and next to Park facilities.
- 2.21 Vehicle access is reliant on a mixture of A and B roads running alongside, and across the Park's boundary. To the west, north-south access is primarily provided by the A10 London-Cambridge Trunk Road. This is supplemented by the A1010 Hertford Road, together with the North/South A1055 running from Waltham Cross to Tottenham Hale. To the east of the Park north/south access is provided by the A1037 running east of William Girling Reservoir, the A112 running from Chingford as far as the M25, and the B194 running from Waltham Abbey to Broxbourne. These key 'edge roads' provide important access to the Park's major facilities including the Lee Valley Leisure Complex, River Lee Country Park, Lee Valley Park Farms and Gunpowder Park. A number of other roads cross the Park from east to west, including one toll road operated by Thames Water. However, links into the Park from these east/west crossings are relatively few.⁵
- 2.22 Journey times to the Park vary considerably due to local road conditions, congestion, and whether a busy commuter route is used such as the A10, M25, and A104.
- 2.23 Car ownership varies significantly between the Riparian Boroughs. The Boroughs of Hackney, Haringey, Newham, Tower Hamlets and Waltham Forest have fewer cars per household than northern Boroughs of Enfield, Epping Forest, Broxbourne and East Hertfordshire.⁶ As such, good accessibility to the Park by other means of transport is particularly important in the south of the Park in order to attract visitors.

Walking

- 2.24 Pedestrian access to the Park from many surrounding urban areas is restricted by barriers including major roads, rail lines, waterways, industrial areas and private land. Of particular significance is the West Anglian Mainline which impedes access to the Park around Walthamstow and then creates a barrier to the west of the Park north of Tottenham through to Ware in Hertfordshire. Pedestrians (and cyclists) are also forced to follow routes that pass under major roads; the A414 in the north, the M25 and North Circular. The A1055 Trunk Road running west of the Park from Tottenham Hale to Waltham Cross creates a hostile environment for pedestrians accessing the Park. In the north the B194 restricts movement from the east to the River Lee Country Park and Nazeing area and limits options for footpath connections with Epping Forest.
- 2.25 There are number of strategic walking routes running through the Park (See **Figure 2.15**). These include the Lea Valley Walk, which provides a key long distance route stretching 50 miles from Bow Locks to the source of the River Lea at Luton, the New River Path another long distance route which passes through the Park in Ware and skirts the Park boundary as it heads south, and the London Outer Orbital linking the Park at Swan and Pike Pool with a 150 mile path circumnavigating the capital.
- 2.26 Other walking opportunities are provided via east-west routes such as the Amwell Walkway Link, the Stort Valley Way and the River Thames Path allowing people to traverse the valley and link into other routes and circular path networks within the sites e.g. the River Lee Country Park, Gunpowder Park and Walthamstow Marshes.

⁵ Lee Valley Regional Park (2000). Park Plan: Part One

⁶ Tesseræ (2009) Lee Valley Park Baseline Study

- 2.27 Despite these walking routes, there are differences in accessibility between and within sites for pedestrians using the Park.
- 2.28 The River Lee Country Park has an excellent network of circular paths which include good connecting routes through to Waltham Abbey in the south and areas of the Park to the North. In the south of the Park there are good connections from Lea Bridge Road into and within the adjoining Hackney Marshes and Walthamstow Marshes. In the north of the Park, new routes have been opened up around Glen Faba and Dobbs Weir and along the River Stort which connect up with the Lee Navigation and existing cycle and pedestrian routes.
- 2.29 The proposed Lea River Park and Leaway route in the south of the Park will better connect up East India Dock Basin and Bow Creek to the Olympic Park and Three Mills. The Walthamstow Wetlands project once opened in September 2017 will enable access into part of the reservoirs, and will include a new north-south cycling and pedestrian route going south from Forest road.
- 2.30 There are areas where access could be improved. Links eastwards into St James’s Park and Low Hall are poor due to severance from railways lines and the River Lee Flood Relief Channel (FRC). From Tottenham Marshes north connections to Pickett’s Lock and Sewardstone are reliant on the towpath for walkers and cyclists and east west links are poor. This is due to large areas of land not owned by the LVRPA, including industrial areas, and the barrier created by the surrounding reservoirs. There is limited accessibility between **the Royal** Gunpowder Mills and adjoining routes and sites such as the Lee Navigation and Cheshunt Marsh. This is due lack of bridging points along the Lee Navigation, as well as access being reliant on Royal Gunpowder Mills Charitable Foundation Trust and their operation of the visitor attraction. North of Broxbourne, there is no connectivity between the Spitalbrook site and the existing walking and cycling network.

Cycling

- 2.31 Cycle access to the Park from adjoining areas is also limited in large part due to severance caused by major roads, industrial land, and railway lines (see **Figure 2.15**). The relatively few cycle networks in northern areas surrounding the Park also means that opportunities to cycle into the Park are limited to using the existing road network.⁷ There are some footbridges across the West Anglian railway line. However, these are currently not well suited to cyclists’ needs e.g. lack of ramps although Network rail are investing in new crossing points with ramps.
- 2.32 Within the Park, there are a number of cycle routes. The principal cycle route, which extends almost the entire length of the Park, is the National Cycle Network (NCN) route 1, which becomes NCN61 for the northern-most stretch of the Park from Rye House to Ware; NCN1 forks east across the Park towards Roydon. NCN1 joins the Park at Hackney Wick; from there, for the majority of the length of the Park, it follows the towpath and paths along the River Lee or River Lee Navigation. For the most part NCN1 is on traffic-free routes. For sections of the Park there are also multiple other north-south paths that cyclists can choose, such as between Cheshunt and Broxbourne or through Walthamstow Marshes. Several east-west cycle routes also cut across the Park with good provision of routes within the Olympic Park and to the north into Hackney and Walthamstow Marshes. East-west connections are also frequent between Waltham Cross and Rye House.
- 2.33 Whilst the Park has a strong cycling offer, as is the case with walking routes there are differences in provision within the Park and missing connections in certain areas. For example, in relation to north-south routes, choice is sometimes limited to the towpath; for example next to the reservoirs near Ponders End. There is also a lack of continuity in the southernmost section of the Park. There is also limited east-west cycling provision in certain areas. For example, east-west connections are poorer between Haringey and Enfield and Waltham Forest due to the barriers created by the reservoirs. In addition, east-west routes are limited from Rye House to Ware due to the barrier created by the railway line, although there is less demand to make east-west movements here given the sparser population⁸. Other issues restricting movement of access within the Park include sections of park with poor surfacing, pinch points where paths narrows, low bridges and encroaching vegetation.

⁷ Lee Valley Park Development Framework

⁸ Lee Valley Regional Park Authority (2017). Lee Valley Regional Park Cycling Strategy April 2017.

2.34 Further to physical barriers described above, there is still a lack of good signposting and mapping at entrances and nodes, as well as other forms of publicity. This limits the cycling potential of the Park despite the Authority’s recent investment in new wayfinding in the last 4 years. For example, knowing a cycle route’s destination is reassuring and encouraging for cyclists, particularly those who do not cycle regularly⁹.

Waterways

2.35 Waterways are a key feature of the Park and the Lee Navigation provides a recreational and commercial route throughout the length of the Park. The Lee Navigation provides links to the Stort Navigation, the Regent’s and Grand Union Canal, as well as the River Thames. **The Canal & River Trust is responsible for the Lee Navigation including the adjacent towpath and is a key stakeholder in relation to the waterway corridor, its heritage, biodiversity, visitor and general recreational use. The Trust is engaged in a series of improvement plans for the towpath to enhance walking and cycling opportunities.**

2.36 Common to waterways nationally the Navigation continues to experience growth in boating, which increases competition with other users of the waterspace. Access by boat is supported by two marinas at Stanstead Abbots and Springfield, each containing around 200 berths, with water and electricity points. The Authority also owns a boatyard at Stanstead Abbots. There are also other facilities to support boaters such as a number of moorings along the Lee Navigation with water and electricity points. **Figure 2.16** shows those water features supporting visits by boat.

Socio-economic profile of visitors

2.37 The large majority of visitors to the Park are from relatively more skilled backgrounds. **Figure 2.17** shows that only 2% of visitors to the Park come from social grade D and E. This is despite a comparably larger proportion of the Riparian Boroughs being made up of Grade D and E.

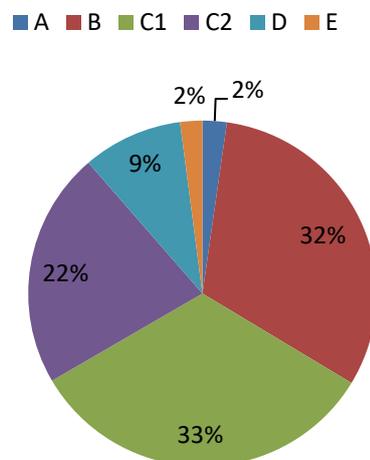


Figure 2.17: Visitors to the Lee Valley Park by Socio-Economic Category year 2015-2016

Visitor accommodation

2.38 There is a range of accommodation available in the Park helping to support visitors. These include camping sites at Sewardstone and Dobbs Weir, Broxbourne, as well as combined camping and caravan sites at Picketts Lock. The YHA hostel located within the Lee Valley Country Park also provides low-cost family accommodation. The hostel is comprised of Scandinavian style lodges with 30 rooms and communal facilities, and is capable of accommodating large groups. This has

⁹ Lee Valley Regional Park Authority (2017). Lee Valley Regional Park Cycling Strategy April 2017.

very high levels occupancy with many visitors using the accommodation to access both the Regional Park and central London. The Authority has recently launched an 'Almost Wild campsite' at Carthage, Broxbourne. Both the Stort and Lee Navigations provide considerable opportunities for 'casual cruising' for boaters managed by the Canal and River Trust.

- 2.39 There is hotel and B&B accommodation at Leyton, Tottenham Hale, Edmonton, Chingford, Cheshunt and Ware. However, many of these hotels are often located some distance away from Park facilities, thereby limiting the visitor offer.
- 2.40 For those visiting by boat there are also a number of temporary moorings available.

Visitor facilities

- 2.41 In addition to visitor accommodation, there are a range of other facilities that are integral to attracting visitors. These include cafes, visitor centres, information points, signage, toilets and pubs located within or just outside the Park.
- 2.42 However, such facilities are not available at all attractions / sites with facilities limited at other sites, such as Glen Faba, East India Dock Basin and Bow Creek Ecology Park. Whilst not all types of facilities are appropriate in all locations there is scope to strategically provide new facilities to enhance the visitor offer.
- 2.43 The quality of facilities also varies between sites. For example, modern toilet and café facilities are located at more recently developed or renovated sites such as the Lee Valley White Water Centre or Myddelton House Gardens. Conversely, sites with older facilities, such as the Waterside Café at Stonebridge Lock, managed by CRT, Tottenham Marshes are of relatively poorer quality and could be significantly enhanced. The differences in quality and provision of visitor facilities combined with other factors including transport accessibility and high quality landscapes has resulted in some locations, such as Fishers Green, being subject to intense visitor pressure, whilst other locations are less well visited. As such, enhancing and adding new facilities will be important for the Park in addressing visitor pressures at existing visitor hubs to spread the spatial impact of demand.

Figure 2.14: Access to the Park by Road

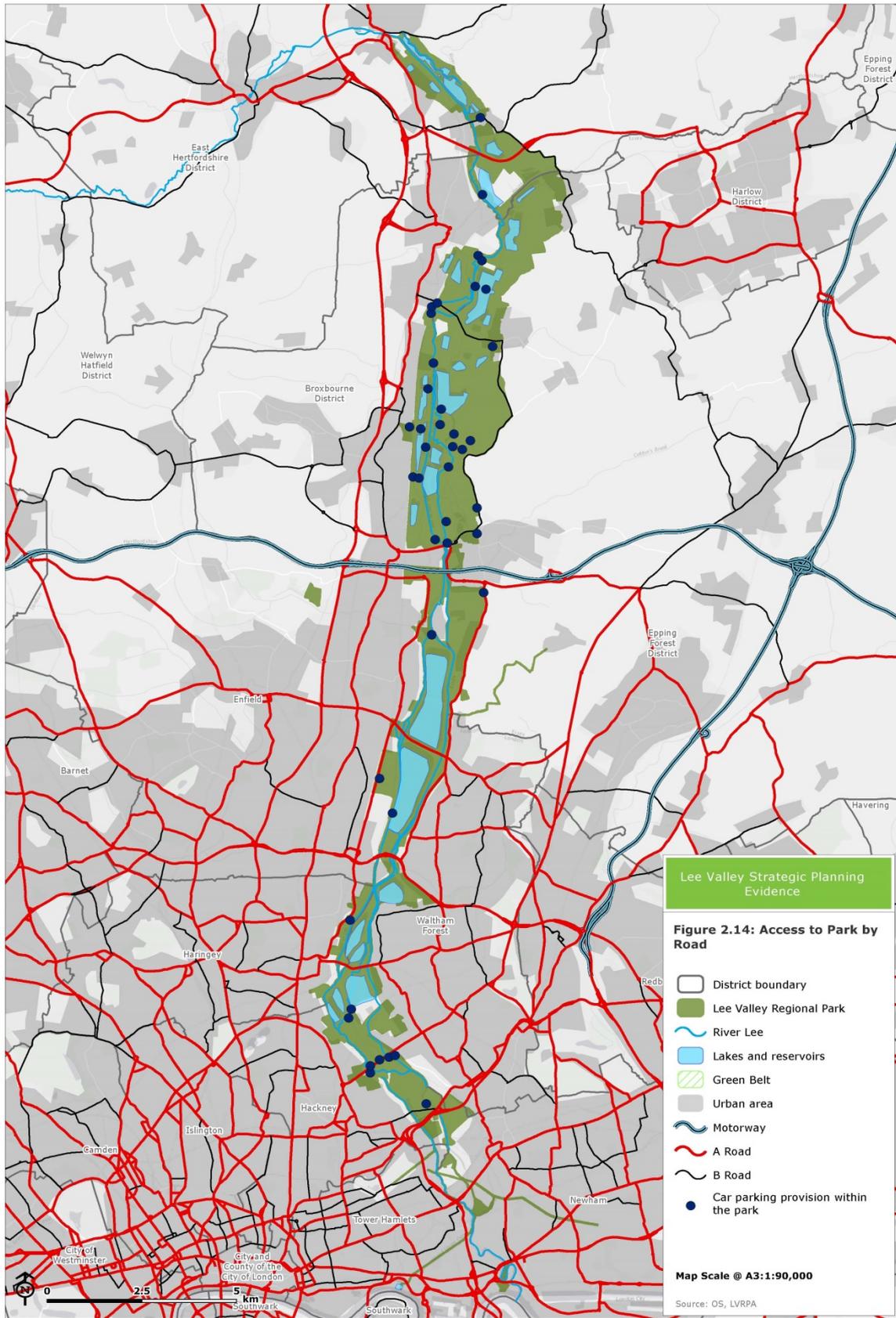
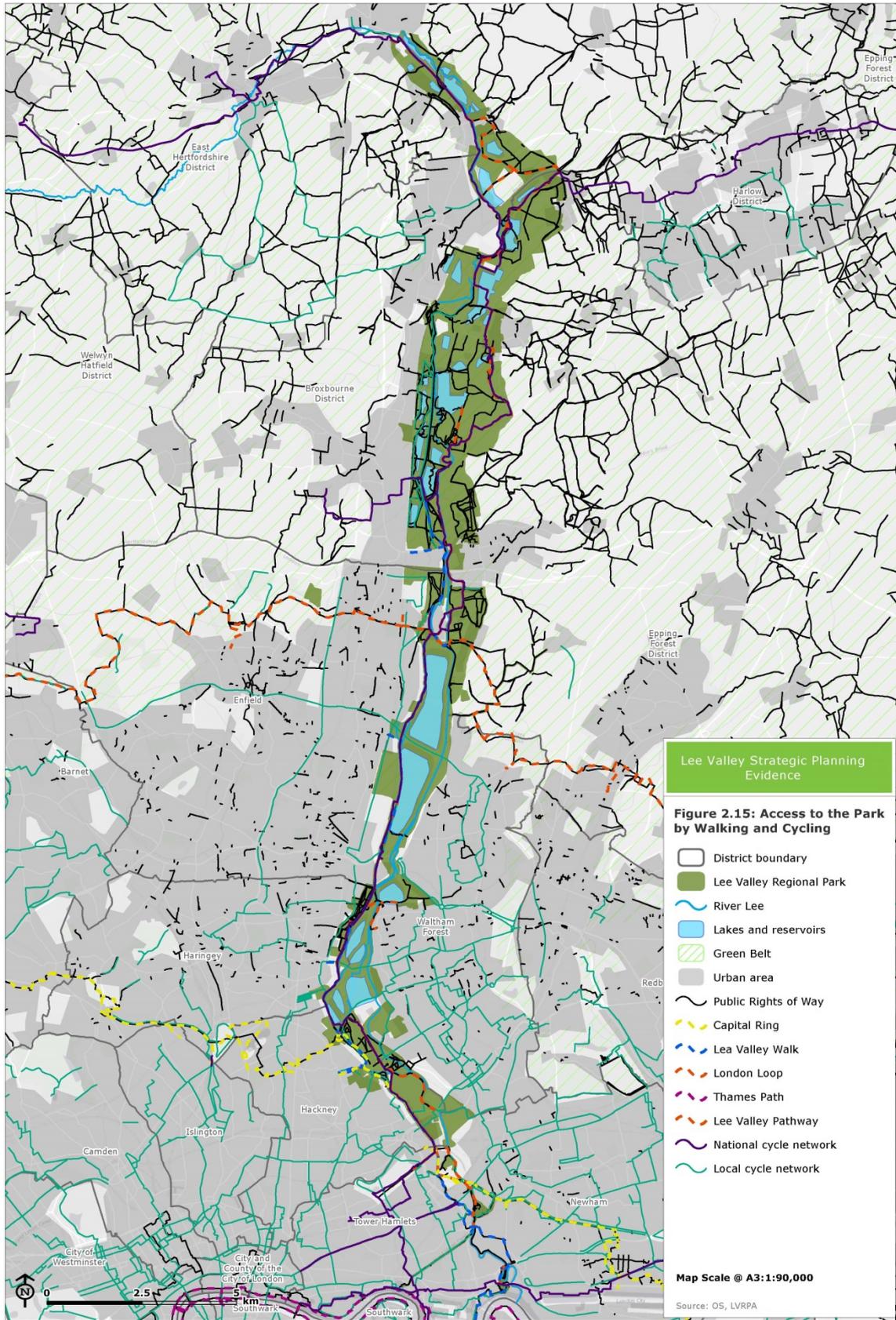


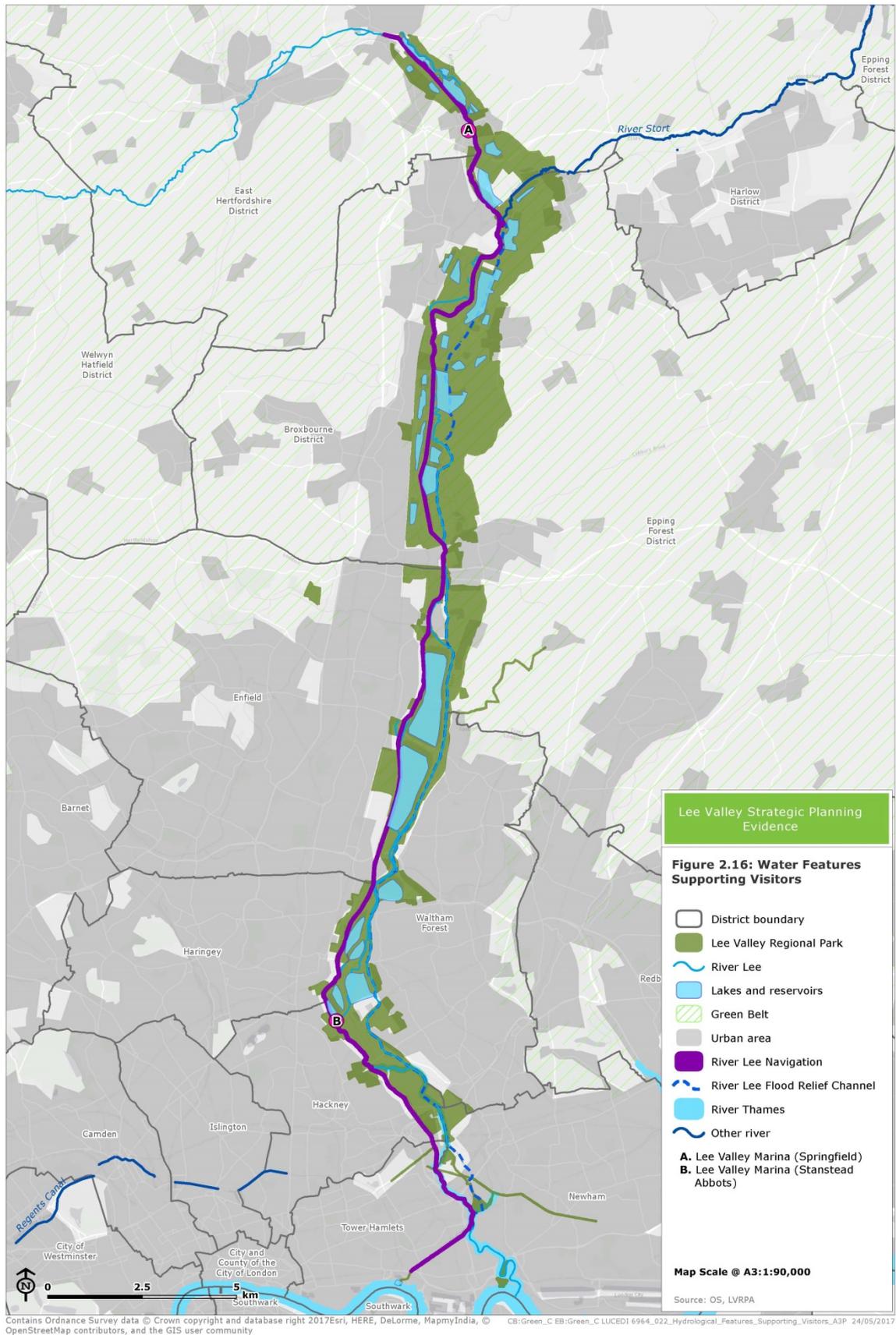
Figure 2.15: Access to the Park by Walking and Cycling



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Figure 2.16: Water Features Supporting Visitors



Issues

Limited entrance points

- 2.44 Along the Park's boundary, there are often long distances between entrance points. This limits accessibility to the Park from surrounding areas and so restricts potential visits to the Park.

Accessibility by foot and bicycle

- 2.45 Accessibility by foot and by bicycle is restricted in many areas due to convoluted routes and severance caused by railway lines, roads and industrial areas. As such, access to the Park could be improved through bridge construction and road crossings, and enhancing the quality and legibility of routes into the Park.

Accessibility by rail

- 2.46 Despite the good links to National Rail, London Underground and DLR, visitors by rail make up a very small proportion of journeys to the Park. However, the incorporation of the current West Anglia line stations into the proposed Crossrail 2 will increase opportunities for visitors to arrive by rail. There is also scope to improve legibility of routes between the stations and the Park, through provision of clear signage and high quality public realm and locate new access points where required.

Attracting younger people

- 2.47 Even accepting for the limitations on data collection a small proportion of visits to the Park are made by 16-24 year olds. This is particularly the case in relation to Parklands (3% of all visits). Although this reflects a national trend, there is potential to attract more young people to the Park, both for formal and informal sport, recreation and play.

Poor provision of visitor facilities

- 2.48 Lack of high quality visitor facilities including toilets, information points, signage and eating facilities limit attractiveness to visitors in some areas of the Park.

Pressure on some visitor destinations

- 2.49 Certain locations within the Park, such as Fishers Green, are subject to excessive visitor pressure, while others are less well visited. Linked to the point above, enhancing signage, accessibility, creating new hubs with new and enhanced visitor facilities could be a way of addressing this pressure.

Potential for boat users to detract from wider enjoyment of the waterways

- 2.50 Residential and commercial moorings on navigable waterways can put pressure on the waterways and create conflict with other Parks users, including walkers, cyclists, pedestrians and residents.

Limited accommodation offer

- 2.51 There are a variety of accommodation types at sites throughout the Regional Park but these should new sites could be developed to directly serve venues.

Encouraging visitors to stay longer

- 2.52 Linked to the point above, where there is visitor accommodation located within or close to the Park, Park attractions will need provide activities that encourage overnight stay.

Access restrictions due to land management requirements

- 2.53 There are some areas of the Park, such as the water storage reservoirs, where opportunities to provide recreation for visitors is limited by the management policies of the owners. King George V and William Girling Reservoir, owned by Thames water, play an important role in providing drinking water to London. There is limited restricted public access in the form of sailing on the King George V reservoir but this does not extend to general access. Both reservoirs have strict

general public access controls because of security and health and safety requirements outlined by DEFRA. Steep banks, and presence of equipment including pipes, pumps etc. are also reported by Thames Water to limit safety and accessibility to these sites.¹⁰

- 2.54 There may be opportunities, however, to negotiate better access to certain sites for recreation. The Walthamstow Wetlands is a good example of improved access to a reservoir site through negotiation with Thames Water¹¹.

¹⁰ Thames Water (2008). Consultation response to Enfield Council's Policy on Central Leaside Area. [online] pp.5-8. Available at: <http://consult.enfield.gov.uk/file/404783> [Accessed 9 Aug. 2017].

¹¹ <http://www.woodberrywetlands.org.uk/about/>

3 Sport and Recreation

- 3.1 Providing sport and recreational opportunities is one of the primary purposes of the Park. The provision of these facilities and spaces affords health and wellbeing benefits for individuals and communities who use them.
- 3.2 The Park provides a wide range of opportunities for sport and recreation. These are supported by a variety of different land uses within the Park, including water bodies, built sport facilities, linear paths and a variety of open spaces. The following paragraphs describe the main activities in the Park. **Figure 3.1** and **Figure 3.2** show the locations of key facilities and spaces supporting these activities.

Formal sport

Athletics

- 3.3 Towards the centre of the Park at Picketts Lock in Edmonton is the Lee Valley Athletics Centre which supports both indoor and outdoor athletics for elite athletes and the general public. In 2015-16 there were around 197,000 visits to the Lee Valley Athletics Centre.

Tennis, hockey and cycling

- 3.4 The Queen Elizabeth Olympic Park includes the Lee Valley Hockey and Tennis Centre and Lee Valley Velopark. The Velopark affords a number of different cycling activities including track, road, BMX and mountain biking. Both facilities are open to public and host elite cycling hockey and tennis events. In 2015 The Lee Valley Hockey and Tennis centre and the Lee Valley Velopark attracted around 172,000 and 822,000 visitors respectively.

Horse Riding

- 3.5 Located near Lea Bridge Road, the Lee Valley Riding Centre comprises an indoor arena and two floodlit outdoor arenas open to the public for riding lessons. The centre also runs riding sessions for the disabled in partnership with the Riding for the Disabled Association. There are also 24 stables at the centre for private livery. In 2015 the Lee Valley Riding Centre attracted around 158,000 visitors.

Ice Skating

- 3.6 Also located near Leyton Bridge is the Lee Valley Ice Centre which provides space for figure skating, ice hockey and public skating sessions. The centre is the Park's second most popular venue after the Lee Valley Velopark and attracted around 333,000 visitors in 2015. There are currently plans to redevelop the existing ice centre into a twin pad ice rink. This will significantly extend the capacity of the existing building and promises to make a significant contribution to the provision of 'ice' nationally.

Golf

- 3.7 Located to the west of William Girling Reservoir is the Lee Valley Golf Course which allows both members and non-members to play on the course. The golf course attracted around 16,400 visitors in 2015.
- 3.8 Golfing activity is also provided at Chingford Golf Range adjacent to William Girling Reservoir.

Outdoor Team sports

- 3.9 The southern part of the Park contains a large number of playing fields for outdoor team sports including cricket rugby and football. These include Chingford Ruby Club, football pitches at

Hackney Marshes and in local parks within the Regional Park, cricket at the northern end of Hackney Marshes. In the south of the Park are the Douglas Eyre Playing Fields at Coppermills Lane, Low Hall and St James' Park playing fields, and the Lee Valley Playing fields at Chingford. The majority of these are the responsibility of the riparian local authorities.

Rafting, swimming, canoeing, sailing, rowing, and windsurfing

- 3.10 Still-water canoeing, swimming, sailing, rowing and windsurfing are activities facilitated by a number of outdoor activity centres. Key facilities include the Herts Young Mariners, Enfield Scout Sailing Club (ESSA), the Leaside Educational Trust, and the Lee Valley White Water Sports Centre which provides opportunities for schools and youth organisations to engage in these activities.¹² There are also a number of clubs supporting water-based recreation. These include Broxbourne Rowing Club, Broxbourne Sailing Club, Lea Rowing Club, King George Sailing Club and Hertford County Yacht Club in Stanstead Abbots.

Informal recreation and other leisure activities

Walking

- 3.11 Walking within the Park is facilitated by an extensive network of paths and tracks. Key north/south routes include the Lee Valley Walk, which provides a key long distance route stretching 50 miles from Bow Locks to the source of the River Lee at Luton, and the London Outer Orbital linking the Park at Swan and Pike Pool with a 150 mile path circumnavigating the capital.
- 3.12 There are also a number of east-west routes allow people to traverse the valley and link into north/south routes e.g. the Amwell Walkway Link, as well as number of circular walks such as those around Amwell and the River Lee Country Park.
- 3.13 The Park Authority also provides self-guided walks throughout the Park. These consist of both circular and linear walks of varying distances. Walks are often based around specific themes or features. For example Artworks, Locks and Lakes, Otter Discovery Trail and Valley views are some of the names given to different walks.

Cycling

- 3.14 The Lee Navigation towpath is suitable for cycling throughout its length. A 14 km circular cycle route has been established in the River Lee Country Park and a shared cycle/footpath has been created at Three Mills. A cycle track is also located parallel to the towpath on Hackney Marsh.
- 3.15 Another key route for cycling is the Lee Valley Pathway, a shared cycle pedestrian pathway which stretches from Hertfordshire to the Thames.
- 3.16 There are cycle hire points within the Park at Old Mill Meadows, Broxbourne, the View Tube and the eastward extensions of the Mayor's hire scheme into the QEOP
- 3.17 A number of the London highway authorities have implemented segregated cycle lanes which cross the Park such as at Lea Bridge Road linking the London Boroughs of Waltham Forest and Hackney, the cycle lane along Ferry Lane/Forest Road and the north-south cycle lane adjacent to Meridian Way.¹³

Natural Play

- 3.18 There is currently little traditional playground provision apart from those incorporated within visitor facilities. The main natural play opportunities are afforded by the Park's diverse range of open spaces.¹⁴ The River Lee Country Park, for example, contains a large number of sculptures using natural materials for children and adults to interact with.

¹² Sourced from websites of facilities stated i.e. <http://www.leaside.co.uk/>, <http://www.hymb.com/hymb-outdoor-centre/>, <https://www.gowhitewater.co.uk/>.

¹³ Lee Valley Regional Park (2000). Park Plan: Part One

¹⁴ Lee Valley Regional Park Authority (2010). Park Development Framework.

Horse Riding

- 3.19 There is limited provision of bridleways within the Park with one route on part of Walthamstow Marshes and a second short section along the boundary of Gunpowder Park. These provide opportunities for informal riding activity complementing more formal riding at the Lee Valley Riding Centre. Overall, equestrian use of the Park is limited due to physical constraints of rail, roads and waterways that traverse the area and by perceived conflicts with other uses.

Fishing

- 3.20 Angling is one of the most popular recreational activities in the Park and well catered for in terms of available water space. The major fisheries include Glen Faba, Abbots Lake, the Lee Navigation, the River Lea Weirpools, and natural sections of the River Lea. Overall there are over 30 different venues.

Boating

- 3.21 Recreational boating (i.e. non-competitive boating) is a major use within the park for both private and non-private users as the Lee Navigation forms part of the wider waterways network managed by the Canal and River Trust with connections to the Stort Navigation, Grand Union and river Thames. A key facility in this regard is The Lee Valley Boat Centre at Broxbourne which operates boat hire for rowing, electric and motor boats. The marinas at Stanstead Abbots and Springfield provide a base for exploring the upper reaches of the River Lea and Grand Union Canal.¹⁵

Lee Valley Park Farms

- 3.22 The Lee Valley Park Farms provide visitors with the chance to see working farm animals as well as more exotic animals. This includes visits from schools as the farms provide resources and facilities for school trips including guided and self-guided tours.

Community Gardening

- 3.23 The Park currently offers a small number of allotment sites, which provide a range of opportunities for food production. A good example of this is the Living Under One Sun Allotment project found on Millmead Road as part of the East Hale Allotment Association. This helps the local community to learn how to grow their own vegetables and recognise the importance of bees.

Enjoying and learning about heritage

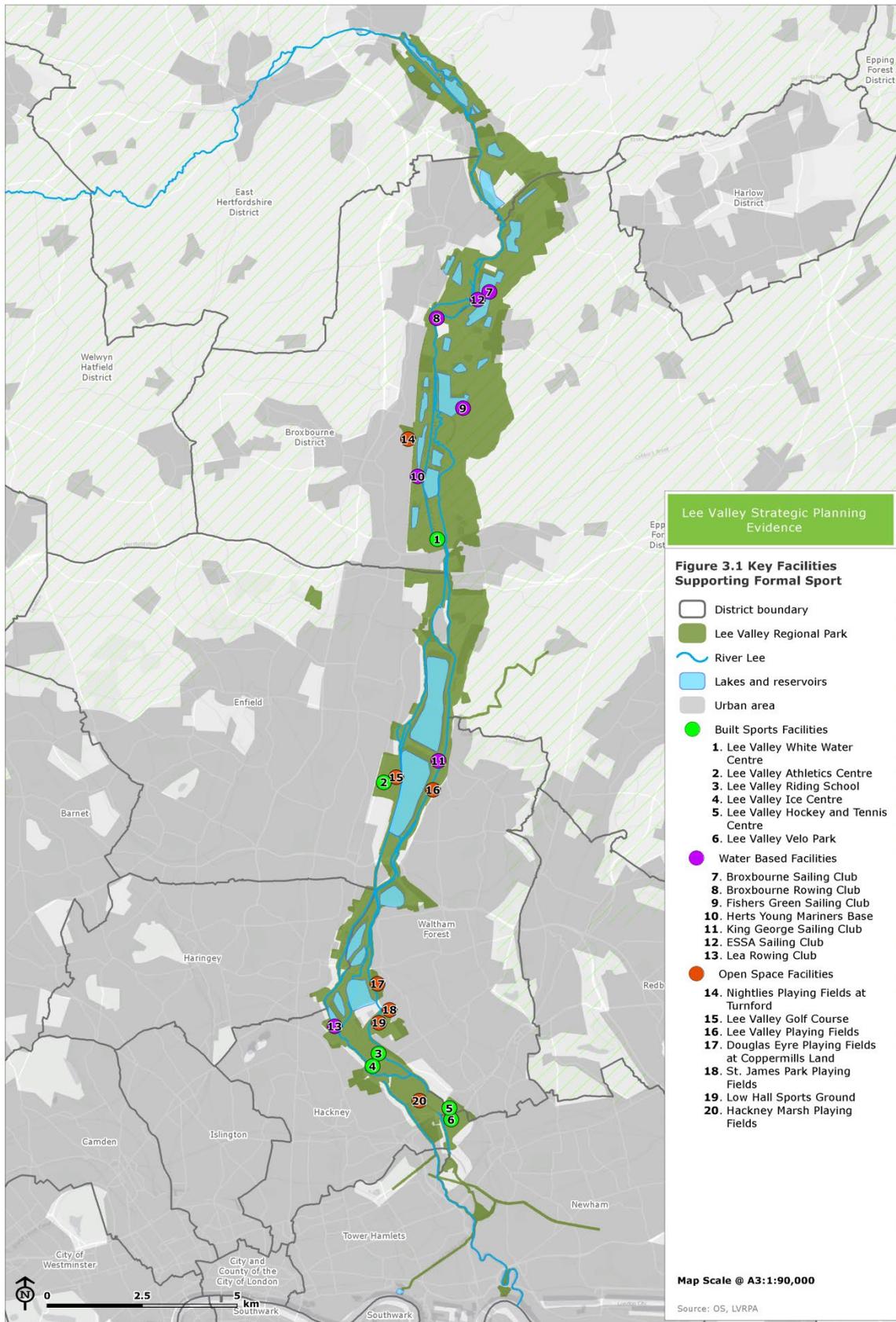
- 3.24 The Park offers a number of opportunities to enjoy heritage in the Park. This is covered in more detail in the next section. A key feature is the Markfield Beam Engine and Museum housed in its original Grade II listed engine house in Tottenham. Another feature is Royal Gunpowder Mills in Waltham Abbey, where visitors can learn about the site's extensive history of producing explosives.

Cinema

- 3.25 An ODEON cinema forms part of the Lee Valley Leisure Complex, which is owned and managed by the Park Authority.

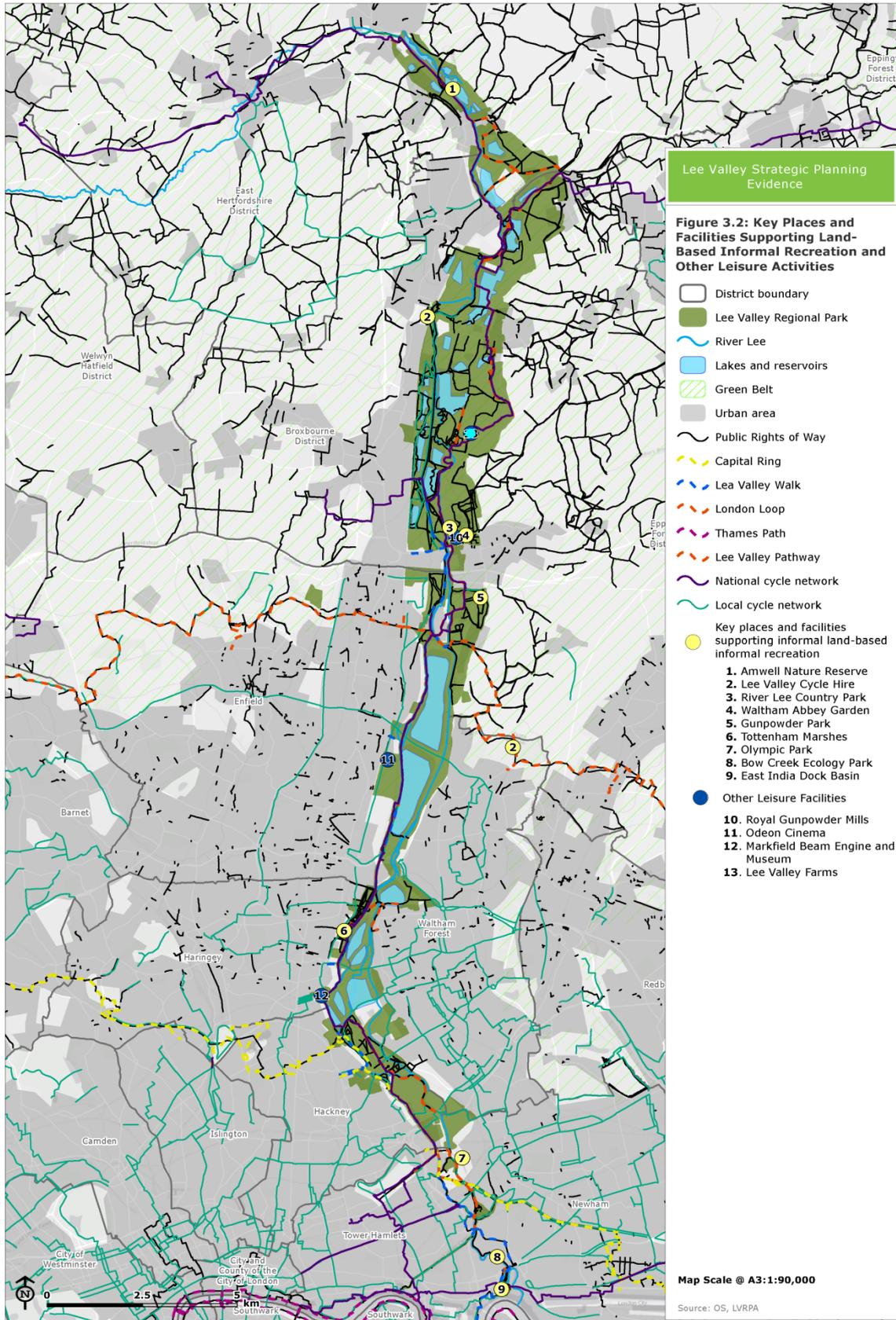
¹⁵ Lee Valley Regional Park (2000). Park Plan: Part One

Figure 3.1: Key Facilities Supporting Formal Sport



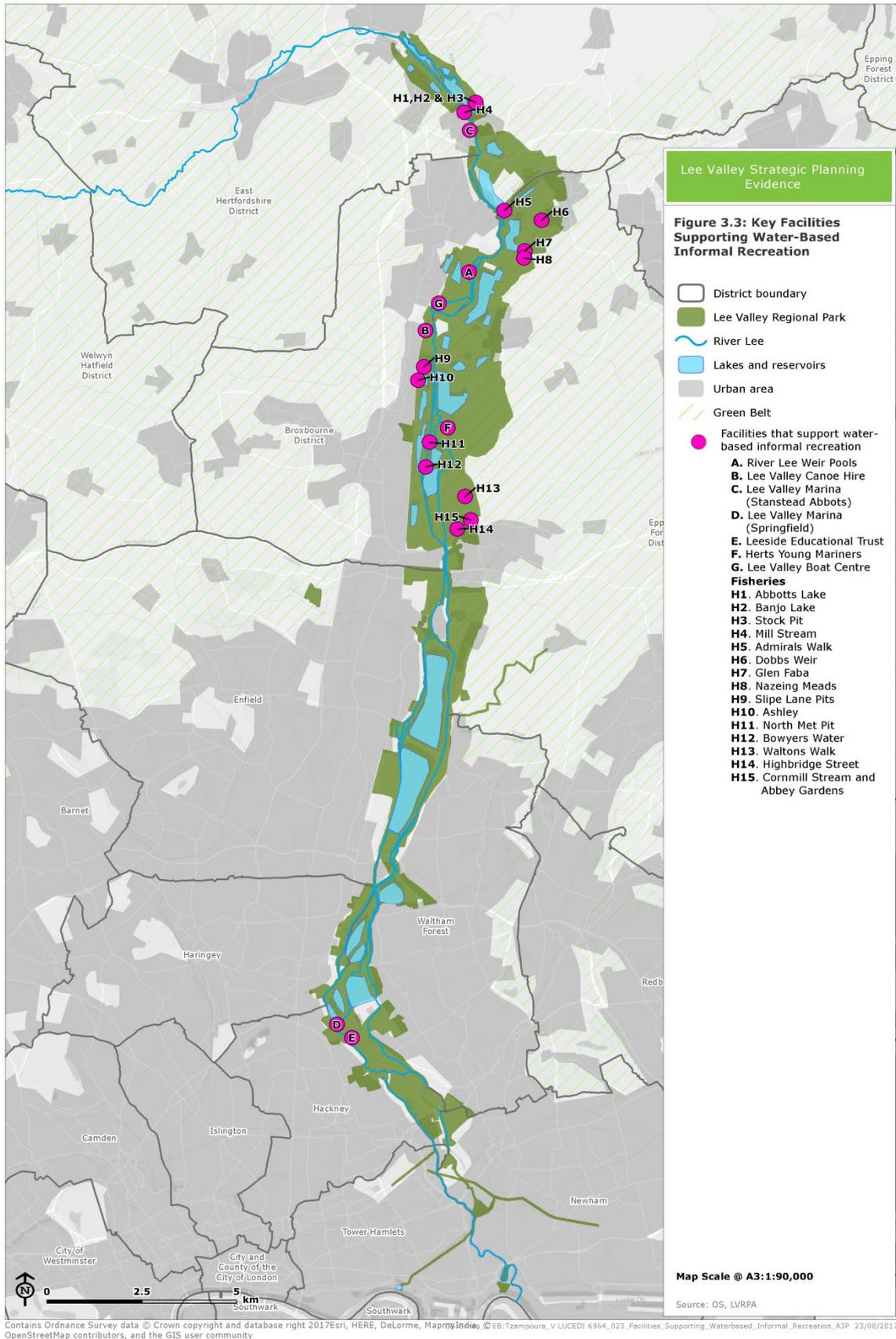
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Figure 3.2: Key Places and Facilities Supporting Land-Based Informal Recreation and Other Leisure Activities



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Figure 3.3: Key Facilities Supporting Water-based Informal Recreation



Enjoying and studying nature

- 3.26 The enjoyment of nature is a popular activity occurring throughout the Park with a number of sites providing access to nature (see biodiversity section for outline of sites providing access to nature.)
- 3.27 For example, nature reserves at Bow Creek, East India Dock Basin and Amwell Quarry provide key spaces for enjoying wildlife and employ different approaches to engaging the public. This ranges from panels used to communicate facts about wildlife to artworks which interpret aspects of the site history and wildlife.¹⁶
- 3.28 Bird watching is a popular activity, making up 6% of all visits to the Park. Bird watching facilities can be found throughout the Regional Park. The Walthamstow Wetlands will open to the public in late 2017 as an Access to Nature site focussed on its habitat for birds.

Issues

Potential for informal recreational activity to adversely affect biodiversity

- 3.29 Informal recreation activities such as walking (including dog walking), cycling and bird watching all have the potential to disturb wildlife through noise and habitat change. The most recent HRA screening statement conducted for the Park notes the particular risks to designated bird species located within the Lee Valley SPA/Ramsar, as recreational activities can result in disturbance. In light of the above increasing access to sensitive ecological and environmental sites will need to be managed appropriately to safeguard biodiversity.

Potential for water-based recreational activity to adversely affect biodiversity

- 3.30 Water-based activities such as canoeing, kayaking, fishing motorised water sports have the potential to have an adverse effect on the environment through disturbance to habitats and wildlife. As such, attention needs to be paid to balancing nature conservation and water-based recreation.

Potential for formal recreational facilities to adversely affect the landscape

- 3.31 Built sports facilities play a beneficial role for health and wellbeing by providing places for formal exercise. However, provision of such facilities can detract from openness and tranquillity of the landscape.

Conflict between different forms of recreational activities

- 3.32 Different recreational activities can conflict with each other. For example, cycle routes can cause conflicts between walkers and runners due to varying speeds. Angling can also conflict with motorised boats, canoeing and kayaking activities.

¹⁶ Lee Valley Regional Park (2000). Park Plan: Part One

4 Biodiversity

- 4.1 The Park provides an extensive natural resource for people and wildlife in London and the south east. It provides an important green corridor / migration route, from the River Thames extending along the River Lea into Essex and Hertfordshire.¹⁷
- 4.2 Having once comprised marshland and forest, the Park now provides a diverse range of habitats, old and new. With the River Lee at its core, human influences have created flood relief channels, gravel pits and other human artefacts such as pill boxes which can benefit wildlife¹⁸.

Key habitats and species within the Park

- 4.3 The main habitat types found within the Park are: rivers and streams; standing open water; grassland and fen; woodlands; and urban (especially post-industrial habitats).¹⁹
- 4.4 Over 200 species of bird have been recorded in the Lee Valley with around 150 occurring annually. 32 species of mammal and over 500 species of flowering plant have been recorded throughout the valley. Below outlines in more detail important flora and fauna within the Park.

Plants

- 4.5 Submerged aquatic plants of clear, flowing or still waters, are one group of significance regionally and locally in the Park. They include the Fan-leaved Water Crowfoot (*Ranunculus circinatus*), Whorled Water-milfoil (*Myriophyllum verticillatum*), Shining (*Potamogeton lucens*) and Flat-stalked Pondweeds (*Potamogeton friesii*) and the nationally scarce River Water-dropwort (*Oenanthe fluviatilis*). Sections of the river system and gravel pits isolated from the river system are important for these plants. The Lee Valley gravel pits have also recently been identified as an important area for Stoneworts, a group of aquatic algae.
- 4.6 Wetland habitats also have their own distinctive flora. Water Speedwell (*Veronica catenata*) are uncommon locally while the Marsh Dock (*Rumex palustris*), which is very much a feature of temporary muddy habitats throughout the Park, is nationally scarce.
- 4.7 The Lee Valley is significant regionally and locally for the provision of wetland plants. However, wetland plants have generally been subject to severe reductions in range as wetland habitats have been become degraded or lost.
- 4.8 The remaining Fen and Meadow habitats within the Park remain a significant resource for a number of local species. These include Meadow-rue (*Thalictrum flavum*), Meadow Saxifrage (*Saxifraga granulata*), Slender Tufted Sedge (*Carex acuta*), Yellow Vetchling (*Lathyrus aphaca*) and Adders-tongue Fern (*Ophioglossum vulgatum*).
- 4.9 Marsh Arrowgrass (*Triglochin palustris*) occurs in relict damp grassland on the west side of King George Reservoir. Drier, sandier habitats typically support the locally uncommon Hares-foot Clover (*Trifolium arvense*), Annual Knawel (*Scleranthus annuus*) and Knotted Clover (*Trifolium striatum*). Creeping Marshwort (*Apium repens*) is a nationally rare species, found on Walthamstow Marshes, the only site outside of Oxfordshire.
- 4.10 There are a number of interesting communities of plants found on urban wasteland. These include Thorn-apple (*Datura stramonium*), ~~Greek Dock (*Rumex cristatus*)~~, Flax (*Linum usitatissimum*) and Warty Cabbage (*Bunias orientalis*).

¹⁷ Lee Valley Biodiversity Action Plan (2000)

¹⁸ Lee Valley Biodiversity Action Plan (2000)

¹⁹ Lee Valley Regional Park Authority(2010). Park Development Framework.

Invertebrates

- 4.11 Whilst there is lack of comprehensive data showing the complete extent and value of invertebrates within the Lee Valley, a number of rare species have been identified and their presence is likely to be indicative of rich invertebrate habitats.
- 4.12 Surveys conducted in the south of the Regional Park have identified a number of UK BAP species. These include Brown-banded Carder Bee (*Bombus humilis*), a planthopper (*Ribautodelphax imitans*), Latticed Heath Moth (*Chiasmia clathrate*) and Small Heath Butterfly (*Coenonympha pamphilus*), a beetle (*Olibrus flavicornis*) and the tephritid fly (*Acinia corniculata*). There is also a population of Cave Spider (*Meta bournetti*) in the Pill boxes on Gunpowder Park.
- 4.13 Aquatic molluscs have been identified at the Cornmill Stream and Old River Lee and include the nationally threatened Red Data Book Shining Ramshorn Snail (*Segmentina nitida*), associated with grazing marsh ditches. A number of other local or notable species also occur here or at nearby sites.
- 4.14 The large and spectacular Musk Beetle (*Aromia moschata*) is a nationally scarce species associated with willows, especially pollards. It has been found at several sites in the valley
- 4.15 The Orthoptera (grasshoppers and bush-cricket) are well represented in the valley. Roesel's Bush-cricket (*Metrioptera roeselii*), Short (*Conocephalus dorsalis*) and Long-winged Coneheads (*Conocephalus discolor*), Lesser Marsh Grasshopper (*Chorthippus albomarginatus*) and Slender Groundhopper (*Tetrix subulata*), are all of at least local significance. The Lee Valley contains the richest orthopteran sites in Hertfordshire and must be rated highly for both Essex and London. The overall abundance of the assemblage of both scarce and commoner species is significant, raising the Lee Valley to at least regional, and probably national, significance for this group.
- 4.16 At least four notable dragonflies breed within the valley; Hairy Dragonfly (*Brachytron pratense*), Ruddy Darter (*Sympetrum sanguineum*), White-legged Damselfly (*Platycnemis pennipes*) and the Willow Emerald Damselfly (*Chalcolestes viridis*), which has recently been recorded at Cornmill Meadows and Amwell Nature Reserve. Population levels of Red-eyed Damselfly (*Erythromma najas*) are of local importance. Overall the dragonfly fauna is rich throughout the valley, with over half the UK total recorded. The mosaic of habitats found across the Lee Valley provide habitat for a range of butterfly species, with nearly half of all the UK butterflies recorded.
- 4.17 The Elm hedges of the farm and Cornmill Meadows provide good habitat for populations of White-letter Hairstreak (*Satyrrium w-album*) a UK priority species another of which, the Small Heath (*Coenonympha pamphilus*) is also present. Species such as Essex (*Thymelicus lineola*) and Small Skipper (*Thymelicus sylvestris*) are declining locally but are still widespread in the grasslands of the valley.
- 4.18 Silver-washed Fritillary (*Argynnis paphia*), has been recorded and is known to be increasing locally, migrant species including Painted Lady (*Vanessa cardui*) and Clouded Yellow (*Colias croceus*) are recorded regularly and there are occasional vagrants such as a Long-tailed Blue (*Lampides boeticus*) recorded at East India Dock Basin.

Mammals

- 4.19 Eight UK Priority species of mammal occur in the Lee Valley Regional Park. Populations of Otter (*Lutra lutra*), Water Vole (*Arvicola amphibius*) and bats are judged to be of regional significance. A number of bat species have been recorded in the valley including the nationally scarce Leisler's (*Nyctalus leisleri*) and Serotine (*Eptesicus serotinus*) with UK populations estimated at 10,000 and 15,000 respectively. Harvest Mouse (*Micromys minutus*) and Water Shrew (*Neomys fodiens*) are of local importance.

Amphibians

- 4.20 The Lee Valley remains a regional stronghold of the Grass Snake (*Natrix natrix*) and is of local importance for amphibians, notably Common Toad (*Bufo bufo*). A Great Crested Newt (*Triturus cristatus*) population is present in one known site.

Fish

- 4.21 The Lee Valley is known nationally for its angling, the Barbel (*Barbus barbus*) populations are of national significance and the Tench (*Tinca tinca*) is of local/regional significance.

Invasive species

- 4.22 There are an increasing number of invasive non-native species (INNS) within the Park. These include the "American Mink (*Neovison vison*), Non-native crayfish and plants such as New Zealand Pygmyweed (*Crassula helmsii*), Giant Hogweed (*Heracleum mantegazzianum*), Himalayan Balsam (*Impatiens glandulifera*), Floating Pennywort (*Hydrocotyle ranunculoides*) and Japanese Knotweed (*Fallopia japonica*). These pose a threat to specific native species as well as general habitat quality. There are a number of factors contributing to an increase and the spread of non-native species, as outlined below.
- 4.23 Whilst the network of waterways provides an excellent habitat, it allows for rapid movement of INNS. Plant seeds can travel long distances whilst remaining viable and therefore can facilitate their movement through the valley. Boat movement can aggravate this by creating currents and acting as vehicle for movement of organic matter.
- 4.24 A Lack of sufficient biosecurity measures can easily increase the risk of both introducing and spreading INNS. Plants such as New Zealand Pygmyweed only need a small fragment transported to a new site, for example on footwear or machinery, for colonisation to occur.
- 4.25 There is also the possibility that species can enter the natural environment through localised introductions, for example through release of unwanted pets such as goldfish (*Carassius auratus*), American Red-eared Terrapins (*Trechemys scripta elegans*) or snapper turtles. Once established they are often very difficult to eradicate successfully.

Designated sites

- 4.26 The Park offers a biodiversity resource of international, national, regional and local importance.
- 4.27 In total there are eight sites of Special Scientific Interest (SSSI) in the Park. In the UK, SSSI status affords statutory protection to the best examples of the UK's flora, fauna, or geological or physiological features (see **Figure 4.1**).
- 4.28 Four of the SSSI's, Amwell Quarry, Rye Meads, Turnford and Cheshunt Pits and Walthamstow Reservoir form the Lee Valley Special Protection Area and Ramsar Site. Special Protection Areas (SPAs) and Ramsars are internationally designated sites protecting rare and vulnerable birds and wetland habitats. The condition of these sites is listed in **Table 4.1** below.

Table 4.1: Condition of Designated Sites in the Lee Valley Regional Park

SSSI	Date Assessed	Condition
Amwell Quarry	2007	Favourable
Rye Meads Nature Reserve	2013	Favourable 39.95% Unfavourable recovering 60.05%
Turnford & Cheshunt Pits	2013	Favourable
Cornmill Stream & Old River Lea	2012	Favourable
Waltham Abbey Woods	2009	Unfavourable
Chingford Reservoirs	2012	Unfavourable recovering
Walthamstow Reservoirs	2014	Unfavourable recovering
Walthamstow Marshes	2009	Favourable 7.56% Unfavourable recovering 92.44%

Non- Locally designated sites

- 4.29 There are also a number of non-statutory **locally designated** sites within the Park ~~These include 31 County Wildlife Sites, 11 Areas of Metropolitan Importance and 26 areas of Borough importance.~~ **which meet a strict and robust selection criterion. Whilst they are non-statutory they are recognised in national planning policies that set out requirements for their protection through local plans and policies. In London these sites are called Sites of Importance for Nature Conservation.**

Site	Designation	Local Authority
Tumbling Bay Gravel Pit	Local Wildlife Site	East Herts District Council
Amwell Railway Fields	Local Wildlife Site	East Herts District Council
Meadow East of New River Ware	Local Wildlife Site	East Herts District Council
Lake south of the Maltings	Local Wildlife Site	East Herts District Council
Stanstead Abbots Gravel Pits	Local Wildlife Site	East Herts District Council
Senior's Lake	Local Wildlife Site	East Herts District Council
Rye Meads Gravel Pit	Local Wildlife Site	East Herts District Council
Lea Valley North	Local Wildlife Site	Epping Forest District Council
Lea Valley Central	Local Wildlife Site	Epping Forest District Council
Carthegena Estate Lakes, Broxbourne Gravel Pits	Local Wildlife Site	East Herts Broxbourne Borough Council
Admirals Walk Lake	Local Wildlife Site	Broxbourne Borough Council
Lea Valley South	Local Wildlife Site	Epping Forest District Council
Broxbourne Meadows	Local Wildlife Site	Broxbourne Borough Council
Silvermeade	Local Wildlife Site	Broxbourne Borough Council
Swamp South of Silvermeade west	Local Wildlife Site	Broxbourne Borough Council
Slipe Lane Open Space South	Local Wildlife Site	Broxbourne Borough Council
Land north and west of Turnford and Cheshunt Pits	Local Wildlife Site	Broxbourne Borough Council
Thistly Marsh and area west of Cheshunt Marsh	Local Wildlife Site	Broxbourne Borough Council
Lee Valley	Site of Metropolitan Importance for Nature Conservation	London Boroughs of Enfield, Hackney, Haringey, Newham, Tower Hamlets and Waltham Forest
Banbury Reservoir	Borough Grade 1	London Borough of Waltham Forest
Tottenham Marshes East	Borough Grade 1	London Borough of Waltham Forest
Tottenham Marshes	Local Importance	London Borough of Haringey
Easthale Allotments	Local Importance	London Borough of Haringey
Spring Hill Playing Fields	Local Importance	London Borough of Hackney
Springfield Park	Borough Grade 1	London Borough of Hackney
Bow Back Rivers	Borough Grade 1	London Borough of Newham
The Greenway and Old Ford Nature Reserve	Borough Grade 1	London Borough of Newham
Bow Creek Ecology Park	Borough Grade 1	London Borough of Newham
East India Dock Basin	Borough Grade 1	London Borough of Tower Hamlets
River Thames and Tidal Tributaries	Site of Metropolitan Importance for Nature Conservation	London Boroughs of Newham and Tower Hamlets

Sites providing access to nature

- 4.30 One of the Park's key functions is to facilitate access to the wide array of species and habitats described above. With 65% of all visits to open spaces, the enjoyment and study of nature is a key activity within the Park. Currently the Park offers many opportunities for visitors to access nature. This access is focused around a number of sites highlighted in **Figure 4.2** and described below.
- 4.31 Amwell Nature Reserve, a former gravel pit near Ware in the north of the Park, supports internationally important numbers of wintering wildfowl, along with outstanding communities of breeding birds and of dragonflies and damselflies. The site is fully accessible to public and incorporates elevated bird hides and boardwalk trails. Further south is Rye Meads Nature Reserve, which is managed jointly by the RSPB and Herts & Middlesex Wildlife Trust. It affords opportunities to see vast numbers of birds, plus wetland mammals and reptiles. Rye Meads contains a number of facilities that enable interaction with nature including bird hides, sign posted trails and visitor centre providing binocular hire. Rye Meads is also open to schools and specialises in environmental education.
- 4.32 Stanstead Innings located at Stanstead Abbots is also a former gravel pit and hosts warblers, waders and other wildfowl. The site also provides bird hides and day/night fishing tickets.
- 4.33 Glen Faba is a mature flooded gravel pit located just south of Rye Meads and is well regarded as a resource for biodiversity. Currently the site is used for fishing with restrictions put in place to protect flora and fauna, as well as to not offend neighbouring residents and land owners.
- 4.34 Further south is Silvermeade, Broxbourne Old Mill and Meadows, and Rusheymead. Silvermeade is a stronghold for the highly endangered Water Vole. It's also an excellent site for dragonflies. Broxbourne Old Mill and Meadows has a diverse range of flora and fauna. Here Kingfisher, Grey Wagtail, delicate flowers of Ragged Robin and Giant Horsetail can often be seen. The visitor offer at Old Mill and Meadows is enhanced by a visitor café. Rusheymead comprises of a patchwork of scrub and woodland with pockets of open grassland and more mature woodland and provides a site to see flocks of small birds including warblers. **The River Lee Country Park provides 1,000 acres of parkland and open water within which to get close to nature and watch a wide range of wildlife. Large expanses of reedbeds across Seventy Acres Lake provide habitat for wintering birds such as Bittern and the mosaic of wetlands including lakes, wet meadows and scrapes are perfect for wildlife watching throughout the year, including a wide range of ducks and waders. There is a large network of pathways including six themed trails (orchids and otters for example) and most are surfaced to a standard that accommodates wheelchair users and buggies.**
- 4.35 Cornmill Meadows near Waltham Abbey comprises of semi-natural floodplain grassland. It has a mosaic of rivers, and pools home to a variety of flora and fauna including Ruff and Black-tailed Godwit, Redshank and common and Green Sandpiper. Also notable are the dragonflies in the summer and the flocks of Wigeon and Teal in the winter. The site has its own car park just of the B194 Crooked Road.
- 4.36 Located just **east** south of Cornmill Meadows is **the** Royal Gunpowder Mills site. The chemicals and pollutants that were once integral to the site's productive activities are no longer due to decontamination of the land. **Decontamination works removed the bulk of chemicals and pollutants from areas of the site, most notably at the south, allowing a visitor attraction to be established. Guided tours** ~~The site~~ **now facilitate limited public supports** access to woodlands (Waltham Abbey Woods SSSI) **in** which a range of flora and fauna **thrive** including a population of fallow deer. The canopy has largely regenerated here from coppice stools and is dominated by Alder trees, with Sycamore, Ash, Poplar and Crack Willow.²⁰
- 4.37 South of Waltham Abbey just to the east of Enfield is Rammey Marsh East and Gunpowder Park, both of which are home to a wide range of flora and fauna. Rammey Marsh is home to Pipistrelle

²⁰ Royal Gunpowder Mills Website. <https://www.royalgunpowdermills.com/must-see-attractions/woodlands/>

bats, Water Voles, bee and Pyramidal Orchids and around 225 other different plant species. Gunpowder Park is a Green Flag award winning Park with surfaced paths and boardwalks passing through the site. Large expanses of grass land are a key feature of Gunpowder Park, bounded by hedgerows and farmland. Also located within Gunpowder Park is Osier Marsh wood consisting of wet willow and birch woodland on infilled gravel pits.

- 4.38 Tottenham Marshes, just to the north of Tottenham Hale, is fully accessible to the public and consists of large expanses of rough grassland with wildflower meadows, accessible river channels and scrubland.
- 4.39 Walthamstow Reservoirs are owned and managed by Thames Water and consist of 10 water bodies. Several of these feature wooded islands and reed-covered fringes. They form part of the Lee Valley Special Protection Area (SPA) due to their importance for the wintering ducks Gadwall and Shoveler. Access to Walthamstow reservoirs in the past has been restricted by Thames Water. ~~In 2017, however, increased public access will be provided~~ **However in October 2017 the site opened as the Walthamstow Wetlands nature reserve the result of a partnership between Thames Water, landowner, London Borough of Waltham Forest, grant holder, and London Wildlife Trust, the conservation delivery partner. Of the £10.6m required to renovate and prepare the site, £4.47m was secured from the Heritage Lottery Fund, £1.8m from Thames Water and £1.8m from the London Borough of Waltham Forest. £750k from the Greater London Authority has also supported the 2km cycle path through the site.** Other at Walthamstow Reservoirs owing to a £8.7m project being led by London Borough of Waltham Forest in partnership with Thames Water and key stakeholders include the Environment Agency, and Natural England. The project is an example of how partnerships between stakeholders can enable greater access to spaces for recreation whilst increasing biodiversity and maintaining environmental functions (water supply).
- 4.40 South of Walthamstow Reservoirs is Walthamstow Marshes, ~~a site~~ **Walthamstow Marshes is managed through use of grazing cattle across the site. Walthamstow Marshes are home to a variety of species including the rare Creeping Marshwort at the edges of grazed ditches as well as water voles in the ditches themselves. Access to site is mainly serviced by the Car Parks at the Lee Valley Ice Centre and the Car Park at Coppermill Lane. To the south of the marshes is the WaterWorks nature reserve, which incorporates the Essex Filter Beds. This contains one of the largest bird hides in London providing a close up experience of wildlife across the original radial filter beds. These are managed to demonstrate different stages of natural succession. There are over 500 species of plants and animals and over 25 species of breeding birds to be seen on this site.**
- 4.41 At the very south of the Park are the Bow Creek Ecology Park and ~~the~~ **East India Dock Basins**. Bow Creek Ecology Park consists of wildflower meadows and tidal mudflats. Flocks of Redshank can often be seen here as well as an array of butterflies attracted by the nectar-rich meadows. East India Dock contains tidal brackish water and there are mudflats with a small band of saltmarsh vegetation to the north. ~~A colony of~~ **Common Tern returns to the valley each year and have bred here to breed every summer** on the artificial rafts. Species here include Black Redstart Shelduck and flocks **of wintering** Teal.

Lea Catchment Nature Improvement Area (NIA)

- 4.42 The Lee Valley River Catchment has been designated a Nature Improvement Area (NIA). The Lea Catchment NIA covers an area of 43, 619 Ha, following the River Lea from its source in Luton through the 2012 Olympic Park, to the Thames at East India Dock Basin. Much of the NIA lies within the Regional Park and is run by a partnership between the Park Authority, Hertfordshire Local Nature Partnership (LNP), Riparian Authorities, Environment Agency, local communities and land owners, the private sector and conservation organisations with funding provided by the Department of Environment, Food and Rural Affairs. With over £100,000 of funding over two years, the Park Authority is working with a range of partners on the current NIA project including the Canal and River Trust, Wildlife Trusts, local authorities and private landowners from across the designated area. This includes a series of projects to aid the survival of the Water Vole

and the Bittern, such as enhancement to reed beds. The NIA project will also include restoration of the River Mimram, a tributary of the River Lea, one of only 200 chalk rivers in the world.²¹

Issues

Safeguarding and enhancing biodiversity of designated sites

- 4.43 As indicated in **Table 4.1** above, some of the designated sites in the Park are not in favourable condition. It is important that development and decisions in the Park prioritise enhancement and safeguard biodiversity in these sites.

Controlling the spread of invasive non-native species

- 4.44 The spread of invasive non-native species poses a risk of habitat deterioration, particularly across wetland habitats already under pressure. Boat movement and recreational activities can aggravate the spread of INNS.

Poor transport accessibility to sites for nature-based recreation

- 4.45 Linked to issues around accessibility in section 2, good access to sites within the Park is reduced by severance from roads and railways, reducing the likelihood of people visiting the Park on foot and by bicycle. There is also potential to enhance sites for biodiversity on the edges of the Park close to sustainable transport infrastructure.

Visitor pressures on sensitive ecological sites

- 4.46 As indicated in section 2 on visitors and visitor management, certain locations within the Park, such as Fishers Green, are subject to excessive visitor pressure, while others are less well visited. As visitor numbers increase generally this has potential to adversely affect biodiversity. Enhancing signage, accessibility, creating new hubs with new and enhanced visitor facilities could be a way of addressing this pressure

Poor connectivity between sites of ecological interest within the Park

- 4.47 There is poor connectivity between some sites within the Park. Improving signage and accessibility could help to enhance access to nature.

Severance of wildlife corridors

- 4.48 The Park includes a network of interconnected ecological sites that can be traversed by variety of species. New development within and adjacent to the Regional Park can result in fragmentation of natural green corridors that exists within the Park. As a result, policy will need to address the safeguarding and improvement of connectivity between ecological sites.

Potential for development to adversely affect biodiversity

- 4.49 Built development within the Park and around the edges of the Park has the potential to reduce the amount of open space, thereby reducing biodiversity. Other adverse effects of development on biodiversity can include light pollution, reductions in air quality and recreational pressures.
- 4.50 As indicated in section 3, recreational activities of all forms have the potential to adversely affect biodiversity as a result of physical activity and noise disturbance. This is issue is particularly relevant for designated bird species within the Lee Valley SPA and Ramsar, which include the Bittern, Gadwall and Shoveler.

²¹ Lee Valley Regional Park Authority Website (no date). <http://www.leevalleypark.org.uk/en/content/cms/corporate/about-us/news/copy-of-saving-britains-wildli/>

Figure 4.1: Designated Sites of Importance to Nature

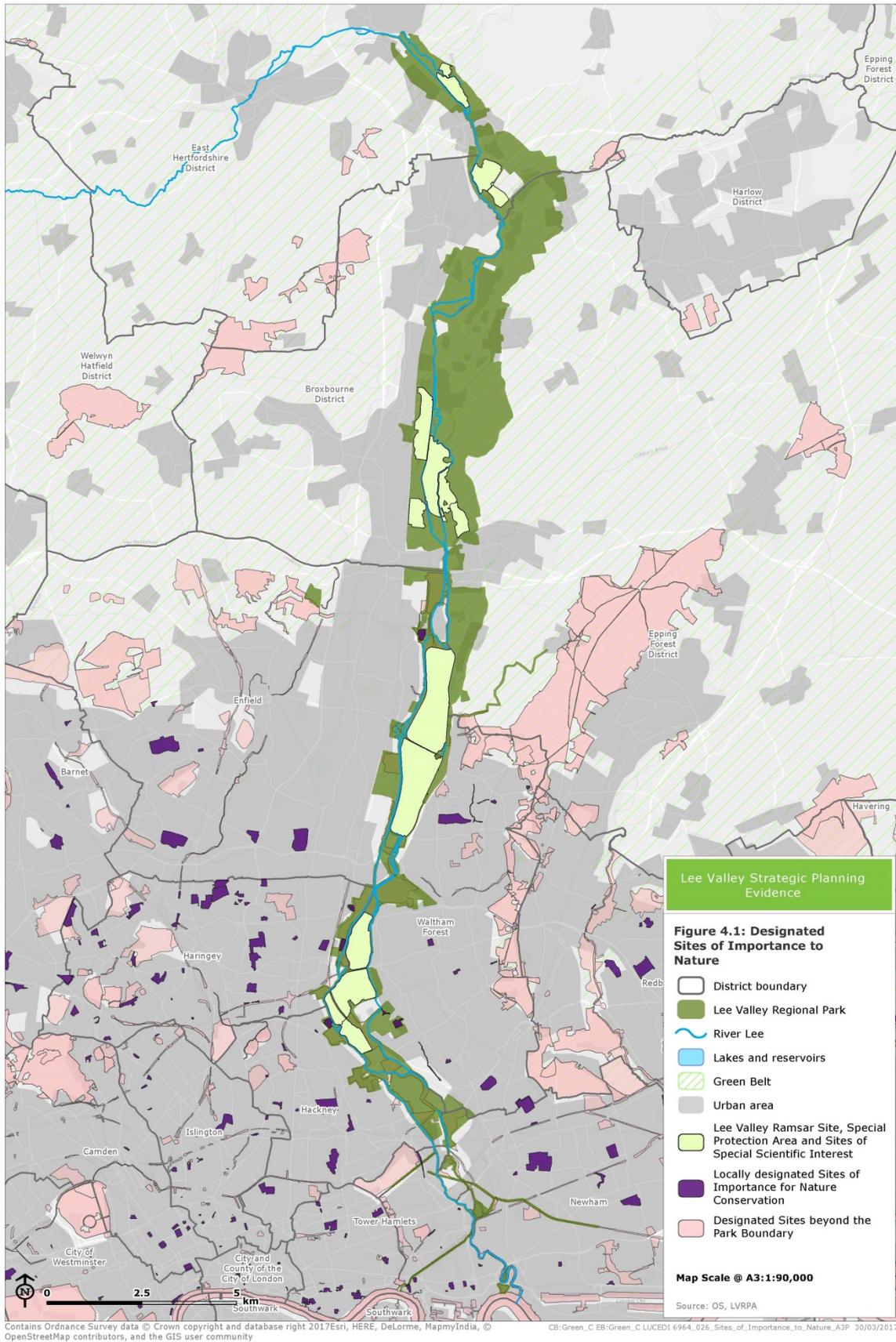
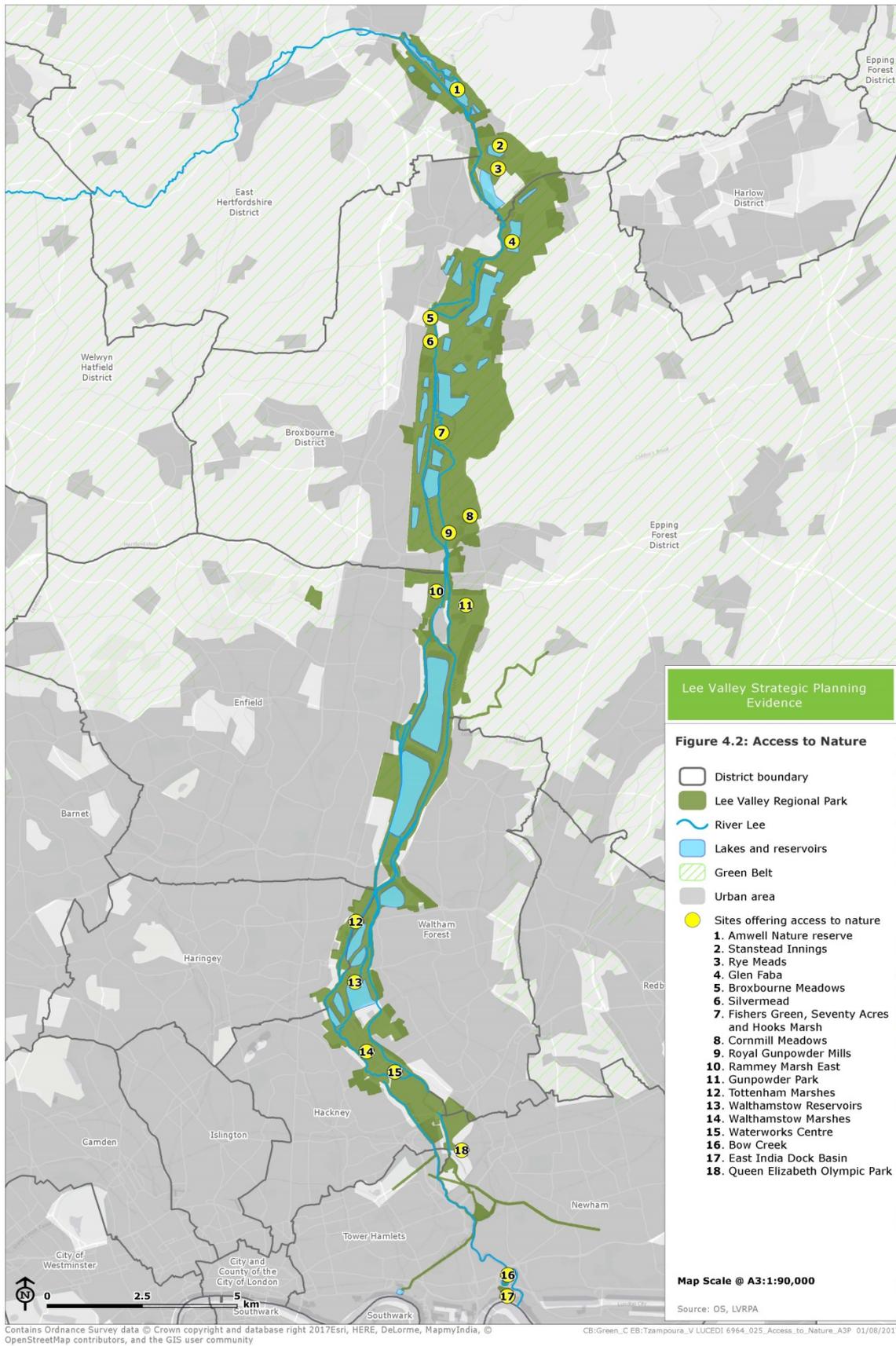


Figure 4.2: Access to Nature



5 Community, health and well-being

- 5.1 The Park serves as a community resource, for events and gatherings. Events, arts, volunteering and educational programmes play an important role in promoting the health and wellbeing of communities, build stronger community relationships and develop skills, knowledge and 'ownership'. The Park's role in promoting health and well-being is particularly relevant given that large parts of the surrounding community have high levels of deprivation, particularly in the south of the Park.

Events

- 5.2 The Park Authority runs a programme of events and activities throughout the year. In 2016 there were 193 events held within the Park. A large majority of these were 'Sport and Outdoor events' (see **Figure 5.1**). A smaller proportion of events are associated with the remaining categories. It should be noted that some 'Sport and Outdoor' events are likely to incorporate elements of the other categories. Open spaces account for 29% of all events and venues accounting for remaining 71% of events (see **Figure 5.2**).

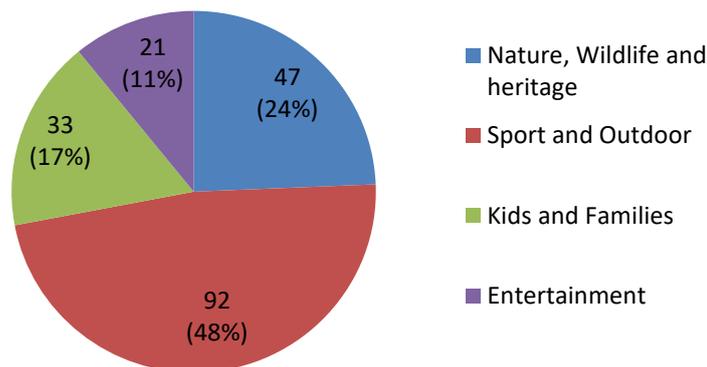


Figure 5.1: Number of Park events broken down by type 2016

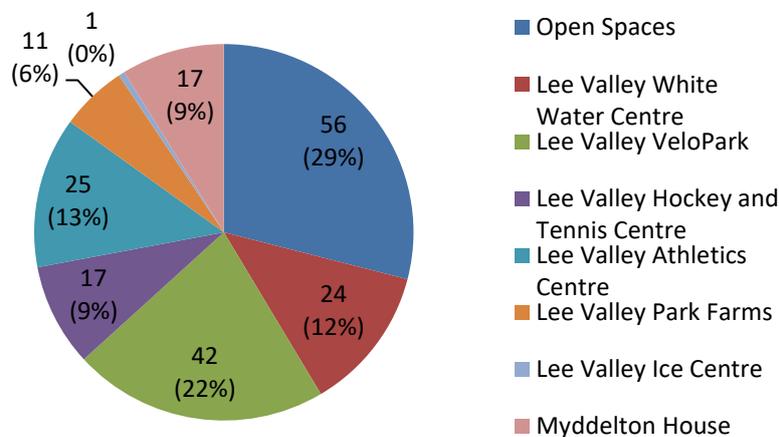


Figure 5.2: Number of Park events broken down by venue 2016

- 5.3 The sporting venues operated by the Authority's Leisure Trust, Vibrant Partnerships, put on competitive events for amateurs and elite sportsmen and women. However, they also put on non-competitive give-it-a-go style events to attract those seeking to gain a taster of a certain sport. Events are also held at the Trust-operated Lee Valley Farm and across the Parklands. These venues tend to run events which have an educational slant; for example the 'Countryside Live event, or sheep week at the Lee Valley Park Farms.
- 5.4 Events are also run by non-trust operators. The Park Authority runs a number of other events, many of which promote active engagement with the Park's natural and heritage resource. These are wide ranging with examples including outdoor theatre, guided walks, foraging boat cruises and family orienteering. Non-authority run events also take place throughout the Park including; for example, charity and sporting events in the Olympic Park and local parks.
- 5.5 Operating events, particularly those in open space in the park can bring with it environmental challenges. Outdoor events, for example, bring people pressures such as litter, noise and light pollution all of which can, if not well managed damage the Park's natural resource.
- 5.6 **Figure 5.3** shows locations of principle visitor attractions and locations for events.

Arts

- 5.7 The Park has established itself as a site for both temporary and permanent arts activities, events and cultural projects. A number of venues, open spaces and built facilities are used on permanent and temporary for the arts (see **Figure 5.4**). Art-works are located throughout the Park, many developed through collaborations between artists, local schools and communities. The River Lee Country Park, in particular, displays a variety of sculpture for the public to interact with. A variety of arts events are also held in the Park including more regular outdoor theatre, concert and circus performances to one-off events like the Inland waterways festival.²²

Volunteering

- 5.8 Volunteering in the Park provides an important form of community engagement. An extensive volunteering programme provides social and community engagement benefits. It is estimated that, in 2016 the work undertaken by volunteers equated to £177,120 at the National Minimum Wage.
- 5.9 There are 2.5 volunteers to every staff member in the Authority. This compares to other organisations such as the RSPB which operates at 6.5:1, Royal Parks at 13.7:1 and the National Trust at 10.5:1. It should be noted, however, this figure is affected by the fact that other organisations may have more volunteers who will only undertake small amounts of volunteering each year, whereas the LVRPA have less volunteers but these undertake activity more regularly.²³ Those venues operated by the Lee Valley Leisure Trust, Vibrant Partnerships have a 1:1 volunteer to staff compared to Authority run venues and parklands that have a 6.3:1 volunteer to staff ratio.
- 5.10 The age make up of those volunteering in 2016 is in line with national average, with the exception of under 16 and 45-64 age cohort. The gender make up of volunteers in 2016 is 54% female to 46% male. This is roughly in line with the national average (50.8% female to 49.2% male). 11% of volunteers are classed as having disabilities. This is above the UK national figure of 7%.
- 5.11 The Park volunteering programme is associated with two areas, the Park's natural resource and the Park's venues.

Nature volunteering

- 5.12 The Park provides a large number of volunteering opportunities relating to its natural resources. Volunteers take an active role in conservation, research and promoting the Park's natural

²² Lee Valley Regional Park Authority website. Events page.

²³ Volunteering in the Lee Valley Regional Park: End of Year Report (2016).

resource. For example, they aid the Lee Valley biodiversity team to monitor and survey species within the Park. The 'Bittern Information Point' at Fishers Green is a bird hide completely run by volunteers who provide information to the public including via a wildlife CCTV system. A number of volunteers help to run the Lee Valley Youth and Schools programme (described below). The Park also has a group of conservation volunteers who help park rangers to maintain the environment through hands on practical tasks. Volunteer opportunities in the natural environment are also available at a range of other locations including the fisheries, Myddelton House Gardens, Rye House Gatehouse and the Lee Valley Park Farms.

- 5.13 In addition to volunteering opportunities, the Park also offers corporate opportunities whereby companies partake in team building exercises and days out to enhance the Park's natural resource. These activities range from clean-up projects such as litter picking, removing graffiti or painting to conservation tasks such as scrub clearance and river management.

Volunteering at venues

- 5.14 The Park's venues also provide many opportunities for volunteers. These venues include built sports facilities, as well as other venues including the Lee Valley Park farms, Lee Valley Caravan and campsites and Lee Valley Marinas. From general and visitor assistants to sports coaches, volunteers play an important role in the everyday workings of these facilities.

Education

- 5.15 Education within the Park is provided in various ways. The Park offers informal opportunities to learn in the natural environment, aided by 'interpretation' signage around the Park that outlines information relating to heritage and biodiversity. The Park also offers more formalised education from a number of sources.
- 5.16 The Lee Valley Youth and Schools (YS) Service is a key provider in this regard managing specially designed, adaptable education programmes and projects to suit the needs of groups with a range of educational needs and disabilities. These programmes occur across the Park with 20,000 children enjoying programmes led by the Lee Valley Youth and Schools Service each year.²⁴
- 5.17 Similar to volunteering formal educational programmes involve both sports venues and the natural environment. The YS service provides a range of learning programmes for primary and secondary schools mainly relating to science, geography, PE, History and Art. These occur at a range of locations throughout the Park. There are also programmes designed for youth groups (e.g. scouts) and those with special needs. The Park also offers schools sports development programmes at the Park's main sporting venues.
- 5.18 **Figure 5.5** shows facilities supporting education within the Park.

Health Initiatives

- 5.19 The Park often has a number of health initiatives at any given time. For example, in partnership with Epping Forest District Council, the Park is currently deploying a Cycling for Health scheme.²⁵ This comprises of a number of cycle rides throughout the summer in the Park. This has the aim of increasing activity and improving health of local communities.
- 5.20 The LVRPA Sports Development Team also plays an important role in coordinating health initiatives. They aim to increase the number of people participating in sport and physical activity across the different sporting venues and open spaces within the Park. Working in partnership with many different organisations across London, Hertfordshire and Essex the team engages community groups and individuals, particularly those who are more likely to experience barriers to participation.

²⁴ Lee Valley Regional Park Authority Website.

²⁵ Epping Forrest District Council (2017) Cycling for Health Ride Diary 2017-2018

- 5.21 On average the team engage with close to 20,000 individuals per year on Sports Development coordinated programmes. These include disability programmes, mental health programmes and activity for people with learning difficulties and visually impaired, as well as targeted initiatives for women and girls and projects for people from different diverse backgrounds. This is in line with the Government's Sporting Future Strategy 2015.²⁶
- 5.22 The Sports Development Team also delivers a number of 'outreach' programmes across the Region, where they work within schools and community settings delivering tennis and cycling coaching. For example, The Lee Valley Sports Development Team coordinates an initiative called the Community Access Fund, where they aim to engage with 'hard to reach' community groups from across the Region. Projects provide groups with free and reduced entry costs to venues and sporting provision. In 2016, over 3500 people from 72 different groups accessed the fund; all these groups were new visitors to the Park.²⁷

Issues

Engaging with the public health and well-being agenda

- 5.23 In order to ensure people take advantage of the health benefits of the Park, strong partnerships are needed between the Authority, **Clinical Commissioning Groups** ~~Primary Care Trusts~~, the Riparian Authorities and other health bodies. The Park Authority will need to engage with existing and future health initiatives to provide opportunities to improve people's health and well-being within the Park, including the provision of appropriate facilities.

The impact of large scale events on public access and the sensitive ecological values of the Park

- 5.24 Large scale events can create pressures on the Parks natural resource in a number of ways including increased light pollution, litter, noise and greater footfall. Events can also result in areas being closed off, thereby reducing the public nature of the Park.

Provision of infrastructure and facilities to support informal and formal learning

- 5.25 Increased provision of interpretation and education facilities could create new opportunities for formal and informal learning within the Park.

Perceived personal safety issues

- 5.26 While there is no firm survey evidence, there is anecdotal evidence of visitors' concerns about personal safety issues in some parts of the Park. This is particularly the case in less managed, or unkempt, areas where there is evidence of anti-social behaviour, such as fly-tipping, littering and graffiti.
- 5.27 Improving the entrances to the Park could help to address this. Increasing overall visitor numbers would also help to increase natural surveillance.

²⁶ HM Government (2015). Sporting Future: A New Strategy for an Active Nation. [online] Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/486622/Sporting_Future_ACCESSIBLE.pdf [Accessed 23 Aug. 2017].

²⁷ Data and information obtained from the LVRPA

Figure 5.3: Principal Visitor Attractions and Location for Events

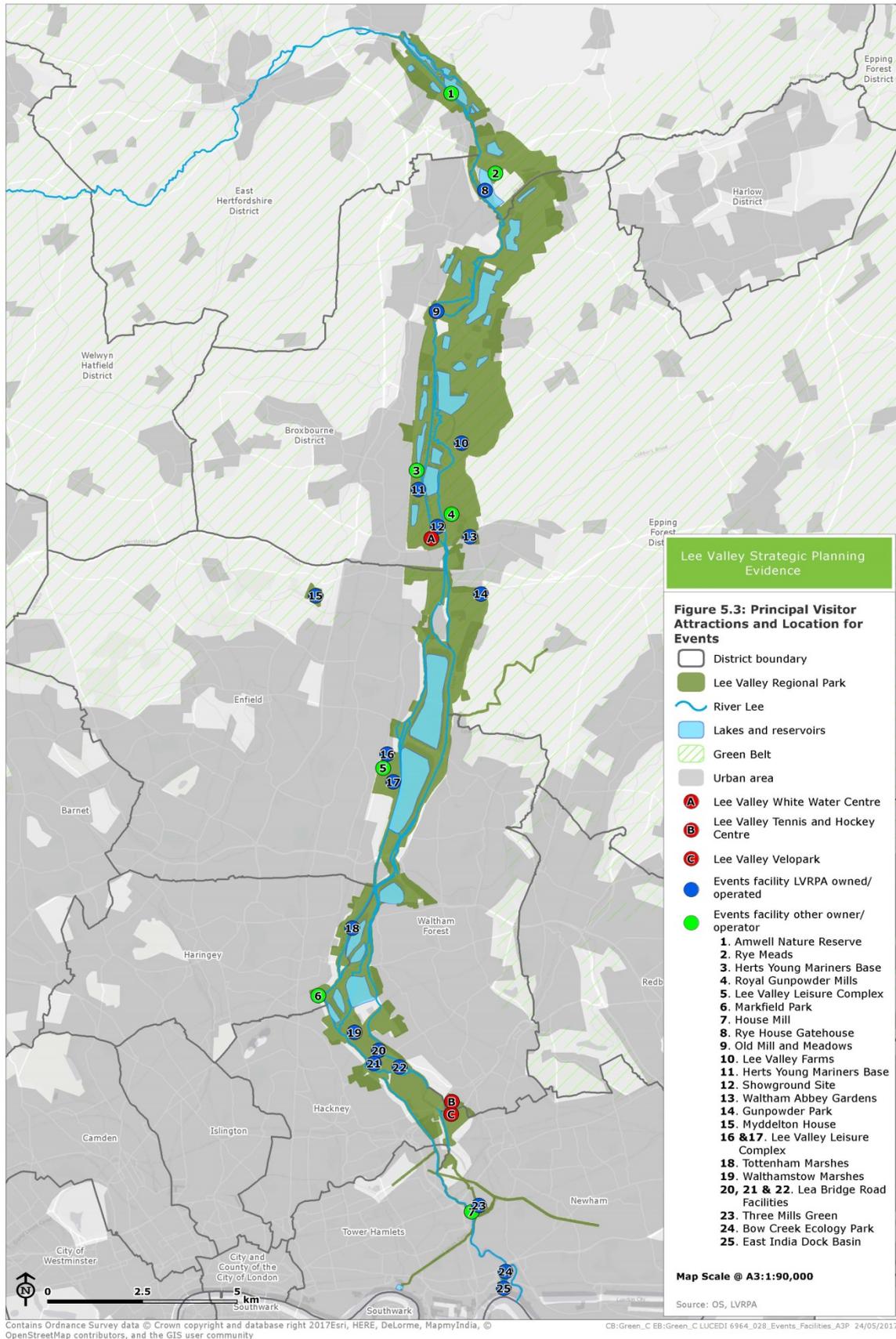


Figure 5.4: Art Installations and Venues

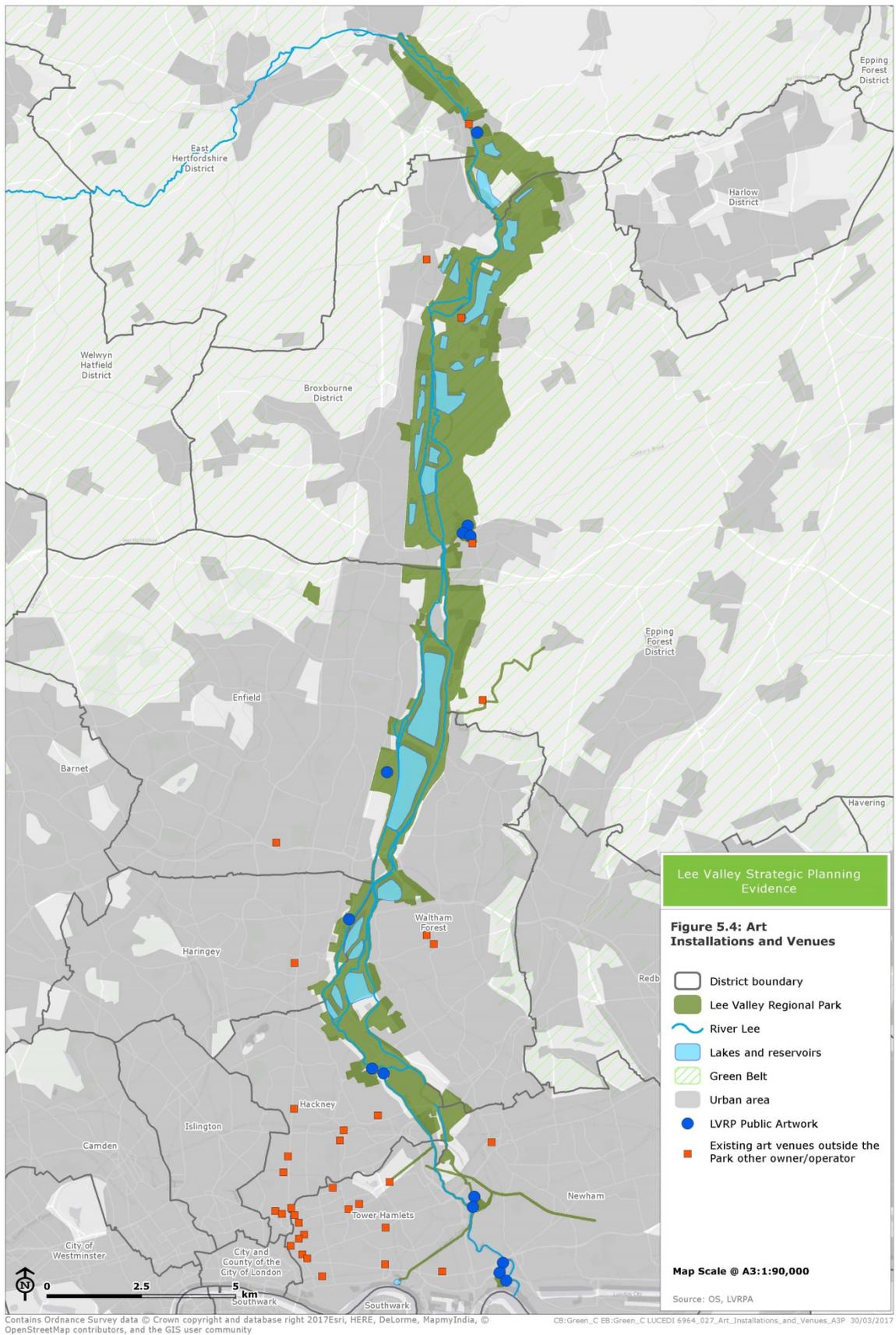
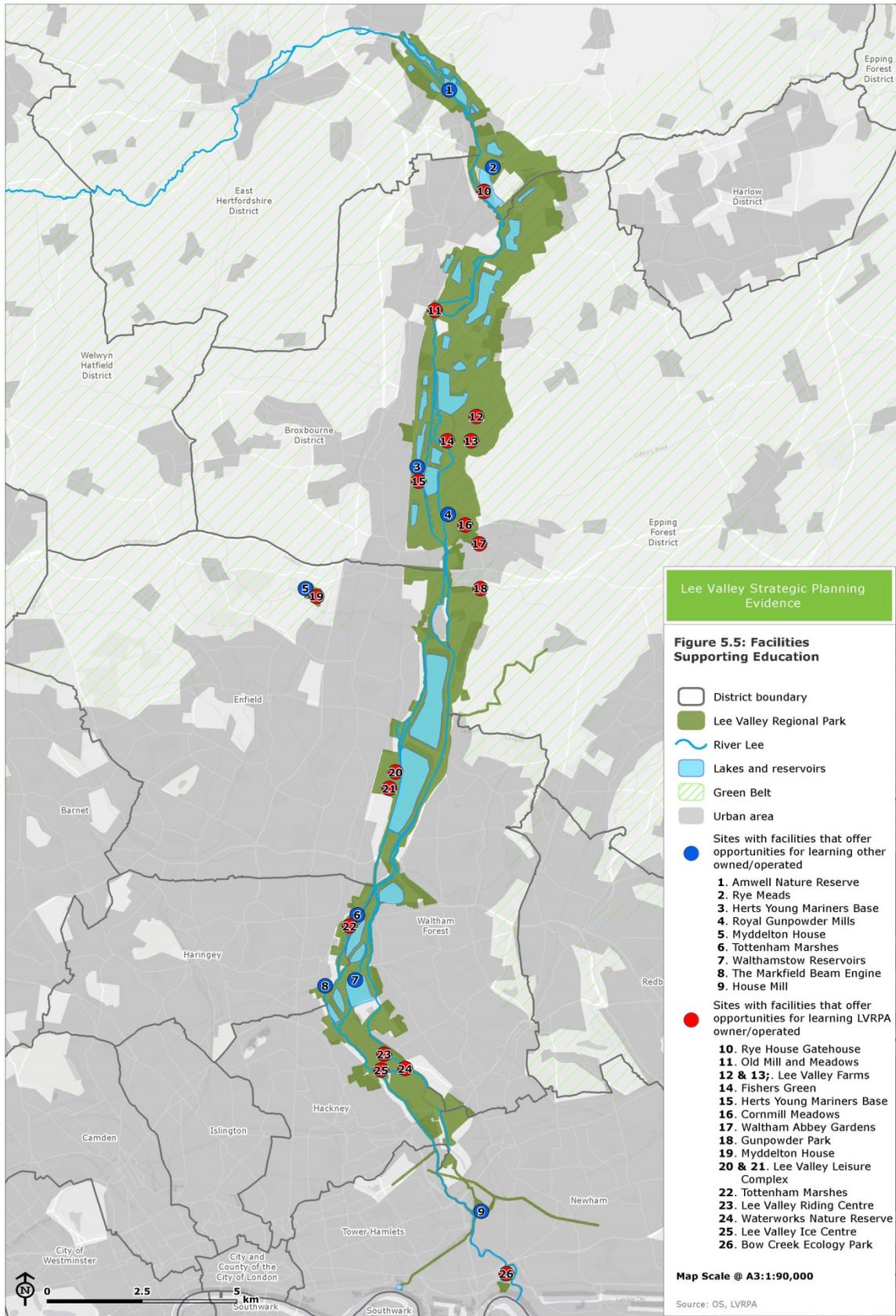


Figure 5.5: Facilities Supporting Education



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CB:Green_C EB:Green_C LUCED1 6964_029_Education_A3P 24/05/2017

6 Landscape and Heritage

- 6.1 The Lee Valley Regional Park includes a series of contrasting landscapes that together form a 'green wedge' of semi-natural land into London, extending around 37km from the outskirts of Ware, Hertfordshire in the north to **the Olympic Park and the River Thames in the south.** ~~Temple Mills near Stratford in London Borough of Newham.~~²⁸ The landscape of the Park is bound up with a wealth of heritage assets including built, natural and industrial heritage. **Its proximity to often densely populated riparian boroughs means it is in a constant state of evolution where there is significant development pressure that has potential to change the intrinsic character of the Park.** This section outlines the key components of landscape and heritage within the Park.
- 6.2 Until recently the landscape baseline for the Regional Park comprised two studies: the 1996 Landscape Character Assessment and Vision (LDA) and the Landscape Sensitivity Study (LUC 2013). **The landscape character assessment undertaken in 1996 followed the standard methodology set out in the 1993 Countryside Commission Landscape Character assessment Guidance. It identifies eight broad landscape character areas running north south within the Park. Since 1996 the LCA guidance has been updated in 2002 and again in 2014. There have also been substantial changes over many areas of the Park over the past twenty years. The Landscape Sensitivity Study used the information from the 1996 work and involved a targeted field survey to capture additional information specifically to inform the sensitivity analysis of specific types of development. The study identified locations where there are important views into the Park and also highlighted a number of locations where there are visually detracting edges to the Park. The study provided a partial update to the landscape baseline characterisation, providing revised key landscape characteristics, updated photos and identifying sensitive features and characteristics.**
- 6.3 **In 2017 the Authority commissioned a new landscape character assessment to update the 1996 baseline and provide a Landscape Strategy in accordance with more current good practice as recommended by Natural England's recently published Approach to Landscape Character Assessment (2014). References in this evidence base refer largely to this new and updated work, currently at the final draft stage pending formal adoption by the Authority in early 2019.**
- 6.4 **The following section provides a summary of the natural and cultural factors that have shaped the character of the Park's landscape and in turn informed the revised landscape classification set out in the Landscape Character Assessment and Landscape Strategy Dec 2018**

Geology

- 6.5 The landscape of the Lee Valley is greatly influenced by its underlying geology. **Geology is an important factor in determining landscape as it influences landform, soil type, vegetation patterns, land use and settlement patterns.** At the regional scale, the Lea Valley is part of the London Basin. Most of the area is underlain with London Clay extending southwards from Hoddesdon and Lower Nazeing. The London Clay forms protruding low hills on the gently sloping valley side to the east and underlies the generally shallower valley profile to the south. North of Hoddesdon and Nazeing steeper valley sides can be seen. These relate to outcropping of the Reading and Woolwich Beds which give rise to a more defined, smaller scale, semi-enclosed valley form. The higher surrounding land to the north is more rolling and open, reflecting a greater influence of chalk.²⁸

²⁸ Lee Valley Regional Park (2000). Park Plan: Part One: Strategic Policy Framework

- 6.6 The geological process that has formed the Lee Valley extends over one million years influenced greatly by glacial ice and its melt waters. This accounts for the width of the valley, presence of terraces, and deposits of gravel and sand.²⁸

Hydrology

- 6.7 The Lee Valley is drained by a complex of watercourses which form part of the extensive Lower Lee and London Lee Catchment. Water flows are regulated by flood defences, including the Flood Relief Channel through the mid-section of the valley, as well as a number of weirs and locks that regulate water levels and flow along the River Lee Navigation.²⁸
- 6.8 The other significant water bodies that exist within the valley are the flooded gravel pits in the north and elevated reservoirs throughout the mid-section. In the lower reaches of the valley, there is a complex series of interconnecting channels between Walthamstow Reservoirs and the River Thames.

Vegetation

- 6.9 **The topography, underlying geology and soils, together with past and present human activity, have influenced the distribution of habitats through the valley. Important habitats include rivers and streams, grasslands and wetlands as well as woodland and trees, and a number of post-industrial sites.**
- 6.10 **Rivers and Streams - The River Lea, its associated channels and its tributaries are vital to the ecology of the valley, providing hydrological and ecological links between the wetlands of the floodplain. A lowland clay river, The River Lea is associated with low gradient, base-rich water and fine/rich substrates. The importance of the river habitats within the valley are reflected in their inclusion in statutory designations (see Figure 3.6) including the Lee Valley SPA, Amwell Quarry SSSI, Rye Meads SSSI, the Turnford and Cheshunt Pits SSSI, Cornmill Stream and Old River Lea SSSI, Chingford Reservoirs SSSI, Walthamstow Reservoirs SSSI, and Walthamstow Marshes SSSI. As the River flows into inner London human influences increasingly dominate the river and its importance as a wildlife corridor is heightened.**
- 6.11 **Woodland and trees - Wet or carr woodland is the most common woodland type in the Park, mostly established on old gravel workings and through natural succession from reed swamp and fen. Willow and poplar thrive on the nutrient rich soils of the valley floor and where gravel workings have been abandoned, willow scrub with alder and birch have relatively quickly formed dense, wet woodland. The heavier clay soils on the eastern valley sides and surrounding higher land support dense woodland. The ridge top woods along the eastern horizon mark the edge of the formerly more extensive Epping Forest. These woods are an important feature influencing the character of the Lee Valley. The better drained, drier soils of the valley sides in the northern part of the park support oak, ash and maple. Hazel and holly are notable amongst understorey and hedgerow species.**
- 6.12 **Wetland habitats - Wetland habitats are focused mostly around the many former mineral extraction sites in the upper valley, but also at Walthamstow Marshes and the complex of Victorian and Edwardian reservoirs now known as Walthamstow Wetlands. The restored gravel pit lakes at Amwell, Rye Meads, Glen Faba and within the River Lee Valley Country Park provide an important habitat, particularly for birds and are designated as SSSI.**
- 6.13 **Grassland and fen - Seasonally flooded grasslands and fen once dominated the Lee Valley but, following national trends, areas of this habitat have been dramatically reduced. In the Lee Valley the loss has primarily been the result of mineral extraction, with large areas also lost to landfill and subsequent use for sports fields, particularly within the urbanised lower valley. Extensive long-standing areas of fen are now scarce in the Park but important areas have survived at Rye Meads, Silvermeade, Cornmill Meadows and Walthamstow Marshes. These are sustained through traditional management, such**

as grazing animals in summer months. The remaining sites are often fragmented and their condition affected by low water levels

- 6.14 **Modified over centuries of human activity, these artificial landscapes are of high wildlife value. For example, the ditches excavated on many wet grassland sites such as Cornmill Meadows and Silvermeade to water livestock, and facilitate irrigation can be used by species such as Water Vole as part of a wider network of water channels. These complexes of wetland habitats also support impressive invertebrate assemblages, with sites such as Cornmill Meadows and Amwell Nature Reserve supporting over half of the total number of British dragonfly species.**
- 6.15 **Post-industrial/Urban habitats - Post-industrial urban habitats form a significant feature in the Park, consisting of open mosaic habitats on previously disturbed land and those of the built environment. The ecological value of these habitats, such as pulverised fuel ash dumps, redundant water treatment works and temporary 'brownfield' sites within the Queen Elizabeth Olympic Park support a diverse range of flora and fauna, often in a stressed environment.**

Cultural/Human Influences

- 6.16 **The Lee Valley has been a strategic corridor of activity and provider of resources for London since the earliest times. The river has been used to transport produce from the surrounding rural areas into London up until comparatively recently and water has been supplied to the city since around 1613 when the New River aqueduct was constructed. Canalisation of the River Lee Navigation began in Elizabethan times. Early industrialisation was a result of the availability of water power for numerous mills. These include the Waltham Abbey Royal Gunpowder Mills (which was producing gunpowder by 1665), the 19th century Royal Small Arms Factory at Enfield and Wright's Flour Mill (Greater London's last surviving working mill) at Ponders End. Further south at Bow is the Three Mills tidal complex, with the grade I listed House Mill open to the public. . In the 19th century the lower Lee became an important area for the manufacture of chemicals, in part based on the supply of by-products such as sulphur and ammonia from the Gas Light and Coke Company's works at Bow Common.**
- 6.17 **From as early as the 18th century, by virtue of its rich soils, the Lee Valley was also renowned for its market gardens, producing plants, fruits and vegetables which were sold at London markets and beyond. This continues today, with extensive nurseries and glasshouse areas in and around the northern part of the Park. In the 20th century the combination of transport, wide expanses of flat land and electricity from riverside and canal-side plants such as Brimsdown, Hackney, Bow and West Ham led to expansion of industries.**
- 6.18 **Gravel extraction in the Lee Valley started in the 1920s and has been a major influence in the changing landscape of the valley. The legacy of former workings persists as numerous flooded pits. These have formed lakes of varying character, with the earlier, less efficient extraction methods giving rise to rich wildlife habitats as at Fishers Green.**
- 6.19 **The expansion of London during the 19th century led to significant changes. Urban and residential development extended along the high ground west of the valley and the level of industrial activity increased considerably. This included the development of various public utilities with the construction of the massive reservoirs to provide water for London's increasing population. Sewage works, power stations and gasworks were also sited in the valley and extensive areas of marshland were filled with refuse. These processes resulted in the degradation and loss of extensive areas of natural and semi-natural wetlands on the valley floor.**
- 6.20 **Urban expansion in the surrounding areas and the development of the railways and roads has seen the valley being used more and more for recreational purposes with this function being positively identified in Abercrombie's plan for Greater London in the 1940s and later reiterated by the Civic Trust in 1967. Extensive areas, often related to land filling of former marshes, were developed as playing fields and in some cases the landfill artificially raised the valley floor leaving unnatural landforms and materials which frequently contained contaminants.**

- 6.21 **Since it was conceived, the LVRP has provided a regional destination for formal and informal recreation, sport and leisure. In 2012 the London Olympic and Paralympic Games introduced a national and international dimension to the Park's profile and sporting offer. It now receives millions of visitors each year, some taking part in the numerous formal activities available, but most visiting to enjoy the semi-natural landscape with its wildlife interest and a break from the surrounding urban environment.**

Landscape character

- 6.22 The Park's 1996 landscape character assessment and 2014 landscape sensitivity study provide a more detailed assessment of the Park's landscape and land uses.^{29,30} The 1996 assessment divided the Park into three zones — the northern, central and southern zones, each of which was further subdivided into landscape character areas (see **Figure 6.1**). These character areas were subsequently adopted in the 2014 landscape sensitivity study which provides an updated assessment of landscape character. The paragraphs below provide a summary of land uses within these three zones.
- 6.23 The Northern Zone includes the most rural landscapes within the Park extending from the southern edge of Ware, in Hertfordshire southwards as far as Enfield Lock on the Western side of the valley, and on the eastern side of the valley as far as the edge of Chingford. The overall character of this area is strongly influenced by open farmland, both within the Park and adjacent to it along most of the eastern side. Former gravel pits which have been restored as open water are a key feature of this area. They support extensive scrub, Carr wood land and wetland habitats. A number of recreational land uses exist within this zone including water based recreation, informal recreation in small parks and larger expanses of pasture and woodland, and formal recreation on allotments and sports fields. The area between Stanstead Abbots Bypass (A414) and Nazeing Marsh is of a more fragmented nature owing to the presence of glasshouses within and outside the Park, and dissection by roads and railway tracks which create visual confusion in this area.
- 6.24 The Central Zone is defined by large and medium sized elevated reservoirs which take up most of the valley floor. All reservoirs, except Banbury Reservoir are designated SSSIs. Walthamstow Reservoirs forms part of the Lee Valley Special Protection Area (SPA) designated for its importance to water and bird species. These stretch 10 kilometres from Enfield to Springfield. Those reservoirs in the northern part of this zone are larger and more elevated with very limited public access. Those in the south provide greater access for fishing and water based recreation. There are also a number of other sport and recreational formal facilities within this zone including Lee Valley Leisure Complex near Edmonton which supports a number of leisure and recreational facilities, including the athletics centre, a golf course, camp site, and cinema.
- 6.25 The area south of William Girling Reservoirs and north of the A406 is currently used by Camden plant Ltd for reprocessing aggregates.³¹ This unauthorised use detracts significantly from the landscape, contributing to a 'peri-urban' character.
- 6.26 The Southern Zone stretches for approximately 4.5 km south eastwards from the Warwick Reservoirs near Springfield and Walthamstow to Hackney Wick, as well as including the areas of the Olympic Park and Three Mills. The overall character of this area is influenced by large areas of recreational open space, a dominant urban context and varying edge character. This includes an extensive area of sports pitches known as Hackney Marshes as well as the Lee Valley Velopark and Lee Valley Hockey and Tennis Centre. Tall structures punctuate the landscape at various locations. Notable are the 275kV electricity pylons following the River Lee Navigation (c. 50m high). In the Olympic Park Anish Kapoor's 114.5m tall ArcelorMittal Orbital stands clearly visible. Further north in the central zone and adjacent to the Park is the Enfield Power Station with a 65m

²⁹ 1996 Landscape Character Assessment for Lee Valley Regional Park

³⁰ 2014 Landscape Sensitivity Study for Lee Valley Regional Park Authority

³¹ https://www.london.gov.uk/sites/default/files/PAWS/media_id_11657/land_south_of_william_girling_resevoir_report.pdf

stack, and the Enfield EcoPark waste incinerator stack (currently 100m, with 105m stack planned as part of the redevelopment);

- 6.27 Whilst the Park offers a diversity of landscapes from north to the south, it is nonetheless characterised by a sense of openness by virtue of the majority of the Park's designation as Green Belt or Metropolitan Open Land (MOL). This overall sense of openness is therefore a key feature of the Park which, particularly in the southern part of the Park, distinguishes it from the surrounding urban areas.

1996 landscape strategy directions

- 6.28 The 1996 study set out three distinct landscape directions which apply to the respective character areas — areas for landscape conservation, investment and enhancement. These form a continuum dependent on the levels of investment and improvement required to ensure they contribute positively to the Park. **Figure 6.2** shows the geographic distribution of these areas. However, it should be noted that a number of areas have changed significantly. A key part of the Olympics 2012 was the transformation of large areas of polluted formal industrial land in the Lower Lee Valley into major sports facilities and the Queen Elizabeth Olympic Park. Alongside new facilities, the legacy includes better access and connections with the Lower Lee Valley, and improved connections within and adjacent parts of the Park. In addition to the Olympic Park, there has also been considerable investment at Bow Creek, Tottenham Marshes, Gunpowder Park and Stanstead Innings.³² As a result of these changes in policy direction, some designations shown in **Figure 6.2** may have changed.
- 6.29 The definitions of the three landscape strategy directions as articulated in the Park Plan 2000 are set out below.

- **Landscape Conservation Areas (LCA)** — where areas of high quality landscape with strong positive and valued landscape character are to be protected and improved through:
 - a. Protection from developments that are detrimental to the quality of the landscape;
 - b. The removal or improvement of features that detract from an otherwise attractive landscape character; and
 - c. The conservation of important landscape qualities which include unspoilt farmland, parkland, rich wildlife areas, well preserved heritage features and attractive water edges.
- **Landscape Enhancement Areas (LEA)** — where areas of weak or unrecognisable character are to be strengthened through:
 - a. Protection from and enhancement of existing positive landscape features
 - b. Resistance to development that would harm their attractiveness or their potential to be improved or enhanced
 - c. Implementation of projects to enhance landscape quality and strengthen landscape character; and
 - d. Design and management schemes that will enhance overall landscape quality of the area.
- **Landscape Investment Areas (LIA)** — where areas with negative, visually or physically fragmented and degraded character are to be redressed through:
 - a. The improvement, linking and integration of fragmented areas to other areas of the Regional Park with attractive landscape character;
 - b. Resistance to development that would harm their ability or potential to be improved or enhanced;
 - c. Measures which enhance and strengthen landscape quality to provide a positive image and identity to the area; and
 - d. Higher standards of development outside the Lee Valley Regional Park boundary.

³² LUC (2014) Landscape Sensitivity Study for the Lee Valley Regional Park Authority

2014 Landscape Sensitivity Study

- 6.30 The 2014 study provided an updated assessment of the Park's landscape character. In doing so it also identified locations where there are important views into the Park. Views are important for promoting a sense of orientation (legibility) and providing an appreciation of the Valley.
- 6.31 The study also highlighted a number of locations where there are visually detracting edges to the Park. This is often the case where built development abuts the Park without an appropriate landscape buffer. To illustrate this point, Figure 6.3 shows an example of a location where there are important views and harsh detracting edges within the central zone of the Park.

Heritage

- 6.32 The Park is a significant heritage resource. This is shown in part through the large number of designated historic features. The Park contains four Grade I listed buildings, 112 Grade II listed buildings, two Registered Park and Gardens and seven Scheduled Monuments. The following paragraphs summarise the key features and attributes relating to heritage within the Park.

Industrial heritage

- 6.33 The industrial heritage of the Park is very much tied to the River Lea. Wright's Flour Mill (Greater London's last surviving working mill) once powered by the waters of the River Lea at Ponders End is an interesting example. Also of interest is the grade I listed House Mill as part of the Three Mills tidal complex. However, historically an important aspect was the evolution of explosives and armaments industry. A key site is at **the Royal** Gunpowder Mills, Waltham Abbey, which includes 21 listed buildings including the Grade 1 listed Gunpowder **Incorporating** Mill. The site was used for over 300 years for explosives and propellant manufacture.³³ The 19th century Royal Small Arms Factory at Enfield was the main Government-owned factory for the production of military small arms, and produced hundreds of thousands of rifles and machine guns during both world wars.³⁴

Built Heritage

- 6.34 The Park contains a high number of historic buildings, many of which **also form part of are** designated conservation areas **and are a major focus for visitors. These include For example** the scheduled monument of Rye House gatehouse, Myddelton House and Gardens, **and** Waltham Abbey **and in the south the complex of buildings and features within the Three Mills Conservation Area and the Limehouse Cut Conservation Area. Many other Conservation Areas lie adjacent to the Park, such as the Fish Island and White Post Lane Conservation Area. both of which are a major focus for visitors.**

Archaeological heritage

- 6.35 The Park is an Archaeological Priority Area and includes a diversity of heritage assets that reflect various phases of its development from the natural hunter-gatherer landscape of the Palaeolithic and Mesolithic, the early agricultural landscape in the Neolithic and Bronze Ages, followed by the rapid growth of London in the Roman and Medieval periods through to modern day. To a large extent, the archaeological heritage of the Lea valley is inextricably linked to its built and natural features. In particular, peat within the valley has been found to preserve archaeological features and artefacts from all periods, including prehistoric and roman remains. For example, excavation and construction works in the Lower Lea Valley in preparation for the London 2012 Olympic and Paralympic Games, revealed a Bronze Age settlement, an Iron Age burial ground including four skeletons, a Neolithic flint axe, Roman River walls, a 19th Century clinker-built boat and a World War II anti-aircraft battery.

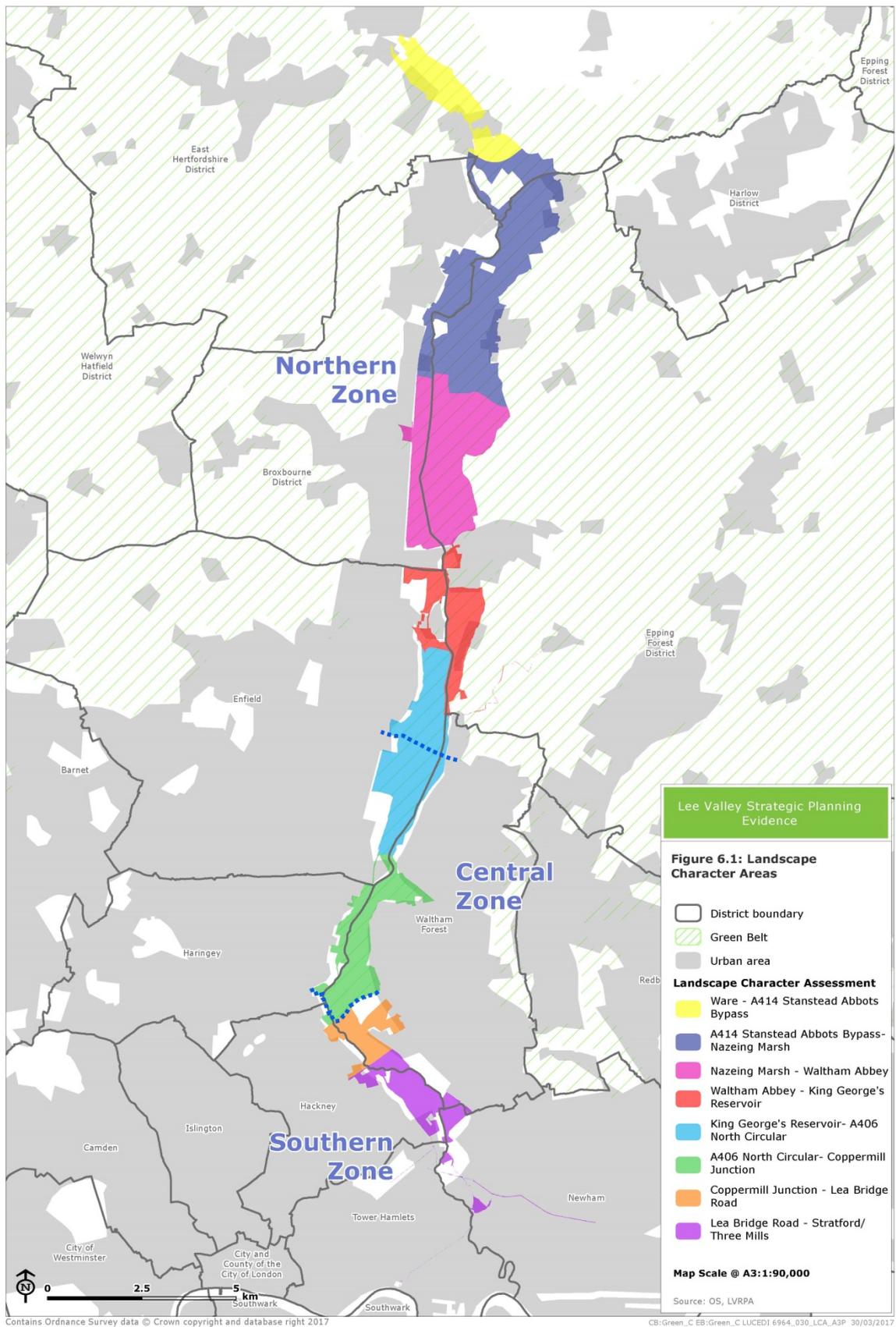
Key heritage destinations

- 6.36 There are a number of key heritage features within the Park. These are highlighted in **Figure 6.4.**

³³ Lee Valley Regional Park Authority (2000) Park Plan: Part 1

³⁴ Royalarmouries.org. (2017). Royal Small Arms Factory (Enfield) | Royal Armouries: A family of national museums of arms, armour and artillery. [online] Available at: <https://royalarmouries.org/what-we-do/community/first-world-war-archives-project/royal-small-arms-factory-enfield> [Accessed 2 Aug. 2017].

Figure 6.1: Landscape Classification Lee Valley North Landscape Character Areas



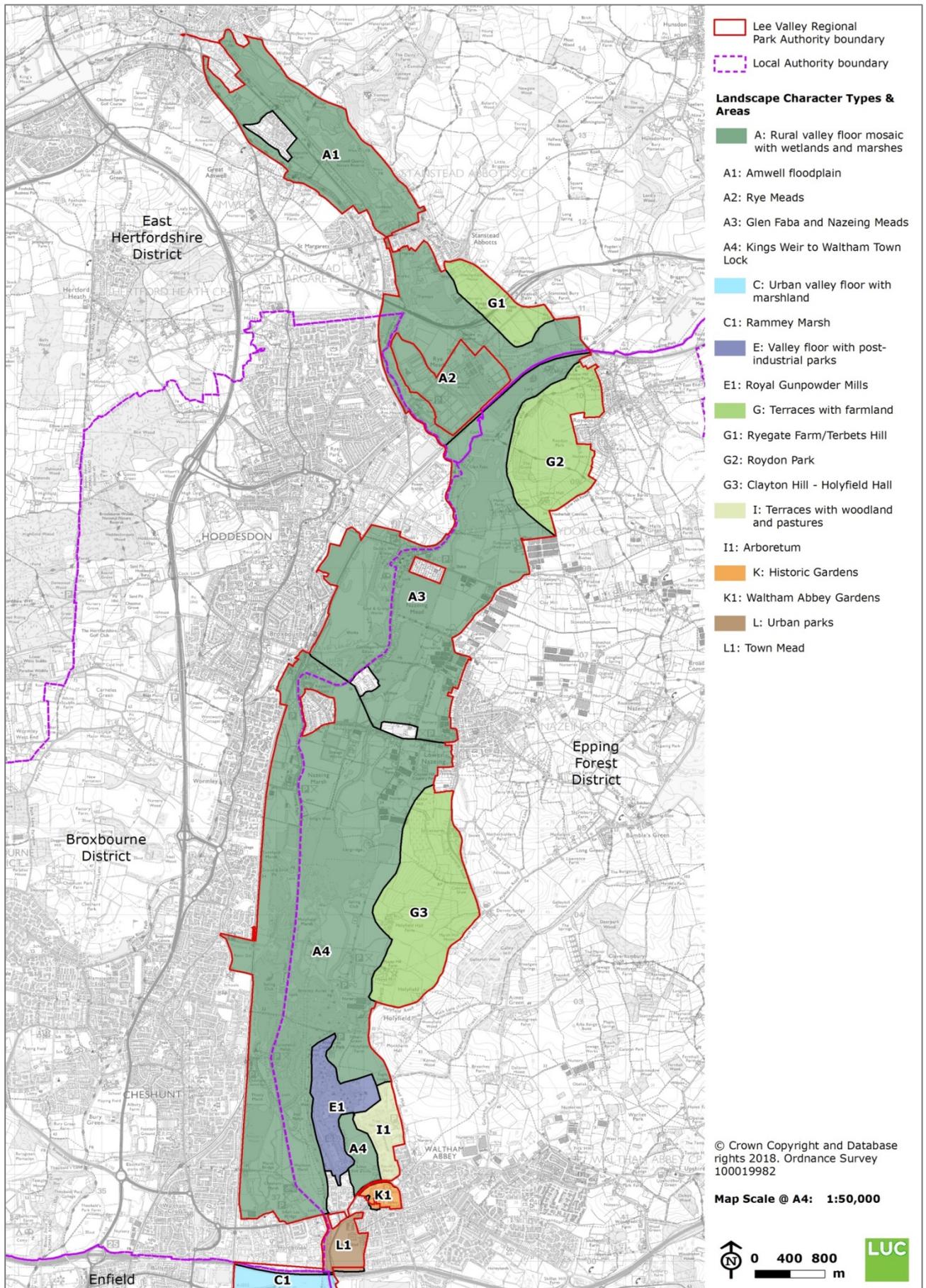
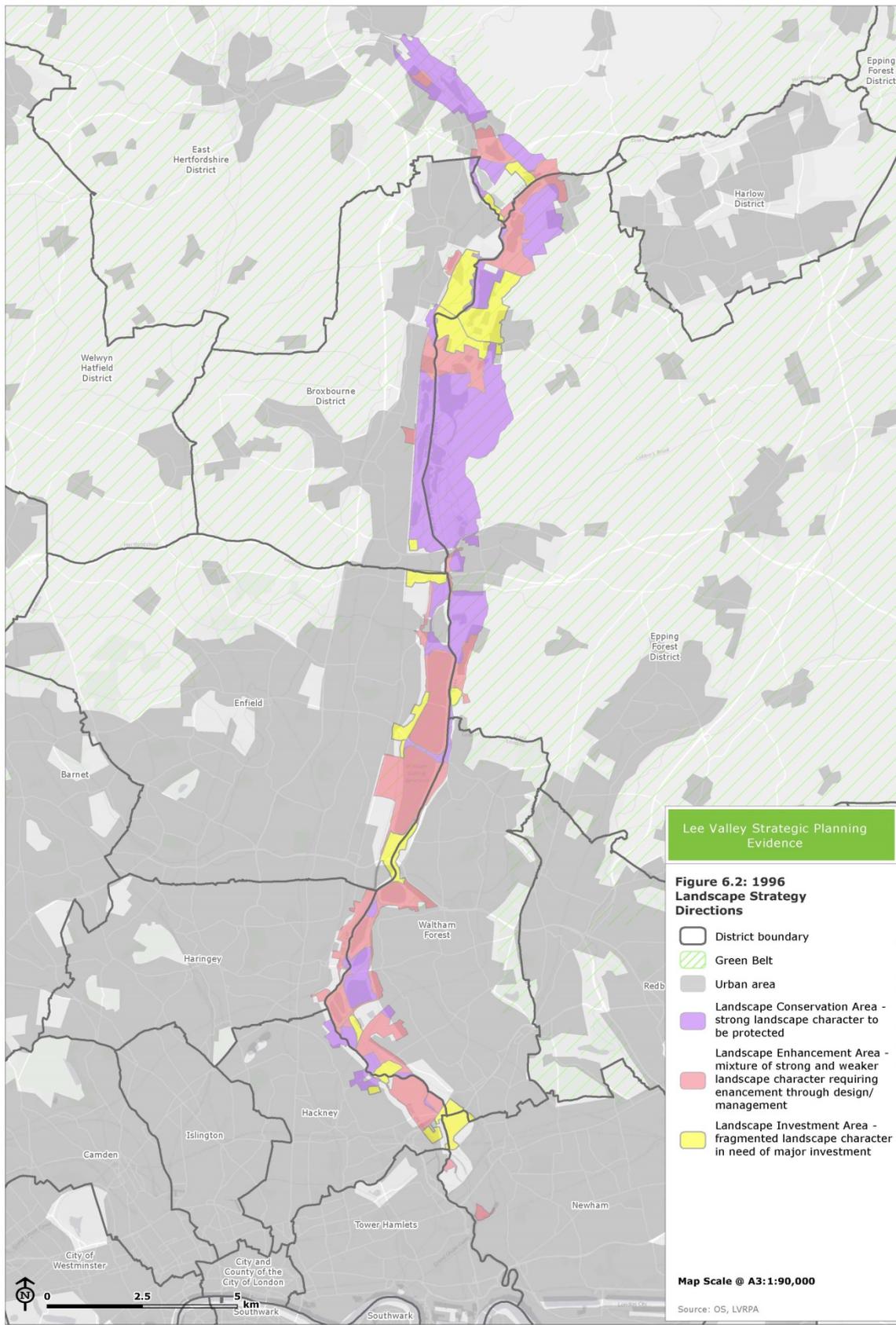


Figure 6.2: Landscape Classification Lee Valley South 1996 Landscape Strategy Directions



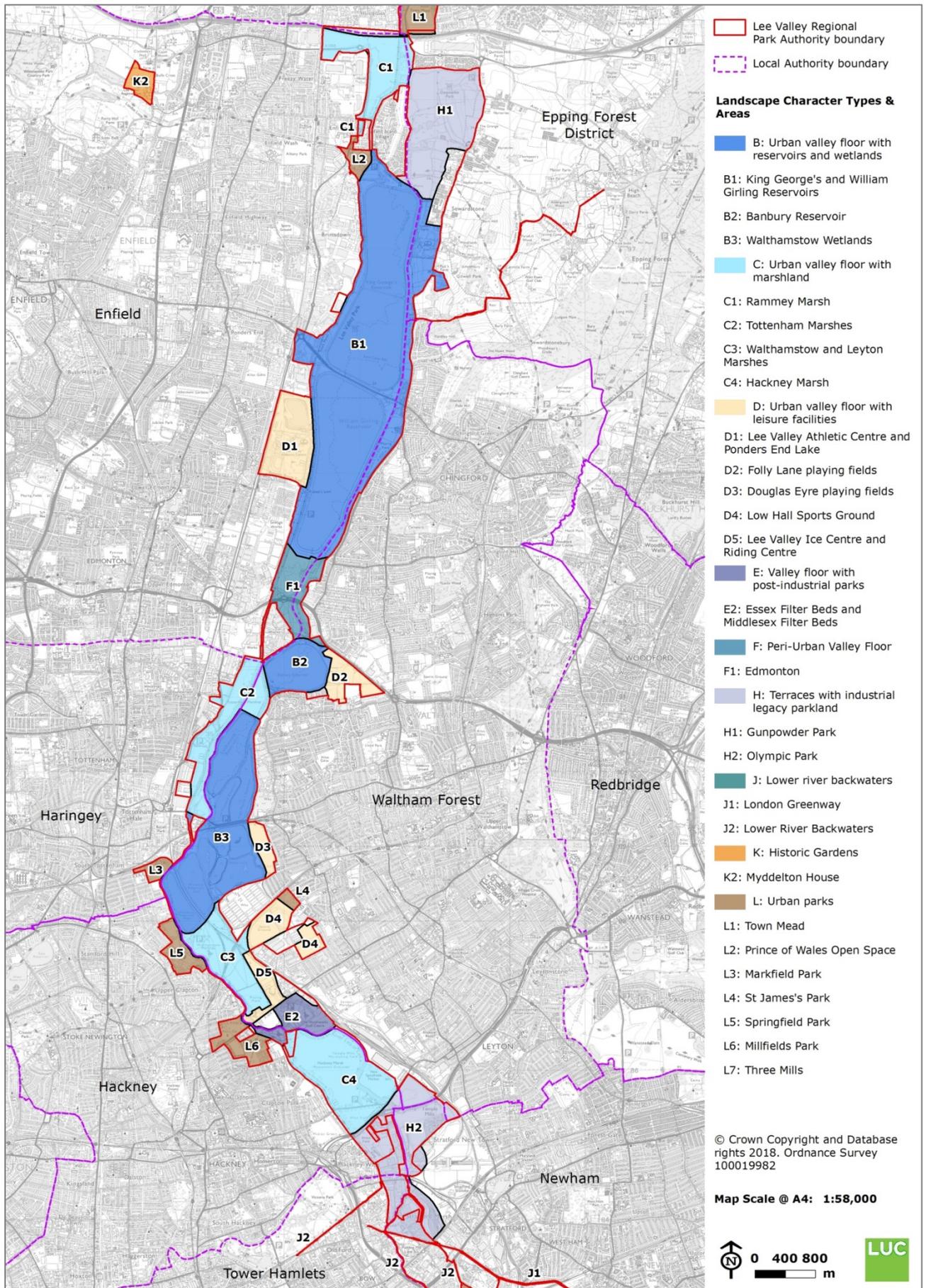


Figure 6.3: Landscape Classification Lee Valley Southern Backwaters Example Area (Central Area) showing Important Views into Park and Harsh Visually Detracting Edges

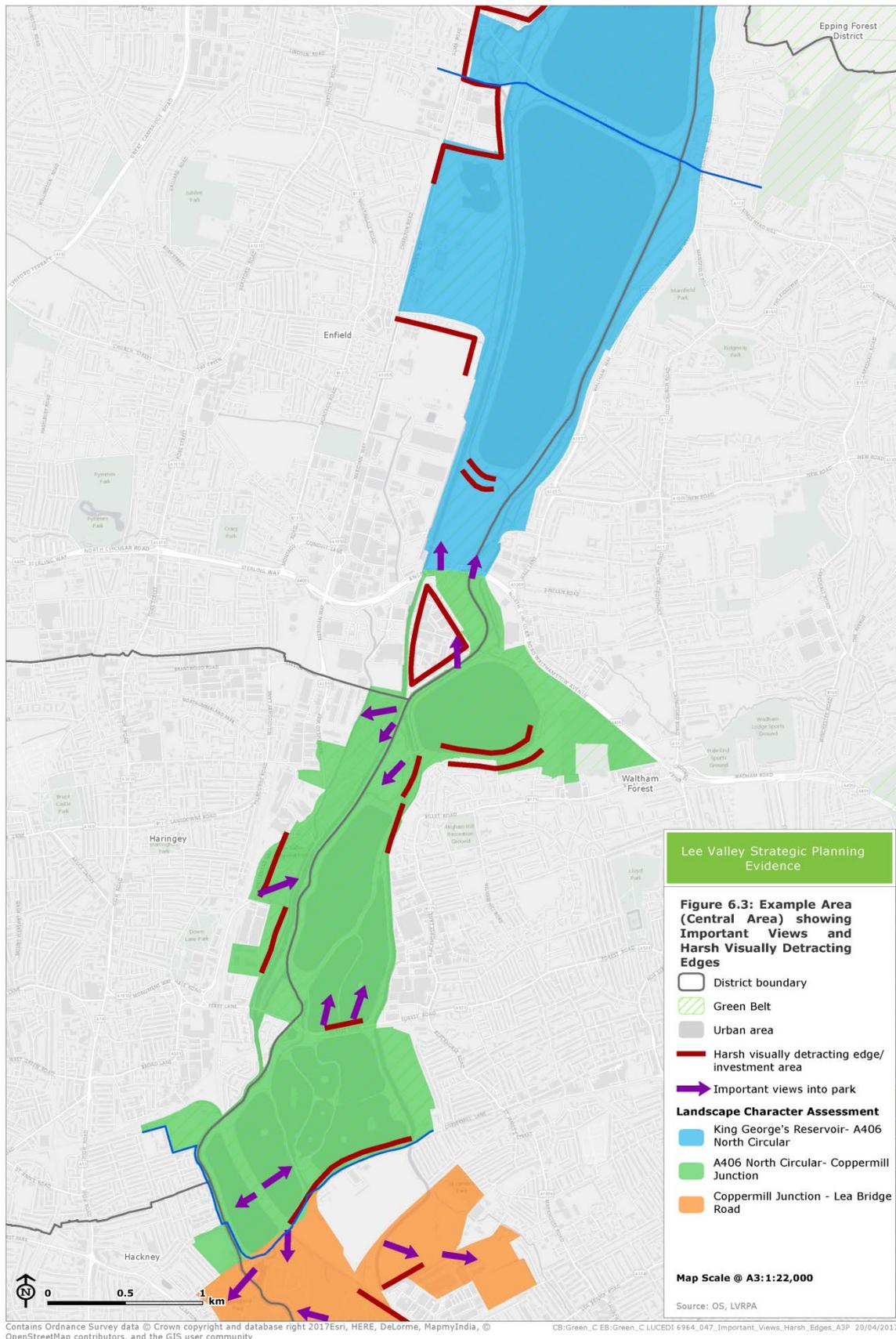
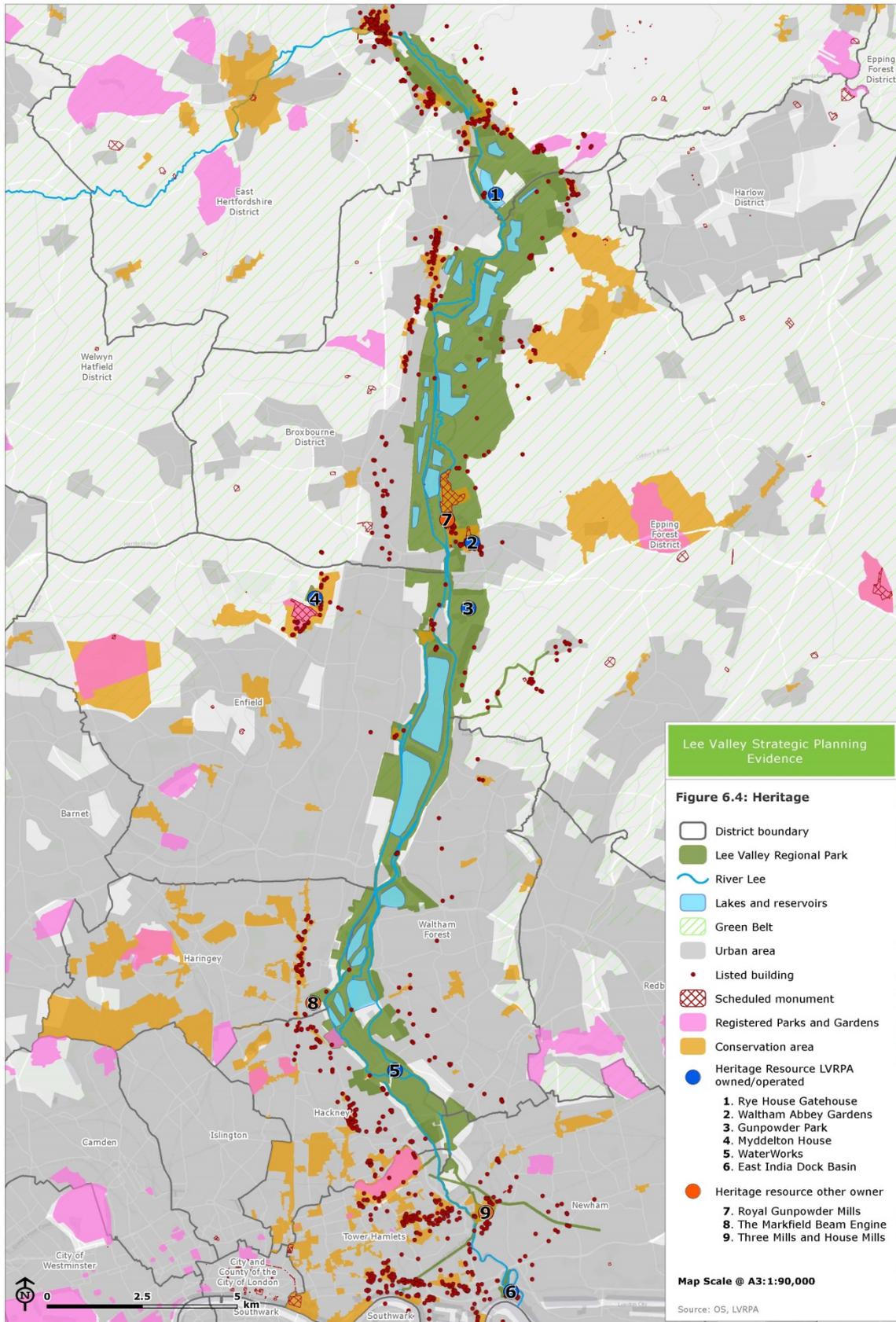




Figure 6.4: Heritage



Issues

Maintaining openness, important views

- 6.37 Large development, such as renewable energy sites and built sport facilities within and surrounding the Park has the potential to detract from the openness of the landscape, as well as obstruct views.
- 6.38 Openness and views are important for promoting and reinforcing the Park's image as a single entity and promote orientation (legibility) and appreciation of the natural features of the Lee Valley.

Enhancing legibility of the landscape

- 6.39 Whilst built development has the potential to detract from legibility by obscuring the natural features of the valley, development can where appropriate provide landmarks that enhance legibility.

Maintaining a coherent landscape character for the Park

- 6.40 A strong coherent identity for the landscape helps to create a consistent and meaningful image for the whole Park which strengthens its corporate identity and raises awareness of the Park as a distinctive place at both a local and regional level.
- 6.41 Developments and buildings that do not respond to the context of the Park can result in a fragmented and weak landscape, thereby undermining the idea of the Park as a single entity. They can form a busy landscape of mixed use which is confusing to the eye.

Need for strong boundaries and edges of the Park

- 6.42 Some areas of the Park are subject to visually poor edges where poorly designed built development conflicts with the greener nature of the Park thereby detracting from the character of the landscape.

Protecting and enhancing the heritage resource

- 6.43 Promoting public interest and appreciation of heritage features contributes positively to the identity and image of the Park as well as increasing the attractiveness of the Park for visitors. However, there are a number of features where heritage value could be enhanced. These include the East India Dock Basin, Rye House Gatehouse and Royal Gunpowder Mills. There are also likely to be other areas where the heritage has yet to be realised within the Park. Unlocking these heritage assets could help to enhance the attractiveness of the Park for visitors.

7 Environment

- 7.1 This section describes the main environmental features and attributes of the park, including four main topics: water; energy; waste; soil and productive landscapes.

Water

The River Lea Catchment overview

- 7.2 From its source in Luton, the River Lea and its tributaries drain a large area of Hertfordshire, Essex and Bedfordshire before passing through a densely populated part of North London as it flows for 80km towards the River Thames at Bow Creek. The Lower Lea catchment is defined as the area between Hoddesdon in Hertfordshire and Tower Hamlets in London where the river flows through an increasingly urban environment including the major settlements of Hoddesdon, Waltham Abbey, Enfield, Edmonton, Tottenham, Walthamstow, Chingford, Hackney and Stratford.³⁵
- 7.3 The main tributaries in the Lower Lea Catchment are Nazeing Brook (Lower Nazeing), Turnford Brook (Turnford/Cheshunt), Cobbins Brook (Waltham Abbey), Salmons Brook (Enfield and Edmonton), Ching Brook (Chingford), Moselle Brook (Tottenham) and Pymmes Brook (East Barnet and Edmonton).³⁵
- 7.4 The waterways of the Lower Lea Valley include the River Lee Navigation, Old River Lee and the Lee Flood Relief Channel (FRC). The FRC is an artificial watercourse completed in 1977 and is designed to carry flood water to reduce the likelihood of flooding in the valley. Water levels in the FRC, Navigation and river are controlled by several weirs, gates and sluices. These maintain water levels for water supply, water treatment, navigation, and amenity and wildlife purposes while allowing flows to pass during storm events.³⁵
- 7.5 The Thames River Basin Management Plan 2015³⁶ includes programme of measures, actions needed to achieve the objectives, including those in the Lower Lea Catchment. The Plan identifies the priority issues for the north and south of the Lower Lea Catchment. In north of the catchment (between Hoddesdon and the M25) the main issues are poor water quality from waste water treatment, pollution incidents and misconnections, and pollution from urban run-off. Historic land use and physical modifications for urbanisation and flood protection have also contributed to poor water quality. The priority issues identified for the south of the Lower Lea are water quality, biodiversity and raising awareness of rivers of the catchment.
- 7.6 **Figure 7.1** highlights the main features of the Lower Lea Catchment described above.
- 7.7 As indicated above water quality is a key issue facing water bodies. **Table 7.1** outlines the waterbodies within the LVRP classified in terms of their ecological status and cites the reasons for not achieving good status as noted in the Environment Agency's Catchment Data Explorer³⁷.

³⁵ Environment Agency (2013). Managing flood risk in the Lower Lee catchment, today and in the future.

³⁶ Environment Agency (2015) Thame Water River Management Plan

³⁷ Environment.data.gov.uk. (n.d.). Environment Agency - Catchment Data Explorer. [online] Available at: <http://environment.data.gov.uk/catchment-planning/ReasonsForNotAchievingGood/496157> [Accessed 23 Nov. 2017].

Table 7.1: Ecological status of water bodies within the LVRPA

Waterbody	2016 Status	Reasons for not achieving good status
Lee Navigation (Enfield Lock to Tottenham Locks)	Bad	Transport drainage Surface water abstraction Sewage discharge Inland boating and structures Misconnections Floating Pennywort Urbanisation and urban development Flood protection structures 'Other' activities associated with recreational pressure.
Lee Navigation (Fields Weir to Enfield Lock)	Poor	Urban development Sewage discharge Misconnections Inland boating and structures Floating Pennywort Use of restricted substance Contaminated water body bed sediments 'Other' activities associated with recreational pressure.
Small River Lee (and tributaries)	Moderate	Urban development Sewage discharge Misconnections

Function of waterways

Managing water flow

- 7.8 The primary function of the Lower Lea Catchment within the Park is to serve as a means of capturing and draining rainwater. The natural elements of the Lea Valley act as a 'wetland sponge' by soaking up excess water during heavy rainfall. Flood water is stored in soils or retained as surface water in lakes, marshes and other water bodies. This reduces the volume of floodwater downstream.³⁵
- 7.9 Flood risk is a key issue within the Park area. Approximately 63 % of the Park is classified as being prone to either fluvial or tidal flooding. Fluvial flood risk poses the greatest threat. The area within Flood Zone 2 (i.e. where the annual probability of flooding is between 0.1% and 1.0% from rivers, and 0.1 – 0.5% from the sea) covers approximately 65% of the park area, while the area within Flood Zone 3 (i.e. where the annual probability of flooding is equal to or greater than 1.0% from rivers, and equal to or greater than 0.5% from the sea) is approximately 47% of the area within the Park boundary (see **Figure 7.2**).
- 7.10 Major floods in the Park area occurred in 1856, 1926 and 1947. However, since the FRC became operational in 1977 there have been no major flood events. The flood defence system almost reached full capacity in 1987, 1993 and 2000. This reflects an overall decrease in the level of flood protection in recent times owing to significant changes in rainfall and run-off which has increased flood risk to an estimated 3.3% in places. Built development on open land has increased the risk of fluvial flooding.

- 7.11 This trend of increasing fluvial flood risk is expected to continue into the future with predicted effects of climate change, which include more severe storm events. Flood risk will be exacerbated where development takes place within the floodplain without suitable consideration of flood risk in its design. It would also become worse if existing flood management structures are not maintained.³⁵
- 7.12 Some tributaries of the Lea, particularly Pymmes, Moselle, Cobbins, Dagenham and Nazeing Brooks, have been placed in artificial channels or culverts in part of their lengths. There is also a large area for storing flood water at Cheshunt North, protecting Turnford. The risk of fluvial flooding along these tributaries varies but in some places is high as 12%. In recent years there have been major floods on the Salmons, Cobbins, Nazeing and Ching Brooks, most recently in 2000, with over 350 properties affected along these four rivers.³⁵
- 7.13 In addition to managing flood risk the features of the Lower Lea Catchment play an important role in managing water levels in times of low rainfall. In particular, wetland habitats maintain water flows for longer periods as wetland habitats slowly release water downstream. Furthermore, the system of weirs, gates and sluices that control water levels in the Reservoirs, Lee Navigation and **Lea e-River** are important for managing water levels in times of drought. Many climate change models show an increased likelihood for hotter, drier summers³⁸. This is likely to increase the importance of these existing features, as well as the need for additional infrastructure to increase resilience of the catchment area to drought.

Water abstraction and supply

- 7.14 Major uses of the water within the Lower **Lea e** Catchment are for abstraction for public water supply. Thirteen major reservoirs occupy the Lower **Lea e** Catchment between Waltham Abbey and Walthamstow. Water treatment works are also located at Coppermill. Owned and operated by Thames Water, these reservoirs and treatment works supply 10% of London's population. The Flood Relief Channel contributes to the water supplies for many of these.³⁵ Licences restrict the amount of water which may be taken and can include further conditions to provide enhanced environmental protection. Over-abstraction of water continues to be an issue as it can significantly reduce water levels in river channels, thereby having adverse effects on water quality and biodiversity.³⁹

Effluent discharge

- 7.15 Sewage treatment works of regional importance are located at Rye Meads in Hoddesdon and Deephams in Edmonton. These discharge during storm surges into the Lee Navigation and Salmons Brook, respectively. They are both owned and operated by Thames Water Utilities.³⁵ There continues to be concern that the discharge from these facilities can reduce water quality of nearby waterways.
- 7.16 **Figure 7.3** maps these key water management facilities relating to water supply and effluent discharge.

Sedimentation, nutrient and pollutant retention

- 7.17 The physical properties of wetlands can slow water flow and therefore increase the deposition of sediments. This is beneficial since nutrients and pollutants are held by sediment particles instead of polluting the water.²⁸
- 7.18 Despite this, water quality in a number of water courses is poor.⁴⁰ Poor Water quality reduces biodiversity, detracts from the landscape (sight and smell), and is detrimental to the recreational and leisure uses of the park. Improvements to water quality is the responsibility of a number of organisations including the Environment Agency, Thames Water, Canal and River Trust, local authorities, as well as individual landowners.⁴¹

³⁸ Environment Agency (2017). Drought response: our framework for England.. [online] Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/625006/LIT_10104.pdf [Accessed 23 Nov. 2017].

³⁹ Lee Valley Biodiversity Action Plan (2000)

⁴⁰ Lee Valley Development Framework (2010)

⁴¹ Park Development Framework (2010)

Boat movement

- 7.19 The Lee Navigation is a canalised river incorporating the River Lea and is operated by the Canal and River Trust. It runs from the River Thames at Bow Creek to Hertford Castle Weir providing navigation for commercial and recreational purposes.³⁵ The lower part of the navigation running from the M25 to Thames at Bow Creek was identified by a recent 2014 report by the Canal and River Trust as having potential for increased transport freight.⁴² This would carry wider environmental benefits of reducing lorry traffic through north east London's congested road network. This potential has been highlighted more recently as the Canal and River Trust are in discussions with the team promoting Crossrail 2 on the opportunities of using the Lee to move construction and waste material from the tunnel portal in the Tottenham area out onto the River Thames, via a transfer facility that could be constructed in the Bow area of East London.⁴³ It should be noted, however, that boat movements and its associated structures can have a detrimental impact on water quality through non-permitted sewage discharge and fuel and oil spillage. Boat movement can also facilitate the spread of invasive species having an adverse effect on biodiversity (see Section 4).

Recreation

- 7.20 The River Lea and associated waterways provides a backdrop for recreation activities throughout the Park. These include water-based and land based recreation at the River Lee Country Park, Lee Valley Marinas and Walthamstow Marshes Nature Reserve (Refer to section on sport and recreation for detail).³⁵

Energy

- 7.21 The Lee Valley has an extensive history of generating energy (see **Figure 7.4**). This ranges from using river and tidal power for its mills to more large scale energy production from coal and gas power stations. However, energy generation in the Park is currently limited.

Energy generation

- 7.22 Several power stations lie on the edge of the Park. These include Kings Yard (QEOP), Enfield Energy Centre (gas powered), and Rye House Power Station in the north (gas powered).
- 7.23 Although the Edmonton Ecopark is primarily a waste/recycling plant the recently granted Development Consent Order will generate enough energy generated from processed waste to power 127,000 homes. That compares to 72,000 homes powered from the existing facility.⁴⁴

Distribution Networks

- 7.24 The Park is home to various elements of National Grid's high voltage transmission system. This includes overhead electricity lines, pylons, major substations and electricity line tunnels that run through the lower Lee Valley. A Development Consent Order was granted in 2013 Park for the substantial upgrade of existing power lines that run from Waltham Cross Substation, near Waltham Abbey, to Hackney Substation. The Consent includes works to extend the two substations at Waltham Abbey and Tottenham
- 7.25 There are also a number of fuel and gas pipelines that pass through the park serving major infrastructure such as the Rye House Power Station. Development restrictions (including in relation to landscape and planting) are associated with these services.

Waste

- 7.26 There are a small number of waste management operations and activities located within (and adjacent to) the Park on land not owned by the Regional Park Authority (see **Figure 7.4**). This

⁴² Canal and River Trust (2014) A proposed policy for waterborne Freight

⁴³ Canal & River Trust (2016) ICE: National Needs Assessment: Response by The Canal & River Trust

⁴⁴ <http://northlondonheatandpower.london/benefits>

includes Edmonton Ecopark where waste incineration takes place and a number of other recycling activities occur. This includes bulk recycling, composting, wood chipping and waste disposal and incineration for energy production. Another key site is an 11.7 hectare site located to the south of the William Girling Reservoir operated by Camden Plant. This site is used for crushing, screening and stockpiling of concrete and other recyclable material. This site was originally permitted on a temporary basis and is the subject of an extant enforcement notice requiring phased re-instatement. The site has been earmarked for release in coming years to be used instead for recreational purposes.⁴⁵

- 7.27 Other sites within the Park run smaller operation such as skip hire, waste recycling and processing plants. In addition, the industrial areas also support a range of waste management operations and activities.

Productive landscapes

- 7.28 The Lee Valley has a legacy of mineral extraction. The current and potential products relating to the Park are outlined below and shown in **Figure 7.5**.

Food

- 7.29 The Lee Valley has a long history of food production owing to its fertile soils, proximity to London markets and river access. Food production has decreased greatly in the last century, though it still remains a prominent activity within the north of the Park with 75ha in use as commercial glasshouses.
- 7.30 The Lee Valley Farms provide commercial, dairy and arable products. In addition, the farms provide a visitor attraction and support biodiversity through provision of grassland and wet meadow habitats.
- 7.31 As well as commercial food production, community led food production takes place on allotments, for example the 'Living Under One Sun Allotment' on Millmead Road in Haringey and on land adjacent to Springfield Park.⁴⁶

Potential for sand and gravel

- 7.32 Despite an extensive history of extraction in the past there are currently no sand and gravel operations within the Park.

Soil

- 7.33 **Figure 7.6** shows the Agricultural Land Classifications for the Lee Valley Regional Park as an indicator of soil quality. The majority of the Park's area is classed as Non-Agricultural and Urban. However there are areas within the upper reaches of the Park classed as grade 2 and grade 3 indicating that there are areas of good or very good quality agricultural land.
- 7.34 Much of the historic activity that has occurred in the Lee Valley was undertaken at a time of little or no regulation of control of waste materials. As a result, some areas of the Park contain underground materials with various levels of contaminants. Whilst most areas pose minimal risks, there are some areas of the park where levels and the nature of contamination are currently unknown. As such, within areas classed as urban and non-agricultural land there are likely to be areas where soil has been degraded through contamination due to the valleys industrial legacy or land filled with contaminants.
- 7.35 The exceptions to this relate to areas where gravel extraction and urban development has not occurred, such as on the preserved Lammas Lands of Walthamstow Marshes.

⁴⁵ Application by North London Waste Authority for an Order Granting Development Consent for the North London Heat and Power Project. Written Representation Lee Valley Regional Park Authority. 23rd March 2016

⁴⁶ LVRPA website. Nature, Parks and Gardens.

Issues

Poor water quality

- 7.36 Some of the Park's watercourses suffer from poorer water quality. The main contributing factors are over-abstraction for public drinking water, effluent discharge from Rye Meads and Deephams sewage treatment plants, litter from commercial and industrial premises, recreational pressure, pollutants from boats and polluted run-off from surrounding urban areas. Poor water quality has a detrimental effect on biodiversity, angling and presents a health hazard to those who engage in water-based sport and recreational activities.

Potential for development to increase flood risk

- 7.37 Built development within and surrounding the Park can increase surface run-off, thereby increasing risk of flooding. This is crucial given the anticipated increases in rainfall associated with climate change.

Increased risk of drought

- 7.38 Hotter, drier summers are likely to increase the risk of drought, which can have implications for water levels within the Park's water bodies.

Potential for waste to adversely affect biodiversity

- 7.39 Waste products are generated from a variety of operations within the park including litter, land-management, and agricultural waste. This can have a detrimental impact on biodiversity through direct contamination.

Potential for hard flood defences to detract from landscape

- 7.40 Hard flood defences such as the Lee Valley Flood Relief Chanel can be unsightly and detract from the overall green nature of the landscape. There may be potential for the Park to adopt 'greener' infrastructure to simultaneously reduce flood risk and enhance biodiversity.

Balancing biodiversity with flood mitigation

- 7.41 There is a challenge of how to adequately balance the Park's function to mitigate flood risk in a way which can enhance both landscape and ecology.

Potential for energy and waste facilities to undermine sustainable values of the Park

- 7.42 Energy facilities that are not underpinned by sustainable values potentially undermine the image of the Park as a place championing biodiversity.

Potential for renewable energy and waste facilities to adversely affect landscape character, openness, tranquillity and biodiversity

- 7.43 Renewable energy and waste facilities such as Edmonton Ecopark can reduce tranquillity and openness, as well as fragment the character of the landscape owing to their large building blocks and large chimney stacks. Such facilities can also adversely affect biodiversity within the Park through increased noise and light pollution. The DCO for this site was however designed in consultation with the Regional Park Authority.

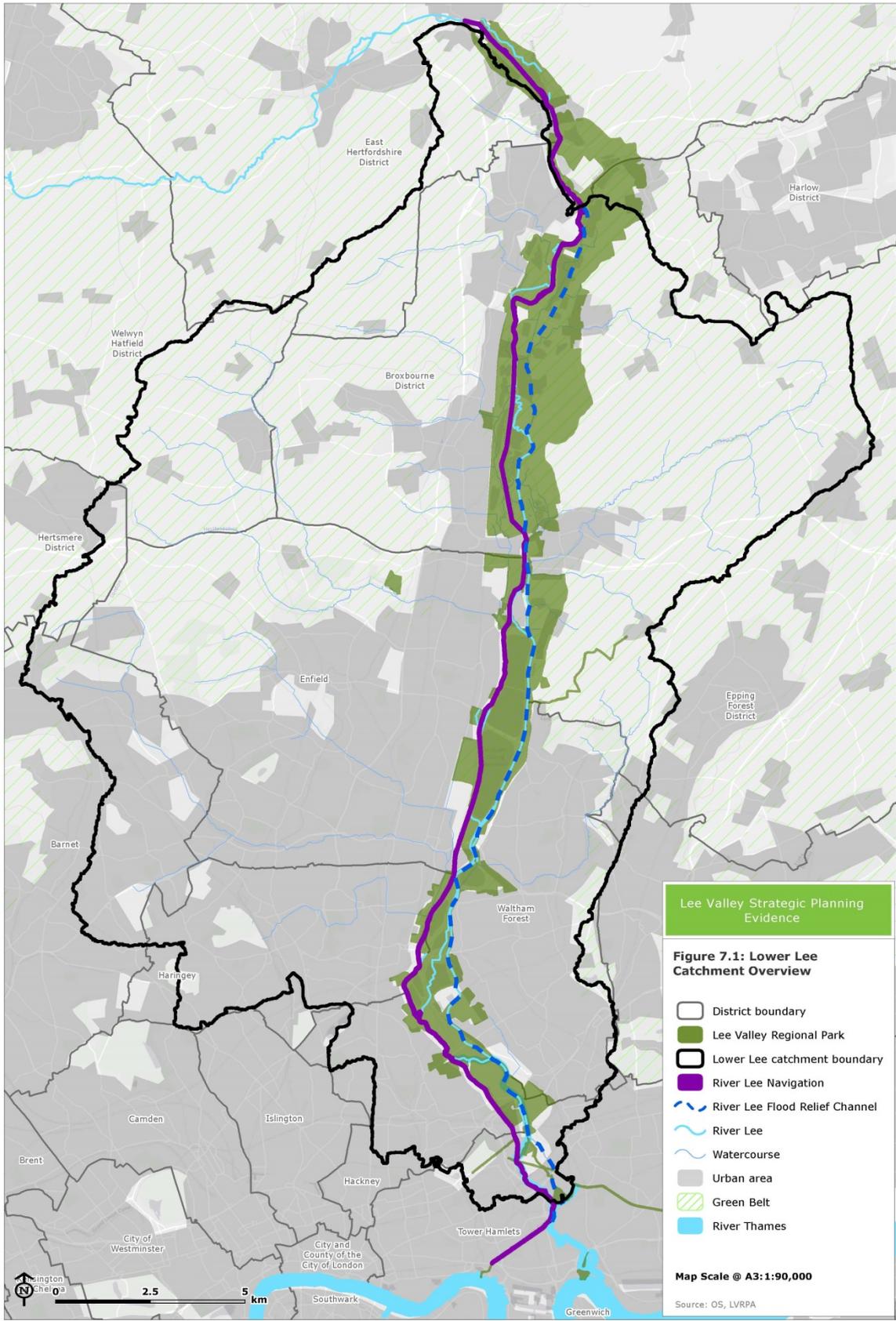
Potential for renewed sand and gravel extraction in the Park to adversely affect soil, biodiversity and landscape

- 7.44 Gravel extraction can remove and degrade soils leading to reduced soil quality and biodiversity. Gravel extraction can also adversely affect the landscape by reindustrialising the landscape.

Contamination of land

- 7.45 There are some sites within the Park with high levels of contamination. There is a question of how best to use contaminated sites in a way which fulfils the Authority's statutory purpose.

Figure 7.1: Lower Lee Catchment Overview



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CB:VT EB:Tzampoura_V LUCEDI 6964_012_Map1_LowerLeeCatch_A3P 24/02/2017

Figure 7.3: Water Management

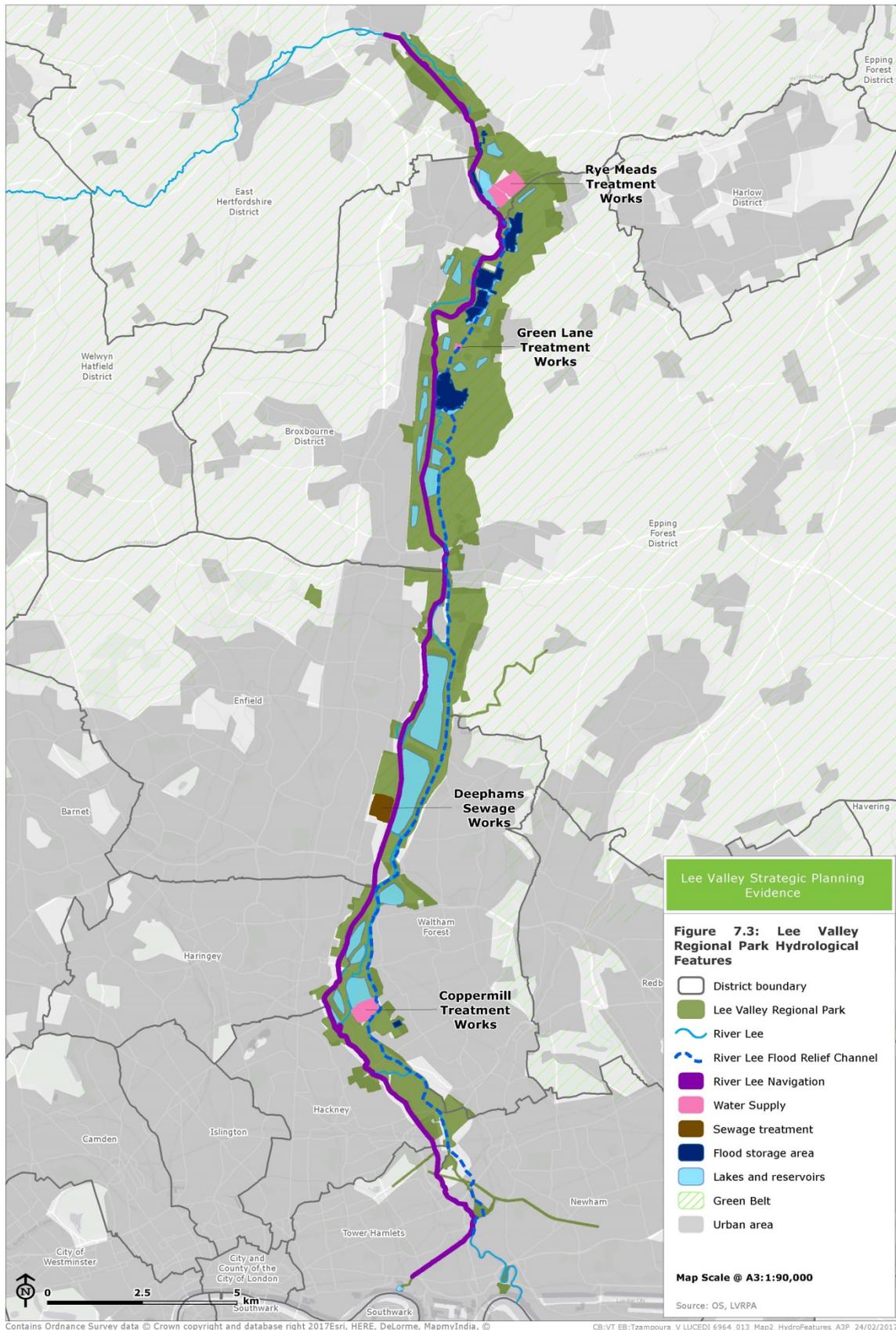


Figure 7.4: Energy and Waste Baseline

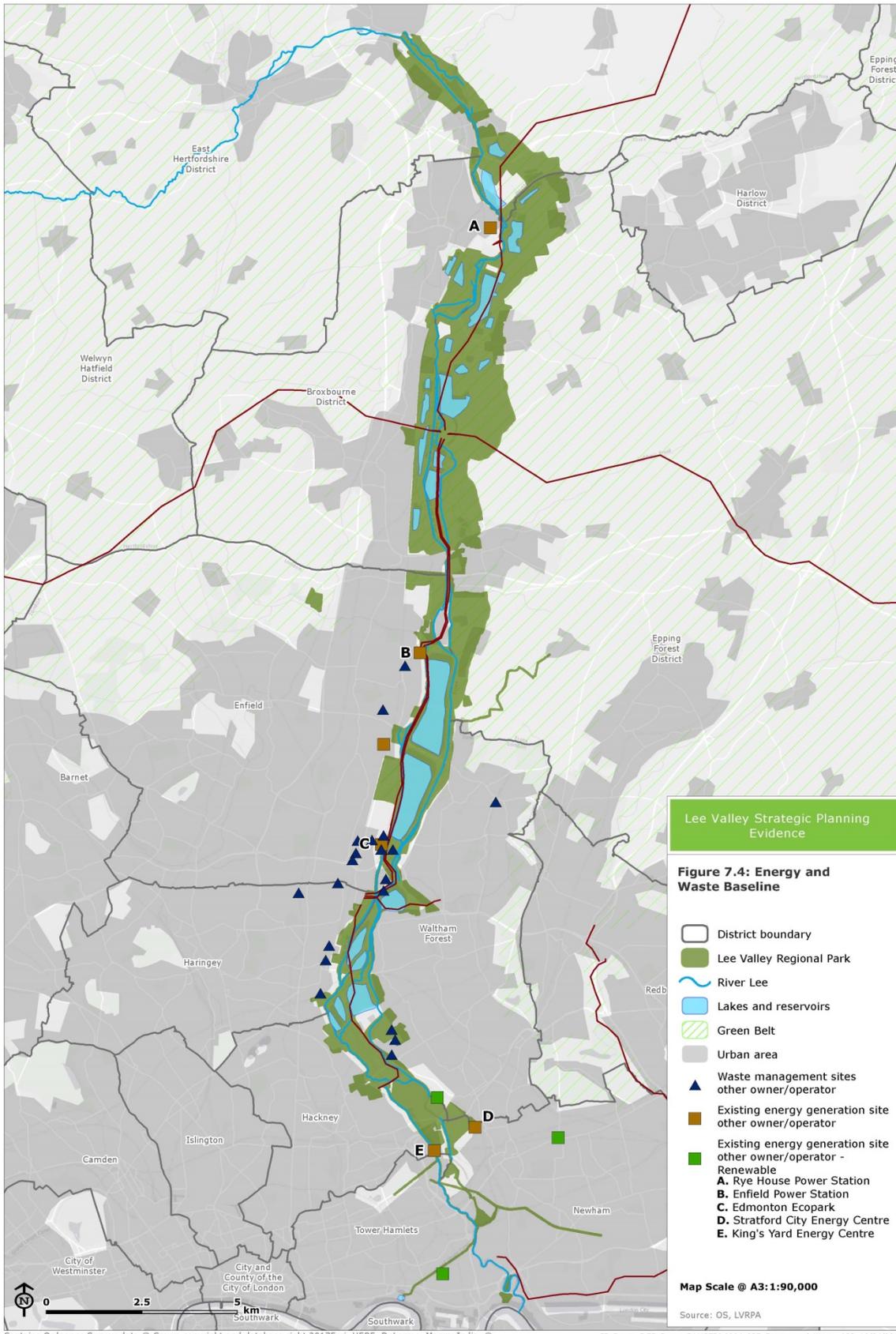


Figure 7.5: Productive Landscapes

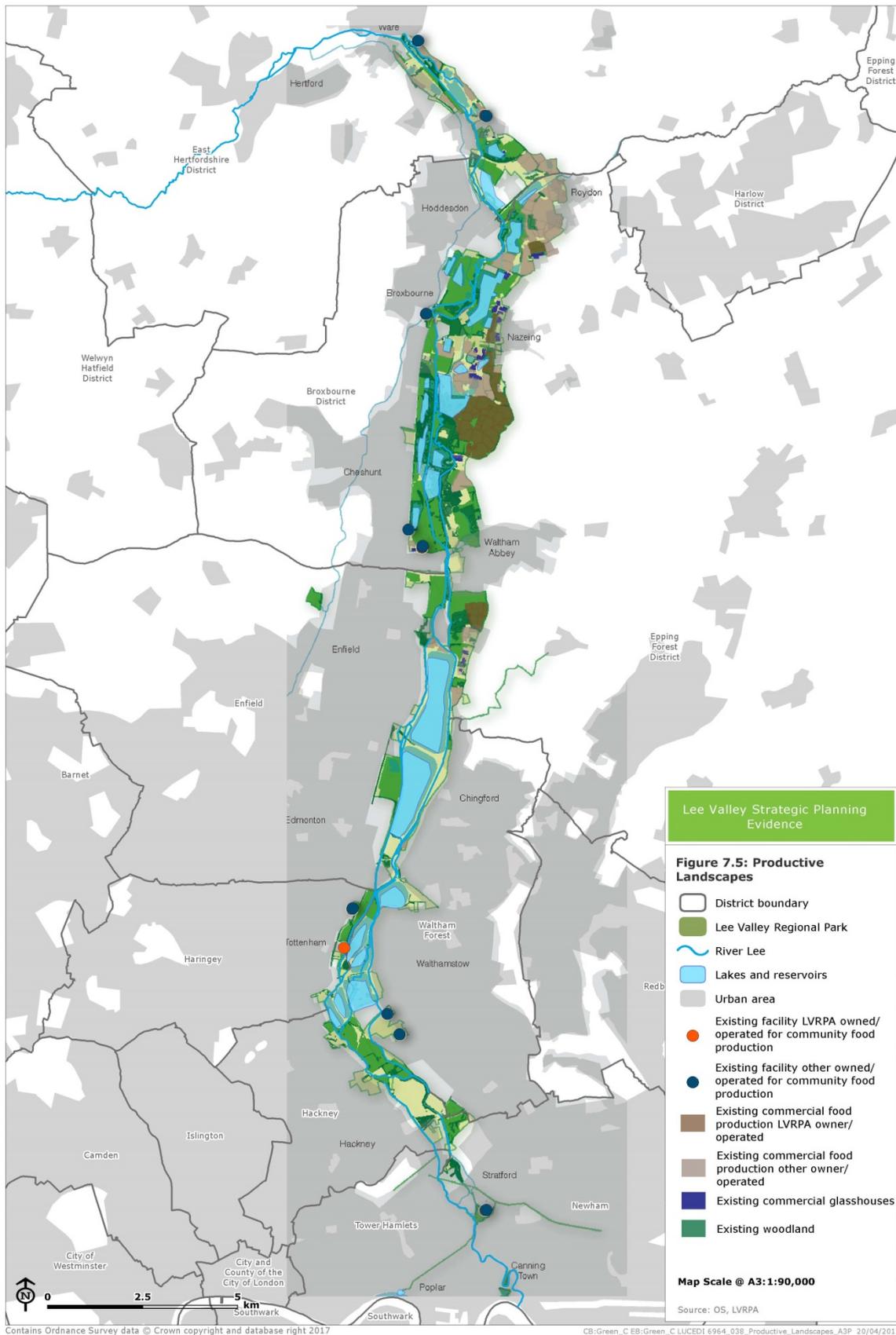
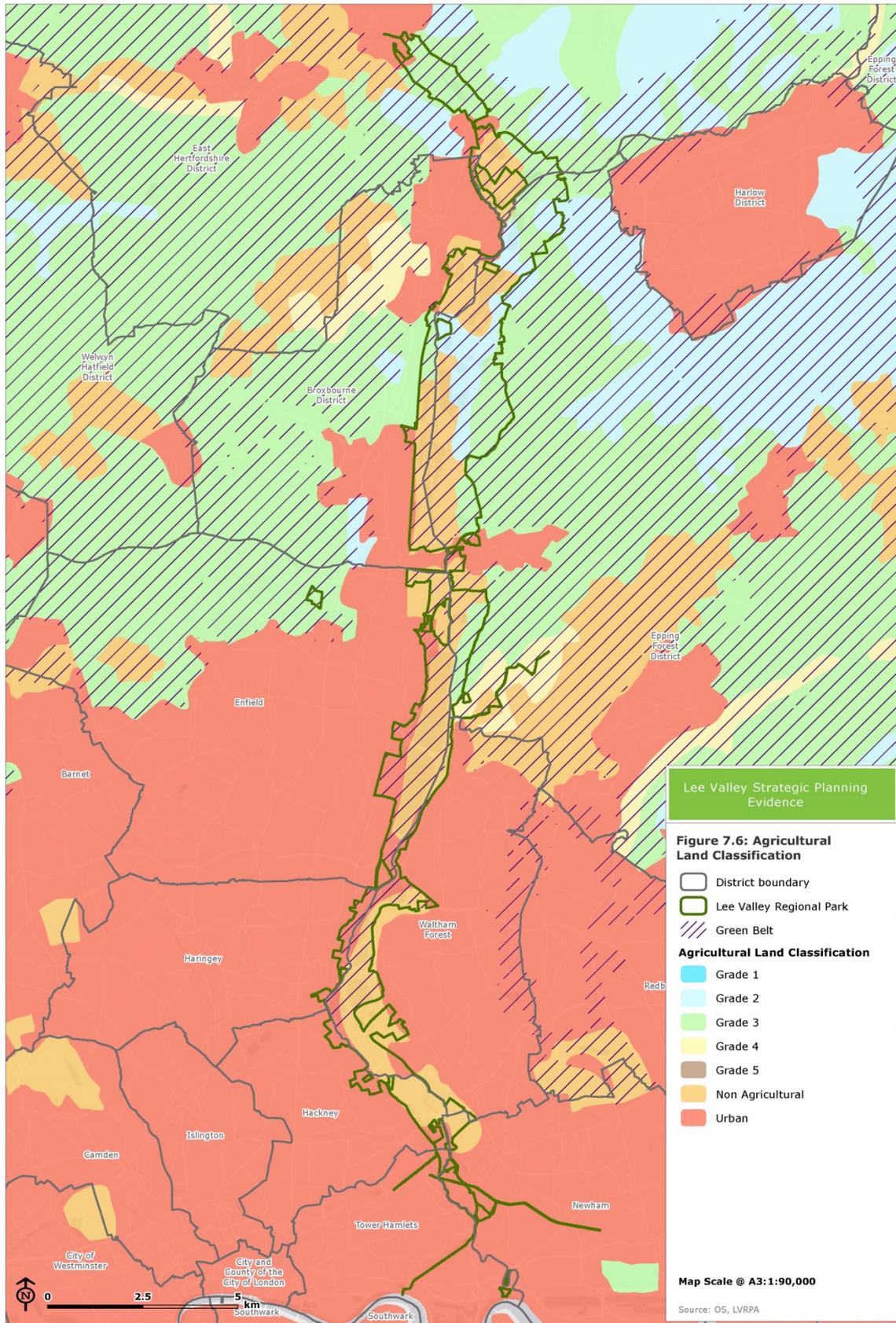


Figure 7.6 Agricultural Land Classifications



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CB:Green_C EB:Green_C LUCED1 6964_050_ALC_A3P 23/05/2017

8 Ecosystem Services

- 8.1 **Table 8.1** summarises the range of services, and benefits, currently provided by the Park to its sub regional catchment which includes London and the two counties of Hertfordshire and Essex and all visitors. Adopting of this approach will inform the development of a new set of strategic policies.
- 8.2 The 2011 Natural England Report, 'The Natural Choice – securing the value of nature', proposed a system of payment for eco-system services whereby the main users, visitors and beneficiaries of open land pay for their use. In this way the system recognises that there is an intrinsic value to all natural assets.

Table 8.1: Ecosystem services provided by the LVRP

Ecosystem services	Key stakeholders and beneficiaries
<p>Supports biodiversity</p> <p>The main habitat types found within the Park are: rivers and streams; standing open water; grassland and fen; woodlands; and urban (especially post-industrial habitats). These habitats support a range of species of which individuals and their assemblages range in status from local to international importance.</p>	<p>The region's population</p> <p>Natural England</p> <p>Thames Water</p> <p>London Wildlife Trust</p> <p>Herts and Middlesex Wildlife Trust</p> <p>Essex Wildlife Trust</p> <p>Canal and River Trust</p>
<p>Connects people with nature and the countryside</p> <p>The predominantly natural and semi-natural character of the Park allows people to experience the countryside and connect with nature close to where they live.</p> <p>Evidence suggests that access to good quality natural green space has a number of associated benefits to health and wellbeing, including increased life expectancy and reduced health inequality, promotion of psychological health and mental well-being.⁴⁷</p> <p>The Park, therefore, is vital resource for those nearby to connect with nature and experience a sense of countryside. This is particularly significant for people in riparian boroughs with limited open space.</p> <p>The significance of this benefit is further amplified by the forecast growth in urban development within the riparian authorities and London more widely over the coming decades.</p>	<p>Park users</p> <p>National Health Service</p> <p>Thames Water</p> <p>Canal and River Trust</p>

⁴⁷ Forest Research (2010) Benefits of Green Infrastructure. Available at [http://www.forestry.gov.uk/pdf/urgp_benefits_of_green_infrastructure.pdf/\\$FILE/urgp_benefits_of_green_infrastructure.pdf](http://www.forestry.gov.uk/pdf/urgp_benefits_of_green_infrastructure.pdf/$FILE/urgp_benefits_of_green_infrastructure.pdf)

Ecosystem services	Key stakeholders and beneficiaries
<p>Provides a sense of openness and tranquillity</p> <p>The natural character and lack of buildings affords a strong sense of openness and tranquillity, which are important for well-being and spiritual nourishment.⁴⁸</p> <p>Ensuring openness and tranquillity is particularly important for southern part of the Park, which is bordered by increasingly dense urban development.</p>	<p>Park users</p>
<p>Keeps the air clean</p> <p>Long term exposure to air pollution is linked to a number of adverse health effects including decline in lung function, asthma, type 2 diabetes, problems with brain development and cognition and cardiovascular diseases. Moreover recent evidence suggests that air pollution contributes to approximately 40,000 early deaths a year in the UK.⁴⁹</p> <p>The Park's wide expanse of vegetation plays a role in keeping the air clean. Trees and other vegetation are recognised as being able to filter particulates and gaseous pollutants so improving the quality of air in and around green spaces.⁵⁰⁵¹</p> <p>This, in combination with the absence of sources of pollution (e.g. road traffic within the Park), means local air quality is better than surrounding areas and the Park provides a refuge for surrounding residents.</p>	<p>The region's population</p> <p>The National Health Service</p> <p>London City Airport and Stansted airport, both of which make considerable contribution to particulates in London</p>
<p>Increases physical activity through formal and informal activities</p> <p>The Park's built sports facilities, open spaces, cycle and footways, and waterways facilitate active lifestyles.</p> <p>According to Sport England, physical activity including Sport is linked to reduced risk of over 20 illnesses, including cardiovascular disease, Type 2 diabetes and some cancers. It can also save between £1750 and £6900 in healthcare costs per person.⁵²</p>	<p>Sub-regional catchment</p> <p>National catchment for major events</p> <p>Park users</p> <p>National Health Service</p> <p>Sport England</p>
<p>Heat amelioration</p> <p>Research shows that urban areas are usually a degree or two warmer than surrounding rural areas. This is due to the urban heat island effect, which is caused by the absorption of direct solar radiation by buildings and manmade surfaces and a lack of vegetation in urban areas.</p> <p>Green open spaces, like the majority of the Park, play a role in mitigating the effects of higher temperatures in surrounding urban areas through evapotranspiration and</p>	<p>Park users</p> <p>Sub regional catchment</p>

⁴⁸ Environmental Protection UK (2010) Quietening Open Spaces: Towards Sustainable Soundscapes for the City of London

⁴⁹ NHS England (2016). Air pollution kills 40,000 per year according to a study by the Royal College of Physicians. Available at: <http://www.nhs.uk/news/2016/02February/Pages/Air-pollution-kills-40000-a-year-in-the-UK-says-report.aspx>

⁵⁰ GLA (2012) Green Infrastructure and Open Environments: The All London Green Grid: Supplementary Planning Guidance. Available at https://www.london.gov.uk/sites/default/files/algg_spg_mar2012.pdf

⁵¹ Forest Research (2010) Benefits of Green Infrastructure. Available at [http://www.forestry.gov.uk/pdf/urgp_benefits_of_green_infrastructure.pdf/\\$FILE/urgp_benefits_of_green_infrastructure.pdf](http://www.forestry.gov.uk/pdf/urgp_benefits_of_green_infrastructure.pdf/$FILE/urgp_benefits_of_green_infrastructure.pdf)

⁵² Sport England Website. Benefits of Sport

Ecosystem services	Key stakeholders and beneficiaries
the shading and conversion of solar radiation to latent heat. 51	
<p>Creates opportunities to learn</p> <p>Learning is supported by a number of the Park’s land uses and facilities including sports facilities, nature reserves and community gardening. The Authority’s Youth and Schools Programme makes considerable use of these resources</p> <p>Of particular importance are the opportunities the Park affords to learn in the natural environment. Research done by Kings College London on behalf of Natural England states that learning in the natural environment has direct benefits as diverse as educational, health and psychological and indirect benefits ranging from social to financial. The same research states that children from urban environments are particularly disadvantaged with regard to connectivity with nature.⁵³</p>	<p>Sub regional catchment</p> <p>Schools and Universities</p>
<p>Boosts the local economy</p> <p>Recreational facilities such as built sports facilities in the Park provide direct economic benefits through creation of jobs. Evidence from Sport England suggests that sport and sport related activity is estimated to support over 400,000 full-time jobs – 2.3 % jobs in England.</p> <p>The Authority and Trust employ 83 and 350 staff respectively. In addition 150 seasonal casuals are normally employed each year. Sport England also describes the indirect economic benefit of sport in the form of improved health, reduction in youth crime and community development.⁵⁴</p> <p>Evidence also suggests green infrastructure, like the large expanses of semi-natural land including productive landscapes that occupy the Park, have strong economic benefits. Forest Research identifies three main strands of economic benefit linked to the presence of green infrastructure: inward investment and job creation; increased land and property values; and local economic regeneration.⁵⁵</p>	<p>Sub regional catchment</p>
<p>Protects London from flooding</p> <p>The presence of green open spaces in the Park helps protect London from flooding, due to a reduction in surface run-off.⁵⁶</p> <p>Hard flood defences such as the Lee Flood Relief Channel</p>	<p>Sub regional catchment</p> <p>Environment Agency</p> <p>Private utility companies e.g. Thames Water⁵⁸, National Grid</p>

⁵³ Natural England Commissioned Report (2016). Learning in the Natural Environment: Review of social and economic benefits and barriers.

⁵⁴ Sport England (2013). Economic value of sport in England. Available at: www.sportengland.org/media/3174/economic-value-of-sport-summary.pdf

⁵⁵ Benefits of Green Infrastructure: Report by Forest Research (2007). Available at [http://www.forestry.gov.uk/pdf/urgp_benefits_of_green_infrastructure.pdf/\\$FILE/urgp_benefits_of_green_infrastructure.pdf](http://www.forestry.gov.uk/pdf/urgp_benefits_of_green_infrastructure.pdf/$FILE/urgp_benefits_of_green_infrastructure.pdf)

⁵⁶ Forest Research (2010) Benefits of Green Infrastructure. Available at [http://www.forestry.gov.uk/pdf/urgp_benefits_of_green_infrastructure.pdf/\\$FILE/urgp_benefits_of_green_infrastructure.pdf](http://www.forestry.gov.uk/pdf/urgp_benefits_of_green_infrastructure.pdf/$FILE/urgp_benefits_of_green_infrastructure.pdf)

Ecosystem services	Key stakeholders and beneficiaries
also play a role in protecting the region from flooding. ⁵⁷	with vested interest in protecting against flood damage. ⁵⁹ Network Rail ⁶⁰ Land development companies
<p>Appreciation of heritage</p> <p>The presence of different heritage features in the Park instils an appreciation of heritage which is linked to a number of other benefits. Research by English Heritage also shows that visiting heritage sites has a significant positive effect on life satisfaction. Heritage features also can instil communal benefits through a deeper sense of collective identity, linked to sense of place.⁶¹ Enhancing appreciation of heritage also has economic benefit through the creation of jobs. Research by the Heritage Lottery Fund suggests that heritage accounts for 1.28 million jobs in the UK.</p>	Park users Historic England Local communities
<p>Supplies water to London</p> <p>The reservoirs managed by Thames Water in the Park contribute significantly to water supply in London.</p>	Sub regional catchment Thames Water
<p>Provides food</p> <p>Commercial food production is significant in the north of the Park, particularly through the operation of glasshouses.</p> <p>Community food production, through allotments and community gardens, also takes place in the Park.</p>	National and Sub regional catchment Lea Valley Growers Association Lee Valley Farm Local communities

⁵⁸ Thames Water (2016). What Causes Sewer Flooding. Available at: <https://www.thameswater.co.uk/help-and-advice/drains-and-sewers/sewer-flooding-who-to-contact/what-causes-sewer-flooding>

⁵⁷ London Borough of Enfield (2016). Local flood Risk Management Strategy: Final Report. <https://new.enfield.gov.uk/services/environment/rivers-and-streams/flood-management/flooding-information-local-flood-risk-management-strategy-2016.pdf>

⁵⁹ National Grid (2014). 'Staying high and dry': Article outlining risks of flooding to National Grid. <http://nationalgridconnecting.com/staying-high-and-dry/>

⁶⁰ Network Rail (no date). How flooding effects the railway. Available at <https://www.networkrail.co.uk/running-the-railway/looking-after-the-railway/delays-explained/flooding/>

⁶¹ Values and benefits of heritage: a research review by HLF Strategy & Business Development Department. April 2016