

Stratford Original BID Green Infrastructure Audit

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Contents

1	Introduction	5
	Purpose of the report	5
	Aims of the Stratford Original BID	6
2	Context	10
	London context	10
	Newham Local Plan	10
	The Stratford Original BID Area	11
3	Key Opportunities	21
	Summary of key opportunities	21
4	Implementation and management	39
	Consultation	39
	Sources of funding	39
	Additional surveys	40
	Design	40
	Maintenance	41
Appendix 1		42
	Outline estimate of potential revenue costs for maintain GI interventions identified in the Stratford Original BID Area	42

1 Introduction

1.1 This report summarises the findings of an audit of the green infrastructure (GI) in the Stratford Original Business Improvement District (BID) area, in south London. The study area is shown on **Figure 1.1**.

1.2 The Green infrastructure (GI) features considered through this audit include:

- Parks and public green spaces
- Green corridors e.g. road and rail corridors
- Street trees
- Public realm
- Green roofs and walls

1.3 LUC was commissioned to carry out the audit by the Stratford Original BID, which is partnership of businesses based in the Stratford area.

Purpose of the report

1.4 The overarching aim of the audit is to identify and prioritise opportunities to increase green cover across the BID area. This report also provides a brief evaluation of the functions and benefits of the existing green infrastructure in the area.

1.5 Within Stratford BID, there is a particular interest in opportunities to enhance or increase the GI provision in the area to:

- Increase accessibility to green spaces for people living and working in, and visiting, Stratford
- Reduce the impacts of air pollution

- Increase the aesthetic appeal of the area
- Provide opportunities for community involvement

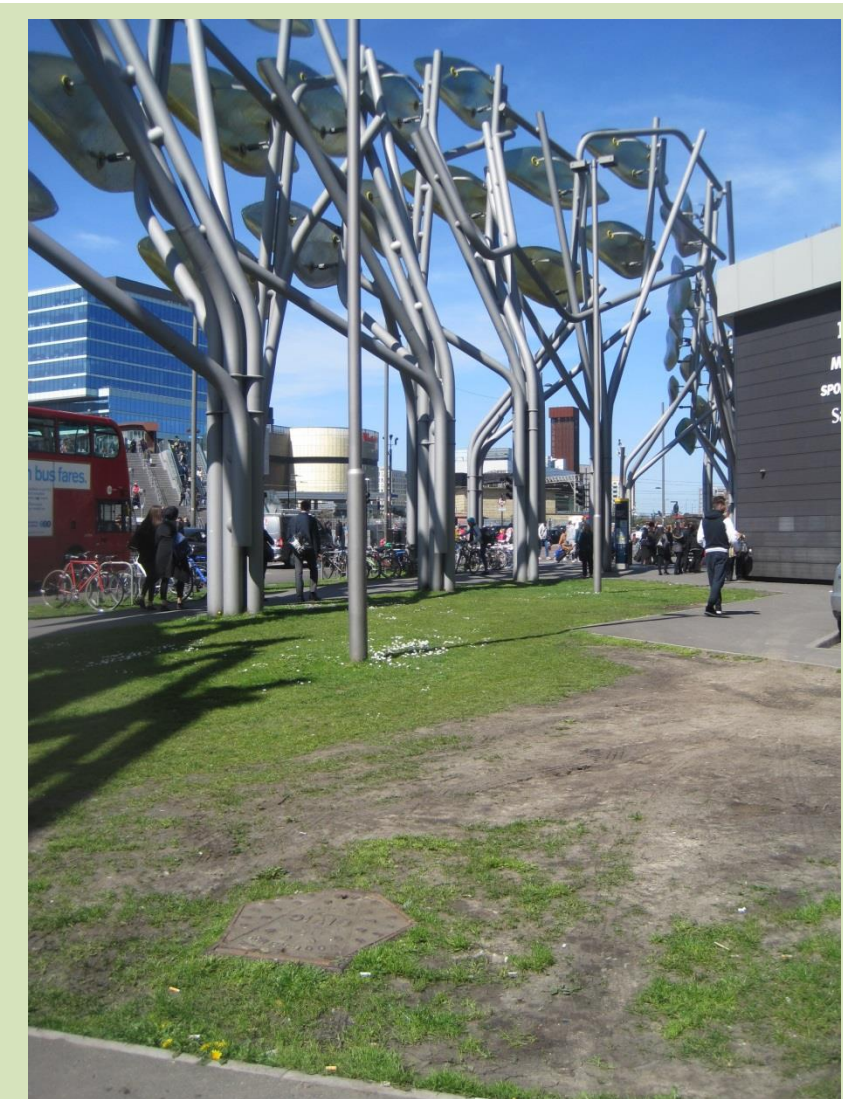
1.6 This report also provides some high level guidance on the potential funding for priority projects, identifying which could be 'quick wins' and highlighting those with the best cost/benefit ratio.



Hard landscaping at Stratford station



Existing mature trees along the wide Broadway



Existing greenspace providing few benefits

Aims of the Stratford Original BID

- 1.7 The Stratford Original BID is centred on Stratford Station, and broadly forms a linear area running east-west along the A118. It also extends to the north along The Grove, and south along West Ham Lane.

Why deliver more green features on the streets of Stratford?

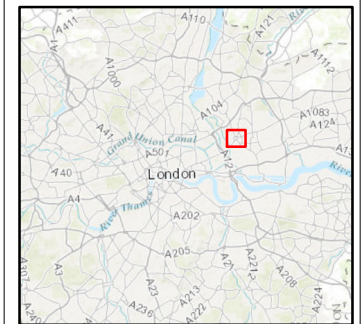
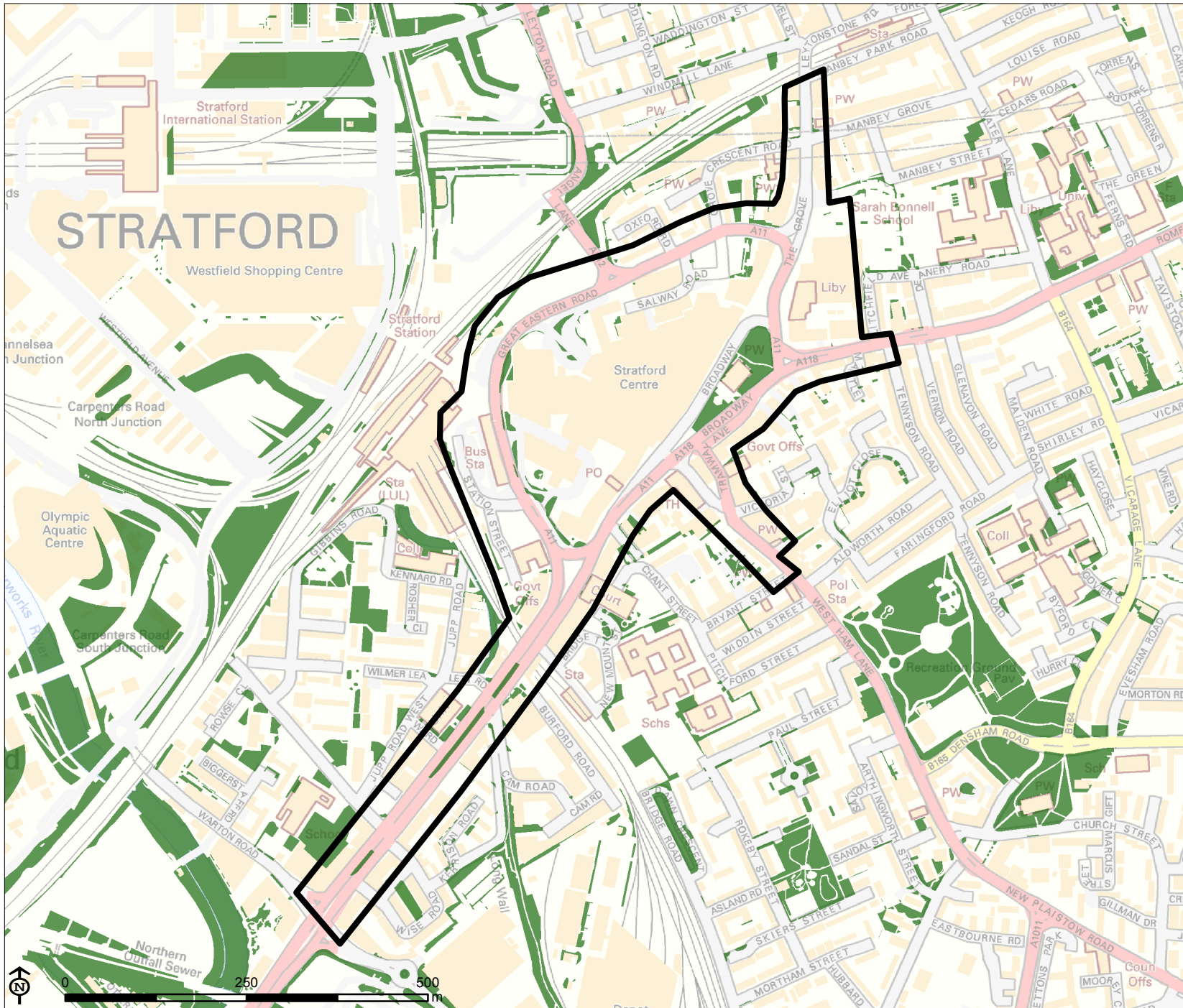
- 1.8 Stratford Original BID has identified three key themes to guide its activities, as summarised below¹:
- **Doing business:** *Stratford has a huge range of businesses that make up the thriving town centre. We want to give them new opportunities to work together to cut costs using joint buying power.*
 - **Promoting Stratford:** *We will work hard to promote the area's unique identity, and encourage visitors and residents to explore and spend here.*
 - **Making the Town Centre feel safer and more welcoming:** *There has been and will continue to be development and investment in Stratford Town Centre. We want to build on this to make the town centre feel safer and more welcoming*
- 1.9 The delivery of green infrastructure within the BID could contribute towards these. It could:
- Increase **businesses engagement** by encouraging them to take an active role in improving the neighbourhood within which their business is based, and provide opportunities for engagement with the wider community.
 - Enhance the **image and marketing** potential of Stratford, by helping improve the gateways to and pedestrian/vehicle routes through the area, including main gateways, and creating a greener, more leafy streetscape.

¹ <http://stratfordoriginal.com/about>

- Make Stratford **cleaner**, through improvements to air quality associated with increased green cover and street trees, and **greener**, through a range of street level and building mounted green features.
- Create a more **attractive** environment, for both people and wildlife.

Figure 1.1: Study Area

- Stratford Original
- Incidental green space and vegetation



Source: LUC, GLA, OS

Map Scale @ A4: 1:7,500



2 Context

- 2.1 The environmental and social context of the study area, as well as the national and London policy context, are important considerations which should influence the function, location and design of GI features. This section sets out these considerations to inform the identification and prioritisation of GI opportunities for delivery.

London context

- 2.2 The GLA has a target to increase green cover across central London by 5% by 2030, as established by the London Plan. Urban greening is a key element of the much broader Climate Change Adaptation Strategy, which encourages the use of planting, green roofs and walls, and other soft landscape features.
- 2.3 The GLA also aims to ensure London's streets and open spaces are easy to use, attractive and resilient. Although renowned as a green city, parts of London are densely developed and green space is at a premium. Key documents which promote the need to provide green infrastructure in London include:
- The London Infrastructure Plan 2050;
 - Natural Capital: Investing in a Green Infrastructure for a Future City – The London GI Task Force Report;
 - Enabling Infrastructure: Green Energy, Water and Waste Infrastructure to 2050;
 - All London Green Grid – Supplementary Guidance to the London Plan.
- 2.4 The study areas lie within the London Borough of Newham and Lambeth, and it will therefore be important to consider the policies

and priorities of the Newham and Lambeth Council as well as the GLA when identifying opportunities.

Newham Local Plan

- 2.5 Newham Council adopted its Core Strategy in January 2012 and includes the following commitments in relation to open space and green infrastructure:
- **SP3 Quality Urban Design within Places:** *"The importance of minimising environmental impact, with sustainability features incorporated into buildings, spaces and neighbourhoods at an early stage of the design process in line with Policies SC1-4"*
 - **SP7 Quality Movement Corridors and Linear Gateways:** *"The need to significantly raise and easily maintain the quality of the public realm, with particular attention to... the value of tree planting to improve amenity"*
 - **SC1 Climate Change:** *"Incorporating living roofs which provide benefits for sustainable urban drainage, biodiversity and the microclimate" and "Greening the borough through landscaping, tree planting and provision of natural environments and increased greenspace connectivity"*
 - **SC4 Biodiversity:** *"Incorporation of living roofs, landscaping and tree planting in developments, meeting the requirements of Policy SC1. In addition, allotments and Tree Preservation Orders (TPOs) should be recognised for their biodiversity value and development should contribute to their enhancement"*
 - **INF6 Green Infrastructure:** *"Green infrastructure will be protected and strengthened over the plan period. Deficiencies in quantity, quality and access to open space in the borough will be addressed"*

The Stratford Original BID Area

Historical Development of the BID Area

- 2.6 The Stratford Original BID area is located within the London Borough of Newham, in the heart of east London. The area has an interesting history of development from farmland, associated with the waterways and wetlands of the River Lea, which provided London with much of its food, becoming particularly well-known for potato production. The area supported a growing industrial economy, with wharves and docks developed by the 1820's, and provided an important link between London and the East of England. The area became a focus for the railway industry in the 1800's, and with a new town growing up to support railway workers and other industries which followed given the good transport links. The area subsequently developed a strong industrial character associated with the River Lea and navigation canals and railway industry.
- 2.7 In more recent years, as for much of the East End, the area saw industrial decline including closure of the railway works in the 1990's, with an increase in abandoned brownfield land along the River Lea and its navigation canals. These areas (as have areas through the East Thames Corridor) developed interesting ecological value, providing a diverse range of habitat types developing on the artificial substrates. These habitats, and particularly bare substrates and developing flower-rich vegetation communities, support a range of rare invertebrates, as well as flagship species such as the black redstart (a species usually associated with rocky habitats which saw population increases in London's bomb damaged areas following the 2nd World War, and subsequently colonised brownfield habitats).
- 2.8 The most recent chapter in the areas history has seen extensive regeneration and redevelopment associated with the 2012 London Olympics. Following the Games, redevelopment of the area continues although open space has been retained as the Queen Elizabeth Olympic Park (QEOP). The development of the Olympic Park, and on-going management of the QEOP, has been guided to a large part sustainability goals, including the delivery of 'green infrastructure', defined as:

A landscape that not only acts as a park in the sense we normally understand it, but which works hard as an integrated part of its environment²

- 2.9 This included the recognition of the value of biodiversity, including the benefits wildlife-rich open spaces provide for people, with habitat creation a core feature of the park. This included innovative approaches to try and maintain those species which were previously reliant on the brownfield mosaic present in the post-industrial landscape, with flower-rich planting and the inclusion of features such as brown roofs as a proxy for these habitats. Retention of this wildlife also provides a link to the historical and cultural heritage of the area.
- 2.10 The BID area is currently subject to significant change, with a number of developments underway and consented and due for commencement, whilst other areas are likely to be subject to development in the relatively near future, such as the Stratford Centre.
- 2.11 Proposals are also being developed for the redesign of the gyratory system, to improve the traffic flows, and enhance the safety and attractiveness of the town centre. Key aims are to³:
- Introduce a two-way traffic system and road calming measures to reduce speeds;
 - Create separate cycle tracks to encourage more people to cycle through Stratford;
 - Widen the pedestrian crossing at Meridian Square and move other crossings to locations where pedestrians prefer to cross;
 - Improve the appearance of streets by resurfacing pavements, removing old street furniture and introducing new landscaping;
 - Enhance the public area near Theatre Square and St John's Church.

² <http://queenelizabetholympicpark.co.uk/our-story/transforming-east-london/creating-a-new-urban-park>

³ <https://www.newham.gov.uk/Pages/Services/Stratford-town-centre-improvements.aspx>

2.12 These aims can be complementary to increasing the provision of GI, and the GI audit has been undertaken in consultation with Newham Council as a key stakeholder. The proposed works will provide a significant opportunity to increase greening within the area.

The BID area today and the need for GI

2.13 The Stratford BID area itself is centred on Stratford Station, which comprises a major public transport interchange with the underground, rail and DLR station as well as a bus station. The BID area is dominated a busy road network, with an existing gyratory around the Stratford Centre, and the east-west A118 forming the southern edge to the BID area.

2.14 As well as heavy vehicle traffic, the area also supports very high levels of pedestrian footfall with access from public transport interchanges and associated with local businesses and residential areas; as well as access to the QEOP, and Westfield Shopping Centre which border the BID area.

2.15 Existing green space and areas of vegetation such as shrubs and lawn within the study area are indicated on **Figure 1.1**, with the BID area itself supporting little greenspace, with GI restricted largely to planters, street trees and areas of amenity grassland along highways/pavements. However, there are a number of greenspaces located around the edge of the BID area, including

- West Ham Lane Recreation Ground (to the south east of the BID);
- The Greenway in the west (providing a walking route to The QEOP, leading to Victoria Park in the north west, and nearly reaching the River Thames in the south);
- The QEOP.

2.16 The BID area currently faces several environmental challenges, and addressing these would contribute significantly to enhancing its image and appeal to a greater range of businesses and visitors.

Flood risk

2.17 Flood risk and surface water management is not identified as a key issue for the BID area, with only very small localised areas

identified as at risk of surface flooding as indicated in **Figure 2.1**. However, this issue will be exacerbated by climate change. Given the relatively low coverage of green infrastructure in the area, it is unlikely that these provide significant alleviation from surface water flooding, whilst increased greening would be likely to also benefit 'downstream' areas by attenuating rainfall.

Poor air quality

2.18 As mentioned, the Stratford area supports major distributor roads. As well as heavy private vehicle traffic, numerous bus routes lead to increased congestion and exacerbate air pollution issues. The area frequently suffers from heavy congestion which may lead to a build-up of harmful pollutants. There is considerable evidence of the damaging effects this pollution can have on children's mental and physical development, as well as the life expectancy of all, but particularly the elderly and those with respiratory problems.

2.19 All of the main roads within the BID area suffer from poor air quality (see **Figure 2.2**), particularly the A118 and the section south of the Stratford Centre. All of the main roads in the BID fail the annual mean objective as defined by the UK Air Quality Standards (2010).

2.20 Improving air quality in London is imperative in order to meet EU standards, and greening our urban realm is recognised as a means of helping to achieve local reductions in air pollution. Vegetation can help filter air pollutants, through physically trapping particulates on leaves, bark etc., with trees accepted as most efficient for example given their size/greater surface area and increased roughness of surfaces. Recent research undertaken in London has also looked at the efficiency of herbaceous and shrub species in filtering air pollution⁴, with plants with small leaves and a high density of hairs most efficient at intercepting particulates. Therefore it may be possible to increase the effectiveness of vegetation in intercepting air pollution through careful plant selection.

⁴ K.Shackleton et al, 2012, The role of shrubs and perennials in the capture and mitigation of particulate air pollution in London. ICL. <http://content.tfl.gov.uk/role-gi-pmpollution.pdf>

Biodiversity and access to nature

2.21 Increasing green cover is beneficial for wildlife and increases peoples' access to nature, providing known benefits to physical and mental health. Green spaces in the wider area provide potential for wildlife, with the QEOP in particular designed to support wildlife. There is potential to increase biodiversity in the BID area, and in particular to encourage species usually associated with 'brownfield' or post-industrial habitats which are a priority for the local area. The Newham Biodiversity Action Plan⁵ includes priority actions for *Public Open Space and Green Corridors* and *The Built Environment* which are of particular relevance to the BID area, with Key Species identified in the BAP which may benefit from GI enhancements in the BID area:

- Starling *Sturnus vulgaris*
- Bees (all types including honey bee and bumble bees)
- Butterflies
- Bats
- Native meadow flowers

2.22 Selecting planting schemes to comprise those species proven to provide greatest benefits to wildlife would benefit delivery of these targets. For example, shrub and herbaceous species could be selected which provide high nectar loads, such as those identified within the Royal Horticultural Society's *Perfect for Pollinator* species lists⁶.

⁵ LUC (2010) Newham Biodiversity Action Plan

⁶ <https://www.rhs.org.uk/science/conservation-biodiversity/wildlife/encourage-wildlife-to-your-garden/plants-for-pollinators>



Existing planters requiring maintenance



Wide pavements with potential to support street trees

Overheating

- 2.23 Urban greening plays an important role in providing cool areas for people to congregate on hot days as well as absorbing some of the heat produced within the city. Research from Manchester shows that despite climate change predictions indicating that urban temperatures could increase by 8°C in the city by 2080, a 10% increase in green space in the city would maintain ambient temperatures at existing levels⁷. There are currently few street trees through the BID area, particularly the main streets, with large areas of open space comprising hardstanding such as at stratford station. Such areas may benefit from shading by trees..

Green space for people

- 2.24 Greening is good for business as well as playing a critical role in improving the health and well-being of local residents, works and visitors to the area. The Natural Capital Committee estimates that the improvements to mental and physical health offered by green infrastructure in urban areas would reduce the associated health treatment costs to the NHS by £2.1 billion⁸. Opportunities should be considered to increase the green cover through the BID area, and create better links to the nearby greenspaces.







⁷ TCPA (2007) Climate change adaptation by design: A guide for sustainable communities

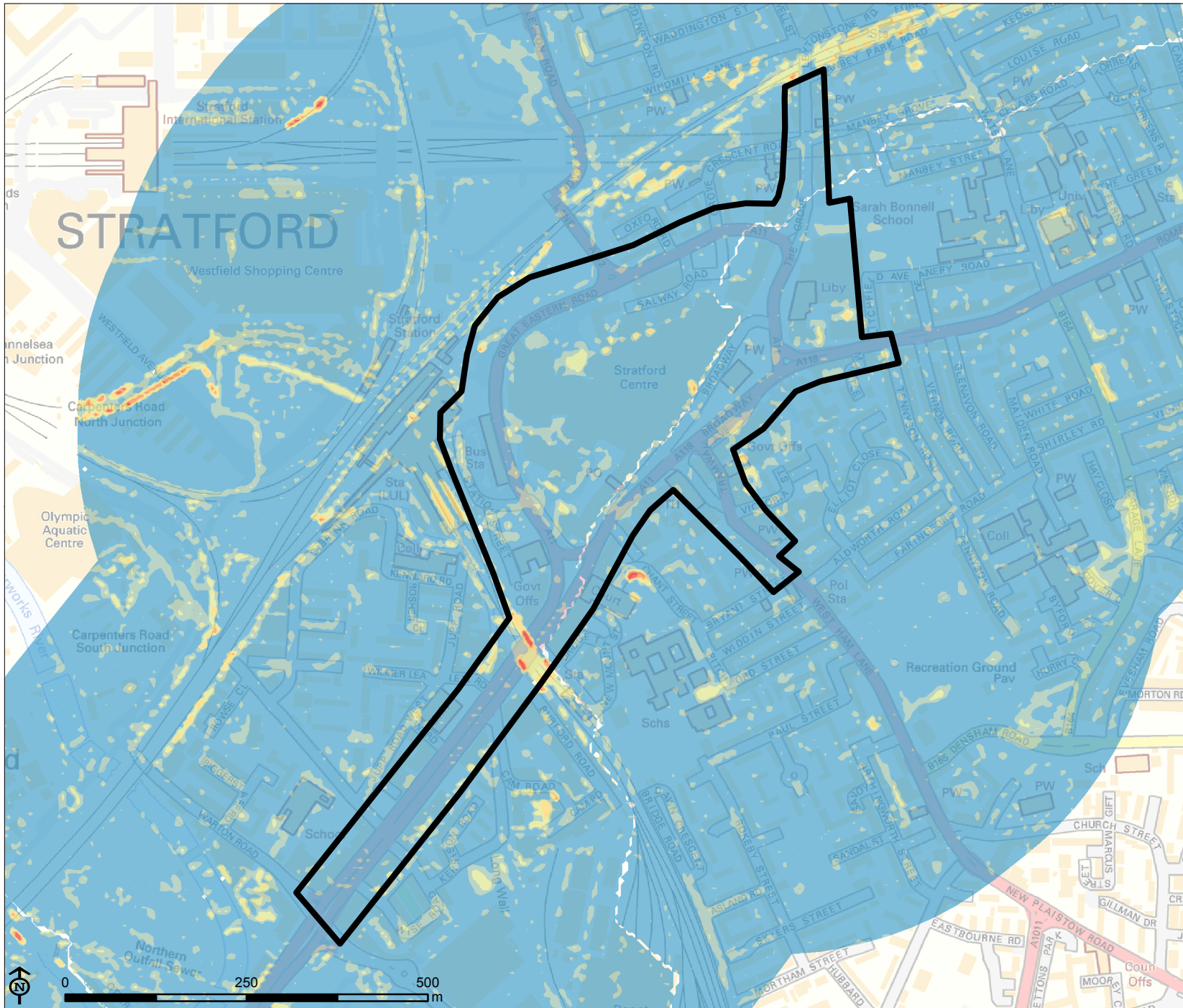
⁸ Natural Capital Investing in a Green Infrastructure for a Future London - Green Infrastructure Task Force Report (2015)

Figure 2.1: Flood Risk

 Stratford Original

1 in 30 year flood depth

-  <0.1m
-  0.1m to 0.25m
-  0.25m to 0.5m
-  0.5m to 1.0m
-  1.0m to 1.5m
-  >1.5m




Source: LUC, GLA, OS

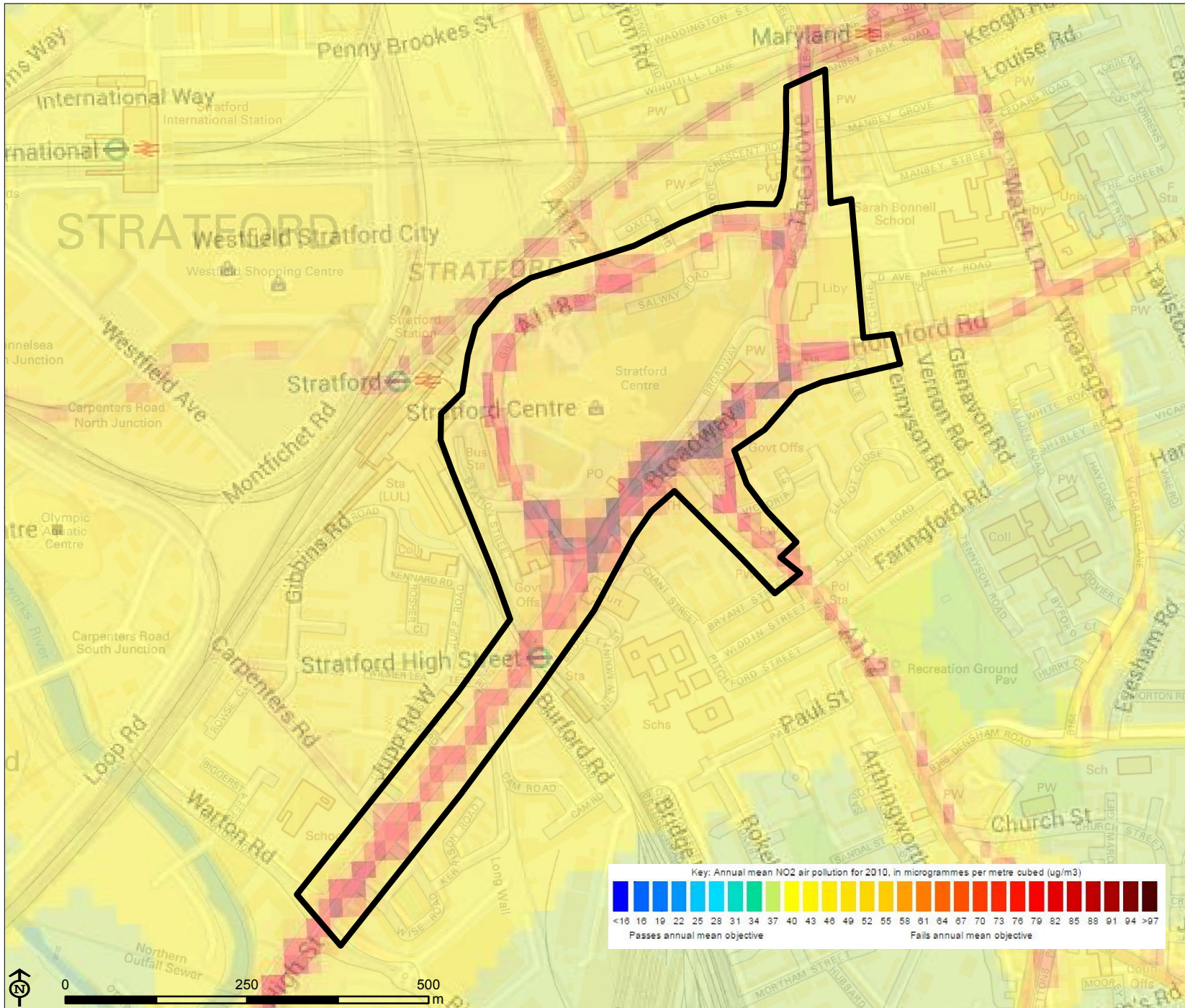
Map Scale @ A4: 1:7,500



Figure 2.2: Air Quality

Annual Mean NO2 Air Pollution (based on 2010 measurements)

 Stratford Original



Source: LUC, GLA, OS

Map Scale @ A4: 1:7,500



Inspiration for new green features



Example of Bike shed with green roof



Children value space to explore nature



Community food growing engages people with nature



Green wall in Victoria, London



Example of Green wall on car park



Lack of access to nature affects well being

Inspiration for new green features



Parks provide space for people and wildlife



Example of pedestrian animated street with outdoor seating



Another example of pedestrian animated street with outdoor seating



Shade can be created where needed



The John Lewis rain garden on Victoria Street



Vigorous climber suitable for green walls

3 Key Opportunities

Summary of key opportunities

- 3.1 The site audit identified 40 opportunities either to enhance or create green infrastructure features throughout the Stratford BID area. These locations are provided on **Figure 3.1**, with a list of all of the opportunities provided in **Table 3.1**. Visualisations are also provided below illustrate possible GI measures.
- 3.2 These include improvements to existing green spaces and streetscape, planting of additional street trees, the creation of rain gardens, green walls and green roofs.
- 3.3 When identifying opportunities for greening, key issues considered were the current usage of spaces (particularly areas of high footfall and activity), security and the likely nature of sub-surface constraints (e.g. services and wayleaves).

Existing green spaces

- 3.4 Existing greenspace within the BID area is restricted to the cemetery and open space surrounding St. John's Church (GI.40). This currently provides opportunities for people to the north of the church, with seating, mature trees and grassland with relaxed mowing. It is also understood that there are restrictions on what can be undertaken within the area as it comprises a burial place. However, there may be the opportunity for light touch enhancements such as wildflower sowing or plug planting within grassland areas which are currently managed as longer grassland. This would further enhance the visual appeal of the grassland, whilst also providing enhanced wildlife habitat.

Squares and Public Open Spaces

- 3.5 Three larger squares or open spaces were identified within the Stratford BID area which have the potential to be enhanced through the creation or enhancement of GI. These included:
 - The entrance to Stratford Station;
 - Theatre Square / Gerry Raffles Square;
 - Broadway / Stratford Library.
- 3.6 The entrance to Stratford Station (GI.21) comprises a very busy pedestrian thoroughfare, given major public transport interchanges associated with the bus station and underground, rail and DLR station, and heavy footfall to reach the Stratford Centre, Westfield Stratford and other local businesses, shops and attractions, as well as residential areas. Pedestrian movements peak with events at the Queen Elizabeth Olympic Park, with West Ham Football Club also to use the 'Olympic Stadium' as their home stadium. Footfall is therefore a significant constraint to greening of Station Square, and it is likely that there are significant issues with below ground services. However, the area is currently a very hard space, with little shading available for visitors or points of visual interest. Opportunities may therefore be restricted to localised tree planting, assuming adequate tree pits can be created (or space made available for raised planters), whilst a small area of grassland and rock gabion walls in the west could be enhanced to provide a more functional GI feature. This could include planting of shrubs or herbaceous plants within the grassland area, or sowing the area with a high impact seed mix – this could also accommodate a rain garden given the ground levels and slopes (see below). There may also be opportunities to 'retrofit' opportunities for planting within/on top of the gabion walls.
- 3.7 Theatre Square / Gerry Raffles Square (GI.3 and 14) is a focus for visitors in the Stratford BID area. There is relatively high footfall here, particularly during the evening and associated with the various entertainment venues and restaurants/bars, whilst vehicle access is required for deliveries and servicing businesses and residential properties. These areas support localised green features, but there is great potential to increase the level of

greening primarily to create more attractive spaces for people, as well as provide increased opportunities for biodiversity, rainwater attenuation and air pollution control (in the later by focusing planting along the road frontage). The area provides a potentially valuable pedestrian route away from the main roads between the station and eastern part of the BID area, and increased greening, combined with waymarking, may help identify this as a route and encourage pedestrian access through these areas.



Greening Theatre Square, creating an attractive outdoor space for visitors, including shading and wildlife habitat (GI.14)

- 3.8 The Theatre Square area (GI.14) in particular provides sufficient space for the creation of pocket park, with opportunities for increased seating, localised tree planting and planters, with potential for a green wall on the residential property to the west of the square (GI.38; possibly using climbers planted at the base of the wall). Careful design would be required to ensure a usable space is retained, potential as an outdoor venue for events, and through access is not restricted, whilst there are also issues associated with ownership of the space. Focussing planting along

the frontage with Great Eastern Road to provide screening and a sense of enclosure, whilst also helping filter air pollutants.

- 3.9 Lastly, the east of the BID area supports expansive areas of public realm including the frontage to the Morrison’s supermarket and Statford Library to the east of The Grove, and to the west the wide pavements alongside Broadway between the Stratford Centre and St. John’s Church. Although these areas are fragmented by The Grove, they may provide the opportunity for a combined approach to greening to improve pedestrian routes. Such interventions may be facilitated by change associated with the gyratory redesign project currently underway, although will need to consider constraints associated with the location of the existing market, pedestrian footfall and underground services in particular. Existing GI in these areas include a number of mature and semi-mature trees within tree pits. Although it is unlikely that extensive greening is possible, there is potential for further tree planting (particularly west of The Grove), and use of planters (including potential pocket park features with incorporated seating).

Streetscape

- 3.10 Many of the opportunities identified comprise relatively low key (although not necessarily low cost/quick wins) interventions along the main roads through the BID area, in particular tree planting and use of planters. Such interventions would aim to enhance, and should be coordinated and follow an agreed palette, adding to a sense of identity for the Stratford area and the ‘brand for the BID, and helping with wayfinding. There may be opportunities to incorporate signage and wayfinding specifically with greening opportunities, for example incorporation with planters. In particular, given the relative lack of greenspace within the BID area for people to enjoy, this should aim to enhance the legibility of pedestrian routes to nearby greenspaces, providing a benefit for the local people (including residents as well as employees, for example to locate greenspace for lunch breaks), and providing health benefits associated with increasing walking and subsequent use of greenspace (with associated physical and mental health benefits). In particular this could help people reach the nearby

greenspaces of West Ham Lane Recreation Ground (to the south east of the BID), The Greenway in the west (with subsequent access to The QEOP, Victoria Park to the north west – a 40minute walk from Stratford Station), and the QEOP.



New planting may help guide people and provide more attractive walking routes (GI.14)

3.11 These opportunities include those running down the High Street (GI.23-27 and 30-36), including for those using the Stratford High Street DLR Station, and along West Ham Lane (GI.29), where increased greening may also support proposals for enhanced cycleways and pedestrian routes from the High Street associated with the gyratory redesign proposals. Increased greening along the pavements of Great Easter Road would also enhance routes between the station and the eastern part of the BID area (GI.1,5

and 16). Such interventions along main roads would also be of particular benefit in reducing air pollution, through filtration of pollutants from vehicles.

- 3.12 Other areas have been identified which may be enhanced, providing a benefit to the local community and those using the streetscape, although which are located within the curtilage of properties. Examples include:
- GI.28 comprises poorly maintained planted beds at the front of the Stratford Magistrates' Court and Family Court. This could be enhanced simply through replacing existing planting and maintaining the bed.
 - GI.24 includes existing planters within the public realm, but this could be supported by the creation of a pocket park or planting within land within the curtilage of Gala Bingo Stratford – this currently comprises an unused area of gravel.
 - GI.32 comprises a derelict site without buildings. At the time of the audit site hoarding was being installed, however should development proposals be delayed there may be the opportunity for the temporary use of the area as pop-up greenspace.
- 3.13 Such opportunities may be achieved through dialogue with the landowners, with potential support of the BID to develop proposals or deliver maintenance.



Enhancing existing and creating new GI to provide a pocket park feature (GI.24)

Street trees

- 3.14 Street trees can be particularly valuable in providing greening where space is limited provided appropriately designed tree pits can be provided. Consideration should be given to spaces and the growing habits, and selected species should be adaptable to urban situations e.g. potential for pollarding/ smaller cutting cycles to reduce crown extent, root ball sizes and therefore water demand. Further guidance on selecting appropriate street trees can be found here⁹. The selection of trees should also reflect the character of the surrounding area, and to help create a sense of place and contribute to the BID 'brand'. It may therefore be appropriate to prepare a Tree Strategy for the Stratford BID area,

⁹ https://www.london.gov.uk/sites/default/files/tdag_canopyweb.pdf

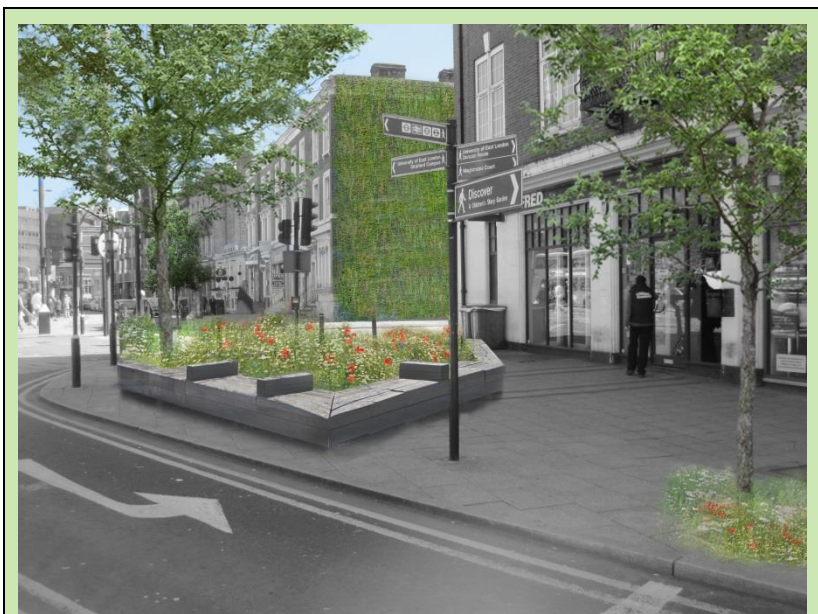
to ensure a coordinated approach to the selection and planting of street trees. Such a strategy should also include a specification for appropriate grades of tree and tree protection (guards, underground guying etc.) to withstand wear and tear associated with the public realm and provision for maintenance.

- 3.15 The planting density of trees is wholly dependent on species selection as well as environmental factors e.g. the proposed location's microclimate and soil condition. Guidance should therefore be sought from specialist nurseries before selecting trees as well as reviewing guidance produced by organisations such as the Arboricultural Association. Likewise the cost of planting trees can also vary depending on species, planting specification and site conditions. As an indication, a tree planted into a hard surface which is free from obstructions, and staked may cost in the region of £500 to £1,000.
- 3.16 Large canopy trees provide the greatest benefits in terms of alleviating the heat island effect through the provision of shading. These mature trees also contribute significant flood alleviation functions. This can be particularly valuable in busy urban areas, providing shade and cooler environment, as well as visually enhancing an area. In addition, trees filter air pollution which can be particularly useful along busy streets such as Broadway, The High Street and Great Eastern Road. They also intercept and funnel rainwater, assisting infiltration of water to substrates at their base and provide habitat for wildlife.
- 3.17 The walkover identified a number of existing street trees, particularly along Broadway, and opportunities for new tree planting. These would buffer pedestrians, office workers and residents from the existing high levels of air and noise pollution.
- 3.18 Even though some of the streets have little potential to increase planting due to the likely presence of underground services and narrow pavements. As discussed above with regards to streetscape, a number of location that could be suitable for tree planting have been identified:
- A number of sections along the High Street. This may be a longer term project should there be the potential for widening of the pavements, potentially accommodating existing cycle routes, to

make space for a line of large scale street trees that would create an avenue leading to the town centre. Measures along the main roads would particularly help reduce air pollution.

- The island at the junction of High Street and Broadway features well maintained shrubs and smaller planting. The addition of more planting would help securing the long term future of the space (GI 27 and 26). These locations will be the focus of significant change as a result of the gyratory enhancement proposals and there is therefore potential for bold interventions here to increase greening and accommodate large scale street trees.
- Planting along West Ham Lane to improve connectivity to local greenspace.

3.19 For all of such locations, careful site selection will be required given to underground services, footfall, sightlines and CCTV.



Tree planting, herbaceous planters and green wall near the junction of Broadway and West Ham Lane (GI.11, 12, 13)

Rain gardens

3.20 A number of sites with potential for rain garden installation were identified within the BID area, with a key factor in suitability being existing ground levels and slopes to determine whether such areas may accept surface water flow without significant alterations to ground levels in surrounding areas. However, given the extensive proposed works associated with the gyratory redesign there may well be other opportunities (for example, associated with the island at the junction of High Street and Broadway GI 27 and 26). The following key opportunities have been identified to date:

- The planting beds forming 'islands' and planted edges to the Picture House car park (GI. 2), with beds at ground level and the slope of the ground meaning retrofitting rain gardens may be achievable.
- Areas of existing amenity grassland west of the Stratford Centre, opposite the station and bus station, where ground levels and slopes may similarly allow for retrofitting, whilst planting of these areas would also increase the visual appeal of the area.

3.21 A 'rain garden' is an area of green space which is designed to collect and absorb rainwater runoff from buildings and urban areas. These features can reduce flood risk and soil erosion in periods of heavy rainfall and collect and store water which could be used for irrigation of other features.

3.22 In addition to providing a water management situation in urban areas, rain gardens are also attractive to people and wildlife, and can be designated to trap and filter waterborne pollutants.

3.23 Rain gardens tend to be 50 or 100mm deep and will have substrate depth of 200-300mm. They are planted with low maintenance vegetation that can withstand both waterlogging or drought for short periods. The soils are specifically designed to take pollutants out of the water and to be very porous. Once at capacity excess water is able to leave the feature and return to the wider drainage system. The water that is retained eventually infiltrates deep in to the soils or is evaporated in to the atmosphere. This process can also help to reduce local air temperatures.

- 3.24 Although the exact volume that rain gardens are able to remove from the drainage system is unknown gardens are able to be designed to capture the first 15mm of rainfall falling on the features, which in most events forms 95% of rainfall¹⁰. This significantly decreases the pressure placed on the surface water drainage systems, particularly during intense summer storms when surface flooding can be severe.
- 3.25 There are a number of barriers to retrofitting such features into the urban realm.
- Presence of underground services and street furniture, which can restrict the area available for rain gardens. Locations where this is less likely to be an issue have been identified, although further survey/ investigation would be required.
 - Rain gardens are a landscape feature that would need to be managed. Maintenance operations would include vegetation management/ replacement and litter picking.
 - Features need to be integrated with existing drainage systems to enable them to intercept surface flow, as well as discharge excess water. Such features could also form part of a wider streetscape scheme such as integrating with areas of permeable paving. It may be appropriate to link these features to provide a chain of complementary interventions.
 - Space is required to create these features and therefore these may not be appropriate in areas of high footfall.
 - The features are sunken to enable the retention of water. However the depth of such features (typically 50-100mm) is relatively minor and the edges can be sensitively defined through use of planting and edge detailing.

¹⁰ Dunnett N. and Clayden A (2007) Rain gardens: Managing water sustainably in the garden and designed landscape

Green walls



Potential location of a modular green wall along the side of Picturehouse (GI.37)

- 3.26 Green walls can have a dramatic and visible greening effect, and have the added advantage of screening unattractive buildings and providing habitats for wildlife.
- 3.27 The most economical way of achieving a green wall is with climbing plants growing from beds or planters at the base of a wall, or plants hanging from planters along a roof edge. The alternative to this is a modular green wall system where plug plants are established within a vertical growing system. The latter is considerably more expensive and requires more intensive management. For a green wall to be a sustainable greening feature however it is also important that a watering system is in place that does not rely on mains water, for example using rainfall runoff or grey water.

- 3.28 Green walls do not normally require planning permission unless the affected building is listed or is within a Conservation Area. However the local planning authority should be consulted.
- 3.29 Important considerations when planning green walls are the aspect, with north facing walls needing less maintenance and use less water, however there are limited plant species which can tolerate high shade. It is also important to consider if there is a nearby water source. For modular systems it is important to confirm with a structure engineer that the wall can support the weight and take any necessary fixings. It is also important the living wall is separated from the structure by a waterproof barrier.
- 3.30 The audit identified 3 opportunities for green walls. Two of these could be created through using climbers grown in the ground and trained on tensioned wire and the other through the use of modular units. However the deliverability of the green walls will be greatly dependent on the support from the property owner and tenants. The following locations were identified as having the greatest potential for green walls:
- The walls on the west side of Theatre Square (GI 38) would be suitable for either a modular green wall, or a simpler approach would be through the use of climbers planted at ground level or within a raised planter at the wall base. This would enhance the visual appearance of the square while also potentially help lessen noise pollution felt from the A118 and filter air pollution.
 - The blank western elevations of the Stratford Centre could provide support for robust fast growing climbers such as Virginia creeper to be grown from planting pits on the ground and lower ground level of the car park (GI 39). This would also greatly enhance the attractiveness of the area, whilst providing for air pollution filtration.
 - The blank wall belonging to the Picture House building may provide opportunities for either a modular green wall or use of climbers (GI 2).
 - The upper sections of wall on the southern elevation of the Stratford Centre (GI.18) would also provide opportunities for modular walls, although it is likely the cost of this would be prohibitive particularly given potential for redevelopment in this

area. A lower cost, much quicker option may be use of hanging plants along planters installed along the edge of the 'awnings' or covered sections above the shop fronts (some of which appear to already support old planting). Hanging baskets have recently been installed in these locations.

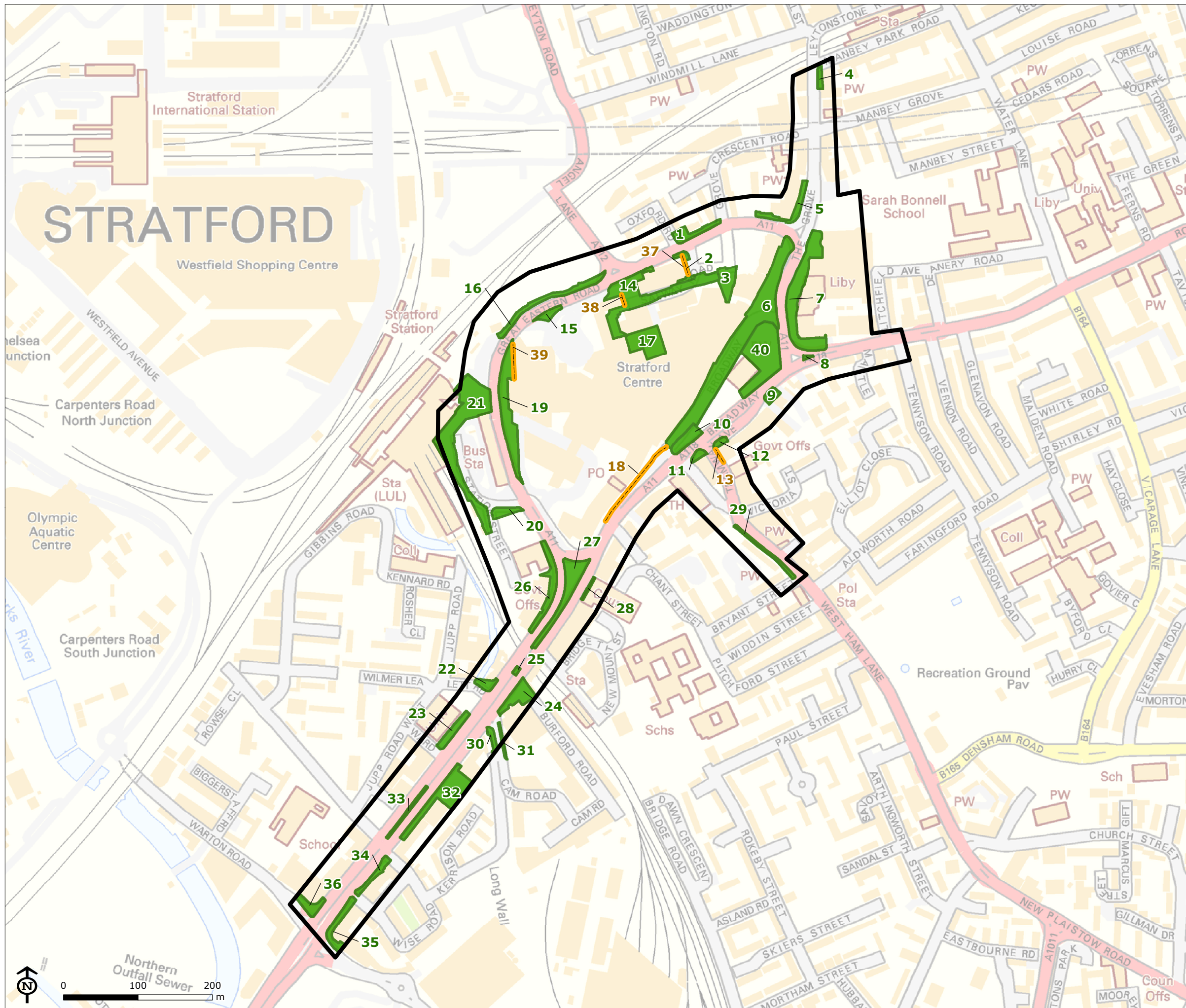
Flat roofs with potential for green roof installation

- 3.31 The type of green roof which can be installed at a building depends on the following:
- Structural loading of the roof
 - Amount of substrate which can be supported
 - Potential for public access
- 3.32 The Green Roof Code identifies four main types of green roof:
- Extensive: lightweight, low maintenance system with a substrate of between 80-100mm
 - Semi-intensive: deeper substrate typically of 100-200mm and therefore able to support a greater range of vegetation.
 - Intensive: a roof garden or small urban park with public access. Requires maintenance and irrigation.
- 3.33 Dependent on the roof type, a range of benefits can be provided such as:
- Water attenuation
 - Improved thermal efficiency of buildings
 - Air pollution control
 - Provision of wildlife habitats
 - Provision of open space
 - Energy savings in relation to the heating and cooling of buildings

- 3.34 There are a range of factors which influence the amount of rainwater a green roof is able to absorb. These include the season, climate, depth of substrate, design of the green roof and the type of plant material. However, as an average, the different types of attenuating approximately the following amount of rainfall:
- Extensive/ biodiverse roof: between 45-55% of annual rainfall
 - Semi-intensive roof: between 60-65% of annual rainfall
 - Intensive roof: between 9—100% of annual rainfall
- 3.35 An initial desk-based assessment of roofs in the Stratford BID area was completed using aerial photography. The identified locations are provided on **Figure 3.2**. However, of these a proportion are likely to be unsuitable given structural capacity, whilst given the level of change in the local area, with proposed or possible redevelopments, many will be unsuitable for greening. From aerial photography a number of flat roof spaces are identifiable which already appear to support gravel materials which may indicate sufficient structural loading for greening (subject to further investigation), including:
- The Stratford Magistrates' Court and Family Court
 - Jubilee House, 2 Farthingale Walk
 - Broadway House, 322 High St
 - Stratford Library
- 3.36 One particular roof area was identified within Stratford Centre. The majority of roofs here may be considered unsuitable for greening given possible redevelopment proposals, but the roof above Peacocks (GI 17) which currently provides a disused car park (with car access no longer appropriate given impacts on the access roads). This site would lend itself well to becoming a pocket park, community garden and/or playground, incorporating other uses (such as a market, or pop-up events/arts space etc.). This would provide a significant benefit to the local community, including local businesses, for example providing accessible greenspace during lunch breaks, and a further visitor attraction (although care would be required to ensure any such use complemented existing business/attractions, such as Roof East - see below).
- 3.37 Other building owners may also be interested in investigating options further, such as Morrison's.
- 3.38 Existing greening has already been provided at Roof East on the multi-story car park in the Stratford Centre. This includes an Urban Park created with support from The GLA Pocket Park Fund and the Stratford Renaissance Partnership, by Roof East with Groundwork London. This includes planting of particular benefit to wildlife, and provides a new green area for the local community.
- 3.39 A relatively recent development at the junction of Victoria Street and West Ham Lane (the East Thames Group offices) appears to include areas of green (biodiverse) roof as well as an accessible roof terrace; whilst the Travelodge and adjacent mixed use development on the High Street also appear to support green (biodiverse) roofs.
- 3.40 These existing roofs may provide useful models for the types of greening that may be achieved should other building owners consider greening.

Figure 3.1: GI Opportunities



- Stratford Original
- GI opportunities
- Green wall opportunities

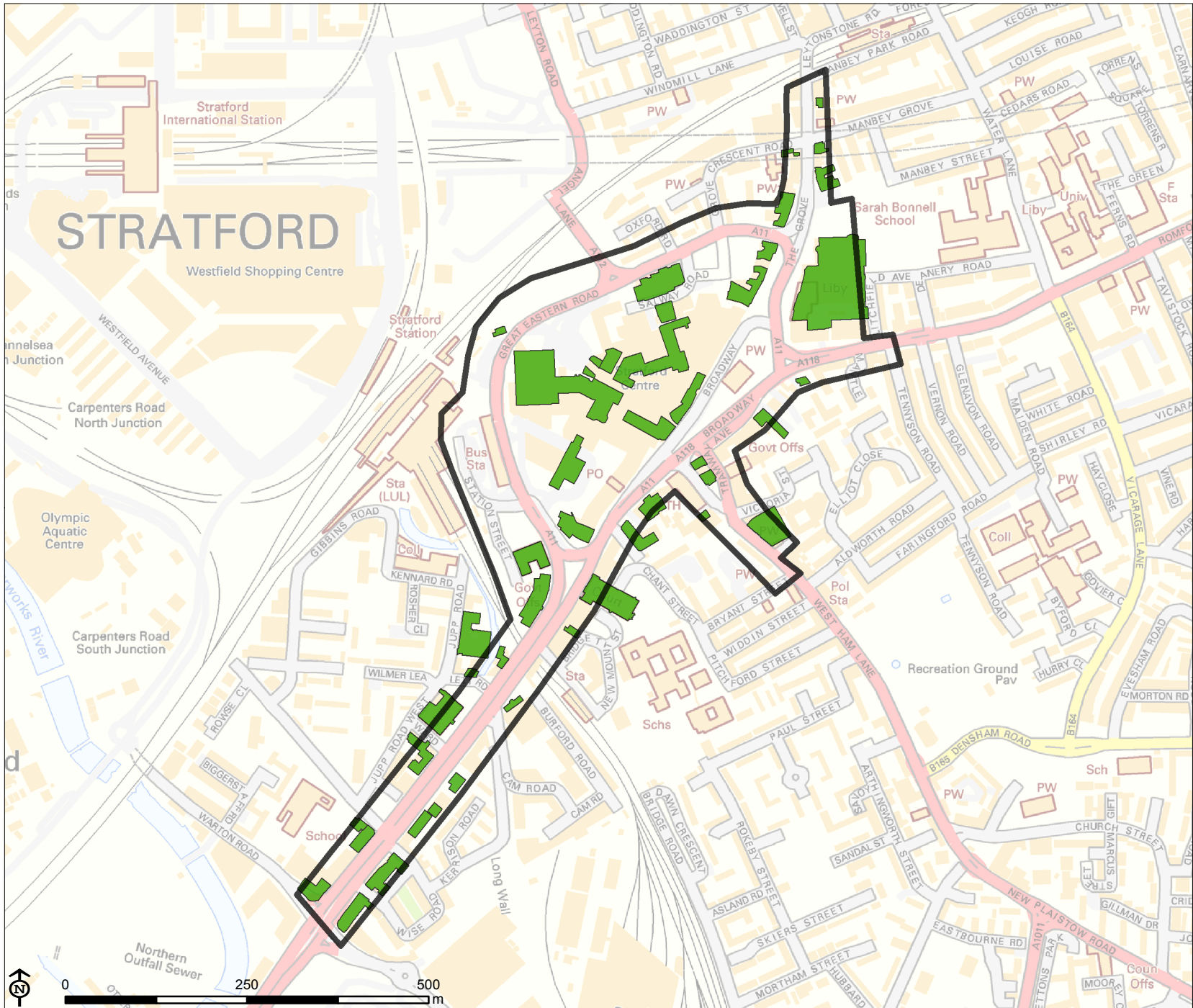


Map Scale @ A3: 1:5,000



Figure 3.2: Green Roof Opportunities

-  Stratford Original
-  Potentially suitable green roofs



Source: LUC, GLA, OS

Map Scale @ A4: 1:7,500



Table 3.1: Summary of terrestrial interventions identified in the This Stratford BID area

Opportunity	Type	Benefits	Ease of delivery / Approximate cost	Barriers to delivery	Management implications (see Appendix 1 for indicative costs)
GI.01: Pavement/ hard surface opposite The Picturehouse	<ul style="list-style-type: none"> Herbaceous planting 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Moderate: £5-15k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers Support of site owners Wayleaves 	<ul style="list-style-type: none"> Litter picking and weeding Application of fertiliser Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Lifting and dividing Mulching
GI.02: Pavement/ hard surface next to The Picturehouse	<ul style="list-style-type: none"> Herbaceous planting Rain garden 	<ul style="list-style-type: none"> Biodiversity Visual appearance Water attenuation 	Moderate: £5-£15k	<ul style="list-style-type: none"> Support from local business Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Lifting and dividing Mulching Checking drainage infrastructure for blockages Clearance of silt deposits (if excessive)
GI.03: Pavement/ Hard surface linking University Square to Broadway	<ul style="list-style-type: none"> Planters Street trees Wayfinding 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants / trees Dead heading of flowers / pruning Application of fertiliser Watering in dry weather Mulching Inspecting trees, checking of tree ties, stakes, tree pruning Inspecting and cleaning wayfinding
GI.04: Pavement/ hard surface along Grove Road	<ul style="list-style-type: none"> Street trees Planters 	<ul style="list-style-type: none"> Biodiversity Visual appearance Local amenity 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Underground services – water mains, gas, telecoms, sewers Support of local businesses 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants / trees Dead heading of flowers / pruning Watering in dry weather Inspecting trees, checking of tree ties, stakes, tree pruning
GI.05: Pavement/ hard surface in front of pub on Grove Road	<ul style="list-style-type: none"> Street trees Planters 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Underground services – water mains, gas, telecoms, sewers Support of local businesses 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Mulching Inspecting trees, checking of tree ties, stakes, tree pruning
GI.06: Pavement/ hard surface in front of shops running down Broadway	<ul style="list-style-type: none"> Street tree Planters Change road into shared 	<ul style="list-style-type: none"> Visual appearance Biodiversity 	Moderate: £15-£30k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants Dead heading of flowers / pruning

Opportunity	Type	Benefits	Ease of delivery / Approximate cost	Barriers to delivery	Management implications (see Appendix 1 for indicative costs)
	surface (pedestrianised)			<ul style="list-style-type: none"> Support of local businesses 	<ul style="list-style-type: none"> Watering in dry weather Mulching Inspecting trees, checking of tree ties, stakes, tree pruning
GI.07: Pavement/ hard surface in front of Morrisons Supermarket	<ul style="list-style-type: none"> Street tree Planters Seating 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Moderate – challenging: £5- more than £30k	<ul style="list-style-type: none"> Underground services – water mains, gas, telecoms, sewers Wayleaves Support of site owners Current uses e.g. active use, transport infrastructure Significant change associated with gyratory proposals will shape opportunities 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Mulching Inspecting trees, checking of tree ties, stakes, tree pruning Inspecting and cleaning seating. Repairs to seating as required.
GI.08: Traffic infrastructure opposite Nandos Restaurant	<ul style="list-style-type: none"> Street tree Planters 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Easy/ quick win – moderate: less than £5k –£15k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Mulching Inspecting trees, checking of tree ties, stakes, tree pruning
GI.09: Pavement/ hard surface opposite Church on Broadway	<ul style="list-style-type: none"> Planters Seating Street tree 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Moderate – challenging: £5k – more than £30k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers Support of local businesses 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Mulching Inspecting trees, checking of tree ties, stakes, tree pruning Inspecting and cleaning seating. Repairs to seating as required.
GI.10: Pavement/ hard surface with seating opposite church graveyard	<ul style="list-style-type: none"> Planters Tree planting Seating 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Challenging: £15k – more than £30k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Mulching Inspecting trees, checking of tree ties, stakes, tree pruning Inspecting and cleaning seating. Repairs to seating as required.
GI.11: Pavement/ hard surface along Broadway	<ul style="list-style-type: none"> Street tree Planters Seating 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Moderate: £5 - £30k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Mulching

Opportunity	Type	Benefits	Ease of delivery / Approximate cost	Barriers to delivery	Management implications (see Appendix 1 for indicative costs)
					<ul style="list-style-type: none"> Inspecting trees, checking of tree ties, stakes, tree pruning Inspecting and cleaning seating. Repairs to seating as required.
GI.12: Pavement/ hard surface along Broadway	<ul style="list-style-type: none"> Street tree Planters 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Moderate: £5 - £30k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers Significant change associated with gyratory proposals will shape opportunities 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Mulching Inspecting trees, checking of tree ties, stakes, tree pruning
GI.13: Brick wall East London Skills for Life Building	<ul style="list-style-type: none"> Green wall 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Moderate £5-£15K	<ul style="list-style-type: none"> Wayleaves Support from landowners and tenants 	<ul style="list-style-type: none"> Watering (irrigation system required) Replacement of failed plants Structural inspections
GI.14: Pavement/ hard surface Theatre Square	<ul style="list-style-type: none"> Street tree Planters Seating 	<ul style="list-style-type: none"> Biodiversity Visual appearance Local amenity 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers Wayleaves 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Mulching Inspecting trees, checking of tree ties, stakes, tree pruning Inspecting and cleaning seating. Repairs to seating as required.
GI.15: Pavement/ hard surface next to Great Eastern Road	<ul style="list-style-type: none"> Street tree Planters 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Moderate £5-£15K	<ul style="list-style-type: none"> Underground services – water mains, gas, telecoms, sewers Highways 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Mulching Inspecting trees, checking of tree ties, stakes, tree pruning
GI.16: Pavement/ hard surface next to Great Eastern Road	<ul style="list-style-type: none"> Street tree 	<ul style="list-style-type: none"> Biodiversity Visual appearance Wayfinding 	Moderate £5-£15K	<ul style="list-style-type: none"> Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Replacement of failed trees Weeding at tree base Watering in dry weather Inspecting trees, checking of tree ties, stakes, tree pruning
GI.17: Abandoned car park / tarmac, roof belonging to Peacocks inside the Stratford Centre	<ul style="list-style-type: none"> Food growing Pocket park creation Market / Pop-up venue 	<ul style="list-style-type: none"> Biodiversity Visual appearance Community involvement Local amenity 	Challenging: £15k – more than £30k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers Wayleaves Building constraints Potential for redevelopment 	<ul style="list-style-type: none"> Highly variable subject to use, could be responsibility of tenant/ business/ community group
GI.18: Wall on Broadway	<ul style="list-style-type: none"> Green wall 	<ul style="list-style-type: none"> Visual appearance 	Easy/ quick win:	<ul style="list-style-type: none"> Building constraints 	<ul style="list-style-type: none"> Watering (irrigation system required for wall)

Opportunity	Type	Benefits	Ease of delivery / Approximate cost	Barriers to delivery	Management implications (see Appendix 1 for indicative costs)
	<ul style="list-style-type: none"> Planters with hanging plants 		Less than £5k	<ul style="list-style-type: none"> Support from owners and tenants Potential for redevelopment 	<ul style="list-style-type: none"> Structural inspections Litter picking and weeding Replacement of failed plants Dead heading of flowers / pruning Mulching
GI.19: Grass verge in front of Stratford Centre	<ul style="list-style-type: none"> Herbaceous planting / wildflower sowing Planters Rain garden 	<ul style="list-style-type: none"> Biodiversity Visual appearance Water attenuation 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Significant change associated with gyratory proposals will shape opportunities 	<ul style="list-style-type: none"> Litter picking and weeding Application of fertiliser Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Lifting and dividing Mulching Checking drainage infrastructure for blockages Clearance of silt deposits (if excessive)
GI.20: Pavement/ hard surface along station street next to the Bus Station	<ul style="list-style-type: none"> Street tree 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Moderate £5-£15K	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers Newly laid surface 	<ul style="list-style-type: none"> Replacement of failed trees Weeding at tree base Watering in dry weather Inspecting tree, Checking of tree ties, stakes, tree pruning
GI.21: Pavement/ hard surface next to Stratford Station	<ul style="list-style-type: none"> Street tree Herbaceous planting (localised, existing amenity grassland behind gabion wall) Planters (localised, associated with current gabion wall) 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Challenging: £5-£15k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants / trees Dead heading of flowers / pruning Watering in dry weather Inspecting trees, checking of tree ties, stakes, tree pruning
GI.22: Planter/raised bed next to Lett Road	<ul style="list-style-type: none"> Reinstatement of existing planter 	<ul style="list-style-type: none"> Biodiversity Visual appearance Wayfinding 	Moderate: Less than £5k - £15k	<ul style="list-style-type: none"> Support from adjacent public house 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Inspecting trees, checking of tree ties, stakes, tree pruning
GI.23: Planted beds and hedges next to College building	<ul style="list-style-type: none"> Herbaceous planting 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Support from college Subject to redevelopment proposals 	<ul style="list-style-type: none"> Litter picking and weeding Application of fertiliser Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Lifting and dividing Mulching
GI.24: Planter/raised bed next to Gala Bingo	<ul style="list-style-type: none"> Planters Herbaceous planting 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Litter picking and weeding Application of fertiliser

Opportunity	Type	Benefits	Ease of delivery / Approximate cost	Barriers to delivery	Management implications (see Appendix 1 for indicative costs)
	<ul style="list-style-type: none"> Seating Pocket park 				<ul style="list-style-type: none"> Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Lifting and dividing Mulching Inspecting and cleaning seating. Repairs as required.
GI.25	<ul style="list-style-type: none"> Informal crossing plant 			<ul style="list-style-type: none"> Do not plant in this section - used as a crossing point 	
GI.26: Pavement/ hard surface next to Broadway intersection	<ul style="list-style-type: none"> Street trees 	<ul style="list-style-type: none"> Biodiversity Visual appearance Wayfinding 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers Significant change associated with gyratory proposals will shape opportunities 	<ul style="list-style-type: none"> Replacement of failed trees Weeding at tree base Watering in dry weather Inspecting trees, checking of tree ties, stakes, tree pruning
GI.27: Transport infrastructure (traffic island, embankment) Broadway intersection	<ul style="list-style-type: none"> Planters Street trees 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers Significant change associated with gyratory proposals will shape opportunities 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants / trees Dead heading of flowers / pruning Watering in dry weather Mulching Inspecting trees, checking of tree ties, stakes, tree pruning
GI.28: Planter/ raised bed in front of Court Building	<ul style="list-style-type: none"> Herbaceous planting 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Maintenance issue 	<ul style="list-style-type: none"> Litter picking and weeding Application of fertiliser Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Lifting and dividing Mulching
GI.29: Pavement/ hard surface along West Ham Lane	<ul style="list-style-type: none"> Street trees 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Replacement of failed trees Weeding at tree base Watering in dry weather Inspecting trees, checking of tree ties, stakes, tree pruning
GI.30 – 31: Pavement/ hard surface along Cam Road	<ul style="list-style-type: none"> Planters Street trees 	<ul style="list-style-type: none"> Biodiversity Visual appearance Wayfinding 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants / trees Dead heading of flowers / pruning Watering in dry weather Mulching Inspecting trees, checking of tree ties, stakes, tree pruning
GI.32: Pavement/ hard surface and disused building plot along Highstreet	<ul style="list-style-type: none"> Planters Street trees 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Litter picking and weeding Replacement of failed plants / trees Dead heading of flowers / pruning

Opportunity	Type	Benefits	Ease of delivery / Approximate cost	Barriers to delivery	Management implications (see Appendix 1 for indicative costs)
				<ul style="list-style-type: none"> Support from landowner Redevelopment proposals 	<ul style="list-style-type: none"> Watering in dry weather Mulching Inspecting trees, checking of tree ties, stakes, tree pruning
GI.33: Transport infrastructure (traffic island, embankment) Highstreet	<ul style="list-style-type: none"> Extend herbaceous / shrub planting 	<ul style="list-style-type: none"> Biodiversity Visual appearance Community involvement Food growing 	Challenging: £5-£15k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Litter picking and weeding Application of fertiliser Replacement of failed plants Dead heading of flowers / pruning Watering in dry weather Lifting and dividing Mulching
GI.34 – 36: Pavement/ hard surface along the Highstreet	<ul style="list-style-type: none"> Street trees 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Current uses e.g. active use, transport infrastructure Underground services – water mains, gas, telecoms, sewers 	<ul style="list-style-type: none"> Replacement of failed trees Weeding at tree base Watering in dry weather Inspecting trees, checking of tree ties, stakes, tree pruning
GI.37: Wall on side of The Picturehouse	<ul style="list-style-type: none"> Green wall 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Moderate: Less than £5k - £15k	<ul style="list-style-type: none"> Building constraints Support from local business 	<ul style="list-style-type: none"> Watering (irrigation system required for wall) Weeding Replacement of failed plants Structural inspections
GI.38: Wall on side of residential block in Theatre Square	<ul style="list-style-type: none"> Green wall 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Moderate: Less than £5k - £15k	<ul style="list-style-type: none"> Building constraints Support from local business 	<ul style="list-style-type: none"> Watering (irrigation system required for wall) Weeding Replacement of failed plants Structural inspections
GI.39: Wall on side of the Stratford centre	<ul style="list-style-type: none"> Green wall 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Moderate: Less than £5k -£15k	<ul style="list-style-type: none"> Building constraints Support from local business 	<ul style="list-style-type: none"> Watering (irrigation system required for wall) Weeding Replacement of failed plants Structural inspections
GI.40: St. John's Church	<ul style="list-style-type: none"> Wildflower meadow/ semi-natural grassland 	<ul style="list-style-type: none"> Biodiversity Visual appearance 	Easy/ quick win: Less than £5k	<ul style="list-style-type: none"> Constraints associated with cemetery 	<ul style="list-style-type: none"> Annual or biannual cut, removal of arisings Litter collection Trimming edges Overseeding in autumn

4 Implementation and management

Consultation

- 4.1 Consultation with landowners, local groups and community representatives will be essential to the effective delivery and long term maintenance of the GI features. Key groups to involve would include Network Rail, Transport for London, statutory undertakers, highways authority, developers, property management companies and neighbourhood forum representatives. The London Borough of Newham already holds a very productive relationship with the BID. We suggest that a short period of consultation with partners of the Stratford BID should take place, aiming to:
- Allow interested parties to comment on opportunities which have been identified on their property, or related to sites and infrastructure in which they have an interest.
 - Provide an opportunity to raise any concerns about the proposals, identify constraints, and comment on potential design.
 - Enable the partnership to refine its priorities and deliver GI enhancements with the support of the wider business and residential communities.
- 4.2 Consultation could take the form of one to one sessions or a roundtable workshop type meeting, where complementary objectives could be matched as a basis for future partnership working, and any conflicts identified and addressed. This could be supported by a follow up session as proposals are worked up.
- 4.3 The continued involvement of Newham Council will be integral to the delivery of many of the opportunities identified, particularly those within the public realm, the management of which is the responsibility of the local authority, with potential for the BID to

provide support for delivery and maintenance given the challenging financial conditions for local planning authorities. Highways consent will need to be granted by TfL where proposals are within public highways (streets and pavements) in accordance with the Highways Act 1980. Planning permission may also be required for green roofs and green walls if a building is listed or within a Conservation Area.

Sources of funding

- 4.4 Sources of funding will be a key consideration when prioritising GI opportunities for delivery. The main options for funding GI delivery are outlined below.

Environmental funding

- 4.5 In the current economic climate, there is limited government funding available for environmental enhancement projects, and BIDs need to be innovative and flexible in seeking partners to support project delivery and maintenance.
- 4.6 One funding stream which is currently open is the Veolia Environmental Trust Capital Improvement Fund. If within the vicinity of a Veolia site, not-for-profit companies such as BIDs can apply for grants of up to £75,000, this may include projects in outdoor spaces such as: public parks, community gardens, cycle-paths or play areas. The closing date for this fund is 26th August 2016.
- 4.7 London-specific funding sources may become available for delivery of GI and the BID and its partners could apply to such funding streams. Other London BIDs have benefitted from the GLA's Air Quality Fund and Pocket Parks Fund, although both of these programmes are now closed. Stratford BID should stay in contact with the GLA and Cross River Partnership, which can provide up to date information on any future funding which could support GI delivery.

Partnering specific businesses

- 4.8 Where enhancements will deliver direct benefits to specific companies, it may be appropriate for Stratford BID to negotiate for the enhancement to be partly or wholly funded by these business partners. This will maximise the enhancements that can be delivered with other funding sources. This approach has been successfully applied by a number of other BIDs, for example the John Lewis Rain Garden in Victoria, and the Grosvenor Casino Green Wall in Edgware Road.

Section 106 and Community Infrastructure Levy

- 4.9 Section 106 Agreements are drafted between an applicant for planning permission and the planning authority, in order to make a development acceptable in planning terms. Section 106 Agreements must be directly related to the proposed development, so are only applicable if a development is taking place in the immediate vicinity of the BID. Where this is the case, funding can be secured for the provision of open space or green infrastructure to alleviate the predicted effects of the proposed development. The BID could work with the local authority to ensure such an agreement delivers new GI features within the area.
- 4.10 The Community Infrastructure Levy is a charge on all developments that are above a set size threshold within a local authority. The funds secured through the Levy can be pooled and spent on an agreed range of social and environmental improvements within a local area. Between 15-25% of the Levy is referred to as the 'neighbourhood portion'. This is allocated by the local authority to the body representing the local community within which the development occurs (e.g. a town or parish council, or a neighbourhood partnership) to determine how the funds are spent. The BID should explore where this funding is channelled to in Stratford, and engage them in discussion on the multiple benefits of delivering GI in the area.

Additional surveys

- 4.11 For some of the opportunities identified, further survey work will be required to ensure that the site or building is suitable for the proposed feature. This is particularly true of the green roof opportunities, and all buildings will require a structural survey to ensure the building can safely take the additional weight that the installation of a green roof generates. Any future modular green walls should also have a structural assessment, to ensure the wall can support the additional weight of the green wall system.
- 4.12 For all street tree proposals (and those involving large/specimen shrubs with large root systems), a detailed assessment should be made of the presence and vicinity of underground services and associated way leaves, plus overground services/power lines/cables/street lighting. Significant information has been collected in relation to the gyratory proposals, although this does not cover the whole BID area and potentially these proposals themselves will result in changes to the location of services. Sight lines and visibility splays in relation to highways and site accesses should also be considered, in liaison with the adopting authority/highway authority. **Section 3** (above) provides more information on key considerations for planting street trees.

Design

- 4.13 For most of opportunities design advice should be sought. Appropriate types of design guidance include:
- Planting advice, including species which are beneficial to wildlife.
 - Horticultural, landscape architectural and landscape management expertise will be important for most features, in order to ensure that an appropriate palette of species is identified for the conditions.
 - Townscape assessment and design plans to ensure continuity with existing streetscape enhancement proposals, and with established character of the place.

- 4.14 Independent environmental consultants (as opposed to contractors and suppliers) should be consulted prior to installing green roofs and walls, as they can advise on the creation and design based on the roof style and a range of environmental factors.
- 4.15 For the larger opportunities - roof gardens, the incorporation of green walls and the creation of new green spaces - it is also possible that planning permission may be required. This should be scoped with the local authority at the earliest stage.

Maintenance

- 4.16 Maintenance of the new GI features will be essential to maintain both the provision of functions such as alleviation of surface water flooding, and their visual appearance. The options for maintenance need to be considered by the partnership at the outset, as this is likely to influence prioritisation of opportunities to be delivered. Where possible, longer term management and maintenance requirements have been identified in **Table 3.1**, with an indicative cost¹¹ provided in **Appendix 1**.
- 4.17 There should be a clear plan in place for maintenance prior to delivery, and the key partner organisations which will be responsible for maintaining the features should be agreed. As the identified opportunities are within the public realm, the local authorities will have a key role to play in agreeing responsibility for management and maintenance.
- 4.18 There may be a need to consider creating an independent body which will oversee GI maintenance, for example a Green Infrastructure Trust, or a partnership approach could be followed with delivery of various aspects shared between the Council and BID, and therefore partly funded by the BID levy (this model has

been used, for example, to deliver environmental maintenance within the Heart of London BID).

- 4.19 An 'adopt a feature' scheme could also be implemented, with local businesses and community groups encouraged to adopt and look after greening features installed within the vicinity, as these features will provide local benefits. This could include, for example, watering street trees and planters, litter picking, and reporting any damage or vandalism.
- 4.20 There may also be scope for consideration of community based implementation and management schemes, along the lines of models being pursued in a number of American cities, such as San Francisco's 'Friends of the Urban Forest' a street tree and sidewalk garden planting project.

¹¹ The outline maintenance costs have been prepared using current known industry rates. An allowance has been made for contingencies at a rate of 10%. However revenue costs will vary due to a number of factors such as complexity of design, economies of scale (e.g. size of GI feature and proximity to other features which form part of the maintenance contract) and accessibility of feature. Actual costs will also need to incorporate the appropriate inflationary uplift.

Appendix 1

Outline estimate of potential revenue costs for maintain GI interventions identified in the Stratford Original BID Area

The outline maintenance costs have been prepared using current known industry rates. An allowance has been made for contingencies at a rate of 10%. However revenue costs will vary due to a number of factors such as complexity of design, economies of scale (e.g. size of GI feature and proximity to other features which form part of the maintenance contract) and accessibility of feature. Actual costs will also need to incorporate the appropriate inflationary uplift.

Type	Management regimes	Quantity	Unit	Frequency	Cost
Herbaceous planting	Litter picking	10	m2	365	£40
	Weeding	10	m2	8	£40
	Application of fertiliser	10	m2	1	£5
	Replacement of failed plants	10	m2	1	£70
	Dead heading/ pruning	10	m2	4	£70
	Watering	10	m2	8	£60
	Lifting and dividing	10	m2	1	£80
	Mulching	10	m2	1	£35
Subtotal for maintaining herbaceous planting					£400
Contingency at 10%					£40
Estimated cost of maintaining herbaceous planting					£440
Rain garden	Litter picking	10	m2	365	£40
	Weeding	10	m2	8	£40
	Replacement of failed plants	10	m2	1	£70
	Dead heading/ pruning	10	m2	4	£70
	Watering	10	m2	8	£60
	Checking drainage infrastructure for blockages	2	nr	52	£160
	Clearance of silt deposits	1	m2	1	£10
	Subtotal for maintaining herbaceous planting				
Contingency at 10%					£45
Estimated cost of maintaining rain garden					£495
Planters	Litter picking	10	m2	365	£40

	Weeding	10	m2	8	£40
	Application of fertiliser	10	m2	1	£5
	Replacement of failed plants	10	m2	1	£70
	Dead heading/ pruning	10	m2	1	£70
	Watering	10	m2	8	£60
	Mulching	10	m2	1	£35
Subtotal for maintaining planters					£320
Contingency at 10%					£32
Estimated cost of maintaining planters					£352
Green wall	Inspection of vegetation	10	m2	52	£50
	Structural inspection	10	m2	1	£2,500
	Replacement of failed plants	10	m2	1	£1,000
	Maintenance of irrigation system	1	nr	1	£400
Subtotal for maintaining green wall					£3,950
Contingency at 10%					£395
Estimated cost of maintaining planters					£4,345
Street trees	Checking tree ties and stakes	1	nr	12	£200
	Inspection	1	nr	52	£80
	Formative pruning	1	nr	1	£30
	Watering	1	nr	8	£90
	Weeding around base	1	nr	8	£5
Subtotal for maintaining green wall					£405
Contingency at 10%					£40
Estimated cost of maintaining street trees					£445
Wayfinding	Inspection	1	nr	52	£40
	Cleaning	1	nr	12	£20
	Repairs/ replacement	1	nr	1	£100
Subtotal for maintaining green wall					£160
Contingency at 10%					£16
Estimated cost of maintaining wayfinding					£176
Seating	Inspection	1	nr	52	£40
	Cleaning	1	nr	12	£20

	Repairs/ replacement	1	nr	1	£100
Subtotal for maintaining green wall					£160
Contingency at 10%					£16
Estimated cost of maintaining seating					£176
Wildflower/ semi-natural grassland					
	Litter collection	10	m2	365	£50
	Cutting including removal of arisings	10	m2	1	£100
	Trimming edges	18	m	15	£60
	Overseeding of meadow areas in autumn	10	m2	1	£10
Subtotal for maintaining wildflower/ semi-natural grassland					£220
Contingency at 10%					£22
Estimated cost of maintaining seating					£242