

Southwark Borough Council Tree Planting Strategy Opportunity Mapping Report

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1. Executive Summary

In this report, undeveloped areas within Southwark have been assessed for their tree planting potential using a Multi Criteria Decision Analysis (MCDA) with Geographic Information System (GIS) software. The aim is to determine the tree planting locations that will achieve the greatest impact to society. The locations have been ranked between 3 and 11 (with 11 being the highest priority planting locations) based upon:

1. Areas with low tree canopy cover
2. Areas with high social deprivation
3. Areas within 10m of a road (increased air pollution removal by trees)
4. Areas at risk of flooding
5. Areas covered by existing tree canopy
6. Areas within a Heat Island

Key Statistics:

- Overall the borough has 29.38% of potential plantable space* which equates to 8.8 km²
- Actual plantable space** located on public (council land) is 15% (4.5 km²)
- Peckham Rye ward has the highest potential area for planting at 53.4% (1.0km²)
- St George's ward has the lowest potential area for planting at 7.8% (0.1 km²)
- If, over time, all actual plantable space could become tree covered, Southwark's canopy cover would increase from 19.9% to 34.9%.
- If all potential plantable space were planted then this figure would be significantly higher at 49.3%.

Note: Although delivering these increases in canopy cover are technically achievable, there are challenges to be overcome and factors to be taken into account, such as:

Time: Trees take a number of years to reach their full potential size and their canopy cover develops over that period. However, as they grow tree canopies can extend over and above hard surfaces, potentially providing a larger coverage than estimated.

* **Potential Plantable Space (PPS):** This is the remaining space calculated from the 'all natural areas' OS layer within Southwark after removing any man made surfaces and existing canopy cover.

****Actual Plantable Space (APS):** This is the remaining space calculated from the 'all natural areas' OS layer within Southwark after removing any man made surfaces, multi surface (allocated mainly to private gardens) and existing canopy cover.

Total Canopy Cover/Urban Forest Cover: This is the area of leaves, branches and stems of trees and shrubs covering the ground when viewed from above.

Mortality: A number of trees each year will be lost and removed due to factors such as pest and diseases, health and safety issues and natural dieback . If mortality exceeds current growth and growth from new plantings, this will lower the canopy cover.

Services: In urban areas there are a number of underground and overground services which can potentially be affected by tree roots or the tree canopies. Identifying suitable locations for planting is paramount and planting sites may require additional engineering solutions (such as Root space systems) in order to realise the actual plantable space figures given in this report.

This report outlines tree planting opportunities across Southwark as part of its tree planting strategy. A tree planting strategy should include: a vision, targets and goals, where to plant, what to plant, how to plant, an action plan, and a monitoring and maintenance plan. This opportunity mapping report covers the 'where to plant' part of a tree planting strategy.

The Greater London canopy cover target for 2050 is 30%¹.

¹Greater London Authority (2018)

1. Brief

1.1 Background

As populations within towns, cities and urban areas grow, there is a depreciation in the availability of green space as more areas become developed with grey infrastructure. Tree cover within urban areas provides a variety of ecosystem services and benefits to human health and wellbeing.

Southwark is committed to new tree planting within the borough and, in order to effectively apportion its tree planting budget, has commissioned this study. Using a GIS based Multi-Criteria Decision Analysis (MCDA) it has been possible to highlight and identify areas where attention should be focused for new planting proposals.

MCDA is a concept whereby multiple criteria are evaluated as part of a decision-making process. In the urban forest environment, key geographical characteristics of an area are categorised to provide a hotspot rating of preferential potential planting areas using a systematic process.

This study complements another report by Treeconomics on behalf of Southwark Borough Council:

- iTREE Eco Report of Southwark's Publicly Owned Trees

A new proposal has been made to identify locations where trees can potentially be planted. The use of MCDA within the decision-making process enables locations to be identified where trees can potentially achieve the greatest impact to the local area.

3. Tree Planting Hotspots

3.1.1 Southwark Potential Tree Planting Hotspots

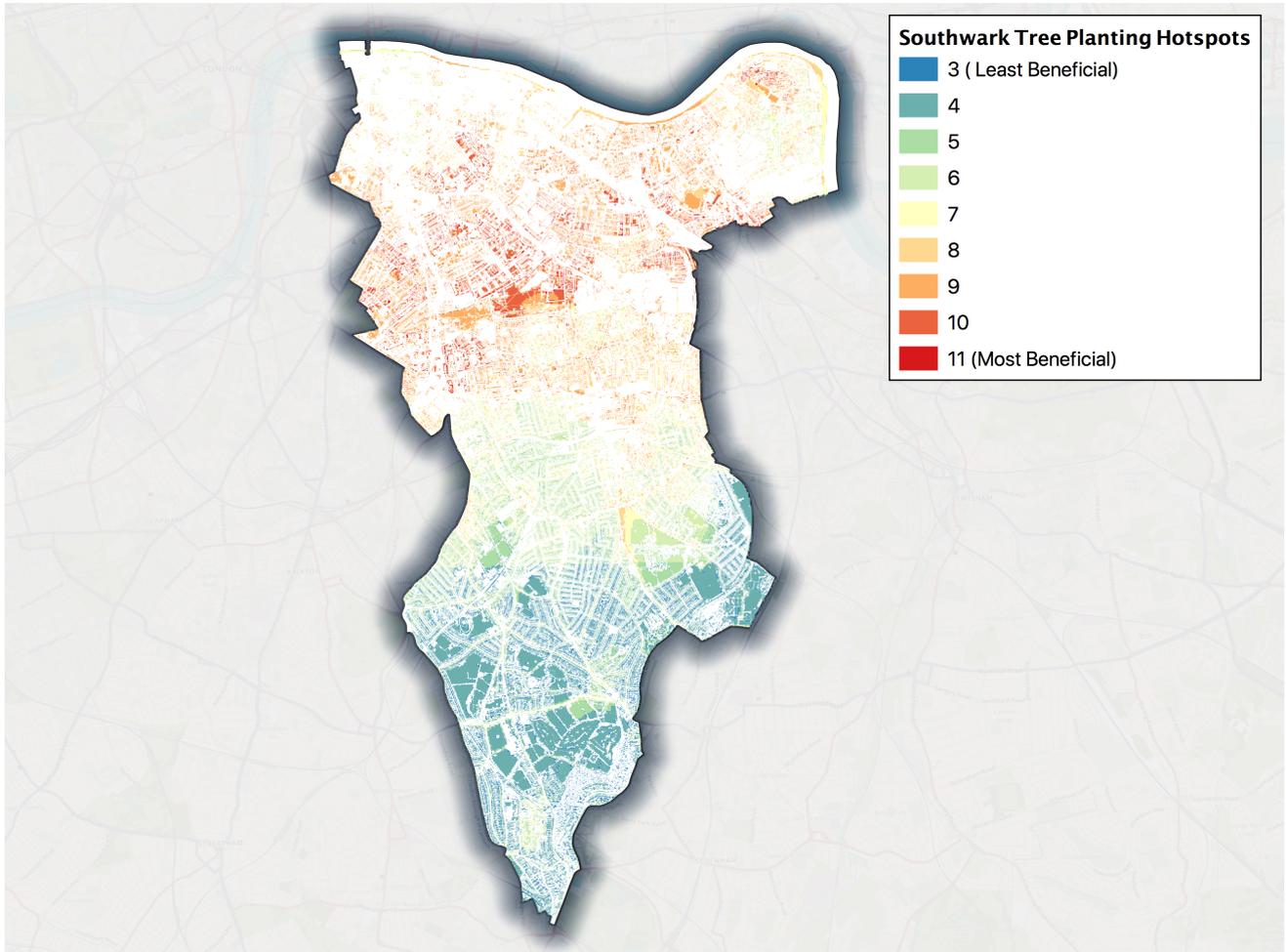
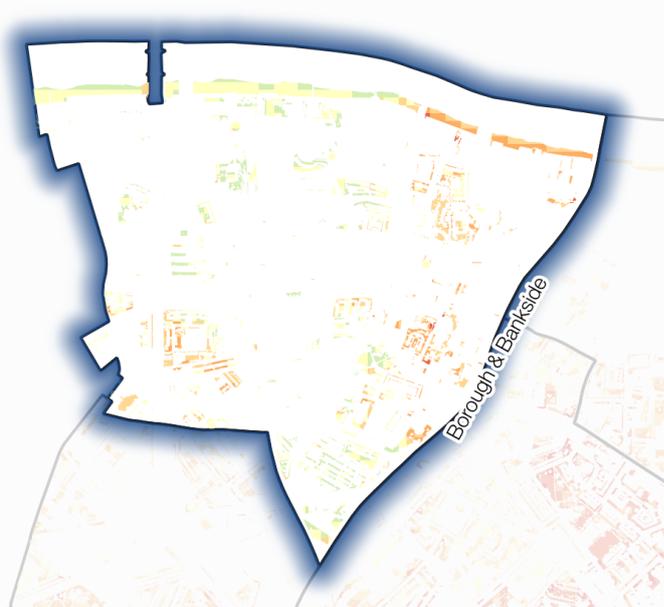


Figure 1: Potential Tree Planting Hotspots within Southwark

Figure 1 (above) shows the potential tree planting space within Southwark (actual tree planting follows). This incorporates all natural areas within Southwark, both public and private, removing any hard spaces, buildings, transport infrastructure and water, as designated by the Ordnance Survey.

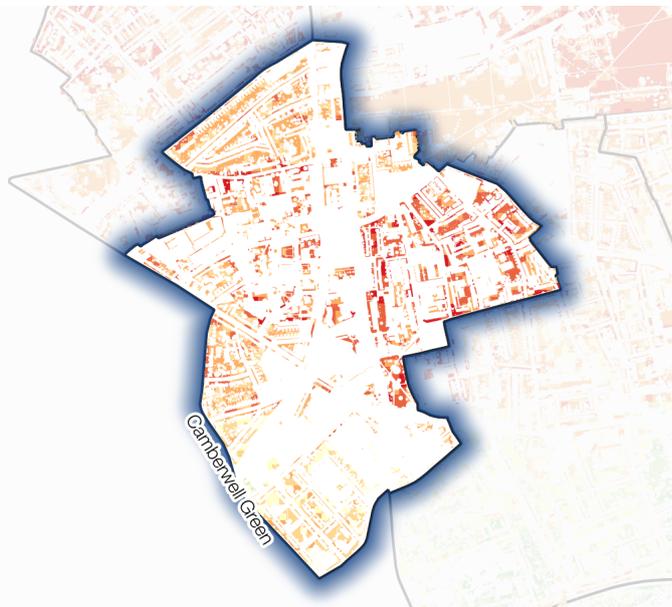
The percentage calculated within Southwark as potential tree planting space is 29.4%.

3.1.2 Potential Tree Planting Hotspots by Ward (Individual Maps)



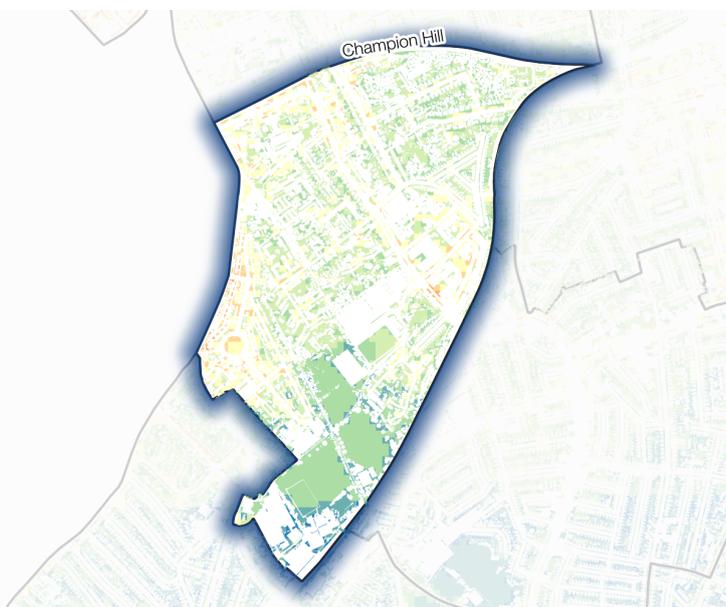
Borough & Bankside is currently highly developed, with limited green spaces the in the ward. In terms of priority planting areas (Level 9,10 & 11), 13.2% of the potential plantable space available within Borough & Bankside Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 2. If all potential planting space was planted it could increase canopy cover in this ward to 13.7%. The current canopy cover is 5.4%.

Figure 2: Borough & Bankside Ward Potential Plantable Space



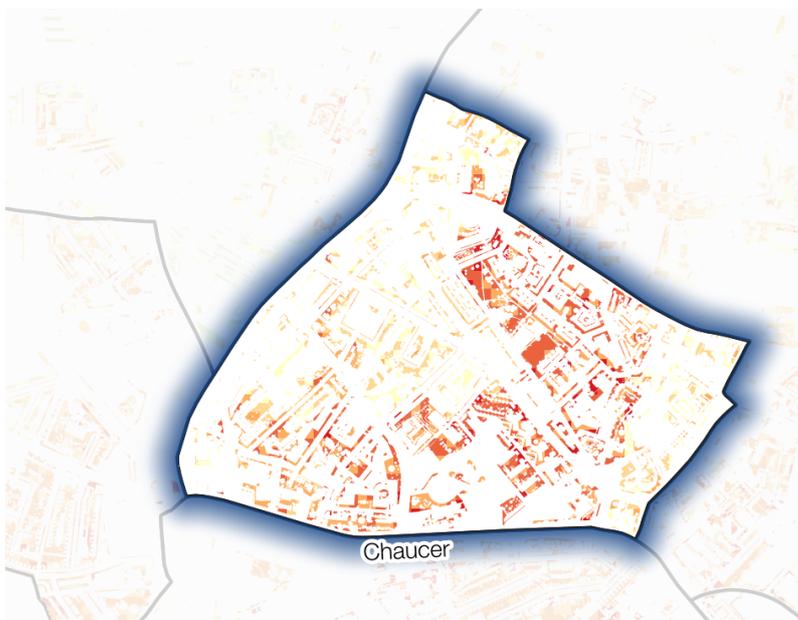
Camberwell Green is mix of commercial/industrial and residential areas but has a small area of of green space towards the South East of the ward boundary. In terms of priority planting areas (Level 9,10 & 11), 73.9% of the potential plantable space available within Camberwell Green Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 3. If all potential planting space was planted it could increase canopy cover in this ward to 34.6%. The current canopy cover is 14.7%. **This could be a beneficial area to focus planting schemes.**

Figure 3: Camberwell Green Ward Potential Plantable Space



Champion Hill is a mainly residential area with some green spaces. In terms of priority planting areas (Level 9,10 & 11), 0.3% of the potential plantable space available within Champion Hill Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 4. If all potential planting space was planted it could increase canopy cover in this ward to 62.2%. The current canopy cover is 24.9%.

Figure 4: Champion Hill Ward Potential Plantable Space



Chaucer is a mix of residential and commercial/ industrial areas. It has some green space in the centre including a park and recreational garden. In terms of priority planting areas (Level 9,10 & 11), 65.2% of the potential plantable space available within Chaucer Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 5. If all potential planting space was planted it could increase canopy cover in this ward to 37.2%. The current canopy cover is 19.8%. **This could be a beneficial area to focus planting schemes.**

Figure 5: Chaucer Ward Potential Plantable Space



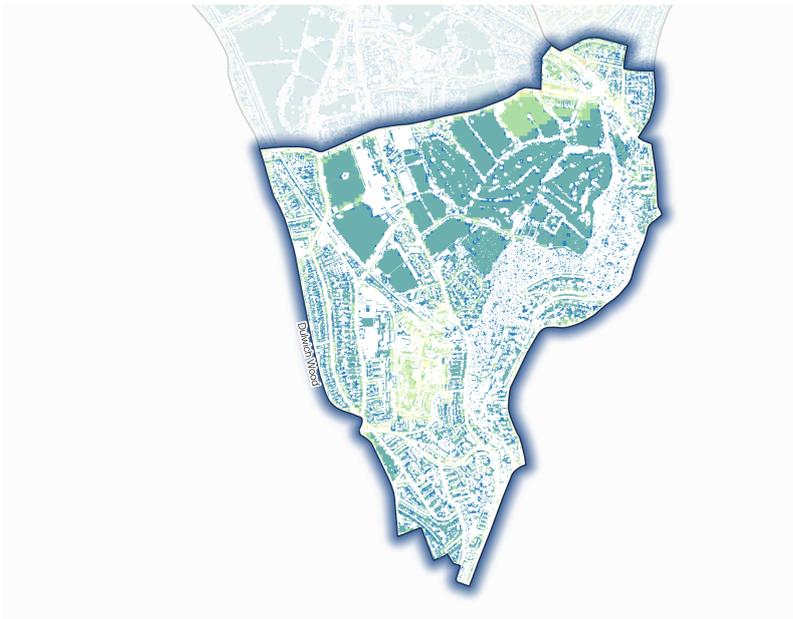
Dulwich Hill is a mainly residential area, which contains Camberwell Cemetery to the East of the ward. In terms of priority planting areas (Level 9,10 & 11), 0.03% of the potential plantable space available within Dulwich Hill Ward is designated as priority planting areas (Figure 6). If all potential planting space was planted it could increase canopy cover in this ward to 64.0%. This ward could potentially be planted in to subsidise other wards with minimal planting space. The current canopy cover is 24.3%.

Figure 6: Dulwich Hill Ward Potential Plantable Space



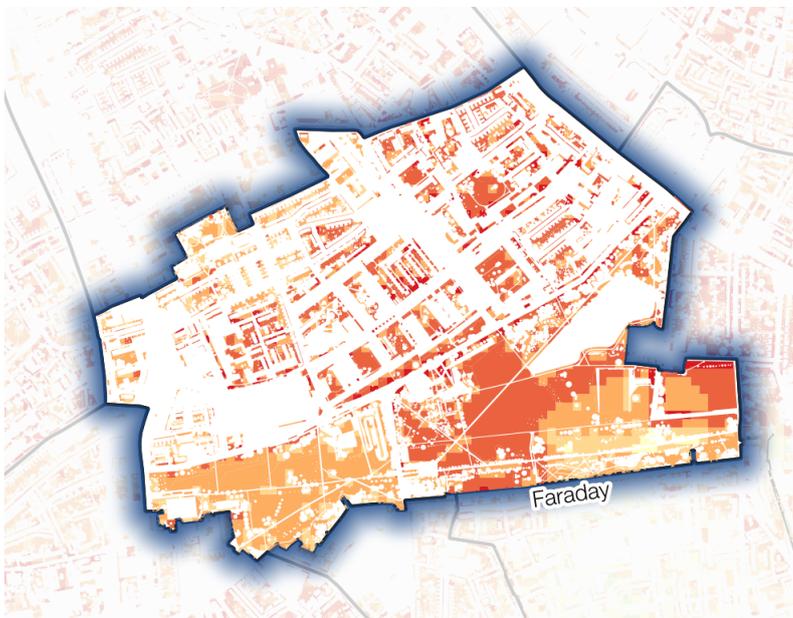
Dulwich Village is mainly residential with a large amount of green space within its boundary. Due to this, the priority planting areas (Level 9,10 & 11), are 0.0% of the potential plantable space available within Dulwich Village (Figure 7). If all potential planting space was planted it could increase canopy cover in this ward to 74.5%. Higher levels of planting could take place in this ward to compensate for other areas within Southwark, where similar high levels of planting cannot be achieved. The current canopy cover is 29.8%.

Figure 7: Dulwich Village Ward Potential Plantable Space



Dulwich Wood is mainly residential including both Dulwich Wood and Sydenham Hill Wood. Due to this, the priority planting areas (Level 9,10 & 11), are 0.0% of the potential plantable space available within Dulwich Wood (Figure 8). If all potential planting space was planted it could increase canopy cover in this ward to 81.9%. Higher levels of planting could take place in this ward to compensate for other areas within Southwark, where similar high levels of planting cannot be achieved. The current canopy cover is 37.8%.

Figure 8: Dulwich Wood Ward Potential Plantable Space



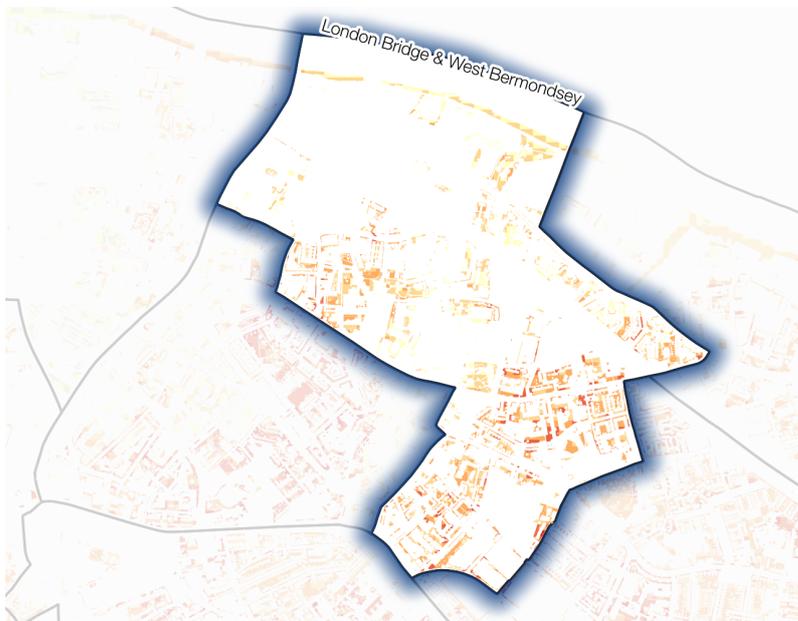
Faraday is a mix of commercial/industrial and residential land with a large amount of green space in the South of the boundary (Burgess Park). In terms of priority planting areas (Level 9,10 & 11), 88.3% of the potential plantable space available within Faraday Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 9. If all potential planting space was planted it could increase canopy cover in this ward to 53.7%. The current canopy cover is 15.9%. **This could be a beneficial area to focus planting schemes.**

Figure 9: Faraday Ward Potential Plantable Space



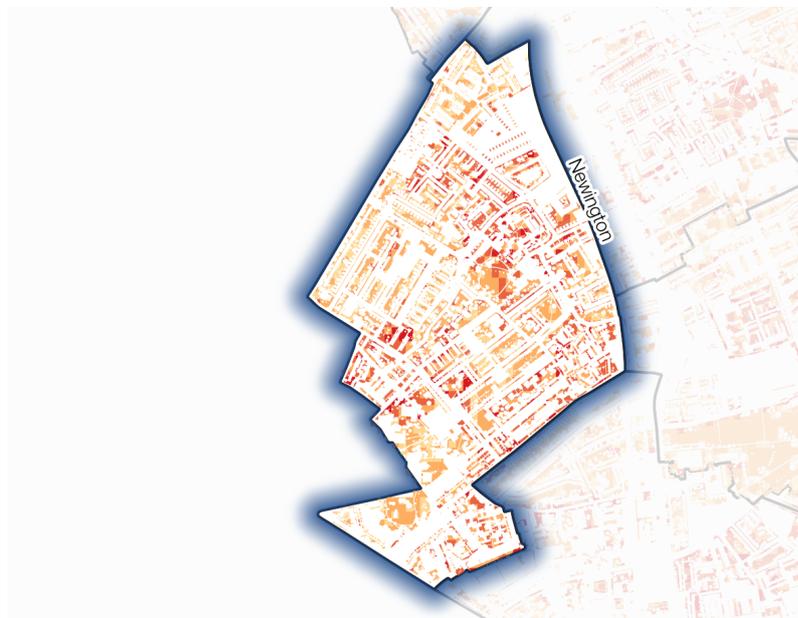
Goose Green is mainly residential with Goose Green open space situated in the north. The priority planting areas (Level 9,10 & 11) are only 0.06% of the potential plantable space available (Figure 10). If all potential planting space was planted it could increase canopy cover in this ward to 47.9%. Higher levels of planting could take place in this ward to compensate for other areas within Southwark, where similar high levels of planting cannot be achieved. The current canopy cover is 16.2%.

Figure 10: Goose Green Ward Potential Plantable Space



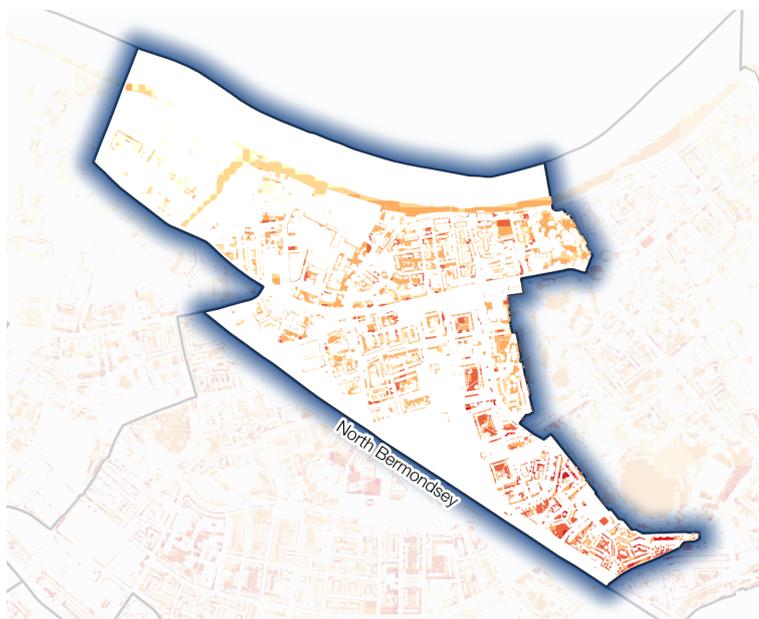
London Bridge & West Bermondsey is a mix of commercial/industrial and residential land with a small section of green spaces. In terms of priority planting areas (Level 9,10 & 11), 42.6% of the potential plantable space available within London Bridge & West Bermondsey Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 11. If all potential planting space was planted it could increase canopy cover in this ward to 20.9%. The current canopy cover is 9.8%.

Figure 11: London Bridge & West Bermondsey Ward Potential Plantable Space



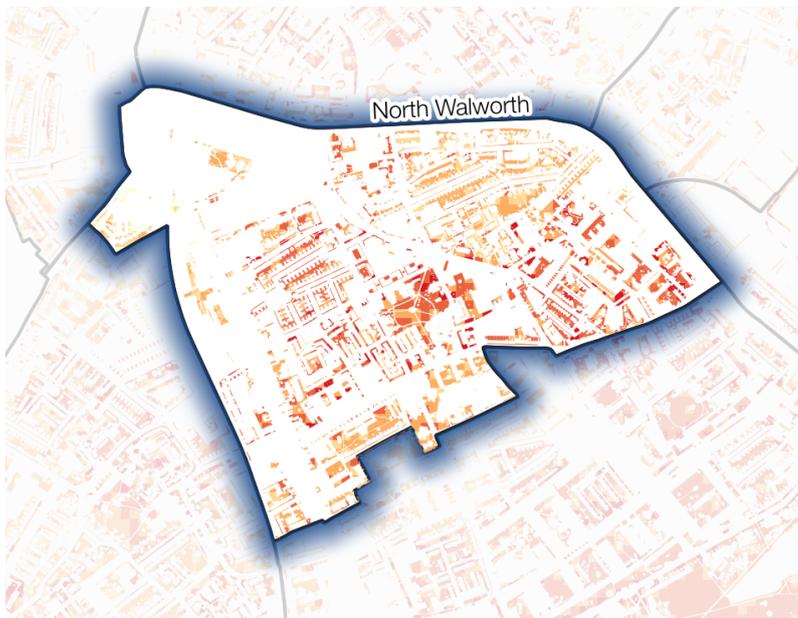
Newington is a mix of commercial/industrial and residential land with a small section of green spaces. In terms of priority planting areas (Level 9,10 & 11), 82% of the potential plantable space available within Newington Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 12. If all potential planting space was planted it could increase canopy cover in this ward to 43.5%. The current canopy cover is 16.6%. **This could be a beneficial area to focus planting schemes.**

Figure 12: Newington Ward Potential Plantable Space



North Bermondsey is a mix of commercial/industrial and residential land. The priority planting areas (Level 9,10 & 11) are 66.3% of the potential plantable space available (Figure 13). If all potential planting space was planted it could increase canopy cover in this ward to 30.9%. The current canopy cover is 15%.

Figure 13: North Bermondsey Ward Potential Plantable Space



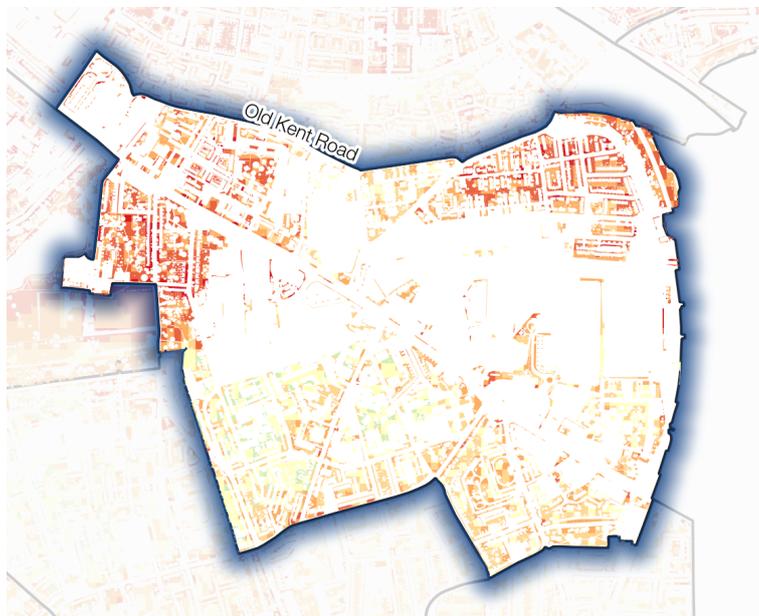
North Walworth is a mix of commercial/industrial and residential land with sections of green spaces including Nursery Row Park. In terms of priority planting areas (Level 9,10 & 11), 85.8% of the potential plantable space available within North Walworth Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 14. If all potential planting space was planted it could increase canopy cover in this ward to 30.8%. The current canopy cover is 13.5%. **This could be a beneficial area to focus planting schemes.**

Figure 14: North Walworth Ward Potential Plantable Space



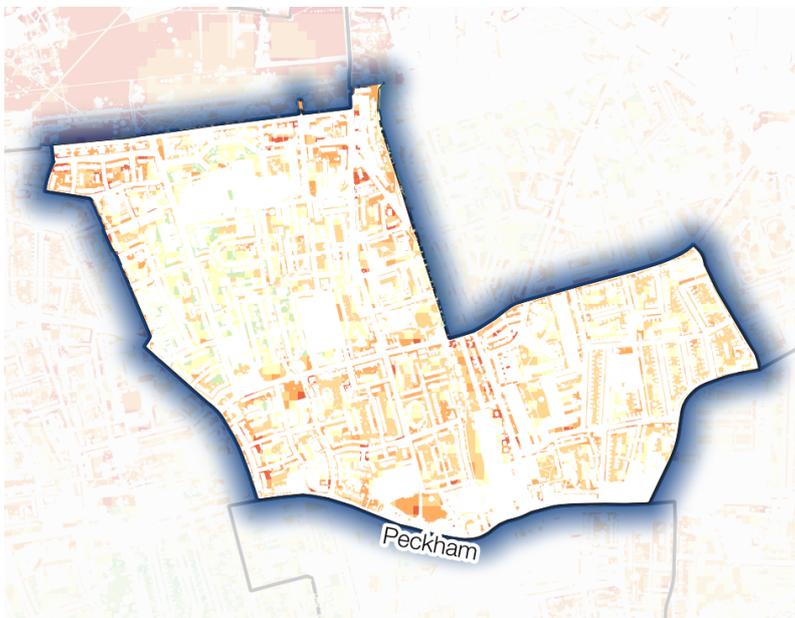
Nunhead and Queen's Road is a mix of commercial/industrial and residential land with sections of green spaces including Nunhead Cemetery and Cossall Park. In terms of priority planting areas (Level 9,10 & 11), 7.4% of the potential plantable space available within Nunhead and Queen's Road Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 15. If all potential planting space was planted it could increase canopy cover in this ward to 55.8%. The current canopy cover is 28%.

Figure 15: Nunhead and Queen's Road Ward Potential Plantable Space



Old Kent Road is mainly commercial/industrial with some residential areas and a few green spaces. The priority planting areas (Level 9,10 & 11) are 51.6% of the potential plantable space available (Figure 16). If all potential planting space was planted it could increase canopy cover in this ward to 31.1%. The current canopy cover is 10.4%.

Figure 16: Old Kent Road Ward Potential Plantable Space



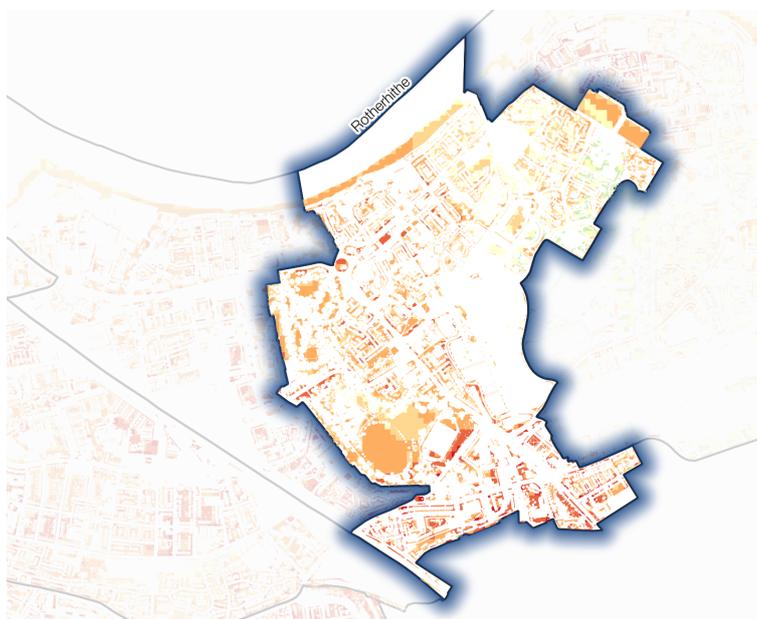
Peckham is mainly residential with limited green space. In terms of priority planting areas (Level 9,10 & 11), 25.2% of the potential plantable space available within Peckham Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 17. If all potential planting space was planted it could increase canopy cover in this ward to 39.2%. The current canopy cover is 10.8%.

Figure 17: Peckham Ward Potential Plantable Space



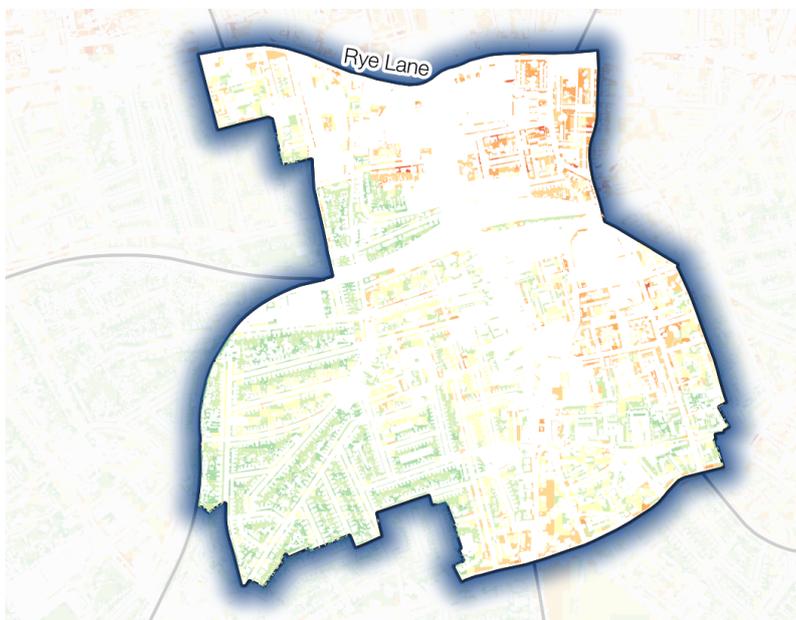
Peckham Rye is mainly residential with a large amount of green space including Peckham Rye Common and a Golf Course. Due to the amount of green space, the priority planting areas (Level 9,10 & 11) are 0.2% of the potential plantable space available (Figure 18). If all potential planting space was planted it could increase canopy cover in this ward to 79.3%. This ward could potentially be planted in to subsidise other wards with minimal planting space. The current canopy cover is 25.9%.

Figure 18: Peckham Rye Ward Potential Plantable Space



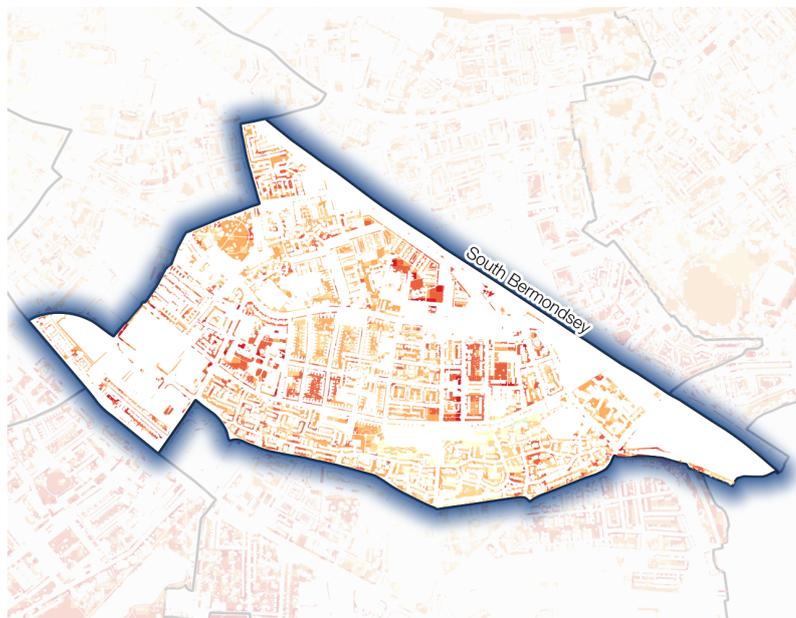
Rotherhithe is a mix between residential and commercial/industrial areas with a large amount of green space including Southwark Park. In terms of priority planting areas (Level 9,10 & 11), 55.1% of the potential plantable space available within Rotherhithe Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 19. If all potential planting space was planted it could increase canopy cover in this ward to 48.2%. The current canopy cover is 24.7%. **This could be a beneficial area to focus planting schemes.**

Figure 19: Rotherhithe Ward Potential Plantable Space



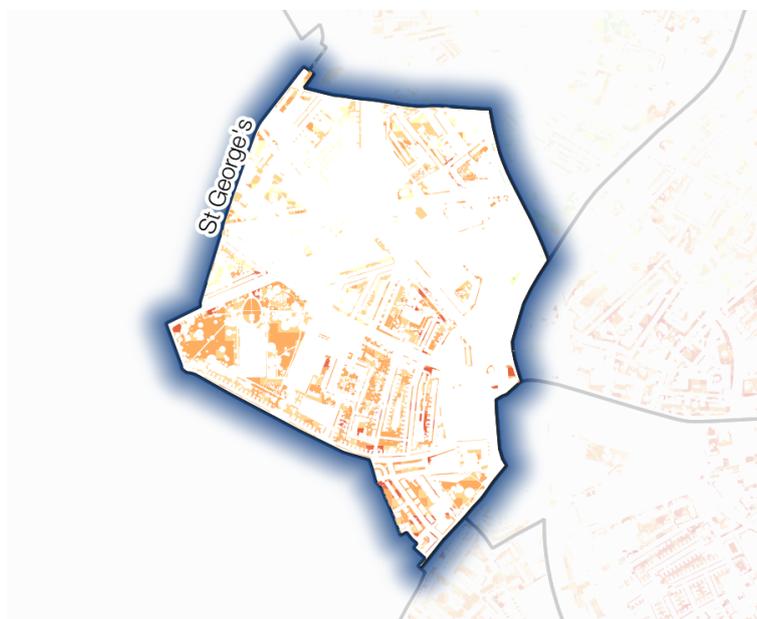
Rye Lane is a mix of commercial/industrial and residential with a section of Peckham Rye Common in the South. In terms of priority planting areas (Level 9,10 & 11), 6.2% of the potential plantable space available within Rye Lane Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 20. If all potential planting space was planted it could increase canopy cover in this ward to 40%. The current canopy cover is 15.4%.

Figure 20: Rye Lane Ward Potential Plantable Space



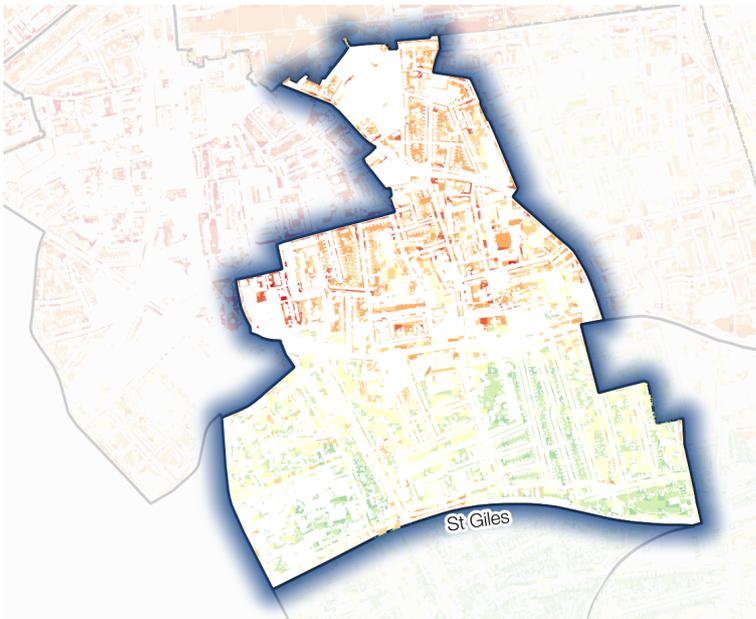
South Bermondsey is a mix between commercial and residential land with some limited green space. In terms of priority planting areas (Level 9,10 & 11), 72.5% of the potential plantable space available within South Bermondsey Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 21. If all potential planting space was planted it could increase canopy cover in this ward to 35.1%. The current canopy cover is 13.2%.

Figure 21: South Bermondsey Ward Potential Plantable Space



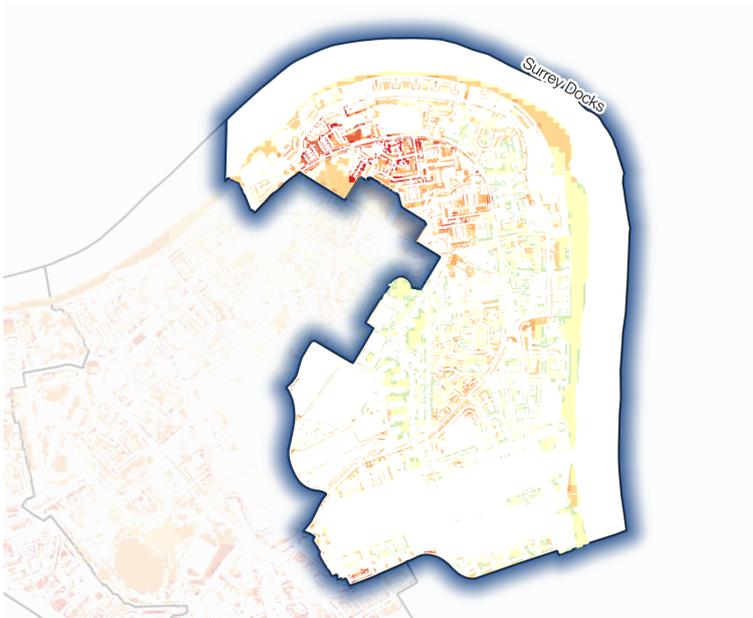
St George's is a mix between residential and commercial/industrial areas with some green space including Geraldine Mary Harmsworth Park. In terms of priority planting areas (Level 9,10 & 11), 54% of the potential plantable space available within St George's Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 22. If all potential planting space was planted it could increase canopy cover in this ward to 30%. The current canopy cover is 13.7%.

Figure 22: St George's Ward Potential Plantable Space



St Giles is mainly residential with a some amount of green space including Brunswick Park. In terms of priority planting areas (Level 9,10 & 11), 26.2% of the potential plantable space available within St Giles Ward is designated as priority planting areas. This is shown by the red and dark orange areas in Figure 23. If all potential planting space was planted it could increase canopy cover in this ward to 44.3%. The current canopy cover is 18.1%.

Figure 23: St Giles Ward Potential Plantable Space



Surrey Docks is mainly residential with some commercial/industrial areas and some green spaces. In terms of priority planting areas (Level 9,10 & 11), 15.8% of the potential plantable space available within Surrey Docks Ward is designated as priority planting areas. This is shown by the red and dark orange areas in figure 24. If all potential planting space was planted it could increase canopy cover in this ward to 44.3%. The current canopy cover is 16.6%.

Figure 24: Surrey Docks Ward Potential Plantable Space

Rating	3	4	5	6	7	8	9	10	11
Category	Low Planting Priority			Medium Planting Priority			High Planting Priority		
Borough & Bankside	0.0%			86.8%			13.2%		
Camberwell Green	0.0%			26.1%			73.9%		
Champion Hill	43.8%			55.9%			0.3%		
Chaucer	0.0%			34.8%			65.2%		
Dulwich Hill	93.4%			6.6%			0.0%		
Dulwich Village	91.1%			8.9%			0.0%		
Dulwich Wood	94.0%			6.0%			0.0%		
Faraday	0.0%			11.7%			88.3%		
Goose Green	62.6%			37.3%			0.1%		
London Bridge & West Bermondsey	0.0%			57.4%			42.6%		
Newington	0.0%			18.0%			82.0%		
North Bermondsey	0.0%			33.7%			66.3%		
North Walworth	0.0%			14.2%			85.8%		
Nunhead & Queen's Road	11.1%			81.4%			7.4%		
Old Kent Road	0.0%			48.4%			51.6%		
Peckham	0.0%			74.8%			25.2%		
Peckham Rye	69.8%			30.0%			0.2%		
Rotherhithe	0.0%			44.9%			55.1%		
Rye Lane	13.0%			80.8%			6.2%		
St George's	0.0%			27.5%			72.5%		
St Giles	0.0%			46.0%			54.0%		
South Bermondsey	6.4%			71.6%			22.0%		
Surrey Docks	0.0%			84.2%			15.8%		

Table 1: Percentage of Priority Planting Areas by Ward

3.1.3 Southwark Actual Tree Planting Hotspots

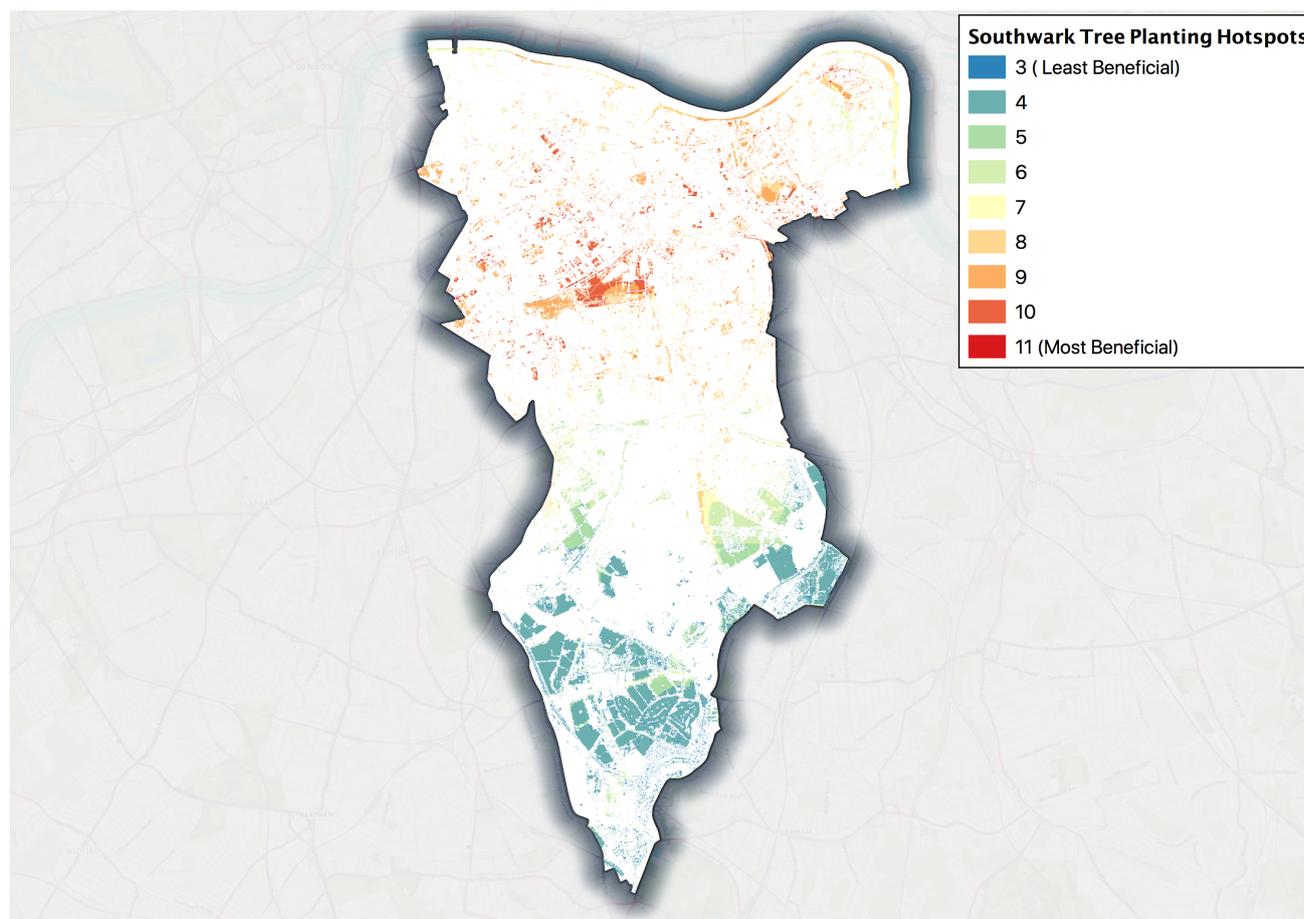


Figure 26: Actual Tree Planting Hotspots within Southwark

Within Southwark's 'all natural areas' Ordnance Survey layer, a sub category of 'multi surface' is applied to private land around housing and other properties. The ground cover of these areas are subject to continual change at the discretion of the owner. When the 'multi surface' layer was removed from the dataset, the area remaining was all of the natural green space within Southwark. This was re-designated as 'Actual Plantable Space'. Therefore, the percentage of potential area calculated within Southwark as actual plantable space is 15.0% (4.5 km²).

21.1% of the available planting space within the actual plantable space map is designated as priority planting areas, these are the red and dark orange areas in figure 24 above.

4. Conclusions

The London Borough of Southwark has an estimated Potential Plantable Space of 29.4%, which equates to an area of 8.8km². Although this is a large area for potential planting, it does incorporate privately owned gardens which have a multitude of ground covers. 23.7% of this area is designated as priority planting areas. These areas would have the highest impact within the borough if trees were to be planted.

At individual ward level the area with the highest priority potential tree planting space is Faraday (with an area of 88.3%). Faraday has a PPS of 37.8% so finding locations where trees can be planted should be possible. This is the 19th (out of 23) largest potential tree planting space percentage and the highest priority planting percentage in Southwark.

Peckham Rye ward has 53.4% potential tree planting space, however only 0.19% of that is classified as priority planting areas. This is due to the presence of Peckham Rye Common which is already providing a level of ecosystem services to the area and a reduction of transport infrastructure.

The estimated Actual Plantable Space within Southwark is calculated to be 15% or 4.5km². 21.1% of this area is designated as priority planting areas.

Southwark Borough Council has ownership of several parks and open spaces. This GIS layer was unavailable at the time of this analysis, therefore calculations for these areas could not be processed. These areas are likely to be the easiest to potentially plant trees as the council would not require permission from private land owners but it is the discretion of the tree officers to decide whether the sites located by this study are suitable at ground level.

5. Recommendations

This report can be used in several ways. It has been formulated to assist Southwark Borough Council to make tree planting decisions using an evidence base which highlights those areas which would benefit most from tree planting where space is available. This should enable resources to be targeted towards those areas where potential for planting and the need for planting are greatest. This in turn should result in maximising the benefits gained from tree planting across the borough as a whole.

5.1 Ground Proof Check

The hotspots produced in this report have been generated using computer data. The suitability of these potential tree planting areas are subject to a ground check to decide whether the location has any restrictions or services which would prevent any tree planting. The large number of hotspots available gives the council a good chance of locating suitable planting areas within the borough.

5.2 Community Engagement

Engaging the community once tree planting sites have been identified is beneficial in many ways. Involving residents, local businesses and utility companies etc. means they are more likely to cooperate with the planting of the trees in their borough and to nurture the new trees. Enlisting the help of local schools can increase the involvement of local residents and simultaneously highlight the benefits of trees to future generations, possibly being part of a social integration scheme.

5.3 Produce a Plan for Species Diversity

Increasing temperatures and pest and disease threats are a major risk to the trees within Southwark. When selecting species to be planted in the urban landscape it is important to diversify from the current tree stock in order to implement sustainable management of the urban forest. Adapting to climate change, soil conditions and species tolerant to urban environments are just three factors to consider as part of tree species selection criteria. It is important to identify potential local future issues such as canopy size and tree height when planting in certain areas. The importance for urban tree diversity cannot be undervalued as recent outbreaks of Ash dieback and future diseases such as *Xylella* could have a damaging impact on our urban trees.

5.4 Continual Management of Tree Stock

Planting new trees is just the start of the process when managing an urban forest. Creating a plan for continual management as the tree grows will ensure it has the potential to achieve maximum performance in terms of ecosystem services and a longer lifespan. Using contractors who are up-to-date in pruning techniques and understand the physiology of trees at each phase of their lifecycle will ensure that best practice is used when management decisions are made.



“Good investment and the establishment of pruning plans, prioritises high quality structural growth alongside the health of trees, which in turn can increase the ecosystem services provided by trees in urban areas”.

Jan Willem de Groot - Pius Floris Boomverzorging

Appendix I - Methodology

GIS (Geographical Information System) project boundaries of Southwark and the individual wards were accessed using the London Datastore. Additional Ordnance Survey background mapping data was obtained from Southwark Borough Council*. Tree canopy cover within the London borough of Southwark was assessed using the Blue Sky National Tree Map** from the Southwark canopy cover survey.

These datasets were combined using GIS software to provide the potential tree planting hotspot maps used in this report.

Suitable areas for planting were identified by using the council Ordnance Survey mapping data and then adding different criteria in order to score the areas which would have a greater benefit for the local area by planting. This was then compared with the different types of area within the borough to assess realistic percentages for possible tree planting.

The three main layers used for scoring were air pollution concentration, indices of multiple deprivation (IMD), risk of flooding and Urban Heat Island Effect (figures 25, 26, 27 & 28 below). They were combined with road proximity data to create a hotspot map of potential tree planting locations.

* The categories used to calculate the ground cover may have changed since the OS maps were generated and this should be considered when using the figures within this report.

** Bluesky National Tree Map (2019) Aerial photography of tree and shrub crown polygons over 3m in height with a 90-95% accuracy.

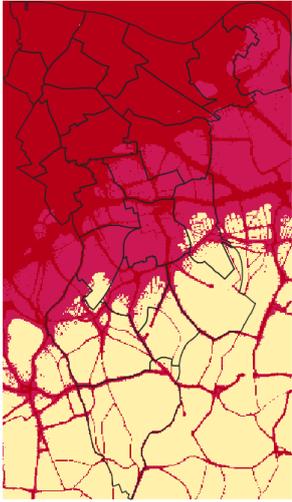


Figure 27: Air Pollution Data Map (NO2 + PM 2.5)

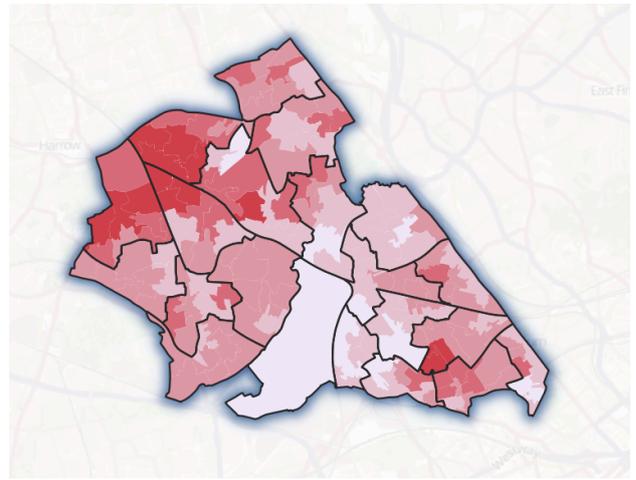


Figure 28: Index of Multiple Deprivation Map (High, Medium, Low)

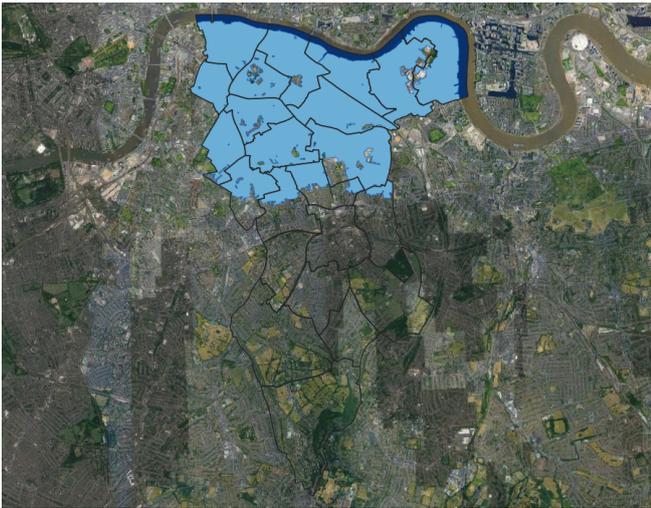


Figure 29: Flooding Risk Map

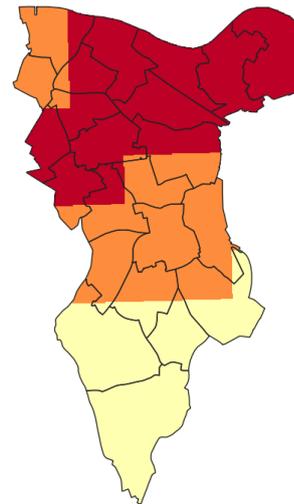


Figure 30: Urban Heat Island Effect Map

Appendix II

Table 2 below shows the current canopy cover and potential planting space percentages by ward.

Ward	Current Canopy Cover	Potential Plantable Space	Actual Plantable Space
Borough & Bankside	5.4%	8.3%	5.2%
Camberwell Green	14.7%	19.8%	4.5%
Champion Hill	24.9%	37.3%	20.9%
Chaucer	19.8%	17.4%	7.2%
Dulwich Hill	24.3%	39.7%	9.8%
Dulwich Village	29.8%	44.7%	22.9%
Dulwich Wood	37.8%	44.2%	30.2%
Faraday	15.9%	37.8%	29.9%
Goose Green	16.2%	31.8%	5.6%
London Bridge & West Bermondsey	9.8%	11.1%	5.6%
Newington	16.6%	26.9%	9.9%
North Bermondsey	15.0%	15.9%	8.6%
North Walworth	13.5%	17.3%	7.8%
Nunhead & Queen's Road	28.0%	27.9%	8.0%
Old Kent Road	10.4%	20.7%	8.6%
Peckham	10.8%	28.4%	8.6%
Peckham Rye	25.9%	53.4%	39.7%
Rotherhithe	24.7%	23.5%	15.4%
Rye Lane	15.4%	24.6%	4.6%
South Bermondsey	13.2%	21.9%	7.3%
St George's	13.7%	16.3%	7.8%
St Giles	18.1%	26.2%	7.2%
Surrey Docks	16.6%	20.4%	12.5%

Table 2: Percentage of Available Plantable Space by Ward

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