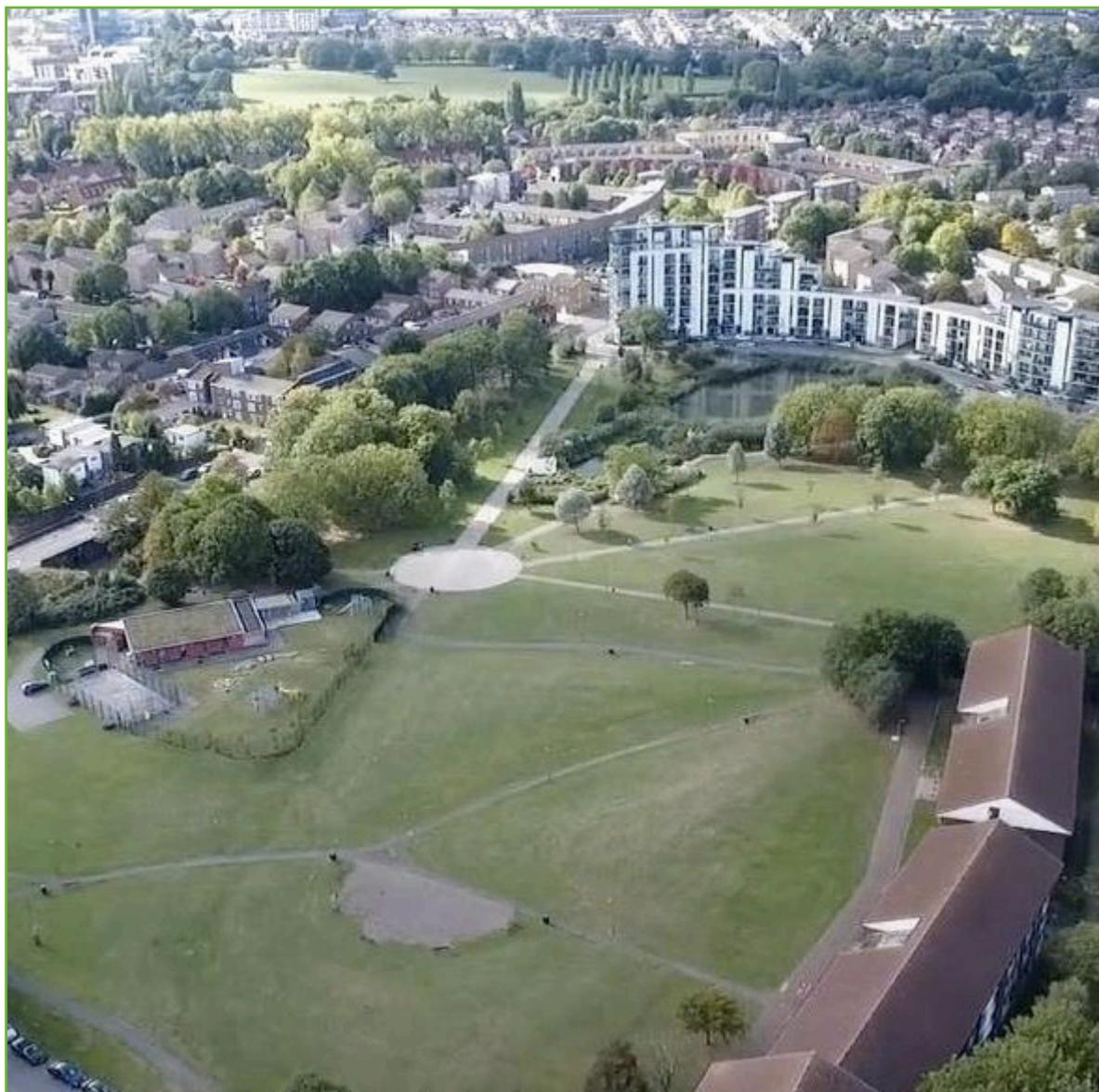


Barnet Annual Director of Public Health Report 2017:

The Built Environment and Health



Acknowledgements

Barnet Public Health:

Building 2, North London Business Park, Oakleigh Road South, London N11 1NP

<https://www.barnet.gov.uk/citizen-home/public-health.html>

Report prepared by:

Lisa Colledge, Senior Public Health Analyst

Rachel Hodge, Public Health Strategist

Brian Johnstone, Senior Public Health Analyst

Saiyeshen Naidoo, Public Health Analyst

Dawn Wakeling, Director of Adults & Communities

Rachel Wells, Consultant in Public Health

Published December 2017

Front cover photograph:

Aerial view of Grahame Park regeneration area

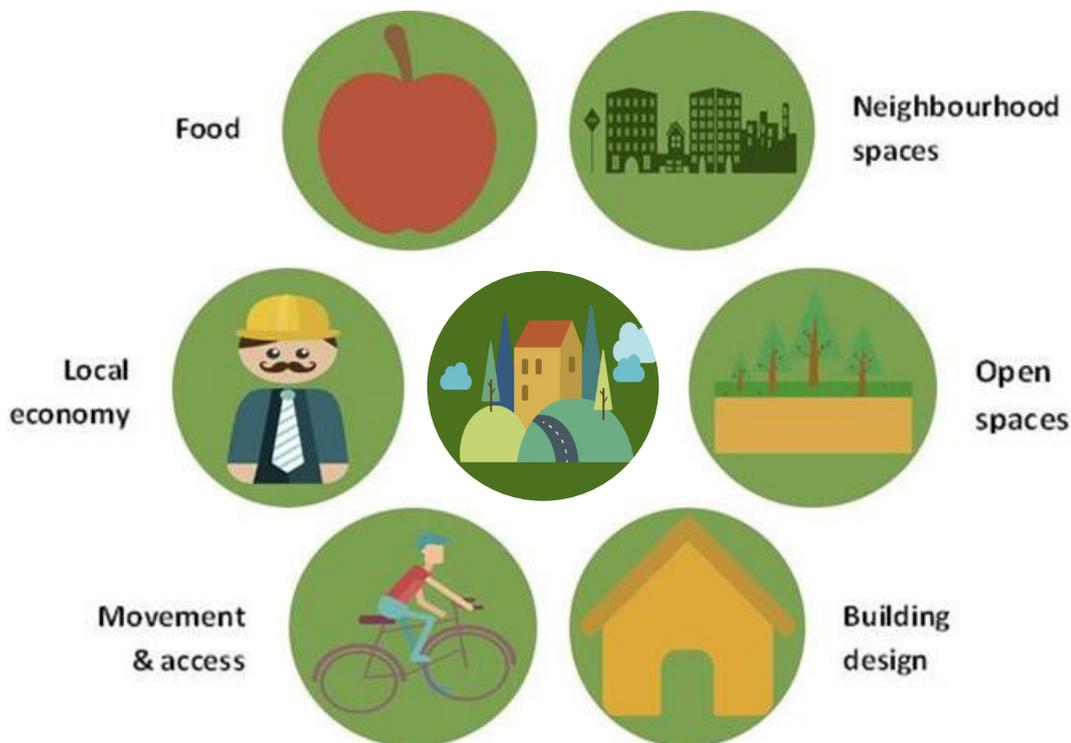
Contents

Introduction	4
Background	4
NEIGHBOURHOOD SPACES	6
Why is it important for health?	6
Local context	6
Supporting documents	7
Local action	8
Recommendations	8
OPEN SPACES, RECREATION & PLAY	9
Why is it important for health?	9
Local context	9
Supporting documents	10
Local action	11
Recommendations	11
BUILDING DESIGN	12
Why is it important for health?	12
Local context	12
Supporting documents	13
Local action	13
Recommendations	13
MOVEMENT & ACCESS	14
Why is it important for health?	14
Local context	14
Supporting documents	15
Local action	16
Recommendations	16
LOCAL ECONOMY	17
Why is it important for health?	17
Local context	17
Supporting documents	18
Local action	18
Recommendations	18
FOOD	19
Why is it important for health?	19
Local context	19
Supporting documents	21
Local action	21
Recommendations	21
Video	23

Introduction

Our health is significantly affected by our 'built environment', that is, "buildings, spaces and products that are created or modified by people".¹ The built environment is made up of six elements: neighbourhood spaces; open spaces (incorporating recreation and play); building design; movement and access; local economy; and food (see Fig. 1).²

Figure 1. The six elements of the built environment



This short report looks at these six elements, focussing on their effect on health, Barnet context, local strategies and action, and future recommendations.

But first, let's look at some underlying concepts.

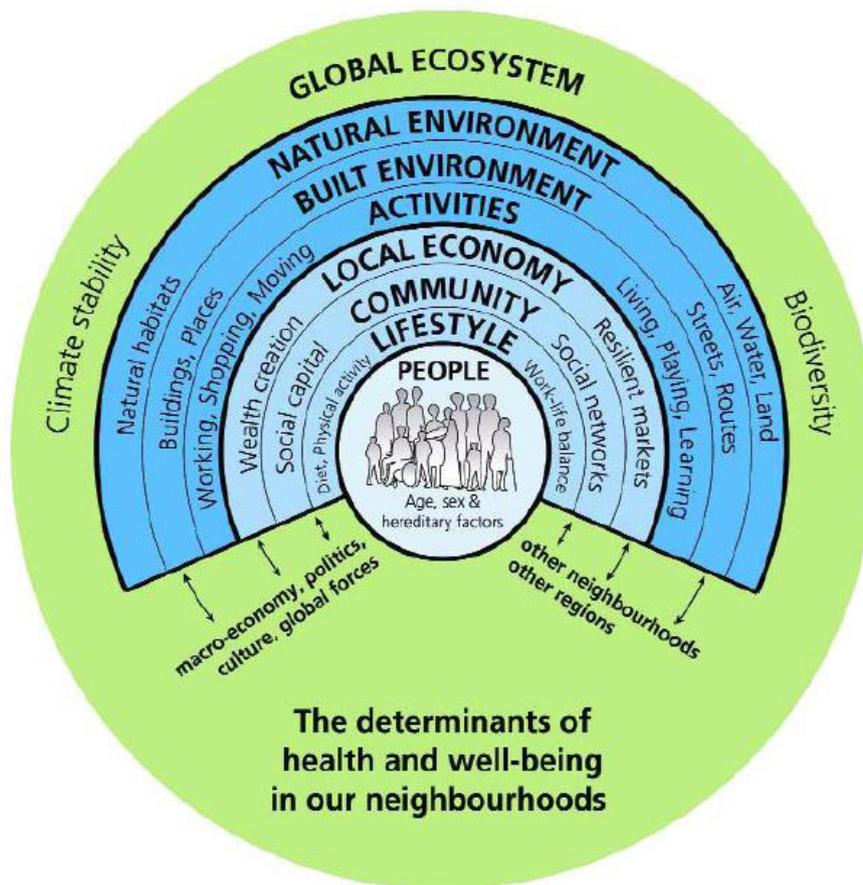
Background

The six elements of the built environment are good examples of what's often referred to as the 'wider determinants of health' (other examples are income and education). These wider determinants have a 'knock-on' effect on other wider determinants and ultimately on people's health. Figure 2 shows this relationship using concentric arcs: the outer determinants affect those within. In this evidence-based model, the built environment shapes people's



activities, local economy, community and lifestyle factors, and ultimately their health and wellbeing. Thus, the built environment is an important target for public health specialist intervention.³

Figure 2: The Health Map: factors that influence health and wellbeing



Source: Barton and Grant⁴

Public health specialists have a responsibility to ensure that local planning and development promote healthy lives and communities.³ Public health staff and other stakeholders aim to maximise the positive health impact of planning and building work, and thus help create healthier places.⁵ That is why it is so important that public health staff continue to work across the whole Council, as they are currently doing on the Council’s regeneration scheme.

It’s important that the scale and intensity of built environment interventions is proportionate to residents’ level of disadvantage.⁶ Environmental burdens weigh heaviest on disadvantaged groups. Those living in deprived areas suffer more from poor housing, higher crime rates, poor air quality, dangerous traffic, lack of green areas and children’s play spaces, and the negative effects of climate change. England-wide, 45% of residents in the most deprived areas



Built environment and health

experience two or more unfavourable environmental conditions, compared with less than 5% in the least deprived areas.⁷

Now, let's look at each element of the built environment in turn.



NEIGHBOURHOOD SPACES

(Public spaces, land use, and community and social infrastructure)

Why is it important for health?

Well-designed and attractive neighbourhoods enhance safety and promote community social capital,⁸ physical activity and service accessibility.⁹ Poorly designed neighbourhoods can deter vulnerable people from leaving the home, contributing to social isolation and premature mortality.¹⁰

Evidence suggests that mixed-use spatial planning is more likely to create healthy places, compared with segregated-use planning (e.g. large residential areas separated from local amenities). Mixed land use typically combines high density residential areas with local services, including grocery stores, health services and green spaces.⁹ This arrangement enables people to access the services they need without using private vehicles,^{11,12} and so promotes non-intentional physical activity.^{13,14} People in these environments typically have a healthier weight.¹⁵⁻¹⁷ Mixed-use environments also encourage social interaction, improving people's social capital.⁸

Attractive neighbourhood spaces encourage physical, psychological and psychosocial wellbeing. Improvements such as better street lighting, less noise pollution, well maintained pavements and green spaces, and 'soft' and 'hard' landscaping are known to improve residents' sense of safety and community cohesion.^{14,18,19}

Local context

Barnet has larger areas of low-density, residential land useage (e.g. Totteridge ward) than London as a whole (see Fig. 3), due to its transport development history.²⁰ However, the population of Barnet is predicted to rise by 19% over the next 15 years.²¹ This will create new demand for housing, and thus new opportunities to develop attractive, mixed-use neighborhoods.



Figure 3: Land use in Barnet, 2009



Source: London Borough of Barnet²²

Supporting documents:

Regional guidance	Local strategies	Neighbourhood SPDs
<ul style="list-style-type: none"> • <i>Health on the High Street</i>²³ • <i>Planning Healthy-weight Environments</i>² • <i>Improving the Health of Londoners: Transport Action Plan</i>²⁴ 	<ul style="list-style-type: none"> • <i>The Local Plan</i>²⁵ • <i>Annual Report: Growth and Regeneration Plan</i>²⁶ • <i>Delivery Plan: Delivering the Borough Transport Objectives</i>²⁷ • <i>Parks and Open Spaces</i>²⁸ 	<ul style="list-style-type: none"> • <i>Brent Cross Cricklewood Framework and strategy</i>^{29,30} • <i>Burnt Oak town centre strategy</i>³¹ • <i>Grahame Park regeneration strategy</i>³² • <i>Finchley Central Town Centre Strategy</i>³³

SPDs = supplementary planning documents



Built environment and health

Local action:

Burnt Oak town centre strategy

The Burnt Oak strategy provides an excellent example of place-based commissioning. All 10 Transport for London (TfL) healthy street environment factors²⁴ (see Fig. 4) were discussed during residents' consultations. Importantly, these needs are clearly addressed in the strategy itself. Continuing to adopt a place-based approach to neighbourhood development will create attractive environments.

Public realm improvements

Barnet now has the second largest number of street trees of any London borough.²⁷ This improvement gives residents an aesthetically pleasing environment which encourages them to go outside. Safety in the public realm is important, and most Barnet residents feel safe within their neighbourhoods (96% during daylight, 76% in the evening).³⁴ Street lighting improvements were completed in 2011. Continuing to make small

investments in local streets helps make Barnet a 'people place'.

'Lifetime neighbourhoods'

The *Local Plan* outlines Barnet's commitment to 'lifetime neighbourhoods' within regeneration areas.³⁵ All new developments and regeneration sites will be sustainable in terms of climate change. Additionally, housing, transport services, public services, civic spaces and amenities will be made more accessible to residents via mixed land use, enabling people of all ages and abilities to engage with their community.

Recommendations:

Use Transport for London's Healthy Street Environment outcomes to guide development

Transport for London's healthy street environment guidelines (see Fig. 4) should be used when developing regeneration strategies,²⁴ to create accessible environments which prioritise pedestrian use.

Figure 4: Transport for London's indicators of a healthy street environment



Yellow section reads 'People choose to walk and cycle'. Source: Transport for London²⁴



Enhance community empowerment in regeneration projects

In addition to gaining residents’ feedback, regeneration projects should facilitate community participation at all stages of planning and implementation. This empowers communities, with long-term social and material benefits. Residents and local businesses should know their input is an integral part of all processes.

Improve pavement quality

Although the transport implementation plan noted a relatively high quality of pavements in Barnet (compared with London levels),²⁷ the issue continues to be a concern for residents.³⁶ Community engagement to understand the reasons for people’s beliefs (e.g. aesthetics or uneven paving stones) will help guide change.

Implement mixed-use buildings and public spaces

To meet the infrastructural needs of communities, we recommend the development of multi-use buildings (in addition to mixed-use neighbourhoods). For example, using a high school sports hall to meet residents’ evening leisure needs may be a cost-effective solution to accessibility issues. This is particularly valuable in areas where mixed land use is difficult to implement.⁵

Invest in infrastructure which supports the social model of disability

Barnet has officially adopted the social model of disability.³⁷ It will be important that all regenerated town centres comply with the social model of disability.



OPEN SPACES, RECREATION & PLAY

(Green spaces, ‘blue spaces’ (rivers and canals), leisure centres and children’s play facilities)

Why is it important for health?

Proximity to high quality green spaces is clearly associated with increased physical activity,^{38–42} less sedentary leisure time,^{43–45} and a reduction in the prevalence of and recovery time from illness. Conversely, those with poor access to high quality green space are more likely to experience weaker social connections^{9,46–48} and mental illness.^{49–52}

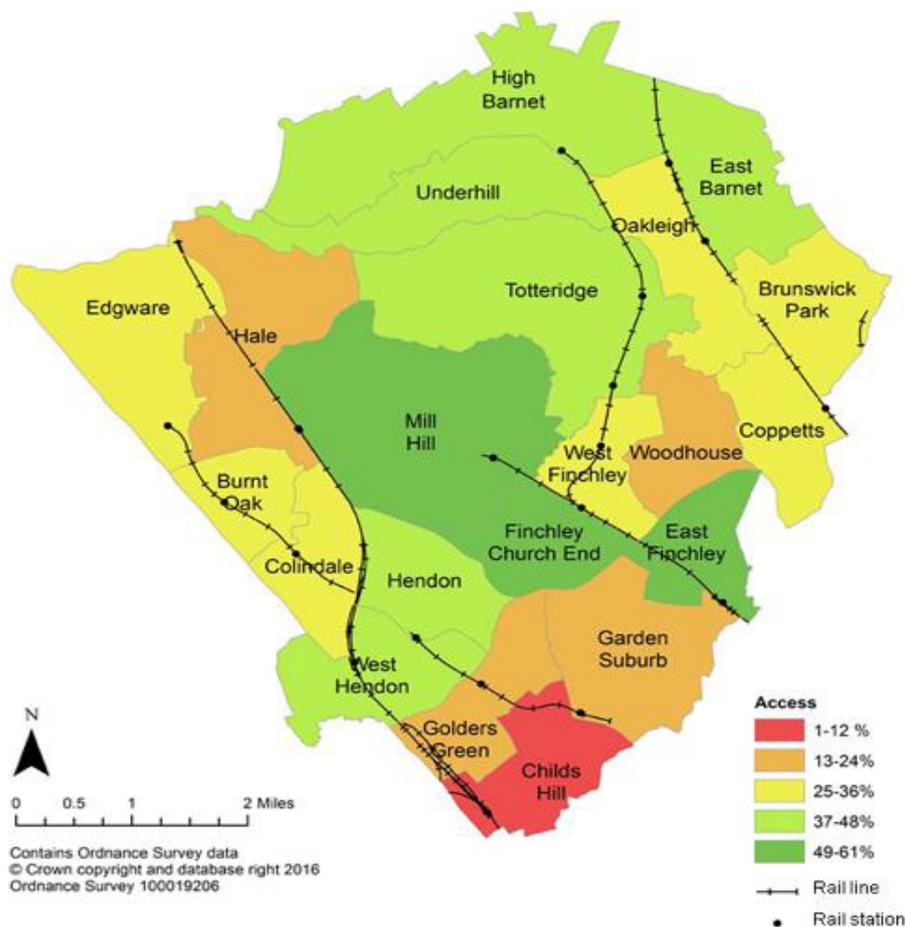
In addition to green space, the provision of play spaces is critical to healthy lifestyles for children.⁵³ Informal play has the largest caloric expenditure of any physical activity (including formal sport),⁵⁴ and thus has an important role in maintaining healthy weight. Use of green spaces is more affected by their quality than their accessibility. Green spaces and play areas of low quality do not deliver the same mental and physical benefits.⁷

Local context

Currently, 34% of Barnet households are within a 400 m walk of open space, but levels vary between wards (see Fig. 5): from just 1% in Childs Hill to 61% in East Finchley.⁵⁵



Figure 5: Barnet household access* to open space by ward, 2015



*Access = within 400 m walk
Sources: Greater London Authority, Ordnance Survey

Additionally, not all Barnet parks currently have play provision for children. To meet Greater London Authority (GLA) standards for play spaces, an extra 3.8 ha of play provision is needed.⁵⁶

Supporting documents:

Regional guidance	Local documents	Neighbourhood SPDs
<ul style="list-style-type: none"> • <i>The London Plan</i> chapter 7⁵⁷ • <i>The London Plan Play and Informal Recreation SPG</i>⁵⁸ • <i>Open Space Strategies: Best Practice Guidance</i>⁵⁹ 	<ul style="list-style-type: none"> • <i>Parks & Open Spaces strategy</i>²⁸ • <i>Barnet Sport and Physical Activity Consultation and strategy</i>^{60,61} • <i>The Local Plan</i>²⁵ • <i>Playing Pitch Strategy</i>⁶² 	<ul style="list-style-type: none"> • <i>Brent Cross Cricklewood Framework</i>³⁰ • <i>Grahame Park SPD</i>³² • <i>Burnt Oak town centre strategy</i>³¹ • <i>Burnt Oak and Colindale parks strategy</i>⁶³

SPG = supplementary planning guidance



Local action:

Further development of Heybourne Park

Barnet's local regeneration plans offer opportunities to improve nearby parkland. In Colindale, this potential has been translated into action. Enhancement of Heybourne Park (formerly Grahame Park) has created a safe, welcoming space with new natural features (e.g. water features),²⁶ formerly a deficiency of this green space. The *Barnet Open Space, Sports and Recreational Facilities Assessment*⁵⁶ identified Colindale green space as high in value but low in quality. Regenerating spaces such as Heybourne Park, Silkstream Park, and Montrose Park and Playing Fields creates spaces of both high value and high quality.

Natural green space

The *Barnet Open Space, Sports and Recreational Facilities Assessment*⁵⁶ states that Barnet has more than the recommended open space area per person, at 2.36 ha per 1,000 people (recommended: 2.05 ha per 1,000 people). Safeguarding this resource will ensure that residents continue to have optimum access to high quality, natural green space as the population grows.

Premier Parks

There are 16 'Premier Parks' within Barnet.²⁵ These support informal recreation and contain provision for sport, children's play areas and cafes. Parks investment should focus on footpath improvements, entrance lighting (creating safer walking routes), accessibility, new equipment for young children, greenways and information boards. This will maintain the parks' 'premier' status.

Outdoor sports provision

In the *Sports and Physical Activity Consultation*, residents were satisfied with the availability, quality and accessibility of Barnet sports fields. The Council has 'Marked and Measured' walking routes and outdoor gyms.

Recommendations:

Increase the quantity of play provision

To improve the physical and mental health of Barnet's children,⁵⁸ we recommend increased opportunities for informal play. Enforcing the development regulations outlined in the *Local Plan*, which require all developers to assess need and provide (or help fund) play provision, will help achieve the necessary increase.

Address accessibility of parks by active transport

The *Barnet Open Space, Sports and Recreational Facilities Assessment* found that 61% of children's play space was not on or adjacent to the Public Rights of Way Network, and 73% was not on or adjacent to cycle paths.⁵⁶ This significantly reduces the likelihood that children will access play areas from their home (even if accompanied by an adult), affecting levels of informal play and reducing positive perceptions of safety. We recommend increasing the connectivity of green spaces via pedestrian paths, cycle greenways and Quietways.

Provide online resources to support the use of open spaces and recreation

Although Barnet has a relatively large amount of open space, residents want to be more aware of this space.⁶⁰ Barnet's online directory currently provides the postcodes of green spaces, but greater information on facilities in parks and green spaces would help residents. We recommend posting an online list of play sites and parks with toilet facilities, cycle paths, shade shelter, picnic benches, parking and cafes.

Support Age-Friendly Cities within open spaces

According to the *Active People Survey*, almost half (48%) of Barnet adults aged 65 and over are inactive.⁶⁴ We recommend the provision of spaces which comply with the World Health Organization (WHO) Age-Friendly Cities guidelines.⁶⁵ These can support older people's uptake of physical activity while improving mental health and social capital.





BUILDING DESIGN

(Residential, public and workplace buildings – both quality and design)

Why is it important for health?

Europeans spend around 90% of their time indoors.⁶⁶ Poorly designed homes contribute to poor physical and mental health. For example, damp, cold, mouldy and overcrowded housing conditions are associated with respiratory infections,⁶⁷⁻⁷⁰ tuberculosis transmission,⁷¹ worse asthma⁷² and poorer mental health.^{73,74} Inadequate household heating is also strongly associated with excess winter deaths.⁷⁵

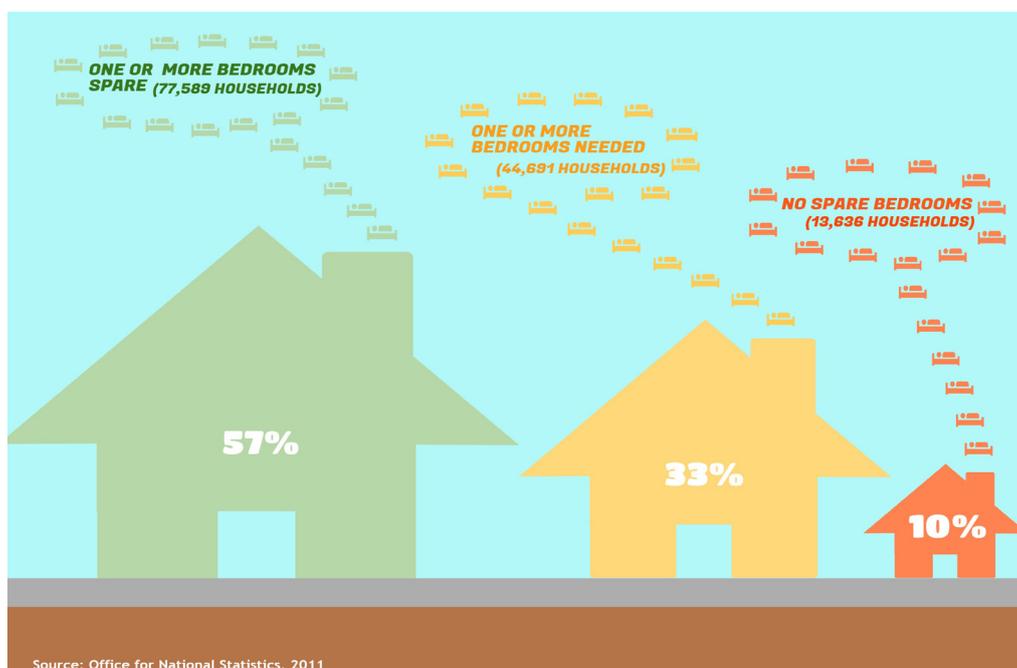
Adverse housing conditions significantly affect children’s wellbeing. Children living in cold, damp housing miss more school days,⁷⁶ experience more long-term ill health and disability, and are more likely to contract meningitis.⁷⁷ Poor housing quality during childhood generally correlates with slow physical growth and delayed cognitive development.^{78,79}

Good building design helps promote physical activity. ‘Active design’ strategies provide guidelines for architects and builders, encouraging them to consider health promotion in their developments and to create environments which make physical activity an integral part of life (e.g. by ensuring stairwells are clearly labelled, safe and attractive, and by providing cyclists’ showers and cycle bays).⁸⁰

Local context

Barnet has a housing stock of about 133,000 units, which are generally in good condition.⁸¹ Five wards have worse overcrowding than the London average: Colindale, Burnt Oak, West Hendon, Childs Hill and Hendon.⁸² Figure 6 shows the range of household occupancy levels in Barnet.

Figure 6: Range of Barnet household occupancy levels, 2011



Supporting documents:

Regional guidance	Local strategies	Neighbourhood SPDs
<ul style="list-style-type: none"> • <i>Lifetime Homes Standards</i>⁸³ • <i>Inclusion by Design</i>⁸⁴ • <i>Housing Standards: Minor Alterations to the London Plan (spatial development strategy)</i>⁸⁵ • <i>Homes for Londoners</i>⁸⁶ 	<ul style="list-style-type: none"> • <i>The Local Plan</i>²⁵ • <i>Annual Report: Growth and Regeneration Plan</i>²⁶ • <i>Barnet Housing Strategy 2015 to 2025</i>⁸⁷ • <i>Adopted Standards for Houses in Multiple Occupation</i>⁸⁸ 	<ul style="list-style-type: none"> • <i>Brent Cross Cricklewood Framework</i>³⁰ • <i>Grahame Park SPD</i>³² • <i>Mill Hill East AAP</i>⁸⁹ • <i>West Hendon SPD</i>⁹⁰

AAP = Area Action Plan

Local action:

Lifetime Homes

Barnet’s existing commitment to Lifetime Homes is essential for future provision of high quality housing. Ten per cent of new homes will be fully wheelchair accessible.⁸⁷ These changes will support Barnet’s ageing population, allowing more residents to ‘age in place’, reducing the need for residential care.

Winter Well programme

In 2015/16, 561 small items (e.g. thermos flasks) were distributed to those struggling to stay warm, 180 radiator panels were given out, and 21 vulnerable residents were provided with grants to repair broken heating systems or improve insulation.

Houses in multiple occupation (HMO) standards

Barnet Council released new HMO standards in July 2016, including guidance on housing quality⁸⁸ (e.g. all rooms must be equipped with adequate fixed space heating capable of efficiently maintaining the room at 19°C). This promotes high quality housing provision across the borough.

Regeneration of West Hendon Estate

All new Barnet homes satisfy Lifetime Homes standards. The West Hendon Estate housing development gives a good example of best practice.

The development partners (Barratt Metropolitan Limited Liability Partnership; BMLLP) recognised the high pollution levels from the nearby A5 trunk road and incorporated air circulation systems into their building design to improve indoor air quality. Residents were able to discuss construction-related issues with BMLLP each month, and several measures were taken to control air and dust pollution from the construction itself.

Recommendations:

Adopt active design principles

People working in buildings should be able to exercise via regular mobilisation (e.g. from their desk to the workplace cafe). Incorporating stairs into a building’s main circulation system will make them the principal access route.⁹¹ Staircases should be visibly appealing and located near building entrances.

Ensure sufficient affordable homes within regeneration areas

Barnet’s *Housing Strategy 2015 to 2025*⁸⁷ states that people who contribute to the life of the borough should be able to live there, in good quality homes that they can afford. However, Barnet is a comparatively expensive place to live, and affordability remains a key concern for Barnet residents.⁹² Consequently, the number of households which require help with



Built environment and health

housing has increased. Home ownership has fallen whilst private renting has increased as more people have found it difficult to buy their own home due to higher prices. Rents are also rising and are increasingly beyond the reach of low income households. It is important to develop a range of affordable housing to meet the needs of households across the income spectrum.

Recognise the potential impact of affordability schemes on overcrowding

The extent of overcrowding in the private rental sector is indicative of housing unaffordability. The five wards in Barnet with significantly worse overcrowding than the London average are all areas of regeneration.

However, as the housing strategy states, regeneration also means new affordable housing will be created.⁸⁷ It is critical that affordability schemes in these areas target those most vulnerable to overcrowding, including families with children. We recommend that the Council closely monitors overcrowding, and uses this data to inform the development of affordable housing.

Support families through Winter Well grants

Winter Well grants are available to vulnerable adults aged 65 and over. However, poor quality housing also impairs child development. We recommend consideration of similar support for families with young children.



MOVEMENT & ACCESS

(Pedestrian, vehicular and public transport patterns)

Why is it important for health?

The most significant role transport plays in community health is enabling physical activity via walking and cycling (alone or as part of public transport journeys).⁹³ In London, such 'active transport' is generally the main way people meet their physical activity needs.²⁴ Physically active people have a lower risk of heart disease,⁹⁴ stroke,⁹⁵ type two diabetes,^{96,97} colon cancer,⁹⁸ breast cancer,^{99,100} hip fractures,^{101,102} depression^{103,104} and dementia.¹⁰⁵ Furthermore, increased active transport is associated with reduced road traffic injuries and air pollution, with considerable reductions in related diseases such as asthma.¹⁰⁶

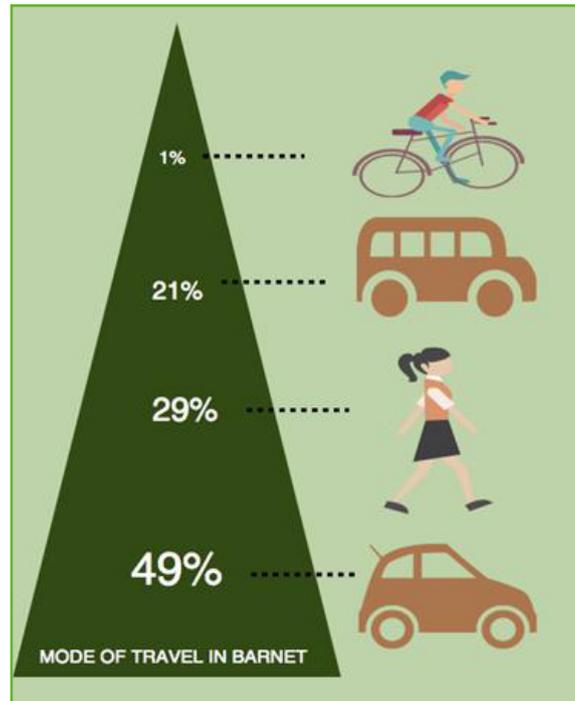
Although the largest health benefits come from increased active transport, vehicle speeds also affect health outcomes. Slowing traffic has been shown to save lives: for children, the risk of a fatal accident at 20 mph is less than one-quarter the risk at 30 mph (adult fatality risks are 1.5% and 8%, respectively).¹⁰⁷

Local context

Most Barnet travel is currently done by car (see Figure 7). Eighty-nine per cent of trips that could be walked are currently done by car – around 40% of these trips are less than 1 km.²⁰ Barnet's cycling uptake is significantly lower than the outer London average,¹⁰⁸ even though TfL ranks Barnet within the top five outer boroughs for cycling potential.¹⁰⁹ Current transport patterns may partially be explained by Barnet's poor level of public transport accessibility.¹¹⁰



Figure 7: Prevalence of different travel modes in Barnet



Source: Transport for London¹¹¹

Supporting documents:

Regional guidance	Local strategies	Neighbourhood SPDs
<ul style="list-style-type: none"> • Mayor’s Transport Strategy Sub-regional Transport Plan²⁰ • <i>Delivering the Benefits of Cycling in Outer London</i>¹⁰⁹ • <i>Improving the Health of Londoners: Transport Action Plan</i>²⁴ 	<ul style="list-style-type: none"> • <i>The Local Plan</i>²⁵ • MTS Local Implementation Plan¹¹² • <i>Delivering the Borough Transport Objectives</i>²⁷ • <i>Sustainable Modes of Transport Strategy</i>¹¹³ • <i>Cycling in Barnet</i>¹¹⁴ 	<ul style="list-style-type: none"> • <i>Brent Cross Cricklewood Framework</i>³⁰ • <i>Burnt Oak town centre strategy</i>³¹ • <i>Finchley Central* Town Centre Strategy</i>³³

MTS = Mayor’s Transport Strategy; *Finchley Church End is also known as Finchley Central



Built environment and health

Local action:

Electric charging points

Eight electric charging points have now been installed on borough roads and in Council-owned car parks; there are also charging stations at High Barnet Underground station, Brent South retail park, Brent Cross shopping centre and some Waitrose supermarkets. These facilities may improve air quality.

Bus stop accessibility

In 2014, only 49% of bus stops in Barnet were wheelchair accessible.²⁷ The Transport Delivery Plan addressed this issue and investment (for main bus stations) was allocated. While bus stop accessibility is still lower than TfL's goal (95%), a more inclusive public transport environment has been created.

Cycling programmes

Balance Bike and Bike It Plus training continues to be run across the borough, increasing cycling uptake in participating schools. Demand for Dr Bike programmes (for residents of all ages) has grown, demonstrating increased interest in cycling.¹¹⁴

Open space provision

Barnet's expansive green space network provides many opportunities for cycling and walking.

20 mph zones

Barnet has eighty 20 mph zones, improving pedestrians' use of street space and reducing road traffic accident severity.

Recommendations:

Prioritise investment in active and public transport

Investment in active and public transport must be prioritised. This recommendation relates to a range of organisations, including TfL. All residents should be

able to access services without using a car, including school and work. Deficiencies in the provision of active and public transport should be considered and addressed in the forthcoming transport strategy.

Renew the Sustainable Modes of Transport Strategy

By May 2017, two *Mayor's Transport Strategy* editions had been published since Barnet's most recent (2007) *Sustainable Modes of Transport Strategy*.¹¹³ Addressing active and public transport means a full renewal of this strategy. We recommend that the new strategy focuses on enabling safe walking and cycling to school.

Complete the local cycling strategy

We recommend prioritising completion of Barnet's cycling strategy, to demonstrate the Council's commitment to active travel. This strategy needs to address the unequal distribution of cycling and develop schemes that focus on uptake in disadvantaged groups.

Use stakeholder feedback when developing the transport strategy

We recommend that stakeholder feedback (especially from schools, hospitals and workplaces) be central to the development of active travel strategies. This can help identify local barriers to behaviour change.

Support the uptake of active travel via online resources and communication campaigns

Barnet respondents to the Great Weight Debate survey¹¹⁵ were unaware of relevant services available in parks and leisure centres. To increase active travel uptake, simple online guides to walking and cycling routes should be developed. We further recommend that sharing information on actual (versus perceived) safety levels for walking and cycling may improve attitudes, and thus active travel uptake.

Routinely collect local data

The Environment Committee cycling report noted that, in order to implement appropriate infrastructure, we need to regularly collect data on Barnet travel habits.



Use the WHO HEAT tool, the London walkability model and ATOS levels

To assess the economic benefits of active travel investment, we recommend using the WHO Health Economic Assessment Tool (HEAT).^{116,117} This tool estimates gross and net savings due to campaigns and improved infrastructure. The London walkability

model¹¹⁸ can also help guide Barnet investment via data such as walking potential, local deprivation, car ownership and pedestrian density. Finally, using the Access To Opportunities and Services (ATOS)⁷ tool can identify the ease of transport from an origin point to a service or destination point (e.g. food shops, workplaces and schools).



LOCAL ECONOMY

(Shops, local services and employment opportunities)

Why is it important for health?

People need to be economically secure if communities are to thrive. In addition, the local economy needs to offer services which promote healthy behaviours rather than inhibit them.

Employment opportunities significantly affect population health. Unemployment is linked to poor physical and mental health in the short and long term, due to: fewer financial resources to live a healthy life; stress associated with job loss and financial difficulty; and higher levels of fuel poverty and homelessness.⁶ Furthermore, the quality of available local jobs directly affects health. To lead healthy lives, people must earn a living wage. Insufficient income means that people cannot afford high quality housing, healthy food or leisure services. Developing local employment and investing in human capital are essential to long-term local health improvement.

The local economy also affects health by determining what services are available. In their *Health on the High Street* report,²³ the Royal Society for Public Health used the prevalence of fast food outlets, bookmakers, tanning salons and payday lenders to indicate poor health on the High Street; in contrast, community pharmacies, health services, leisure centres, libraries, pubs and bars indicated good health. All these services affect health through their influence on lifestyle.

Local context

Barnet's local economy is supportive of healthy living, and its town centres offer services which promote health and healthy living. The *Health on the High Street* report named three Barnet High Streets as amongst the 10 healthiest in London.²³ Further research is needed to develop ways of directly measuring the impact of High Street services on local health behaviours (e.g. smoking, alcohol consumption, diet and gambling) and health outcomes.



Supporting documents:

Regional guidance	Local strategies	Neighbourhood SPDs
<ul style="list-style-type: none"> • <i>The London Plan town centre SPGs</i>¹¹⁹ • <i>The Future of London’s Town Centres</i>¹²⁰ • <i>Health on the High Street</i>²³ 	<ul style="list-style-type: none"> • <i>Entrepreneurial Barnet</i>¹²¹ • <i>Annual Report: Growth and Regeneration Plan</i>²⁶ • <i>The Local Plan</i>²⁵ 	<ul style="list-style-type: none"> • <i>Brent Cross Cricklewood Framework</i>³⁰ • <i>Finchley Central Town Centre Strategy</i>³³ • <i>Chipping Barnet Town Centre Strategy</i>¹²² • <i>Edgware Town Centre Framework</i>¹²³

Local action:

Commercial development in regeneration sites

At present, most Barnet residents commute out of the borough for work.¹¹² The development of local commercial areas (with an extra 161,000 m² office space and an estimated 17,000 new jobs)²⁶ will cut travel distances for some people. With the necessary infrastructure, this means increased opportunities for active travel. Continuing to integrate commercial space into regeneration areas is an important part of mixed-use neighbourhoods.

Investment in ‘direction of travel’

Entrepreneurial Barnet recognises the value of increased footfall. Pedestrians who travel to shopping centres on public transport spend more per visit than those using private vehicles.¹²¹ Town centre regeneration plans will consider traffic calming and ‘direction of travel’ plans which prioritise pedestrians.

‘Active frontage’

Town centre strategies propose ‘active frontage’ along High Streets.³⁰ This prioritises pedestrians and creates a safe, visually appealing walking environment.

Barnet’s employment support services

Barnet’s support services are free and open to all unemployed Barnet residents who are claiming Employment Support Allowance, are suffering from mental health issues, or have other complex needs. Services currently operate at seven locations across the borough, and use case workers to robustly assess people’s barriers to work. Over 30 support areas are explored, including housing, finance, childcare and health. Strong links with local and national provision allow service providers to help clients to improve control of their lives and find meaningful, lasting employment.¹²⁴

Recommendations:

Implement cycle parking in appropriate locations

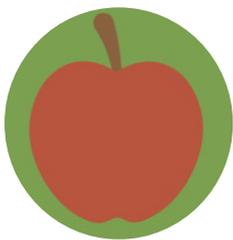
Although already discussed in local documents, we reiterate the importance of well-placed cycle parking in town centres and transport hubs. Following TfL guidelines,¹²⁵ cycle bays are a mandatory part of planning applications for both residential and commercial areas. These should be in highly visible



areas and secure (i.e near main entrances). They should ideally include shelter to protect bikes from adverse weather.¹²⁶

Increase accessible childcare

Alongside the increase in commercial spaces, we recommend that developers consider the incorporation of childcare facilities into mixed-use developments.



FOOD

(Food access, food retail and food growing)

Why is it important for health?

Poor quality diet is a major risk factor for many chronic diseases associated with premature mortality. There is a direct link between fast food outlets and obesity levels.^{127–129} An England-wide study found that neighbourhoods with higher numbers of unhealthy food outlets had worse levels of child excess weight, while the opposite was true for areas with more healthy food outlets.¹³⁰ Furthermore, eating patterns established in adolescence often persist into adulthood, so fast food outlets which are easily accessible from schools are a major health concern.^{131,132}

Poor access to fresh fruit and vegetables widens health inequalities and puts vulnerable people at risk. In households without a private vehicle, poorer pedestrian access to supermarkets (the cheapest source of fresh produce) increases obesity risk.^{133–135}

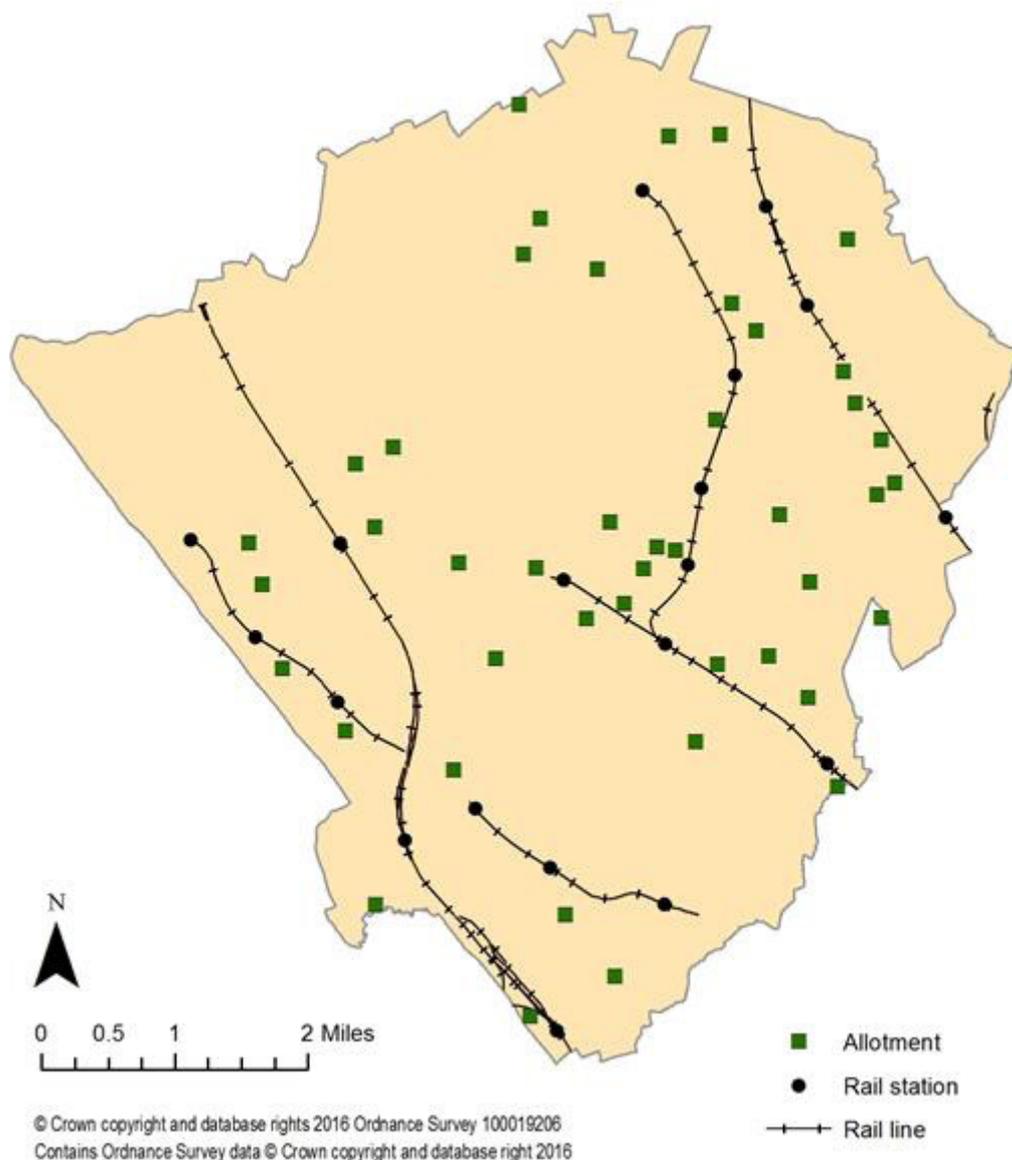
Food growing is another way that communities can get affordable fresh produce. Gardening allotments promote health in several ways, not only by improving healthy food access but also by reducing anxiety and stress,¹³⁶ enabling physical activity for people of all abilities,¹³⁷ and increasing social connections.¹³⁶

Local context

Barnet has at least one food shop in each of its 20 town centres. Allotments are worked by 3205 Barnet ploholders (with 461 people on waiting lists),¹³⁸ across 44 allotments sites (see Fig. 8). These figures suggest relatively good access to affordable fresh produce in Barnet (in the absence of a direct measure).



Figure 8: Barnet allotments in 2016



Sources: Barnet Allotment Federation, Ordnance Survey

Compared with London, Barnet has low numbers of fast food outlets. In 2016, there were an estimated 278 fast food outlets in the borough, equating to 74 outlets per 100,000 residents. However, distribution of fast food outlets across the borough is not equal: numbers are higher in more deprived areas (a pattern seen England-wide) (see Appendix E). Cardiovascular disease is by far the biggest reason for the worse life expectancy in more deprived Barnet neighbourhoods,¹³⁹ so the number of fast food outlets available in these areas is of great concern.



Supporting documents:

Regional guidance	Local strategies	Neighbourhood SPDs
<ul style="list-style-type: none"> • <i>Good Food for London 2016</i>¹⁴⁰ • <i>Beyond the Food Bank: London's Food Poverty Profile 2016</i>¹⁴¹ • <i>Cultivating the Capital: Food Growing and the Planning System in London</i>¹⁴² • <i>Mayor's Food Strategy</i>¹⁴³ • <i>London's Allotments and Community Gardens</i>¹⁴⁴ • <i>Health on the High Street</i>²³ 	<ul style="list-style-type: none"> • <i>The Local Plan</i>²⁵ 	<ul style="list-style-type: none"> • <i>Grahame Park regeneration</i>³²

Local action:

Food growing spaces

Barnet is home to 6% of all farms within London, and has the largest number of allotment sites per person of any London borough (44 sites).²⁵ These factors increase the sustainability and accessibility of locally sourced fruit and vegetables for residents.

Town centre food shop provision

According to the *Town Centres Floorspace Needs Assessment*, there is at least one food shop within each of Barnet's 20 town centres.¹⁴⁵ This is significant, as almost all (96%) Barnet residents visit town centres at least once a week.²⁵ Providing food shops within town centres improves the accessibility of nutrient-rich foods.

Healthier Catering Commitment

Barnet participates in the Healthier Catering Commitment (HCC) scheme, which recognises catering businesses that show a commitment to healthier food choices and cooking techniques. Continuing this business engagement will support the accessibility of nutrient-rich food. Year 7 and 8 students have now

been introduced to the HCC scheme, and encouraged to look for HCC window stickers when buying food from fast food outlets.

Recommendations:

Collect data on food accessibility

We recommend the mapping of food accessibility, taking into consideration transportation routes, income levels and health data. This information will identify areas of fast-food saturation and areas with fewer food shops and outlets. Evidence-based interventions can then be developed. The opportunities offered by the London devolution agreements should also be explored to support these issues.

Integrate healthier catering commitments into pre-planning applications

Access to good food should be incorporated into the *Local Plan* and supplementary planning documents. For example, food outlet pre-planning applications (A3–A5 types) should require a commitment to healthier catering. Barking and Dagenham Council requires hot food takeaway developers to contribute £1,000 to fund local obesity initiatives.¹⁴⁶



Built environment and health

Develop and sustain relationships with ‘third sector’ organisations promoting food growth

We recommend collaboration with allotment societies and third sector organisations already promoting food growing within Barnet. For example, participating in Capital Growth’s ‘Big Dig’ event can introduce new people to gardening, promoting a variety of health benefits while increasing the accessibility of affordable food.¹⁴⁷ Similarly, participating in the London Food

Growing Schools scheme¹⁴⁸ will (along with HCC work) help create positive food cultures in schools, educate children about food production, and support young people’s mental health (a growing concern).

Create food growing spaces in regeneration areas

Allotments are in demand in Barnet. New allotment provision should be considered as part of regeneration plans, to meet current and future demand.



Video

This report is accompanied by a video presenting health issues related to Barnet's built environment.

The report and video are available via the Barnet Council public health webpages:

<https://www.barnet.gov.uk/citizen-home/public-health.html>



References

- 1 Lavin T, Higgins C, Metcalfe O et al. Health Impacts of the Built Environment: A Review. Institute of Public Health in Ireland, 2006, p. 7. http://publichealth.ie/files/file/Health_Impacts_of_the_Built_Environment_A_Review.pdf
- 2 Ross A, Change M. Planning Healthy-weight Environments – A TCPA Reuniting Health with Planning Project. Town and Country Planning Association, 2014. <https://www.tcpa.org.uk/Handlers/Download.ashx?IDMF=7166d749-288a-4306-bb74-10b6c4ffd460>
- 3 Raphael D. Social Determinants of Health, 2nd edn. Toronto: Canadian Scholars, 2004
- 4 Barton H, Grant M. A health map for the local human habitat. *J Roy Soc Promot Health* 2006;126:252–3
- 5 Healthy Urban Planning Checklist. London Healthy Urban Development Unit, 2015. <http://www.healthyurbandevelopment.nhs.uk/wp-content/uploads/2015/07/Healthy-Urban-Planning-Checklist-June-2015.pdf>
- 6 Fair Society, Healthy Lives. The Marmot Review, 2010. <http://www.instituteofhealthequity.org/projects/fair-society-healthy-lives-the-marmot-review/fair-society-healthy-lives-full-report>
- 7 Geddes I, Allen J, Allen M et al. The Marmot Review: Implications for Spatial Planning. UCL Institute of Health Equity, 2011. <http://www.instituteofhealthequity.org/projects/nice-spatial-planning-and-health>
- 8 Carpiano R. Actual or potential neighbourhood resources and access to them: testing hypotheses of social capital for the health of female caregivers. *Social Sci Med* 2008;67:568–82
- 9 Leyden K. Social capital and the built environment: The importance of walkable neighborhoods. *Am J Public Health* 2003;93:1546–51
- 10 Goodall B. Disability and Inclusive Access to the Built Environment. University of Reading, 2010. <http://www.reading.ac.uk/web/files/geographyandenvironmentalscience/GP193.pdf>
- 11 Nagel C, Carlson N, Bosworth M et al. The relation between neighborhood built environment and walking activity among older adults. *Am J Epidemiol* 2008;168:461–8
- 12 Clarke P, George L. Understanding and addressing the challenges of disability: the role of the built environment in the disablement process. *Am J Public Health* 2005;95:1933–9
- 13 King C, Satariano W, Marti J et al. Multilevel modelling of walking behavior: Advances in understanding the interactions of people, place, and time. *Med Sci Sports Exercise* 2008;40:S584–93
- 14 Commers M, Gottlieb N, Kok G. How to change environmental conditions for health. *Health Promotion Int* 2006;22:80–7
- 15 Heinrich K, Lee R, Regan G et al. How does the built environment relate to body mass index and obesity prevalence among public housing residents? *Am J Health Promotion* 2008;22:187–94
- 16 Li F, Harmer P, Cardinal B et al. Built environment, adiposity, and physical activity in adults aged 50–75. *Am J Preventative Med* 2008;35:38–46
- 17 Rundle A, Roux A, Freeman L et al. The urban built environment and obesity in New York City: a multilevel analysis. *Am J Health Promotion* 2007;21:326–34
- 18 Brennan L, Hoehner C, Brownson R et al. Indicators of activity-friendly communities: an evidence-based consensus process. *Am J Preventive Med* 2006;31:515–24
- 19 Cleland V, Timperio A, Crawford D. Are perceptions of the physical and social environment associated with mothers' walking for leisure and for transport? A longitudinal study. *Preventive Med* 2008;47:188–93
- 20 Sub-regional Transport Plan: North. Transport for London, 2011. <http://content.tfl.gov.uk/north-london-sub-regional-transport-plan.pdf>
- 21 Barnet Borough Preferred Option Population Projection. Greater London Authority Demographics, 2017. <https://data.london.gov.uk>
- 22 Characterisation Study of London Borough of Barnet. London Borough of Barnet, 2010, p. 28. <https://www.barnet.gov.uk/citizen-home/planning-conservation-and-building-control/planning-policies-and-further-information/ldf-evidence-and-supporting-documents/characterisation-study.html>
- 23 Health on the High Street. Royal Society for Public Health, 2016. <https://www.rsph.org.uk/our-work/campaigns/health-on-the-high-street.html>
- 24 Improving the Health of Londoners: Transport Action Plan. Transport for London, 2014. <http://content.tfl.gov.uk/improving-the-health-of-londoners-transport-action-plan.pdf>
- 25 The Local Plan (Core Strategy). London Borough of Barnet, 2012. <https://www.barnet.gov.uk/citizen-home/planning-conservation-and-building-control/planning-policies-and-further-information/Adopted-Local-Plan---Core-Strategy-DPD.html>
- 26 Appendix 1 Annual Report: Growth and Regeneration Plan. London Borough of Barnet, 2016. <https://barnet.moderngov.co.uk/documents/s30496/Appendix%201%20Growth%20and%20Regeneration%20Programme%20Annual%20Report.pdf>
- 27 Delivery Plan: Delivering the Borough Transport Objectives. London Borough of Barnet, 2013. <http://barnet.moderngov.co.uk/documents/s17598/Appendix%202.pdf>
- 28 Parks and Open Spaces: Our Strategy for Barnet 2016-2026. London Borough of Barnet, 2016. <https://open.barnet.gov.uk/dataset/open-spaces-strategy/resource/94c1a991-560b-437b-ab1d-dfc1dc6f37ae>
- 29 Brent Cross London NW4. Hammerson, 2017. <http://www.brentcrosslondon.co.uk>
- 30 Brent Cross Cricklewood Framework. London Borough of Barnet, 2006. <https://www.barnet.gov.uk/citizen-home/planning-conservation-and-building-control/planning-policies-and-further-information/brent-cross-cricklewood-regeneration/brent-cross-cricklewood-framework.html>
- 31 Burnt Oak Looking Forward: A Plan for Burnt Oak Town Centre October 2016. London Borough of Barnet, 2016. https://engage.barnet.gov.uk/development-regulatory-services/burnt-oak-town-centre-project/user_uploads/094-burnt-oak_town-centre-plan_summary.pdf
- 32 Grahame Park. London Borough of Barnet, 2016. <https://www.barnet.gov.uk/citizen-home/regeneration/grahame-park.html>
- 33 Finchley Central Town Centre Strategy: Draft for Consultation 30-11-2016. London Borough of Barnet, 2016. <https://engage.barnet.gov.uk/development-regulatory-services/finchley-central-draft-town-centre-strategy>
- 34 The Local Plan (Core Strategy). London Borough of Barnet, 2012, p. 23. <https://www.barnet.gov.uk/citizen-home/planning-conservation-and-building-control/planning-policies-and-further-information/Adopted-Local-Plan---Core-Strategy-DPD.html>
- 35 The Local Plan (Core Strategy). London Borough of Barnet, 2012, p. 65. <https://www.barnet.gov.uk/citizen-home/planning-conservation-and-building-control/planning-policies-and-further-information/Adopted-Local-Plan---Core-Strategy-DPD.html>

- 36 Residents' Perception Survey Spring 2016 Headline Summary. London Borough of Barnet, p. 17. https://engage.barnet.gov.uk/consultation-team/residents-perception-survey-spring-2016/user_uploads/residents--perception-survey-headline-summary-spring-2016.pdf
- 37 Barnet's Joint Strategic Needs Assessment 2015–2020. London Borough of Barnet, 2015, p. 195. <https://www.barnet.gov.uk/jsna-home>
- 38 Foster C, Hillsdon M, Thorogood M. Interventions for promoting physical activity. *Cochrane Database Syst Rev* 2005;(1):CD003180
- 39 Cohen D, McKenzie T, Sehgal A et al. Contribution of public parks to physical activity. *Am J Pub Health* 2007;97:509–14
- 40 Cervero R, Duncan M. Walking, bicycling, and urban landscapes: Evidence from the San Francisco Bay area. *Am J Pub Health* 2003;93:1478–83
- 41 Giles-Corti B, Broomhall M, Knuiaman M et al. Increasing walking – how important is distance to, attractiveness, and size of public open space? *Am J Prev Med* 2005;28(2 S2):169–76
- 42 Coombes E, Jones A, Hillsdon M. The relationship of physical activity and overweight to objectively measured green space accessibility and use. *Soc Sci Med* 2010;70:816–22
- 43 Storgaard R, Hansen H, Aadahl M et al. Association between neighbourhood green space and sedentary leisure time in a Danish population. *Scand J Public Health* 2013;41:846–52
- 44 Kaczynski A, Henderson K. Environmental correlates of physical activity: A review of evidence about parks and recreation. *Leisure Sciences* 2007;29:315–54
- 45 Humpel N, Owen N, Leslie E. Environmental factors associated with adults' participation in physical activity: A review. *Am J Preventative Med* 2002;22:188–99
- 46 Kweon B, Sullivan W, Wiley A. Green common spaces and the social integration of inner-city older adults. *Environ Behav* 1998;30:832–58
- 47 Kuo F, Sullivan W, Coley R et al. Fertile ground for community: inner-city neighbourhood common spaces. *Am J Community Psychol* 1998;26:823–51
- 48 Maas J, van Dillen S, Verheij R et al. Social contacts as a possible mechanism behind the relation between green space and health. *Health Place* 2009;15:586–95
- 49 Richardson E, Pearce J, Mitchell R. Role of physical activity in the relationship between urban green space and health. *Public Health* 2013;127:318–24
- 50 Huynh Q, Craig W, Janssen I et al. Exposure to public natural space as a protective factor for emotional well-being among young people in Canada. *BMC Public Health* 2013;13:407
- 51 Grahn P, Stigsdotter U. Landscape planning and stress. *Urban Forestry Urban Greening* 2003;2:1–18
- 52 Pretty J, Peacock J, Sellens M et al. The mental and physical health outcomes of green exercise. *Int J Environ Health Res* 2005;15:319–37
- 53 Plane J, Klodawsky F. Neighbourhood amenities and health: Examining the significance of a local park. *Social Sci Med* 2013;99:1–8
- 54 Saunders L. Mayor's Transport Strategy and Health. Transport for London, 2017, p. 9. <http://iseh.co.uk/data/documents/MTS%20Health%20Sector%20Stakeholders%20Engagement%20event%20Jan%202017.pdf>
- 55 Access to Public Open Space and Nature by Ward. Mayor of London, 2015. <https://data.london.gov.uk/dataset/access-public-open-space-and-nature-ward>
- 56 Barnet Open Space, Sports and Recreational Facilities Assessment: Final Report. London Borough of Barnet, 2009. https://www.barnet.gov.uk/dam/jcr:8002391c-0fe0-4be1-8c41-531af53cd28d/open_space_assessment_dec09_4.pdf
- 57 Chapter Seven: London's Living Spaces and Places. Mayor of London, 2016. https://www.london.gov.uk/sites/default/files/the_london_plan_malp_march_2016_-_chapter_7_-_londons_living_spaces_places.pdf
- 58 Shaping Neighbourhoods: Play and Informal Recreation Supplementary Planning Guidance. Mayor of London, 2011. https://www.london.gov.uk/file/5270/download?token=_LaKt0Dq
- 59 Open Space Strategies: Best Practice Guidance. CABE Space, 2009. <https://www.designcouncil.org.uk/sites/default/files/asset/document/open-space-strategies.pdf>
- 60 London Borough of Barnet Sports and Physical Activity Consultation. London Borough of Barnet, 2014. <https://barnet.moderngov.co.uk/documents/s13723/Sport%20and%20Physical%20Activity-%20Appendix%20%20Summary%20of%20Consultation%20on%20Leisure%20Service.pdf>
- 61 Barnet SPA Strategy 2013–18. London Borough of Barnet, 2013. <https://barnet.moderngov.co.uk/documents/s13722/Sport%20and%20Physical%20Activity-%20Appendix%201%20Barnet%20SPA%20strategy%20statement.pdf>
- 62 London Borough of Barnet Draft Stage D Playing Pitch Strategy. London Borough of Barnet 2016. <https://open.barnet.gov.uk/dataset/draft-playing-pitch-strategy/resource/1b6b562b-0eb8-4b9d-b42a-e65d29715f76>
- 63 Silkstream and Montrose Park Redevelopment Update. London Borough of Barnet, 2016. <https://barnet.moderngov.co.uk/documents/s34795/Appendix%201%20Silkstream%20and%20Montrose%20Park%20Redevelopment%20Update.pdf>
- 64 Active People Interactive. Sport England, 2015. <http://activepeople.sportengland.org>
- 65 Checklist of Essential Features of Age-friendly Cities. World Health Organization, 2007. http://www.who.int/ageing/publications/Age_friendly_cities_checklist.pdf
- 66 Indoor Air Quality. BRE, 2016. <https://www.bre.co.uk/page.jsp?id=720>.
- 67 Fonseca W, Kirkwood B, Victora C et al. Risk factors for childhood pneumonia among the urban poor in Fortaleza, Brazil: A case-control study. *Bull World Health Organ* 1996;74:199–208
- 68 Denny F Jr. The clinical impact of human respiratory virus infections. *Am J Respir Crit Care Med* 1995;152(4 Pt 2):S4–12
- 69 Murtagh P, Cerqueiro C, Halac A et al. Acute lower respiratory infection in Argentinian children: A 40 month clinical and epidemiological study. *Pediatr Pulmonol* 1993;16:1–8
- 70 Graham N. The epidemiology of acute respiratory infections in children and adults: A global perspective. *Epidemiol Rev* 1990;12:149–78
- 71 Stein L. A study of respiratory tuberculosis in relation to housing conditions in Edinburgh: The pre-war period. *Br J Soc Med* 1950;4:143–69
- 72 Evaluation Group of Good Places Better Health. Good Places Better Health for Scotland's Children. Scottish Government, 2011. <http://www.gov.scot/resource/0039/00398236.pdf>

- 73 Gabe J, Williams P. Women, crowding and mental health. In: BurrIDGE R, Ormandy D, eds. *Unhealthy Housing: Research, Remedies and Reform*. New York: Spon Press, 1993;191–208
- 74 Hopton J, Hunt S. Housing conditions and mental health in a disadvantaged area in Scotland. *J Epidemiol Community Health* 1996;50:56–61
- 75 Wise J. Number of excess winter deaths is three times as high in the coldest homes as in the warmest. *BMJ* 2011;342:1046–7
- 76 Levine Coley R, Leventhal T, Doyle Lynch A et al. Poor Quality Housing is Tied to Children’s Emotional and Behavioral Problems. MacArthur Foundation, 2013. https://www.macfound.org/media/files/HHM_Research_Brief_-_September_2013.pdf
- 77 Leventhal T, Newman S. Housing and child development. *Children Youth Services Rev* 2010;32:1165–74
- 78 Coulton C, Richter F, Kim S et al. Temporal effects of distressed housing on early childhood risk factors and kindergarten readiness. *Children Youth Services Rev* 2016;68:59–72
- 79 Chance of a Lifetime: The Impact of Bad Housing on Children’s Lives. Shelter, 2006. https://england.shelter.org.uk/__data/assets/pdf_file/0016/39202/Chance_of_a_Lifetime.pdf
- 80 Active Design Guidelines: Promoting Physical Activity and Health in Design. New York City Departments of Design and Construction, 2010. <https://centerforactivedesign.org/dl/guidelines.pdf>
- 81 The Local Plan (Core Strategy). London Borough of Barnet, 2012, p. 24. <https://www.barnet.gov.uk/citizen-home/planning-conservation-and-building-control/planning-policies-and-further-information/Adopted-Local-Plan---Core-Strategy-DPD.html>
- 82 Occupancy rating (bedrooms). Office for National Statistics, 2011. <https://www.nomisweb.co.uk/census/2011/qs412ew>
- 83 The Lifetime Homes Standard (From 5 July 2010). Lifetime Homes, 2010. <http://www.lifetimehomes.org.uk/pages/revised-design-criteria.html>
- 84 Inclusion by Design: Equality, Diversity and the Built Environment. Commission for Architecture and the Built Environment, 2008. <https://www.designcouncil.org.uk/sites/default/files/asset/document/inclusion-by-design.pdf>
- 85 Housing Standards: Minor Alterations to the London Plan: The Spatial Development Strategy for Greater London Consolidated With Alterations Since 2011. Mayor of London, 2016. https://www.london.gov.uk/sites/default/files/housing_standards_malp_for_publication_7_april_2016.pdf
- 86 Homes for Londoners: Draft Affordable Housing and Viability Supplementary Planning Guidance 2016. Mayor of London, 2016. https://www.london.gov.uk/sites/default/files/draft_affordable_housing_and_viability_spg_2016.pdf
- 87 Barnet Housing Strategy 2015 to 2025. London Borough of Barnet, 2015. <https://www.barnet.gov.uk/dam/jcr:b49187f8-d93a-41c8-9f32-57e8f49a15ae/Approved%20Housing%20Strategy%202015%20to%202025.pdf>
- 88 Adopted Standards for Houses in Multiple Occupation. London Borough of Barnet, 2016. <https://www.barnet.gov.uk/dam/jcr:cb3f95f9-797f-4c32-b177-6b1bf3c66958/Adopted%20HMO%20Standards.pdf>
- 89 Mill Hill East AAP. London Borough of Barnet, 2009. <https://www.barnet.gov.uk/citizen-home/planning-conservation-and-building-control/planning-policies-and-further-information/mill-hill-east-aap.html>
- 90 West Hendon. London Borough of Barnet, 2015. <https://www.barnet.gov.uk/citizen-home/regeneration/west-hendon.html>
- 91 Active Design. Sport England, 2015. <https://www.sportengland.org/facilities-planning/planning-for-sport/planning-tools-and-guidance/active-design/>
- 92 Residents’ Perception Survey Spring 2016 Headline Summary. London Borough of Barnet, 2016. https://engage.barnet.gov.uk/consultation-team/residents-perception-survey-spring-2016/user_uploads/residents--perception-survey-headline-summary-spring-2016.pdf
- 93 Travel in London: Report 8. Transport for London, 2015. <http://content.tfl.gov.uk/travel-in-london-report-8.pdf>
- 94 Kokkinos P, Narayan P, Pittaras A et al. The role of exercise and physical activity in the prevention of hypertensive heart disease. In: *Hypertension and Cardiovascular Disease*. Berlin: Springer, 2016;181–99
- 95 Mozaffarian D, Benjamin E, Go A et al. Executive summary: Heart disease and stroke statistics – 2015 update. *Circulation* 2015;131:434–41
- 96 Sigal R, Armstrong M, Colby P et al. Physical activity and diabetes. *Can J Diabetes* 2013;37:S40–4
- 97 Shephard R. Diabetes and physical activity. *Appl Physiol Nutr Metab* 2015;40:103
- 98 Boyle T, Keegel T, Bull F et al. Physical activity and risks of proximal and distal colon cancers: A systematic review and meta-analysis. *J Nat Cancer Inst* 2012;104:1548–61
- 99 Wu Y, Zhang D, Kang S. Physical activity and risk of breast cancer: A meta-analysis of prospective studies. *Breast Cancer Res Treatment* 2013;137:869–82
- 100 Kyu H, Bachman V, Alexander L et al. Physical activity and risk of breast cancer, colon cancer, diabetes, ischemic heart disease, and ischemic stroke events: Systematic review and dose-response meta-analysis for the Global Burden of Disease Study. *BMJ* 2016;354:i3857
- 101 Kemmler W, von Stengel S, Bebenek K et al. Exercise and fractures in postmenopausal women: 12-year results of the Erlangen Fitness and Osteoporosis Prevention Study. *Osteoporosis Int* 2012;23:1267–76
- 102 Muir J, Ye C, Bhandari M et al. The effect of regular physical activity on bone mineral density in post-menopausal women aged 75 and over: A retrospective analysis from the Canadian multicentre osteoporosis study. *BMC Musculoskel Disord* 2013;14:253
- 103 Da Silva M, Singh-Manoux A, Brunner E et al. Bidirectional association between physical activity and symptoms of anxiety and depression: The Whitehall II study. *Europ J Epidemiol* 2012;27:537–46
- 104 Mammen G, Faulkner G. Physical activity and the prevention of depression: A systematic review of prospective studies. *Am J Preventive Med* 2013;45:649–57
- 105 Erickson K, Weinstein A, Lopez O. Physical activity, brain plasticity, and Alzheimer’s disease. *Arch Med Res* 2012;43:615–21
- 106 Stevenson M, Thompson J, Herick de Sa H et al. Land use, transport, and population health: Estimating the health benefits of compact cities. *Lancet* 2016;388:2925–35
- 107 Royal Society for the Prevention of Accidents. Road Safety Factsheet: 20mph Zones and Speed Limits Factsheet. London: RSPA, 2016
- 108 National Travel Survey: 2015. Department for Transport, 2016. <https://www.gov.uk/government/statistics/national-travel-survey-2015>
- 109 Delivering the Benefits of Cycling in Outer London. Transport for London, 2010. <http://content.tfl.gov.uk/benefits-of-cycling-report.pdf>
- 110 Barnet’s Joint Strategic Needs Assessment 2015–2020. London Borough of Barnet, 2015, p. 67. <https://www.barnet.gov.uk/jsna-home>

- 111 Travel in London 9 Supplementary Information: Borough Local Implementation Plan (LIP) Performance Indicators. Transport for London, 2016, p. 3. <https://tfl.gov.uk/cdn/static/cms/documents/borough-lip-performance-indicators.pdf>
- 112 Delegated Powers Report No. 1517. London Borough of Barnet, 2011. <http://barnet.moderngov.co.uk/documents/s3511/DPR%201517%20-%20Local%20Implementation%20Plan%20Submission%20for%20Approval%20by.pdf>
- 113 Sustainable Modes of Transport Strategy (SMoTS). London Borough of Barnet, 2007. <https://www.barnet.gov.uk/citizen-home/schools-and-education/school-transport/sustainable-modes-of-travel-strategy-smots>
- 114 Barnet Council Environment Committee. Cycling in Barnet. London Borough of Barnet, 2016. <https://barnet.moderngov.co.uk/documents/s34785/Cycling%20in%20Barnet.pdf>
- 115 The Great Weight Debate: A London Conversation on Childhood Obesity. Healthy London Partnership, 2016. <http://gethealthy.london/greatweightdebate>
- 116 Valuing the Health Benefits of Transport Schemes: Guidance for London. Transport for London, 2015. <http://content.tfl.gov.uk/valuing-the-health-benefits-of-transport-schemes.pdf>
- 117 HEAT Health Economic Assessment Tool. World Health Organization, 2014. <http://www.heatwalkingcycling.org>
- 118 Stockton J, Duke-Williams O, Stamatakis E et al. Development of a novel walkability index for London, United Kingdom: cross-sectional application to the Whitehall II study. *BMC Public Health* 2016;16:416
- 119 The London Plan. Mayor of London, 2015. <https://www.london.gov.uk/what-we-do/planning/london-plan/current-london-plan>
- 120 London Assembly Planning Committee. The Future of London's Town Centres. Greater London Authority, 2013. <http://www.london.gov.uk/sites/default/files/Planning%20Committee%20Town%20Centres%20Report.pdf>
- 121 Entrepreneurial Barnet: The Public Sector Contribution to Barnet's Economy, 2015–2020. London Borough of Barnet, 2014. <https://www.barnet.gov.uk/citizen-home/business/Entrepreneurial-Barnet.html>
- 122 Chipping Barnet Town Centre Strategy. London Borough of Barnet, 2013. <https://www.barnet.gov.uk/citizen-home/planning-conservation-and-building-control/town-centre-frameworks/chipping-barnet-town-centre-strategy.html>
- 123 Edgware Town Centre Framework. London Borough of Barnet, 2013. <https://www.barnet.gov.uk/citizen-home/planning-conservation-and-building-control/town-centre-frameworks/edgware-town-centre-framework/documents-for-edgware-town-centre-framework.html>
- 124 Future Path: Helping Others Choose Their Future. London Borough of Barnet, 2017. <http://www.future-path.co.uk>
- 125 International Cycling Infrastructure Best Practice Study. Transport for London, 2014. <http://content.tfl.gov.uk/international-cycling-infrastructure-best-practice-study.pdf>
- 126 Workplace Cycle Parking Guide. Transport for London, 2006. <http://content.tfl.gov.uk/Workplace-Cycle-Parking-Guide.pdf>
- 127 Townshend T, Lake A. Obesogenic urban form: theory, policy and practice. *Health Place* 2009;15:909–16
- 128 Sallis J, Glanz K. The role of built environments in physical activity, eating, and obesity in childhood. *Future Children* 2006;16:89–108
- 129 Zenk S, Schulz A, Odoms-Young A. How neighbourhood environments contribute to obesity. *Am J Nurs* 2009;109:61–4
- 130 Cetateanu A, Jones A. Understanding the relationship between food environments, deprivation and childhood overweight and obesity: Evidence from a cross-sectional England-wide study. *Health Place* 2014;27:68–75
- 131 Tyrell R, Greenhalgh F, Hodgson S et al. Food environments of young people: Linking individual behaviour to environmental context. *J Public Health* 2016;39:95–104
- 132 Jennings A, Welch A, Jones A et al. Local food outlets, weight status and dietary intake: Associations in children aged 9–10 years. *Am J Preventive Med* 2011;40:405–10
- 133 Coveney J, O'Dwyer L. Effects of mobility and location on food access. *Health Place* 2009;15:45–55
- 134 Chen D, Jaenicke E, Volpe R. Food environments and obesity: Household diet expenditure versus food desert. *Am J Public Health* 2016;106:881–8
- 135 Larsen K, Gilliland J. Mapping the evolution of 'food deserts' in a Canadian city: Supermarket accessibility in London, Ontario 1961–2005. *Int J Health Geographies* 2008;7:16
- 136 Ferres M, Townshend T. The Social, Health, and Wellbeing Benefits of Allotments: Five Societies in Newcastle. Newcastle University, 2012. <http://www.ncl.ac.uk/media/wwwnclacuk/globalurbanresearchunit/files/electronicworkingpapers/ewp47.pdf>
- 137 Mackay G, Neill J. The effect of 'green exercise' on state anxiety and the role of exercise duration, intensity and greenness: A quasi-experimental study. *Psych Sport Exercise* 2010;11:238–45
- 138 Barnet Allotment Federation Sites. Barnet Allotment Federation, 2015. <http://www.barnetallotments.org.uk/allotmentFinder.php>
- 139 Barnet's Joint Strategic Needs Assessment 2015–2020. London Borough of Barnet, 2015, p. 91. <https://www.barnet.gov.uk/jsna-home>
- 140 Good Food for London 2016. Sustain, 2016. https://www.sustainweb.org/publications/good_food_for_london_2016
- 141 Beyond the Foodbank: London's Food Poverty Profile 2016. Sustain, 2016. https://www.sustainweb.org/publications/beyond_the_food_bank_2016
- 142 London Assembly Planning and Housing Committee. Cultivating the Capital: Food Growing and the Planning System in London. Greater London Assembly, 2010. https://www.london.gov.uk/sites/default/files/gla_migrate_files_destination/archives/archive-assembly-reports-plansd-growing-food.pdf
- 143 London Development Agency. Healthy and Sustainable Food for London: The Mayor's Food Strategy May 2006. Mayor of London, 2006. https://www.london.gov.uk/sites/default/files/the_mayors_food_strategy_2006.pdf
- 144 London's Allotments and Community Gardens. CPRE London, 2012. <http://www.cprelondon.org.uk/resources/item/download/607>
- 145 Town Centres Floorspace Needs Assessment. London Borough of Barnet, 2009. <https://www.barnet.gov.uk/citizen-home/planning-conservation-and-building-control/planning-policies-and-further-information/ldf-evidence-and-supporting-documents/town-centres-floorspace-needs-assessment.html>
- 146 Good Food for London 2016. Sustain, 2016, p. 22. https://www.sustainweb.org/publications/good_food_for_london_2016
- 147 The Big Dig Saturday 22 April, 2017. Capital Growth, 2017. <http://www.capitalgrowth.org/bigdig>
- 148 Get Support to Help Your School Grow. Food Growing Schools London, 2017. http://www.foodgrowingschools.org/get_involved