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Local Plan Transport Assessment

November 2021

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Chapter 1 – Introduction

Local Plan Transport Assessments

1.1 According to government planning guidance note "Transport evidence bases in plan making and decision taking", local planning authorities need to undertake an assessment of the transport implications when developing or reviewing their Local Plan, as it is important that a robust transport evidence base be developed to support the preparation and/or review of that Plan.

1.2 It states: "The transport evidence base should identify the opportunities for encouraging a shift to more sustainable transport usage, where reasonable to do so; and highlight the infrastructure requirements for inclusion in infrastructure spending plans linked to the Community Infrastructure Levy, section 106 provisions and other funding sources."

1.3 Transport assessment of the Local Plan should be "undertaken at a number of stages in the preparation of the Local Plan". A process of transport assessment has been carried out for the Bexley local plan, culminating to date in this Local Plan Transport Assessment (LPTA), written to support the proposals set out in the draft Bexley local plan submitted in November 2021.

This LPTA for Bexley

1.4 The local plan process is set out in the Town and Country Planning (Local Planning) (England) Regulations 2012. The Council published a set of preferred policies and potential development sites in its Regulation 18 (Reg 18) consultation document Preferred approaches to planning policies and land-use designations, published in February 2019. It subsequently published its Regulation 19 Draft Local Plan in May 2021 and submitted this, together with other relevant documents, to the Secretary of State in November 2021. The Bexley LPTA specifically supports the submitted Draft Local Plan and associated Schedule of Changes.

1.5 The LPTA document can be read as a whole or by treating each chapter as a topic-based technical paper.

1.6 The LPTA comprises the following sections:

- Introduction (chapters 1 and 2);
- Bexley's Transport Network (chapters 3 and 4);
- Future Transport Proposals and Policies (Chapters 5, 6 and 7);
- Analysis of Potential Site Allocations, Reg 18 to Reg 19 (Chapters 8 to 11);
- Site Allocations for Reg 19 (Chapter 12); and
- LPTA Conclusions (Chapter 13).

1.7 The appendices to the LPTA provide the following:

- Bibliography (Appendix A);
- Site Capacities and Trip Generation (Appendix B);
- Air Quality Results by Site (Appendix C)

- Site-by site Connectivity Analysis by public transport, walking and cycling (Appendix D); and
- Site-by-site Technical Analysis (Appendix E).

1.8 The Council has produced the LPTA in-house and published it in accessible document format, for ease of reading by people who need reading assistance.

Preface: Covid-19 and the Local Plan Transport Assessment

1.9 Covid-19 has brought about a very significant change in outlook for both businesses and people.

1.10 Work on the Bexley LPTA started before the first reported case of Covid-19 in the UK. The evidence gathered for the LPTA was therefore based on the 'old normal'. Currently, despite the lifting of restrictions, it is simply not possible to forecast future travel behaviour and the level of longer-term transport demand. Hence, the 'old normal' has been adopted as the only fixed point for information/data on which to base the Bexley LPTA.

1.11 For completeness, the following paragraphs provide a short commentary on travel behaviour and the influencing factors behind them under Covid.

1.12 During the restrictions there were fewer trips made due to Government advice as well as fears of illness/infection, people working from home more often, less business travel as virtual meetings replaced some or all business trips, and increased unemployment. The peak period reduced as working patterns shifted and commuters tried to avoid the busier trains and buses.

1.13 This overall reduction in travel was highest for travel by public transport. The introduction of the first lockdown saw usage on London's tube network drop to 4% of normal levels and to 14% on the capital's buses (DfT, 2021). The latest figures from TfL suggest that these have now recovered somewhat but are still significantly below previous levels. London Underground weekday passenger numbers were 50% of pre-pandemic levels as of late August 2021 whilst buses are seeing figures as high as 75% in the afternoons and at weekends.

1.14 Nevertheless, many travellers who used to use public transport regularly are reporting that they plan to make fewer trips by public transport, mainly due to concerns over illness/infection. Some expect to work from home a lot more others have found other ways of making their journey– a trend potentially borne out by figures which show some road routes in London up to near normal levels of traffic. Public transport continues to have compulsory face mask wearing in London. All of this, and the effect of social distancing on the usable capacity of buses and trains, will have a significant financial impact on operators; as a result TfLs financial future remains uncertain with discussions continuing with government about a longer term funding settlement for the Capital.

1.15 This shift away from public transport has led to increased levels of walking and cycling although the challenge will now be to maintain and build on this shift. The government is encouraging the reallocation of carriageway space to make cycling safer and for wider pavements to encourage walking. These measures also support the government's aim for a much lower-carbon transport future.

1.16 The predicted decline of business travel, with both employers and employees seeing the benefits of travelling less, means an uncertain future for large infrastructure schemes; with more focus and spending on local transport solutions and for accelerating the roll-out of high-quality broadband.

1.17 The lockdown saw an increase in online shopping (mostly involving van-based deliveries), which took significant spending away from the high street. Likewise, the closure of cafes, restaurants and pubs has seen further reductions in visits to town centres. Conversely, continued fears over foreign travel and quarantine restrictions may lead to a greater demand for visiting local attractions, as people become more acquainted with their local area and spend their holidays exploring within the UK. However, although figures suggest an increase in town centre footfall recently, they remain well below pre-pandemic levels.

1.18 With all this in mind, the Bexley LPTA has had to rely on pre-Covid data sources; there is too much uncertainty to do otherwise and is therefore based on behaviours and trends pre-Covid, including a more stable development sector. Only time will tell whether the overall amount of travel and the modes chosen will take a more sustainable direction. With the level of subsidies paid to public transport providers during the pandemic, a great deal of uncertainty hangs over the future of traditional public transport networks, especially those elements that are the least financially viable. In this context the Local Plan will need to ensure a flexible and resilient policy approach and regular monitoring of trends to ensure approaches remain relevant and can be reviewed when appropriate.

Chapter 2 – Partnering with Stakeholders

Introduction

2.1 The purpose of this chapter is to set out the ways in which the Council has partnered with stakeholders to create the information in the Bexley LPTA.

2.2 LBB has engaged with stakeholders throughout the LPTA process, including strategic transport bodies and neighbouring local authorities. The methodology has been developed with reference to government guidance on forming a transport evidence base (MHCLG 2015) and with support, advice and information from Transport for London (TfL). Below is a summary of the engagement with stakeholders.

National Highways (Formerly Highways England)

2.3 In April 2019, National Highways (NH) provided the following representation in response to the Regulation 18 Local Plan Preferred Approaches Paper (NH's full response can be read in the Regulation 18 Consultation Statement):

> "In the case of the area covered by the London Borough of Bexley, although there is no SRN within the borough boundaries, it should be noted that the M25, A282 and A13 are located to the east and north-east of the borough respectively. The junctions that the Bexley Local Plan could potentially impact are M25 Junction 1a, 1b, 2, 30 and 31. The M25, A282 and A13 are heavily congested throughout the peak hour periods and any material increase in traffic on this section of the SRN would be a concern to the Highways England.
>
> Highways England should be consulted on any development that may have an impact on the M25, A282 or A13. There is a high level of development proposed within this Local Plan and it should be ensured that the transport evidence base for the Local Plan; following this review, provides indication as to what the residual impacts of the development would be on the SRN".

2.4 The LPTA addresses the points raised by NH in relation to the cumulative impacts of Local Plan development on the SRN through an:

- assessment of potential trips generated by allocated development sites
- assessment of the impact on trips on the local highway network, the SRN, and Junction 1a of the M25; and
- identification of mitigation measures where applicable

2.5 The Council and NH met on 24th September 2020 where the Council set out it's overall timetable for the Local Plan and the approach taken for the Transport Assessment. The meeting also discussed NH's representations on the Reg 18 consultation and the Council's proposed changes to the draft Local Plan policies. NH's concerns at the meeting were the lack of data on trip distribution onto the strategic road network including the A2 and A20 and also the need to include small sites in

the assessment as well as the large sites. They were also concerned with impacts on Junction 1a A282 Dartford Crossing and the need for these to be modelled. NH were generally happy with the proposed policy changes.

2.6 In November 2020, NH confirmed the need for an assessment of the cumulative or aggregate impacts of all non-consented development upon the strategic road network outside of the London boundary. This may include detailed junction modelling of the M25 Junctions 1-2 should it look like capacity is an issue. The assessment should also include 'with' and 'without' scenarios of the non-consented elements of the Local Plan and also 'with' and 'without' the Lower Thames Crossing scenarios. This modelling work has now been commissioned by the Council and is ongoing at the time of writing. It is proposed to publish the results at submission stage on the basis that it is considered highly likely the conclusions will not alter the approach outlined in the draft Local Plan.

2.7 In July 2021, NH made representations under Regulation 20. They stated:

'Highways England is aware of the relationship between development planning and the transport network, and we are mindful of the effects that planning decisions may have on the operation of the SRN and associated junctions…In order to constructively engage in the local plan-making process, we require a robust evidence-base so that sound advice can be given to local planning authorities, in relation to the appropriateness of proposed development in relation to the SRN.'

NH then go on to support the draft Local Plan's reference to the Council working with them to understand, develop, fund and deliver necessary interventions on the strategic road network to support future development proposals. They also note that

'..part of this collaboration will be directed by the… work currently being undertaken regarding the modelling and assessment of impacts which the Draft Local Plan could potentially have on the M25 / A2 carriageways.

They further state:

Overall, Highways England are in support of the relevant policies included within the Draft Local Plan document. It has been acknowledged that the implementation of any policy which impacts the operation of the SRN will involve Highways England as a stakeholder. Measures promoting sustainable transport usage and safety, while reducing congestion are in line with the thoughts of Highways England.

However, the evidence made available on the Draft Local Plan is insufficient to allow Highways England to determine the predicted levels of impact on the SRN, should these policies be implemented…

It is therefore unclear at this stage whether it will be possible to sufficiently mitigate the impact of the allocated development locations, or whether the impact will be too great to feasibly ensure that the network operates within capacity at the end of the plan period. Highways England ask to be consulted on all steps in the development / identification of this transport information, able to comment on the appropriateness of the raw data, modelling assumptions and modelling software to be used, etc. A scoping report should be submitted to Highways England in the first instance to agree the modelling and trip
generation parameters.

Highway England is aware that modelling / infrastructure discussions are currently underway with Stantec regarding the Local Plan, and we await the outcome of these discussions.

2.8 This modelling work was commissioned by the Council and reported in November 2021. The results have been published as part of the submission of the Draft Local Plan and are considered in Chapter 5. The Council is discussing these results with National Highways as part of the duty to cooperate and will confirm the position at the examination stage through a Statement of Common Ground.

2.9 In this context it should also be noted that in September 2020, LBB were invited by Dartford Borough Council to join a steering group of local authorities and stakeholders overseeing medium to long-term solutions to the traffic problems at the A282 (M25) junction 1a. This work will take into consideration the impact of developments likely to generate trip rates that will impact on the operation of junction 1a. A first meeting has been held and further meetings will be held regularly thereafter.

Transport for London

2.10 In April 2019, TfL made a representation in response to the Regulation 18 Local Plan Preferred Approaches Paper (see the Regulation 18 Consultation Statement) and their main relevant points are summarised as follows:

> "Increased capacity on the road network needs to be carefully managed to avoid wider negative impacts on the Transport for London Road Network, the Strategic Road network, local roads, and other road users including bus users and people walking and cycling. Increased capacity should also mitigate impacts on air quality, noise and public health.
>
> Any street or road improvements should be made in line with the Healthy Streets Approach and should help meet the London-wide strategic aim of 75 per cent of all journeys in outer London being made by active, efficient and sustainable modes by 2041, as set out in the MTS. This includes the need to encourage and enable shorter trips to be made by walking and cycling, and some longer trips by public transport. These measures can help improve public health through increased activity levels, supported by provision of high-quality public realm.
>
> We encourage a more ambitious approach to managing congestion on the road network and a stronger commitment to mode shift to walking, cycling and public transport.
>
> New development should mitigate any negative impacts on the operation or efficiency of the Local and Strategic transport network or the public transport network. Mitigation measures should be sought through agreements with TfL and the London Borough of Bexley".

2.11 LBB has addressed these comments through the qualitative and quantitative assessments. While the quantitative assessment considers the potential impact of development on the highway network, the qualitative assessment covers a wider range of impacts. TfL reviewed the LPTA methodology in May 2020 and after some discussion, was happy that the approach taken is logical.

2.12 LBB and TfL met on 24th September 2020 and TfL suggested changes to some of the draft chapters in the LPTA as well as providing updated information on air quality and highway delay mapping. LBB and TfL have since engaged in a range of detailed discussions with regard to policy development through the duty to cooperate

2.13 In July 2021 TfL made representations under Regulation 20. In these they stated:

We welcome the positive changes that have been made to the draft local plan in response to TfL's feedback as part of the Regulation 18 consultation. We also welcome recent very positive and constructive dialogue between TfL Planning and Bexley officers to try to ensure consistency with London Plan transport and parking policies. However, we still have some limited concerns about the approach to parking standards where they are not in conformity with the London Plan.

TfL went on to say:

In particular, we are unable to support a higher parking standard for 3+ bedroom dwellings in areas of PTAL 2 if it is based on the adoption of a threshold of a 5 minute walking distance for determining the areas outside of which non-conforming standards will apply. The threshold should at least be doubled to align with the approach used elsewhere in the London Plan and to ensure consistency with well-established transport and land use planning practices.

They further stated:

While we welcome protection and safeguarding for the public transport and active travel schemes listed in policy SP11, two road-based projects (targeted traffic capacity increases on the South Thames Development Route (A206/A2016) and A206 Thames Road dualling between Bob Dunn Way and Crayford Way, including widening Cray Mill Bridge and enlarging the Thames Road/Crayford Way roundabout) should be removed from the Local Plan as previously requested.

However, TfL went on to say:

Increased capacity on the road network needs to be very carefully managed to avoid wider negative impacts on the Transport for London Road Network, the Strategic Road network, local roads, and other road users including bus users and people walking and cycling….

It is important that development schemes include positive proposals that provide for, and promote the use of, more sustainable ways of travelling. Increased capacity should also mitigate impacts on air quality, road danger, noise and public health.

TfL then went on to propose a series of detailed changes to the draft Local Plan which are set out in the Council's Consultation Statement.

2.14 The Council subsequently met to discuss these comments with TfL officers and further changes to selected policies made. These are set out in the Council's Schedule of Changes document and selected amendments are discussed in more detail in Chapter 7 of the LPTA.

2.15 LBB continues to meet with TfL on a regular basis for updates on the Local Implementation Plan (LIP) and TfL's operations. Officers from TfL Buses work closely with LBB officers on bus matters such as bus performance and route improvements.

2.16 Additional liaison has also been undertaken with TfL regarding Bexley's Growth Strategy, the Thamesmead & Abbey Wood and Bexley Riverside Opportunity Area Planning Frameworks, as well as preliminary work on Bexley Riverside and collaboration on the Thamesmead & Abbey Wood transport strategy.

Network Rail

2.17 LBB and Network Rail met on 13th October 2020. Specific issues such as development above stations and 12-car running were discussed but Network Rail had no major concerns with the proposals in the draft Local Plan.

Kent County Council

2.18 KCC made representations under Regulation 20 in July 2021. They made particular reference to the LPTA and stated:

> No transport modelling work has been provided to demonstrate the impact of the Local Plan on the Dartford highway network. As referenced at paragraph 5.27, further modelling work is currently being undertaken and through discussions with Bexley officers it is understood this will be provided to KCC prior to the Local Plan being formally submitted. Tables 9.5 and 9.6 show a reasonably large number of PCUs travelling to/from Dartford in the AM and PM peaks. It is therefore imperative that an assessment of the key junctions within Dartford are assessed, and mitigation proposed where appropriate, as part of the Local Plan.
>
> KCC conclude by asking that the Council:
>
> Work with KCC to determine which parts of the Dartford network will need to be modelled (which will include Bob Dunn Way and Junction 1a, as previously discussed with Bexley officers), and provide the modelling work for review. This should include the bottle neck at Cray Mill Lane bridge.

As noted above, modelling work was commissioned by the Council and reported in November 2021. The results have been published as part of the submission of the Draft Local Plan. The Council is discussing these results with KCC as part of the duty to cooperate and will confirm the position at the examination stage through a Statement of Common Ground.

Further engagement

2.19 Alongside the LPTA, LBB regularly talks with other stakeholders and organisations where local planning and transport issues are discussed.

Crossrail to Ebbsfleet (C2E):

2.20 The Council is working with the following partners to extend Crossrail services to Ebbsfleet:

> GLA/TfL, Kent County Council, Dartford Borough Council, Gravesham Borough Council, Ebbsfleet Development Corporation, Thames Gateway Kent Partnership and Network Rail

2.21 The aims of the group are set out in *Section 5 - Identified New Transport Projects*. The C2E partners meet regularly at technical, executive and political/senior executive levels, with reporting to the Department for Levelling Up, Housing and Communities (DLUHC)and DfT.

Transport Users Sub-Committee (TUSC)

2.22 LBB Members with officer support discuss public transport and road safety-related issues with TfL, Network Rail, Southeastern, the Met Police Service, London Fire Service and other interested parties.

Silvertown Tunnel Implementation Group (STIG)

2.23 This is a forum for TfL and local authorities. Meetings are held twice a year, where TfL consult boroughs on matters such as the Silvertown Tunnel Monitoring and Mitigation Strategy, charging scheme proposals and amendments to bus services. In terms of LBB, issues arising from on-going traffic and transport modelling and environmental impacts are of most relevance

Chapter 3 –Bexley's Transport Network

Bexley – The Place

3.1 Bexley is an outer London borough in south east London, with an area of around 64 square kilometres. Its location is shown in Fig.3.1. It is bounded by the Royal Borough of Greenwich to the west, London Borough of Bromley to the south, Kent to the east and London Borough of Havering to the north.

Figure 3.1 Bexley's Location in London

3.2 Much of Bexley is residential in nature, a good deal of it low density suburban. There are many areas of open space and several large areas of industrial activity. There is less office-based employment compared with most areas of London. The borough has a five-mile frontage onto the River Thames in the north, which includes the Belvedere Employment Area, one of the largest concentrations of industrial activity in London. Bexley is one of the greenest boroughs in London with over 100 parks and open spaces covering 638 hectares.

3.3 Bexley has one Strategic Centre, Bexleyheath, defined as a Major Centre in the London Plan. In addition, there are four District Centres – Crayford, Erith, Sidcup and Welling – and a number of smaller local centres and neighbourhood parades. Visitor attractions include Lesnes Abbey, Red House, Hall Place and Danson Park.

3.4 Bexley's population is over 245,000, an increase of 5% since the 2011 Census and is predicted to rise to about 300,000 by 2050 (GLA, 2018). It is also an ageing population – by 2050 over 65s will make up about 22% of the population, up from 16% currently (GLA, 2019). The population will also become more diverse; black and ethnic minority groups will account for an estimated 30% of the population by 2045, up from 18% at the 2011 Census (GLA, 2019).

3.5 There were about 93,000 households in 2011 (Office for National Statistics, 2013), which is estimated to have increased to nearly 100,000 in 2017 and predicted to increase to more than 121,000 by 2040 (GLA, 2019). Average household size is predicted to decrease over the same period although the picture is complex with intensification in the use of the housing stock a recent trend, together with evidence of some increase in household sizes within some populations in some areas.

3.6 Unemployment for the borough at 4.2% is slightly lower than for London as a whole (4.6%) (GLA, 2017). Overall the level of deprivation from Indices for Multiple Deprivation (Office for National Statistics, 2019) using 39 separate indicators to measure deprivation, show a clear strip of deprivation in the north of the Borough and a small area in the south of the Borough, as shown in Fig. 3.2. The darker the shade, the higher the level of deprivation as measured in IMD deciles.

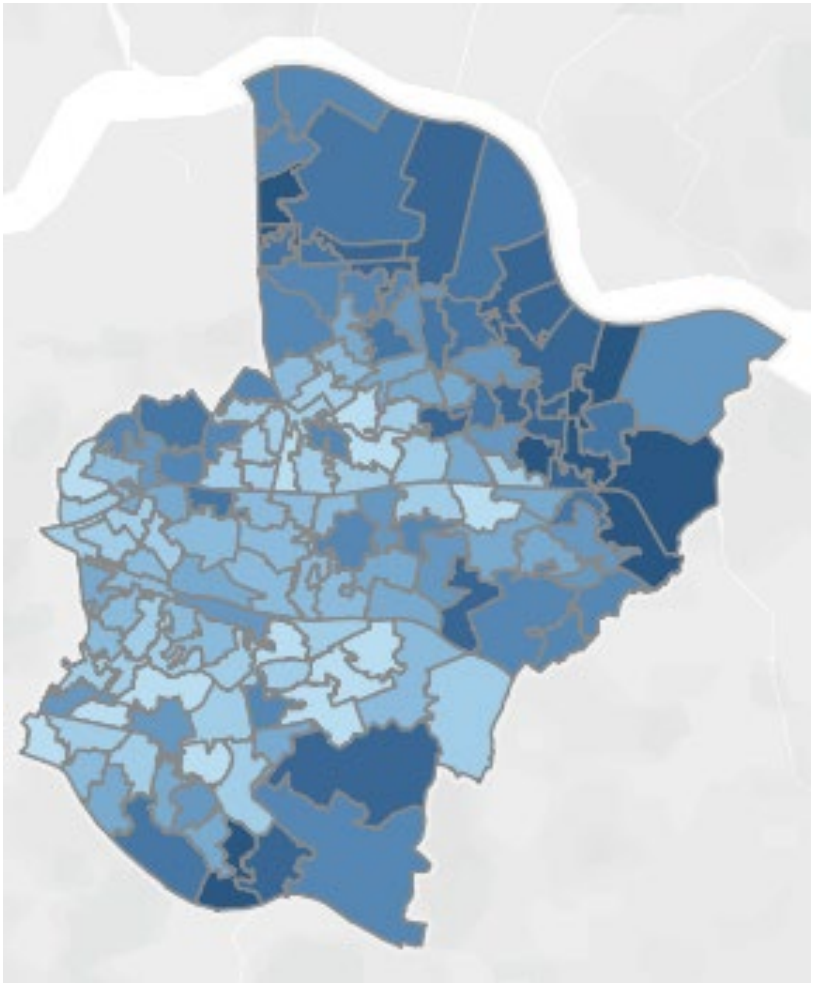


Figure 3.2 Indices of Multiple Deprivation by LSOA 2019

The Road Network

3.7 There is a total of 348 miles of road in Bexley, of which 50 miles are A and B roads and 298 miles are a mixture of classified and unclassified local roads. The A2 and A20 are part of the TfL Road Network (TLRN). The A2 is at or near capacity for extended periods of the day, which pushes drivers onto local roads for alternative routes. The A2 carries as many as 90,000 vehicles per day (DfT, 2019) of which 4,500 per hour are westbound in the evening peak period.

Figure 3.3 Strategic Road Network

3.8 Fig. 3.4 provides an overview of traffic flow on the major road network (A roads) since 2000 and shows that the broad trend is a general increase in the volume of traffic despite a drop during the last recession. The pattern is much the same for all roads in the borough. (source: DfT (2020), Motor vehicle traffic (vehicle miles) by local authority in Great Britain: Table TRA8901)

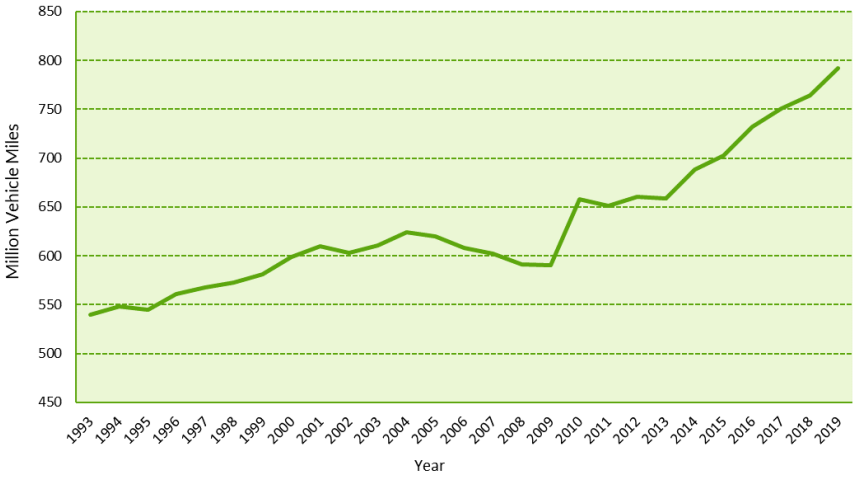


Figure 3.4 Traffic Flows on Major Road Network (2020)

3.9 Fig. 3.5 shows the locations of traffic delay in the morning peak period. Many of the delays are on the roads approaching the borough's town centres. Some of the borough's major roads carry high volume of heavy goods vehicles. The A206/A2016 South Thames Development Route is the strategic route for lorries accessing the industrial areas on the south bank of Thames Gateway. It has the second highest flow of HGVs in the borough, after the A2. Poor air quality and severance are local issues for these routes.
(source: TfL Playbook, 2020)

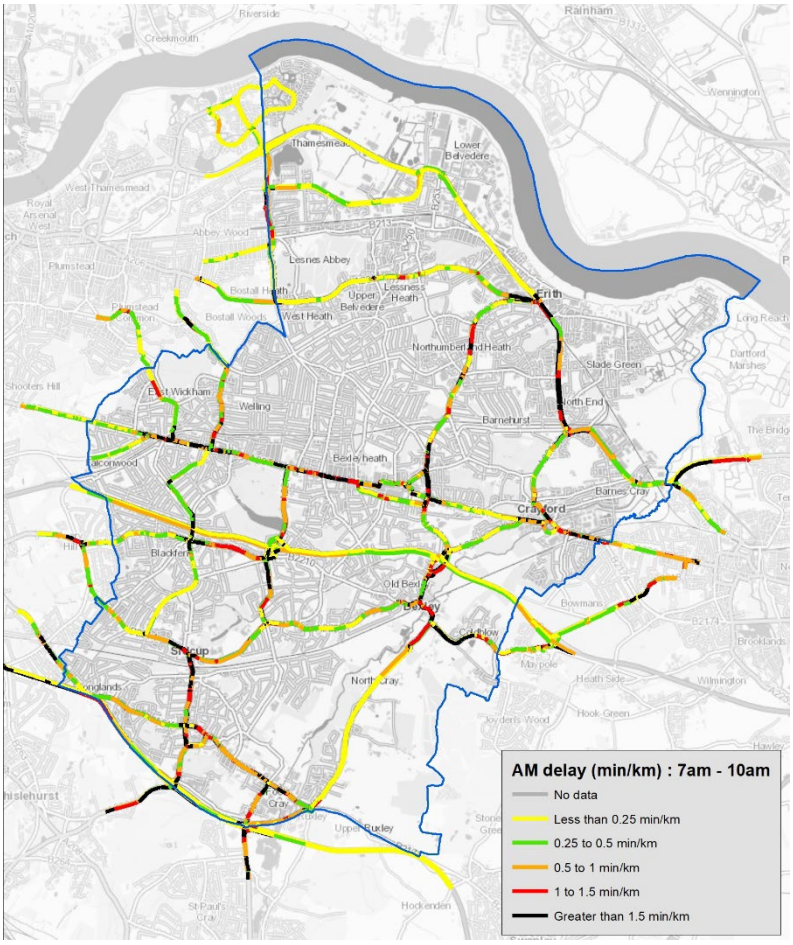


Figure 3.5 Traffic Delay AM Peak

3.10 **A282 (M25) Junction 1a Dartford Crossing (A282 Interchange with A206)** – this junction to the immediate south of the crossing, is a critical point of access to the strategic road network for traffic to/from the northern parts of Bexley borough. The A206 links the industrial areas on the south bank of the Thames with the Dartford Crossing.
Unfortunately, the closeness of the junction to the tunnel entrance means that any congestion into the northbound tunnels quickly blocks junction 1a, causing long tailbacks along the A206 Bob Dunn Way and Crossways Boulevard. Since the toll booths were removed in 2014 when the Dart Charge scheme was introduced (automatic number place recognition charging), the northbound lane gain from the A206 has been lost, which makes it harder for traffic to join the heavy tunnel-bound flows, which in turn leads to tailbacks.

3.11 **South Thames Development Route (STDR) A206/A2016 –** STDR is the strategic route that serves the industrial areas on the south bank of the Thames between the M25 and Thamesmead. It is one of the few dual carriageway roads in the borough that is not part of the TLRN, but it does form part of TfL's designated strategic network. Inter-peak flows are not much lower than the am and pm peaks, particularly during the school-run. Congestion on STDR particularly occurs near Erith town centre, focussed on the Queens Road/Bexley Road roundabout and the nearby signalled junction at James Watt Way, where the A220 is the direct road link to Bexleyheath town centre. This results in significant rat-running on local streets by drivers avoiding A206 Queen's Road and A206 Bronze Age Way during peak times.

3.12 **Cray Mill Bridge, A206 Thames Road (STDR)** – though STDR is almost all dual-carriageway, there is a pinch-point at the Cray Mill railway bridge on Thames Road that carries the North Kent Line railway. The road is constricted down to a single-carriageway to pass through the bridge arches, which are at an angle and not perpendicular to the direction of the road. This pinch-point causes long queuing during busy periods. There is a long-standing plan for completing this last stage of dualling, which will support future growth; details are set out in Chapter 5.

3.13 **Crayford Town Centre** - Crayford town centre suffers from the dominance of traffic on its one-way ring-road and approaches, especially on the A207/A226 Dartford-Bexleyheath ('Watling Street') corridor, along with congestion and delays. This makes the area unattractive to shoppers, residents and developers. Road and public realm improvements have been identified in the town centre to support local regeneration.

3.14 **North-South Movement** – the strategic road network is generally radial, with the A2, A20 and A206/A2016 corridors providing good east-west movement between inner London and Kent on dual-carriageways. The A2 and A20 also have grade-separated junctions meaning that their flow isn't interrupted by local traffic. North-south movements are not so well-served, with the only length of dual-carriageway being North Cray Road which reduces to a single lane through Bexley village, causing queuing traffic during the peak. Other north-south routes either run through urban centres or have busy junctions that queue back during the am and pm peak.

Public Transport

3.15 Bexley is not served by TfL Underground or Overground services, or by the Docklands Light Railway (DLR) or tram routes. The Royal Borough of Kingston-on-Thames is the only other London borough in the same position. The borough's public transport network is simply made up of national rail or local bus services. Therefore, Bexley has a systemic shortfall in access to public transport services compared with the rest of London. Only a relatively small area in Bexleyheath town centre has a high public transport accessibility level (PTAL) – the only place in London that achieves a PTAL of 6 through bus services alone . Some of the borough's railway stations are located in the suburbs some distance from urban centres. This is especially the case with Bexleyheath and Sidcup stations which when the services were originally conceived served the market gardens supplying inner London and subsequently the rapidly expanding suburban areas in the mid-late Victorian era. Topographical challenges also influenced the location of the stations.

3.16 Although three other boroughs in outer London have a lower overall average PTAL score (as shown in table 3.1), both Havering and Hillingdon are served by the Underground and parts of Bromley are served by Tram. Much of Bromley, for example, is in the Green Belt (with a much less intensive public transport network in those areas). A high proportion of Bexley borough is built-up – it therefore requires more comprehensive coverage by public transport.

Table 3.1: Average Public Transport Accessibility (TfL, 2015)

Borough	Score	PTAL
Havering	2.7	1b
Bromley	3.6	1b
Hillingdon	3.6	1b
Bexley	4.6	1b
Enfield	4.6	1b

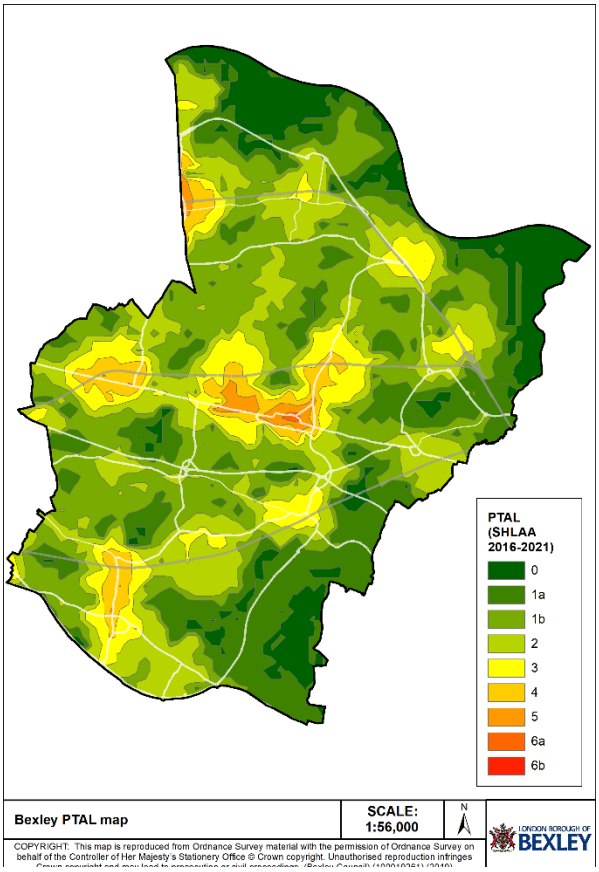


Figure 3.6 Public Transport Accessibility Levels

Bus Services

3.17 There are 36 bus routes serving the borough, including 7-night bus routes, of which 15 are high frequency services. Most routes run a 7-day a week service, the exceptions are the school bus services and route B13 – which does not run on Sunday evenings. The lowest frequency routes (route 492 & B14) run twice an hour. The highest frequency service (route 472) runs every 6 minutes.

3.18 Figure 3.7 shows the borough's bus route network and the level of service (buses per hour) on parts of the network. Buses have a reasonably good penetration across the borough as a whole.

Figure 3.7 Bus Route Network

3.19 Bexleyheath town centre is the borough's main bus hub, connecting to almost all parts of the borough and neighbouring towns and regional centres. Direct connections extend as far as the O_2 at North Greenwich and Bluewater shopping centre. There are approximately 670 bus stops in the borough.

3.20 The majority of the borough's local bus services are provided by privately owned operators through contracts with London Buses The other bus-based services in the borough include;

- the community transport scheme run by BATS
- a Dial-a-Ride service for people whose mobility needs require them; and
- commuter minibus/coach services (especially from north Kent into central London on the A2).

3.21 Once the Elizabeth line services start at Abbey Wood (expected to be in 2022 at the time of writing), London Buses has plans to reorganise local routes to provide better access and increased capacity. A new route 301 between Bexleyheath and Woolwich via Abbey Wood was introduced in July 2019.

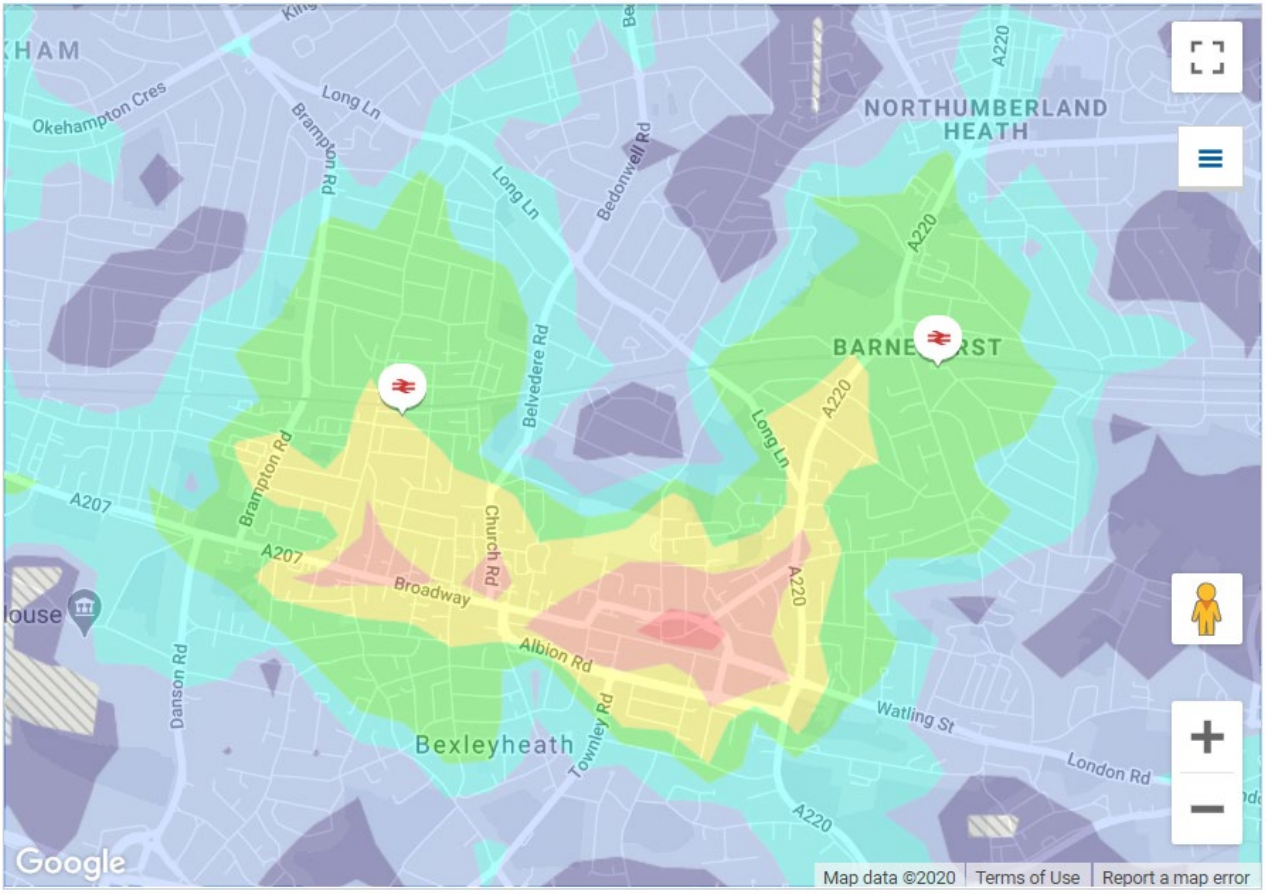
Bus Issues

3.22 **Capacity at Bexleyheath bus hub** – Bexleyheath town centre is over twice as far from its nearest railway station than any other major district centre in London (see Table 3.2) and has to rely on buses as the only local public transport mode available. Buses are therefore crucial in supporting the commercial life of the town centre and it is through buses alone that Bexleyheath reaches a PTAL of 6 – probably unique in London. However, the available space for both bus stops and bus stands is at a premium, severely limiting future prospects for growth-related service enhancements – whether through high frequencies or new routes.

Table 3.2: London District Centre Proximity to Nearest Railway Station

Centre	PTAL	Walking Distance from Station to High Street Core (m)	Nearest Station	Off Peak Trains per Hour to Central London
Bexleyheath	6A	1,500	Bexleyheath	6
King's Road (east)	6A	700	South Kensington	24
Orpington	6A	650	Orpington	12
Eltham	6A	600	Eltham	6
Lewisham	6B	600	Lewisham	12

Figure 3.8: PTAL Map of Bexleyheath Town Centre (Source: WebCAT)



Key PTAL Level

6a	5	4	3	2	1b	1a	0

3.23 **Delays at key junctions/corridors during the peak period** – TfL's current work as part of the GLA's previous City in the East growth strategy for bus priority measures is initially focused on five locations:

- A222 Station Road/Longlands Road/Hatherley Crescent junction, Sidcup
- A220 Gravel Hill/Erith Road/Watling Street/Broadway junction and corridor to Long Lane junction, Bexleyheath
- A211 Sidcup High St between Hatherley Road and Station Road/Elm Road junctions
- A206 Queens Road/James Watt Way junction, Erith
- A206 Bexley Road/A2016 Queens Road/Bronze Age Way between Arran Close and Bexley Road/Fraser Road roundabout, Erith

3.24 **Poor performance of certain bus routes** – there is a range of indicators used by TfL to monitor the performance of the bus network, some of which can be mapped and analysed. Figure 3.9 shows bus speeds across the borough, with the lowest speeds (lighter colours) through Welling Corner, Sidcup Town Centre, Bexley Village and Crayford Town Centre. A good indicator of disruption to bus services is mileage operated, which happens when the bus is unable to make it back to the start point in time to commence the next journey. The target set by TfL is 98% of mileage operated and 19 out of 29 daytime routes failed to meet the target between 2016 and 2020. The main reasons for this are congested junctions on-route and a longer distance route which gives more opportunity for delays. These delays can be magnified where a late-running bus has to pick up the additional passengers who would have caught the following bus, causing the late-running bus to be increasingly delayed, leading to bunching.
(Source: TfL CityPlanner)

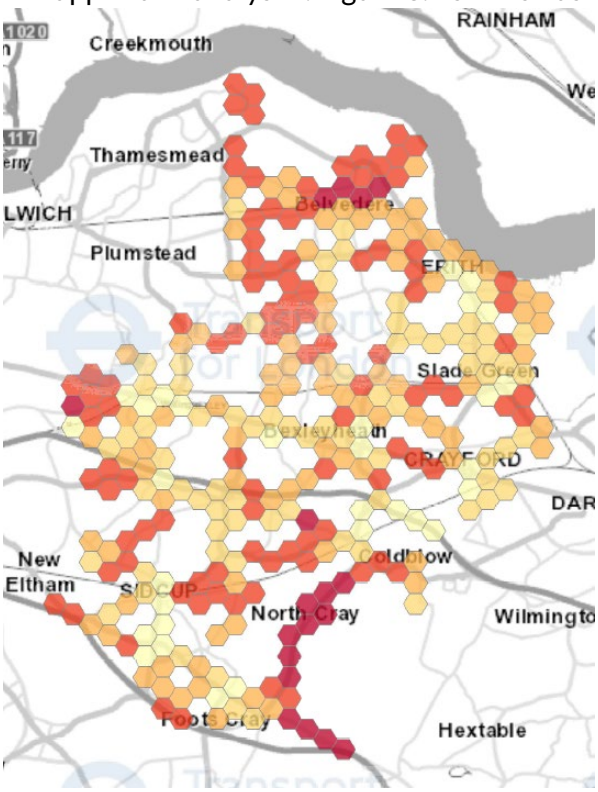


Figure 3.9 Bus Speeds

Rail Services

3.25 The rail network in the borough consists of three east-west radial lines from central London towards Dartford, Gravesend and the Medway Towns that were opened in the mid-19th century:

8.1. **North Kent Line** (Abbey Wood to Slade Green) – Southeastern services to London Bridge, London Cannon Street, Dartford; Thameslink services to London Bridge, Farringdon, Luton and Medway towns

8.2. **Bexleyheath Line** (Falconwood to Barnehurst) - Southeastern services to London Bridge, Charing Cross, Cannon Street, Victoria and Gravesend

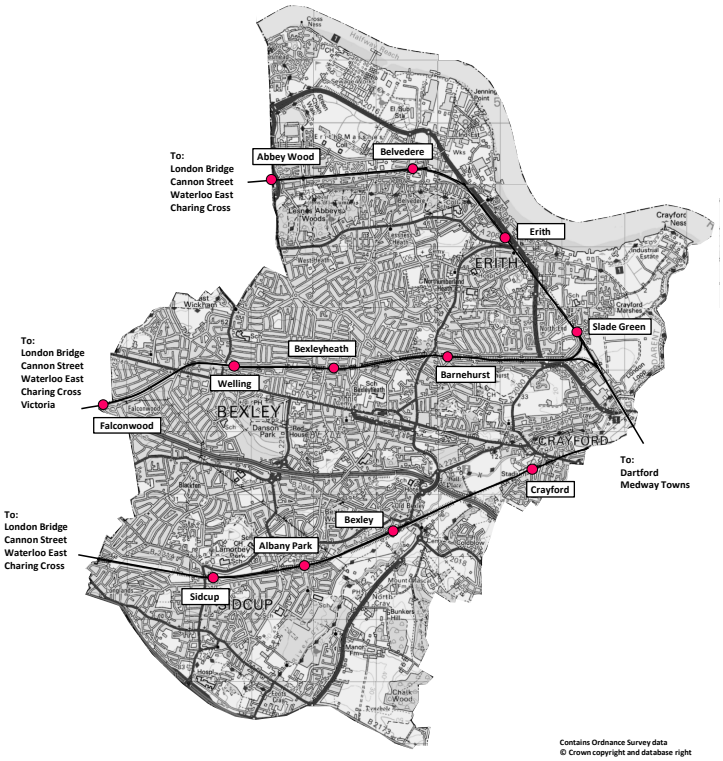


Figure 3.10 Bexley's Rail Network

8.3. **Sidcup Line** (Sidcup to Crayford) – Southeastern services to London Bridge, Charing Cross, Cannon Street and the Medway towns

3.26 Southeastern is the main Train Operation Company (TOC) for rail services in the borough, providing its 'Metro' services. The Thameslink services (which were introduced in May 2018) run between Rainham and the Medway Towns to Luton and only call at Slade Green and Abbey Wood. North-south movement in the borough is made difficult by the east-west nature of the three rail lines. Some north-south connections are provided by 'loop' services from central London that run via one line and back via another, making some orbital journeys possible.

3.27 New Elizabeth line services from Abbey Wood are due to commence in 2022 (over three years after the planned opening of December 2018); this will bring TfL Rail services into the borough for the first time.

3.28 As shown in Table 3.3, Abbey Wood, Sidcup, Bexleyheath and Welling stations have the highest footfall in the borough.

Table 3.3: Entries and Exits at Stations in the Borough (Source: Office of Road and Rail)

Station Name	Entries and Exits 2018-19
Abbey Wood	3,769,402
Sidcup	3,172,138
Bexleyheath	2,842,130
Welling	2,487,768
Barnehurst	1,646,204
Crayford	1,594,426
Bexley	1,302,454
Belvedere	1,219,758
Falconwood	1,045,686
Erith	1,036,532
Albany Park	1,006,946
Slade Green	958,102

3.29 The data in Table 3.4 shows that rail use has grown particularly at North Kent Line stations. Recently, Abbey Wood has seen the biggest increase, which is likely due to the adoption of an all-day barrier policy since its opening in October 2017 which will have reduced the number of fare evasions.

Table 3.4: % Change in Entries and Exits at Stations in Bexley between 2008-09 and 2018-19 (Source: Office of Road and Rail)

Station Name	% change in Entries and Exits 2008-09 to 2018-19
Slade Green	109%
Belvedere	78%
Erith	47%
Abbey Wood	24%
Crayford	20%
Welling	12%
Bexley	11%
Falconwood	10%
Barnehurst	5%
Albany Park	4%
Sidcup	4%
Bexleyheath	-7%

Rail Connectivity from the Borough

3.30 Bexley's railway stations are in Travelcard Zones 4 to 6. Distances to London Charing Cross vary from 18.6 km (Abbey Wood) to 24.6 km (Crayford). The borough's stations receive less frequent and slower train services than similar Outer London local centres as set out in Table 3.5:

Table 3.5: Train Frequency and Journey Time to London Terminals (Source: National Rail)

Travelcard Zone	Local Centre	Morning Peak Frequency (tph)	Journey Time to London Terminals
4	Abbey Wood	8 tph National Rail + 12 tph Elizabeth Line (2022)	37 mins to Cannon Street 20 mins to Farringdon
4	Richmond	8 tph National Rail + 6 tph Underground	20 mins to Waterloo 25 mins to Earl's Court
4	Barking	11 tph National Rail + 18 tph Underground	18 mins to Fenchurch Street 17 mins to Liverpool Street
5	Bexleyheath	9 tph National Rail	41 mins to Cannon Street
5	Harrow	2 tph National Rail + 20 tph Underground	16 mins to Marylebone 18 mins to Baker Street
5	Sutton	12 tph National Rail	30 mins to Victoria
6	Crayford	7 tph National Rail	46 mins to Charing Cross
6	Upminster	10 tph National Rail +	26 mins to Fenchurch Street

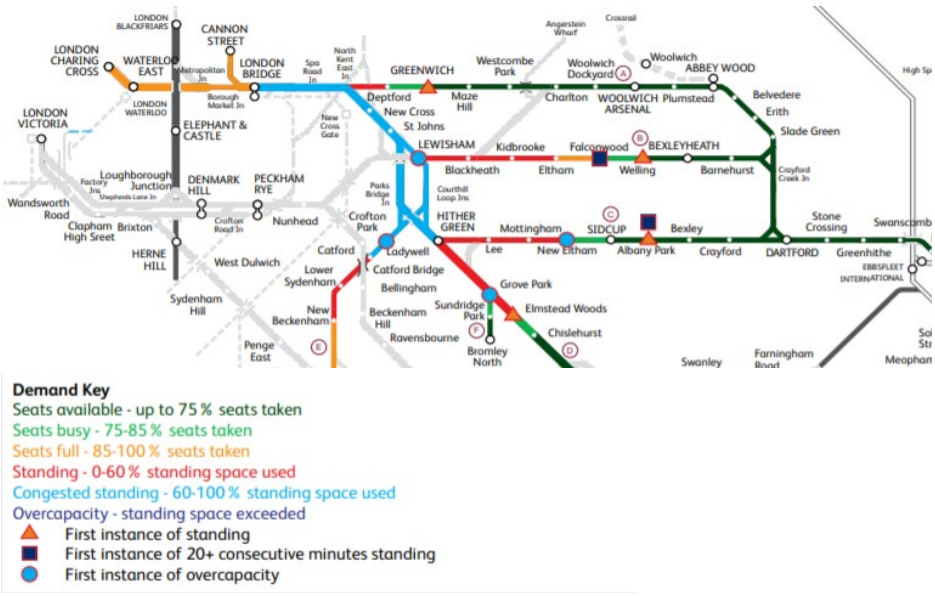
Travelcard Zone	Local Centre	Morning Peak Frequency (tph)	Journey Time to London Terminals
		13 tph Underground	44 mins to Liverpool Street
6	Purley	10 tph National Rail	23 mins to Victoria

3.31 Line capacity at Lewisham Station is severely restricted by the "diamond junction" where trains to/from Cannon Street, Charing Cross and Victoria on the Bexleyheath and Sidcup/Hayes Line merge and need to slow to 20 mph. This bottleneck in the network severely limits the number of trains/frequency to/from Bexley stations and is the major causes of minor delays (2-5 minutes) on Bexleyheath and Sidcup Line trains during peak hours.

Train Capacity

3.32 The trains serving the borough are Class 465s/376s in 8-car, 10-car and occasionally 12-car formations during peak hours. The Class 465 fleet is among the oldest trains in service in Greater London and is showing signs of deterioration but does offer a high-level of seating. Forecasting by Network Rail (pre-Covid19) suggests that by 2024, most London-bound metro services from the borough will reach standing-only by Lewisham (Bexleyheath Line) and by New Eltham (Sidcup Line). Commuters standing from Welling and Albany Park stations would exceed the standing time limit of 20 minutes set by the Department for Transport. Figure 3.11 illustrates the seating and standing capacity on trains to London Bridge during morning peak hours at year 2024. Capacity issue on the North Kent Line will be eased by Elizabeth Line services.

Figure 3.11: Train Capacity on London Bridge Metro Routes in 2024



3.33 Network Rail predict that Bexleyheath and Sidcup Lines will require additional 6-car and 8-car trains by 2024 and additional 10-car and 12-car trains by 2044 to meet future travel demand. All stations in Bexley can accommodate 12-car trains, yet, most metro services are not running with them due to the lack of train carriages. New trainsets would be required to allow existing train

carriages to be joined to 10-car or 12-car length for capacity improvement. Southeastern is in the progress of acquiring 30 Class 707 trains to add to existing formations of metro services.

3.34 One solution to increase capacity is the replacement of current rolling stock with new metro trainsets like Class 700/707/720 that reduce seating in favour of more standing room and have no toilets. This would lead to Bexley passengers being more likely to stand on London-bound journeys with no access to a toilet.

Walking and Cycling

3.35 The main provision for walking are the borough's pavements, paths, alleyways and byways, complemented by controlled/uncontrolled crossing points, footbridges and subways. In addition, there are pedestrian-only areas in Bexleyheath and Erith town centres and shared spaces where vehicle speeds are low and pedestrians and other vulnerable users have a greater prominence. Away from the road network, there are 61.1km of footpaths, some of which form part of much longer walking routes like the Green Chain Link walk, the Capital Ring and London Loop. The borough also has many parks and open spaces where users are free to wander and explore.

3.36 Much of Bexley's cycling takes place on local roads and streets, with signing and promotion where there are quieter routes that are more suitable for the less confident cyclist. Dedicated cycling facilities include cycle lanes, tracks and safe crossings as well as areas where traffic calming makes road conditions more cycle friendly. The Thames Path forms a continuous traffic free cycling route (National Cycle Route 1) and there is some cycle access through the borough's parks and open spaces. Cycle parking is provided at most major destinations and a cycle map of the borough is available free of charge. (You can request a copy of the Bexley Cycling Map by emailing: roadsafetyeducation@bexley.gov.uk)

Walking and Cycling Issues

3.37 **Severance by main roads and railway lines** – the A2 and A20 and the three railway lines in the borough all act as barriers to pedestrians and cyclists, particularly for north-south movement. There are footbridges and subways on the A2 and A20 and some are shared with cyclists but they mean that journeys on foot and by bike have to divert and become longer. Other examples of severance are Bronze Age Way and Northend Road which cut through neighbourhoods. An example of severance on the railways is to the west of Belvedere station, where the next crossing point is 1.6km away towards Abbey Wood.

3.38 **Poor walking and cycling environment on the edge of urban centres** - many residential streets in the borough are already fairly 'healthy' for walkers and cyclists since they have relatively low levels of traffic and wide footways. This changes as you leave these quieter back streets and approach the urban centres where there is heavy traffic with narrow footways, parked cars and other kerbside activity.

Mobility and Accessibility

3.39 According to the 2011 Census, 24% of households did not have access to a car (ONS, 2013). Those residents have had to rely on buses, trains or the other transport services such as Dial a Ride and Taxicard if they have a registered disability and require that extra help. The programme of bus stop accessibility has made 570 out of 577 (or 99%) of the borough's bus stops meet TfL's accessibility standards.

3.40 **Step-free accessibility at stations** – Table 3.6 sets out the accessibility arrangements at the twelve stations in the borough.

Table 3.6: Access Arrangements at Bexley's Railway Stations

Station	Access to Platforms	Access between Platforms
Abbey Wood	Lifts and stepped access to all platforms	Lifts and stepped access
Albany Park	Stepped access to both platforms	Footbridge only
Barnehurst	At-grade access to both platforms	Footbridge and step-free route beyond station confines (approx. 400m).
Belvedere	At-grade access to both platforms	Footbridge and step-free route beyond station confines (approx. 700m).
Bexley	At-grade access to Platform 2, stepped access through subway to Platform 1	Stepped access via subway
Bexleyheath	At-grade access to both platforms	Lifts and footbridge
Crayford	At-grade access to both platforms	Footbridge and step-free route beyond station confines (approx. 450m).
Erith	At-grade access to Platform 2, footbridge access only to Platform 1.	Footbridge only
Falconwood	Stepped access to both platforms	Footbridge only
Sidcup	At-grade access to both platforms	Footbridge and step-free route beyond station confines (approx. 200m).
Slade Green	At-grade access to both platforms	Footbridge and step-free route beyond station confines (approx. 1,500m).
Welling	At-grade access to both platforms	Footbridge and step-free route beyond station confines (approx. 300m).

3.41 In summary, only two out of the twelve railway stations in the borough have step-free access to all platforms and step-free interchange within the station confines. Six stations have step-free access to both platforms and a footbridge linking these platforms but step-free access requires a journey via local pavements to reach the opposite platform. Two stations are in cuttings where their

platforms can only be reached by steps. None of the borough's stations have been identified for funding from the DfT's current Access for All programme.

3.42 **Electric Vehicle Ownership and Use** - despite having high levels of car ownership, Bexley has the third lowest percentage of Ultra Low Emission Vehicles (ULEVs) in London (DfT, 2019). Despite this, the number of ULEVs licensed has increased at a higher rate than London in general when compared as a % over the base year; see Figure 3.12.

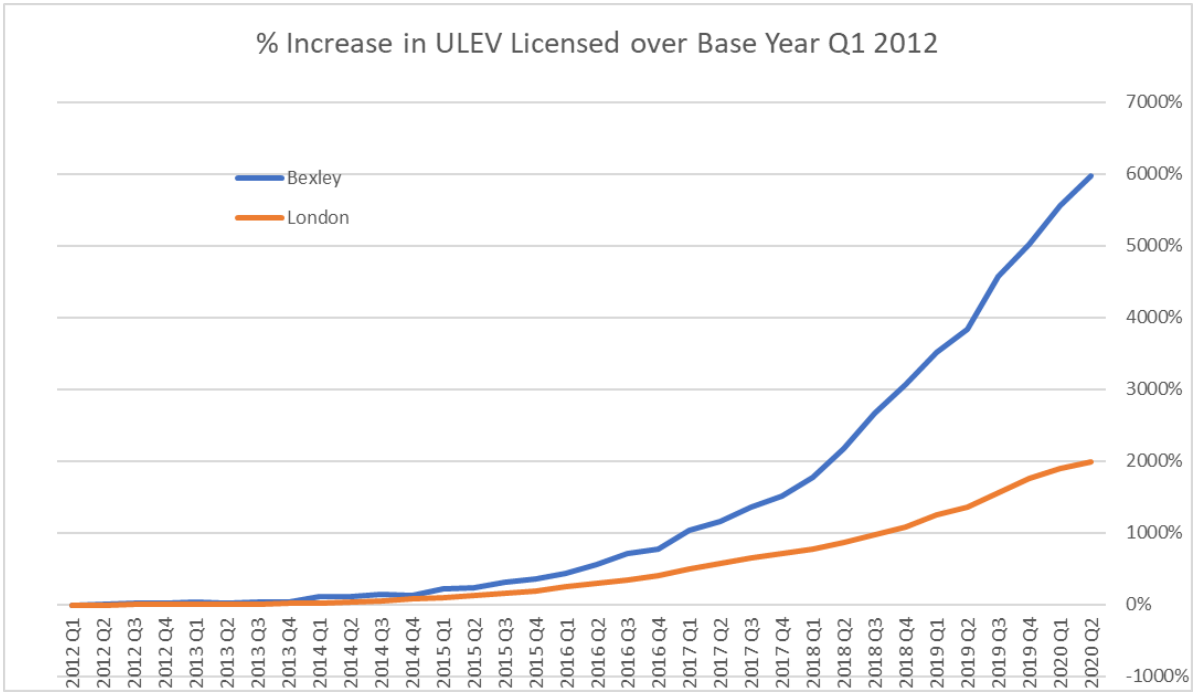


Figure 3.12 ULEV Licenced Over Base Year 2012

3.43 26 new charging points were installed by the Council in 2019, in response to the views of local people who are interested in making the switch to electric vehicles but are concerned with the lack of charging points. Increasing the availability of charging points is the first step in a range of initiatives to enable local people to make the switch. Through the development planning process there are 409 individual charging points which have either been or are in the process of being installed, the majority of which are as part of new residential developments. In addition, there are a further 608 passive charging points where the ducting has already been installed and can easily be converted to charging points in the future.

Travel Behaviour

3.44 With a relatively low level of public transport connectivity across most of the borough, Bexley has had the fifth highest percentage of car ownership in London, with an average of 1.17 cars or vans per household in 2011. Car use and ownership – the borough has the sixth highest level of car ownership of all London boroughs with an average of 1.13 cars or vans per household (ONS, 2013).

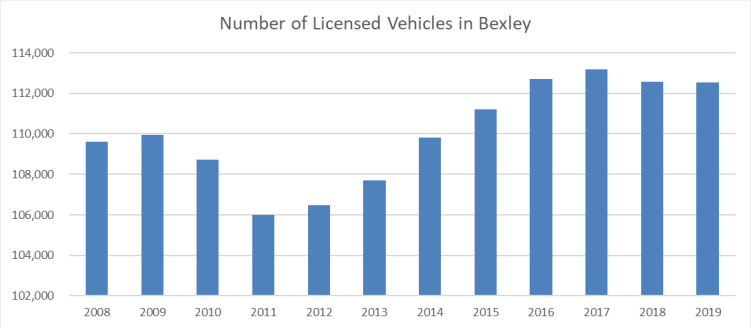


Figure 3.13 Licensed Vehicles in Bexley

3.45 31% of the borough's households had 2 or more cars. Overall 76% of Bexley households had a car available and while this remained constant between 2001 and 2011(ONS, 2013). The absolute number of licensed vehicles in Bexley has steadily increased since 2011, reaching a peak in 2017 where ownership fell slightly in 2018 and remained the same in 2019 (DfT, 2020). Within the borough, car ownership varies, with areas in the north of the borough having a higher proportion of non-car owning households and multiple car ownership per household more common in the south (ONS, 2013).

Table 3.7: Census 2011 - Number of Cars or Vans per Household

Area	Number of cars or vans per household
Sevenoaks	1.53
South East	1.35
Dartford	1.28
Kent	1.25
Havering	1.21
Bromley	1.18
Bexley	1.17
London	0.82

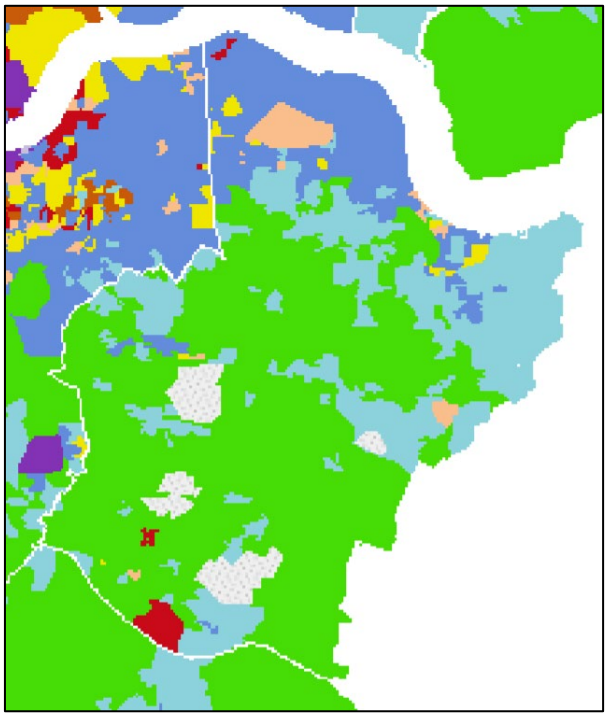
3.46 The car is the main mode of transport to work with 40% using a car, compared to 30% London-wide (ONS, 2013). This difference reflects the relatively high level of car ownership and generally low connectivity by public transport. Table 3.8 details the latest mode share by Bexley and London residents.

Table 3.8: Mode share in Bexley and London (Source: TfL, London Travel Demand Survey 2015/16 – 2017/18)

Mode	Bexley %	Outer London %	London %
Car/motorcycle	57	47	34
Walking	24	28	33
Cycling	1	2	3
Rail	5	4	5
Tube/DLR	0	5	9
Bus/tram	12	13	14
Taxi/other	1	1	2

3.47 In addition to the relatively dominant role of the car for travel by Bexley residents, the table particularly highlights the low proportion of travel by public transport (17%) compared to the whole of London (28%), as well as the lower level of cycling and walking (25%) compared to outer London (30%) and London-wide (36%).

Figure 3.14 Transport Classification for Londoners



3.48 TfL has developed a tool called the Transport Classification of Londoners (TCoL) which categorises Londoners based on the travel choices they make (TfL, 2017). The basis for TCoL is the London Output Area Classification that uses data from the 2011 Census, supplemented by data from the London Travel Demand Survey and segmentation survey data from 2015 on travel behaviours, preferences and attitudes. The variables that were used to help determine segmentation are the propensity to change travel mode, mode usage and dominant mode, life-stage, income, ethnicity, changes in behaviour motivated by health and fitness and the use of mobile phones for email. There are nine TCoL segments.

3.49 Figure 3.14 shows that the resultant mapping of the dominant transport classification in different parts of the borough. The main category in the south and centre of the borough is 'Detached Retirement' (green), with more 'Settled Suburbia' (light blue) towards Erith and 'Suburban Moderation' (dark blue) in Abbey Wood and Thamesmead. These dominant categorisations cover some 96% of the borough, as follows:

	Detached Retirement	'Empty nest'/retired with high car ownership, very low levels of change where travel is dominated by the car with some use of rail, but very little bus or active modes. Applies to 59% of Bexley residents
	Settled Suburbia	Lower income families with at least one child at home, lower levels of change with high car use and low use of active modes. Use of bus, rail and Underground well below average. 25% of Bexley residents
	Suburban Moderation	Families with at least one child at home, high car use and below average use of public transport and active modes. Average level of change. 12% of Bexley residents

3.50 Bexley has the fourth lowest % of trips by walking of all London boroughs (TfL, 2020); 22.5% compared to the outer London average of 26.7% and Greater London average of 31.4%. In terms of cycling, it's mode share of 1% puts the borough as the eighth lowest. The outer London average is 1.5% and this increases to 2.5% for the Greater London area.

Airports

3.51 The nearest airport to the borough is London City Airport (LCY), an international airport located in the Royal Docks in the London Borough of Newham. It is the fifth-busiest airport by passengers and aircraft movements serving the London area - after Heathrow, Gatwick, Stansted and Luton - and was the 14th-busiest in the UK in 2018 with over 4.8 million passenger movements (DfT, 2020). Prior to Covid-19, there was a 50/50 split between business travellers (with its close proximity to London's financial district) and leisure passengers (London City Airport, 2020). The airport is usually busier during the week than weekends (when there is a 24-hour flight-free "quiet period"). Flights tend to be clustered around the am and pm peak hours.

3.52 London City Airport is most easily accessed from the borough via DLR from Woolwich Arsenal. Most Bexley residents have a direct train or bus connection to Woolwich Arsenal, making the journey time to the airport less than one hour. 60% of all trips to the airport are by the DLR and 14% of trips are by minicabs (London City Airport, 2019). The airport is bound by a Section 106 planning agreement to employ local people, suppliers and businesses. 42% of employees live in Newham and 26% of employees come from the other east London boroughs.

Parking

3.53 On-street parking in the borough is arranged to meet traffic management and road safety objectives, with parking enforcement undertaken by a joint service arrangement between the Council and the London Borough of Bromley. Payments for parking in popular on-street bays or in the Council's own car parks are managed through either pay and display or through RingGo, the council's cashless parking provider.

3.54 Parking is further controlled and restricted in certain areas and at certain times – such as around busy town centres and some (though not all) railway stations – where local residents and

businesses need to pay for an exemption permit and short-stay visitors need to use a scratch card. There are 16 Controlled Parking Zones (CPZs) in the borough of which 7 are around railway stations (Abbey Wood, Sidcup, Welling, Crayford, Falconwood, Bexleyheath and New Eltham). With the commencement of Elizabeth line services, it is likely the Council will need to expand its radius CPZs at the North Kent line stations to deter increased rail-heading. 'Before' parking surveys around these stations and at Crayford station were undertaken in 2018 in preparation for this.

3.55 There are 19 council-operated car parks within the Borough, including one in Bexleyheath town centre for disabled (blue) badge holders only. All car parks hold the Safer Parking Award. Pay and display tickets can be purchased at most of the car parks from 30 mins up to 24 hours, though some are restricted to short/medium stay. The Council also sells season tickets for its longer stay car parks. Public car parks not owned by the Council are available at Bexleyheath Shopping Centre and at larger retail units (such as supermarkets) across the borough. Overnight lorry parking is banned on the borough's roads (lorries over 5 tonnes and buses - 6.30pm to 8am). Two of the Council's car parks (Oaklands Road, Bexleyheath and Nags Head Lane, Welling) provide paid overnight parking for HGVs/PSVs.

Road Safety

3.56 Prior to late November 2016, figures for Killed or Seriously Injured casualties (KSIs) were collated using the STATS 19 system. Table 3.9 shows the number of killed and seriously injured collisions and casualties on borough and TfL roads between 2014 and 2016 in comparison with the average 2005/9 baseline using the STATS 19 reporting method. On average the number of the 'killed or seriously injured' (KSI) collisions has more than halved.

3.57 In November 2016, the Metropolitan Police Service (MPS) introduced the Case Overview and Preparation Application (COPA) to report road traffic collisions. This system sees Police officers record the type of injury suffered rather than their assumptions about the severity of the injury and this change has seen more injuries being classified as serious rather than slight. This means that data for serious injury casualties from this point forward is not truly comparable to previous years though TfL has carried out a 'back-casting' exercise to enable more meaningful comparisons to be made and this data is shown in column 3 in Table 3.9 (latest data is 2018: the most current road safety data for London can be found at https://tfl.gov.uk/corporate/publications-and-reports/road-safety).

Table 3.9 Killed or Seriously Injured (KSI) Casualties 2014-2018 (based on STATS 19 and COPA)

Year	KSI casualties (STATS 19) on Bexley Roads and TLRN	Number of KSI casualties (COPA 'back-casted' formula) on Bexley Roads	Number of KSI casualties on Bexley Roads
2014	24	59	21
2015	30	61	26
2016	51	74	47
2017	New recording system introduced	57	56
2018	N/A	81	75
Average 2016/18	N/A	N/A	59
Average 2005/09	N/A	N/A	81
% change	N/A	N/A	-27

Table 3.10 Killed and Seriously Injured (KSI) on Bexley Roads by Mode 2014-2018

Mode and Type of Casualty	2014	2015	2016	2017	2018	Total	%
Pedestrian KSI	6	10	14	26	22	78	33
Cyclist KSI	2	2	3	6	5	18	8
Powered 2- wheeler (P2W) KSI	9	13	16	12	23	73	31
Car KSI	5	5	13	11	19	53	23
Other KSI	2	0	5	1	4	12	5
Total KSI	24	30	51	56	73	234	

Table 3.11: All Casualties on Bexley Roads by Mode 2014-2018

Mode and Type of Casualty	2014	2015	2016	2017	2018	Total	%
Pedestrian All Casualties	80	76	107	122	101	486	17
Cyclist All Casualties	32	35	39	19	36	161	6
P2W All Casualties	80	82	78	70	59	369	13
Car All Casualties	319	324	311	283	310	1547	56
Other All Casualties	45	37	36	45	54	217	8
Total All Casualties	556	554	571	539	560	2780	

Source: STATS19/COPA data

3.58 Between 2014 and 2018, 33% of KSI casualties in the borough were pedestrians and 31% of KSI casualties were related to powered two-wheelers (P2W). Cyclists form 6-8% of KSI and total casualties, though they make up less than 1% of all journeys by mode.

3.59 For all road casualties, Tables 3.12 and 3.13 identify the sections of roads and junctions with the highest road user casualties.

Table 3.12 Roads with Highest Road User Casualties (based on COPA Data 2017-18)

Road	From	To	Highway Authority	Number of Casualties 2017 - 18
A2 East Rochester Way	Bourne Road	Lodge Lane	TfL	22
A207 Welling High Street/Park View Road	Upper Wickham Lane	Danson Road	LBB	13
Avenue Road/Pickford Lane	Crook Log	Long Lane	LBB	10
B213 Abbey Road	Wilton Road	Picardy Road	LBB	10
A220 Bexley Road	Belmont Road	Fraser Road	LBB	9
A207 Broadway	Avenue Road	Albion Road	LBB	9
Colyers Lane	Erith Road	Northend Road	LBB	9
A221 Danson Road	Park View Road	Lodge Lane	LBB	9
A222 Station Road, Sidcup	Sidcup High Street	Longlands Road	LBB	8

Table 3.13 Junctions with Highest Road User Casualties (based on COPA Data 2017-18)

Junction	Highway Authority	No. of Casualties 2017-18
Walnut Tree Road/Bexley Rd (Fish Roundabout)	LBB	11
Sidcup Bypass/Chislehurst Road/Perry Street (Frognal Corner)	TfL	10
Sidcup Bypass/Cray Road (Crittalls Corner)	TfL	10
Gravel Hill/Bourne Road	LBB	7
Bellegrove Road/Wickham Street	LBB	6
Bexley High Street/Bourne Road	LBB	5
Erith Road/Mayplace Road West	LBB	5
Brampton Road/King Harolds Way	LBB	5
Upper Wickham Lane/Okehampton Crescent	LBB	5

Junction	Highway Authority	No. of Casualties 2017-18
Harrow Manorway/Yarnton Way	LBB	5

Air Quality

3.60 The Council has a statutory responsibility under the Environment Act 1995 to review and assess local air quality against objectives contained in the National Air Quality Strategy (NAQS). The whole borough was declared an Air Quality Management Area (AQMA) in 2007 for exceedances of the annual nitrogen dioxide NO_2 NAQS objectives and the annual and daily particulate matter (PM_{10}) NAQS objectives. In 2017, monitoring at four locations showed that both the annual and daily concentrations of PM_{10} met the respective NAQS objectives. The annual mean NAQS objective for NO_2 was also met at these locations. The objectives for sulphur dioxide (SO_2) and particulates (as $PM_{2.5}$) continued to be met.

3.61 Despite this, legal standards for pollutants continue to be exceeded in certain parts of the borough. The poorest air quality is alongside the borough's main road network as shown in Figs. 3.15 to 3.18 clearly illustrating the link between road traffic and NO_2, PM_{10} and $PM_{2.5}$ pollution levels.

Fig. 3.15: Annual Mean Nitrogen Dioxide concentrations (London Atmospheric Inventory 2016)

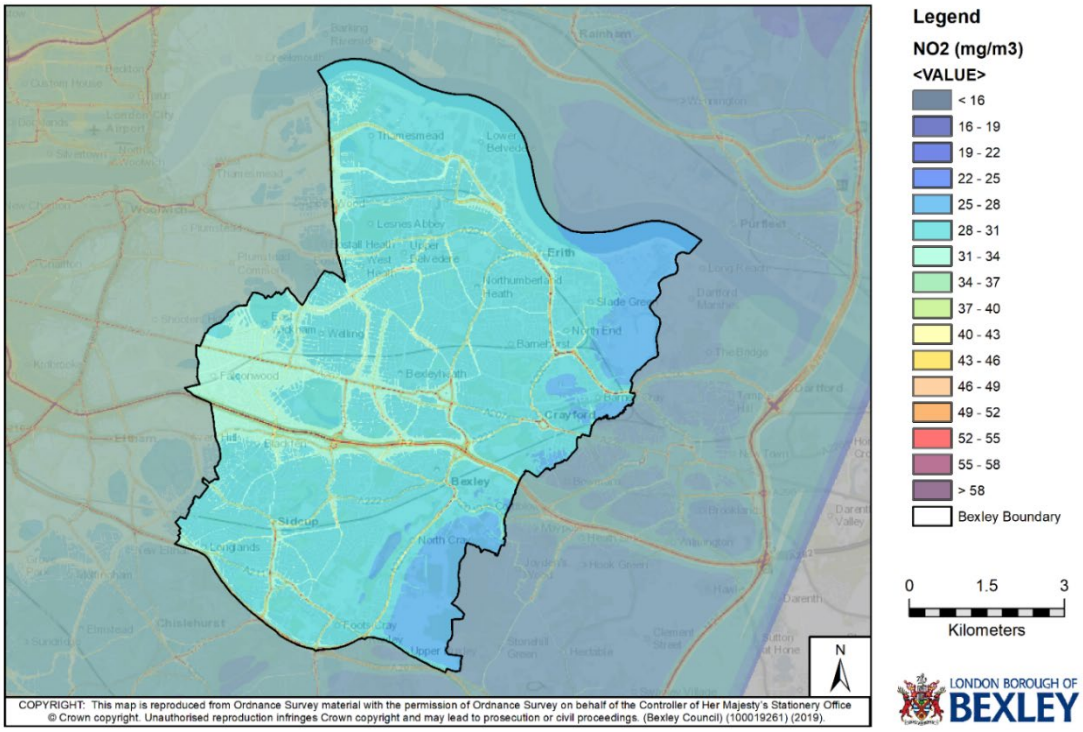


Fig. 3.16: Annual Mean Nitrogen Oxide concentrations (London Atmospheric Inventory 2016)

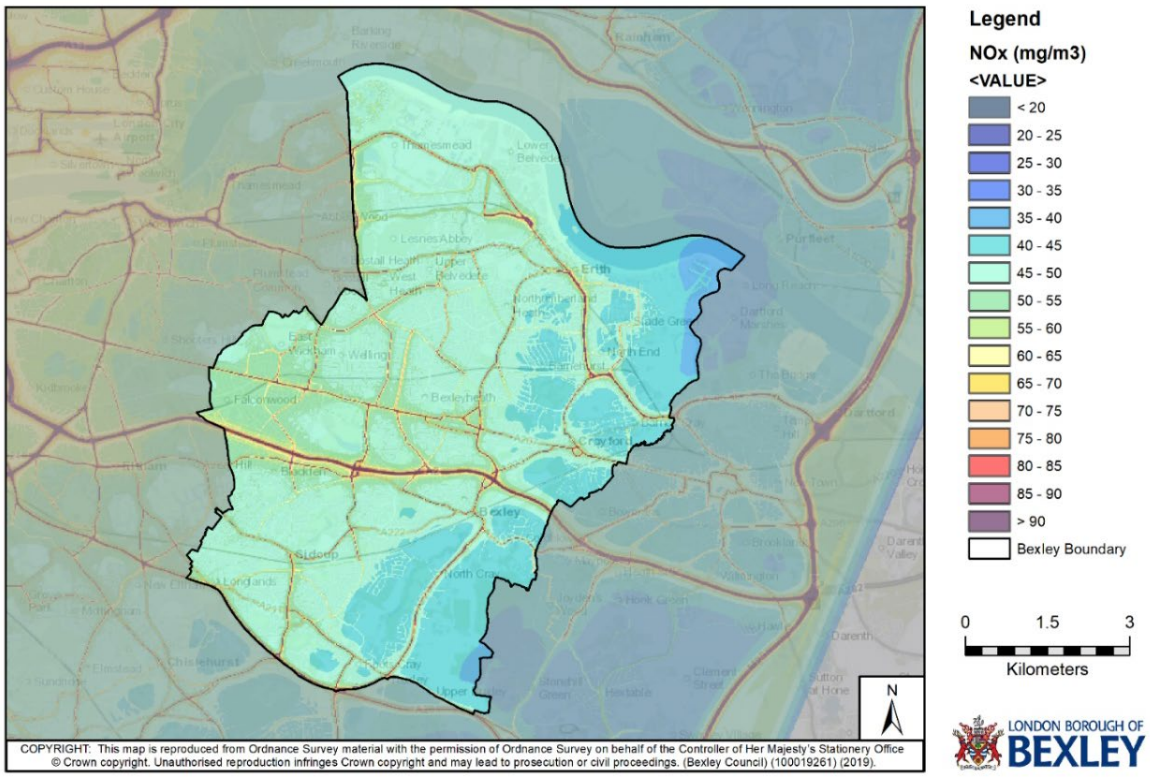


Fig. 3.17: Annual Mean PM10 concentrations (London Atmospheric Inventory 2016)

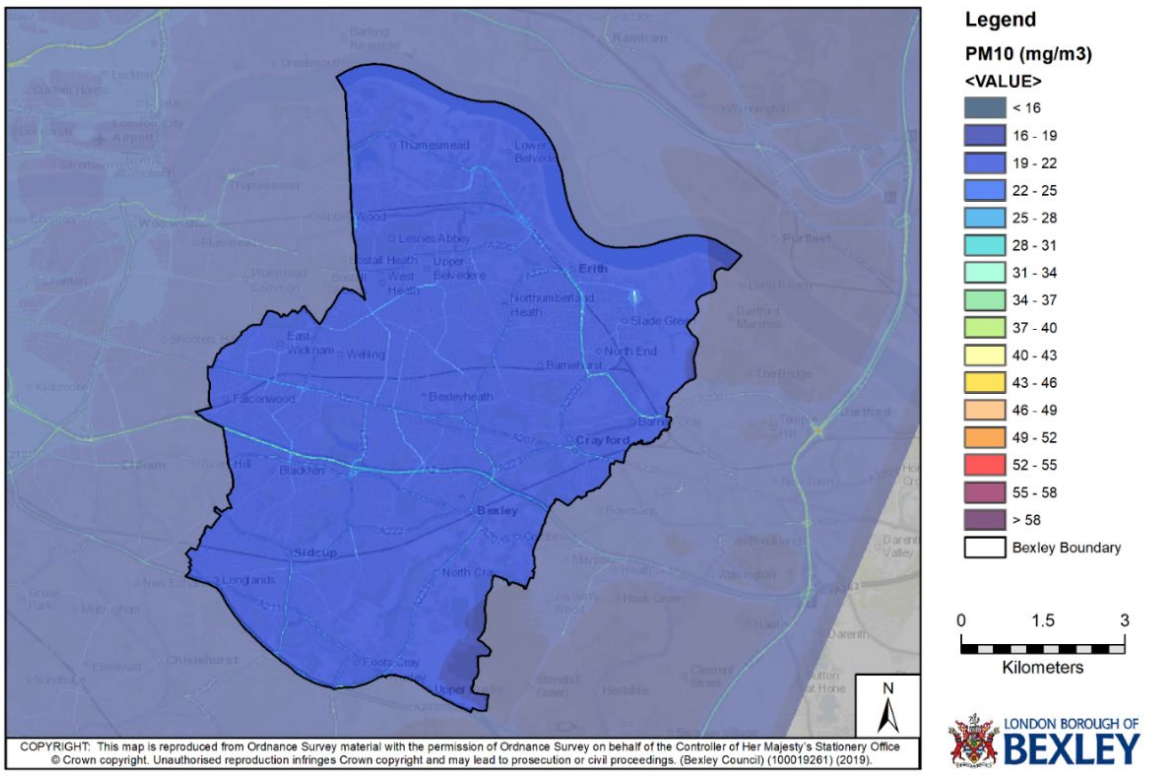
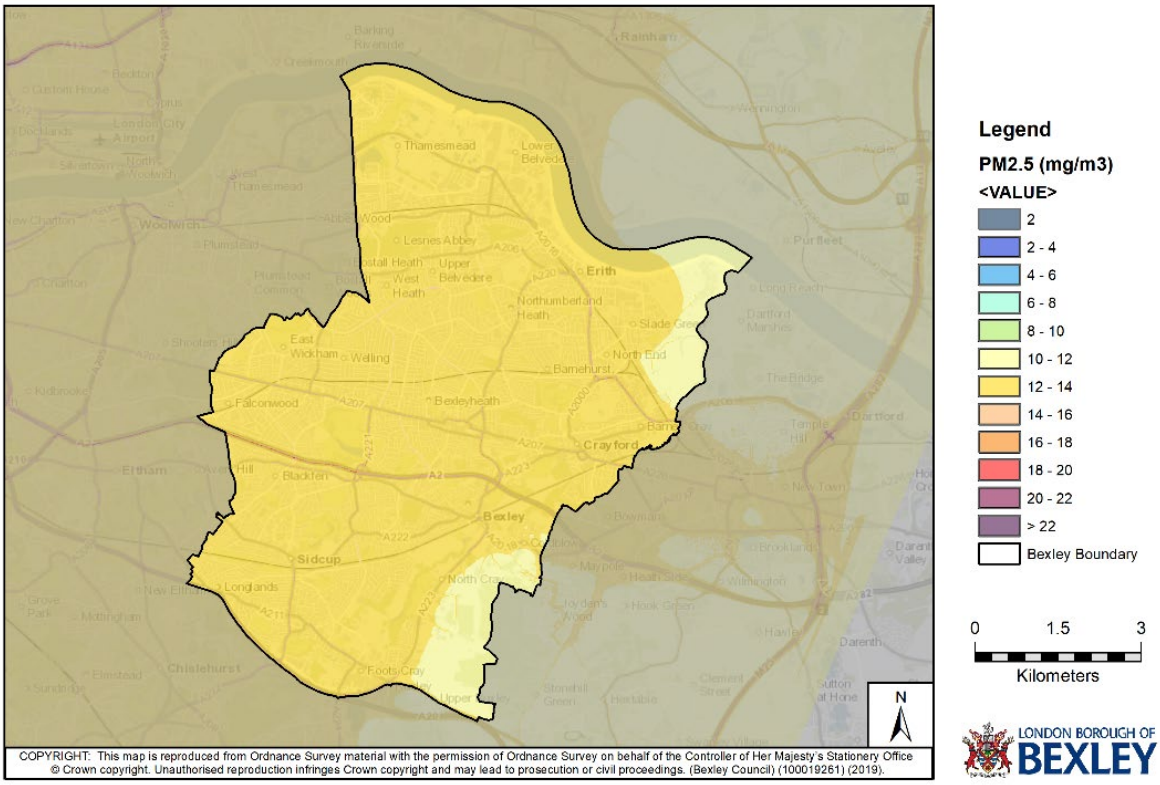


Fig. 3.18: Annual Mean PM2.5 concentrations (London Atmospheric Inventory 2016)



Chapter 3 Conclusions

3.62 Unlike almost all London boroughs, Bexley lacks any Underground, Overground, DLR or tram routes; instead it has to rely on either national rail (where the lines all run east-west) or local bus services (for which there has always been little or no space for any bus priority, making services slow and unreliable). Being on the Greater London/Kent border as a true outer London borough, the trip-making pattern of residents is more diverse than for, say, inner London boroughs where travel patterns have historically been shaped around the available public transport links. This all results in high car ownership (and use) and a systemic transport infrastructure deficit, which need to be resolved before significant mode shift can be achieved. Despite that, the Bexley LIP is signed up to the Mayor's mode share targets.

3.63 The bus hub in Bexleyheath town centre achieves a PTAL of 6a **through buses alone**, something not achieved in the same way by any other London town centre. Both bus stop and bus stand capacity are at a premium. Services will need to increase in the future to provide links between existing neighbourhoods and the new development.

3.64 The lack of good quality north-south routes (with the main routes being east-west) affects all modes, since there are distinct pinch-points and bottlenecks in the borough's road network and little or no land available to increase capacity.

Chapter 4 – Potential Transport Changes (during the Plan Period, to 2036)

Introduction

4.1 The LPTA planning guidance states that the assessment should be "taking into account all the changes and improvements in, for example, technology and behaviour that is likely to happen in that [Local Plan period] time". In response, this Chapter sets out the changes that we can foresee at this moment in time subject to the uncertainly surrounding Covid impacts discussed in Chapter 1.

4.2 The first section provides general commentary on forecast changes in demand and behaviour at both the national and London-wide levels. This is followed by the Mayor's transport aims and how they will drive changes in transport delivery and travel behaviour. Then, the specific objectives, targets and planned projects and improvements at the local level are presented under the following topic areas:

- Healthy streets and active travel
- Public transport
- Strategic connections – under construction
- Roads and traffic
- Safety
- Air quality and the environment
- Freight and deliveries

Changes in Demand

4.3 Overall growth in road travel demand across England and Wales is forecast to continue over the coming decades. However, this is largely driven by population growth; people are travelling less per person now than one or two decades ago. This is partly due to a decline in commuting due to flexible working, working from home and part-time and self-employment. Shopping trips have decreased 30% since 2007 as online shopping has become more popular. Increasing online shopping is predicted with multiple delivery options to homes, stores or collection points (Government Office for Science, 2019). Although, as stated in Chapter 1, the long-term impacts of Covid 19 is as yet not fully understood, it is likely that the pandemic will embed and accelerate these trends.

4.4 The biggest expected change towards 2035 is a move away from vehicle ownership to its use as a service. The number of teenagers holding a driving licence has plummeted by almost 40% in two decades (UWE Bristol/University of Oxford, 2018). The trend for young people to drive less began approx. 25 years ago, in contrast to baby boomers who spearheaded the growth in licence holding. Driving licensing among young people peaked in 1992/4, with 48% of 17-20-year-olds and 75% of 21-29-year olds holding a driving licence. By 2014, driving licence holding had fallen to 29% of 17-20-year-olds and 63% of 21-29-year olds. Between 1995-99 and 2010-14 there was a 36% drop in the number of car driver trips per person made by people aged 17-29. Car ownership and use will continue to increase as people become older and typically start working, begin relationships and

have children but the rate of this increase is becoming less. Some estimates are that car ownership will hit its peak in the UK in 2034 before beginning a steady decline.

4.5 The reasons for this decrease include the decline in stable employment across multiple years which is strongly linked to holding a driving licence and running a car. The increase in university attendance among young people means that many settle in large cities where public transport is readily available. Coupled with this is that fewer young people can afford a house, making them less likely to live in residential areas where car use is the only option. The increased convenience and certainty of taxis (like Uber) and rise in online shopping and home delivery also makes car ownership and use less attractive. The effect of this will be less marked in Bexley, where the population is projected to have a larger proportion of older people, most of whom will have enjoyed car ownership and use all their adult lives and will be reluctant to relinquish its convenience and attractiveness.

4.6 In support of the Mayor's London Plan submission, the Mayor provided evidence of how London is expected to change by 2041 and this was set out in 'Challenges and Opportunities for London's Transport Network to 2041,'TfL (July 2017). The headline predictions relating to transport are as follows:

- 'Total travel will increase by 23 per cent, with 5 million more trips per day by 2041 than today.'
- 'Despite a falling car mode share, without further action traffic is expected to rise across much of London, with 8.6 million more kilometres travelled by road on average day in 2041 compared to 2015. Over the same period, the amount of space available for use by general road traffic is expected to reduce by 3 per cent, more in central London. By 2041 the average Londoner could waste two and a half days a year sitting in congested traffic.'
- 'The effect of this [more traffic] is that by 2041, it will take more than an hour (64 minutes) to travel 10km by road in central London, 15 minutes longer than today. In inner London, the same journey would take 35 minutes, 4 minutes longer than today, and in outer London 21 minutes, 3 minutes longer than today.'
- 'By 2041, the number of junctions operating at this level [over 90% of capacity] increases dramatically, from 750 in 2015 to 1,150 in 2041'
- 'Between 2015 and 2041, van traffic is expected to increase by a quarter as a result of trends in ecommerce, an increase in just-in-time deliveries, and lengthening supply chains.'
- 'Demand for public transport services is expected to rise by nearly 50 per cent by 2041.'
- 'A million additional daytime public transport trips are expected by 2041 to, from, or within central London.'
- 'Among public transport modes, rail and Underground will see the largest growth, with daytime passenger kilometres increasing by more than 50 per cent between 2015 and 2041. Bus passenger kilometres are forecast to increase by around 18 per cent.'
- 'By 2041, demand will have outstripped supply and in the absence of new rail capacity we can expect to see severe crowding across almost all of the Tube and rail network as it approaches central London and spreading much further in many cases. Crowding will increase by 50 per cent on London Underground and 90 per cent on national rail services by 2041'
- 'Even committed new lines such as Crossrail will be crowded by 2041, particularly in the east.'
- 'bus demand is still expected to grow by around 30 per cent over the same period, with the strongest growth expected in the east of London.'

- 'By 2041, planned station control measures may be required at 30 key stations, including London Underground stations serving each of the six major National Rail termini.'

4.7 However, these do now need to be set against the most recent TfL thinking on future passenger demand resulting from the impacts of the pandemic. In the most recent Financial Sustainability Plan (TfL, January 2021), TfL has considered a total of six future city planning scenarios ranging from a return to business as usual to a remote revolution where technology has driven a revolution in behaviour and London has successfully adapted. The favoured approach is signalled as 'Decarbonise by 2030' which incorporates a hybrid city planning scenario assuming variable changes to working patterns and behaviours which can be modelled to understand impacts across the organisation whilst also assuming investment to meet net zero carbon targets, replace outdated assets and improve safety. The variable demand changes in this approach assume lower passenger demand post pandemic but a stabilisation over time and a return to slow growth by 2026.

The Mayor's Transport Strategy and LIP3

4.8 The Mayor wants to see a London "where walking, cycling and green public transport become the most appealing and practical choices for many more journeys. These active, efficient and sustainable transport choices not only support the health and wellbeing of Londoners, but also the city as a whole by reducing congestion and enabling the most efficient use of valuable street space".

4.9 The Mayor's ambitions are set out in his Transport Strategy (MTS) that was published in March 2018 under three priority areas for action by TfL, the boroughs and other delivery partners:

- Healthy Streets and healthy people, including traffic reduction strategies
- A good public transport experience
- New homes and jobs

4.10 The overarching aim of the MTS is for 80% of all trips across London to be on foot, by cycle or using public transport by 2041, compared to 63% today. TfL acknowledges that some boroughs would not be able to achieve this mode share by sustainable transport by 2041 but are expecting all boroughs to work towards this aim. TfL has issued trajectories for a range of metrics to be used to assess progress against the overall aim and the nine MTS outcomes. For Bexley TfL's specific trajectories are 46% and 63% for 2021 and 2041 respectively, as shown in Table 4.1.

4.11 The Local Implementation Plan process sets out how the Council proposes to deliver the Mayor's Transport Strategy (MTS) in the borough, as well as contributing to other local and sub-regional goals. The current LIP (LIP3) covers the same period as the MTS (2019-2041) and takes account of the transport elements of the draft London Plan and other relevant Mayoral and local policies. LIP3 sets out long-term goals and transport objectives for Bexley as well as a three-year Delivery Plan with annual programmes of investment for 2019-22 and the targets and outcomes the Council is seeking to achieve. The Council has submitted a draft three-year Delivery Plan to TfL for 2022-25, the outcome of which is expected in March 2022.

Healthy Streets and Active Travel

4.12 The overarching aim of the MTS is for 80% of all trips across London to be on foot, by cycle or using public transport by 2041, compared to 63% today. For Bexley the specific trajectories are shown in Table 4.1. These trajectories were set in 2018 and will need to be reviewed and possibly amended following the pause in transport projects and possible behavioural change through the pandemic.

Table 4.1: MTS Outcomes for Bexley (Walking, Cycling and Public Transport)

Aim	Measure	Baseline	Bexley Trajectory 2021	Bexley Trajectory 2041
80% of trips to be made by active, efficient and sustainable modes	Walking, cycling & public transport mode share (%)	42% (2013/14–2015/16)	46%	63%
MTS Outcome 1a: London's streets will be healthy, and more Londoners will travel actively	Londoners to do at least 20 minutes of active travel each day by 2041	26% (2014/15–2016/17)	35%	70%
MTS Outcome 1b: London's streets will be healthy, and more Londoners will travel actively	70% of Londoners will live within 400m of the London-wide strategic cycle network by 2041	0% (2016)	7%	38%

4.13 The Council also has its LIP3 objectives relating to healthy streets and active travel. These are:

Objective 1	To encourage as much movement as possible to use sustainable modes of transport (public transport, walking and cycling)
Objective 2	To provide good networks for pedestrians and cyclists particularly in growth areas and linking them to the communities beyond
Objective 4	To create healthy streets and pleasant routes
Objective 12	Provision of excellent public transport links with railway stations, existing communities and other growth nodes

4.14 A range of Healthy Streets and active travel schemes and project themes are provided in the first part of London Plan Table 10.1. Bexley's LIP3 (LBB, 2019) sets out a range of different initiatives for potential delivery in the borough between 2017 and 2041 (subject to available funding and approved designs), working towards the Mayor's mode share objectives and wider environmental targets. Boroughs will be expected to deploy at least some of those scheme types in their LIP Programmes of Investment (PoIs) up to 2041 to achieve their own local contribution towards the overall goal. By meeting TfL's required trajectory of 63% of trips by sustainable transport in Bexley by 2041 the Council will be contributing significantly to achieving the pan-London aim of 80%, but this is dependent on an adequate level of investment being made available to deliver the appropriate initiatives. as well as any revision to the targets owing to the pause in transport projects and behavioural change owing to the Covid-pandemic.

Healthy Streets

4.15 The layout and design of our streets will be increasingly informed by the spread of healthy streets within the capital and the benefits brought to all users. The street scene will see more space allocated to street activities other than the movement of vehicles and kerbside activity. There will be much more infrastructure provided such as seating, cycle parking and planting to make public areas attractive and usable for community activities.

Erith Links Town Centre Renewal

4.16 The Council is working on a transformation of Erith town centre under the Erith Links project, which has already commenced. This will seek to address transport and environmental issues to assist the regeneration of the town centre. The Council's plans for Erith include removing the one-way traffic system to enhance permeability, accessibility and bus speeds and reliability; better pedestrian crossings within the town centre and on its approaches; improved cycle paths and facilities, measures to reduce congestion at the access points into the town centre and better pedestrian waymarking between the railway station and the town centre.

4.17 As part of the Erith Links programme access by foot, cycle and bus to the railway station in Erith town centre is being enhanced. Initial development work for TfL and GLA growth-related funding has included a placemaking and movement strategy developed by consultants. Proposed measures within the strategy include new cycle routes, signage and wayfinding, seating and tree planting, improved access by bus including a bus only street and changes to bus routes and amendments to the road network to reduce car dominance and enhance the approaches to the town centre to make it a more appealing destination.

Crayford Town Centre

4.18 Smaller scale town centre renewal schemes such as the review of Active Travel connections in Crayford, will include better pedestrian, cycle and bus access. This will include public realm and sustainable transport enhancements within a Healthy Streets approach.

Bexleyheath Town Centre

4.19 A masterplan for Bexleyheath is in development which will seek to realise the potential for the town centre. Its aim is to ensure that Bexleyheath

- is a walkable town which is easy to get to and move around in and creates a safe and inviting place where people want to linger and socialise
- has improved public transport access;
- provides a resilient highway network supported by an appropriate amount of convenient and good quality parking
- has streets and spaces that are safe, pleasant and convenient for pedestrians and cyclists.
- achieves an exemplar public realm which links the different parts of the town together coherently and connects the centre to important facilities in the wider area, increases the amount of green cover

Secondary Town Centres

4.20 The Healthy Streets approach is also being applied to local centres by improving the environment through more space for walking and cycling, and minimising road dangers.

Yarnton Way: Active Travel Connections

4.21 A similar approach (to Harrow Manorway) is planned for Yarnton Way to create a healthier street, with a re-allocation of road space away from general traffic for public transport improvements, together with widened footways and segregated cycle lanes as well as improved crossing facilities for pedestrians and cyclists. The project is linked to the Council's aspiration for a bus transit route.

4.22 A healthy streets approach for Yarnton Way is planned. An initial network of Healthy Streets has been identified based on the Mini Holland bid with a focus on cycle routes serving Abbey Wood railway station.

Cycle Route Network – Strategic and Local

4.23 Local cycle routes and cycle parking - the provision of high-quality cycle route infrastructure and cycle parking at destinations are key components to support more cycling. The lack of safe cycle routes is often cited by existing and potential cyclists as a deterrent to taking up cycling or to cycle more. The local cycle routes will complement strategic cycle route Quietway 1 and form links to local town centres and growth areas.

The Council will be seeking to provide local cycle routes, in particular in Abbey Wood and Thamesmead to complement Elizabeth line services at Abbey Wood railway station and the cycle hub facilities provided there. The Council is also seeking support from TfL for routes between its strategic centre, Bexleyheath, and two of its growth zones (Erith and Crayford).

4.24 Better cycle facilities are also planned for local town centres – Blackfen, Northumberland Heath and Nuxley.

Station Accessibility/Routes to Stations

4.25 Routes to railway stations – improvements to cycle and pedestrian access to important local railway stations at Bexley, Sidcup and Belvedere are planned. It would be complemented by the separate programme to introduce CPZs around railway stations.

Public Transport

4.26 The overarching aim of the MTS is for 80% of all trips across London to be on foot, by cycle or using public transport by 2041, compared to 63% today as set out in Table 4.1 in respect of healthy and active travel. For public transport in Bexley the specific trajectories for usage and performance are shown in Table 4.2 although, of course, these are services provided by TfL and not Bexley

Table 4.2: MTS Outcomes for Bexley (Public Transport)

Aim	Measure	Baseline	Bexley Trajectory 2021	Bexley Trajectory 2041
80% of trips to be made by active, efficient and sustainable modes	Walking, cycling & public transport mode share (%)	42% (2013/14–2015/16)	46%	63%
MTS Outcome 5: the public transport network will meet the needs of a growing London – between 14 and 15 million trips will be made by public transport every day by 2041	Increased number of trips per day by public transport	105,000 (2014/15–2016/17)	124,000	196,000
MTS Outcome 7: journeys by public transport will be pleasant, fast and reliable	Bus speeds (in mph) will improve by approx. 5-15% London-wide by 2041, with particular improvement expected in inner London	12.4 (2015)	12.8 (3%) 12.5 (1%)	14.2 (15%) 13.0 (5%)

4.27 The Council also has its LIP3 objectives relating to public transport. These are:

Objective 1	To encourage as much movement as possible to use sustainable modes of transport (public transport, walking and cycling)
Objective 3	To support more reliable and faster bus services through bus priority measures with segregation from other traffic as much as possible
Objective 12	Provision of excellent public transport links with railway stations, existing communities and other growth nodes

Bus Services

Bus Stop Accessibility

4.28 Bus stops – over 95% of existing bus stops in Bexley offer step free access. Opportunities will be taken to extend bus stop accessibility wherever possible on services that are not 'hail and ride'.

Demand-Responsive Transit (DRT)

4.29 A form of bus-based public transport with no fixed route, timetable or stops that operates within a specific area. The route of the bus is based on the origins and destinations of the passengers who have 'hailed' the bus, usually through an app. The most efficient route is calculated and the passenger informed; some services offer to pick up and drop off within a certain distance to reduce long detours. DRT is suited to low density urban areas, away from public transport corridors where there are many different journey origins and destinations. The smaller vehicle used makes it suitable for areas with narrow streets and tight junctions.

4.30 Areas such as East Thamesmead, Nuxley, Blackfen and Albany Park are suitable locations for the scheme, having low public transport patronage and irregular travel demand pattern over a day.

DRT aims to offer the benefits of taxis (door-to-door service) and buses (lower cost) to provide a viable alternative to the private car. DRT could also offer a substitute to walking and cycling during bad weather and during hours of darkness. The current London Dial-a-Ride service could merge with a DRT service to provide a service that can be booked at short notice which would be better for the elderly who would be less dependent on pickup by relatives or fixed dial-a-ride service.

Bexleyheath Transport Hub

4.31 The role of the town centre as the public transport hub of the borough will be further enhanced through a central area with sufficient fully accessible bus stops and stands. The hub will offer real-time service information and other journey-planning information plus cycle parking, seating, shelter and signing.

Bus Priority Portfolio

4.32 Bus priority schemes originally identified as concepts in the GLA's previous City in the East growth strategy have been translated into studies and eventually schemes that will deliver improved service reliability and reduce delays to passengers, and are currently focused on the following locations:

- A222 Station Road/Longlands Road/Hatherley Crescent junction
- A220 Gravel Hill/Erith Road/Watling Street/Broadway junction and corridor to Long Lane junction
- A206 Bexley Road/A2016 Queens Road/Bronze Age Way between Arran Close and Bexley Road/Fraser Road roundabout

Rail Services

South-East Upgrade

4.33 Network Rail is investing £1.25bn to upgrade track, signalling, embankments, structures, stations and depots in south-east London to give passengers better journeys, with fewer delays. Some of the key projects are:

- Bexleyheath Line Improvement Work – retaining wall and other infrastructure improvements
- Hither Green Resignalling – new signalling system leading to fewer delays and better journeys for passengers
- Lewisham Railway Upgrades – new signalling, electrical systems and remote monitoring installation

Lewisham Station Enhancement Project

4.34 Lewisham Station has narrow interchange tunnels (about 2-metre wide) at the London-end which are too narrow to handle current passenger flows. A one-way system is implemented during peak hours to divert interchange passengers to wider tunnels. The country-end platforms are also very narrow; the product of platform extension works during 1960s to 1990s and there are no connecting corridors so passengers have to make their way along the narrow platforms to the London-end for interchange and exit.

4.35 Network Rail is undertaking a study of Lewisham Station to tackle the overcrowding and safety issues caused by poor layout and large demand to interchange. A feasibility design (GRIP* stage 1-2) commenced in January and is planned to be complete in May 2022. Further GRIP stages are planned with work on site projected to start 2026/27 with completion by 2029, dependent on approval and funding. (*GRIP – Governance for Railway Investment Projects – management and control process developed by Network Rail for delivering projects. It divides projects into eight distinct stages).

Metroisation by TfL

4.36 Rail devolution has shown to provide benefits for London residents through higher service frequencies, all day staffing at railway stations and better customer information. In principle, the Council supports greater devolution of rail franchising and the opportunities this will provide for local authorities to be involved in the franchise specification. However, the Council does have concerns on the impact of rail devolution on Freedom Pass costs for the borough which would need to be addressed prior to TfL taking over additional suburban rail services. It would also be opposed to any devolution resulting in a reduction resident access to central London termini.

Kent Area Route Study

4.37 Network Rail published its South East Route: Kent Area Route Study – Advice for Funders in May 2018. It sets out the strategic vision for the rail network between the Kent/East Sussex coast and London (including Bexley) with a strategy for infrastructure improvements that could be carried out in the medium-term (2024) and the long-term (2044). The medium-term proposals to meet demand in the London Bridge Metro area are for 12-car operation; these will require signalling alterations on the Erith Loop and track circuit alterations on the Up Crayford Loop Line. The long-term challenge is to overcome capacity constraints at the London termini (Victoria, Charing Cross and Cannon Street).

London Rail Termini served from Bexley Stations

4.38 The Government has aspirations, through the franchising process, for rail services to be simplified, with all of Bexley's services serving one London termini. This would reduce the need for trains to cross at Lewisham and the associated delays at this bottleneck. It is also argued that it will create turn-up-and-go frequency (waiting time less than 10 minutes) on each railway line.

4.39 This measure would cause the increase in interchange traffic at Lewisham Station for access to respective London Terminal, and overload Lewisham Station where more accidents may occur during peak hours at Lewisham Station. The Council opposes this: commuters on each line rely on being able to use direct services to the destination they need, which will have informed their choice of where to live. Simplifying service patterns will increase the need to change trains, increasing journey times and, potentially, making overall journeys less reliable – as well as the added inconvenience.

4.40 Transport for London has proposed an extension of the Bakerloo Line to Lewisham, with the possibility of linking the underground station to existing National Rail station. Department for

Transport has granted £5.5 million to Network Rail in March 2020 to conduct early design works for improvements to Lewisham Station. No further funding has been granted for the actual work for the redevelopment of the station. Before the improvement works at Lewisham Station are completed, interchanges at Lewisham would not be desirable or even safe, and single terminus metro services which involves interchange at Lewisham would not be feasible.

Airports

4.41 The completion of the Elizabeth Line in the first half of 2022 will significantly improve the boroughs access to Heathrow airport. Travel times are expected to be just over 51 minutes, 42 minutes quicker than currently.

4.42 Improved connectivity to London City Airport – in its current masterplan, London City Airport is committed, in the longer term, to working with local stakeholders to deliver a new Crossrail Station on the Elizabeth Line south of the airport which would improve connectivity in the south east and deliver a host of regeneration benefits in the wider Thames Estuary. In the meantime, the airport is looking to maximise connectivity with Elizabeth Line as follows:

- promoting the link to Custom House station and the rerouting of the 474-bus service to connect the airport and Custom House;
- working with TfL to promote the Stratford station interchange to enable passengers to have a convenient, covered and secure interchange between the Elizabeth Line and DLR; and
- engaging with TfL on their redevelopment of Poplar DLR Depot to provide a better passenger interchange between DLR and the Elizabeth Line.

Strategic Connections – under construction

4.43 The Council has its LIP3 objectives relating to strategic connections. These are:

Objective 5	To improve the accessibility of the transport network to assist access to jobs, local amenities and other destinations
Objective 14	To work with TfL and the Mayor to deliver a Government-led extension of the Elizabeth line to Ebbsfleet
Objective 15	To secure the key transport infrastructure investment of an extension of the DLR from Gallions Reach through Thamesmead to Belvedere; the completion of a public transit corridor from North Greenwich to Slade Green and the completion of road-based river crossings connecting Belvedere with Rainham and Thamesmead with Gallions Reach

Elizabeth Line Services

4.44 Delays in construction and the necessary testing for the Crossrail Project have put back the opening of the Elizabeth line at Abbey Wood to the first half of 2022. The original plan was for opening in December 2018; that followed on from opening of the new fully accessible interchange station (with the North Kent Line) at Abbey Wood in October 2017. Even at opening of the central London core tunnel section for operation in 2022, it will be another 12 months before all Elizabeth line services will be connected in and operational.

4.45 Of all the stations on Crossrail, Abbey Wood was expected to see the greatest uplift in connectivity, with journey times to Canary Wharf reducing from 35 minutes to just 11, for example. Elizabeth line trains will run as often as every 5 minutes in the peak. TfL has predicted that the Elizabeth line will increase the number of jobs accessible within 45 minutes from Abbey Wood from 459, 833 (2011) to 592,742 jobs by 2031, a 28.9% increase (TfL, 2020). Abbey Wood is already seeing the beginnings of a period of regeneration, thanks to the prospect of a PTAL uplift from PTAL 3-4 to PTAL 5.

4.46 TfL has planned a local bus network upgrade that will be introduced when Elizabeth line services start at Abbey Wood. One new route, part of that package, was introduced early (in July 2019) – route 301: Bexleyheath-Abbey Wood-Thamesmead-Woolwich (5 buses per hour).

Silvertown Tunnel

4.47 The construction phase of this TfL project is under way, with a view to opening around 2025. The Council was a participant in the Examination in Public for the required Development Consent Order (DCO), voicing concerns that the scheme would add too much extra traffic to the A2 corridor and to local roads; and seeking to ensure that the extensive bus-based public transport element of the scheme provide positive benefits for connectivity with Bexley. When the scheme opens, user charges will be levied – and also introduced on the nearby Blackwall Tunnel(s). This is intended to manage overall traffic demand, to protect the value provided in new crossing capacity.

4.48 The project will provide two tunnels bored under the Thames between the Blackwall Tunnel southern approaches and West Silvertown, aimed particularly at reducing the extensive queues and delays on the northern and southern approaches to the Blackwall Tunnel for several hours of the day and the severe impacts on local air quality. There will be two traffic lanes in each direction, one of which will be allocated for buses and HGVs. Crucially, this new Thames crossing will provide a full-height northbound tunnel – which the northbound Blackwall tunnel is unable to provide. This will decrease current HGV demand for the Woolwich Ferry and reduce queuing and delays for the ferry.

4.49 The structure of the DCO consent includes the opportunity for boroughs to take part in the Silvertown Tunnel Implementation Group (STIG), which will oversee TfL's traffic monitoring and public transport planning relating to the project. TfL undertook very extensive traffic surveys prior to the Examination in Public for modelling inputs and calibration. That data set will then be used as the basis for traffic monitoring once the scheme is open.

4.50 The expectation therefore is that the combination of more cross-Thames capacity and tolling will allow much better management of traffic, with reduced journey times and less impact on air quality. This benefit should also positively influence traffic patterns on the wider road network – including a reduced risk of queuing on the A2 into the borough when an incident occurs at the Blackwall Tunnels. In Bexley, any extra negative impact on the local road network should be negligible. Drive times from Bexleyheath to Canary Wharf are forecast to decrease by 16 minutes and by 12 minutes to Stratford.

Roads and Traffic

Smart Roads

4.51 A typical smart road will be more animated, able to communicate with vehicles and people using sensors, data capture abilities and the ability to be responsive to changes in the environment. Roads will literally talk to traffic signs, bicycles and vehicles. Smart roads will be able to store solar energy and transfer that energy into electricity for vehicles and the infrastructure. They will glow in the dark using photo-luminescent powder that charges during the day. Smart roads will use motion-sensor lights to light up only the sections of road that are being used, providing night visibility while going dim when not in use.

Changing Business Models

4.52 The alternative to owning a private car is likely to be in the form of Mobility as a Service (MaaS) which gathers together a range of transport services such as public transport, ride-, car- or bike-sharing, taxi and car rental/lease. This will provide the user with a tailor-made service available on demand through a single platform that can be accessed on your phone. This platform would offer a single payment channel instead of multiple ticketing and payment systems. Autonomous vehicles will become part of this, operating as 'driverless taxis' and bridging the gap between personal and public transport. Personal driving skills are likely to become obsolete.

4.53 These need to be managed carefully though, since there is a risk that people who currently walk, cycle and use public transport will start to use modes such as ride/car sharing or self-drive vehicles, which will see an increase in traffic rather than a reduction. For example, on-demand taxi and private hire services would be a 'first and last mile' solution linking up with public transport hubs.

4.54 Connected and Autonomous vehicles (CAVs) – also known as 'driverless cars'. Although much publicised advances are being made, 2030-2040 is more realistic for widespread rollout (GLA, 2018).

4.55 Petrol and diesel car ban – the Government announced in July 2017 that new diesel and petrol cars will be banned in the UK from 2040 in a bid to tackle air pollution. It follows the government being give its own deadline of 31 July after the High Court judges said it was failing to meet EU pollution limits. The Government recently announced that the ban is to be brought forward to 2030 since the 2040 deadline is considered too late by experts to achieve zero carbon by 2050. The ban is also being expanded to hybrid cars and plug-in vehicles.

Smart Road User Charging System

4.56 Though it may not extend as far as Bexley, the current Congestion Charge scheme and Low Emission Zone is proposed to be integrated to form a charging area that responds to real-time congestion and demand on different parts of the network, and fairly reflects the economic and environmental costs of the least efficient and most damaging vehicles

Traffic Management and Parking Issues

4.57 Current Controlled Parking Zones around railway stations will be reviewed following the commencement of rail services on the Elizabeth Line.

Low Traffic Neighbourhoods

4.58 Building on the success of Mini Holland schemes, these measures are likely to see an increase in London in areas between 'distributor' main roads where through-traffic is either restricted or removed altogether with 'modal filters' such as bollards, width restrictions and bus-gates used. However, within Bexley with its high car reliance and more traditional non-grid road layout, the opportunity for such schemes is considered to be limited.

Safety

4.59 The mayor's Vision Zero ambition is the elimination of all deaths and serious injuries from London's streets by 2041. The Council shares these casualty reduction aspirations and concurs with the Vision Zero approach to road danger reduction. Progress has been made in reducing KSI collisions. However, there are significant challenges facing the borough in achieving the Mayor's Vision Zero, particularly as no additional funding has been provided to deliver it. Of the 121 KSI collisions between 2014 and 2016, 17 or 14% occurred on the TfL road network. This will require joint-working with TfL on programmes to reduce these collisions. Over the same period all pedestrian and cycle collisions and nearly 80% of motorcycle collisions occurred on local borough-controlled roads. It is recognised that much work will be required to reduce these collisions.

Aim	Measure	Baseline	Bexley Trajectory 2021	Bexley Trajectory 2041
MTS Outcome 2: Vision Zero – deaths and serious injuries from all road collisions to be eliminated from our streets	65% reduction in KSIs by 2022 (based on the 2005-09 baseline)	149 (2005-09)	52[1] (2022)	0
MTS Outcome 2: Vision Zero – deaths and serious injuries from all road collisions to be eliminated from our streets	70% reduction in KSIs by 2030 (based on 2010-14 baseline)	85 (2010-14)	25[1] (2030)	0
MTS Outcome 6: public transport will be safe, affordable and accessible to all – everyone will be able to travel spontaneously and independently	Reduce on average the difference between total network and step-free network journey times by 50% by 2041	97 (Full network) 105 (Step-free network) 7 (Time difference)		83 (Full network) 86 (Step-free network) 4 (Time difference) 49%

1. Generic London-wide percentage reduction target based on the MTS targets and back-casted casualty data.

4.60 The Council has its LIP3 objectives relating to safety. These are:

Objective 6	To promote safe travel on the road network and support delivery of measures to reduce road collisions and work towards Vision Zero
Objective 7	To support road danger reduction through physical road safety measures, travel planning and education, training and publicity programmes
Objective 13	Support delivery of safe and secure public transport network

School and Local Safety Schemes

4.61 The Council will support measures to reduce road danger around schools to encourage more walking particularly to primary schools.

4.62 The locations with the highest number of casualties have been identified and this analysis will form the basis for developing programmes to reduce casualties. Further detailed analysis will be undertaken as part of the annual spending submissions over the next three years.

4.63 The Council will consider extending the number of streets within 20mph zones with physical measures to deter speeding, subject to funding availability and the result of public consultation.

4.64 Intelligent Speed Assistance – automatically limits the speed of vehicles as necessary; this is looking to be adopted on all London Buses by 2032. In addition. Self-driving buses and shuttles may play a role in the future

Local Area Accessibility for Pedestrians

4.65 The Council has carried out a local area accessibility programme over a number of years and will continue to do so, subject to funding. Accessibility improvements are delivered such as formal and informal crossing points including zebra crossings and refuges. Other measures include dropped kerb removal of barriers and provision of signage. The proposals will improve walking facilities to help make them accessible to all and will improve access to transport, jobs, education centres / schools, local amenities, key services and health and leisure facilities.

4.66 Better pedestrian facilities are planned for local shopping centres – Blackfen, Northumberland Heath and Nuxley.

Air Quality and the Environment

Table 4.3: MTS Outcomes for Bexley (Air Quality and the Environment)

Aim	Measure	Baseline	Bexley Trajectory 2021	Bexley Trajectory 2041
MTS Outcome 3a: London's streets will be used more efficiently and have less traffic on them	10-15% reduction in vehicle kms by 2041	917 (2015)	917	871 (-5%) 825 (-10%)
MTS Outcome 3c: London's streets will be clean and green – traffic will fall, and	Household car ownership. 250,000	111,208 (2015)	106,700	94,300

Aim	Measure	Baseline	Bexley Trajectory 2021	Bexley Trajectory 2041
congestion kept in check, allowing more efficient operations	fewer cars owned in London by 2041			
MTS Outcome 4a: London's streets will be clean and green – a 72% reduction in CO_2 emissions from road transport by 2041	Reduction in CO_2 emissions (in tonnes) from road transport	185,000 (2013)	169,000	52,200
MTS Outcome 4b: London's streets will be clean and green – a 94% reduction in road transport NO_x emissions by 2041	Reduction in NO_x emissions (in tonnes) from road transport	610 (2013)	270	30
MTS Outcome 4c: London's streets will be clean and green – a 45% reduction in road transport PM_{10} emissions by 2041	Reduction in PM_{10} emissions (in tonnes) from road transport	64 (2013)	55	38
MTS Outcome 4d: London's streets will be clean and green – a 53% reduction in road transport $PM_{2.5}$ emissions by 2041	Reduction in $PM_{2.5}$ emissions (in tonnes) from road transport	37 (2013)	27	18

4.67 The Council has its LIP3 objectives relating to air quality and the environment. These are:

Objective 8 To seek improvements to air quality by supporting the use of zero emission capable (ZEC) vehicles

Objective 9 To protect significant green corridors

Objective 10 To encourage sustainable drainage systems and greening measures through the planning process

The Council is also in the process of commissioning an air quality strategy.

Electric Vehicle Charging Points – Hubs and Lamp Columns

4.68 The Council is also working closely with TfL in developing two separate work-streams which are focussing on the introduction of both rapid charging hubs and more localised residential charging infrastructure. Work is underway to identify sites that are suitable for rapid charging and on-street electric vehicle charging points. It is expected that the majority of rapid charging points in Bexley would be in the form of hubs. These can typically accommodate between 4 and 8 vehicles which can all be charged simultaneously within 10-20 minutes. The Council is working closely with the taxi and private hire trade on the use and possible locations of these hub-based rapid charging points. A programme to introduce slower, on-street charging points, located nearer to where people live is currently in development.

4.69 Ultra-Low Emission Zone – the original ULEZ replaced the T-Charge on 8 April 2019, covering the same area as the Congestion Charge 24 hours a day, 7 days a week, every day of the year (except Christmas Day). From 25 October 2021, the ULEZ boundary was extended to create a single larger zone bounded by the North and South Circular Roads.

Freight and Deliveries

4.70 The Mayor wants to make streets work for people by freeing up space for the essential freight and commercial journeys that keep London's businesses functioning. Accordingly, he aims to reduce freight traffic in the central London morning peak by 10 per cent on current levels by 2026. There is no MTS outcome for Bexley on this aim.

4.71 The Council has its LIP3 objective relating to freight and deliveries. It is:

Objective 11 Encourage the use of the River Thames as a transport corridor especially for freight, including safeguarding wharves used for this purpose

Road Freight and STDR

4.72 There has been a steady increase in online shopping as a percentage of total retail sales; from 2.8% in 2006 to 21.5% in December 2019. This percentage jumped to 36% during the Covid-19 lockdown in November 2020 (ONS, 2020). This increasing demand for online shopping will lead to further growth in distribution and warehousing activities in the north of the borough around the South Thames Development Route (STDR); Ocado, Tesco.com and Amazon already have distribution bases in north Belvedere, with delivery journeys extensively using (and impacting on) the STDR. Some junctions on STDR already experience congestion during peak periods and there is the single-carriageway section on Thames Road (Cray Mill Bridge) that acts as a severe bottleneck at times.

4.73 Businesses in the area have already raised concerns with the delays on the STDR and especially where the A206 joins the A282 (M25) Dartford Crossing at junction 1a, where it is difficult for tunnel-bound traffic from Bob Dunn Way to merge into the main northbound traffic stream, which leads to traffic backing up along the A206 Bob Dunn Way.

Rail Freight

4.74 There is no rail freight facility in the borough, but considerable volumes of freight are moved through the borough by rail, mostly via the Sidcup line. There has been a proposal for a strategic rail freight interchange (SRFI) at Howbury Park near Slade Green but the second planning application was called in by the Mayor and appealed and was eventually refused on Green Belt grounds by the Secretary of State. Other disadvantages of this site were:

- its limited ability to serve as a successful SRFI with an internal layout only suitable for trains half of the maximum potential length (or having to split half-trains on site)
- a lack of daytime hours when enough spare train paths could be found for trains to/from the SRFI in the existing timetable, let alone with enhanced train frequencies thanks to the C2E project (see Chapter 5)

- the complexity of current train operation at the point where the SRFI would be accessed by trains – including Slade Green train depot and the proximity to two difficult triangle rail junctions where capacity and reliability is already an issue.

Thames-based Freight

4.75 Wharves in the borough are already used for moving bulk products and waste. The wharf locations where this can be achieved are safeguard (as supported by the Port of London Authority), along with the land-side means of access.

Note PLA Reg 18 response:

- Reference must be given to the potential use of existing piers and structures as part of the delivery of small-scale freight as well as for the maximisation of use for passengers over the timescales of the Local Plan. This could further help to achieve the Borough's sustainable travel goals with regard to improving air quality and decreasing road congestion for local communities.

Local Deliveries

4.76 As mentioned earlier, shopping trips have decreased 30% since 2007 (Government Office for Science, 2019) as online shopping has become more popular and this is likely to continue, especially given the current Covid-19 pandemic.

4.77 The biggest changes in delivery to households and businesses will occur in the 'last-mile'. The last-mile is where a lot of the cost of moving goods occurs as it is serving few customers by less efficient modes when compared to movement between hubs using ships, trains, large lorries or planes. It is also where a lot of problems occur such as theft and safe delivery. One solution for this last-mile is the use of airborne drones which are now increasingly being used for freight delivery and droids (or ground-based drones) programmed to transport goods along pavements

4.78 The technology that enables real-time tracking and advanced notification of delivery allows customers to dynamically redirect incoming parcels to any location, so that deliveries can be directed to people (work, home or a trusted person at any other location) rather than places. Many logistics companies are developing a network of local agents, where neighbours who are at home are paid to act as a collection and distribution point; a role that many householders already carry out. The Royal Mail has recently introduced a parcel pick-up service in addition to its delivery service.

4.79 The use of smart technology in the home/workplace means that customers can give time-limited access to their property for deliveries remotely through their mobile phone which they can monitor through a surveillance camera; this could alternatively give access to the garage, car boot or a parcel locker. New residential development should consider the provision of communal pick-up points, similar to Amazon lockers

4.80 The way we shop could change. High Street shops may only stock 'display items' for you to browse; the goods you buy are immediately delivered to your home and are waiting for you by the time you return.

Chapter 5 –Identified New Transport Projects

5.1 The purpose of this chapter is:

- to set out the new transport projects that will be needed in the borough that increase the connectivity of places in the borough and support provision of more homes and jobs;
- to highlight the transport projects required specifically to support the growth set out in the Bexley draft local plan, as well as the longer-term Bexley Growth Strategy (to 2050);
- to indicate whether those projects are already identified in the London Plan;
- to review existing transport scheme safeguarding (UDP Policy T7; Core Strategy Policies CS03 and CS04) which safeguarded land for larger transport schemes, including whether that safeguarding is still required; and
- to highlight where new safeguarding will be required to ensure that development does not preclude delivery of important future transport projects.

5.2 The adopted London Plan Table 10.1 provides an "Indicative List of Transport Schemes" that will be needed to support delivery of the London Plan. The list of schemes is a mixture of generic and specific projects; it is divided up into two sets of schemes: Healthy Streets and Active Travel; and Public Transport. The Healthy Streets and Active Travel schemes are all generic.

5.3 Taking those schemes in Table 10.1 that are relevant to Bexley, some are necessary to support the development in the local plan during the plan period. A few are expected to be delivered after the plan period (2021-2036). Where relevant the local plan will look to support the future delivery of these schemes in policy and they are also discussed in this chapter.

5.4 There are further transport interventions that will be highlighted later in the chapter that are needed in support of the local plan but that are not included in Table 10.1. Where this is the case, the purpose and nature of the intervention will be made clear, even if a scheme has not yet been defined.

5.5 Before that, the chapter considers the Bexley Growth Strategy and its supporting transport measures – including the deliberations of an overview and scrutiny sub-group set up specifically to look at future transport requirements in the borough.

5.6 The chapter then considers what potential "big kit" major transport infrastructure schemes will be needed to support the draft local plan and which emerging schemes it will seek to support for future delivery through policy. These are divided up as summarised in Table 5.1.

Table 5.1 - "Big Kit" major transport infrastructure schemes and local plan requirements

Major Transport Infrastructure Scheme	Included in Table 10.1 of London Plan?	Required in support of the draft Bexley local plan?	Future development supported in Local Plan policy
Elizabeth Line	Yes	Yes	N/A
Bus Transit	Yes: pilot schemes	No	Yes
DLR extension to Belvedere	Yes, to Thamesmead	No	Yes
Crossrail to Ebbsfleet	Yes	No	Yes
New Thames Crossings and Use of the Thames	Yes	No	Yes
South Thames Development Route	No	Yes	Yes

5.7 These are then followed by the section on transport scheme safeguarding and overall conclusions from this chapter.

Transport Measures to support the Bexley Growth Strategy

5.8 The Bexley Growth Strategy was adopted by the Council in December 2017. In putting this 30-year development strategy together, information was assembled about the supporting infrastructure required to support the envisaged amount of new development. That included a Development Infrastructure Funding Study in 2015/16.

5.9 Where at all possible, such new infrastructure would be set up to serve both the existing communities in and around the identified growth areas and the new communities of residents and businesses. Naturally, that principle will apply to transport infrastructure as much as any other forms of infrastructure.

Growth Strategy modelling by TfL

5.10 In 2014/15, in parallel with its work on alternative options for a new Thames crossing in east London, TfL undertook modelling of a number of transport initiatives that could deliver the emerging Growth Strategy. Various alternatives were tested (as well as options for Thames crossings east of Silvertown), including:

- DLR extensions – from either the Woolwich Arsenal or Beckton branches, reaching east Thamesmead or even Erith.
- Extending Crossrail services east of Abbey Wood, or other means of achieving significant uplift in train frequencies through Belvedere, Erith and Slade Green.
- Extensive upgrading of the bus network in terms of service frequencies and of places/routes served. Within that, a further option of Bus Rapid Transit was explored.

5.11 TfL drew together the key technical conclusions of that work into a draft strategy document, though this was not worked up into a final version. It included:

- DLR: an extension from the Beckton branch of DLR as far as Abbey Wood or Belvedere (to connect with the North Kent Line) looked worthwhile. An extension into north east Thamesmead or as far as Erith did not, however.
- Rail ridership could increase significantly with higher frequency services on Crossrail east of Abbey Wood (see C2E section below). This option provided a high level of mode shift but also needed other supporting public transport to provide the wider area connectivity required.
- Buses alone will not have sufficient capacity to support the potential demand, even at much higher frequencies
- Bus Transit could perform very well and could capture more trips to public transport; it could provide the 'loops and feeders' into the wider area through connection with railheads and key centres along its route.
- Additional Thames crossings were not directly needed to provide the development capacity required to support the Growth Strategy. However, the Belvedere Crossing could have very significant benefits to both businesses (better access to markets, suppliers and workforce) and public transport connectivity. The Mayor of London expects the operation the Lower Thames Crossing, DLR to Thamesmead and the Silvertown Tunnel to be able to be fully considered in any case to support other such Thames crossings (MTS Proposal 95).

Bexley's Transport Strategy Sub-Group

5.12 That information was considered by a Transport Strategy Sub-Group (TSSG) (a cross-party sub-committee of the Council's Places Overview and Scrutiny (O&S) Committee) between November 2015 and September 2016. The purpose of the TSSG was to explore a range of strategic transport issues, particularly with the longer-term Growth Strategy in mind; but Members also looked at some more immediate transport concerns. Meetings included presentations from a variety of technical speakers (mostly external) on different transport issues and a visit to view the Fastrack bus rapid transit system in Dartford/Gravesham. The TSSG reported to the Places O&S Committee (Item 12, 13 October 2016) with its key observations and recommendations, including:

- "The Sub-Group support the proposal for a Crossrail extension to Ebbsfleet/Gravesend, particularly the possibility of the creation of a link to Ebbsfleet International station and links to the east of the borough for businesses and jobs.
- "The Sub-Group consider that, whilst DLR may be able to offer more local connectivity for both the growth areas and beyond, in addition to an extension of Crossrail, there is some concern about severance effects from DLR that other forms of rapid transit do not cause.
- "The Sub-Group believe it is important to coordinate how the new growth areas and bus routes work together, planned so as to integrate with the wider bus network in the borough.

- "The Sub-Group recommend that a segregated right of way be provided for public transport services through the new growth areas to provide the basis for a rapid transit system, to aid service reliability and reduce journey times.
- "The Sub-Group support the notion of a Bus-Rapid Transit (BRT) system in areas where there is sufficient space to accommodate segregated corridors. Rapid transit corridors should be specified so that more advanced systems (eg. trams) are not precluded in future. The Council should consider what neighbouring authorities are planning regarding rapid transit to ensure future infrastructure connects up.
- "The Sub-Group support the principle of transit-oriented development, with denser development and key facilities concentrated around public transport nodes.
- "The Council should take note of findings that creating extra road space to solve congestion can simply generate more traffic. The Sub-Group is concerned about further congestion and worsening air quality and that care should be taken when designing additional road network capacity.
- "The Council should seek to encourage Car Club operators to set up Car Clubs in Bexley."

5.13 In the case of DLR, contemporary thinking was how DLR could interchange at Abbey Wood, via the Harrow Manorway corridor. One of DLR's operating requirements (given automated running) is the absolute need to have no at-grade crossing (whether for pedestrians or vehicles). Running DLR at-grade would create significant severance in a regeneration area (and Housing Zone) where a key objective was to create greater permeability. Providing DLR on a viaduct would require moving back the proposed building line, whilst DLR operation would bring noise problems for the residential buildings along that frontage. As described later in this chapter, TfL dropped the idea of a DLR extension through Thamesmead to Abbey Wood station.

5.14 In the adopted Bexley Growth Strategy, the chosen transport approach is set out in its Growth Theme 3 (transport provision) with Transport Ambitions that are objective- and outcome-led, rather than solution-led. These Transport Ambitions are:

1. Improve the connectivity of places
2. Create healthy streets and liveable neighbourhoods to provide opportunities for local living
3. Ensure effective connections within, between and to/from each growth area, including links with the rest of the borough and beyond
4. Maximise connectivity by a choice of means of travel thereby reducing reliance on the car
5. Secure the required transport infrastructure investment in a timely and cost-effective fashion

5.15 Under the last of those, the Growth Strategy (paras 2.3.11-2.3.12) saw walking, cycling and public transport (both bus and rail) having a key role in the short-term but that a greater level of intervention – including some road improvements – would be necessary in the medium-term, to provide the "right mix" of transport provision for growth in Bexley.

5.16 TfL's subsequent transport modelling work in the area has been to understand the potential public transport solutions (including DLR extension, Overground, Bus Transit and bus route enhancements) to support the transport strategy for the Thamesmead & Abbey Wood Opportunity Area Planning Framework (OAPF). That OAPF was published in December 2020. The modelling work was complemented by a high-level design concept (for modelling purposes), including outline budget costing, that included DLR reaching Belvedere. Further, more detailed technical work for the DLR Thamesmead extension was underway by summer 2020.

5.17 The Mayor has been developing OAPFs (as supplementary planning documents to the London Plan) for Opportunity Areas. An OAPF for Bexley Riverside is expected to follow on from that for Thamesmead & Abbey Wood and a supporting transport strategy will be needed. It is likely that this will be based on the technical work in support of the C2E project (described in more detail later in this chapter). The transport strategy will look both at transport-based responses to growth and master-planning of areas around key transport nodes in and to the east of the Bexley Riverside OA.

5.18 It is unlikely that the C2E project will be delivered during the life of the local plan (2021-2036). Even so, the supporting technical work for the project will inform the evidence base that supports development – particularly in north Bexley – and provide more focussed insights into the transport interventions needed to support good growth in the borough. That technical work should be a key input to formulating the transport strategy approach for the Bexley Riverside OA and influence the next review of the Bexley Local Implementation Plan (LIP).

5.19 In summary, TfL's work with the Council in 2014-2017 to support the Growth Strategy has been scrutinised by Council Members and has led to the Mayor of London including many of the required projects in the London Plan (Table 10.1).

London Plan, Table 10.1

5.20 In Table 10.1 of the London Plan, the Mayor sets out the transport schemes that will be needed to support the development proposed in the London Plan. Table 10.1 was established from TfL's Strategic Transport Modelling Report and Appendix One includes a public transport scheme list with 2018 MTS schemes and additional schemes that arose from the 'London Plan core reference case'. London Plan policy T1 requires development plans to support the transport schemes in Table 10.1 and policy T3 (C) expects development plans to safeguard for delivery of those schemes. Transport scheme safeguarding is discussed later in this chapter. Further considerations from London Plan policies for the Bexley draft local plan are set out in Chapter 7.

5.21 Table 10.1 is divided into two categories of transport schemes: (a) Healthy Streets and Active Travel schemes; and (b) Public Transport schemes. The Healthy Streets and Active Travel schemes are set out under themes rather than as individual projects – such schemes are more likely to be locally driven, although some would still be taken forward by TfL, say, as a part of a wider programme. The Public Transport schemes tend to be of a greater scale of cost and intervention, so are listed individually with a project cost banding and a broad timescale.

5.22 For Healthy Streets and Active Travel, Bexley's LIP sets out a range of scheme types that might be appropriate to deliver across London during the life of the current Mayor's Transport Strategy (to 2041), subject to available funding. The Council has already been developing Healthy Streets scheme proposals for Erith (as part of Erith Links) and a similar approach will be considered for Crayford town centre. With TfL funding support, the Council has already delivered successful public realm improvement schemes in both Bexleyheath and Sidcup town centres, which have provided a higher quality environment and made walking and cycling more pleasant. Healthy Streets schemes and Active Travel projects are further discussed in LPTA Chapter 4.

5.23 This chapter sets out the Table 10.1 public transport schemes that will support Bexley's growth strategy and highlights those that are specifically needed in support of the level of development proposed in the Bexley Reg 19 draft local plan.

5.24 The Council also has transport schemes that aren't listed in Table 10.1 but are needed during the life of the local plan. These include highway-based interventions since road corridors like the A206/A2016 South Thames Development Route (STDR) continue to support the supply chain needs for existing and new local businesses.

5.25 While this approach seems out of step with the strategy and philosophy of both the London Plan and the MTS (along with the approaches to take the aims of the MTS forward in the LIP), this is not meant to be a return to 'predict-and-provide', nor to promote more road traffic. Traffic levels may grow anyway, though they should be mitigated and controlled more and more over time as LIP-based measures and more significant transport interventions are progressively introduced. This LPTA is still firmly based on public transport solutions and using new development to encourage and deliver more walking and cycling but the current patterns of housing and employment that do not support a dense public transport network are not going to be turned around overnight. The Council's aim therefore is for a balanced transport offer, recognising the specific issues that Bexley faces – a context already set out in the Bexley LIP.

5.26 The overall transport approach for the Reg 19 draft local plan will therefore need the right mix of public transport and walking/cycling interventions, Healthy Streets investment and targeted movement-focussed highway projects in regeneration areas to be able to accommodate the level of development envisaged in the plan, while minimising negative impacts on and supporting the needs of existing residents and businesses. The Council considers that this careful and more nuanced approach can still deliver locally the Mayor's overall aims for significant mode shift by 2041, as then set out in the LIP.

5.27 Unfortunately, the production of the Bexley Riverside OAPF, which GLA had hoped to do in parallel with the Thamesmead and Abbey Wood OAPF, has been delayed. Work has not started in earnest towards the supporting transport strategy for Bexley Riverside. The only modelling completed is to build a base-year transport model (completed in 2019). The Council had hoped to use the transport modelling for Bexley Riverside OAPF to establish the transport infrastructure needs of the borough in some detail. Instead, it has been necessary to base the approach to transport in the borough on the work for the Bexley Growth Strategy, that was informed by some of the supporting technical

work for other projects (such as the Thamesmead and Abbey Wood OAPF or the London Plan) as well as specific junction modelling examined in Chapters 8 and 9. Further modelling is also currently being undertaken regarding impacts of development on strategic routes which will be published at submission.

5.28 The next sections of this chapter look at the major transport infrastructure schemes that are required to support the local plan, while at the same time looking further ahead to delivery of the full Growth Strategy by 2050.

Major Transport Infrastructure Schemes

5.29 The borough's historic lack of public transport choice has already been discussed. Bexley only benefits from local bus and national rail services. This section highlights opportunities for beginning to turn this situation around and establish more of a culture where public transport use is the norm for many journeys, particularly for travel to/from the main growth centres in the borough.

5.30 Not all schemes listed in the public transport section of Table 10.1 in the London Plan are required to deliver the development in the local plan in the plan period. It is important to distinguish between those that do and those that do not.

5.31 Table 5.2 below sets out the transport schemes described in this chapter and whether they are featured in Table 10.1 of the London Plan, whether they are specifically required to deliver the development in the Reg 19 draft local plan or whether they are supported by the local plan in order to ensure their future delivery. Individual schemes are described in more detail in the next sections of this chapter, followed by how the draft local plan should make safeguarding provision for schemes required for to support future growth.

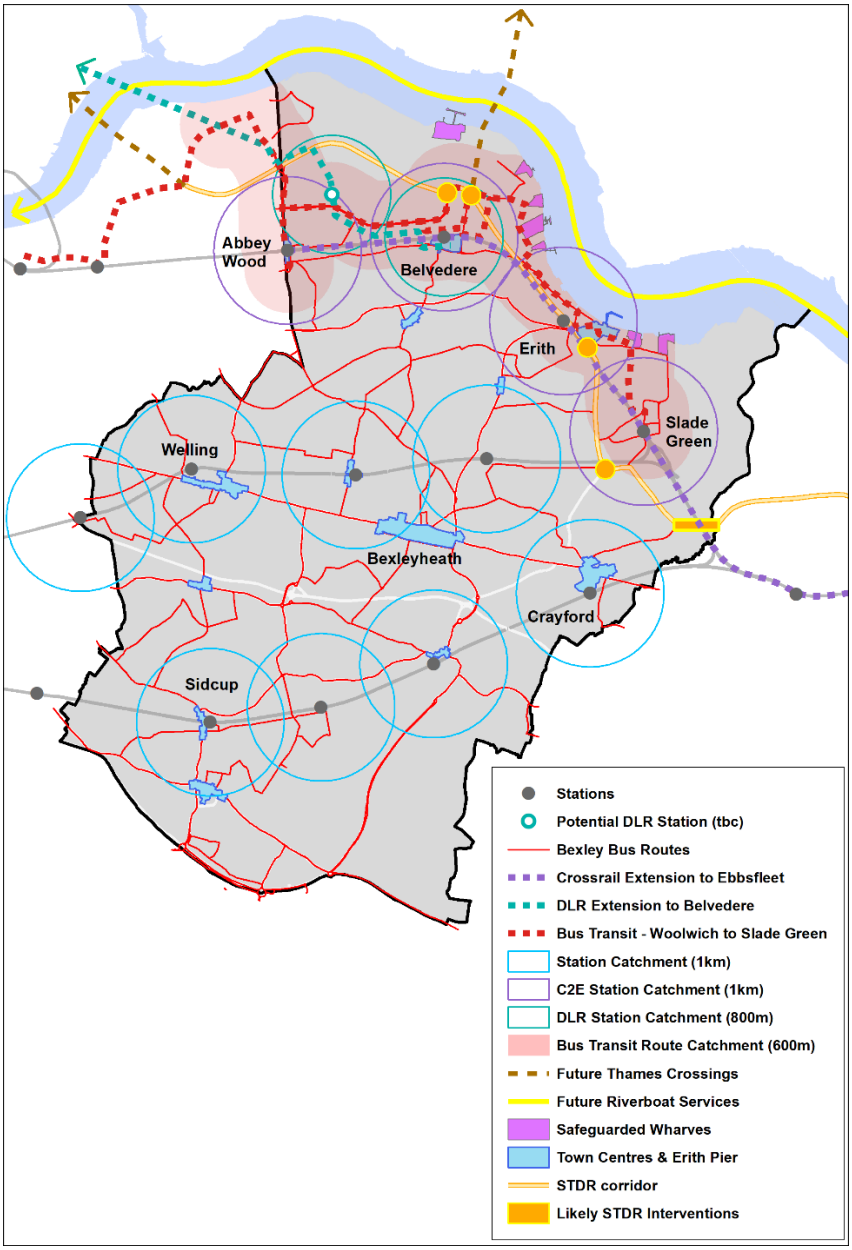
Table 5.2 - Requirements for Major Transport Schemes

Transport Scheme	In London Plan Table 10.1	Required to Support the Bexley Reg 19 draft Local Plan	Future development supported in Local Plan policy
Elizabeth Line	Yes	Yes	N/A
Bus Transit (Abbey Wood-Slade Green)	Yes: Bus Transit pilot schemes	No (but delivery could occur within the plan period and support additional growth),	Yes
DLR extension to Thamesmead and Belvedere	Yes, in part: DLR extension to Gallions Reach and Thamesmead (subject to further assessment)	No, (but delivery could occur within the plan period and support additional growth)	Yes

Transport Scheme	In London Plan Table 10.1	Required to Support the Bexley Reg 19 draft Local Plan	Future development supported in Local Plan policy
C2E (Crossrail to Ebbsfleet)	Yes: Elizabeth line extension/rail enhancements east of Abbey Wood	No (delivery likely to be after the plan period)	Yes
Thames crossing: Gallions Reach	Yes: River crossing at Gallions Reach and/or Belvedere (subject to further assessment)	No (delivery likely to be after the plan period).	Yes
Thames crossing: Belvedere-Rainham	Yes: River crossings (public transport) in East London (subject to further assessment)	No (delivery likely to be after the plan period)	Yes
Thames River Bus services serving upgraded pier at Erith	Yes: River services extensions to the east (subject to further assessment)	No (a useful addition to the borough's connectivity – including cross-river, but not essential to the local plan)	Yes
STDR – targeted improvements	No	Yes (but the nature and extent of the interventions need further investigation)	Yes

5.32 Figure 5.1 below shows a map diagram with the locations of the Major Transport Schemes, including those identified as needed in the borough to support the development in the local plan.

Figure 5.1 - Proposed major transport schemes



Bus Rapid Transit and Transit-Oriented Development

LIP3 Objective 15	**To secure the key transport infrastructure investment of an extension of the DLR from Gallions Reach through Thamesmead to Belvedere; the completion of a public transit corridor from North Greenwich to Slade Green and the completion of road-based river crossings connecting Belvedere with Rainham and Thamesmead with Gallions Reach** **Table 2.18 (Borough Transport Objectives), Bexley LIP3**

5.33 LIP Objective 15 highlights the need for a 'public transport corridor' starting in the Royal Borough of Greenwich and running through the north of the borough, forming a set of 'loops and feeders',

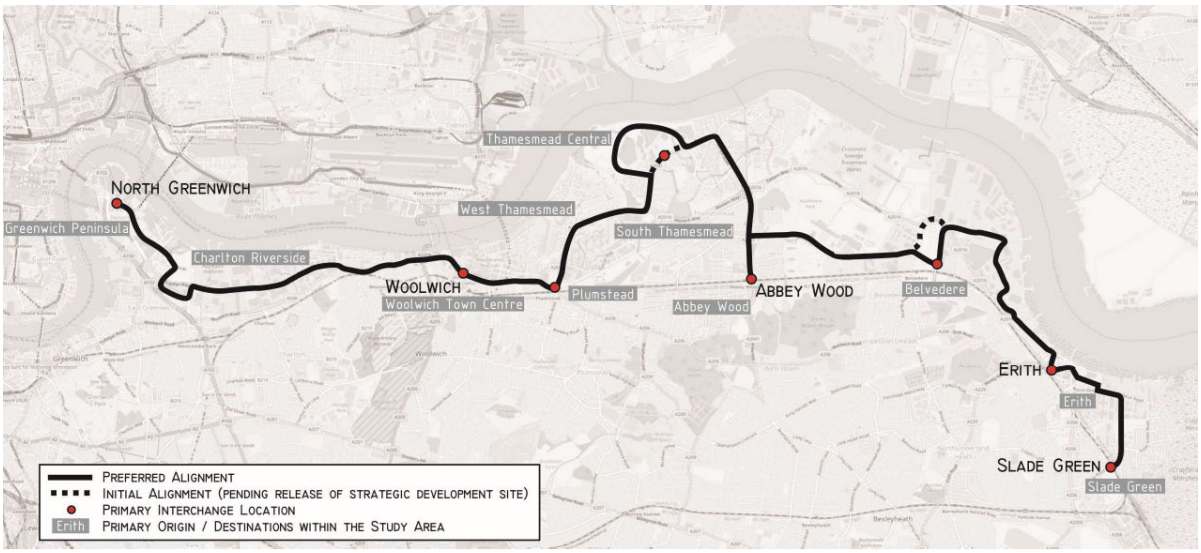
providing connections with rail stations, town centres, existing places and new development. This will most likely be delivered in the form of Bus Transit.

5.34 In the LPTA, the terms Bus Rapid Transit, BRT and Bus Transit are used interchangeably to mean a high quality, mostly segregated, bus-based rapid transit system.

5.35 The aim for a North Greenwich-Slade Green bus transit corridor arose from a consultants' report commissioned jointly by TfL, RB Greenwich, LB Bexley and Peabody in 2017 to look at the feasibility of delivering a mostly-segregated corridor for a new bus transit system. A diagram showing the potential route corridor is shown as Figure 5.2.

5.36 The report provided encouragement that a bus transit scheme would not only be feasible but could potentially be delivered at a cost of £24.4 million, with the opportunity to save some £1.6m in capital costs for buses and a potential reduction in overall bus operating costs of £2m per year. In part, this concept revisited the former Greenwich Waterfront Transit proposal abandoned by Mayor Boris Johnson in 2009.

Figure 5.2 - Potential bus transit route corridor



5.37 The Bexley Growth Strategy envisages bus transit as an important and necessary catalyst for enabling development to come forward in the right way in the north of the borough. It highlighted the importance of a high profile "intermediate mode" public transport solution in its first Transport Ambition. An important part of that approach was to secure transport- [or transit-] oriented development as a key solution (see www.tod.org and https://www.itdp.org/2018/02/26/tod-and-affordable-housing/). This would provide linked places with a much-reduced role for the car, with the transit route corridor at the heart of the development layout, densest around the public transport stops/nodes – along with more space for walking and cycling. Bus transit has emerged as the means of achieving the public transport component.

5.38 A bus transit scheme has also featured in the options appraisal work undertaken as part of the C2E Study (see section below and figure 5.6). Although not selected by the C2E Partnership as the

preferred approach to improving connectivity between Abbey Wood and Ebbsfleet, bus transit is still considered an important element of the overall transport package for growth in north Bexley as the study showed it generated significant positive transport user impacts and improvements to transport reliability in the area.

5.39 More recently, the Thamesmead and Abbey Wood OAPF has identified a core corridor for bus transit between Woolwich, Thamesmead and Abbey Wood, which could act as a bus transit pilot for London. If successful, bus transit could be extended further east into the Bexley Riverside OA. Successful bus transit in north Bexley is not dependent on whether the corridor is extended west beyond Woolwich. Bus transit features in all but the lowest development options in the OAPF.

5.40 Bus Rapid Transit (BRT) is a high-quality bus-based transit system that delivers fast, comfortable, and cost-effective services, potentially at metro-level capacities. It does this through dedicated lanes, with busways and iconic stations, off-board fare collection, and fast and frequent operations. As BRT can contain features similar to a light rail or metro system, it is much more reliable, convenient and faster than regular bus services. With the right measures, BRT is able to avoid the causes of delay that typically slow regular bus services, like being stuck in traffic and queuing to pay on board. The transit system would provide local transport to employment, education, health, leisure and shopping.

5.41 BRT can provide a tram-like quality image and ride performance at a fraction of the cost of a tram-based system. It does not require extensive re-laying of statutory undertakers' equipment or a new, land-hungry vehicle depot. ITP's bus transit report cites Nantes (France) as being an excellent example of high-quality bus transit– which is marketed as an integrated part of the city's tram network, rather than its bus service network.

5.42 The main requirement for successful BRT is to ensure as much segregation as possible from other traffic. That will enable shorter and more reliable journey times to be achieved. Bus transit is usually branded as something quite distinct from normal bus services, though there needs to be joined-up thinking about how transit services might be integrated with the wider bus network. There is a hierarchy of ways in which bus transit's "right of way" can be achieved (particularly to provide faster journey times) - segregation and priority often being the key:

- Off street bus-only roads/links and continuous busways;
- On-street bus lanes – continuous, or at least enough to avoid traffic delays;
- Traffic lights with green preference for BRT vehicles (e.g. bus pre-signals); or
- Quiet streets with low traffic and limited/no on-street parking.

5.43 Usefully, bus transit offers considerable flexibility; it can readily be introduced section-by-section and grown 'organically', so the network evolves over time as development progresses and passenger demand increases. Bus transit vehicles can run along ordinary roads before dedicated infrastructure is in place. And other bus services can use the bus transit corridor if it can offer bus priority advantages over sections of route. Importantly, according to BRT-UK, a bus transit route can cost between a sixth and a tenth of an equivalent tram system per km.

5.44 Bus transit vehicles can (but do not have to) be externally guided (by kerbs, optical- or buried wire-based systems); or be simply steered by the driver. The Council's concern with kerb guidance is its negative impact on providing attractive public realm; and neither optical nor wired guidance have yet been proven on a UK bus transit system. Even at pinch points, external guidance can often be avoided simply by allowing BRT drivers to give way to one another by line-of-sight. BRT proposals within Bexley are therefore unlikely to use external guidance; that avoids the associated engineering complexity (and therefore cost).

5.45 Though bus transit has been slow to take off in the UK, many places now have schemes in place or are at the planning stage. Some schemes have come forward to open up areas for new development and many are associated with public realm improvement. Some have come about in order simply to provide better public transport services. Good examples include Dartford's Fastrack, the Belfast Glider and Crawley's Fastway (all differently branded from the wider bus network).

Table 5.3: Potential Measures along the Bus Transit Route

Section of Proposed Bus Transit Route	Comments
1a/1b Harrow Manorway, South Thamesmead	Healthy Street scheme complete, including bus priority. Increased bus priority will be possible as required land becomes available.
2 Yarnton Way, South Thamesmead	Design developed and under discussion with Peabody, who own some of the land required, to deliver a Healthy Street scheme with bus priority. Land could be dedicated under s106 agreements for adjacent developments.
3/4 Belvedere	The route across Belvedere may change over time, as land and supporting infrastructure becomes available. There is no street infrastructure at present that would allow straightforward route access to and beyond Belvedere station other than existing roads, which are indirect.
5 Church Manorway, North Belvedere	On-street running proposed
6 West Street, Erith	On-street running proposed, which will require setting back of some on-street parking to provide a 'quiet street' for uninterrupted running.
7/8 Erith town centre	The Erith Links scheme will give bus transit a route opportunity via Walnut Tree Road and Bexley Road and Colebrook Street to serve both Erith station and the town centre, running on-street. There is also an opportunity for provision along Erith High Street
9 Manor Road, Erith	Land will be required for bus transit for a 'short-cut' busway between the eastern end of James Watt Way and Manor Road near Frobisher Road.
10 Erith to Slade Green	Subject to design and land availability a north-south busway will be needed between Manor Road and Richmer Road. On Richmer Road, attention will be given to limiting on-street parking to provide a 'quiet street' for bus transit, with a possible point closure (buses only) at the southern end.

11 Slade Green	Initially, the route to Slade Green station will be on-street. A busway will be sought through land south of Slade Green Road in the future, to provide a straighter and shorter alignment between Richmer Road and the station.

5.46 In the Annex to chapter 5, there is a corridor review of individual sections of the bus transit route from Abbey Wood to Slade Green. It provides information about the route taken; the measures feasible on that route to deliver service performance suitable for bus transit; and where some additional land might need to be taken. Key points for those sections of route are summarised in table 5.3.

5.47 Safeguarding land for bus transit is discussed later in this chapter.

5.48 At present, bus transit (whether the potential Thamesmead pilot scheme or the full route through north Bexley), is unfunded and requires further technical design work before a business case can be made. Once the pilot scheme is in place, the next stages of implementation are likely to be from west to east. TfL have said that the pilot scheme could be implemented by 2025, subject to available funds. The Yarnton Way (South Thamesmead) section could follow soon after.

DLR Extension to Belvedere

LIP3 Objective 15	**To secure the key transport infrastructure investment of an extension of the DLR from Gallions Reach through Thamesmead to Belvedere; the completion of a public transit corridor from North Greenwich to Slade Green and the completion of road-based river crossings connecting Belvedere with Rainham and Thamesmead with Gallions Reach.** **Table 2.18 (Borough Transport Objectives), Bexley LIP3**

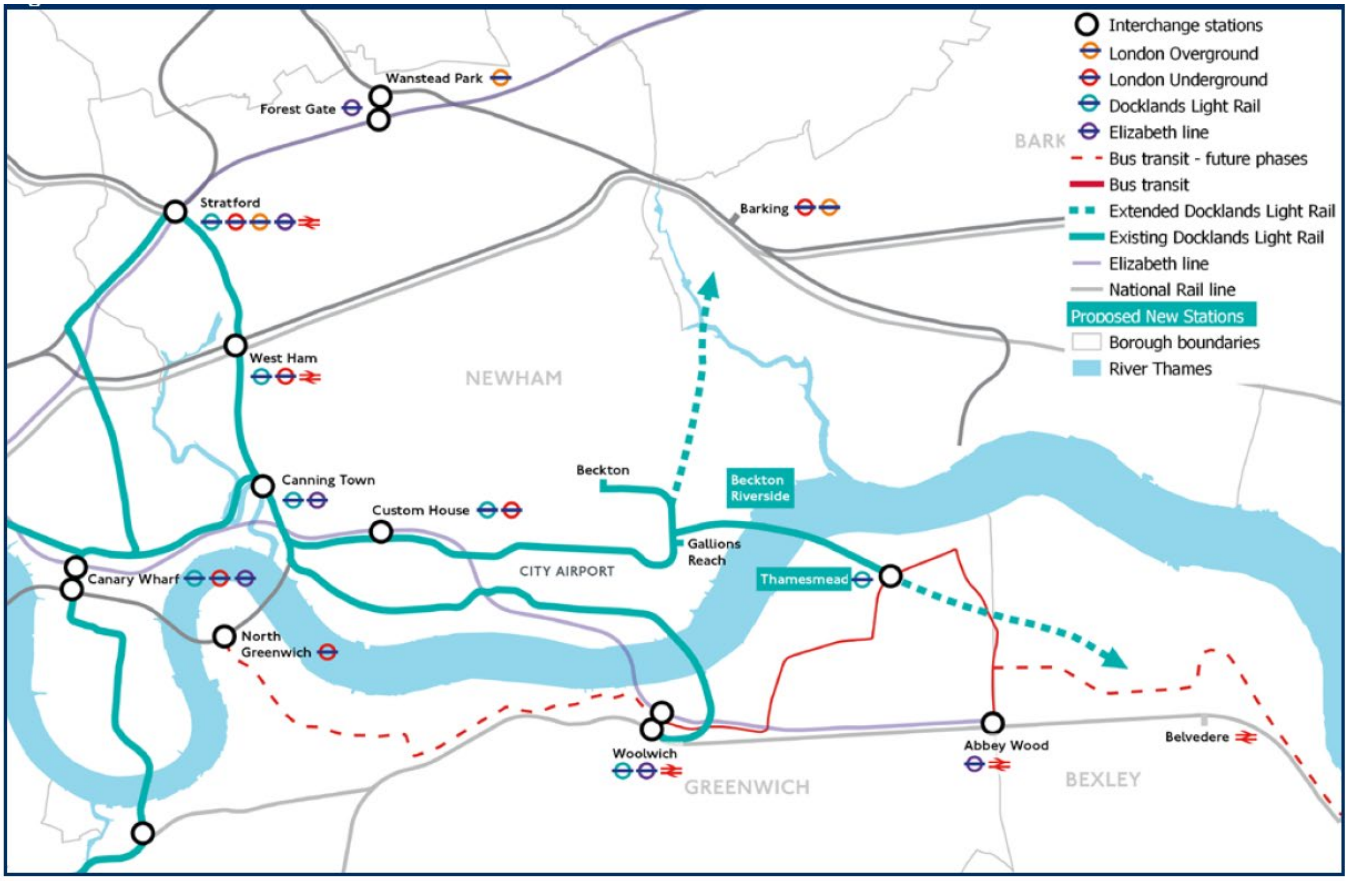
5.49 Table 10.1 in the London Plan includes DLR extension from Gallions Reach to Thamesmead "subject to further investigation".

5.50 Historically, Thamesmead has been isolated from London's rail network, being so far north of the North Kent Line at Plumstead or Abbey Wood. In TfL's December 2014 consultation on public transport links needed, associated with Thames crossings east of Silvertown, many of the consultation responses came from Thamesmead, with links to/from Thamesmead making up more than half of the top ten places needing public transport enhancements.

5.51 The MTS identified a possible DLR extension to Thamesmead to provide a cross-Thames public transport link (in MTS Proposal 95, which expects other future Thames crossings in east London to follow after opening of Silvertown Tunnel, DLR to Thamesmead and the Lower Thames Crossing – see later in LPTA Chapter 5). TfL then undertook extensive modelling in 2018/19 to examine DLR extension options, as well as other public transport options for Thamesmead. This work was a key input into the transport solutions chosen for the Thamesmead and Abbey Wood OAPF. Potential routeing beyond Thamesmead was also looked at, to provide an interchange with the North Kent Line at either Abbey Wood or Belvedere. Reaching Abbey Wood was found to be particularly

challenging for DLR in engineering terms, while reaching Belvedere, on a viaduct, looked technically feasible. TfL have further technical work in progress on this DLR extension.

Figure 5.3 - Potential future extensions of DLR and Bus Transit



5.52 DLR to Thamesmead (and potentially beyond) is a key requirement to support the higher growth scenario in the OAPF – the option that generally found favour at public consultation. The preferred route will leave the DLR Beckton branch between Gallions Reach and Beckton, serve new development at Beckton Riverside, then tunnel under the Thames to central Thamesmead. Between Thamesmead and Belvedere, there could be an intermediate station north of Yarnton Way, near St Katherine's Road. TfL's intention at this stage is to design DLR to Thamesmead that would allow for eastward extension. The scheme could be built "within ten years" (according to informal briefings from TfL); it would be feasible therefore, based on the pace at which DLR extensions can be delivered, for DLR to reach Belvedere before the end of the plan period for the Bexley draft local plan – as supported by the Thamesmead and Abbey Wood OAPF – see Figure 3.

5.53 No funding has yet been secured to build the scheme. Project development continues supported by developers from both sides of the Thames.

5.54 A potential DLR extension to Belvedere provides the scope for considerably additional higher density development around Belvedere station in the last five years of the plan period. Likewise, an intermediate station near Yarnton Way could be a catalyst for additional development to the east

side of Southmere lake in South Thamesmead. There are no known plans at TfL for further project development work for the Thamesmead-Belvedere section at this stage.

The C2E Project: extension east of Abbey Wood towards Ebbsfleet

LIP3 Objective 14	**To work with TfL and the Mayor to deliver a Government-led extension of the Elizabeth line to Ebbsfleet.** **Table 2.18 (Borough Transport Objectives), Bexley LIP3**

5.55 The Crossrail to Ebbsfleet (or C2E) project is being promoted by the C2E Partnership – an informal grouping involving GLA/TfL, LB Bexley, Kent County Council, Dartford BC, Gravesham BC, Ebbsfleet Development Corporation, Greater North Kent Partnership and Network Rail. The C2E Group has been collaborating on the project since 2014 and submitted an initial Strategic Outline Business Case (SOBC) document to the Department for Transport (DfT) in November 2018 followed by a revised SOBC in November 2021.

5.56 Table 5.4 sets out the strong policy support base for the project.

Table 5.4 - Policy support for the C2E project

Policy Document	Policy
Bexley Core Strategy (2012)	Policy CS03(b) Belvedere geographic region The vision for the Belvedere geographic region will be achieved by: supporting the development of Crossrail to Abbey Wood, capitalising on the opportunities for enhanced facilities presented by this new transport link, and safeguarding land for potential extension of the line between Abbey Wood, Gravesend and Hoo Junction. Policy CS04(e) Erith geographic region The vision for the Erith geographic region will be achieved by: safeguarding land to enable future extension of Crossrail from Abbey Wood to Gravesend and Hoo Junction, and securing sustainable transport improvements that would enhance accessibility levels, such as the creation of local pedestrian and cycle links Policy CS15 Achieving an integrated and sustainable transport system. The policy confirms the Council will work in partnership to secure the extension of Crossrail eastwards of Abbey Wood.
Mayor's Transport Strategy (2018)	Proposal 86 The Mayor, through TfL and relevant boroughs, will support a Government-led extension of the Elizabeth line eastwards from Abbey Wood to provide up to 12 trains per hour, enabling Good Growth in the Thames Gateway corridor within and beyond London.
Bexley Growth Strategy (2018)	Transport Ambition 4 Maximise connectivity by a choice of means of travel thereby reducing reliance on the car

Policy Document	Policy
	Public Transport Hierarchy: Heavy Rail: North Kent Line and Crossrail train services, including potential Crossrail services extending east from Abbey Wood towards Ebbsfleet (C2E), offering enhanced service frequencies at Belvedere, Erith and Slade Green. 'Intermediate Mode'… [Pointing towards Bus Transit] Buses…
Bexley LIP (2018)	LIP Objective 14 (Table 2.18) To work with TfL and the Mayor to deliver a Government-led extension of the Elizabeth line to Ebbsfleet.
London Plan (2021)	Table 10.1 – List of Public Transport Schemes Elizabeth line extension / rail enhancements east of Abbey Wood Paragraph 10.3.7 An eastward extension to the Elizabeth line could support thousands of new homes and jobs along the route in Bexley and north Kent. The extension could link to High Speed 1 at Ebbsfleet and boost rail connectivity throughout the Wider South East.

5.57 The aim of C2E is to deliver such a step-change in the number of train services between Abbey Wood and Ebbsfleet that it will support the delivery of a significant number of new homes and jobs along the route corridor. Several scheme options have been identified, up to a potential 4-tracking of the North Kent Line for part or the whole of the route.

5.58 The Council won't rely on delivery of the project during the plan period of the Reg 19 draft local plan until the project technical specification has been determined in more detail and the business case accepted by Government. It is currently assumed that the opportunities to deliver additional, significant development growth arising from the project will be realised after 2036 (in the second half of the 30-year growth strategy for Bexley). It is possible that construction of the C2E project could start before the end of the plan period and a review of the plan could be triggered if the potential development benefits of C2E could be exploited sooner. It is important however that development envisaged in the Bexley draft local plan does not compromise C2E's ultimate delivery.

5.59 The public consultation on Crossrail in 2003 included a south-east branch serving Ebbsfleet via Canary Wharf, Abbey Wood and Dartford. In 2004/05, the Abbey Wood-Ebbsfleet section was deleted from the project; "performance pollution" problems were anticipated from running Crossrail trains on the same 2 tracks as the (then) unreliable South Eastern services. Much better reliability was needed for a network of services that would be running every 2½ minutes through the central core section. The south east branch would therefore terminate at an interchange with the North Kent Line at Abbey Wood.

5.60 Ebbsfleet is no further out of central London than Shenfield and a lot closer than Reading – the terminal points for the Elizabeth line north-east and western branches respectively.

5.61 During 2004/05, the local authorities from Bexley to Gravesham lobbied the Department for Transport to make provision for further extension to Ebbsfleet later. The result was a safeguarding direction for Abbey Wood to Hoo Junction, published in draft by the Secretary of State for Transport in 2005 and as a formal Direction in 2009 (see https://www.crossrail.co.uk/route/safeguarding/abbey-wood-to-hoo-junction), which is still in place. The safeguarding had in mind Crossrail services reaching Gravesend, with a train stabling point at Network Rail's yard at Hoo Junction.

5.62 Starting with a prospective C2G (Crossrail to Gravesend) project from 2014, the (now) C2E Group sponsored a series of supporting technical studies that culminated in the SOBC submission to DfT in November 2018. This identified the potential for 55,000 new homes and up to 50,000 new jobs that the project could unlock. It was estimated that some £20m would enable further development of the project, up to securing the necessary legal powers to deliver it. According to the 2018 SOBC, C2E can't reach a Benefit-Cost Ratio of more than 2 on transport benefits alone. But the business case is certainly strong enough if the additional potential housing delivery and new jobs are factored in.

5.63 Network Rail's 2018 Kent Area Route Study report (see https://cdn.networkrail.co.uk/wp-content/uploads/2018/06/South-East-Kent-route-study-print-version.pdf - May 2018, page75) highlighted C2E, recognising its operational and wider development benefits, anticipating that the project could cost some £1.5 billion (excluding optimism bias and land costs) and take up to ten years to design and build.

5.64 The C2E Group also put a case for C2E to the Treasury, to the National Infrastructure Commission and to the Thames Estuary 2050 Growth Commission. The Thames Estuary Commission then identified the C2E project as one of its priorities for the corridor in its report in June 2018 (see https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/718805/2050_Vision.pdf and also https://www.bbc.co.uk/news/uk-england-44601963). The Government (MHCLG) response to that report was published in March 2019 (see https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/789048/Thames_Estuary_Commission_Response.pdf page 40), which featured the following:

> **Transport services from Abbey Wood to Ebbsfleet**
> We are pleased to announce that we are supporting local partners to develop a business case for enhancing transport services between Abbey Wood and Ebbsfleet and the Ministry of Housing, Communities and Local Government will provide £4.85 million to support development of low-cost proposals, subject to suitable housing ambition. We are clear that this work should be undertaken with a view that any decision on future transport enhancements would be subject to consideration of a business case and would require a detailed evidence base that demonstrates that the scheme would be both technically feasible, offer value for money (including the identification of funding) and deliver ambitious new housing in the area.
> **Thames Estuary 2050 Growth Commission, June 2018**

5.65 A Memorandum of Understanding between the member bodies of the C2E Group, the Ministry of Housing Communities and Local Government (MHCLG) and the Department for Transport (DfT) was signed in January 2020. With that in place, MHCLG released £4.85m to identify and explore the range of options for enhancing capacity and connectivity in the strategic Abbey Wood-Ebbsfleet corridor with a view to delivering ambitions and sustainable housing and economic growth in the area (see https://www.london.gov.uk/decisions/add2455-abbey-wood-ebbsfleet-connectivity-study). This included working up combined spatial and transport propositions in more detail including, at DfT's request, analysis of cheaper, non-rail solutions to be factored into the optioneering and appraisals, on a "mode-agnostic" basis.

5.66 Three workstreams were pursued (Land & Housing, Technical & Engineering, Funding & Financing), which culminated in an overall report with project recommendations submitted to government in November 2021. This included a full appraisal of scheme solutions using the DfT WebTAG (see https://www.gov.uk/guidance/transport-analysis-guidance-webtag) process, completing Stage 1 and partially progressing Stage 2 appraisals – sufficient to support a fully compliant and updated SOBC.

5.67 Three options were shortlisted within the report. These are summarised in figures 5.4 to 5.6 below.

Figure 5.4 Option 1: Elizabeth Line Extension from Abbey Wood to Northfleet/Ebbsfleet and Gravesham (sharing existing tracks with National Rail services)

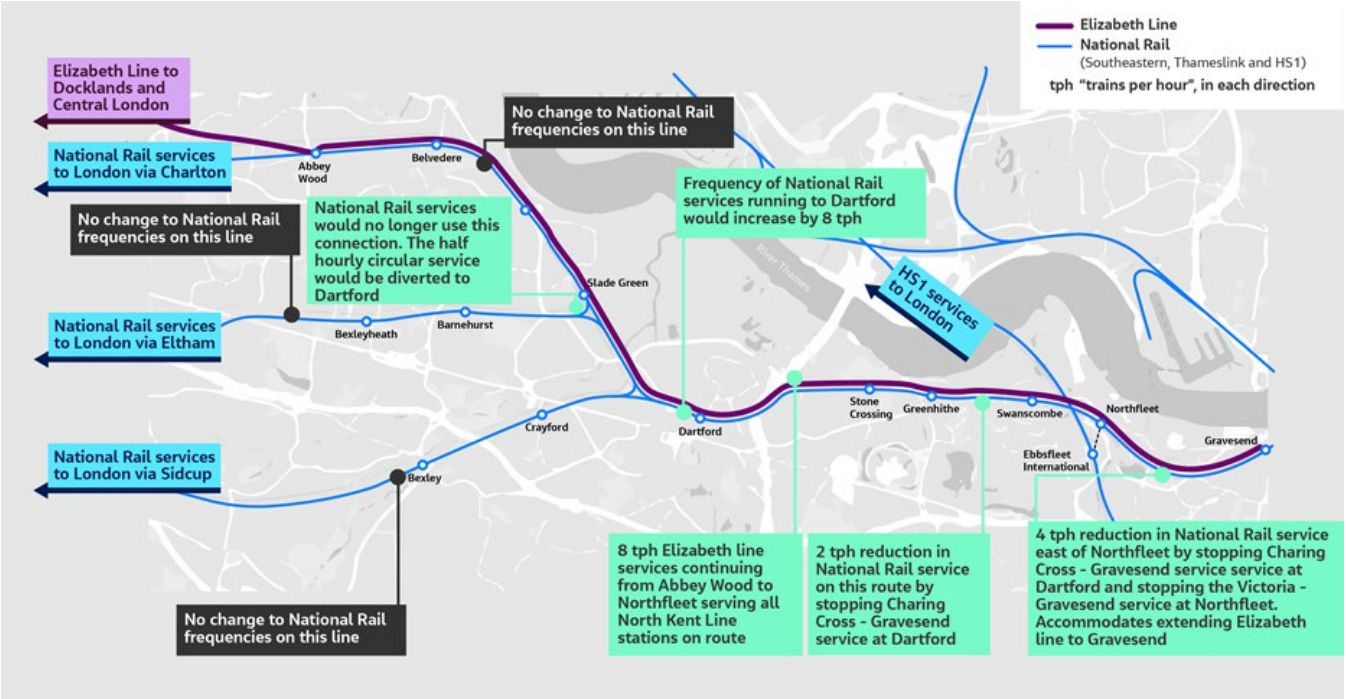


Figure 5.5 Option 2: Elizabeth Line Extension from Abbey Wood to Dartford (using dedicated tracks) with Increased National Rail Service Frequencies between Dartford and Northfleet

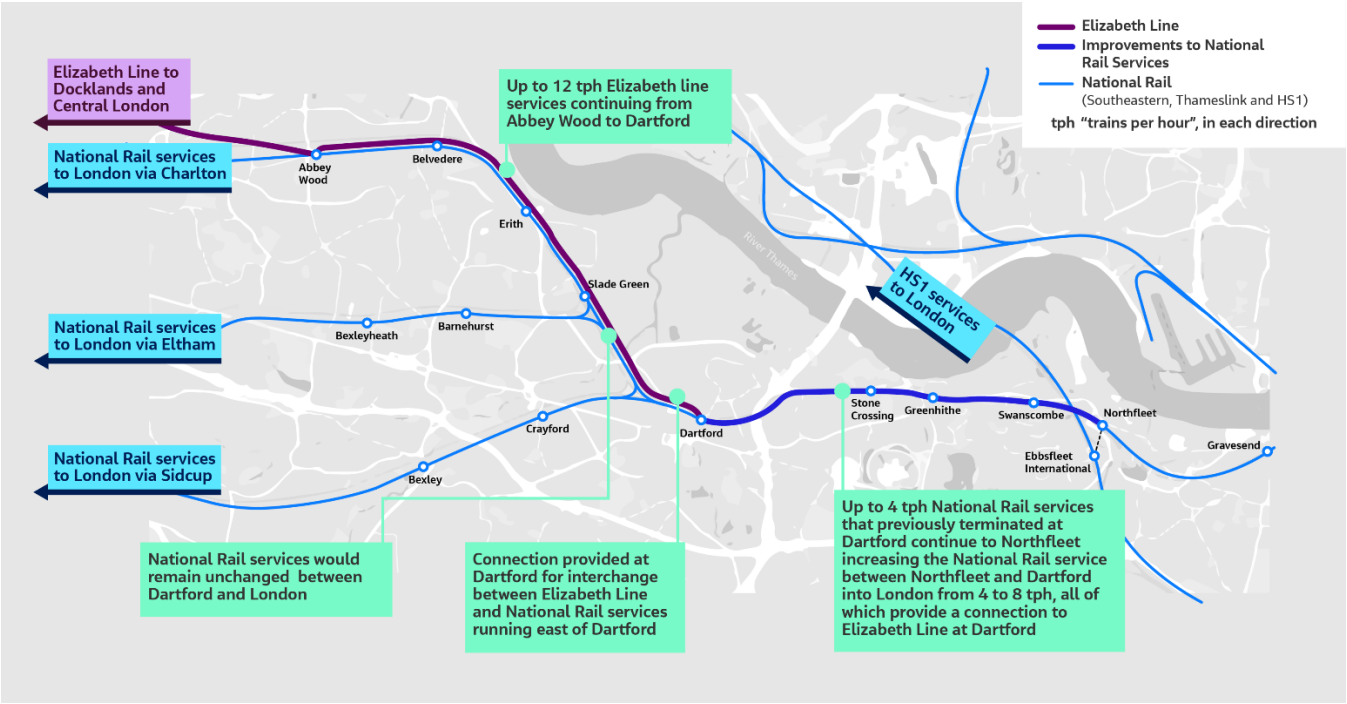
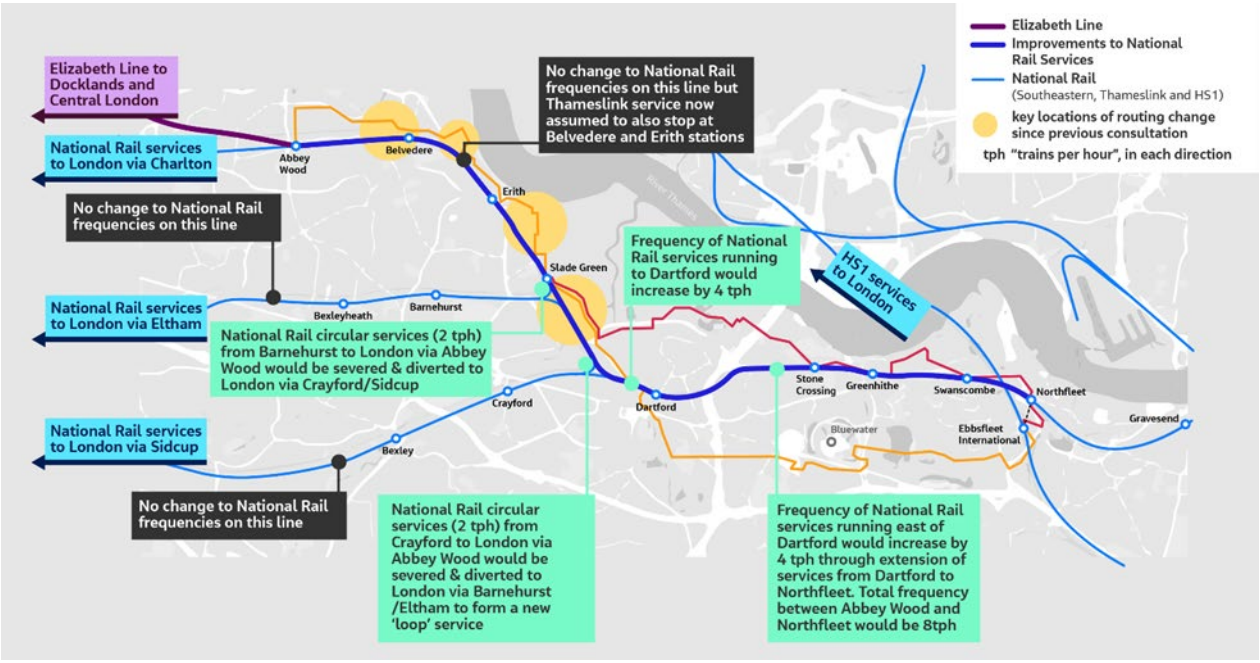


Figure 5.6 Option 3: National Rail Frequency Improvements Combined with a New Bus Rapid Transit (shown in amber and red within the graphic)

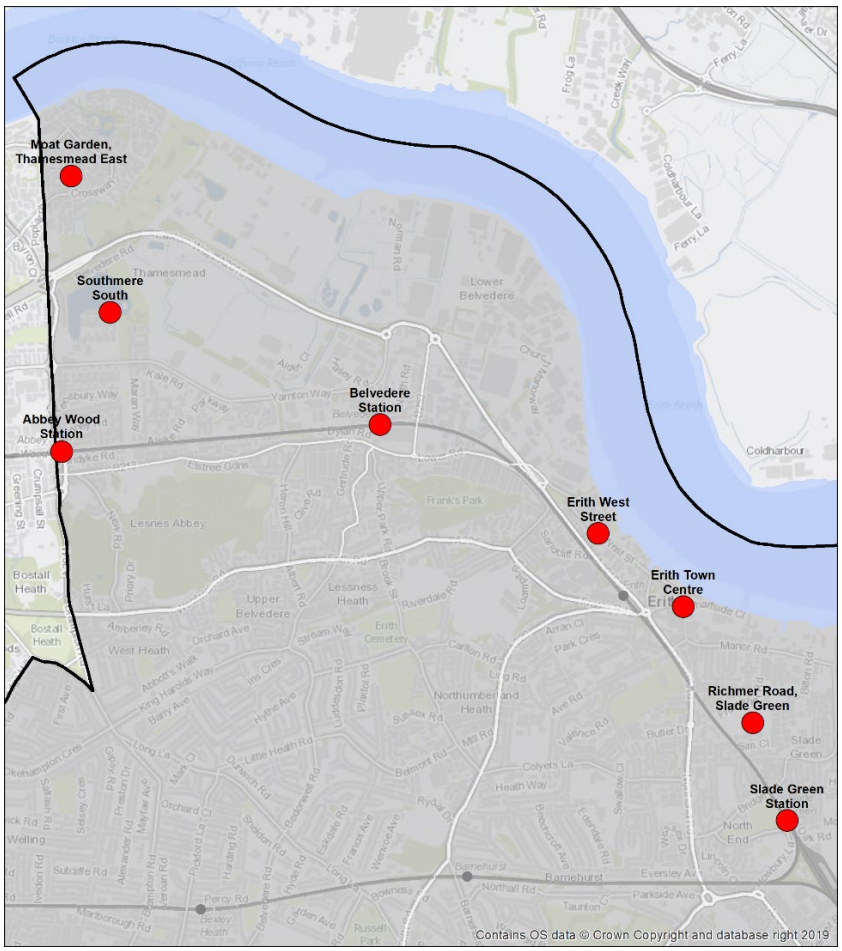


5.68 The study identifies Option 1 as the best performing option given its impacts on improving connectivity and enabling growth. The SOBC is currently with government for evaluation with a response expected within the first half of 2022.

5.69 Potential scheme delivery is very much dependent on getting government agreement to the new business case and securing funding for further development and implementation. A C2E based scheme could potentially be under construction by the mid-2030s and completed as soon as 2037/38 – placing it into Network Rail's Control Period 9 (CP9). For the purposes of the local plan, it is best to assume that the opening of C2E will not be before the end of the plan period (2021-2036). If it becomes likely that the C2E opening might be somewhat sooner, that could trigger the need for an early local plan review.

Potential PTAL Improvements

Figure 5.7 – Locations where potential PTAL uplift have been assessed



5.70 Table 5.5 below shows the 2019 Public Transport Accessibility Level (PTAL) score and potential future PTALs at eight different places across the north of the borough (as shown in the map diagram at Figure 5.4) that might benefit particularly from Bus Transit, DLR to Belvedere and/or C2E. It assumes peak service levels of 12 buses per hour on bus transit, 8 trains per hour on DLR to Belvedere and up to 12 trains per hour on C2E. It shows which scheme benefits each location the most. It particularly shows a strong PTAL increase at Southmere south with both bus transit and the DLR extension in place – highlighting how an intermediate DLR station would offer a major opportunity to locate more development close to it.

Table 5.5 Potential PTAL improvements with new infrastructure

Location	2019 PTAL	PTAL: Elizabeth line open (2022)	PTAL: Add BRT	PTAL: Add BRT and DLR extension	PTAL: Add BRT, DLR extension and C2E	PTAL: Add BRT and C2E
Abbey Wood Station	4	5	5	5	5	5
Moat Garden, East Thamesmead	2	2	2	3	3	3
Southmere south	1b	2	2	4	4	4
Belvedere station	3	3	3	4	5	4
Erith, West Street	2	2	3	3	3	3
Erith town centres	3	3	3	3	4	4
Slade Green, Richmer Road	1a-1b	1a-1b	2	2	2	2
Slade Green Station	3	3	3	3	4	4

New Thames Crossings and Use of the Thames

LIP3 Objective 11	**Encourage the use of the River Thames as a transport corridor especially for freight, including safeguarding wharves used for this purpose**
LIP3 Objective 15	**To secure the key transport infrastructure investment of an extension of the DLR from Gallions Reach through Thamesmead to Belvedere; the completion of a public transit corridor from North Greenwich to Slade Green and the completion of road-based river crossings connecting Belvedere with Rainham and Thamesmead with Gallions Reach** **From Table 2.18 (Borough Transport Objectives), Bexley LIP3**

New Thames Crossings

5.71 In the 2012 Bexley Core Strategy, policy CS15gave support for the development of major new transport infrastructure proposals including river passenger services and crossings.”.

5.72 The Council supports road-based Thames crossings at both Gallions Reach and Belvedere, with a preference for Belvedere to open first. Neither scheme is essential to deliver the development in the Bexley draft local plan. Scheme delivery after 2036 is most likely.

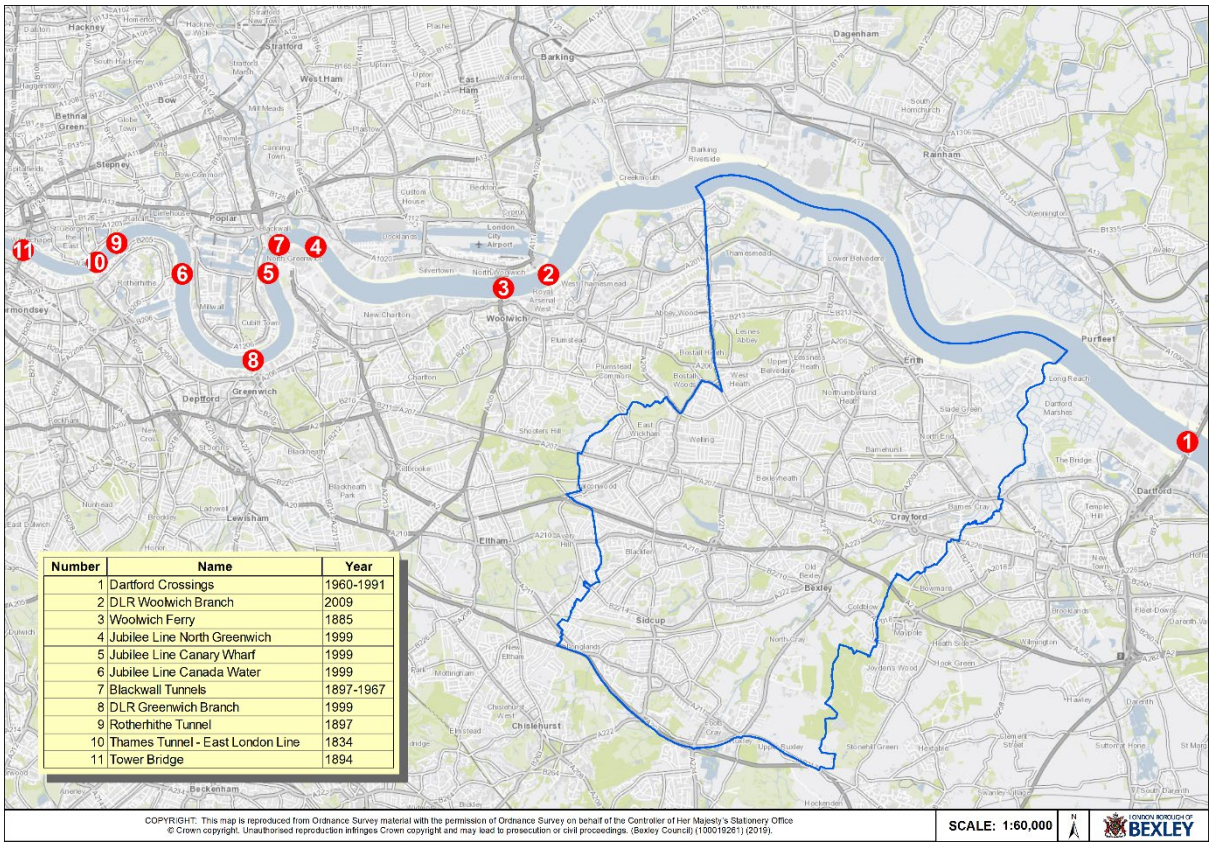
5.73 As well as a DLR extension to Thamesmead and Belvedere, the Council supports further investigation into bus transit or light rail capability for both the Gallions Reach and Belvedere crossing proposals.

5.74 There has long been an imbalance in the number of Thames crossings east and west of Tower Bridge. Including both road and rail crossings, there are 11 river crossings between Tower Bridge and Dartford (Tower Bridge, East London Line, Rotherhithe Tunnel, Jubilee Line, DLR Greenwich branch, Jubilee Line, Blackwall Tunnels, Jubilee Line, Woolwich Ferry, DLR Woolwich branch and the Dartford Crossing – of which 5 were opened in/after 1999), compared with 32 river crossings from Tower Bridge to Richmond, the same distance (19 miles) west.

5.75 Likewise, Bexley is one of only two riparian London boroughs on the south side of the Thames with no fixed transport link (bridge/tunnel) across the river – the other is Lewisham. Bexley's riverside is 9km long; Lewisham's is less than 1.5km long.

5.76 This has had a range of socio-economic impacts over the years. Even today, it depresses necessary connectivity – especially for short, straight-line journeys. For people, it makes it harder to reach job opportunities, education and other things they need. For businesses, it costs more to access potential markets, suppliers and employees.

Figure 5.8 - Thames Crossings: Dartford Crossing to Tower Bridge



Thames Crossings Timeline

5.77 The following table is a timeline showing key dates since 2008 for proposed future Thames Crossings east of Tower Bridge.

Table 5.6 - Thames Crossings Timeline from 2008 to the late 2020s

Date	Description
2008 November	London Mayor Boris Johnson announces that he would drop the contentious Thames Gateway Bridge project for a new six-lane two-way highway bridge across the Thames at Gallions Reach (West Thamesmead to Beckton). Bexley opposed the crossing on the grounds of the accompanying traffic impacts. Safeguarding for a future crossing in the same location was retained (and remains extant).
2009 January	DfT consults on three potential route options for a Lower Thames Crossing downstream of Dartford. Technical study commissioned in April 2009.
2010 May	Mayor's Transport Strategy (MTS2) proposes a potential "package" of new river crossings in east London, including: A new fixed link at Silvertown An upgraded Woolwich Ferry and possible new ferry at Gallions Reach Local links for pedestrians and cyclists Longer-term fixed link at Gallions Reach Encouragement of cross-Thames mode shift away from the car Support for overcoming congestion at Dartford River Crossing
2012-2016	Series of public and stakeholder consultations by TfL on Thames crossings in east London. In turn, these established: Mayoral support for progressing a tunnelled crossing at Silvertown; and Mayoral support in principle for new 'local' multi-modal fixed crossings at Gallions Reach (*without* an interim ferry scheme – which the Mayor had hoped might replace the Woolwich Ferry) and at Belvedere (to Rainham). In successive consultation responses the Council came to a position of support for tunnelled crossings at both Gallions Reach and Belvedere, progressed together.
2014 July	TfL consults specifically on crossings east of Silvertown and publishes a series of technical reports on river crossing options, with a focus on Gallions Reach (for which a large amount of historic background technical work was already available) and Belvedere (still an early concept at that stage).
2014 December	TfL consults again on east of Silvertown crossings, this time focussed on potential public transport needs/links. Of the public's top ten missing cross-Thames public transport connections, seven are to/from Thamesmead.
2015 October	Statutory consultation on Silvertown Tunnel in preparation for submission of a draft Development Consent Order.
2015 December	Mayor Boris Johnson announces a package of 13 new Thames crossings from Fulham downstream to the London-Kent boundary.

Date	Description
2016 January	DfT consults on whether the Lower Thames Crossing should involve providing extra capacity at Dartford or a new alignment east of Gravesend. Bexley disagreed with the Dartford option: risk of undermining case for future crossing at Belvedere and operational risk of putting all additional capacity in one place.
2016 October	Incoming Mayor Sadiq Kahn announces a new package of just five Thames crossings in east London for further investigation, including two options to address the shortfall in public transport connectivity for Thamesmead (DLR extension and/or London Overground extension). No road-based crossings are included.
2017 April	Secretary of State for Transport announces preferred alignment of Lower Thames Crossing.
2018 May	TfL's Silvertown Tunnel project gained its Development Consent Order. Bexley's representations had included traffic levels on the A2 and to be part of the Silvertown Tunnel Implementation Group (STIG), who would oversee delivery of related road and public transport solutions.
2018 October	Highways England's statutory consultation on the Lower Thames Crossing. Supplementary consultation Jan 2020. Bexley raises concerns about traffic impacts, highlighting predicted increased traffic on A2 east of M25. Woolwich Ferry closes for upgrades.
2019 February	Woolwich Ferry reopens with improved docking arrangements. Two new ferries were built for use on the service in 2018, offering quicker loading/unloading and 14% more carrying capacity.
2019 November	TfL's contract to design, build and finance Silvertown Tunnel awarded to RiverLinx Limited, a consortium made up of Aberdeen Standard Investments, BAM PPP PGGM, Cintra, Macquarie Capital and SK Engineering & Construction.
2020 October	DCO application submission for Lower Thames Crossing.
2020 November	DCO application for Lower Thames Crossing withdrawn
2021/22	Expected resubmission of Lower Thames Crossing DCO
2025	Expected opening of Silvertown Tunnel. On its completion, tolls will be introduced on the Blackwall and Silvertown Tunnels – likely to be a feature of all new road-based Thames Crossing capacity in East London.
2027	Expected opening of Lower Thames Crossing.

5.78 TfL undertook public consultation several times between 2012 and 2016 on Thames crossing proposals east of Tower Bridge. TfL's Gallions Reach and Belvedere crossings consultation in winter 2015/16 (see https://consultations.tfl.gov.uk/rivercrossings/east-of-silvertown/user_uploads/gallions-reach-and-belvedere---final-report2.pdf, especially Table 6). asked the public to respond particularly about missing cross-Thames public transport connections

that these crossings could help unlock. This drew out a range of responses about lack of connectivity to/from and within Thamesmead to the extent that Thamesmead featured in eight out of the top ten responses about the need for new/better public transport links.

5.79 TfL commissioned strategic transport modelling to consider the Bexley Growth Strategy proposition in 2014/15. That work supported the view that new road-based Thames crossings were not essential to delivering the Growth Strategy. The Belvedere crossing could positively benefit commercial growth in the north of the borough by enabling much easier access to workforce, suppliers and markets north of the Thames; it may even have a positive effect on land values.

5.80 In TfL's 2014 crossings consultation, the Belvedere Crossing was put forward as one of three proposed road river crossings in the area, along with Silvertown Tunnel and a Gallions Reach Crossing. The alignment of the Belvedere Crossing is to be northwards from the roundabout junction of A2016 Eastern Way with Yarnton Way in Belvedere towards the A13/Marsh Way interchange in Dagenham near CEME in Havering borough. Bexley's expressed preference is for a tunnel rather than a bridge (a bridge would have to be at least 50m high to meet the air draught requirements of the Port of London Authority and a tunnel would minimise sterilisation of otherwise developable land on the approaches). Some consideration was given to providing a ferry initially and a fixed crossing later but, according to TfL, better value for money would be achieved from going for a fixed crossing in the first place (which reduces whole-life costs).

5.81 The incoming Mayor of London, Sadiq Khan, announced a review of Thames crossings in east London in October 2016 (see https://www.london.gov.uk/press-releases/mayoral/mayor-commits-to-east-london-crossings). Five specific crossings were to be investigated in more detail, with further new road crossing projects for east London effectively shelved:

- DLR extension to Thamesmead
- London Overground extension from Barking Riverside to Thamesmead and beyond
- A pedestrian/cycle crossing between Rotherhithe and Canary Wharf
- A possible ferry service between North Greenwich and the Isle of Dogs
- Making the Silvertown Tunnel project "more public transport focussed"

5.82 The Mayor's Transport Strategy (2018) sets out his support for the Silvertown Tunnel scheme, including the introduction of user charging (Proposal 93). The MTS also recognises "there are no road bridges or tunnels in outer east London" (MTS page 242) and the context of development growth in east and south east London. "Further road crossings in this part of London may be beneficial during the course of this strategy". Any such crossing must include "a strong public transport element" and meet criteria set out in Proposal 95 – including a sequencing putting Silvertown Tunnel (2025), the Lower Thames Crossing (2027) and DLR to Thamesmead (2030?) ahead of other Thames fixed crossing proposals in east London.

5.83 Table 10.1 in the London Plan includes the following on Thames Crossings east of Tower Bridge:

- DLR extension from Gallions Reach to Thamesmead (subject to further assessment) – which is discussed elsewhere in this section of the LPTA; cost 'medium', timescale 2017-2030.

- River crossing at Gallions Reach and/or Belvedere (subject to further assessment). Cost 'medium', timescale 2030-2041;
- River crossings (public transport) in East London (subject to further assessment). Cost 'medium', timescale 2017-2041. (This is assumed to be in addition to the DLR extension to Thamesmead; probably delivered in combination with a new crossing at Gallions and/or Belvedere).

5.84 There is no evidence that says any of these potential crossings will be built before 2036, although the DLR extension could be delivered "within ten years".

5.85 It is assumed that the reference to London Overground extensions and to other public transport crossings in Table 10.1 does not include the idea of further extending the proposed Barking-Barking Riverside link under the Thames to serve Thamesmead and beyond. This scheme concept was examined as an option as part of TfL's transport strategy to support the OAPF for Thamesmead & Abbey Wood. The Overground extension showed poorer value for money than a DLR extension to Thamesmead from Beckton, through a combination of low predicted revenue and the high costs of tunnel building and operation.

5.86 Of the three Thames crossing schemes in London Plan Table 10.1, delivery of the DLR Thamesmead extension (with a further extension from Thamesmead to Belvedere) is the scheme that has some bearing on the local plan although there is no direct reliance on it. DLR to Belvedere could provide important additional public transport connectivity in the area and increases in proposed development density (most notably at and around Belvedere station).

5.87 Otherwise, following the direction of the Bexley Growth Strategy, development in the local plan should not (and cannot) be predicated on provision of future Thames crossing capacity before the end of the plan period. Even so, the Council will support earliest delivery of the other Thames crossings – especially during the life of the London Plan (to 2041) – and will work with the Mayor and TfL as further technical work progresses. One vehicle for this could be the required technical work to derive a supporting transport strategy for the Bexley Riverside OAPF.

Use of the Thames

Figure 5.9 - Thames Clipper vessel at Westminster

5.88 The Council supports delivery of an upgraded Thames pier at Erith for river bus services. Thames passenger services are a desirable part of the overall transport mix in the north of the borough, but not critical in any way towards delivery of development in the draft local plan.

5.89 There are five safeguarded wharves in the borough, most of which are currently used for bulk freight movement – minerals, waste or 'own-account' goods. The Port of London Authority (PLA) is keen to see this safeguarding continued. The PLA also promotes use of the Thames for transporting smaller freight loads and for passenger services (both along and across the river).

5.90 Erith Pier, the longest pier in London (see https://londonist.com/london/best-of-london/londons-longest-pier), was built in 1842 as a holiday attraction of the town as a riverside resort. The pier turned into a deep-water wharf for industrial use but was abandoned in 1957 as deep-water freight shifted further down the River Thames. Since then, there has been extensive silting that would need to be addressed before the pier could be used for large draft vessels.

5.91 There are still no boat services (passenger or freight) using the pier. Instead, the pier is now a local public amenity, owned by the neighbouring Morrisons supermarket. The Council organises regular events on the pier as part of its activities to revitalise Erith town centre.

5.92 TfL and the Council have established that the pier can be upgraded to take river boat services, but that it requires substantial investment to do so. In the London's Passenger Pier Strategy 2019, both Erith and Thamesmead are identified as potential stopping points for extended Thames River Boat services.

5.93 Table 10.1 in the London Plan includes "River services extensions to the east (subject to further assessment)", with a relatively low-cost and potential delivery by 2030.

A206/A2016 South Thames Development Route (STDR)

5.94 Identification of a dual-carriageway road between Plumstead and Northfleet had been identified by the late 1950s and was safeguarded by the North West Kent Town Map of the time as the Thames-

side Industrial Route (TIR), which became known as the South Thames Development Route (STDR) in the mid-1980s.

5.95 The Greater London Council approved a grade separated dual-carriageway solution in 1976 for the section of route between Plumstead and Erith (the Thamesmead and Erith Spine Road) – though the eastern section into Belvedere and Erith was not completed until 1997. The Dartford Northern By-Pass (now Bob Dunn Way) opened in 1993, providing a new eastward link to the M25 at Junction 1a. Responding to the high levels of traffic this generated in the north of the borough, in 2001 the Council approved dualling of the A206 south-east from Erith via Northend Road and Thames Road as far as the western end of Bob Dunn Way (the borough – and Greater London – boundary). This £21.5m A206 Thames Road Improvement Project opened in 2007/08 but did not complete the dualling. At the eastern end of Thames Road, it was not possible to replace the Cray Mill railway bridge as had initially been agreed with Railtrack. This last section (about 275m of the original 1.6km scheme) was left as single-carriageway.

5.96 The A2016 and the section of the A206 between Erith and the Bexley/Kent boundary are designated as "strategic roads" under Sections 60-63 of the Traffic Management Act 2004. This gives the Mayor of London additional powers to work with the borough to minimise traffic disruption (eg caused by road works).

5.97 A general decline in industrial employment prompted major redevelopment initiatives of vacant industrial land in the area between the 1960s and 1990s. Erith saw many Victorian buildings making way for semi-detached housing, tower blocks and a new shopping centre. Some 50s-built council housing was demolished; Bellway Homes built homes off Slade Green Road in the mid-1990s in return for providing part of the route. Along Thames Road in the 1990s, the Optima Group's Optima Park industrial park generated heavy traffic that warranted reconfiguration of roundabouts along Thames Road.

5.98 For more than 60 years, the principle behind STDR as a strategic route has always been to service the needs of current and future industry along the south side of the Thames. Past London Plans and the new London Plan see a key employment role for this area, with much of it designated as Strategic Industrial Land (SIL). These employment uses are critical for people living in South Thamesmead/Abbey Wood, Belvedere, Erith and Slade Green and are therefore key to the future economic health of areas within both the Thamesmead & Abbey Wood and Bexley Riverside OAs.

5.99 The presence of both the North Kent Line and STDR in the north of the borough, together with a greater amount of previously developed land, leads to north Bexley being a particular opportunity for new development – as identified in the Bexley Growth Strategy and as highlighted by STDR being a key spine route through two OAs.

5.100 Through TfL's 2014/15 modelling work, it was clear that there could be severe impacts on STDR with the Bexley Growth Strategy in place, with significant increases in queuing and delays at junctions along the route. While the public transport requirements to support the Growth Strategy were examined in more detail, the potential need for highway-based interventions were not. The

Council has therefore had to wait until TfL work up a transport strategy for the Bexley Riverside OAPF till this could be addressed; as noted above, that work has been delayed. For the purposes of the LPTA junction modelling has been undertaken to assess the impact of new development, including a number of junctions on the STDR, and this is set out in Chapters 8 and 9. Moreover additional modelling was commissioned to assess the impacts of developments on strategic routes and the results of this are also considered in Chapters 8 and 9 .

5.101 Land was safeguarded for the A206 Thames Road Improvement Project in the Bexley UDP of 2004. That safeguarding remains in place for the eastern section of the scheme that was not delivered. The Safeguarding section later in this chapter sets out the conclusions to the question of whether there is still a need for dualling this section of road or not.

5.102 Despite the Mayor's overall policy view on road building, there is still a case for being able to upgrade pinch-points in the STDR corridor. That case is based on the road's unique local (and important strategic) role as a key corridor to support economic development and regeneration in the north of the borough - which the Mayor is looking to increase. As the 2004 UDP said (in relation to the now mostly-delivered Thames Road scheme):

> **The South Thames Development Route is a key part of London's freight lorry network. It provides an essential link from the major industrial areas of Belvedere to the national motorway network at the M25, and thus to the Channel ports and tunnel. The congestion and delays currently suffered by these delivery lorries on the bottleneck at Thames Road serve to deter business investment and threaten existing jobs.**
> **Paragraph 8.24, Bexley UDP, 2004**

5.103 A failing STDR will undermine the success of the Mayor's allocation of SIL in much of the north of the borough and the distribution companies based in the area like Ocado, Amazon and Tesco.com –. With homes deliveries increasing, freight traffic in and out of their distribution centres (and potentially others like them) is going to intensify.

5.104 Businesses are already reporting significant capacity problems at pinch-points along STDR. Two of the junctions in question have been included in the quantitative analysis set out in chapter 9 of the LPTA, namely: A206 Queens Road/A2016 Bronze Age Way/Bexley Road in Erith (often just referred to as the Queens Road junction) and the A206 Thames Road/Perry Street gyratory at Slade Green. The Council is keen to look at other junctions with TfL while it prepares the transport strategy approach for the Bexley Riverside OA.

5.105 The Queens Road/Bexley Road junction is being considered as part of the Erith Links project, potentially for a radical Healthy Streets treatment that will reduce the overall scale of the junction and make better provision for pedestrians and cyclists. Detailed junction analysis of this proposal is under discussion with TfL Network Management. This junction has been examined and options modelled for more than ten years to identify a solution to traffic delays and traffic growth but none has been found; enlarging the roundabout or converting the junction to traffic signals are constrained by the railway line which runs next to and parallel to Queens Road.

5.106 For both the remaining Thames Road dualling and the Queens Road/Bexley Road junction, the C2E project may offer some sort of solution – especially if an option for that scheme is chosen that includes 4-tracking. That might require replacement of Cray Mill Bridge on Thames Road and would very likely require the same for the Bexley Road bridge at Erith.

5.107 In 2015, TfL commissioned consultants to provide a technical note on the potential feasibility and cost of a "fly-under" at the Queens Road junction. The associated traffic modelling work used predicted 2031 flows (which assumed less development than is now expected through the London Plan) and concluded that a solution may be feasible. That would see a single-lane road in each direction carrying through traffic between Queens Road and Bronze Age Way below the main roundabout. It could cost in the region of £110m. To be effective, it would still require Bexley Road to be widened over the railway at Erith. At present, the Council is not looking to promote that scheme within the plan period.

5.108 The potential impact of increased development traffic on STDR will have to be analysed carefully, based on traffic modelling work that has yet to be commissioned. It is premature to try to identify solutions (other than the Queens Road junction proposal as part of the Erith Links project already under discussion with TfL) until the potential effect of new development traffic is better understood. But, based on the modelling undertaken 5-6 years ago, the potential additional queues and delays could have a severe adverse impact on STDR itself, the surrounding road network, local businesses and on air quality.

5.109 The Council must safeguard land from development proposals that could preclude future works to STDR and the surrounding road network. It is likely that the following locations will be particularly affected:

Potential locations on STDR with future significant highway delays
A2016 Eastern Way/Yarnton Way
A2016 Bronze Age Way/Picardy Manorway
A2016 Bronze Age Way/Crabtree Manorway south (left in/left out) – possibly to allow for bus transit
A2016 Bronze Age Way/A206 Queens Road/Bexley Road
A206 Queens Road/James Watt Way
A206 Northend Road/Boundary Street
A206 Northend Road/Perry Street/A206 Thanes Road
A206 Thames Road/Howbury Lane
A206 Thames Road/Crayford Way
A206 Thames Road/Bob Dunn Way

Transport Scheme Safeguarding

5.110 This section of the chapter looks at the London Plan Policy T3 (B1), the need to safeguard the transport schemes listed in Table 10.1 and existing transport assets. It then looks at the safeguarding policies from the Bexley UDP (2004) and the Bexley Core Strategy (2012) to consider whether there is a continuing need to safeguard land for the transport schemes they identify. Lastly, it sets out what safeguarding should be put in place for any other transport schemes needed to support the local plan and beyond.

5.111 From London Plan, Policy T3:

B Development Plans and development decisions should ensure the provision of sufficient and suitably-located land for the development of the current and expanded public and active transport system to serve London's needs, including by:

1) safeguarding existing land and buildings used for public transport, active travel or related support functions (unless alternative facilities are provided to the satisfaction of relevant strategic transport authorities and service providers that enable existing transport operations to be maintained and expanded if necessary)

2) identifying and safeguarding new sites/space and route alignments, as well as supporting infrastructure, to provide necessary strategic and local connectivity and capacity by public transport, walking and cycling, as well as to allow for sustainable deliveries and servicing

3) safeguarding London's walking and cycling networks

5.112 London Plan Policy T3C requires development plans to safeguard land for the transport schemes in Table 10.1.

5.113 This chapter has already discussed key schemes in Table 10.1 of the London Plan including the eastern extension of Crossrail (C2E), the DLR extension to Thamesmead (and possibly beyond) and Bus Transit.

5.114 There is a considerable list of existing and proposed transport infrastructure and facilities in the borough. Over the 15-year life of the draft local plan, many changes to these can be expected. It would not be reasonable to expect the local plan to be the means of keeping any list up to date. Instead, a less specific approach needs to be used, which involves a policy-based general safeguarding of existing transport assets whilst the need to consider future transport improvements is also sought in relevant site-based policies where such land offers the best opportunity to make provision for a scheme. In such cases development should at least not preclude future delivery, on the basis that to do so would not present an unreasonable barrier to the site coming forward within the plan period.

Bexley UDP and Bexley Core Strategy

Bexley UDP Policy T7 (2004)
The Council will promote the construction of, and safeguard land needed for, the following highway schemes, as shown on the Proposals Map:
A206 improvement of Thames Road (completion of dualling of the South Thames Development Route, west of the M25);
a road linking James Watt Way with Manor Road (in the vicinity of Turpin Lane); and the
A223 Bexley bypass.
Highest priority will be given to the A206 Thames Road Improvement Scheme.

5.115 The 2004 UDP specifically safeguarded land for three highway schemes – the 1.6km Thames Road dualling, a relief road for a residential section of Manor Road in Erith and a by-pass for Bexley Village.

Thames Road dualling – retain safeguarding

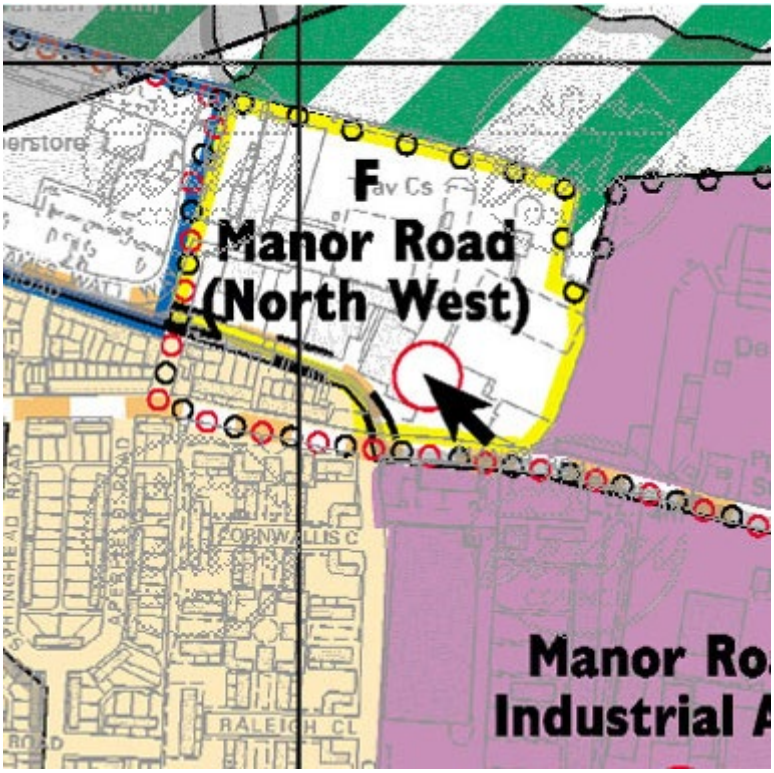
5.116 Given the importance of STDR as a strategic road on which so many businesses rely, it is intended to retain the element of safeguarding for the section of Thames Road between Crayford Road and Bob Dunn Way, including those junctions as necessary. This will retain the ability to bring forward a dualling scheme in the future, subject to future proposals for Cray Mill railway bridge. This approach has been supported by Dartford Borough Council in its consultation response at Reg 18 stage.

Manor Road Relief Road – delete safeguarding, but for Bus Transit

5.117 At Manor Road in Erith, the original proposal (in the early 1990s) was for a road for general traffic between James Watt Way and Manor Road/Turpin Lane.

5.118 The prime purpose of this new road was to relieve the occupants of the Victorian terraced houses at the western end of Manor Road from excessive dust/particulates and led the Council to adopt its first Air Quality Management Area, just for Manor Road (for PM_{10}). Figure 5.7 is an extract from the UDP proposals map that shows the expected alignment of the proposed Manor Road by-pass as a pair of parallel black dashed lines.

Figure 5.10 - Extract from UDP Proposals Map showing line of Manor Road by-pass



5.119 The specific air pollution problem has been satisfactorily mitigated through a range of measures and the need for the Manor Road Relief Road as originally conceived no longer applies, therefore the safeguarding line is proposed to be removed. However,, there is a need for a short section of busway shortcut for Bus Transit between James Watt Way and Manor Road at the point where the route is planned to turn south towards Slade Green station near Frobisher Road. Turpin Lane, mentioned in the original Manor Road safeguarding, is further east than Frobisher Road, suggesting that the length of the land required for Bus Transit is shorter than the original scheme proposal. There is no confirmed design or funding for a route, but a clear intention to facilitate a scheme and an emerging alignment. Therefore, policy will reflect the need to establish a route on the relevant land. More detail is set out in the Annex to this chapter, Item 3 under Route Section 8.

A223 Old Bexley By-Pass – safeguarding should be dropped

5.120 The 1970s proposition for a by-pass of Old Bexley or Bexley Village would provide a dual-carriageway road linking in with the southern roundabout at the A2 Black Prince interchange. The line of the by-pass starts at the roundabout at the northern end of the dual-carriageway section of A223 North Cray Road, then runs northwards, crossing the A2018 Vicarage Road at grade and linking to the Black Prince roundabout across the floodplain of the River Cray. It would mean that the A223 route between the A20 at Ruxley Corner and the A2 would be dualled other than Edgington Way at the southern end. The complete length of the proposed by-pass is in the Green Belt.

5.121 The main benefit of the by-pass is to remove a significant amount of traffic from the centre of Bexley village, with reduced impacts from noise and in air quality.

5.122 Since before the 2004 UDP, the by-pass has not reached a priority status for funding by the Council. Successive editions of the Mayor's Transport Strategy have had different policy views about such 'relief roads', but the 2018 MTS is clear that TfL will not support such a scheme.

5.123 Local landowners have looked at whether the new road could be paid for, in whole or in part, by development in the green belt . The Council's position in this regard is:

- neither TfL nor the Council are in a financial position (and also, in TfL's case, a supportive policy position) to pay towards the cost of the by-pass; and
- Inappropriate development within the green belt is contrary to policy in the absence of very special circumstances whilst the release of green belt land through the development plan process would require exceptional circumstances which are not currently considered to exist.

5.124 Supporting this view is the case of the Howbury Park Strategic Rail Freight Interchange (SRFI) appeal in 2018. The site in Slade Green is in the Green Belt. In other parts of the country, SRFI proposals on Green Belt land had met the test of "very special circumstances", in that they could not be put elsewhere – and certainly not on land outside the Green Belt.

5.125 The rail freight proposal had already been the subject of a planning appeal to overturn a refusal by both this Council and by Dartford Borough Council (where the road access junction is located). That permission lapsed. A further application was then made, which was the subject of a considerable technical debate. The Council decided to permit the application the second time around, but then it was called in by the Mayor and refused on Green Belt grounds. The Secretary of State agreed with the appeal inspector that the "very special circumstances" had not been met by that second application for a range of reasons.

5.126 NPPF paragraph 146(c) supports the idea that transport infrastructure can be permissible in the Green Belt. Likewise, given that the Secretary of State had supported appeals for Green Belt SRFIs, including the previous appeal on the same site, upholding the Mayor's refusal of permission was particularly strong support for the Mayor's Green Belt policies. On that basis, it appears very unlikely that planning consent would be granted for a road scheme in the Green Belt such as this one – whether refused by the Council or called in by the Mayor and refused. That is without consideration of the ecological, nature conservation and flood management concerns that would be raised.

5.127 Green Belt review would therefore seem to be the only circumstance that could allow the Bexley by-pass to be built. Such a review has not been undertaken in this plan as it is considered that sufficient land is available to meet development needs in the plan period. Even if release where a prospect, public monies would need to be in place to bridge the funding gap, which they aren't and have no prospect of being. Moreover, the scheme is not considered a priority to support new development as much of the proposed growth will be in the north of the borough.

It is therefore recommended, that the Bexley by-pass land safeguarding in the 2004 UDP be dropped.

Crossrail to Ebbsfleet – continue to safeguard

5.128 Core Strategy policies for both Erith and Belvedere are supportive of the C2E project:

- Core Strategy Policy CS03b: "supporting the development of Crossrail to Abbey Wood, capitalising on the opportunities for enhanced facilities presented by this new transport link, and safeguarding land for potential extension of the line between Abbey Wood, Gravesend and Hoo Junction"; and
- Core Strategy Policy CS04e: "safeguarding land to enable future extension of Crossrail from Abbey Wood to Gravesend and Hoo Junction".
- Policy CS15 Achieving and integrated and sustainable transport system. The policy confirms the Council will work in partnership to secure the extension of Crossrail eastwards of Abbey Wood.

5.129 Through these policies, the 2012 Bexley Core Strategy explicitly brought safeguarding of Crossrail east of Abbey Wood into the development plan, though not specifically based on the detail of the DfT's 2009 safeguarding – thus allowing flexibility if those details were to change in future.

5.130 It is very important that the C2E scheme is safeguarded in the Bexley draft local plan, even though it may not be implemented before the end of the plan period because it is needed for the remaining development in the second half of the thirty-year Bexley Growth Strategy. It is therefore proposed that the draft local plan has a policy that protects the land required by C2E, based on the relevant safeguarding directions and requirements at the time.

Other Schemes

5.131 For schemes such as DLR to Belvedere and Bus Rapid Transit, where these are seen as future aspiration as set out in the Growth Strategy, but where they are not relied upon to deliver development within the plan period, the policy approach will be to support their continued design and development. At a site-specific level this will include a requirement to at least not preclude the potential scheme as a result of any development and to positively plan for it where possible. This will be particularly important on sites which offer the best opportunity to secure provision as a result of their location or developability on the basis that doing so does not present an unreasonable barrier to development coming forward within the plan period.

Chapter 5 Conclusions

5.132 This chapter has identified key transport schemes that are required to meet the needs of the Bexley draft local plan (2021-2036) and/or the Bexley Growth Strategy (after 2036). It has considered specific schemes that are set out in the London Plan Table 10.1, as well as some key schemes that are not.

5.133 It is clear that safeguarding is required in three circumstances :

i. To protect existing transport assets from the direct impacts of new development;

ii. To protect land from development for schemes where the land requirement has already been identified; and

iii. To support the continued development of schemes where the land requirements are not yet fully identified and ensure proposals in key locations do not preclude future schemes.

5.134 Responding to this, the chapter has highlighted two specific schemes for future safeguarding and two schemes where the safeguarding is proposed to be dropped.

5.135 Based on TfL's Reg 18 consultation response and their representations at Regulation 20, the Council recognises that the principle of safeguarding land to deliver improvements to the STDR corridor will be contentious. The Council has proposed some changes to the approach to these improvements in the Schedule of Changes to ensure that any schemes support growth and regeneration as well as promote sustainable transport and improve road safety. The Council will continue to discuss this in more detail with TfL and GLA through the Duty to Cooperate, both in terms of the main driver of promoting economic development and in terms of the nature of suitable design solutions.

Annex to LPTA Chapter 5: Bus Transit Corridor Review

I. A study was undertaken by consultants ITP in 2017/18 on the potential for a cross-boundary bus transit route corridor between North Greenwich and Slade Green. Clients for this study were Transport for London, London Borough of Bexley, Royal Borough of Greenwich and Peabody.

II. Based on their work, a potential bus transit corridor from South Thamesmead (the Bexley/ Greenwich boundary) to Slade Green has been examined by the Council in more detail. Design work for all of the bus transit corridor within Bexley needs to be progressed further; this is to be achieved as part of the Abbey Wood to Ebbsfleet project – outputs on more detailed bus transit corridor designs should be available in summer 2021.

III. Generally, stops on the bus transit corridor may be further apart (600m-1000m) than conventional bus stops tend to be. It is not yet decided whether stops should all be exclusive for bus transit services or (where appropriate) shared with other local bus services. On-road provision should ideally be through continuous bus lanes, with absolute priority at junctions. That standard may well not be achievable in all cases. Generally, the link descriptions below do not specify stop locations; it is assumed that stop positions will be optimised to the places on the line of route.

Figure 5.4 - Map diagram showing proposed route corridor sections for bus transit

IV. Whilst something of a compromise, some sections of route will have to use existing streets with insufficient room available for bus priority. In such cases, measures should be put in place to ban on street parking (to provide bus transit services with smooth and easy passage) and to keep traffic levels down to local traffic only. The bus transit corridor can then be protected with measures such as bus gates and special junction treatments.

V. The information below provides a tabulation of the proposed bus transit corridor from South Thamesmead/Abbey Wood to Slade Green, section by section, which are then mapped in the accompanying diagram.

Bus Transit Corridor Route Sections – Link Descriptions

Image of Street	Link Section and Link Description
	1a: Eastern Way Interchange-Yarnton Way Roundabout 1b: Yarnton Way Roundabout-Abbey Wood Station Dual-carriageway with two lanes in each direction, including 24-hour nearside bus lanes and segregated cycle lanes. There are three large roundabouts and two medium-size roundabouts in the section, so the bus lanes are not continuous. Harrow Manorway (pictured) is subject to a new 20 mph speed limit. There is high traffic demand and the Yarnton Way roundabout is already at capacity at certain times. There are 8 bus routes on this section of road. Additional bus priority is planned as part of later phases, once the required land has been obtained. Potential bus transit solution: Use the bus lanes as provided, enhanced as the required land becomes available. Consider additional priority solutions (eg pre-signals) at the Yarnton Way roundabout and at other points on this part of the route, as needed. Consider additional priority solutions at the southern end of the route, along with space for bus stands for transit.
	2: Yarnton Way Roundabout-Southern Gas Networks Dual-carriageway with one lane or two narrow lanes in each direction. There is a small roundabout at the majority of side roads. There is high traffic demand on this section. There are 2 bus routes on this section of road. Potential bus transit solution: A scheme, similar in design to that on Harrow Manorway, has been designed and costed, and potential land requirements have been identified. The scheme is unfunded. It forms the basis of discussions with Peabody about the redevelopment of sites towards the western end of Yarnton Way. Lay-bys should be provided for bus/transit stops to enable one vehicle to stop and another to pass. Stops may be best provided as “floating” stops with cycle lane behind the stops. Bus priority could continue further along Yarnton Way towards Bronze Age Way, depending on the selected route corridor through Belvedere via the station. Secure the required land (for widening) through planning agreements where possible.
	3: Southern Gas Networks-Belvedere Station The available on street route (suitable for buses to use) from Yarnton Way to Belvedere station involves a circuitous route via Bronze Age Way, Picardy Manorway and Lower Road, to reach the south side of the station. The residential roads on the north side of Belvedere Station are not suitable for buses (as shown in the adjacent photo of Norman Road: too narrow and with on-street parking. Potential bus transit solution:

Image of Street	Link Section and Link Description
	A possible off-line route needs to be investigated, which could be achieved by leaving Yarnton Way (at some point between Waldrist Way and the east side of the Southern Gas Network gas holders) and then hugging the north side of the railway, subject to more detailed design work. This will require third party land. Designs will need to take account of both the potential track widening along the North Kent Line as part of the C2E project, and a potential extension of DLR to Thamesmead and on to Belvedere. It is feasible to consider a design that crosses the NKL and approaches the station on the south side of the railway instead.
	4: Belvedere Station-Bronze Age Way/Picardy Manorway Station Road North (pictured) is a narrow (<6m) residential road with on-street parking on one side. Station Road, on the south side of the tracks, is of a similar standard to Station Road North on the north side. Picardy Manorway runs north-south, crossing the railway on a flyover. The flyover also crosses the eastern end of Station Road North, providing access to industrial premises on the east side of Picardy Manorway. Potential bus transit solution: Station stop on north side of the railway: Available land widens, west to east; helping to limit land take for making this road suitable for transit. The transit corridor could then run under the Picardy Manorway flyover towards Crabtree Manorway South via industrial sites that are expected to come forward for redevelopment (except for Cleveland Cables, whose land would need to be skirted along the southern edge). The flyover is at least high enough to accommodate single deck buses. A transit-only road can be established along at least part of the section to Crabtree Manorway South and has been the subject of some master planning with land owners. Northbound from there, some bus lane and a bus gate will be needed on the approach to a new at-grade transit-only crossing of Bronze Age Way to Crabtree Manorway North (which will need careful consideration of levels on the north side) to reach the north Belvedere industrial area. On street parking on Crabtree Manorway North would need to be restricted. Station stop on south side of the railway: to Lower Road, then Picardy Manorway to the horse roundabout. There appears to be little opportunity for bus priority measures, but that will need to be examined in more detail. At the station itself, careful design consideration must be given to how a high-quality interchange can be achieved between bus and rail, that takes in the potential needs of both bus and bus transit, and National Rail/C2E/DLR.
	5: Bronze Age Way/Picardy Manorway-Lower Road interchange Single carriageway industrial roads with a 30mph speed limit. Road width is at least 6.75m for the majority of the route, though there is extensive on street parking along the western section. There are stopping of industrial vehicles along the road. No parking restrictions are implemented on the road. Road speed can reach 30 mph in the section. Potential bus transit solution:

Image of Street	Link Section and Link Description
	On street running is necessary as there is no obvious prospect to deliver segregation in the short- to medium- term. On street parking may have to be removed in part or completely to allow for smooth flow of transit vehicles.
	6: Lower Road Interchange-Walnut Tree Road West Street is the preferred route for transit, rather than Bronze Age Way, because of easier access to passenger catchment – although the relative merits are close. Bronze Age Way has a 50mph speed limit and is a two-lane dual carriageway. The practicality of any stop locations is very constrained – and could involve expensive engineering solutions to provide walking access to them; and there can be considerable queues and delays at different times of day at the Bronze Age Way/Bexley Road/Queens Road roundabout, which are expected to worsen in the future (as well as geometric constraints there that limit bus priority options). Much of Bronze Age Way is free-flowing otherwise. West Street is a residential road of variable width, currently used by three bus routes, with a 30mph speed limit. On street parking will be an issue, especially in the evening. Some traffic calming (speed cushions and road narrowing) are in place. Some rat-running occurs at times of delays on Bronze Age Way towards Erith. Potential bus transit solution: It will be necessary to remove on street parking from the main carriageway as much as possible. This may be facilitated by new lay-by parking on sections where the road is wide enough. An option of a bus gate at some point along West Street (to restrict through traffic, though not cyclists, emergency vehicles etc) should be investigated, but careful account should be taken of the negative operational impact on local residents. There should be at least one pair of stops for transit along West Street – which, ideally, should be conveniently sited close to Nordenfeldt Road to provide easy walk access to Sandcliff Road and the northern end of the Europa trading estate under Bronze Age Way.
	7: Walnut Tree Road-Erith, Morrison's Operation of the roads around Erith town centre are currently under review as part of the multi-£m Erith Links programme, which will provide significant improvement to the public realm in the town. Traffic around Erith town centre runs in a clockwise circuit via Walnut Tree Road, High Street (pictured) and Bexley Road (where there is widening that accommodates bus stops and stands). There is then no through access by public highway for general traffic to the southern side of Erith town centre, but through movements are possible via Morrison's car park. For northbound bus movement, there is a bus gate between Pier Road and Colebrook Street. James Watt Way forms the primary road access to Morrison's from the A206. Potential bus transit solution: Subject to more detailed feasibility design, the preferred routeing for bus transit is via Walnut Tree Road and Bexley Road to Morrison's as a two-way

Image of Street	Link Section and Link Description
	operation. Stops on Walnut Tree Road could serve Erith station, the FE college and the northern end of the town centre. An alternative route via Bexley High Street would require widening and removal of parking. It would not be able to provide as good a stop location as Walnut Tree Road for the station and the college. A further stop could then be formed at Morrison's (for the southern end of the town centre). A form of bus gate would be needed for buses to be able to move between Bexley Road and Walnut Tree Road – under the Erith Links scheme, Walnut Tree Road would remain northbound for general traffic, but transit could run contra-flow. Some bus priority may be achievable on Bexley Road, but running with-traffic will be needed for most of this length.
	8: Erith, Morrison's-Manor Road James Watt Way (pictured) is a modern single carriageway road (mostly double yellow lined) that provides the prime road access to Morrison's car park. Industrial land to the east has been identified for residential redevelopment. Potential bus transit solution: Running on street eastwards from Morrison's. Advantage should then be taken of the land reservation for the erstwhile Manor Road by-pass to provide a bus way through to Manor Way near its junction with Frobisher Road.
	9: Manor Road-Richmer Road (northern end) The transit route should run southwards towards Slade Green from Manor Road. The one way of achieving this involves running close and parallel to Frobisher Road (pictured) and then on street running on Richmer Road. This route has the potential advantage of being very direct. Frobisher Road runs north-south and is residential on the west side. The narrow industrial site to the east has potential for medium- to long-term redevelopment. Frobisher Road has an intermittent grass verge on the west side, with parking lay-bys and a continuous grass verge (generally 2-4m wide) on the east side. Potential bus transit solution: Frobisher Road itself does not appear suitable for buses without some widening, more off-carriageway parking and careful traffic management measures that give priority for bus transit while restricting general vehicle speeds. More appropriate would be to deliver a segregated busway for transit through the narrow industrial site on the east side of Frobisher Road. A bus gate will need to be formed to link through the grass embankment at the south end of Frobisher Road into the north end of Richmer Road. A transit stop would be appropriate in/around this location and has been assumed to be on the Richmer Road side of the bus gate.

Image of Street	Link Section and Link Description
	10: Richmer Road north-Slade Green Road Richmer Road (pictured) is a 7.3m wide single carriageway and was constructed as an industrial access road. Residential development has been built recently on the east side of Richmer Road and, at its northern end, is in process of being built on both sides. The industrial site on the east side of the road has potential for redevelopment. The majority of new homes on the west side of the road have off street parking. Pre-application discussions with potential developers of the adjacent industrial site have been used to highlight the need to include a parking lay-by along the frontage to allow for bus transit operation in the future. On street parking is permitted. Outline consent for the residential development recently completed or currently in-build was granted prior to knowledge about the need to allow for bus transit. Potential bus transit solution: A transit stop has been assumed at the north end of Richmer Road, south of a bus gate linking with a corridor parallel with Frobisher Road. On street parking would need to be restricted, assisted by the off-street parking (west side) and potential parking lay-by (east side). It may be appropriate to have a bus gate at/towards the junction of Richmer Road/Slade Green Road, so that general traffic has to route instead around Newham Way and Slade Green Road.
	11: Slade Green Road-Slade Green Station Between Richmer Road and Bridge Road, Slade Green Road (pictured) is around 7.3m wide (which has allowed for access to industrial premises). There is a 7 ft width restriction on Slade Green Road just to the east of the junction with Hazel Road, which has a bus gate for existing local bus services running north/south. The area of Slade Green to the south of Slade Green Road is mostly residential with on-street parking, though buses already use Hazel Road, Moat Lane and Forest Road to run via Slade Green Station, where Cedar Road, Hazel Road, Moat Lane and Forest Road form a one-way loop. The bus stops at Slade Green station on Forest Road accommodate one through bus route and one terminating. Potential bus transit solution: Initially, access can be gained to Slade Green station by running on street via roads already used by buses. Bus transit terminating at the station would therefore operate in a one-way loop around those roads, as there is currently no suitable space for turning buses near the station. More bus stand space would also be required. This on-street route involves some 90 degree turns. It may be possible (for example at the Slade Green Road/Richmer Road for transit works to involve cutting off the corner to increase the radius of the bend. Some additional on street parking restrictions are likely to be required to make the roads easier to pass through. In the long term, it may be possible to establish a transit route through the industrial site south of Slade Green Road that would allow straight running north-south from/to Richmer Road. Access could then be gained to Bridge

Image of Street	Link Section and Link Description
	Road either by an embankment/ramp to the east side of the railway bridge or, subject to property acquisition, by some other means. One option is a possibility of a bus transit road running parallel to the railway on the immediate west side, with easy access/interchange between a transit stop and the station. This would have to be done with care (if at all) because of the status (SINC) of the open land that it would cross. Consideration has also been given to serving the station on Bridge Road itself, with direct access to the north end of the platforms. The hump of the Bridge Road railway bridge means this might well not be possible for reasons of road safety (forward visibility).

Chapter 6 – Policies and Policy Background

Introduction

6.1 The purpose of this chapter is to draw together transport policy and related material that should be considered by the Council when writing the draft Bexley local plan. The starting point is the Council's Regulation 18 (Reg 18) consultation document 'Preferred approaches to planning policies and land-use designations', published by the London Borough of Bexley in February 2019.

6.2 Part I of the Reg 18 document provides preferred approaches for strategic and development management policies; Part II provides preferred approaches to spatial policies and land use designations. Both parts of the document contained policy considerations for review in preparation for publication of the Reg 19 draft local plan.

6.3 This chapter of the Local Plan Transport Assessment (LPTA) references the five transport policies proposed at Reg 18 stage and sets out how transport policies were framed at Reg 19 stage, taking account of:

- The National Planning Policy Framework (NPPF) and the London Plan, especially considering:
  a) Whether the proposed policy approach at Reg 18 conforms with the expectations of those documents;
  b) Whether any other policy areas are flagged up in national or regional policy that also need to be addressed at Reg 19 stage;
- Comments from consultee and stakeholder responses to the Reg 18 consultation; and
- Any other relevant comments/issues raised by Bexley officers.

6.4 Through this commentary, the chapter highlights where the Regulation 19 draft Bexley local plan made changes to aspects of the Reg 18 approach to transport policy – whether to respond better to national/regional transport policy approaches, to take account of representations from Reg 18 consultees or to reflect any other issues that have come to light while producing the LPTA up to Reg 19 stage and then beyond.

6.5 Separate consideration of proposals for parking and development site allocations, including cumulative impact assessments and individual site assessments is given in later chapters of the LPTA.

Reg 18 Transport Policies

6.6 The approach in this section of the chapter is to consider each Reg 18 transport policy and identify the potential drivers for making amendments to the policy approach, whether in the wording of the policy and/or its supporting text in Part I of the Reg 18 consultation document.

6.7 The transport section of the Reg 18 consultation document can be found in Chapter 5 (Infrastructure) on page 53 in Part I. The transport section comprises one preferred strategic policy and four preferred development management policies:

- SP8 Bexley's Transport Network
- DP14 Sustainable Transport
- DP15 Parking Management
- DP16 Impact of New Development on the Transport Network
- DP17 Road Hierarchy

6.8 In addition to those policies and their supporting text, Part II of the Reg 18 consultation document outlined further preferred approaches to spatial policies and land use designations for Bexley's infrastructure, including transport, where further detailed evidence and policy-based content may be required – specifically, in Reg 18 Part II Chapter 7, paragraphs 7.32 to 7.38. Those paragraphs talk about a need for further technical work on matters including Bexley's road hierarchy and safeguarding land for transport projects – which are considered in more detail in earlier chapters of the LPTA.

National Planning Policy Framework (NPPF)

NPPF transport policy requirements

6.9 The NPPF (paragraph 104) sets out that transport issues should be considered from the earliest stages of plan-making and development proposals. It is important that transport needs, opportunities and impacts are integrated within the plan and within designs for development. The location of development should be in places where access by different modes are or can be made sustainable.

6.10 NPPF paragraph 106 provides advice for forming planning policies:

- Supporting mixes of uses across an area and within larger sites;
- Involving a range of transport stakeholders in transport policy-making;
- Protecting sites and routes for future transport infrastructure/assets;
- Provide for walking and cycling;
- As needed, plan for large-scale transport facilities in the area; and
- Take account of the Government's General Aviation Strategy.

6.11 The last two of those are unlikely to be relevant for the draft local plan.

6.12 The NPPF also deals with how to set parking standards for new residential and non-residential development. It also flags up the need to provide for overnight lorry parking – including making sure that new distribution centres have enough for their needs.

6.13 Site allocations in development plans should be on the basis that each site offers opportunities for promoting use of more sustainable means of travel, suitable access can be provided for all user and

significant impacts on the transport network (whether capacity or congestion) can be affordably and acceptably mitigated.

6.14 Importantly, development can only be prevented or refused on highway grounds if there would be **severe** impacts on highway safety or through residual cumulative impacts on the road network.

6.15 The NPPF requires development proposals to give priority to pedestrian and cycle movements and high quality public transport (whether on or off site); address the needs of people with particular mobility difficulties; create safe, secure and attractive places, responding to local character and design standards; allow for goods deliveries, service vehicles and the emergency services; and provide for low emission vehicle needs (such as electric vehicle charging).

6.16 A transport statement or transport assessment should be prepared for larger developments (depending on the scale of the development proposal) for assessing potential impacts; and developments that generate "significant amounts of movement" will be expected to provide a travel plan.

Conformity of Reg 18 transport policies with national policy

6.17 Table 7.1 below sets out how the five Reg 18 transport policies stand up to scrutiny based on the national policy requirements in the NPPF. It shows that there is a good fit between the content of each of the Reg 18 transport policies and the expectations of the NPPF. It highlights that NPPF para 111 may make parts 2 and 3 of Reg 18 policy DP16 unnecessary, so that they could be deleted from the policy.

Table 6.1 – Commentary based on NPPF of the five Reg 18 transport policies

Reg 18 Transport Policy	Commentary on the Policy based on NPPF
SP8 Bexley's Transport Network	This policy responds well to aspects of NPPF paras 104-106, particularly in terms of: realising opportunities through existing or proposed infrastructure (para 104(b)); promoting walking, cycling and public transport use (para 104(c)); identifying routes which could be critical in developing infrastructure to widen transport choice (para 106(c)); provide for high quality walking and cycling networks (para106(d)); and provide for any large scale transport facilities that need to be located in the area [for example C2E, DLR to Belvedere and Bus Transit] (para 106(e)).
DP14 Sustainable Transport	The policy is consistent with NPPF para 104(c), to identify opportunities to promote walking, cycling and public transport use at "the earliest stages of … development proposals". NPPF para 106(d) seeks policies that should "provide for high quality walking and cycling networks." The importance of significant development to be focussed on locations which are or can be made sustainable (para 105); policy DP14 is consistent with that paragraph's objective for "offering a genuine choice of transport modes."
DP15 Parking Management	Parking is dealt with primarily in NPPF paras 107, 108 and 109. Policy DP15's approach has taken into account para 107 (a) to (c) in setting parking standards and para 106's approach to having maximum parking standards (especially as they apply to places that are not" well

Reg 18 Transport Policy	Commentary on the Policy based on NPPF
	served by public transport." NPPF para 107(d) does allow local car ownership levels to be taken into account in setting local parking standards (also referred to in Reg 18 para 5.20).
DP16 Impact of New Development on the Transport Network	NPPF para 111 restricts the grounds by which proposals with transport-related problems might be prevented or refused. They are "unacceptable impact on highway safety" or "severe" residual impacts on the road network. Policy DP16 2 therefore implies that, locally, "significant negative" is equivalent to "unacceptable" when considering road safety impacts. In policy DP18 3, "severe" impacts (NPPF) is replaced with "significant negative" - there could be an argument that severe is a higher level of test to satisfy than "significant negative", so DP18 might be trying to be more restrictive than national policy allows. NPPF's para 111 could be considered sufficient policy test in itself, so DP18 2 and DP18 3 aren't really needed.
DP17 Road Hierarchy	NPPF para 104 (a) requires transport issues arising from new development to be considered at an early stage, particularly so that "the potential impacts of development on transport networks can be addressed". This has a relationship with both DP16 and DP17. However, the NPPF does not specifically require definition of a road hierarchy in local plans.

Remaining NPPF-flagged transport policy areas to address

6.18 The five transport policies from Reg 18 stage cover the key areas of NPPF, when considered alongside the policy base in the London Plan (see below). No specific policy gaps were identified from examination of the NPPF that still needed to be dealt with by adding or amending proposed policy wording.

London Plan

6.19 The London Plan provides an important layer of policy that needs to inform the content of the draft local plan. The London Plan takes account of the MTS, which in turn sets the framework for boroughs' Local Implementation Plans (LIPs). TfL have signed off Bexley's LIP to conform sufficiently to the objectives in the MTS.

London Plan transport policy requirements

6.20 Table 7.2 below sets out, policy-by-policy, the key matters arising from each of the London Plan's transport policies that were specifically taken into account by the Reg 19 draft local plan.

Table 6.2 - Highlighted issues for the draft local plan from the London Plan

London Plan Transport Policy Reference	Matters to be taken account of in the draft Bexley local plan
Policy T1: Strategic Approach to Transport	Need to mainstream the MTS mode split target (80% of London-wide trips by non-car means by 2041) in the local plan. Bexley's local targets are given in LPTA chapter 3, based on the Bexley LIP (Bexley's target towards the overall target for London is 63% borough-wide and 75% in the Opportunity Areas. For comparison, London Plan Fig 10.1 shows a general target for outer London of 75%. Support the schemes in Table 10.1. LPTA Chapter 5 provides details of which schemes apply – some generic and others more Bexley-specific.; LBB LIP should be highlighted to developers – policy should expect developers to facilitate both LIP and MTS objectives (as per LPTA Chapter 4). The Bexley LIP (incl targets) was signed off by Full Council and agreed by the Deputy Mayor for Transport, so should be weighed accordingly.
Table 10.1 (Healthy Streets and Active Travel)	The sorts of interventions likely to be appropriate in the borough are set out in the Bexley LIP and referenced in LPTA Chapter 5. The draft local plan needs to take this into account, through minor rewording to Reg 18 Policy SP8.
Table 10.1 (Public Transport)	Specific advice for the relevant schemes is set out in LPTA Chapter 5.
Policy T2: Healthy Streets	T2A: This is addressed in more detail in the Design SPD. Policy T2 needs to be reflected in the local plan policy backing for the SPD, to include the Healthy Streets principle, more than in the Reg 18 supporting text and Policy SP8. The SPD takes those principles on board. Note the importance of weighing parking in the mix of different street needs – parking should not dominate. Any reference to the ten Healthy Streets indicators MUST be dealt with in consistency with the Bexley context (ie as dealt with in the Bexley LIP), rather than simply re-iterating TfL's more general London-wide priorities – some measures are more suitable for use in other boroughs. T2B1/B2: likewise, as in B1: As above, follow the approach taken in the LIP, that the principles are supported but schemes must be relevant and appropriate to the Bexley context. T2B2: More shared surfaces *may* be appropriate, possibly single-track, but allowing vehicles to at least pass each other at the limits of their inter-visibility will create a more flexible public realm. T2C: need to consider having an explicit policy position on the main growth area(s) outside OAs – this will apply to Bexleyheath town centre, for example. T2D: need developers to take on the Bexley 'flavour' of Healthy Streets in the context of Bexley version of MTS strategic policy on mode share (see also above). This will be via the Development Plan/SPD and via Highway Authority advice on promoting/delivering active travel.
Policy T3: Transport Capacity, connectivity and safeguarding	T3A: need to treat this as a test for the local plan's transport policies overall. Bear in mind the transport schemes needed in the Bexley Riverside OA that aren't in Table 10.1 (eg DLR to Belvedere), which TfL will need to consider through their work in the Bexley Riverside OAPF; note that the transport options modelling for C2E (to be completed by November 2021) will be very helpful in that regard.

London Plan Transport Policy Reference	Matters to be taken account of in the draft Bexley local plan
	T3B1: Need to safeguard existing public transport, cycling and walking infrastructure. A specific list is provided in LPTA Chapter 5 but, in policy terms, this will be best dealt with through a generally-worded policy rather than having a specific (and 'comprehensive'?) list. However, consider whether any specific existing supporting infrastructure deserves specific mention. T3B2: New public transport, cycling and walking infrastructure – approach dealt with in LPTA Chapter 5. T3B3: Not clear why this is needed given B1 – possibly for explicitly safeguarding the cycling/walking network as a whole. Local plan will need to safeguard routes in TfL's own [cycling] network analysis but, again, this could be dealt with through a more generally worded policy. Bexley's current cycling network is effectively what was provided as part of the London Cycling Network, with a few additions. Other links previously proposed (eg as part of TfL's Quiet Streets network project) have not yet been funded and delivered. T3C: LPTA Chapter 5 provides specific recommendations on scheme safeguarding. T3D: Thames crossings (including DLR) plus C2E are dealt with in LPTA Chapter 5, with recommendations for local plan policy approaches. T3E: It may be appropriate to seek contributions from developers towards delivery of improvements to capacity and quality of the bus network as already set out in LIP, or towards other schemes that have been identified since the LIP was produced.
Policy T4: Assessing & Mitigating Transport Impacts	Overall – no extra issues to be considered. It's "business as usual". Developers' Transport Assessments, Travel Plans, plans for construction traffic, Servicing & Delivery Plans etc (as required through the policy) should support the objectives and measures set out in the Bexley LIP. Although the London Plan assumes that local guidance is TfL's, Bexley's own guidance in the Highway Authority Advice Notes further clarify local thresholds and requirements (while being in conformity with TfL's).
Policy T5: Cycling	Need the local plan to reflect T5A1 and T5A2, adding LIP3 cycling items. T5B: The London Cycling Design Standards are referenced in the Design SPD. Work on the Highway Authority Design Notes has been considering approaches taken by other authorities (such as Cambridgeshire). T5C: London Plan cycle parking standards (Table 10.2) should suffice for Bexley. Note that higher cycle parking standards will be expected in Bexleyheath (see London Plan Figure 10.3). T5D, E, F: London Plan approach is acceptable
Policies T6, 6.1, 6.2, 6.3, 6.4, 6.5: Car Parking	Consideration of the approach to car (etc) parking standards for Bexley is dealt with in LPTA Chapter 7.
Policy T7: Deliveries, Servicing and Construction	T7A: Freight: the LIP supports the PLA's wharf safeguarding. There are no rail freight facilities in the borough (and the appeal for the proposed SRFI at Howbury Park was dismissed). The complexity and intensity of passenger train scheduling makes it difficult to provide additional daytime paths for through movement of freight by rail. The borough only has one navigable inland waterway – other than the height-limited, tidal River Cray from the Thames as far as Jolly Farmers Wharf in Crayford near Thames Road. Regular freight use would require installation of suitable wharf-based equipment and extensive silt dredging.

London Plan Transport Policy Reference	Matters to be taken account of in the draft Bexley local plan
	T7B: The local plan needs a Freight Strategy. Revised TfL Guidance on Freight was issued March 2019, which will also be considered in Highway Authority advice review. The Bexley LIP sets out Bexley's approach on freight; so, the draft local plan's policy wording should reference the LIP, not the MTS/London Plan. The initiatives in T7 are generally supported in the LIP and, as well as reducing road-borne servicing, the LIP also looks at measures to reduce environmental impact (Quiet Deliveries and daytime servicing). T7C: No comments. T7D: Does not apply to Bexley – there aren't any rail freight facilities in the borough to be safeguarded. T7E: No comments. T7F: This comes straight out of the MTS but is unlikely to require any significant changes to the draft local plan. T7G to K: No comments.
Policy T8: Aviation	No comments. LPTA Chapter 3 briefly addresses aviation as it affects the borough.
Policy T9: Funding Transport Through Planning	T9A: No comments. T9B: This invites propositions for a 'package of other strategically-important transport infrastructure' – details for relevant projects in Bexley are set out in Chapter 5. T9C: Local plan needs equivalent s106 policy for transport and other infrastructure, allowing for multiple s106 contributions towards schemes addressing cumulative impacts.

Conformity of Reg 18 transport policies with London-wide policy

6.21 This section of the chapter considers how each of the five Reg 18 proposed transport policies fared against the policy expectations in the transport chapter of the London Plan. Table 7.3 sets this out, highlighting where the Reg 18 proposed policy approach followed a consistent approach. As necessary, it also shows whether there were still any policy issues left outstanding.

Table 6.3 - commentary on the five Reg 18 transport policies from the point of view of the London Plan

Reg 18 Transport Policy	Commentary on the Policy based on the London Plan
SP8 Bexley's Transport Network	This policy is in general conformity with the London Plan, as it supports: Bexley's element (63% overall) towards the Mayor's overall aim for 80% of all trips in London to be made by foot, cycle or public transport by 2041; relevant transport schemes in London Plan Table 10.1; better public transport connections; and, river crossings and the eastwards extension of the Elizabeth line. This policy approach is in line with the London Plan requirement for development plans to reflect and integrate with current and planned transport access, capacity and connectivity. Whilst the policy mentions promoting Healthy Streets, its position in SP8 as the last item in the list should be reviewed, along with relevant supporting text.
DP14 Sustainable Transport	The policy is consistent with London Plan policy T1B - regarding the need for "connectivity and accessibility by existing and future public transport, walking and cycling routes"; with London Plan policy T2B(1), in the context of Healthy Streets, to "increase walking, cycling and public transport use"; in growth areas, the need for planning new and improved walking, cycling and public transport networks (London Plan policy T2C); and providing "necessary strategic and local connectivity and capacity by public transport, walking and cycling" (London Plan policy T3B(2). Policy DP14 also promotes the walking, cycling and public transport approaches in London Plan Table 10.1.
DP15 Parking Management	The Mayor's approach to development parking is to keep provision as low as possible. The aim (as set out in London Plan policy T2B(1)) is *inter alia* to "reduce car dominance, ownership and use". The 'balanced' approach in policy DP15 contrasts with this in that it acknowledges negative impacts of cars, but also supports "the need for parking". DP15's residential parking standards where PTAL is 0-2 (DP15 1(a)) and the idea of requirements for minimum parking standards in some development (DP15 1(b)) will need justification and support against London Plan policy T6.1 and associated Table 10.3. DP15 1(c) needs to be compared with the approach in London Plan para 10.6.18; DP15 does not explicitly separate 'commuter' parking (for which London Plan para 10.6.18 expects B1 Office standards to be used, which are particularly restrictive in OAs) from operational parking; DP15 1 (c)'s requirement for delivery and servicing plan (DSP) corresponds to part of London Plan policy T4B (Assessing and mitigating transport impacts), last sentence, in using DSPs as a way to determine operational need for parking in a way that accords with the aims of London Plan policy T7 (Deliveries, servicing and construction). London Plan policy T6K includes a requirement that any minimum parking standards applied to residential development should only apply where PTAL is 0-1. In supporting text to London Plan Policy T6.1 (Residential parking), para 10.6.5 says that [parking spaces for] car clubs "count toward the maximum parking permitted".
DP16 Impact of New Development on the Transport Network	London Plan policy T4 (Assessing and mitigating transport impacts) provides a series of requirements that development proposals should meet. The requirements of the policy are considerably more detailed than the three principles in DP16; there is no particular need for DP16 to repeat them.
DP17 Road Hierarchy	The definition of a local road hierarchy may assist in defining the road types best suited to the Mayor's Healthy Streets approach (ref: the early words in ItP London Plan policy T2B

Reg 18 Transport Policy	Commentary on the Policy based on the London Plan
	(1)). However, this is not explicit and is probably not the only intention of establishing a defined road hierarchy. The former idea of 'Movement and Place' - which ties in very well with defining a road hierarchy - is no longer a part of the Mayor's policy base. There may therefore need to be greater clarity in the local plan about why the road hierarchy is particularly important to mention in policy and what the Council will want to achieve/avoid on the different types of road.

Remaining London Plan-flagged transport policy areas to address

6.22 The information in Table 7.3 pointed to the following specific changes being needed in the set of five Reg 18 transport policies, for going forward into the Reg 19 draft local plan:

- SP8: The Healthy Streets principle is a fundamental point in both the Mayor's Transport Strategy (MTS3) and the draft London Plan. The Healthy Streets item should not be the last item in the list under Reg 18 policy SP8.
- DP14: No specific changes required that arise from this comparison with the London Plan.
- DP15: Specific justification must be made for the proposed approach to parking standards for residential sites with PTAL 0-2 and for the use of minimum parking standards. Likewise, DP15(1c)'s approach to allowing transport assessments to justify exceedance of London Plan parking standards for B2/B8 uses requires evidential support and consideration of whether different approaches should be taken in those developments for employee and visitor parking compared with operational needs. Much of this is discussed in more detail in Chapter 7.
- DP16: Parts of this policy may not be needed as they refer to things already required in London Plan policy T4.
- DP17: Consideration to be given to how the need to define a local road hierarchy sits with the London Plan's approach – especially to Healthy Streets.

Transport-related Responses from Reg 18 Consultees

6.23 Overall, a total of 93 consultees responded to specific policy matters in the Reg 18 preferred approaches document in February/March 2019 (in addition to the 297 survey responses from members of the public). They provided a total of 51 specific responses on transport policies and related matters.

6.24 Each transport response was allocated against one of the policies listed under paragraph 7.4 above. Issues of future transport scheme safeguarding tended to be grouped together under strategic policy SP8 for this purpose.

6.25 Table 7.4 provides a breakdown of the number of consultees who responded on each transport policy and the number of issues they raised.

Table 6.4 – Breakdown of Reg 18 responses on transport policy issues

Reg 18 Transport Policy	Number of Consultees who Responded	Number of Issues Raised
SP8 Bexley's transport network	9	21
DP14 Sustainable transport	4	7
DP15 Parking Management	6	15
DP16 Impact of new development on the transport network	2	8
DP17 Road hierarchy	0	0

6.26 Two key respondents to these transport policies were, understandably, Transport for London (TfL) and Highways England (HE) – of whom TfL provided the greatest amount of feedback. Other respondents include local residents and groups, housing providers, the GLA and the Port of London Authority (PLA).

6.27 In the Regulation 18 Consultation Statement, each of the Reg 18 transport-related representations are set out and summarised alongside the Council's comments on those responses – including whether any changes should be made to content proposed at Reg 18 stage.

6.28 Based on these Reg 18 responses, a number of changes were proposed to the transport policies proposed at that stage. The major changes can be summarised as follows:

- The creation of a new strategic policy on safeguarding for new transport schemes
- Additional policy wording to clarify the approach on joint working with TfL and Highways England with regard to intervention s on the strategic road network required to support future development proposals
- Additional policy wording on Healthy Streets and local mode share targets to 2041
- Specific references to river passenger services and Erith Pier upgrades
- A refined approach to local parking standards (see Chapter 7)
- Specific references to motorcycle parking, transport assessments and travel plans for high impact developments and the need to assess cumulative as well as individual impacts of development proposals.

Officer-level comments on the Reg 18 transport policies

6.29 Policy-specific comments from Bexley technical officers are set out in Table 7.5 below.

Table 6.5 – Officer-level commentary on the Reg 18 policies

Reg 18 Transport Policy	Overall Commentary on the Policy
SP8 Bexley's Transport Network	This strategic policy has a clear overall objective. It aims for a broad list of potential transport interventions to be achieved. Those potential projects are either needed directly to support the local plan or the projects themselves need the local plan to support, facilitate and safeguard for them. Many of the transport projects rely on resourcing from TfL for their development, design and delivery. Many have been identified while working with TfL on the 30-year Bexley Growth Strategy, of which the local plan represents the first 15 years of plans and proposals. Schemes such as C2E and new Thames crossings are more likely to be delivered after 2036, but they will require project development support from the plan, during the plan period.
DP14 Sustainable Transport	Promoting more walking, cycling, using public transport and shared mobility are essential; development proposals must address them well, early on in the design process. More use of these more sustainable transport modes rather than car travel must be a key aim, to reduce and manage the potential impact of car use. This is consistent with national and regional guidance.
DP15 Parking Management	Other than in a few, specific examples, the borough has relatively poor access to public transport and requires more investment in walking, cycling and public transport in the borough before any serious difference starts to happen in the overall levels of car ownership in the borough (as sought in ItP London Plan policy T2B(1)), in spite of that occurring in other (especially inner London) boroughs. The Council seeks therefore to achieve a balance in its approach to parking in new development that takes into account Bexley's particular transport characteristics - particularly in places with low PTAL values - that address genuine need.
DP16 Impact of New Development on the Transport Network	Policy DP16 is based on the key principles of reducing movement, more use of more sustainable travel modes, promoting road safety and minimising negative operational impacts on the transport network.
DP17 Road Hierarchy	Policy DP17 seeks to define a borough road hierarchy (to be shown on the Proposals Map) and thus to define what would be (in)appropriate use, function and purpose for each type of road. However, the basis and categories of the borough road hierarchy are not defined in the policy or the supporting text - they seem to be left to be defined in the proposed Design SPD. The policy would benefit from at least adding in some more detail about how these principles will be applied, including what constitutes "inappropriate road use". This policy could even be absorbed into DP16 as an additional, specific point on assessing planning submissions.

Transport-related Responses from Reg 19 Consultees

6.30 Overall, a total of 80 representors replied to the Reg 19 consultation which ran between May and July 2021). They provided 92 specific representations on transport policies and related matters.

6.31 Table 6.5 provides a breakdown of the number of consultees who responded on each transport policy and the number of issues they raised.

Table 6.5 – Breakdown of Reg 20 responses on transport policy issues

Reg 19 Transport Policy	Number of Representors	Number of Representations
SP10 Bexley's transport network	13	33
SP11 Safeguarding Land for Transport	7	12
DP22 Sustainable transport	7	20
DP23 Parking Management	9	21
DP24 Impact of new development on the transport network	2	6

6.32 Two key respondents to these transport policies were, understandably, Transport for London (TfL) and Highways England (now National Highways) – of whom TfL provided the greatest amount of feedback. Other respondents include local residents and groups, housing providers, the GLA, neighbouring boroughs and the Port of London Authority (PLA).

6.33 In the Regulation 19 Consultation Statement, each of the Reg 20 transport-related representations are set out and summarised alongside the Council's comments on those responses. The Councils Schedule of Changes then sets out the proposed amendments to the Draft Local Plan.

6.34 The main issues raised by representations can be summarised as:

- TfL and environmental interests seeking amendments to the parking management approach to better align with the London Plan in terms of reducing car ownership whilst local businesses, residents and amenity groups raise concerns about there being insufficient parking
- TfL and environmental interests raising concerns over proposed improvements to the transport network and particularly identified road improvements
- TfL seeking a range of modifications to policies to promote active travel, the creation and extension of controlled parking zones and the transition of existing parking facilities to car free development
- National Highways raising concerns over the impact of development on the strategic road network and requiring further information

6.35 Based on these Reg 19 responses, a number of changes have been proposed to the transport policies. The main changes can be summarised as follows:

- A modification to the application of the local maximum parking standard for family housing in areas with moderate public transport connectivity (DP23) (see Chapter 7 for more details)
- Modifications to the approach to parking with regard to specialist housing for older people and industrial development (CP23) (See Chapter 7 for more details)
- Modifications to the policy on the protection of car parks (SP10) (See Chapter 7 for more details)
- Modifications to the approach to proposed road schemes (SP10 and 11) to emphasis their role in assisting regeneration and removing barriers to growth as well as encouraging modal shift away from the car and improving road safety.

Chapter 7 – Parking Standards in New Development

Introduction

7.1. The purpose of this chapter is to establish a basis on which the Council can set a robust policy position on parking standards for new development.

7.2. It considers the approach to parking standards in national and London-wide policy. It reviews known issues about parking provision for new development in Bexley – including the specific context of Bexley's transport network. From that review, it highlights where there is justification for exceptions from or additions to the policy approach set out in the London Plan. This evidence should then inform policy-making for parking standards for the draft Bexley local plan, alongside the issues raised in LPTA Chapter 7 (Policies and Policy Background) which includes, as well as a policy review, consideration of the responses to consultation on Reg 18-stage preferred Policy DP15 covering parking standards and subsequent Regulation 19 policy DP19.

7.3. The resulting policy approach to parking in new development in the borough is intended to generally conform to the approach taken in the London Plan having regard to specific local circumstances.

7.4. The majority of the chapter is concerned with vehicle parking standards as opposed to cycle parking standards, although the latter is considered.

Reasons for using Parking Standards

7.5. Put simply, parking standards provide a way of working out how much parking might be appropriate for different types of development in different types of location. This avoids having to go back to first principles to calculate the parking requirement/need for every development proposal, by having a standard approach that will normally apply. Clear parking standards provide benchmarks for parking provision to inform developers when considering their development proposals and to enable the local planning authority (and the local highway authority) to test whether parking provision, as part of a development proposal, meets predetermined requirements.

7.6. Parking standards enable, at a policy level, control of the level of parking that should be provided in development proposals. They will generally set a level of parking provision that is aimed at:

i stopping provision of "too much" parking – in the form of maximum parking standards; or

ii ensuring provision of "enough" parking – in the form of minimum parking standards.

7.7. Parking standards can have a large influence on both how a development looks/feels and how it operates. Setting car parking standards, and how parking areas should be designed, can influence both car ownership (mainly in residential development) and car use (for "destination" uses). Parking standards dictate how much land within a development should be used to meet its parking needs – and therefore how much land will then be available for whatever the prime purpose of the

development is intended to be. Parking standards can be seen as a policy tool for spatial planning, transport planning and environmental planning, among others.

7.8. Parking standards for new development have historically been aimed mainly at general car parking (e.g. for residents, visitors, shoppers, workers etc). They can also relate to types of use (e.g. by residents, by visitors, operational requirements, Blue Badge parking for people with disabilities); to different vehicle types (e.g. coaches/buses, HGVs, bikes); or to particular technologies (e.g. for electric vehicle charging).

7.9. Generally, a development plan should set its parking standards at a level consistent with delivering the authority's wider land use, transport and other relevant planning objectives.

National Policy on Parking Standards

7.10. The government's National Planning Policy Framework (NPPF) includes promoting sustainable transport as a key policy (NPPF paragraphs 104-113). Paragraph 104 sets out specific transport objectives for plan-making and for development proposals, by considering transport issues "from the earliest stages", so that:

a. "the potential impacts of development on transport networks can be addressed;

b. opportunities from existing or proposed transport infrastructure, and changing transport technology and usage are realised – for example in relation to the scale, location or density of development that can be accommodated;

c. opportunities to promote walking, cycling and public transport use are identified and pursued;

d. the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and

e. patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places."

7.11. NPPF paragraph 107 sets out considerations for plan-makers wanting to set policies with local parking standards, whether for residential or non-residential development. Policies should take into account:

a. "the accessibility of the development;

b. the type, mix and use of development;

c. the availability of and opportunities for public transport;

d. local car ownership levels; and

e. the need to ensure an adequate provision of spaces for charging plug-in and other ultra-low emission vehicles.

7.12. According to NPPF paragraph 108, "Maximum parking standards for residential and non-residential development should only be set where there is a clear and compelling justification that they are necessary for managing the local road network, or for optimising the density of development in city and town centres and other locations that are well served by public transport" (in accordance with NPPF chapter 11 – Making Effective Use of Land).

7.13. Also, the NPPF seeks proper provision of:

i cycle parking (para 106 d);

ii town centre parking that is "convenient, safe and secure" (para 108);

iii overnight lorry parking where there are adequate facilities and where it will not cause a nuisance (para 109); and

iv sufficient lorry parking for anticipated use at distribution centres (para 109).

Parking Standards in the London Plan

7.14. The prime driver in the approach to transport in the London Plan (chapter 10) is the Mayor's strategic target for 80% of trips made in London being made by foot, cycle or public transport by 2041 (as set out in Policy T1 A). This driver is at the heart of the Mayor's Transport Strategy MTS, (2018). London Plan Figure 10.1 shows how different targets apply in central, inner and outer London, with different expectations in terms of percentage uplift in use of those more sustainable modes. Outer London already achieves 60%; the target for 2041 for outer London is an average of 75%. As acknowledged in paragraph 10.1.4, this will be achieved in different places by different means, to differing extents. These mode share targets were first set out in the Mayor's Transport Strategy (2018) and incorporated into the borough Local Implementation Plans (LIPs) across London – including Bexley's. The mode share targets agreed with TfL in the Bexley LIP take some account of Bexley's systemic lack of provision for the more sustainable modes – especially public transport – by setting the borough's mode share targets for 2041 at a lower level than the average for outer London boroughs (63%, though 75% in Opportunity Areas).

7.15. This driver is reinforced in London Plan Policy T2 B(1), which expects development plans to "promote and demonstrate the application of the Mayor's Healthy Streets Approach". This Healthy Streets approach was set out in the Mayor's Transport Strategy (MTS, 2018) and, as reinforced in Policy T2, includes reducing "car dominance, ownership and use", among a range of other key objectives and indicators.

7.16. With that driver in place, the strategic approach to transport in London for the Mayor is to have the "ambitious aim" to reduce dependency on cars. The London Plan identifies this dependency as a significant barrier to achieving continued sustainable development in the capital and "new parking provision must be carefully controlled" (paragraph 10.6.1). The Mayor therefore considers that this provides the necessary "clear and compelling justification" for having maximum parking standards, other than in limited circumstances. Likewise, the strategic imperative leads the Mayor not to base parking standards on prevailing local car ownership (NPPF paragraph 105 d).

7.17. The strategic target in London Plan Policy T1 A leads on to the requirements on all development in London, as set out in Policy T1 B. Those requirements are that development should:

i Make the most effective use of land; and

ii Ensure mitigation of [negative] impacts on London's fixed and operational transport assets.

7.18. Making effective use of land is also a requirement of chapter 11 of the NPPF. While a level of parking for a new development may be needed, the point comes where parking provision is at the expense of using that land for more beneficial (including commercially profitable) purposes – whether with design and/or operational implications. Available land is finite – land on which development is financially viable the more so. In other words, providing marginal additional parking can involve a material opportunity cost. That puts downward pressure on parking provision in new development – the London Plan does not regard parking as a good use of land.

7.19. Cycle parking is then addressed by London Plan Policy T5. Cycle parking standards are set out in Table 10.2, as minimum standards. Inner London and parts of south west and north east London, along with main town centres in outer London are shown in the map at Figure 10.3 as having the higher minimum cycle parking standards set out in Table 10.2. In Bexley's case, this only applies to Bexleyheath. There is no other location-based differentiation in the levels of cycle parking that should be provided.

7.20. Minimum standards are used for cycle parking to try to ensure that enough provision is made, at a level that is sufficient to cope with anticipated levels of cycling if it is properly encouraged. Policy T5 A2 expects development plans to "help remove barriers to cycling" through "appropriate levels of cycle parking", in addition to supporting delivery of a London-wide network of cycle routes (Policy T5 A1).

7.21. Connectivity and accessibility (as measured using TfL's PTAL methodology) are to be used as the basis for site allocations, taking account of both current and predicted future PTALs (Policy T6 A). The London Plan assumes a direct link between PTALs and parking need, by setting out (in Table 10.3) how residential parking provision should reduce as PTAL values increase (down to nil parking in areas with PTALs of 5 or 6). Residential parking standards in the London Plan differentiate between outer and inner/central London, recognising the differing patterns of both car ownership and car use. Additional flexibility on family dwellings (3+ units) in low PTAL areas (PTAL 0-1) was introduced as a result of a direction from the Secretary of State who was concerned about parking stress and associated impacts on active travel and electric vehicle take up as well as the repercussions of low parking levels on the supply of and demand for family housing.

7.22. Bearing down on car parking in new residential development mostly affects car ownership, whereas in new non-residential "destination" developments, it mostly affects car use. The Mayor wants to reduce both, associated with more transport solutions based around public transport, cycling and walking.

7.23. The London Plan's maximum parking standards "should be applied to development proposals and used to set local standards within Development Plans" (Policy T6 D). Specific details, by land use, are set out in:

- Policy T6.1: Residential parking;
- Policy T6.2: Office parking;
- Policy T6.3: Retail parking;
- Policy T6.4: Hotel and leisure uses parking; and
- Policy T6.5: Non-residential disabled persons parking (based generally on minimum standards).

7.24. Additionally, minimum cycling parking standards for new development are set out in Policy T5 and Table 10.2.

7.25. The transport policies in the London Plan all contribute towards delivering the objectives of the MTS through both development plans and development proposals, especially with regard to the necessity for future mode shift. In the context of parking standards and parking demand, the MTS recognises that car clubs and car-based ride sharing can be important tools to help promote mode shift, especially in areas of higher car dependency.

Other Factors in Parking Management

Traffic Orders

7.26. Through powers in both primary and secondary legislation, local highway authorities can make traffic regulation orders/traffic management orders to assist in managing the local road network – these include orders restricting parking and loading/unloading. The powers given to highway authorities to introduce traffic orders come from highways- and transport-related legislation, not from planning legislation.

7.27. Traffic orders can restrict parking/loading by location (length of road(s) or zone(s)), by time/day/date, by length of stay or by type of vehicle for example; and set out arrangements for paid parking. For enforcement of these traffic orders, the Council shares a contracted parking enforcement service with the London Borough of Bromley.

7.28. The main purposes for managing parking/loading in this way are for road safety, to maintain smooth traffic flow or to restrict some kinds of use – for example, to protect safe visibility around junctions, to reduce obstructions or to stop all-day parking in a shopping street.

CPZs/RPZs

7.29. Controlled Parking Zones (CPZs) and Restricted Parking Zones (RPZs) look to address parking issues across an area by restricting the use of parking bays in the area to permit holders. Figure 7.1 provides a location map of the CPZs in the borough, which shows them centred on town centres

and railway stations. Around stations, there can be high demand for all-day parking, which could make it difficult for local residents to park near their homes. Around town centres, there can be high demand for long stay parking for workers and short stay parking for shoppers . The Council sells permits to local residents and businesses and in some zones, the Council also offers some paid on-street parking– for example short-stay parking on Welling High Street or long-stay parking spaces in Abbey Wood.

7.30. When a CPZ/RPZ is introduced, some of the incoming parking demand moves into car parks, some parking demand disappears, while some is displaced to areas just outside the CPZ. The Council keeps such situations under review – for example, "before" surveys have been taken, prior to opening of the Elizabeth line, on roads in/around Abbey Wood, Belvedere, Erith and Slade Green. Those surveys then provide base data when considering further parking restrictions in future – including new or extended CPZs.

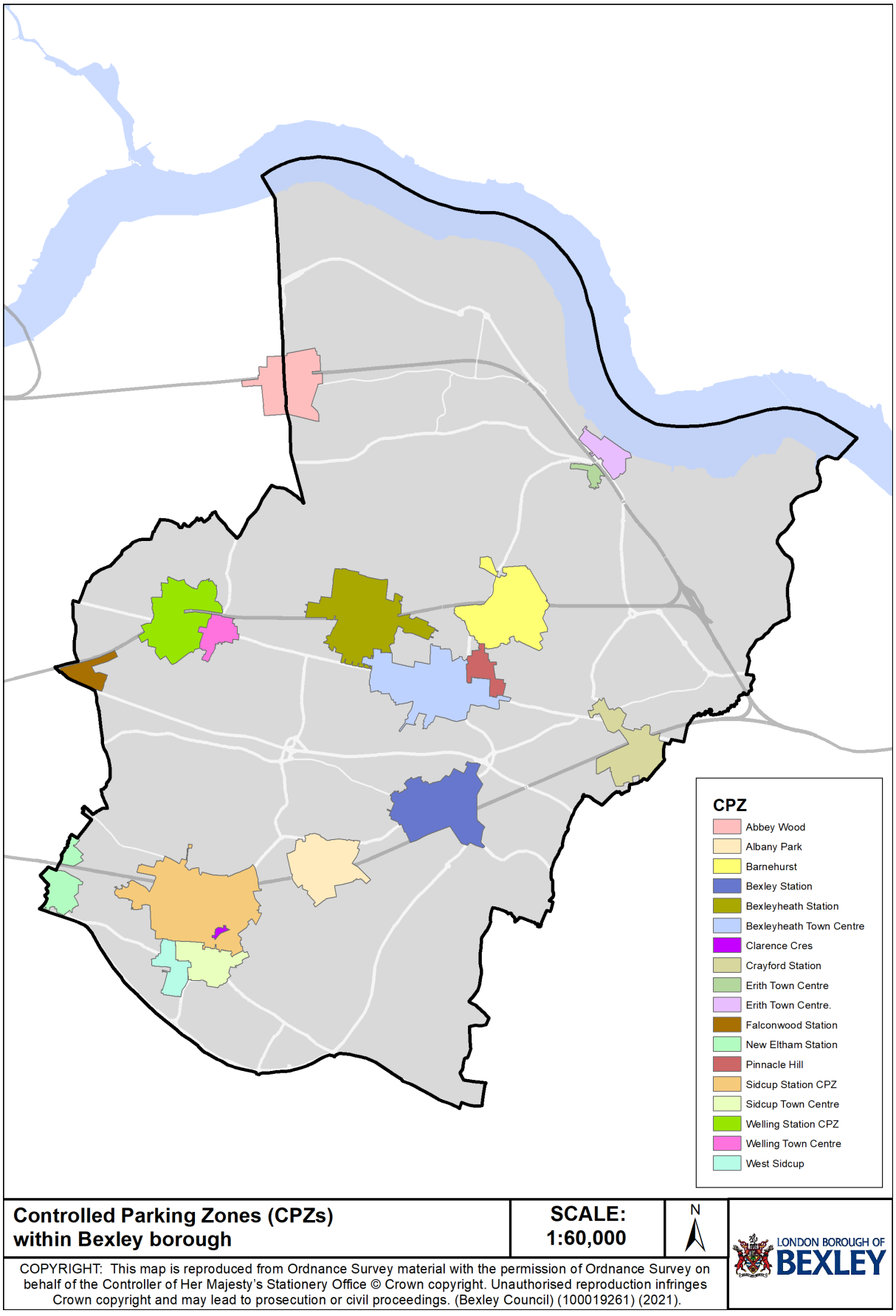
7.31. The Council has not implemented CPZs unless there is a specific local need and the proposal has majority support from local residents. This is unlike other boroughs in London (usually those in inner London – for example in LB Hackney) that have CPZ arrangements in place over most or all of the borough.

Car Parks as Parking Management Tools

7.32. The Council has a range of tools to manage parking and will retain car parks where there is demand at a level of provision that avoids harm. The closure of off-street car parks in Bexleyheath town centre, for example, would shift parking onto streets just outside the town centre CPZ or to other locations – including outside the borough completely. Town centres remain as inter-competitive as ever and adequate and affordable parking is viewed by businesses and shoppers alike as an important attribute of a viable and vital shopping area.

7.33. The NPPF particularly recognises the importance of town centres and applies a sequential approach to main town centre uses, which should first be located in town centres and not elsewhere (NPPF paragraph 86). Doing so makes it more likely that town centre parking demand can be managed overall through concentrating town centre parking into car parks rather than a series of small on-plot parking areas. Short and long-stay parking can then be managed (e.g. by location and by price). Land in town centres tends to be more valuable than in surrounding areas. Where demand for use of a station or town centre car park falls and is unlikely to grow, there is then an opportunity to consider redeveloping in whole or part one or more car park sites while avoiding negative parking displacement consequences – such as further loss of town centre demand overall or additional unmanaged parking on town centre fringes.

Figure 7.1 - Controlled Parking Zones in Bexley Borough



Residential Car Parking Research

7.34. 'Residential Car Parking Research' was the title of a report published in 2007 by the then DCLG which studied the relationships between different residential development and parking use/demand, how parking is provided within developments and how to minimise the overall supply of parking space while meeting likely demand.

7.35. The report highlighted that the most useful starting point for estimating the amount of residential parking needed was the prevailing levels of car ownership in the surrounding area (compare with NPPF paragraph 107 d). It looked at the relationship between car ownership and the availability of local facilities and services within easy non-car access of the development. It highlighted how car ownership (and therefore car parking demand) varied between different unit sizes, types and tenures (and by how much). It identified that social housing tends to generate less parking than owner-occupied housing; and that flatted development tended to have less parking demand than houses of similar sizes. It also identified that 70% of garages are used for storing things other than cars (so, in terms of 'useful parking' a garage is in effect worth just 30% of a parking space), important where a significant element of the proposed parking is provided as garage parking.

7.36. Importantly, it highlighted the importance of the split between on-plot (including remote-but-owned) and shared parking space. One key conclusion was that the more shared parking in a development, the less parking you need to address the potential parking need. Combining that with the other variables based on dwelling size, tenure and type, it was possible to size how different parking layouts (on-plot, off-plot and shared) could have significant differences in the potential overall level of parking that was required to meet the actual parking need.

7.37. A number of local authorities (often highway authorities) adopted methodologies based on this research in order to calculate figures for parking need, for use alongside local planning authorities' adopted parking standards – for example Nottinghamshire County Council, who supplemented the DCLG report with extra local data.

7.38. Other residential car parking research has found useful conclusions that are relevant in the context of this chapter of the LPTA.

7.39. Parking supply and demand in London (David Leibling, 2014) looks at parking availability. The study "uses several different sources of data to investigate the under-researched area of parking availability which is of considerable importance to transport planners and policy makers". Key conclusions of this work included:

- In outer London there is more spare capacity [in available residential parking than in inner London];
- Restricting residential parking space does not limit the growth in car ownership especially in outer London where the car is an essential part of modern living;

- Restricting residential parking increases pressure on limited on-street parking which leads to unsightly and dangerous parking on streets not designed for parking or illegal parking on footways; and
- Car free/ car lite design will become a differentiation for major new developments.

7.40. Residential Parking in new Developments (TfL, 2012) was a Travel in London Research Report. It was based on surveys aimed at understanding the relationship between parking and car ownership/use. Its key conclusions included:

- Residents of new developments were more likely to own a car than London residents as a whole, and were also more likely to have access to off-street parking;
- The average number of cars per household rises as public transport accessibility decreases. Developments in parts of outer London with the best access to public transport have lower car ownership levels than parts of Inner London with the least public transport access.
- People choose a home that meets their needs; there is a close relationship between the importance attached to parking and satisfaction with the quality of parking in the local area; and
- The more parking provided by a new development, the higher the household car ownership level. Where there is more parking [availability], there are more cars. This was true for all groups and in all areas studied.

7.41. This research is by no means recent, but the survey work on which the research was based provided the opportunity to highlight specific insights and inferences not found in more recent behavioural research – particularly comparisons between the older minimum parking standards and newer maximum residential parking standards that would have bedded into the planning process by 2011-2013.

Local Issues in Bexley affecting Parking in New Development

The Deficits in Bexley's Transport Network

7.42. The Bexley Local Implementation Plan (LIP) of 2019 and chapter 3 of the LPTA set out specific characteristics of the borough's transport network. It is important to ensure that this information is considered in applying parking standards to development proposals in the borough.

7.43. As an outer London borough with a restricted public transport offer, car ownership in Bexley is high and people's travel needs (and expectations) require access to a more dispersed range of places than can readily (and/or viably) be provided by improving connections by non-car modes. This has established a self-fulfilling cycle, where the lack of a good alternative means of connection drives car demand upwards, which in turn lowers the ability to establish viable alternative means of connection. Note that, being on the edge of Greater London, some journeys to/from the borough will be from/to places that are not subject to London's transport and land use policies (e.g. Kent, Thurrock and Essex in Bexley's case). Meeting the demand for those sorts of

journeys by means other than the car can be very difficult unless some good means of doing so is already in place (e.g. linked by rail).

7.44. The approach that the Council has taken in the Bexley LIP, as approved by the Mayor, is a balanced one. Simply providing travel alternatives and better spaces/places/streets is not enough to achieve significant mode shift in the borough so the approach is for considerable infrastructure investment. The Council will still promote Healthy Streets and ensure more travel alternatives become available over time – whether through specific LIP schemes or provided by/in new development – for better design of places and more walking, cycling or public transport use but real change will only be secured through transformational investment. As this will not be secured within the plan period the needs of car users need to be considered where appropriate.

7.45. The Bexley LIP shows the mode share target agreed with TfL for 2041. Expressed in terms of the proportion of car-based trips to all person trips the target is to lower this to 37% across the borough by 2041, compared with 25% on average for outer London and 20% for the whole of London. The recent exception since the Mayor's adoption of the Opportunity Area Planning Framework (OAPF) for Thamesmead and Abbey Wood in 2020, is that car-based trips should be 25% on average within this OA by 2041.

Managing the Highway Network

7.46. The Council is the highway authority (otherwise, the local traffic authority) for adopted roads in the borough other than the A2 and A20 (which are part of the Transport for London Road Network (TLRN)). The term "free flow of traffic" was used in strategic Policy SP8 in the Reg 18 consultation document, about which TfL raised concerns in their consultation response. The term is consistent with the duty that the Council has as local highway authority as part of its Network Management Duty.

7.47. The Council's Network Management Duty is set out in the Traffic Management Act 2004 (TMA). The overview to that Act says "The TMA places a duty on local authorities to make sure traffic moves freely and quickly on their roads and the roads of nearby authorities". Section 16 (1) defines two specific objectives for how the local traffic authority should manage their road network:

a) "securing the expeditious movement of traffic on the authority's road network; and
b) facilitating the expeditious movement of traffic on road networks for which another authority is the traffic authority."

7.48. This is not the only function of the road network. As set out in the Bexley LIP regarding Movement and Place, different priorities exist for different types of roads in different places for different purposes. The Mayor's Healthy Streets principle is an important part of this. There are roads in the borough that will always have more of a movement than a place role – and others that are more important as places for other activities such as shopping, socialising, playing etc. Both are relevant to the road network in Bexley. Measures and policies that encourage walking, cycling, using public

transport and home-working/home-deliveries all play a part in bringing the borough's transport network closer to the approved mode share targets in the Bexley LIP.

7.49. The context of car parking mentioned in Reg 18 Policy SP8 1(i) is to bring parts of the public highway used for on street parking very much into the equation for how streets are treated. It is not intended as a commentary on whether the Council intends to alter the level of the borough's overall parking stock, whether up or down.

Cycling and Cycle Parking

7.50. As noted in both the Bexley LIP and chapter 3 of the LPTA, levels of cycling in the borough are low compared with many other London boroughs, but have shown signs of growth in recent years, especially for journeys to railway stations. Cycle parking demand at Abbey Wood station grew considerably once the Crossrail project construction works were under way there, thanks to the presence of those works providing a more secure environment for parking bikes. A cycle hub is to be provided at Abbey Wood, to promote further access to Abbey Wood station by bike once the Elizabeth line is open.

7.51. Developers have sometimes been concerned that the cycle parking standards of the London Plan are too onerous, bearing in mind the relatively low levels of cycle use in the borough. Even so, the Council has applied the London Plan standards.

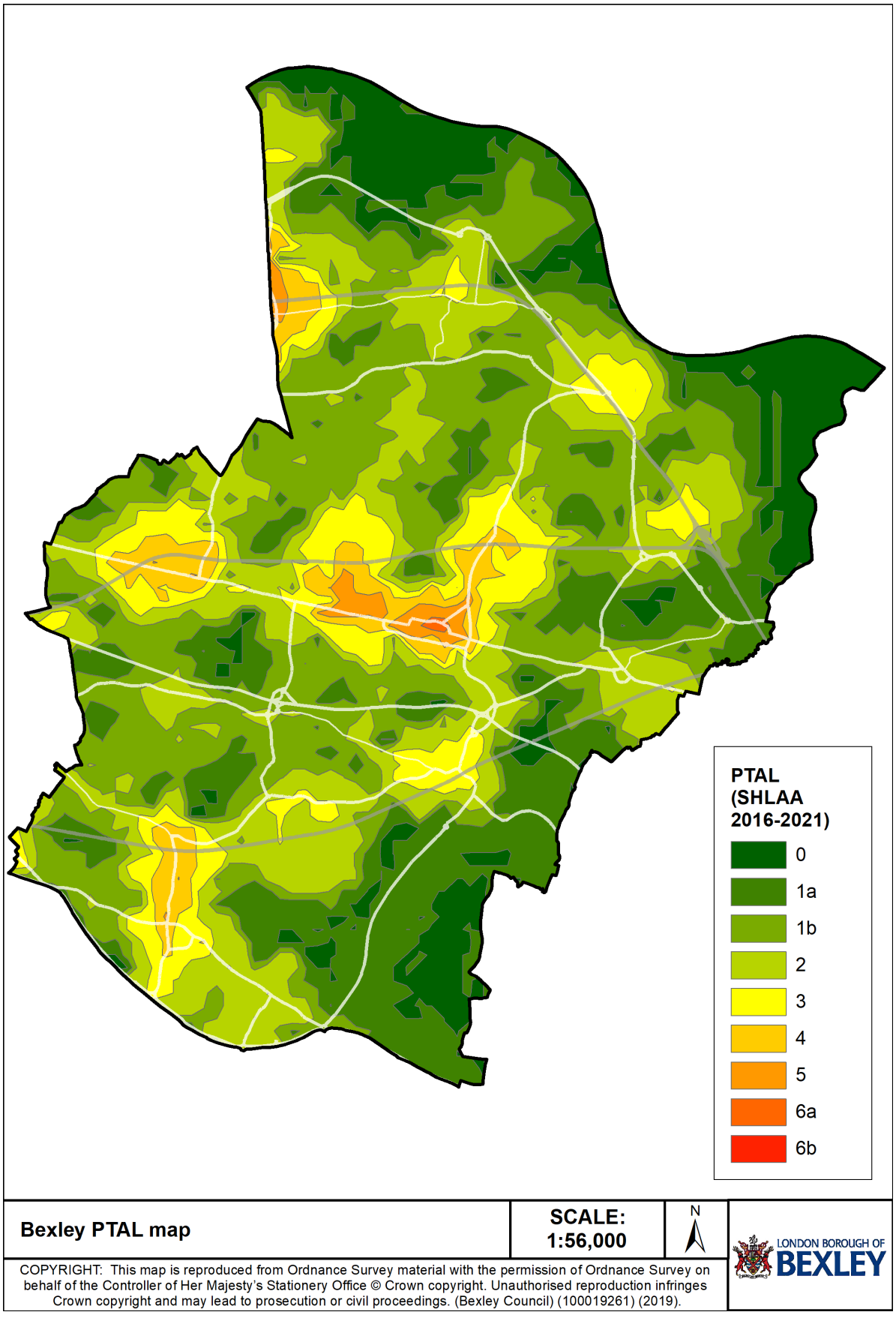
PTALs Determining Parking in New Development

7.52. Figure 7.2 provides a map showing public transport access levels (PTALs) across the borough of Bexley. The borough as a whole used to have an average PTAL of 1b (2015) but, because TfL have recalibrated how connectivity is measured in PTAL values, the latest average PTAL is at the very bottom of PTAL 2. Bexley is one of the five worst London boroughs for public transport access, when measured in terms of PTAL.

7.53. TfL has acknowledged, both in its Reg 18 consultation response (see Regulation 18 Consultation Statement) and in Duty to Cooperate meetings that not all areas that share the same PTAL value are "created equal". This becomes all the more important in areas with low PTALs (PTAL 2 and below) where a small change in public transport service level might make a big difference (between one place and another with the same PTAL value) to actual public transport connectivity.

7.54. The majority of the borough is in PTALs 0, 1a, 1b or 2. At least PTAL 3 is scored around most rail stations and town centres in the borough (but not all – Crayford only reaches PTAL2, for example). PTAL 4 is achieved around Abbey Wood station, Welling station/town centre, Sidcup station/town centre and the periphery of Bexleyheath town centre.

Figure 7.2 - Bexley PTAL map



7.55. Bexleyheath town centre is the only place in the borough where PTAL 5/6 is achieved at present; Abbey Wood will reach PTAL 5 once the Elizabeth line is open. Bexleyheath's PTAL 6 is achieved in a small part of the town centre, concentrated around the bus stops at and around Market Place. This is probably the only place in Greater London (and certainly the only town centre) where PTAL6 is achieved with no rail services at all.

7.56. There may therefore be an issue in treating Bexleyheath town centre in the same way as other places with the same PTAL values. Because Bexleyheath's public transport offer is only bus-based, it offers relatively comprehensive coverage within the borough but coverage beyond is both slow and indirect. Bromley South (PTAL6) has a wide selection of bus services **and** trains serving central London, the Medway Towns and mid-Kent, down to the east Kent coast. Likewise, the majority of places with the same PTAL as Bexleyheath town centre will tend to have access to a wider choice of places over a much larger geographical area; PTAL scoring hides that aspect of connectivity.

7.57. Table 10.3 in the London Plan sets out the appropriate maximum residential parking standards that should be applied in different parts of London, by PTAL value and by whether the development location is in inner or outer London. There is some variation in the set maximum parking standard, depending on the size of dwelling and the ability for outer London Boroughs in PTAL 0-1 areas to increase parking requirements for family housing (3+ beds) over the stated maximums where there is clear evidence that that this would support additional family housing. This reflected the Secretary of State's concern regarding the potential negative impacts of increased parking stress in outer London including the repercussions for active travel and electric vehicle take up. The justification for additional flexibility in Bexley is considered in more detail below.

The Need for More Family Housing

7.58. As stated above, alterations to the new London Plan directed by the Secretary of State, provided outer London boroughs the ability to increase maximum standards for family housing in low accessibility areas were this would help support the delivery of family housing. The need for family housing and the link between higher maximum standards and the delivery of such housing is therefore material to the setting of appropriate standards. In Bexley the case has been made to extend this flexibility given local circumstances. In particular it is considered that low accessibility areas should encompass some locations with PTAL 2. A separate technical paper on this interrelationship has been prepared but key findings are summarised below.

7.59. Demand for family housing is highlighted as a key unmet need in chapter 7 of the Bexley Strategic Housing Market Assessment (SHMA) and 2018 Household Survey. In this context, the proposed housing mix suggests that over 46% of units should have 3 or more bedrooms.

7.60. Agent and developer surveys undertaken by the Council confirmed that off street parking was very or fairly important to those purchasing family housing even in areas of very good accessibility. The general expectation from clients was confirmed to be 2 spaces for 3+ bed properties. There was also a clear indication in the survey that greater flexibility for parking

standards in local policy would be very important in making properties more attractive to their clients. Finally, developers confirmed that the parking needs of customers were very or fairly important to their decision making regarding the provision of family housing, particularly in areas of moderate accessibility.

7.61. Analysis of the Molior development database has also suggested that the majority of developments delivering family housing are in low PTAL areas (0-2), suggesting the restrictive parking standards elsewhere are an influencing factor. The level of parking provision in these developments is already very close to the maximum standards set in the London Plan. Although these is no evidence to suggest that lower parking standards affect sales rates, qualitative evidence suggests that demand in the borough is driven by owner occupiers rather than investors who are more concerned about parking. Moreover, discussions with sale suites at major development sites suggest that parking is a factor for buyers of larger units.

Overspill Parking from New Development

7.62. The transport case for seeking higher standards in family housing, as set out by the Secretary of State in his direction, is to avoid adverse impacts of increased on street parking stress. In Bexley, reduced levels of on-site parking for new residential development (through maximum parking standards) are considered to increase the likelihood of on-street parking on local streets, rather than reducing car-use and ownership.

7.63. An analysis of 91 on street parking surveys carried out to support planning applications since 2013 suggest that parking stress is a significant issue in the borough. Table 7.1 below summarises the results of this analysis.

Table 7.1: Parking Stress Surveys by PTAL

PTAL Level/Parking Stress	Proportion of Surveys with 50% or above	Proportion of Surveys with 60% or above	Proportion of Surveys with 70% or above	Proportion of Surveys with 85% or above
PTAL 3 - 5	60%	53%	26%	13%
PTAL 2	66%	45%	39%	6%
PTAL 0 - 1	76%	56%	36%	16%

7.64. This clearly shows a high proportion of recent development locations have high parking stress levels – over half of all locations showed 60% + parking stress levels – and that, broadly, the lower the PTAL level the higher proportion of sites with higher parking stress levels. In PTAL 2 areas nearly 40% of all surveyed sites had stress levels of 70% or above. The Council generally considers 85% to be the limit of acceptable parking stress. Further information on parking stress is provided in the following section.

7.65. Examples of specific issues on particular development sites include the first phase of the Erith Park social housing development at Larner Road, Erith (PTAL1, on the edge of PTAL2) informal surveys have shown evening and weekend parking on yellow lines and on verges. During 2020 lockdown, double parking became common, as fewer people were using their cars. In this particular case, the streets affected were mainly those within the overall site itself. The same pattern of greater demand for parking than provided for in residential parking standards has been seen at a variety of places.

This on street parking stress relates directly to sustained high car ownership in the borough, as set out in Chapter 3. The relationship between car ownership, unit size and location is important when considering the case for higher standards for family housing in particular locations. This is further considered below in the section on managing development parking.

7.66. Parking overspill issues are not confined to residential development. The Amazon development at Crabtree Manorway North in Belvedere (which involved use of an existing speculative-build industrial site, with parking provision following older parking standards) has added significantly to the already extensive on-street parking on several of the neighbouring industrial roads. This is understood to be because of a combination of higher workforce parking demand and the particular operational needs of this occupier. The parking situation on Crabtree Manorway North is shown in the picture at Figure 7.3. An articulated HGV is seen passing between two solid rows of parked cars and vans. The Amazon operation requires a large number of vans; it is understood that the occupier is now looking for third party land for a call-on facility, in order to be able to manage the situation better.

7.67. Likewise, at Optima Park (Slade Green), application of maximum parking standards from previous London Plans have created congested access roads. Those maximum standards took no account of the differing operational needs of different occupiers. Additionally, significant car and van movement is generated by trade counters (such as Screwfix) on the estate, which is then added to the already congested access roads.

Figure 7.3 - On street parking with passing HGV on Crabtree Manorway North, Belvedere

7.68. Overspill parking from new development has led to calls for the Council to do more to protect residents' amenity and the operational needs of local businesses . LIP para 3.6.16 confirms the Council will use CPZs to deter commuters parking near local railway stations, but not to manage parking overspill due to inadequate development parking.

7.69. The Council has no direct means to stop occupiers of new development from owning cars – hence the desire for a realistic and managed approach, alongside a set of actions that will bear down on car use in the longer term, working within the transport and planning frameworks set by the Mayor.

Managing Development Parking

The Spatial Development Strategy

7.70. An appropriate approach to parking in the borough should link closely with the Council's overall spatial strategy (further details of which are set out in the relevant technical paper). The spatial strategy sets out the Councils overarching approach to the location of development over the plan period and reflects the requirements of the London Plan. Development locations are identified which are considered to be the most sustainable areas for new homes and jobs. In essence they have a combination of characteristics which ensures any negative effects of development can be effectively mitigated and the associated benefits are maximised.

7.71. Considerations in this regard include the opportunity to make the best use of existing and proposed public transport links, 'walk to' local shopping facilities and services and the sorts of housing typologies that lend themselves to densification. The Council has, therefore, based its sustainable development areas on the locations within walking distance of its town centres and

railway stations. These distances range from 800m to 400m depending on the level of connectivity to public transport (the PTAL level) and shopping provision (number of commercial units). The association with parking standards arises because the lower the quality of the centre, the more likely surrounding residents are to own and use cars to access alternative provision.

7.72. All development within the borough will be directed to these locations as they are the most sustainable and other locations will only be considered if the developer can prove that they adhere to sustainable development principles. However, family housing is particularly reliant on car ownership in suburban areas such as Bexley. Primary school and healthcare provision is rarely located within town centres whilst more flexibility in the choice of schools can mean longer travel distances which are not always easy to achieve by active means or public transport. Therefore, consideration was given at the Regulation 19 stage as to how less well-connected areas within sustainable development locations, as well as other areas with poor accessibility, can ensure sufficient family housing is provided to meet identified need without increasing parking stress and its associated drawbacks. Some flexibility in maximum parking standards in these areas in certain circumstances would appear appropriate where it is likely that the London Plan standards would raise issues. In determining which areas should see flexibility, consideration will need to be given to the high car usage, even over short distances in Bexley (some 40% of shopping related car journeys are over distances of less than 2km) and the very low mode share for walking and cycling (Bexley has the lowest active travel/sustainable mode share in London). This should be allied with the dispersed nature of local services (such as schools and health care) and the relatively isolated nature of many employment areas in the borough, which means it is very difficult to undertake multi use trips using modes other than the car – particularly for the elderly and working parents with small children. These factors suggested the area of flexibility should be large enough to ensure it coincides meaningfully with the identified sustainable development areas. This is considered further in paragraphs 6.79 to 6.82 below.

7.73. Moreover, the Councils spatial strategy suggests that, of the borough's London Plan opportunity areas, only Abbey Wood and Thamesmead is developed enough in its planning and investment approach to be considered a sustainable development location. Bexley Riverside Opportunity Area currently lacks a planning framework and is not proposed to benefit from any strategic transport investment within the plan period. It is, therefore, not capable of supporting growth, outside of the area immediately around its town centres and railway stations. The approach to parking within the opportunity area will, therefore, need to be realistic to ensure adverse impacts do not arise from an overly ambitious approach to maximum standards.

Parking in High PTAL Areas

7.74. London Plan parking standards expect nil parking (with the exception of disabled parking) in areas with PTAL 5/6 – which, for Bexley, applies to the area immediately around Bexleyheath town centre and Abbey Wood Station. In and around both these areas , there are already measures in place that manage parking, including in Bexleyheath a CPZ that applies on streets surrounding the town centre between 08.30 and 17.30 Monday to Saturday.

7.75. For some development proposals in areas with PTAL below 5, developers may put forward very low parking provision compared with the London Plan parking standards. This may be appropriate in some PTAL 3/4 areas, but not where the PTAL is below 3, given that these areas have low connectivity and, as suggested in Table 6.1, are also likely to experience high levels of on street parking stress. Developers are expected to provide evidence with such development proposals about levels of existing parking stress on neighbouring streets. This is so that the Council can understand the potential outcome if overspill parking occurs from the development.

7.76. The Council from time to time seeks parking stress surveys that use the "Lambeth Methodology" for gathering the required information. This comprises surveying streets within 200 metres of the development site boundary for actual parking demand and for details of all existing parking restrictions (including road markings and signs). With that information, conclusions can be drawn about both supply of and demand for on street parking. Bexley has concerns with the way in which data is interpreted and with some of the methodology's assumptions. On street parking tends to be longitudinal, not side-by-side. Bexley considers that the methodology's assumption of 5m per parking space is insufficient; instead, it prefers calculations to be based on a 5.5m space length, which is operationally more realistic in the Council's experience. The Council considers it important that 85% should be considered as a limit on acceptable average parking stress, from the point of view of residential amenity. This takes into account that sometimes there is more parking demand and sometimes less; and that sometimes, 'available' parking space can include lengths of less than one parking space. It is always important for a developer to contact the Council about the specification and methodology of parking surveys linked to their development proposal, before they are undertaken. This avoids the risk of the methodology not being considered sound by the Council.

7.77. In Bexley, introduction of (or extension to) CPZs requires majority support of the public for the proposal and no overriding objections at statutory consultation stage to the draft Traffic Management Order under traffic (not planning) legislation. From past experience, support is much less likely to be given to proposals to create or extend parking restrictions if the outcome is a worse position for existing residents.

7.78. The Council's website provides information on Parking Permit Pricing, showing that annual CPZ residents' permits cost £125-£150 (as at September 2021).

Parking in Lower PTAL Areas

7.79. As referenced above, in particular areas of low connectivity, it is considered that the delivery of family housing may be impeded by low maximum parking standards and result in a worsening of parking stress. This will be particularly the case where London Plan standards seek to impose standards significantly below the average cars per household figure. Table 7.2 sets out an analysis of the average car ownership for different sizes of home in different PTAL levels using Lower Super Output Areas (LSOA) data from the 2011 Census.

Table 7.2 Average Cars Per Family Home in Low PTAL Areas (2011)

PTAL	Beds	Cars per HH 2011	Max Standard London Plan (2021)
0 - 1	3+	1.34	1.5
PTAL 2 (<400m from station and town centre)	3+	1.10	1
PTAL 2 (>400m from station and town centre)	3+	1.29	1

7.80. The figures clearly illustrate that differences in average car ownership occur within areas of the same PTAL, in this case PTAL 2 areas further than 400m from a station and town centre have average car ownership levels more than 17% higher than those within 400m. This confirms that such areas are not uniform in terms of connectivity and may need different approaches to reflect local distinctiveness.

7.81. Although these Census figures are now dated, there is nothing to suggest that they have altered significantly in the interim. In fact, Chapter 3 (paragraph 3.45) suggests that the number of licenced vehicles in the borough has increased steadily in the interim whilst residents surveys from 2020 for new development sites also indicate these averages have been maintained or increased, albeit the sample size for these is very low.

7.82. When these average figures are compared to the maximum standards in the London Plan, it can be seen that there will be a clear tension between the car ownership levels that can reasonably be expected and the parking spaces that are likely to be provided. Other evidence in this document confirms that this may not dissuade people from owning cars but simply push them into increasingly crowded streets, an issue further exacerbated by associated visitor parking. It is acknowledged that some gentle downward pressure should reasonably be exerted to encourage reduced car use, but this is only likely to be achieved in areas which are close to local services and public transport. As a result, at the Regulation 19 stage, it was considered that a higher standard should be sought for family housing in poorer PTAL 2 areas, defined as those more isolated from transport and service hubs (more than 400m away or approximately 5 minutes' walk). This approach was amended slightly following representations made at the Regulation 20 stage and subsequent discussions with TfL, to better align with the spatial strategy and the London Plan. Further detail is provided below.

Parking in Opportunity Areas

7.83. The London Plan proposes that within outer London opportunity areas maximum residential standards are set at 0.5 spaces for all PTAL lower than 5 and for all housing types. This is designed to reflect the growth opportunities and infrastructure investment being made in these areas and

their ability to accommodate higher densities and additional growth. As indicated above, Bexley Riverside Opportunity Area is not considered to be at the same stage as other opportunity areas in the planning and investment of these growth opportunities. Outside of the identified sustainable development locations it is not considered that growth is likely to be appropriate, whilst inside them, existing car reliance and use is likely to require a more measured approach to demand management.

Fractions of Spaces

7.84. Where parking standards are expressed in fractions of spaces this will sometimes result in total provision on a given site also incorporating a fraction. On larger sites a rounding down of this fraction is unlikely to cause issues as a large number of spaces will be provided and provision will average out across the piece. However, for smaller sites rounding down is more likely to result in some units having no parking at all when they require some, thereby increasing on parking stress.

Parking Needs for Social Care

7.85. In Bexley, social care for the elderly is increasingly procured, managed and run on the basis that care services will be brought to people rather than people to the care. Through this process, the Council's care services can be more targeted and more cost-efficient, while allowing people the dignity of staying in their own home as much as and for as long as possible.

7.86. The Council's care strategy is therefore one of prevention, as set out for example in Bexley's 2018 strategy document Ageing Well – Bringing individuals, communities and care together.

7.87. One aspect of feedback from the care teams to the highways and the planning teams is about making parking available for visiting care workers, especially in CPZs. Care workers have schedules of different visits that are spread throughout the day (and evening/night), perhaps with as little as a 15-minute call at some people's homes. Even so, care workers report that they have to park within restricted areas at restricted times on occasion and that it is not uncommon for them to receive penalty charge notices (PCN) for doing so.

7.88. For some new developments – especially those offering particular care packages for the elderly – that will expect regular calls from visiting care workers, it is important that sufficient operational parking is provided for that purpose within the development. This is in addition to residents' and visitors' parking, along with any Blue Badge parking that should be provided (in line with the minimum standards in the London Plan). To keep streets clear from loading and unloading, development proposals for new care homes need to provide loading facilities for minibuses – including dial-a-ride.

7.89. The need for such arrangements had already been highlighted prior to publication of the Reg 18 consultation document and were included in proposed Policy DP15. It would be useful if the wording could be made to reflect not only use class C2 care homes but also use class C3 sheltered housing. As set out in LPTA chapter 6 and the Regulation 18 Consultation Statement , further representations were received on this issue at Reg 18-stage, and a redrafted policy was presented at Regulation 19 (DP23). Following representations made as Regulation 20 stage and subsequent

discussions with TfL the policy has been further amended to more clearly reflect the London Plan position. Further details are provided below. Parking for Industrial Uses

7.90. As highlighted above, there are already several examples in the borough of where industrial development is already generating overspill parking. This is especially true on Strategic Industrial Land in the borough, where PTALs tend to be low – often PTAL 0-1b.

7.91. Excess parking demand in industrial development can arise for a range of reasons. Shift working can result in very high demand for parking around shift change time; as one shift finishes and another one starts (with the starters needing to park up before the finishers have left). Some site occupiers may have operational characteristics that are very different from the typical occupier for that type of use (B2 light industrial or B8 warehousing, say), with a high turnover of delivery movements and high numbers of sales-related visits.

7.92. High employee parking demand can occur where they mainly live in places from where car travel is the only reasonable means of getting to work. That might be because the need for people with particular skills specialisms (or just skills shortages) requires recruitment over a much wider area. There is a direct relationship between commuter journeys by mode and PTAL scores, but that is not the only factor in Bexley's case. In overall terms, Bexley is easier to get to by car than it is by public transport. The M25 motorway, along with the A2 and A20 trunk roads are within easy reach of much of the borough; and public transport routes, walking and cycling simply cannot compete with the potential "hinterland" that employee car travel offers employers in industrial units.

7.93. In some cases, overspill parking occurs because the level of parking demand is higher than was allowed for in the parking standards applicable at the time. That may just be because assumed mode shares have not been achieved. It may be because the business in question is simply outgrowing its operating base.

7.94. The new London Plan does not include specific operational parking standards for industrial development proposals but does suggest that the starting point for non-operational parking should be the office parking standards set out in Table 10.4.

7.95. There is no one-size-fits-all answer to these points. An approach is therefore needed for industrial development proposals that will consider and minimise/mitigate car-based demand in the case of employee/customer parking while dealing with the occupier's (and potential future occupiers') genuine operational needs. Such a policy approach was proposed at Regulation 19 stage. Further amendments were made as a result of representations received at Regulation 20 stage and subsequent discussions with TfL. Further details are provided below.

Proposed Direction for Local Parking Standards Policy for Bexley

7.96. Despite cycling demand in the borough being at relatively low levels, the Council seeks to apply London Plan cycle parking standards in Bexley and should continue to do so through the life of the Bexley local plan (2021-2036).

7.97. It will be important to recognise the importance of parking provision (along with proper parking management) for town centres, taking account the importance placed on development in town centres in the NPPF. Concentrating town centre parking into shared car parks (rather than a series of small on-plot parking areas) makes for more efficient land use. In assessing whether it may be appropriate to consider alternative development proposals for an existing station or town centre car park, it will be important to take into account potential adverse effects of rail heading and/or on town centre viability. It should be considered whether any of the lost capacity should be replaced and whether there will be a negative impact on the highway authority's ability to manage overall parking demand effectively that will need to be mitigated.

7.98. The Reg 19 draft local plan therefore sought to resists redevelopment or change of use of car parks – either at stations or in town centres (performing a wider town centre function) – unless that amount of parking (or the amount that is still considered to be required, if less) is replaced. Following representations at the Regulation 20 stage, the policy was further clarified to state that an appropriate level of public parking is retained where such provision is essential to avoid unacceptable harm and that this should be the minimum necessary, informed by an appropriate transport assessment.

7.99. The Council remains concerned that parking (by occupiers/users of new developments) can spill over into neighbouring streets. Some streets just do not have sufficient spare capacity to be able to absorb this overspill parking demand, given the level of parking in the neighbourhood anyway (which may already give rise to problems of 'parking stress'). In considering a development proposal, the Council needs to have data that enables it to understand existing levels of local parking stress and therefore how well the streets in question would be able to deal with overspill parking. Impacts of possible overspill parking on residential amenity (if the development is in a residential area) need to be understood before determining an application for such a development proposal. Factored into the highway authority's thinking will be whether more parking stress might lead to negative impacts in terms of road safety or traffic movement, particularly for those undertaking active travel. The impact of over reliance on on-street parking to efforts to increase electric vehicle take up through improved on site charging provision will also be considered . Parking stress surveys (e.g. using the "Lambeth Methodology", or to a similar specification) should be used in such cases. It will always be wise for a developer to scope the parking stress survey methodology with the highway authority before undertaking the surveys.

7.100. This should be expected particularly in PTAL 3/4 areas if the proposed parking provision for the development proposal is materially below the maximum allowed in the London Plan. If the low level of parking is aimed especially at delivering mode shift, the Council may require the developer to enter into a section 106 agreement, undertaking that occupiers/ users/visitors will not be eligible for parking permits for that CPZ. Some or all of any parking spaces provided on the development site could be made available as leased spaces, with a regular leasing charge, which would also be included in the s106 agreement. The London Plan is clear (in paragraph 10.6.14) that parking spaces "should be leased rather than sold".

7.101. As noted earlier in the chapter, less parking overall is needed on a development site if more of the parking to be provided is able to be shared. On larger sites, this also gives the opportunity, as mode shift is achieved, for some parking areas gradually to become surplus to requirements and therefore able to be redeveloped. Such an approach allows occupiers to enjoy a reasonable level of connectivity through the life of the development, while reducing the parking provision over time if alternative means of connectivity are delivered and people begin to own fewer cars. Such an approach may be particularly relevant in areas with low current PTAL that might expect a significant uplift in alternative means of connectivity in the future (for example through public transport schemes set out in LPTA chapter 5).

7.102. New family homes will need more parking in areas with lower PTAL, making them potentially attractive for both developers to sell and buyers to buy. The following local approach was therefore proposed for residential parking standards in the Reg 19 draft Bexley local plan:

- For 3+ bed homes: maximum 1.25 parking spaces per dwelling
  In PTAL 2 more than 400m from either a station or a town centre – this would be a local policy alteration from the London Plan.

7.103. This was considered to reflect the fact that places in PTAL 2 that are within 400m or five minutes' walk of both a station and a town centre are the ones that have the best connectivity by non-car means and access to a good range of local facilities and that those conditions are more applicable for the residential parking standards for PTAL 2 in the London Plan.

7.104. However, as a result of further discussions with TfL following the regulation 20 stage, it is acknowledged that this approach does not align exactly with the Councils spatial strategy which has identified sustainable development locations in the borough within 800m of a town centre and railway station in some circumstances. This clearly suggests that such locations have the characteristics required to support more ambitious parking standards and should be encouraged to do so in the context of the draft Local Plan's and the London Plan's overall objectives. As a result, the approach to residential parking standards for family housing has been revised so as to apply the flexibility only in areas of PTAL2 outside of the defined sustainable development locations where exceptional circumstances can be shown.

7.105. Otherwise, it should be expected that the residential parking standards set out in Table 10.3 of the London Plan will be applied with the exception of the Opportunity Area standards for outer London which would only apply to the Abbey Wood and Thamesmead Opportunity area in Bexley. This is in recognition of the undeveloped nature of plans for infrastructure improvement in the Bexley Riverside opportunity area and the dangers of imposing an over ambitious demand management approach in that context .

7.106. Development proposals that include a proposition for parking standards materially below the relevant maximum standards should set out the basis for the levels of parking chosen in a transport statement (for smaller developments) or transport assessment (for larger developments).

7.107. For residential development proposals that include specialist housing for older people, it is considered essential that the needs of visiting care workers and non-resident staff are considered. Other operational parking and loading/unloading space on site should also be considered for example for minibuses/Dial-a-Ride services. Blue Badge parking should be provided in accordance with the standards set out in the London Plan. As a result, the Reg 19 draft local plan sought:

a) A maximum of 1 car space for every 6 residents (for visitors); and

b) A minimum of 1 car space for every 2 staff full time equivalents (FTE) for non- resident staff and visiting health care workers. Further spaces may be required to support additional demand, to be determined through a Transport Statement or Assessment.

7.108. Following representations at the Regulation 20 stage and further discussions with TfL it is clear that the broad parking principles sought for specialist housing in Bexley can be accommodated within the London Plan approach. The policy has, therefore, been revised to specify the consideration of specialist housing schemes on a case-by-case basis, using the residential parking standards in the London Plan as the starting point and with particular regard being had to public transport accessibility of the area and the character of the residential care being provided.

7.109. For industrial development proposals – including light industrial and warehousing – the Regulation 19 Draft Local Plan sought that development demonstrate overall parking requirements have been minimised through measures in a Delivery and Servicing Plan (for aspects of operational requirements), a Travel Plan (for aspects of employee and visitor/customer journeys) and a Parking Management Plan (to show the basis on which the required parking and loading/unloading areas will be laid out on site). Once this had been demonstrated, provision of the projected parking need would then have to be considered acceptable. However, again following discussions with TfL post Regulation 20, this policy has been revised to more clearly align with the London Plan approach. The policy continues to seek provision in line with projected operational need but non-operational parking should be considered on a case by case basis, using the London Plan office standards as a starting point and having regard to the nature of the use and the locality.

Chapter 7 Conclusion

7.110. Through identification of policies on parking and parking standards in NPPF and the new London Plan, this chapter has identified the planning context for parking provision for new development in Bexley borough.

7.111. The chapter has also identified specific matters in parking management and operation, and in parking research material, that suggest that consideration should be given to a local approach to parking provision and parking standards for new development in the borough in certain circumstances.

7.112. The chapter has reviewed the reasons for these potential exceptions from national and London-wide parking policy, based on the issues raised. It has then set out parking standards policy development through to the Reg 19 and 20 stages of Local Plan production.

These exceptions are still very much in the spirit of the objectives and policies set out in the London Plan, but recognise the specific issues faced in the borough to achieve them.

Chapter 8 – Quantitative Analysis –Trip Generation

General Approach to Modelling

8.1 The guidance published by the Ministry of Housing, Communities & Local Government (2015), Transport evidence bases in plan making and decision taking identifies the need to: "assess the existing situation and likely generation of trips over time by all modes and the impact on the locality in economic, social and environmental terms"

8.2 The guidance also refers to the use of area-wide traffic models but in Bexley, there is no strategic modelling available that reflects the development sites being proposed in the draft local plan, and there is unlikely to be in the near future. Transport for London (TfL), with funding from Bexley, commissioned modelling for the Bexley Riverside OAPF in 2018. Only the base year model has been produced; the rest of the work is on hold, pending resources at TfL becoming available.

8.3 Other modelling was carried out by TfL for the Bexley Growth Strategy and the options for Thames crossings east of Silvertown (2014-2016). This work was reviewed and found that whilst some of the outputs provided useful background information, none of them related sufficiently closely to the patterns of development being proposed in the draft local plan 2021-2036 and were therefore not suitable.

8.4 As a consequence, the LPTA comprises a collection of different assessments, including this quantitative assessment (trip generation, traffic distribution, junction assessment); connectivity; air quality; and the individual site-specific assessments. These have been based on two lists of development sites.

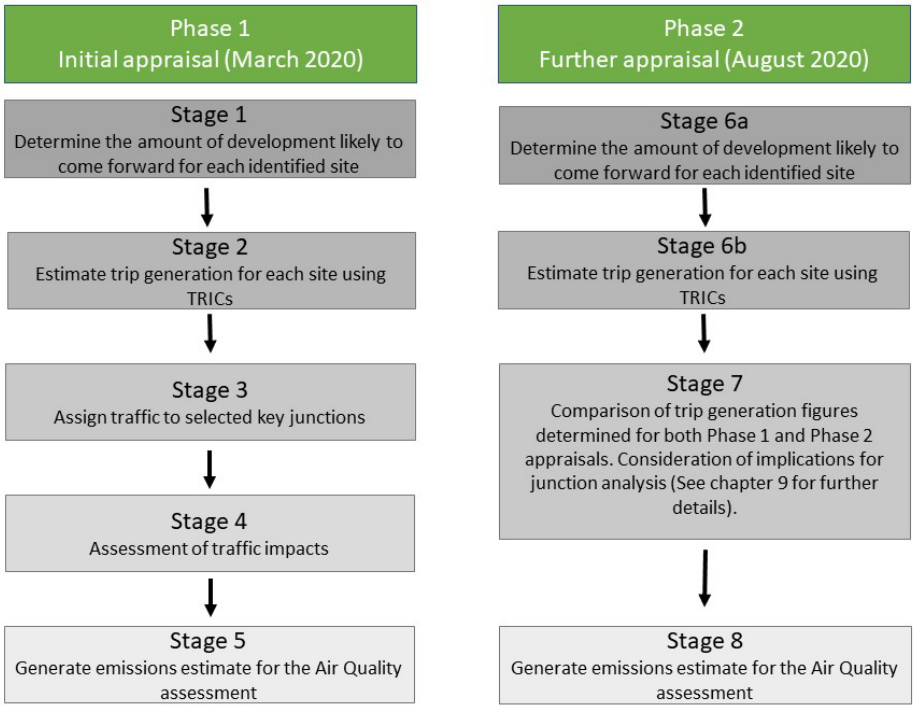
- **Reg 18-based List (the March 2020 List)** - developed from the set of proposed sites in the Reg 18 consultation document (early 2019) and edited based on feedback in the consultation responses, receipt of new information about the sites or other information. The list comprised a total of 112 large sites of which 53 sites made up the emerging housing trajectory (see appendix B of the LPTA). The trajectory comprised some 11,135 residential units.

- **Potential Reg 19 List (the August 2020 List)** – an updated list with interim iterations in June and July 2020. This comprised a total of 91 large sites of which 47 made up the emerging housing trajectory for the Local Plan. The trajectory comprised some 8,372 residential units.

8.5 The site lists have been used as the basis for both the quantitative analysis set out in full in Chapter 9 and the air quality analysis which is presented in Chapter 10. The March list forms the main input into the quantitative analysis since it comprised the most up to date information available at the time of that work, although trip generation data derived from the August list was subsequently generated for comparison purposes. For the air quality work, trip generation data from both the March and August lists were available to inform calculations and a direct comparison could therefore be made. In addition, a small sites capacity exercise had also been

undertaken at this point which informed the air quality modelling work. Figure 8.1 provides a simplified flow diagram which illustrates the modelling methodology used for the different LPTA assessments.

Figure 8.1 Modelling Methodology Flow Diagram



8.6 The approach as illustrated above has been to produce a high-level analysis with the following stages:

1. Derivation of expected development on a site-by-site basis from the March 2020 list through a development capacity calculation
2. Estimated trip generation for each of the identified sites (for all modes) by site and, where helpful for the analysis, by site cluster using the TRICS database;

This trip generation data was then used in the quantitiative analysis as follows:

3. Manual traffic assignment around the network, to derive how development-generated traffic flows in three scenarios might impact on selected key junctions for assessment;
4. Assessment of traffic impacts through junction modelling at each key junction (which have been chosen as representative of traffic levels/issues in each relevant growth area) in the selected scenarios;

And in the air quality assessment as follows:

5. Generate emissions estimates for the main emmissions types using the GLAs 2016 air quality model

The August 2020 List was then used to:

6. Repeat steps 1 and 2 above

7. Compare trip generation figures with those generated from the March 2020 list and consider the implications for the junction analysis

8. Repeat step 5 above and compare the air quality results with the results generated from the March 2020 list.

8.7 Steer Group were appointed in January 2020 to carry out the high-level quantitative analysis on behalf of the London Borough of Bexley.

8.8 Further detail on the trip generation stage is provided in the next section whilst more information on each assessment is provided in the relevant chapter.

8.9 At this stage it should be noted that this methodology only considered the impact of residential growth and does not include traffic impacts from employment growth with the exception of a commercial floorspace component within large town centre sites and some assumptions around reprovision of employment uses in colocation sites (see below for further detail). This is because at the time, the nature and distribution of employment growth in the borough was insufficiently clear to be incorporated. Subsequent evidence gathering has enabled reasonable assumptions to be made on these matters. These assumptions have been fed into further modelling work to test the impact of proposed development on the strategic road network in and around Bexley. This work has now been completed with regard to strategic roads outside the borough and is considered in the following chapter. Additional modelling on the local road network is expected in December 2021 and will be published as a supplement to the Local Plan evidence base, although it is not expected to alter the Council's fundamental conclusions.

Introduction to Trip Generation Analysis

8.10 The rest of this chapter considers steps 1, 2 and 6 of the above methodology and sets out the likely/potential trip generation (across all modes) for the major potential development sites in the borough during the AM peak hour (8am-9am) and the PM peak hour (5pm-6pm) . The sites assessed were the 53 larger development sites contributing towards the potential Housing Trajectory indicated in the Reg 18-based list for Large Sites (the March 2020 List). The Mayor's targets for housing include a significant number of Small Sites too – such that the split between Large Sites and Small Sites is 55%/45%.

8.11 This approach starts with analysis of the potential traffic generation from Large Sites on the March 2020 List. Small Sites of less than 0.25ha and windfall sites have not been individually assessed but an assumption made that their impact is equivalent to TEMPRO based growth within the plan period. Further information on this approach is provided in chapter 9 at paragraph 9.31.

8.12 The March 2020 List provided data on site size and potential development densities for the larger sites, which were used to estimate the number of potential units that could be accommodated on each site, for assessment purposes.

8.13 The methodology provides a worst-case estimate of vehicle trip generation based on historic trends and patterns rather than the aims and planned outcomes of the Mayor's London Plan.

8.14 For example, the Mayor's target is for 80% of all trips in London to be made by public transport, walking and cycling by 2041 (the borough target is 63%). The analysis has assumed that only 36% of journeys are made by public transport, walking and cycling, taken from existing new development in the local area. In practice, as measures to promote rail, bus, walking and cycling come into effect across the plan period, the % of vehicle trips will decline. Other London plan requirements which aim to reduce the level of car use include:

- Policy T2 Healthy Streets – proposals should deliver patterns of land use that facilitate residents making shorter, regular trips by walking and cycling; promote the application of the Healthy Streets Approach
- Policy T2 Car parking – car parking should be restricted in line with levels of existing and future public transport accessibility and connectivity and car-free development should be the starting point for all development proposals in places that are (or planned to be) well-connected by public transport.
- Policy GG2 Making the best use of land – prioritise sites which are well-connected by existing or planned public transport, promoting higher density development that reduce the length of journeys, plan for good walking, cycling and public transport connections
- Policy GG3 Creating a healthy city – promote more active and healthy lives for all Londoners and using the Healthy Streets approach to prioritise health in all planning decisions
- Policy SD6 Town centres and high streets – delivering sustainable access to a competitive range of services and activities by walking, cycling and public transport
- Policy SD8 Town centre network – local and neighbourhood centres should focus on providing convenient and attractive access by walking and cycling to local goods and services
- Policy D8 Public Realm – proposals should encourage active travel and ensure the design of public realm discourages travel by car and excessive on-street parking; movement function and it's function as a place are provided for, desire lines for people walking and cycling should be a particular focus
- Policy SI 1 Improving air quality, where, as a minimum, development proposals must be at least Air Quality Neutral.

Overview of Trip Generation

8.15 Vehicle trip generation and non-vehicle trip generation are presented separately, with the vehicle-trip generation outputs used to inform the traffic modelling described in Chapter 9.

- Vehicle trips – trips undertaken in a private vehicle, such as a car, HGV, motorcycle etc.

- Non-Vehicle trips – trips undertaken by bus, rail, walking and cycling

8.16 The sites have been grouped by three separate development type as follows:

8.4. "**Primarily Residential**": housing development only;

8.5. "**Town Centre**": residential development (75%) with appropriate town centre commercial uses on the ground floor (25%); and

8.6. "**Co-location (Industrial & Residential)":** residential development on land currently designated as industrial, through industrial site intensification.

Vehicle Trip Generation

Primarily Residential Sites

8.17 Vehicle trip rates were taken from TRICS compliant post-development surveys of Erith Quarry (20/00775/OUTM; PTAL 1b) as set out below in Table 8.1.

Table 8.1: Recorded Vehicle Trip Rates for Erith Quarry

Time Period	Total Vehicle Trip Rates per unit Arrivals	Total Vehicle Trip Rates per unit Departures	Total Vehicle Trip Rates per unit Two-Way
AM Peak	0.084	0.358	0.442
PM Peak	0.232	0.158	0.389

8.18 These trip rates were then adjusted to account for different PTAL levels, since a residential site with poor public transport accessibility and therefore a low PTAL figure is likely to have more journeys made by vehicle and vice versa. The % adjustments for the various range of PTAL levels are shown in Table 8.2, while the adjusted trip rates are shown in Table 8.3.

Table 8.2: Percentage Adjustment to Trip Rates according to the PTAL.

PTAL	0	1a	1b	2	3	4	5	6
% adjustment	+20%	+10%	0%	-10%	-20%	-30%	-40%	-50%

Table 8.3: Residential Vehicle Trip Rates (per unit) by PTAL Rating

PTAL	AM Peak Arrivals	AM Peak Departures	AM Peak Two-Way	PM Peak Arrivals	PM Peak Departures	PM Peak Two-Way
0	0.184	0.362	0.546	0.295	0.174	0.469
1a	0.168	0.332	0.501	0.271	0.160	0.430
1b	0.153	0.302	0.455	0.246	0.145	0.391
2	0.138	0.272	0.410	0.221	0.131	0.352

3	0.122	0.242	0.364	0.197	0.116	0.313
4	0.107	0.211	0.319	0.172	0.102	0.274
5	0.092	0.181	0.273	0.148	0.087	0.235
6	0.077	0.151	0.228	0.123	0.073	0.196

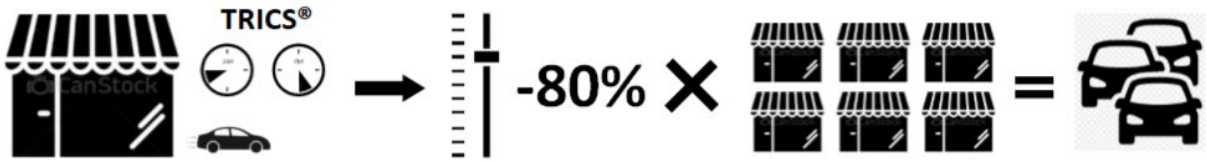
8.19 These trip rates, combining locally observed trip rates with adjustments based on PTAL level, were applied to the potential number of units for each site to produce the total number of trips for the AM and PM peak hours. See Figure 8.1 flowchart for calculating residential trip rates.

Figure 8.2: Residential Vehicle Trip Rate Calculation

Town Centre Sites

8.20 The same methodology for Primarily Residential Sites has been followed for the residential elements of these sites. Trip rates were selected from the TRICS database (database of recorded trip rates for new developments in the UK) for small-to-medium sized convenience retail stores in other London boroughs (as no equivalent information was available for such uses in Bexley) to reflect the commercial ground-floor land-uses found in town centres. These trip-rates are based on floorspace (per 100sqm) and on the assumption that only 50% of the given site surface area is used for the buildings; the remainder is allocated for parking, landscaping and access. The trip rates also take into account that some visitors to the ground floor commercial use would be making a "linked trip" taking in other destinations in the town centre too. A typical rate of 80% has been used to discount the total number of vehicle trips associated with that use, based on that linked trip assumption.

Figure 8.3: Commercial Vehicle Trip Rate Calculation



Co-location (Industrial & Residential) Sites

8.21 The approach for these sites has been to assume that the traffic generated for the industrial component on site will still be in the network, either through intensification of part of the site or through local relocation. In quantifying broad impacts on the traffic network, only the

residential component therefore needs to be assessed. The methodology used is therefore the same as that used for the Primarily Residential sites.

Summary

8.22 Based on these approaches to each site type, it was possible to calculate the potential number of peak hour vehicle trips in both AM and PM peaks arriving at and departing from each of the 53 identified larger development sites. Appendix B of the LPTA sets out the peak hour vehicle trips arriving and departing from each site.

Non-Vehicle Trips

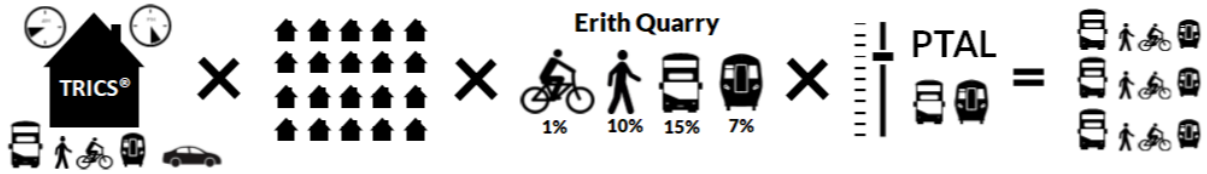
Primarily Residential Sites

8.23 The average total person trip rates per dwelling during the AM and PM peak were obtained from TRICS, using data from comparable sites in outer London boroughs These were then multiplied by the potential number of dwellings on each site to find the total number of trips per site. The vehicle trip rates from the TRICS-compliant survey of Erith Quarry (July 2019) were then factored in to ensure that this aspect of the trip rate data was locally based. A PTAL factor was then applied, aimed to represent reducing car trip rates and increasing non-car trip rates as PTAL increases. The resultant mode share estimates for non-vehicle modes by PTAL score is shown in Table 8.4 below.

Table 8.4: Residential Modal Shares by PTAL for Non-vehicle Modes

PTAL	Rail	Bus	Walking	Cycling
0	12.0%	5.6%	10.4%	0.8%
1a	13.5%	6.3%	11.7%	0.9%
1b	15.0%	7.0%	13.0%	1.0%
2	16.5%	7.7%	14.3%	1.1%
3	18.0%	8.4%	15.6%	1.2%
4	19.5%	9.1%	16.9%	1.3%
5	21.0%	9.8%	18.2%	1.4%
6	22.5%	10.5%	19.5%	1.5%

Figure 8.4: Residential Non-Vehicle Trip Rate Calculation



Town Centre Sites

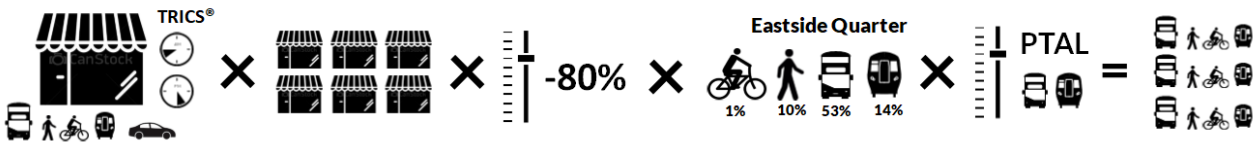
8.24 The methodology for Primarily Residential non-vehicle trips was repeated for the residential element of the town centre sites. For the commercial element, total person trip rates for commercial use were obtained from TRICS. Due to the town centre location, many of those who visit the site and travel in by bus, rail, walking and cycling are more likely to be visiting as part of their regular shopping trip to numerous stores. Those who arrive in a vehicle are more likely to have made a special journey. It is therefore assumed that only 20% of non-vehicle trips to the commercial element are new trips.

8.25 Mode shares have been taken from the Eastside Quarter Transport Assessment and adjusted for the Eastside location of PTAL 5 as shown in Table 8.5 below:

Table 8.5: Commercial Use Modal Share for Non-Vehicle Trips

PTAL	Rail	Bus	Walking	Cycling
0	5.6%	21.2%	4.0%	0.4%
1a	7.0%	26.5%	5.0%	0.5%
1b	8.4%	31.8%	6.0%	0.6%
2	9.8%	37.1%	7.0%	0.7%
3	11.2%	42.4%	8.0%	0.8%
4	12.6%	47.7%	9.0%	0.9%
5	14.0%	53.0%	10.0%	1.0%
6	15.4%	58.3%	11.0%	1.1%

Figure 8.5: Commercial Non-Vehicle Trip Rate Calculation



Co-location (Industrial & Residential)

8.26 Like the vehicle trip methodology, the industrial element has been ignored since these uses are already in operation and therefore generate no additional journeys on the network. The method for the Primarily Residential sites has been repeated for the residential element.

Calculated Trips by Public Transport, Walking and Cycling

8.27 The estimated trip generation by non-vehicle (non-car) modes for each of the 53 sites from the March Reg 18-based list is set out in Appendix B of the LPTA.

Chapter 8 Conclusions

8.28 As mentioned at the beginning of this chapter, this data has been used to inform the traffic distribution and turning movement assessment of the six selected key junctions, as set out in Chapter 9. For Chapter 10 (Air Quality), the same methodology has been used to derive traffic generation estimates to inform air quality modelling.

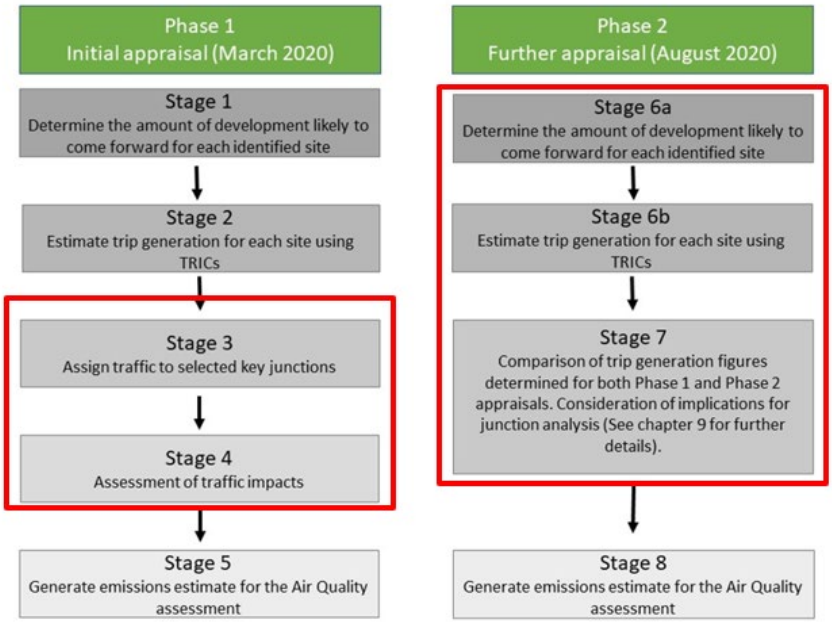
8.29 In terms of the robustness of the resulting data, a comparison between this initial trip generation exercise and subsequent calculations using the August 2020 figures, as well as the final housing trajectory, is considered in the following chapter. However, as already stated the trip generation figures are considered to be an overestimate of what will be seen as they do not take account of the target to increase walking, cycling and use of public transport by 2041 as set out in the Bexley LIP (the borough's contribution towards the Mayor's overall target for London in the MTS). The LPTA has therefore taken a robust approach in terms of potential traffic generation and its effects on the surrounding road network by using current trip rates and mode split for new development. As mode share policies come into effect and more projects are delivered that encourage walking, cycling and the use of public transport, the expectation is that car mode share will reduce. This won't happen quickly as Bexley is more car-dependent than other London boroughs and has fewer alternative means of travel but the approach in the draft local plan should see trips generated from new developments being increasingly taken by modes other than the car.

Chapter 9 – Traffic Distribution and Junction Modelling

Introduction

9.1 This chapter builds on the trip generation information set out in Chapter 8. It explains the approach used to provide a high-level assessment of potential traffic impacts from the development set out in the draft local plan. As in Chapter 8, this is based on the Reg 18-based, March 2020 list and has been undertaken through consultants Steer's high-level quantitative analysis. This work incorporates the red bordered stages of the overall assessment methodology set out in figure 9.1

Figure 9.1 Modelling Methodology Flow Diagram



9.2 In particular the process involved:

- Selecting of a key junction in each of the six main growth areas in the draft local plan: Each junction then acts as a proxy for sizing the potential traffic impact of local development on that area. A skeleton road network was then used on which to base manual traffic assignment and distribution, so that cumulative impacts from development traffic is considered; and
- Running junction capacity models for each junction, taking relevant traffic growth into account, to provide a means for comparing three separate scenarios:
    - 2021 (local plan start year)
    - 2036 (local plan horizon year) without Large Developments
    - 2036 (local plan horizon year) with Large Developments

9.3 This assessment has assumed that trip generation from each development site will have similar mode split to developments built out in recent years, in order to provide a robust, 'worst-case' picture. The relevant trip rates and mode shares meant that the highest mode share is for travel by car, across all development. In practice however, development proposals for sites in the draft local plan will be expected to come forward in such a way as to promote the more sustainable modes of travel and minimise the resultant level of car use that will be generated – looking to at least meet the Mayor's mode share target for non-car-based travel in 2041 (63% for the borough overall and 75% within the Opportunity Areas).

9.4 The focus in this chapter is therefore on traffic impacts (traffic levels, junction capacity). However, consideration of the potential increases in walking, cycling and using public transport is also dealt with together with a summary of the strategic road network modelling completed in November 2021.

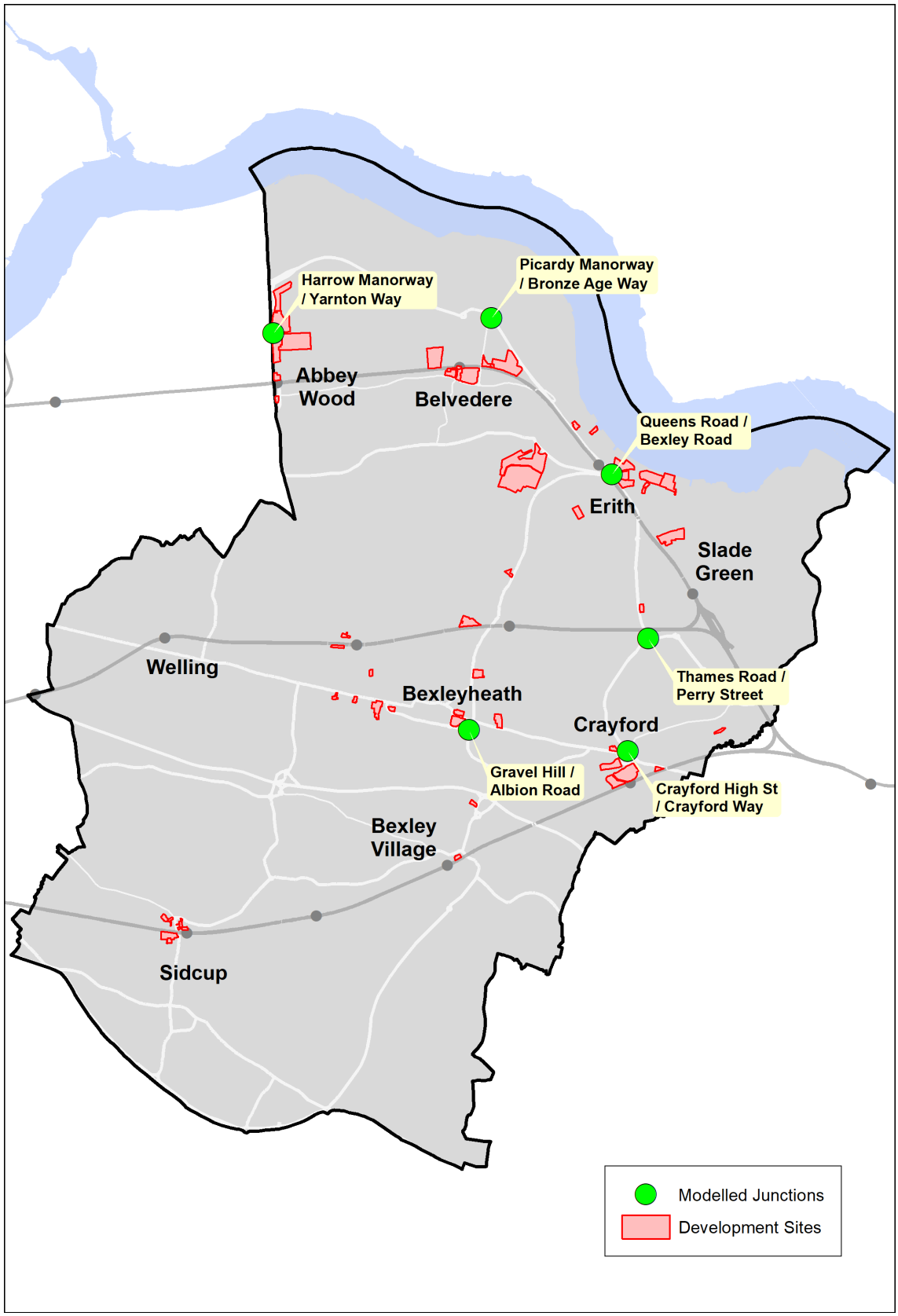
Detailed Methodology

9.5 For the junction assessment, one junction in each of the growth areas was chosen which was deemed to be particularly sensitive to future traffic growth and for which there was recent, relevant traffic survey data. The development sites were clustered together for assigning their trips to the nearest chosen junction and a workshop was held with LBB officers to agree how many of the trips generated by each cluster should be assigned to this junction and how many should be distributed to the rest of the network. This proportion of trips decided was based on:

- local knowledge of the wider network outside of the associated junctions within the growth areas;
- the likely trip attractors across the borough and beyond;
- the range of available routing to and from each development cluster; and
- the proximity of the development cluster to the associated growth area modelled junction

9.6 For assigning trips to the nearest key junction, sites close to one another were clustered for the sake of ease of analysis. Details are shown in Figure 9.2 below.

Figure 9.2: Location of Modelled Junctions



9.8 Following agreement on the % of trips to be assigned to the appropriate arms of the chosen junctions, these trips were converted to Passenger Car Units (PCUs) with the assumption that 10% of the trips would be HGVs carrying out servicing and deliveries. The distribution of the trips generated by each cluster through the modelled junction was based on existing turning count data.

Model Development

Table 9.1: List of Junction Models

Junction	Model	Source	Notes
Harrow Manorway/ Yarnton Way	ARCADY roundabout model	Southmere Village Transport Assessment (Peter Bretts Associates 2016)	Assume HGV% = 10% 2015 base year
Picardy Manorway/ Bronze Age Way	ARCADY roundabout model	Cory Riverside Transport Assessment (Peter Bretts Associates 2019)	2018 base year
Queens Road/ Bexley Road	ARCADY roundabout model	Burts Wharf Transport Assessment (BWB Consulting 2016)	2016 base year
Thames Road/ Perry Street	LinSig signalised model	Howbury Strategic Rail Freight Interchange Transport Assessment (WSP 2015)	2015 base year Assumptions made on lane geometry and mean cruise speed
Gravel Hill/Albion Road	ARCADY roundabout model	Eastside Quarter Transport Assessment (Mayer Brown 2017)	2015 base year
Crayford High/ Crayford Way	LinSig signalised model	(Advanced Transport Research 2019) OS base for geometry TfL signal timing sheets, control sheets, UTC plan data	Assumed SCOOT background plans Junction modelled in isolation to rest of this large signalised gyratory so does not consider coordination effects and likely not reflect local network capacity constraint accurately

9.9 The scenarios that have been modelled are:

- **Scenario 1: 2021 Local Plan Base Year** – the existing traffic flow data was uplifted to 2021 values using TEMPRO
- **Scenario 2: 2036 Local Plan Horizon Year without Large Site Development** – estimated traffic growth based on the forecast levels of development was taken from TEMPRO.
- **Scenario 3: 2036 Local Plan Horizon Year with Large Site Development** – traffic estimates based on TEMPRO growth from Scenario 2 and the trips generated and assigned as described in previous sections.

Table 9.2: TEMPRO Growth Factors 2021-2036

Junction Name	Date of Survey Flows	Scenario 1 (2021 Local Plan Base Year) AM Peak	Scenario 1 (2021 Local Plan Base Year) PM Peak	Scenario 2 (2036 Local Plan horizon year without development) AM Peak	Scenario 2 (2036 Local Plan horizon year without development) PM Peak
Harrow Manorway/ Yarnton Way	2015	1.04540	1.03980	1.12015	1.12545
Picardy Manorway/ Bronze Age Way	2018	1.02840	1.02535	1.10175	1.10980
Queens Road/Bexley Road	2016	1.04825	1.04305	1.12320	1.12900
Thames Road/Perry Street	2015	1.04540	1.03980	1.12015	1.12545
Gravel Hill/Albion Road	2014	1.04260	1.03655	1.11720	1.12200
Crayford High Street/ Crayford Way	2019	1.01870	1.01675	1.09135	1.10045

Note: The TEMPRO growth factor takes account of the traffic likely to be generated by small sites (less than 0.25ha).

Model Results and Analysis

Harrow Manorway/Yarnton Way

9.10 **Scenario 1: 2021 Local Plan Base Year** – Harrow Manorway north is approaching capacity, particularly in the PM peak. Queue lengths remain reasonable at around 4.5 PCU during both peaks.

9.11 **Scenario 2: 2036 Local Plan Horizon Year without Development** – Harrow Manorway north is approaching capacity in both peaks. The junction operates near capacity, with reduced residual capacity compared to Scenario 1.

9.12 **Scenario 3: 2036 Local Plan Horizon Year with Development** – the junction will experience a systematic breakdown of flow in both peaks, with the Yarnton Way arm seeing significant increases with traffic from the local clusters. This suggests that this junction may become a significant constraint on the network.

Picardy Manorway/Bronze Age Way

9.13 **Scenario 1: 2021 Local Plan Base Year** – none of the arms approach capacity and queue lengths on all approaches are below 2.3 PCU. The busiest approaches are Bronze Age Way in the AM peak and Picardy Manorway in the PM peak.

9.14 **Scenario 2: 2036 Local Plan Horizon Year without Development** – all junction arms continue to provide a good level of service. The Picardy Manorway approach is starting to reach capacity in the PM peak with a RFC of 0.74.

9.15 **Scenario 3: 2036 Local Plan Horizon Year with Development** – the junction will experience a systematic breakdown of flow in both peaks. The RFC value for Picardy Manorway in the PM peak increases to 1.07 and Bronze Age Way suffers increases in the AM peak. Anderson Way continues to operate within capacity.

Queens Road/Bexley Road

9.16 **Scenario 1: 2021 Local Plan Base Year** – the AM peak results show the Bexley Road west approach is above capacity with queue lengths above 20 PCU. Also, in the AM peak, Queens Road approaches capacity (RFC = 0.82) meaning the junction does not offer an acceptable level of service in the AM peak. In the PM peak, the junction provides an adequate level of service with a residual capacity of 16%.

9.17 **Scenario 2: 2036 Local Plan Horizon Year without Development** – Bexley Road west is 20% above capacity during the AM peak and the queue length is above 60 PCU. Queens Road is operating above capacity and while the other arms are operating within capacity, the junction overall is operating with a residual capacity of -15%. The results for the PM peak are not as concerning where the junction operates near capacity with a residual capacity of 7%, providing an acceptable level of service.

9.18 **Scenario 3: 2036 Local Plan Horizon Year with Development** – the junction will experience a systematic breakdown of flow in both peaks, with all arms well above or just above capacity in the PM peak. The total flow increase by more than 30% from Scenario 2 and this junction's congestion will impact the viability and accessibility of future development in the Erith area as well as neighbouring areas.

Thames Road/Perry Street (note: current signal timings used for all three scenarios)

9.19 **Scenario 1: 2021 Local Plan Base Year** – the results show that the junction is already congested. Parkside Avenue is operating at capacity during the AM peak, with a degree of saturation equal to 98%. During both peaks, Thames Road approaches capacity, and is likely to be a critical arm in the future.

9.20 **Scenario 2: 2036 Local Plan Horizon Year without Development** – the junction continues to operate well above capacity in the AM peak with a mean maximum queue on Parkside Avenue of

33.1 PCU. Thames Road, Wyatt Road and Perry Street all operate near capacity and queues have increased by a minimum of 15% compared to Scenario 1 on all of these arms. In the PM peak, no arm is operating above it's saturation flow but there are average delays of at least 25 sec/PCU.

9.21 **Scenario 3: 2036 Local Plan Horizon Year with Development** – Northend Road and Thames Road experience an increase in flow with a breakdown of flow in both peaks where all arms will operate well above or just above capacity. In the AM peak, long queues could affect the Thames Road/Thomas Road roundabout. The congestion at this junction will affect the viability and accessibility of future developments in this area.

Gravel Hill/Albion Road

9.22 **Scenario 1: 2021 Local Plan Base Year** – all junction arms are operating well within capacity during both peaks, with queue lengths below 2 PCU.

9.23 **Scenario 2: 2036 Local Plan Horizon Year without Development** – all junction arms continue to operate well within capacity, with queues only increasing by a maximum of 0.5 PCU in both peaks.

9.24 **Scenario 3: 2036 Local Plan Horizon Year with Development –** all three junction arms experience a significant increase in flow due to the large town centre developments that will use Albion Road as the primary access but also from development sites in all the other growth areas due to it's central location. Albion Road will operate well above capacity during both peaks. Gravel Hill north and south are the critical arms in the AM peak while in the PM peak, it is Gravel Hill north and Albion Road that begin to operate close to or above capacity.

Crayford High Street/Crayford Way

(note: signal timings were manually optimised taking into account the likely operational strategy for the gyratory as a whole)

9.25 **Scenario 1: 2021 Local Plan Base Year** – the junction is already congested in both peaks, with the gyratory entry arms being the critical arms; Crayford High Street is fully saturated and Crayford Way is near saturation. Total queues on Crayford High Street reach 26 PCU. The junction will likely not provide an adequate level of service in 2021 with a total traffic delay of 35.8 PCU/hr in the AM peak and 41.9 PCU/hr in the PM peak.

9.26 **Scenario 2: 2036 Local Plan Horizon Year without Development** – the results show that both Crayford High Street and Crayford Way operate above capacity with queues on Crayford High Street extending to more than 150m. Queues have increased on both entry arms by more than 50% compared to scenario 1. In the AM peak, the roundabout operates above capacity with a PRC of -16.8% and a total traffic delay of 53.2 PCU/hr (PRC = Practical Reserve Capacity - the difference between the practical capacity of the junction and how much traffic is using it. Thus, the higher the PRC value, the greater available capacity). In the PM peak, the PRC is -21.8% with a total traffic delay of 82.9 PCU/hr.

9.27 **Scenario 3: 2036 Local Plan Horizon Year with Development** – all entry arms experience a large increase in flow and the junction will have a breakdown of flow in both peaks. The large queues are likely to affect the London Road/Roman Way junction and that regardless of future development, this junction will be a major constraint on the network in the future and will impact on the viability and accessibility of future development.

Large Site Assessment Outside the Six Main Growth Areas

9.28 There are also larger development sites located outside the six Growth Areas in Sidcup that are 3-4km from their nearest modelled junction and therefore the results of the modelling do not reflect the impact the generated traffic will have on junctions and corridors serving these sites. In response, an assessment has been carried out on the CSI1 Sidcup Station cluster as follows:

Table 9.3: Comparison of Vehicular Traffic Generation from CSI1 Sidcup Station with Traffic on Station Road, Sidcup

Site Ref	Site Name	AM Peak Two Way	PM Peak Two Way
SID001	Co-op Food, Station Road, Sidcup	32	41
SID002	Travis Perkins Builders Merchant, 2 Hurst Road, Sidcup	15	13
SID004	Former Lamorbey Baths, 155-159 Station Road, Sidcup	16.5	22
SID005	Old Farm Avenue Car Park, Station Road, Sidcup	25	22
SID006	Marlowe House, Station Road, Sidcup	75	65
NEW012	Longlands Road, Sidcup (Longlands Ward)	16	14
	Total	179.5	177
	Station Road, Sidcup near railway bridge*	1,561	1,615
	Trips generated by Cluster CSI1 as % of trips on Station Road, Sidcup*	11.5%	11.0%

*Figures taken from traffic surveys carried out by Street Behaviour 7th June 2018

9.29 Another corridor that could see impacts from the proposed development is the A207 between Bexleyheath and Welling. Welling is a sustainable development location, mainly for potential small sites and the A207 Bellegrove Road/Welling High Street/Park View Road/Broadway sees congestion at its major junctions and along those sections with shops and kerbside activity. In 2019, the DfT estimated the annual average daily flow on Welling High Street is 16,000 motor vehicles. The A206 is the key corridor for east-west bus movements from the Bexleyheath town centre hub towards the capital and sees up to 43 buses per hour in each direction along Broadway. Therefore, the performance of this corridor will need to be monitored as development comes forward.

Potential Traffic Impacts on the Strategic Road Network

9.30 The methodology included an initial assessment of the potential for development traffic to impact on the strategic road network, both within and outside the borough as part of the traffic distribution stage. With the data available, traffic estimates for development traffic will get less reliable with distance. This assessment has only been able to reach as far as identifying a quantum of traffic from development that *could* reach/cross/use the strategic road network. It is implied therefore that a 'true' number of trips that might affect the strategic road network will be an (unsized) element within the traffic figures derived.

9.31 For this purpose, consideration has been given to potential traffic generation reaching the M25 at Junction 1A, the M25 at Junction 1B and the A2 at either Black Prince or Dartford Heath. The data presented is for 2036 including development.

9.32 Detailed analysis of traffic generation by location has been undertaken for proposed Large Sites, but the approach to Small Sites is that their traffic generation is going to be equivalent to the estimated TEMPRO-based traffic growth between 2021 and 2036. That Small Site traffic calculation is therefore included in Scenario 2 and rolled into Scenario 3. For the sake of this strategic road network traffic estimation however, to derive the total potential development traffic it is necessary to add an allowance for Small Site traffic too. As part of the robust approach being taken overall in this quantitative assessment, Small Sites are assumed to comprise 45% of the total proposed development; the estimated quantum of Small Site traffic is therefore based on the calculated Large Site traffic flows being 55% of the actual total development traffic.

9.33 Estimates of the potential traffic levels from planned development (Large Sites and Small Sites) towards key interchanges on the strategic network are set out in Tables 9.4 to 9.5 below.

Table 9.4: Development Trips (PCU) potentially affecting the A2 at Black Prince via Gravel Hill, based on the Gravel Hill/Albion Road junction assessment – worst case

A220 Gravel Hill to/from direction of A2 (Black Prince)	AM Peak Hour towards A2	AM Peak Hour from A2	PM Peak Hour towards A2	PM Peak Hour from A2
Large Site traffic	389	412	307	533
Small Site traffic	318	337	251	436
Total	707	749	558	969

Table 9.5: Development Trips (PCU) including trips to/from Dartford, A2 Dartford Heath or M25 Junction 1B, based on the Crayford High Street/Crayford Road/Crayford Way junction assessment – worst case

Crayford to/from direction of Dartford, A2 at Dartford Heath and M25 Junction 1B	AM Peak Hour from Crayford	AM Peak Hour to Crayford	PM Peak Hour from Crayford	PM Peak Hour to Crayford
Large Site traffic	116	0*	137	0*
Small Site traffic	95	0*	112	0*
Total	211	0*	249	0*

*Development trips to the Crayford development cluster from the Crayford High Street/Crayford Way are routed via the Gravel Hill/Albion Road junction within the assessment due to the one-way nature of the Crayford junction. Based on assessment of that junction on that part of Crayford's one-way ring road, it is not possible to estimate westbound trips as there are none at that junction. For the sake of the traffic routeing in the high-level traffic assignment, it was assumed that those trips would access the A2 via Bourne Road.

Table 9.6: Development Trips (PCU) including trips to/from Dartford town centre (via A2026) and Bob Dunn Way (for M25 Junction 1A), based on the Thames Road/Perry Street junction assessment

Type of Traffic	AM Peak Hour from Thames Road	AM Peak Hour towards Thames Road	PM Peak Hour from Thames Road	PM Peak Hour towards Thames Road
Large Site traffic	158	118	86	183
Small Site traffic	129	96	70	150
Total	287	214	156	333

9.34 The most significant potential development traffic impact appears to be for the A2 Black Prince interchange. However, the coarse-grained nature of this analysis may well overstate the impact – for example the figures may well include traffic that will access/cross the A2 at Danson, say. It will be important to work with TfL Network Management to understand the potential scale of impacts on the A2 interchanges and the A2 itself in more detail – including how the effects of potential impacts might be resolved.

9.35 Potential additional traffic levels at M25 Junction 1A are of particular concern to National Highways (formerly Highways England). Again, it will be important for the Council to work with Highways England to determine whether specific action is needed with regard to traffic generation levels arising from the draft local plan, and whether those should be technical solutions on the

ground and/or measures at a policy level. This includes the recently completed strategic modelling to further assess the impact of development on the SRN. This work is considered at paragraphs 9.44 to 9.50 below.

Summary of Results – Junction Capacity

Table 9.7: Residual Capacity Growth at Junctions AM Peak

Junction	Scenario 1 (2021 Local Plan Base Year) AM Peak Residual Capacity	Scenario 2 (2036 Local Plan horizon year without development) AM Peak Residual Capacity	Scenario 3 (2036 Local Plan horizon year with development) AM Peak Residual Capacity
Harrow Manorway/Yarnton Way	13%	6%	-27%
Picardy Manorway/Bronze Age Way	41%	32%	0%
Queens Road/Bexley Road	-8%	-15%	-39%
Thames Road/Perry Street	-9% (PRC*)	-36% (PRC)	-30% (PRC)
Gravel Hill/Albion Road	39%	30%	-2%
Crayford High Street/Crayford Way	-12% (PRC)	-17% (PRC)	-30% (PRC)

Table 9.8: Residual Capacity Growth at Junctions PM Peak

Junction	Scenario 1 (2021 Local Plan Base Year) PM Peak Residual Capacity	Scenario 2 (2036 Local Plan horizon year without development) PM Peak Residual Capacity	Scenario 3 (2036 Local Plan horizon year with development) PM Peak Residual Capacity
Harrow Manorway/Yarnton Way	12%	4%	-29%
Picardy Manorway/Bronze Age Way	39%	29%	0%
Queens Road/Bexley Road	16%	7%	-20%
Thames Road/Perry Street	1.5% (PRC)	-6% (PRC)	-18% (PRC)
Gravel Hill/Albion Road	32%	22%	-16%
Crayford High Street/Crayford Way	-12% (PRC)	-22% (PRC)	-36% (PRC)

9.36 These summary tables from the sets of junction calculations show that all six of the key junctions assessed will be at/over/significantly over capacity based on the estimated traffic flow patterns. This result is unsurprising, given the scale of development proposed and how close to or over capacity those junctions are already.

Further Appraisal August 2020

9.37 The August 2020 list of sites represented an update on the March list, taking into account further site analysis and capacity calculations as well as reductions in the emerging housing target for Bexley in the London Plan. Some 47 large sites were identified within the amended trajectory, 19 of which were within the first 5 years and the remainder within the 5 to 15 year phases. A smaller number of units were identified, totalling 8,372, which is a 25% reduction on the March list. A full list of the August 2020 sites and their capacities is provided in Appendix B of the LPTA. A comparison of the capacity figures resulting from the two lists is shown in table 9.9.

Table 9.9 Comparison of Development Capacity, March and August Lists

	Belvedere	Erith	Slade Gn	Thamesmead	Bheath	Bex Vil	Crayford	Sidcup	Total
March List	1,421	3,033	258	2,750	1,775	152	1,265	481	11,135
% of all dev	13	27	2	25	16	1	11	4	100
Aug List	1,753	2,222	219	1,324	1,047	0	1,413	394	8,372
% change	23	-27	-15	-52	-41	-100	12	-18	-25
% of all dev	21	27	3	16	13	0	17	5	100

9.38 It can be seen that the general distribution of development across the borough in the August list was broadly similar to that within the March list with both showing northern parts of Bexley (Thamesmead /Belvedere /Erith /Slade Green) accommodating some two thirds of the large site development, the centre of the borough (Bexleyheath/Crayford/Bexley) accommodating just over a quarter and the South (Sidcup) accommodating around 5%. There were larger variations within individual growth areas between the lists e.g. Thamesmead seeing a 52% reduction and Bexleyheath a 41% reduction in development capacity whilst areas such as Crayford and Belvedere saw increases. However, the strategic pattern of development remained the same whilst the quantum of development in August decreased significantly.

9.39 The August figure can now also be compared to the final proposed housing trajectory within the Regulation 19 document. Table 9.10 sets out this comparison.

Table 9.10 Comparison of Development Capacity August 2020 List and Final Proposed Trajectory

	Belvedere	Erith	Slade Gn	Thamesmead	Bheath	Bex Vil	Crayford	Sidcup	Total
Aug List	1,753	2,222	219	1,324	1,047	0	1,413	394	8,372
% of all dev	21	27	3	16	13	0	17	5	100
Final Traj	1651	1517	219	1764	1104	0	679	119	7053
% change	-6	-32	0	33	5	0	-52	-70	-16
% of all dev	23	22	3	25	16	0	10	2	100

9.40 It can be seen that the final large site capacity total is smaller still at 7053 or 16% less than the August total. However, the distribution of development across the borough is again broadly similar with a little under three quarters of development in the north of the borough, a quarter in the central area and 2% in the south.

9.41 The overriding message from these results is that the March modelling represents a robust, worst case scenario with regard to residential led growth and that the refined list of sites in subsequent iterations of the trajectory have seen a steady reduction in the quantum proposed, albeit with a similar distribution across the borough. Notwithstanding this, and as mentioned in Chapter 8, the Council is running additional junction modelling to reflect these revised residential numbers and factor in new information on traffic generated by industrial development which was not available until recently.

9.42 However, this supplementary modelling is not expected to alter the Councils fundamental conclusions which are that it is likely that key junctions will come under pressure and that for the draft local plan to be successful (and avoid adverse impacts on the road network), there must be strong emphasis placed on development proposals to promote a lower car-based mode share alongside the improvement of particular junctions as required to support regeneration and economic development . Progressively, mode switch is expected over time – including through measures in the LIP and through improvements to non-car alternatives obtained through new development going ahead.

9.43 Attention should also be given to maintaining smooth operation of the road network, which cannot be maintained if key junctions are operating over capacity. The A206/A2016 South Thames Development Route (STDR) corridor (which takes in two of the key junctions studied – both the Queens Road/Bexley Road junction in Erith and the Thames Road/Perry Street gyratory in Slade Green) is going to be of particular concern to the Council because of its strategic role in supporting local businesses.

9.44 It will be important for the Council to work with TfL on these issues – especially in sizing the overall picture in more detail once more information is available on the nature of particular developments and associated modelling work has been undertaken.

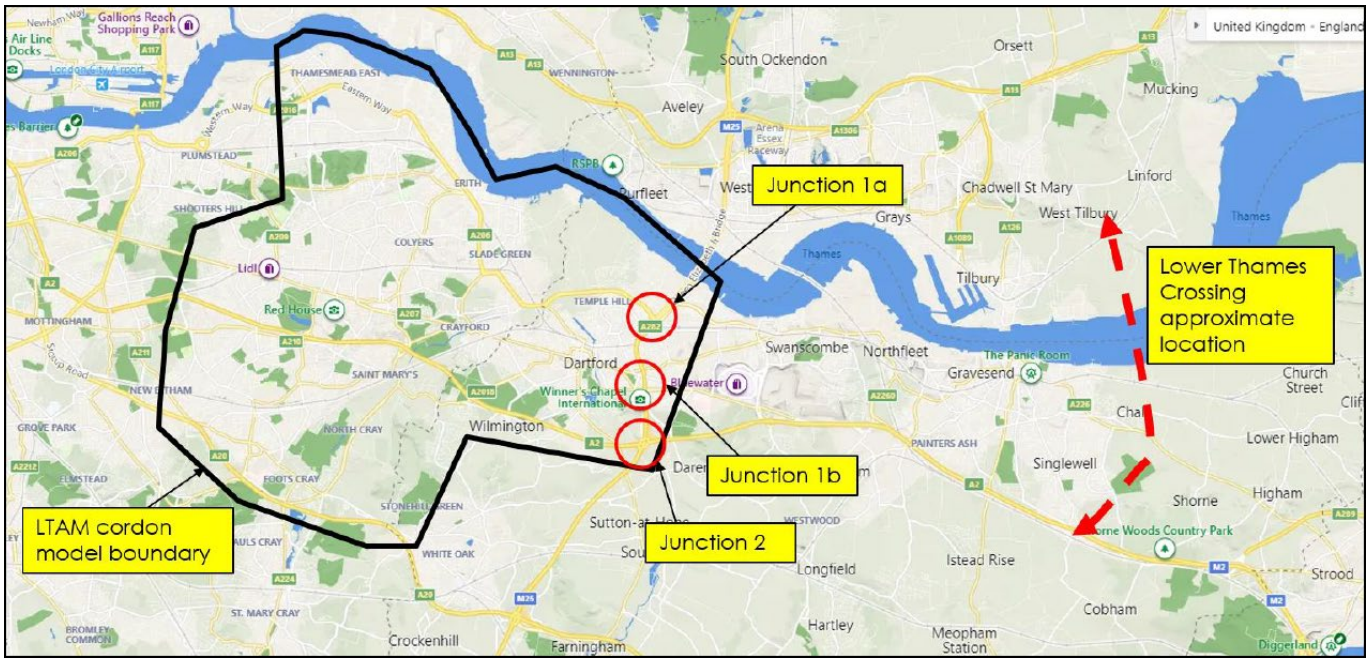
Modelling of Impacts on the Strategic Road Network (SRN)

9.45 The Council appointed consultants Stantec to assess the cumulative effects of non-consented development in Bexley, as set out in the draft Local Plan, on the strategic road network outside of the borough, namely Junctions 1a, 1b and 2 of the M25.

9.46 To enable this the consultants used the Lower Thames Area Model (LTAM), developed by National Highways (NH) to assess the Lower Thames Crossing (LTC) scheme. Prior to undertaking the assessment, a scoping exercise was conducted with NH and the study reflects these discussions.

9.47 The Bexley cordon area was utilised which includes the whole of Bexley borough and the routes to the M25/A282 under consideration (see Figure 9.3 below). The model looks at the 0700-0800 morning peak hour and the 1700-1800 evening peak hour on the basis that these represent the peak hours on the SRN. It also considers three user classes – car, LGV and HGV - which simplifies data handling. Traffic generation was extracted from the Trip Rate Information Computer System (TRICS) and incorporates a robust approach that considers data from sites outside of London, for both urban and suburban sites. The distribution of the traffic generation on the network was generated using the existing LTAM matrices. The output of the models comprised demand flow data, link delay and volume to capacity (V/C) statistics.

Figure 9.3: Bexley Cordon Area and Junctions Modelled



9.48 A 2016 base year reference case is presented followed by a 2038 reference case model and a 2038 'with Local Plan' model, both of these are considered with and without LTC. The 2038 reference case includes development sites with planning permission. The 2038 'with Local Plan' scenario includes development over and above the reference case and totalling 11,240 residential unts and 380,000sqm of non-residential floorspace.

9.49 The 2016 base year shows higher traffic flows in the A282/M25 corridor in the morning peak hour than in the evening peak hour. The A2 corridor flows are tidal in nature with the dominant flow tending to be higher in the PM peak hour (heading out of London). With respect to flows through the junctions, these are generally higher in the morning peak hour with the exception of Junction 1b. Junction 2 has the highest throughput due to its role serving the A2.

9.50 The analysis also shows the following results for the 'with Local Plan' scenario:

- It will increase flows passing through the J1a to J2 cordon by between 2.4% and 3.3% or between 728 and 1033 vehicles
- It will increase demand flows at Junction 1a (west) by 4.4% to 6.9% or between 201 and 264 vehicles. Link delays only change by between 0 and 1 second for all links and all links experience V/C below 100%.
- It will increase demand flows at Junction 1a (east) by 2.1% to 6.1% or between 112 and 292 vehicles. Link delays again only change by between 0 and 1 second with the exception of the southbound on slip during the evening peak hour in the' with LTC' scenario where the delay increases by 33 seconds. All links experience V/C below 100% with the exception of the south bound slip which sees 103.1% during the evening peak hour for the 'with LTC' scenario.
- It will increase demand flows at Junction 1b by 2% to 4.6% or between 87 and 218 vehicles. Link delays only change by between 0 and 2 seconds for all links and all links experience a V/C below 100%.
- It will increase demand flows at Junction 2 by 1.9% to 4.7% or 100 to 218 vehicles. Link delays again only change by between 0 and 1 seconds with the exception of the southbound slip during the morning peak hour in the 'with LTC' scenario where the delay increases by 11 seconds. All links experience V/C below 100% with the exception of the south bound slip which sees a marginal increase during the morning peak hour in both scenarios.
- Merge and diverge analysis on each of the junctions shows no alteration to layout categories as a result of alterations in flows with the exception of Junction 1a northbound A282 merge, Junction 1a northbound A282 diverge, Junction 1a southbound A282 diverge, Junction 1b northbound A282 merge, Junction 2 eastbound A2 merge and Junction 2 eastbound A2 diverge.

9.51 These results indicate the development levels in the draft Local Plan have a modest impact on these junctions even without considering changes in travel behaviour induced by proposed sustainable

transport policies. This information will form the basis of further discussion with partners with a view to identifying, developing, funding and implementing required mitigations.

Chapter 9 Conclusion

9.52 Whilst this junction modelling report has highlighted some potential areas of concern, we consider that targeted Local Plan policy, together with some junction improvement works as required, would mitigate against further negative impacts. Recommendations relating to the promotion of sustainable travel modes have been carried forward within Chapter 6 of the Local Plan, but are echoed throughout the whole Local Plan document.

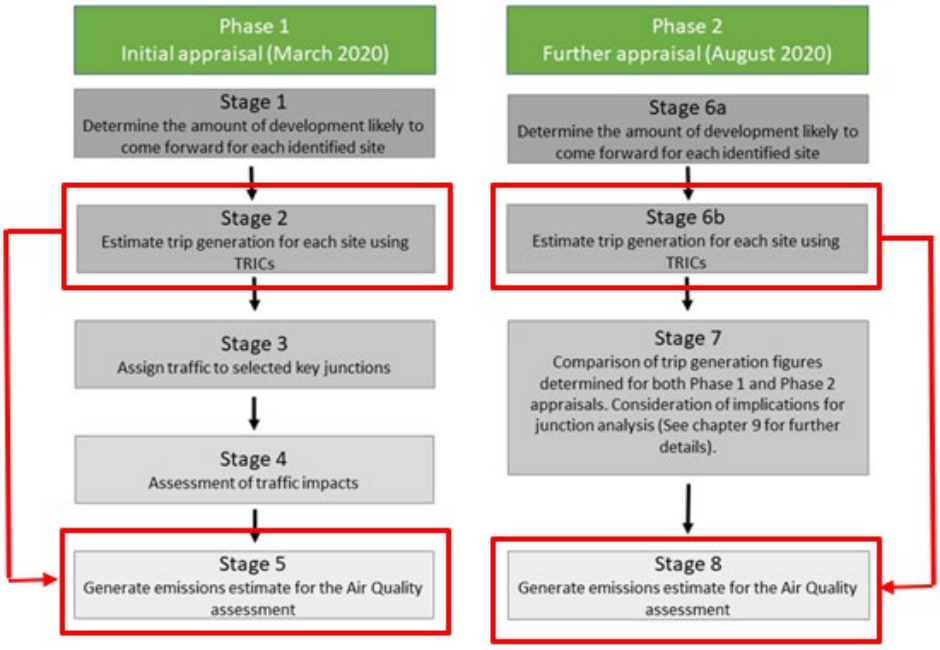
9.53 A number of different evidence bases, including the results of modelling exercises, have been used to form a detailed assessment of the sites emerging through the housing trajectory work. The assessment process has resulted in a significant reduction in the number of potential sites and units as detailed analysis of opportunities has progressed. This decrease will lessen the direct impact upon the above junctions. Even at junctions where the positive effects of fewer sites will be limited, the Local Plan approach will seek to realise a shift in modal share towards non-car modes. Over time this will have a positive cumulative effect on traffic generation in these locations. Impacts will be further mitigated through selected junction improvement schemes, which will come forward as part of the Council's annual road improvement programmes or in partnership with regional stakeholders.

Chapter 10 – Air Quality Assessment

Introduction

10.1. This chapter of the Local Plan Transport Assessment (LPTA) provides outputs from a high-level assessment of potential air quality impacts from traffic generated by new development sites considered in developing the draft local plan. The work incorporates the red bordered stages of the overall assessment methodology set out in figure 10. 1. The assessment includes analysis of potential impacts from individual sites (for Large Sites only) and cumulatively (for both Large Sites and Small Sites).

Figure 10.1 Modelling Methodology Flow Diagram



10.2. This high-level assessment methodology has been followed because there is no comprehensive strategic transport model available to provide a more detailed set of supporting data. Air quality impacts have therefore had to be been assessed using the same trip generation information used for the LPTA quantitative assessment of Large Sites, as described in Chapter 8. The same approach to trip rates and traffic generation has also been used to include a cumulative assessment of air quality impacts from Small Sites.

10.3. For the sake of consistency with the assessment set out in Chapters 8 and 9, the development information used was from the March 2020 version of the shortlist of Large Sites. The shortlist took forward 112 sites from the Reg 18 consultation document, of which 53 comprised the 5-year housing supply (2021-2026) and the 10-year housing trajectory (2026-2036). That analysis has then been updated, based on an August 2020 draft shortlist, to show how predictions of air quality impacts will change. So, the March 2020 list can be taken as the preferred approach to delivering Large Site development based on Reg 18. The August list is then a draft for the list of Large Sites for

the Reg 19 draft local plan. It is the Reg 18-based list that has been used first, as described below; assessment of the sites from the draft Reg 19 list then follows on at the end of this Chapter, with some comparison between the two.

10.4. Using the approach from Chapter 8 for traffic estimation should provide a 'worst-case' picture in terms of air quality impacts. In practice, impacts should be lower. Further technological improvements towards cleaner vehicle engines and measures to achieve greater non-car mode share (with the Mayor's 2041 mode share targets in mind), will all have a downward pressure on both traffic generation and the levels of pollutants.

10.5. The high-level air quality impact assessment for the Reg 18-based list of Large Sites has been undertaken in two stages:

- Screening, to determine which of the 53 Large Sites in the Reg 18-based list exceed a threshold for requiring an air quality assessment to support the potential development proposal.

- Estimating potential air quality impacts for each of the 112 individual Large Sites in the full Reg 18-based list, then estimating the potential overall cumulative impact for both the 53 Large Sites (from the Reg 18-based list) and the 206 Small Sites (identified during the development of the Reg 19 draft local plan after March) together.

10.6. The basis of this assessment assumes that walking, cycling and using public transport will be air quality neutral. For public transport trips, this is justified on the basis that the relevant service levels (bus/rail) will be running whether or not development takes place. In practice of course, there will be some air quality impacts from any additional public transport services that are put on to respond to the needs of new development – whether new transport infrastructure schemes (eg DLR extension, Bus Transit) or improved bus services. The assessment therefore concentrates on pollutants from general road traffic.

10.7. Both the screening process and the high-level assessment of potential air quality impacts from developments are based on the trip generation calculations from LPTA Chapter 8 for each of the Large Sites, with the same applied to the identified Small Sites. The data derived from this process are assumed to provide a 'worst case' view both of mode split and of levels of potential traffic generation. In practice, various means of mitigation will be necessary to make development proposals Air Quality Neutral, which inevitably includes influencing mode choice in favour of less polluting travel choices. But, again, the air quality screening process and the high-level air quality assessment in this chapter are intended to highlight a worst-case, pre-mitigation position.

Methodology

Stage 1: Air Quality Screening for Large Sites

10.8. The screening process that has been applied to traffic generation predictions from Large Sites uses Institute of Air Quality Management's Air Quality Planning Guidance (IAQM's Air Quality Planning Guidance). Table 6.2 from that guidance provides indicative criteria, based on daily traffic levels, for whether a development proposal will need to have an air quality assessment submitted with it. This should be considered alongside the London Plan's policy SI1 B2, particularly:

- Policy SI1 B2(a): Development proposals must be at least Air Quality Neutral; and
- Policy SI1 B2(c): Major development proposals must be submitted with an air quality assessment.

10.9. Specifically, the IAQM screening criteria for site air quality assessments are based on the daily amounts of traffic movement and types of traffic (light- or heavy-duty vehicles) that the development is expected to generate. The relevant thresholds for requiring an air quality assessment vary, based on whether the site in question is in or near to an Air Quality Management Area (AQMA). So, according to Table 6.2 of the Air Quality Planning Guidance, an air quality assessment will be needed if, because of the development proposal, traffic levels increase more than these thresholds:

- A change of Light-Duty Vehicle (LDV) flows of:
  - More than 100 Average Annual Daily Traffic (AADT) within or adjacent to an AQMA
  - More than 500 AADT elsewhere
- A change of Heavy-Duty Vehicle (HDV) flows of:
  - More than 25 AADT within or adjacent to an AQMA
  - More than 100 AADT elsewhere.

10.10. As recorded by DEFRA, the whole borough was declared an Air Quality Management Area for PM_{10} and NO_2 in March 2007. That designation still applies, although it will be necessary to review that status in the future. The lower IAQM minimum thresholds for additional traffic are therefore applicable – ie either 100 LDVs or 25 HDVs AADT.

10.11. The methodology in Chapter 8 has calculated traffic generation in Passenger Car Units (PCUs), so does not distinguish between HDV/LDV movements. So, for this high-level screening, a threshold of 100 PCUs per day has been used, as a reasonable proxy for the 100 LDV threshold. The outcome of this screening is provided later in this chapter.

10.12. The traffic generation figures available are based on AM/PM peak hour flows. To derive estimates for AADT (as needed by the air quality assessment) from these, a factor of 10 has been applied to the average of the estimated flows in the two peak hours. In practice, as shown in data from any set of traffic surveys from different sites, broken down by hour, this factor can vary site-by-site. But its value usually lies in a range between 8 and 12.5 on urban roads, reflecting the degree to which peak flows exceed off-peak flows – using a higher factor will imply a smoother hourly traffic profile

across a day as a whole; a lower factor will mean peak-time traffic flows are more dominant (more 'peaky') in the hourly traffic profile.

Stage 2: Potential Air Quality Impacts from Large Sites and from Small Sites

10.13. The methodology for the second stage of the high-level air quality assessment uses the London Atmospheric Emissions Inventory (LAEI) model to calculate potential air quality impacts based on the predicted traffic levels (in terms of NO_x, PM_{10}, $PM_{2.5}$ and CO_2). There is a LAEI-based model (2017 base year) for calculating potential pollutant levels for a range of different activities – including road traffic.

10.14. Taking the LAEI 2016 inventory data and the 2017-based LAEI model together, it is possible to make comparisons between 'current' (2016) pollutant levels in the borough as a whole and the levels of pollutants that could be generated by traffic movement arising from new development. The LAEI model currently only estimates 2017 pollutant levels, so the assessment therefore uses pollutant estimates on that basis. In this LPTA, the assumed trip rates, mode split and traffic generation for new development (generated using the methodology outlined in Chapter 8) reflect recent historic data and not necessarily the conditions that will relate to 2036 (the horizon year for the draft local plan). Assessing impacts on that basis reflects the overall approach in this LPTA to provide a 'worst-case' picture – air quality impacts by 2036 from new development should be somewhat lower, based on both policy- and project-based interventions that will come into play across the plan period (2021-2036). Using a 2017-based air quality model is therefore consistent with this 'worst-case' approach.

10.15. The LAEI model was used to calculate potential emissions increases from:

- Each Large Site listed in the Reg 18-based list (for 112 individual sites);
- Cumulatively, the 53 Large Sites from the Reg 18-based list identified as part of the draft local plan's potential housing trajectory (ie the total for all 53 sites);
- The Small Sites in the housing trajectory (total for all 206 identified Small Sites).

10.16. For this purpose, the following specific assumptions were made for analysing each and all sites, bearing in mind the high-level nature of this assessment:

- Traffic flows input as AADT (PCUs)
- A single, standard percentage for heavy vehicle traffic of 10%; there is insufficient data available to fine-tune the HGV%
- An average speed of 48 km/hr (30 mph) for all trips (more detailed information is not available)
- An average trip distance (treated as 'Link Length' in the LAEI model) of 2.4km. This is based on data in the 2018/19 London Travel Demand Survey (Cell O36) that shows an average distance travelled per day by car drivers in outer London is 4.8km. For this purpose, it is assumed that all

journeys will be out-and-back, hence the average journey length for each trip should be half of 4.8km.

- A standard average gradient of 0% (more detailed information is not available).

10.17. To assess the total emissions from Small Sites, traffic generation has been derived using the methodology in Chapter 8, using an average PTAL of 1b. (With assumption of the "worst-case" scenario for potential impacts and traffic generation, as a number of Small Sites will have PTAL of 2 or more and some of them will have PTAL of 0 or 1a.)

10.18. This methodology does not calculate dispersion rates, concentrations of pollutants etc; just a coarse overall estimate, as this can only be a high-level assessment.

Results

Stage 1: Air Quality Screening of Large Sites

10.19. Of the 53 Large Sites from the March 2020 version of the draft local plan housing trajectory, all but one (Site ER020, DYNES Vehicle Repair Shop) are estimated to generate daily traffic in excess of relevant the IAQM threshold (tested as 100 PCU/day, AADT). However, of those that exceed the threshold, only about a third are expected to generate AADT more than 300 PCU/day – which would be the threshold were the borough not a declared AQMA.

10.20. The implication of this is that development proposals for at least 52 of the 53 sites will, according to the IAQM road traffic-based screening criteria, need to be submitted with an accompanying air quality assessment. Even though the one remaining site may not trigger the need in terms of traffic generation, there could be other reasons for which the Council could reasonably expect an air quality assessment to be submitted.

10.21. Thinking too about the relevant London Plan policy (policy SI1 B2), the requirement for all major development proposals to be accompanied by an air quality assessment (policy S1 B2(c)) is likely to have a bearing on all Large Sites by definition, whether or not triggered by potential traffic generation.

Stage 2: Air Quality Impacts from Large Sites and Small Sites

10.22. The LAEI model has provided a basis to estimate the potential air quality impacts from traffic for each of the 112 Large Sites in the Reg 18-based housing trajectory from March 2020, an assessment that includes 59 alternative, 'low probability' sites also identified in the Reg 18 consultation document. The potential pollutant levels from each site is shown in Appendix C, first of all for the 53 sites that make up the Large Sites element of the draft housing trajectory and then for the 59 'low probability' sites.

10.23. The LAEI database has provided the Base pollutant levels (2016 estimate) generated by road traffic across the borough as a whole, before considering any of the new developments set out in the draft local plan.

10.24. This enables comparison between the potential traffic-based emissions arising from proposed site allocations in the draft local plan with the Base pollutant impact from traffic across the borough.

Estimated Pollutants from Road Traffic – Reg 18-based Large Sites, Reg 19 Small Sites

10.25. The comparisons are shown in Table 10.1 (estimated in tonnes of pollutants per year) and Table 10.2 (showing impacts from new development as a percentage of the Base). Values are rounded to one decimal place.

Table 10.1 – Estimated cumulative pollutants from road traffic: Base levels and from new development (Reg 18-based)

Estimated Pollutants from Road Traffic	CO_2 tonnes/year	NO_X tonnes/year	PM_{10} tonnes/year	$PM_{2.5}$ tonnes/year
Bexley borough (Base)	191,678.9	582.2	63.1	34.3
Large Sites (53 sites)	7,460.5	21.2	1.8	1.1
Small Sites (206 sites)	3,420.1	9.7	0.8	0.5
Large and Small Sites combined	10,880.6	30.9	2.6	1.6

Table 10.2 - Estimated % of pollutants for cumulative road traffic from new development, compared with Base levels (Reg 18-based)

Estimated Share of Pollutants from Road Traffic	% contribution CO_2 tonnes/year	% contribution NO_X tonnes/year	% contribution PM_{10} tonnes/year	% contribution $PM_{2.5}$ tonnes/year
Large Sites as % of Base	3.9%	3.6%	2.9%	3.2%
Small Sites as % of Base	1.8%	1.7%	1.3%	1.4%
Large + Small Sites as % of Base	5.7%	5.3%	4.2%	4.6%

Estimated Pollutants from Road Traffic – draft Reg 19, Large Sites and Small Sites

10.26. Following on from that assessment of the Reg 18-based list of Large Sites (and Reg 19 Small Sites), the LPTA next assessed the air quality impacts from the pattern of development proposed in the draft list of Large Sites for potential Reg 19 publication (from August 2020). This includes a total of 91 Large Sites, of which 19 make up the 5-year housing supply (for 2021-2026); 28 make up the Large Site element of the draft local plan housing trajectory (2026-2036); and the remaining 44 are the lower probability 'reasonable alternative' sites. The pollutant levels for each of these sites is also set out in Appendix C of the LPTA.

10.27. Starting with the IAQM screening (the Stage 1 assessment), 17 of the 19 Large Sites from the 5-year housing supply have an estimated net traffic generation in excess of 100 PCUs AADT. The same applies with all but two of the 28 Large Sites in the Reg 19 list housing trajectory. Two of the four exceptions generate traffic levels less than 10% below the threshold. Of the 44 lower probability sites, 33 exceed the 100 PCU AADT threshold and another three are less than 10% below it.

10.28. Some 17 of the 19 5-year housing supply sites already have planning consent. Over the plan period, 28 out of 30 sites still to be permitted therefore exceed the threshold in the IAQM planning guidance for requiring a site air quality assessment to be submitted with their respective development proposals. This needs to be seen alongside the London Plan's Policy SI1 B2(c)'s requirement that ALL major development proposals must be submitted with an air quality assessment.

10.29. As with the March 2020 list of Reg 18-based sites, the Large Sites from the draft list of Reg 19 sites have been analysed for the potential level of air pollutants that are likely to arise from the road traffic they generate (Stage 2 assessment). This involves examining the potential traffic generation from:

i. Each of the 72 individual sites (some of which were also assessed when looking at the March 2020 SHLAA); and

ii. Cumulatively, the 19 housing supply sites and the 28 sites identified as part of the draft local plan's housing trajectory (ie the total for all 47 sites) – along with the potential Small Site element of housing delivery through the draft local plan.

10.30. The resultant comparisons are shown in Table 10.3 (estimated in tonnes of pollutants per year) and Table 10.4 (showing impacts from new development as a percentage of the Base). Values are rounded to one decimal place.

Table 10.3 - Estimated cumulative pollutants from road traffic: Base levels and from new development (draft Reg 19-based)

Estimated Pollutants from Road Traffic	CO_2 tonnes/year	NO_X tonnes/year	PM_{10} tonnes/year	$PM_{2.5}$ tonnes/year
Bexley borough (Base)	191,678.9	582.2	63.1	34.3
Large Sites (47 sites)	3,986.5	11.3	1.0	0.6
Small Sites (206 sites)	3420.1	9.7	0.8	0.5
Large and Small Sites combined	7,406.6	21.0	1.8	1.1

Table 10.4 - Estimated % of pollutants for cumulative road traffic from new development, compared with Base levels (draft Reg 19 based)

Estimated Share of Pollutants from Road Traffic	% contribution CO_2 tonnes/year	% contribution NO_X tonnes/year	% contribution PM_{10} tonnes/year	% contribution $PM_{2.5}$ tonnes/year
Large Sites as % of Base	2.1%	2.0%	1.6%	1.8%
Small Sites as % of Base	1.8%	1.7%	1.3%	1.4%
Large + Small Sites as % of Base	3.9%	3.7%	2.9%	3.2%

Estimated pollutant changes between Reg18 and Reg19

10.31. The August 2020 large sites list is updated from the March list following further evidence gathering and analysis. Both the March 2020, Reg 18-based assessment and the August 2020, draft Reg 19 assessment contain the full numbers for the 5-year housing supply, the 10-year housing trajectory, whilst a Small Sites assessment has also been generated in order to assess the position that *could* potentially arise of all of those opportunities in fact being delivered in the plan period. The net reduction between the Reg 18-based scenario and the draft Reg 19 scenario amounts to some 2,700 dwellings.

10.32. The reduction in the housing requirement between the two scenarios tested here will mean a reduction in the potential level of traffic generation from new development in the plan period and,

likewise, a reduction in expected extra pollutants. This can be seen by comparing the results in the two pairs of tables: table 10.1 with table 10.3 and table 10.2 with table 10.4.

10.33. Full details of the respective site lists and site-by-site impacts can be found in the Reg 18 site list and draft Reg 19 site list attached to this chapter.

Chapter 10 Conclusion

10.34. This chapter reflects the overall approach in this LPTA to provide a 'worst-case' higher growth and pre-mitigation position, of both mode split and of levels of potential traffic generation. In practice, various means of mitigation will be necessary to make development proposals Air Quality Neutral, which inevitably includes influencing mode choice in favour of less polluting travel choices. Therefore, air quality impacts by 2036 from new development are anticipated to be lower than current levels, based on changes to government legislation, policy and project-based interventions that will come into play across the plan period (2021-2036).

10.35. The UK government have committed to reduce the UK's emissions by at least 68% by 2030, compared to 1990 levels, setting the UK on the path to net zero by 2050. To achieve this target, the government will end the sale of new petrol and diesel cars and vans by 2030, with all vehicles being required to have a significant zero emissions capability (e.g. plug-in electric and full hybrids) from 2030 and be 100% zero emissions from 2035. The electrification of UK vehicles and their supply chains will put thousands more ultra-low and zero-emission cars and vans on UK roads than there are today. This will have a significant positive impact on improving air quality in the UK, and therefore Bexley.

10.36. At a local level, Bexley's Development Plan supports the improvement in Air Quality. Local Plan policy SP10 supports an improved and expanded role for sustainable transport across Bexley's transport system, which includes improving air quality. The Mayor of London is also committed to making air quality in London the best of any major city. London Plan Policy SI 1 Improving air quality ensures that new developments, as a minimum, must not cause new exceedances of legal air quality standards. The policies ensure that new developments are designed and built, as far as is possible, to improve local air quality and reduce the extent to which the public are exposed to poor air quality.

10.37. The entirety of Bexley was declared an AQMA in 2007 for exceedances of the annual and daily particulate matter as (PM10) National Air Quality Strategy (NAQS) objective, and for exceedances of the annual nitrogen dioxide (NO2) NAQS objectives. In accordance with Part IV of the Environment Act and the NAQS, the Council continually reviews the ambient air quality within its administrative boundary, monitoring local air quality across four automatic roadside monitoring stations. The latest air quality monitoring results show that the annual concentrations of pollutants fall below the NAQS objectives at all four monitoring locations. Not only that, the data shows that pollutant levels have fallen consistently year on year since 2017 at all 4 monitoring stations.

10.38. The requirements set out within Bexley's Development Plan will ensure that development proposals are at least Air Quality Neutral. These requirements, alongside the implementation of the government strategy for transitioning UK vehicles away from polluting fuels are predicted to result in a decrease in the background levels of pollutants, and a continued year on year improvement in the boroughs air quality. Therefore, air quality impacts by 2036 from new development are anticipated to be lower than current levels, avoiding the 'worst-case' pre-mitigation position set out in this Chapter.

Chapter 11 – Qualitative Assessment

Introduction

11.1. This section presents a summary of the findings of the Qualitative Assessment of walking, cycling and public transport connections for each of the 53 Large Sites from the list of sites produced in March 2020. The same set of sites was reviewed in the Quantitative Assessment in LPTA Chapters 8 and 9. Together, both the Quantitative and Qualitative Assessments then feed into the site-by-site analysis in Chapter 12 which informed the selection of allocated sites for the draft Local Plan. Three additional sites have been added to the qualitative assessment to reflect new opportunities not included in the March list which have subsequently emerged as deliverable sites within the latest trajectory.

11.2. The purpose of this Qualitative Assessment is to look beyond the simple PTAL (public transport accessibility level) scores for each site. As a tool, PTAL on its own can fail to tell the whole story about the connectivity of a place. Though PTAL provides a measure of the supply of public transport services, it does not indicate for example whether the services available at a given location serve places that people actually want to travel to in ways that will attract them to use the services on offer. So, different places with the same PTAL level do not necessarily enjoy the same degree of genuine public transport connectivity.

11.3. This chapter therefore provides a lot more information about the connectivity of the Large Sites in the housing trajectory. It provides connectivity details about both walking/cycling and the public transport network.

11.4. For each of the relevant Large Sites separate detailed assessments have been made of:

- What facilities are available near the site to encourage local walking and cycling; and
- What genuine connectivity is there to/from the site by public transport (what services are on offer, whether they serve useful destinations/origins, etc).

11.5. To provide a headline summary of site connectivity, each of the 56 identified development sites have been assessed against eight connectivity indicators, with a red/ amber/ green (RAG) rating against each – the indicators and how they have been banded (for RAG) is shown in Table 11.1. The assumption is that anticipated 2021 connectivity levels should apply (which, at the time of writing, included the opening of the Elizabeth line currently due to open in the first quarter of 2022). Appendix D of the LPTA sets out the detailed connectivity analysis for the relevant sites, i.e those that do not already have planning permission and have, therefore not already been assessed for accessibility as part of the application process.

Table 11.1: Site Connectivity Assessment Matrix

Ref	Criteria	Red	Amber	Green
1	Proximity to Local Centre	>800m walking distance to Local Centre	400-800m walking distance to Local Centre	<400m walking distance to Local Centre
2	PTAL Level	0 to 1B	2	3 to 6B
3	Highway delay on approach to nearest Local Centre	>3min/km delay on road No Bus Priority	<3min/km delay on road No Bus Priority	<3min/km delay on road. Some bus Priority
4	Proximity to existing/ potential cycle network	>800m	400m-800m	0m-400m
5	Quality of nearest train station	No step-free access Busy	No step-free access Less Busy	Step-free access Less Busy
6	Proximity to existing railway services	>960m walk	480m-960m walk	<480m walk
7	Passenger comfort on morning peak train service to London in 2041	>2 standing passengers per m^2 from nearest station	1-2 standing passengers per m^2 from nearest station	<1 standing passenger per m^2 from nearest station
8	Proximity to existing bus network	>400m walk	200 to 400m walk	<200m walk

11.6. The 56 Large Sites have been grouped into clusters for presentation of the results of this RAG analysis. Consideration of those site clusters is then by location. Table 11.2 explains which site(s) are included in which site cluster. The RAG analysis results are then set out on the pages that follow, cluster by cluster. Locations have been set out starting from Abbey Wood in a clockwise direction.

Table 11.2: Index of Clusters and Sites

Location	Cluster	Site ID	Site Name
Thamesmead and Abbey Wood	CTA1	TA001	Shop, vacant land and car wash, 500 Abbey Road, Abbey Wood
Thamesmead and Abbey Wood	CTA1	TA002	Crossrail South East Section Project Land, Felixstowe Road, Abbey Wood
Thamesmead and Abbey Wood	CTA1	TA003	Peabody Estate (Part) Wolvercote Road, Thamesmead
Thamesmead and Abbey Wood	CTA3	NEW005	Peabody Estate Regeneration, Southmere Village, Yarnton Way, Thamesmead
Thamesmead and Abbey Wood	CTA3	NEW007	Peabody Estate Regeneration, Binsey Walk, Thamesmead

Location	Cluster	Site ID	Site Name
Thamesmead and Abbey Wood	CTA3	NEW008	Peabody Estate Regeneration, Coraline Walk, Thamesmead
Belvedere	CBV1	BV007	SGN Belvedere Holder Station, Yarnton Way
Belvedere	CBV2	BV001	ASDA and B&Q Belvedere, Lower Road
Belvedere	CBV2	BV002	Belvedere Family Centre and utilities substation, Station Road
Belvedere	CBV2	BV003	Belvedere Station and Network Rail land, Station Road
Belvedere	CBV2	BV004	Railway Place Shops, Station Road, Belvedere
Belvedere	CBV4	BV010	Monarch Works, Station Road North, Belvedere
Belvedere	CBV4	BV012	Crabtree Manorway South Industrial Area
Belvedere	CBV3	BV013	Former Woodside School
Erith	CER1	ER020	DYNES vehicle repair shop, 391-395 Erith Road (A220)
Erith	CER2	ER015	Hainault House and Former Homeleigh Care Home
Erith	CER3	ER005	Land at 156 to 168 West Street, and 1 to 6 St Francis Road, Erith
Erith	CER3	NEW002	Erith Quarry Phase 1, Fraser Road
Erith	CER3	NEW004	Ballast Wharf, West Street, Erith
Erith	CER3	NEW006	Erith Quarry Phase 2 onwards, Fraser Road
Erith	CER4	ER006	Erith Western Gateway
Erith	CER4	ER007	Erith Town Centre (between Bexley Road and Pier Road)
Erith	CER4	ER008	Erith Town Centre (between Pier Road and Queen Street)
Erith	CER4	ER011	Morrisons, James Watt Way, Erith
Erith	CER4	ER012	Erith Riverside (eastside), Wheatley Terrace Road
Slade Green	CSG4	NEW003	Former Linpac Site and adjoining Warehouse, Richmer Road, Slade Green (Phase 2)
Crayford	CCR7	CR001	Tower Retail Park, Crayford
Crayford	CCR5	CR007	Land to the north of the River Cray, east of Maiden Lane, Crayford

Location	Cluster	Site ID	Site Name
Crayford	CCR6	NEW001	74 Crayford Road, Crayford
Crayford	CCR7	CR003	Sainsbury's Crayford, Stadium Way
Crayford	CCR7	CR004	Crayford Greyhound Stadium
Crayford	CCR7	CR005	Former Electrobase/Wheatsheaf Works, Maxim Road, Crayford
Bexleyheath	CBH4	BH001	Former educational playing fields for Upland Primary School
Bexleyheath	CBH1	BH002	Former Bexley CCG Offices and GP Practice, Erith Road
Bexleyheath	CBH2	BH015	Avenue Road car park, Bexleyheath
Bexleyheath	CBH2	BH016	Buildbase, 15-17 Pickford Lane, Bexleyheath
Bexleyheath	CBH3	BH003	Bexleyheath Bus Garage, Erith Road
Bexleyheath	CBH4	BH012	Builders Merchants, Rowan Road
Bexleyheath	CBH4	BH013	Bexleyheath Telephone Exchange, Broadway
Bexleyheath	CBH4	BH014	ASDA Bexleyheath Crook Log
Bexleyheath	CBH5	BH006	Former Civic Offices, Broadway, Bexleyheath
Bexleyheath	CBH5	BH005	Cinema/ Restaurants/ Bingo/ Car park, Broadway, Bexleyheath
Bexleyheath	CBH5	BH009	Oaklands Car Park and Lorry Park, Albion Road, Bexleyheath
Bexleyheath	CBH5	BH010	EDF Energy Site, Broadway, Bexleyheath
Bexleyheath	CBH6	BH004	Army Reserve Centre, Watling Street, Bexleyheath
Bexley Village	CBX1	BX002	Crayford BT Telephone Exchange, Southwold Road, Bexley
Bexley Village	CBX2	BX001	Bexley High Street car park
Sidcup	CSI1	SID001	Co-op Food, Station Road, Sidcup
Sidcup	CSI1	SID002	Travis Perkins Builders Merchant, 2 Hurst Road, Sidcup
Sidcup	CSI1	SID004	Former Lamorbey Baths, 155-159 Station Road, Sidcup
Sidcup	CSI1	SID005	Old Farm Avenue Car Park, Station Road, Sidcup

Location	Cluster	Site ID	Site Name
Sidcup	CSI1	SID006	Marlowe House, Station Road, Sidcup
Crayford	CCR7	NEW009	London Road, Crayford (Crayford Ward)
Slade Green	CSG4	NEW010	North End Road, Slade Green (Slade Green & Northend Ward)
Erith	CER4	NEW011	Morrisons (Part), James Watt Way, Erith (Erith Ward)
Sidcup	CSI1	NEW012	Longlands Road, Sidcup (Longlands Ward)

Belvedere Sites

Belvedere area includes four development clusters and a total of 8 sites in the north of the Borough, around the Local Centre of Belvedere Station.

Development Cluster CBV1: Belvedere West

This cluster consists of one site located to the north-west of Belvedere station. The site has PTAL of 3 and is served by the 180 and 401 bus services along Yarnton Way.

The Local Centre of Belvedere Station is within walking distance (400m, 5 minutes) through Maida Road and Norman Road. There is a continuous footway on the south side of Yarnton Way.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
BV007	SGN Belvedere Holder Station, Yarnton Way	<400m walking distance to Local Centre	5	<3min/km delay on road No Bus Priority	0-400m	Step-free access Less busy	480m-960m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Development Cluster CBV2: Belvedere

This cluster consists of four sites to the south of the railway line near the Local Centre of Belvedere Station. The sites have PTALs of 3 through the bus services that serve this area; the 229, 401, 469.

All sites are within a 10-minute walk/distance of the station and the local shops and there are regular zebra crossings on Lower Road. The footbridge at the station provides pedestrian access to the north and there is a path from the station, south of the railway line that links to the bus stops and footway over the railway line on the Picardy Manorway flyover.

There is a cycle route in both directions along Lower Road extending as far as Abbey Wood to the west and Battle Street to the east. This is made up of mandatory/advisory cycle lanes with a short section of segregated cycle track that avoids the Picardy Manorway roundabout for cyclists travelling east.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
BV001	ASDA and B&Q Belvedere, Lower Road	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	0-400m	Step-free access Less busy	<480m walk	<1 standing passenger per m^2 from nearest station	<200m walk
BV002	Belvedere Family Centre and utilities substation	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	0-400m	Step-free access Less busy	<480m walk	<1 standing passenger per m^2 from nearest station	<200m walk
BV003	Belvedere Station and Network Rail land, Station Road, Belvedere	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	0-400m	Step-free access Less busy	<480m walk	<1 standing passenger per m^2 from nearest station	<200m walk
BV004	Railway Place Shops, Station Road, Belvedere	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	0-400m	Step-free access Less busy	<480m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Development Cluster CBV3: Belvedere South

This cluster consists of a single site on existing educational land, located to the south of Lower Road and to the north of Frank's Park. The site has a PTAL of 2; with the nearest bus stops located on Lower Road adjacent to the site which are served by the 229 and 469 services. Further bus stop provision is also available on Picardy Manorway, served by the 401 service.

The site is within PTAL calculation distance of Belvedere Station. There is a direct walking route to the station via Lower Road, which benefits from a zebra crossing.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
BV013	Former Woodside School	<400m walking distance to Local Centre	2	<3min/km delay on road No Bus Priority	0-400m	Step-free access Less busy	<480m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Development Cluster CBV4: Belvedere Crabtree Manorway

This cluster consists of two sites on existing industrial land, located between Picardy Manorway to the west, Bronze Age Way to the north-east and the railway line to the south. The sites have PTALs ranging from 1B to 3; the only nearby bus stops are located on Picardy Manorway on top of the flyover that are served by the 401 service (Bexleyheath to Thamesmead Town Centre). The sites have access to bus routes 229 and 469 from bus stops on Lower Road.

All sites are within walking distance (5-15 minutes, 300-850m) of Belvedere Station, the main walking links are the two footbridges over the railway line on Crabtree Manorway South/Mitchell Close and Picardy Manorway. There are footpaths to the north and south of the railway line connecting Picardy Manorway to Belvedere Station.

The only pedestrian crossing on Bronze Age Way is the footbridge near Crabtree Manorway South, which joins the cycle track that runs alongside the Ocado site and into the cycle route on Church Manorway.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
BV010	Monarch Works, Station Road North, Belvedere	<400m walking distance to Local Centre	2	<3min/km delay on road No Bus Priority	0-400m	Step-free access Less busy	<480m walk	<1 standing passenger per m^2 from nearest station	<200m walk
BV012	Crabtree Manorway South Industrial Area	>800m walking distance to Local Centre	1B	<3min/km delay on road	0-400m	Step-free access Less busy	480m-960m walk	<1 standing passenger per m^2 from nearest station	200 - 400m walk

Thamesmead and Abbey Wood Sites

Thamesmead and Abbey Wood area includes two development clusters and a total of 6 sites in the north of the Borough, around the Local Centre of Abbey Wood.

Development Cluster CTA1: Abbey Wood

This cluster consists of three sites near Abbey Wood Village (Wilton Road) Local Centre. The sites have PTALs ranging from 3 to 5, being located on the Harrow Manorway corridor which is well served by the 180, 229, 244, 301 and 469 services which connect to the new station. This is in addition to a local service, B11.

All sites are within walking distance (0–15 minutes' walk, 0-800m) of the Local Centre and the new station at Abbey Wood provides lifts and steps over the railway line. There is a green corridor to the east of the Wolvercote Road estate with a north-south walking and cycling route connecting Southmere Lake and Lesnes Abbey.

Recent improvements have seen cycle facilities provided along the Harrow Manorway corridor from the roundabout at the foot of Knee Hill to the Link on Bazalgette Way, where cyclists and pedestrians can join the Ridgeway or cross Eastern Way to Thamesmead. There is also an east-west cycle route along Abbey Road and Abbey Wood Road that is mainly on the footway and provides a useful connection to Lesnes Abbey.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
TA001	Shop, vacant land and car wash, 500 Abbey Road, Abbey Wood	<400m walking distance to Local Centre	4	<3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	<480m walk	<1 standing passenger per m^2 from nearest station	<200m walk
TA002	Crossrail South East Section Project Land, Felixstowe Road, Abbey Wood	<400m walking distance to Local Centre	5	<3min/km delay on road. Some bus Priority	0m-400m	Step-free access Less busy	<480m walk	<1 standing passenger per m^2 from nearest station	<200m walk
TA003	Peabody Estate (Part) Wolvercote Road, Thamesmead	400-800m walking distance to Local Centre	2	<3min/km delay on road. Some bus Priority	0m-400m	Step-free access Less busy	480m-960m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Development Cluster CTA3: Southmere

This cluster consists of three sites near Abbey Wood Village (Wilton Road) Local Centre. The sites have PTALs ranging from 2 to 4, being located on the Harrow Manorway and Yarnton Way corridors which are well served by the 177, 180, 229, 244, 301, 401 and 469 services.

Some locations within these sites have longer than desirable walking distances to the Local Centre. However, the new station at Abbey Wood provides lifts and steps over the railway line, which shorten actual walking distances considerably. There is a green corridor to the east of the Wolvercote Road estate with a north-south walking and cycling route connecting Southmere Lake and Lesnes Abbey.

Recent improvements have seen cycle facilities provided along the Harrow Manorway corridor from the roundabout at the foot of Knee Hill to the Link on Bazalgette Way, where cyclists and pedestrians can join the Ridgeway or cross Eastern Way to Thamesmead. There is also an east-west cycle route along Abbey Road and Abbey Wood Road that is mainly on the footway and provides a useful connection to Lesnes Abbey.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
NEW005	Peabody Estate Regeneration, Southmere Village, Yarnton Way, Thamesmead	>800m walking distance to Local Centre	4	<3min/km delay on road. Some bus Priority	0m-400m	Step-free access Less busy	480m-960m walk	<1 standing passenger per m^2 from nearest station	<200m walk
NEW007	Peabody Estate Regeneration, Binsey Walk, Thamesmead	>800m walking distance to Local Centre	3	<3min/km delay on road. Some bus Priority	0m-400m	Step-free access Less busy	>960m walk	<1 standing passenger per m^2 from nearest station	200 to 400m walk
NEW008	Peabody Estate Regeneration, Coraline Walk, Thamesmead	400-800m walking distance to Local Centre	5	<3min/km delay on road. Some bus Priority	0m-400m	Step-free access Less busy	<480m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Erith Sites

Erith area includes five development clusters and a total of 12 sites in the north of the Borough, around the Local Centres of Erith and Northumberland Heath.

Development Cluster CER1: Northumberland Heath

This cluster consists of one site south of Northumberland Heath Local Centre. The site has a PTAL of 3, with local bus services 89, 229 connecting Bexleyheath Local Centre with Erith. The site is within easy walking distance (5 minutes' walk. 250m) of the Local Centre. There are no cycle routes or facilities in the local area.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
ER020	DYNES vehicle repair shop, 391-395 Erith Road (A220)	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	400m-800m	No step-free access Less Busy	480m-960m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Development Cluster CER2: Northumberland Heath North

This cluster consists of one site to the north of Northumberland Heath Local Centre. The site has a PTAL of 1A, with the 229 running along Bexley Road into Erith from Northumberland Heath and the B12 that serves the Erith and District Hospital, the area to the north and Bexleyheath Station.

The site is within walking distance (15 minutes' walk, 800m) of the Local Centre. There are no cycle routes or facilities in the local area but Avenue Road and its pedestrian cut-through onto Queens Road serves as a quiet alternative for pedestrians and cyclists going to Erith, wishing to avoid Bexley Road and the Queens Road roundabout.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
ER015	Hainault House and Former Homeleigh Care Home	400-800m walking distance to Local Centre	2	<3min/km delay on road No Bus Priority	0m-400m	No step-free access Less Busy	480m-960m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Development Cluster CER3: Erith West

This cluster consists of four sites, two of which are located to the south of Fraser Road while the other two are north of the railway line off West Street. The sites have PTALs ranging from 1A and 4 with bus stops located on Fraser Road for the 99 service, which runs between Bexleyheath and Belvedere before terminating in Woolwich. The 229 runs along Bexley Road and West Street, along with the 469 service to Abbey Wood.

All four sites are far (13-25 minutes' walk 750-1300m) from the Local Centres of Erith and Northumberland Heath. Birch Walk forms a walking route from Fraser Road into Northumberland Heath. Northwards, it continues from Fraser Road into Sandcliff Road where it joins the cycle route along Sandcliff Road/St. John's Road towards Belvedere. In the other direction, there is an underpass of the railway line for pedestrians and cyclists via Nordenfeldt Road onto West Street. West Street has cycle lanes and cycle bypass lanes at its pinch points and connects through to the Thames Path at Corinthian Manorway; in the other direction it continues into Erith. There is also a direct footpath link from the Queens Road roundabout to Station Approach for Erith station.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
ER005	Land at 156 to 168 West Street, and 1 to 6 St Francis Road, Erith	>800m walking distance to Local Centre	1B*	<3min/km delay on road No Bus Priority	0m-400m	No step-free access Less Busy	480m-960m walk	<1 standing passenger per m^2 from nearest station	<200m walk
NEW004	Ballast Wharf, West Street, Erith (opp. Mildred Road)	400-800m walking distance to Local Centre	3*	<3min/km delay on road No Bus Priority	0m-400m	No step-free access Less Busy	480m-960m walk	<1 standing passenger per m^2 from nearest station	<200m walk
NEW002	Erith Quarry Phase 1, Fraser Road	>800m walking distance to Local Centre	1B	<3min/km delay on road No Bus Priority	>800m	No step-free access Less Busy	>960m walk	<1 standing passenger per m^2 from nearest station	200 to 400m walk
NEW006	Erith Quarry Phase 2 onwards, Fraser Road	>800m walking distance to Local Centre	1A	<3min/km delay on road No Bus Priority	>800m	No step-free access Less Busy	>960m walk	<1 standing passenger per m^2 from nearest station	200 to 400m walk

*Whilst sites ER005 and NEW004 are only 200 metres apart, site ER005 is just outside walking range of Erith station, giving it a PTAL of 1B compared to PTAL 3 for NEW004.

Development Cluster CER4: Erith

This cluster consists of six sites, near Erith Local Centre. The sites have PTALs ranging from 2 and 3 with the centre well-served by five bus services; 99, 229, 428, 469 and the B12. The 99 bus route connects the centre with those sites located off Manor Road.

All sites are within walking distance (2–10 minutes' walk 100-550m) of the Local Centre, which is well-suited to walking, having a dense street network with pedestrianised areas and is generally flat. There are direct paths to the railway station and a pleasant riverside path. National Cycle Route 1 runs off-street and on-street along West Street and towards the pier, where the centre is easily accessed. From the pier, it joins Manor Road with a cycle track located on the footway before entering Crayford Marshes. The signal-controlled crossing of Queens Road at the James Watt Way junction and the pedestrian cut-through onto Avenue Road provides a direct walking/cycling route to the leisure centre and onwards to Northumberland Heath.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
ER006	Erith Western Gateway	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	0m-400m	No step-free access Less Busy	<480 m walk	<1 standing passenger per m^2 from nearest station	<200m walk
ER007	Erith Town Centre (between Bexley Road and Pier Road)	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	0m-400m	No step-free access Less Busy	<480 m walk	<1 standing passenger per m^2 from nearest station	<200m walk
ER008	Erith Town Centre (between Pier Road and Queen Street)	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	0m-400m	No step-free access Less Busy	480m - 960m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
ER011	Morrisons (Part), James Watt Way, Erith	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	0m-400m	No step-free access Less Busy	480m - 960m walk	<1 standing passenger per m^2 from nearest station	<200m walk
ER012	Erith Riverside (eastside), Wheatley Terrace Road	400-800m walking distance to Local Centre	1B	<3min/km delay on road No Bus Priority	0m-400m	No step-free access Less Busy	>960 m walk	<1 standing passenger per m^2 from nearest station	<200m walk
NEW011	Morrison's (Part), James Watt Way, Erith	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	0m-400m	No step-free access Less Busy	480m - 960m walk	<1 standing passenger per m2 from nearest station	<200m walk

Slade Green Sites

Slade Green area has one development cluster with 2 sites in the north of the Borough, around Slade Green station. The closest Local Centre Reference Point is that used for Erith.

Development Cluster CSG4: Slade Green

This cluster consists of two site located near Slade Green station. The sites have a PTAL of 1A. The nearest bus stops being located on Bridge Road and North End Road for the 89 service that runs between Bexleyheath and Erith via Slade Green station.

The site is beyond reasonable walking distance (1100m–1700m) of Erith Local Centre. There is a footbridge from the western end of Slade Green Road over the railway line. At this point, a footpath runs northward to the east of the railway line and provides a direct link towards Erith. There are no local cycle routes or facilities.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
NEW010	North End Road, Slade Green (Slade Green & Northend Ward)	>800m walking distance to Local Centre	1B	<3min/km delay on road No Bus Priority	>800 m	No step-free access Less Busy	480m - 960m walk	<1 standing passenger per m^2 from nearest station	>400m walk
NEW003	Former Linpac Site, Richmer Road, Slade Green	>800m walking distance to Local Centre	1B	<3min/km delay on road No Bus Priority	>800 m	No step-free access Less Busy	480m - 960m walk	<1 standing passenger per m2 from nearest station	>400m walk

Bexleyheath Sites

Bexleyheath area includes six development clusters and a total of 13 sites around the Local Centres of Bexleyheath and Bexleyheath Station.

Development Cluster CBH1: Barnehurst

This cluster consists of one site on the old maternity hospital site, to the north of the Bexleyheath line adjacent to Bursted Wood. The site has a PTAL of 3, with nearby bus stops on the A220 Erith Road for the 89 service between Bexleyheath and Northumberland Heath.

The site is beyond reasonable walking distance of Northumberland Heath Local Centre (1.0km, 20 minutes) but there are shops nearby on Barnehurst Avenue, reached by a zebra crossing on Erith Road. There is also a direct pedestrian/cycling link, north of the railway line for access to the station. To the west, a path provides a pedestrian link onto Lavernock Road for the shops on Long Lane. Bursted Wood is open space across which Swanbridge Road can be reached. There are no other cycle routes or facilities in this area.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
BH002	Former Bexley CCG Offices and GP Practice, Erith Road	>800m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	<480 m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Development Cluster CBH2: Avenue Road

The development cluster consists of two sites near Bexleyheath Station Local Centre. The sites have PTALs of 4, being close to the station and the bus routes that serve it; the 422, B11, B12 and B15 which connect Bexleyheath with Plumstead, Abbey Wood, Erith and Eltham Local Centres.

The sites are within reasonable walking distance of the station (0-200m, 3 minutes). There is a pedestrian link from Blackthorn Crescent onto Brampton Road. There are no cycle routes or facilities in this area.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
BH015	Avenue Road car park, Bexleyheath	<400m walking distance to Local Centre	4	<3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	<480m walk	<1 standing passenger per m^2 from nearest station	<200m walk
BH016	Buildbase, 15-17 Pickford Lane, Bexleyheath	<400m walking distance to Local Centre	4	<3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	<480m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Development Cluster CBH3: Bus Garage

The development cluster consists of one site on Erith Road, north of Bexleyheath Local Centre. The site is PTAL 4 with bus stops located next to the site. The bus routes that serve it are the 229, 89, B11 and B16 though the last two services terminate here as the site is currently the bus garage.

The site is within reasonable walking distance of Bexleyheath Local Centre (650m, 8 minutes) and there are controlled pedestrian crossings at the junction of Erith Road with Mayplace Road East/West. There are no cycle routes or facilities in the area.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
BH003	Bexleyheath Bus Garage, Erith Road	400-800m walking distance to Local Centre	5	<3min/km delay on road No Bus Priority	400m-800m	Step-free access Less busy	480m-960m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Development Cluster CBH4: Bexleyheath West

The development cluster consists of four sites to the west of Bexleyheath Local Centre. The sites have PTALs of 3, 4 and 5 being located near Bexleyheath station. The nearest bus stops are located on Broadway for services which connect Bexleyheath with Welling.

The sites are within reasonable walking distance of Bexleyheath Local Centre (400-700m, 5-10 minutes) and there are numerous signal-controlled pedestrian crossings of the Broadway. There are no cycle routes or facilities in this area.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
BH001	Former educational playing fields, Church Road/Belvedere Road	400-800m walking distance to Local Centre	3	>3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	480m - 960m walk	<1 standing passenger per m^2 from nearest station	>400m walk
BH012	Builders Merchants, Rowan Road	400-800m walking distance to Local Centre	4	>3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	480m - 960m walk	<1 standing passenger per m^2 from nearest station	200 to 400m walk
BH013	Bexleyheath Telephone Exchange, Broadway	400-800m walking distance to Local Centre	4	>3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	480m - 960m walk	<1 standing passenger per m^2 from nearest station	<200m walk
BH014	ASDA Bexleyheath Crook Log	400-800m walking distance to Local Centre	5	>3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	480m - 960m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Development Cluster CBH5: Bexleyheath

The cluster consists of four sites in and around Bexleyheath Local Centre. The sites have PTALs of 3 to 5, being near the main bus hub in the borough with 16 bus routes.

The sites are within reasonable walking distance of Bexleyheath Local Centre (100-400m, 1-7 minutes). The area is well-suited for walking, with signal-controlled crossings on most pedestrian desire lines and the central shopping area is pedestrianised. Whilst cycling is banned within the pedestrianised area, there is a segregated cycle track along Albion Road which continues along Gravel Hill and through the roundabout outside the Civic Offices. To the north of the Local Centre, Arnsberg Way is a 20mph zone with shared space junctions that encourage low traffic speeds.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
BH005	Cinema/ Restaurants/ Bingo/ Car park, Broadway, Bexleyheath	<400m walking distance to Local Centre	5	<3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	>960 m walk	<1 standing passenger per m^2 from nearest station	<200m walk
BH006	Former Civic Offices, Broadway, Bexleyheath	<400m walking distance to Local Centre	5	<3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	>960 m walk	<1 standing passenger per m^2 from nearest station	<200m walk
BH009	Oaklands Car Park and Lorry Park, Albion Road, Bexleyheath	<400m walking distance to Local Centre	4	<3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	>960 m walk	<1 standing passenger per m^2 from nearest station	<200m walk
BH010	EDF Energy Site, Broadway, Bexleyheath	<400m walking distance to Local Centre	4	<3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	>960 m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Development Cluster CBH6: Bexleyheath East

This cluster consists of one site on Watling Street to the west of Bexleyheath Local Centre. The site has a PTAL of 2, with the 96 bus to Crayford stopping adjacent to the site on Watling Street. The nearest railway station (Barnehurst) is 1.4km from the site.

The site is within walking distance of Bexleyheath Local Centre (800m, 15 minutes). There are cycle crossings and a shared footway at the roundabout outside the nearby Civic Offices.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
BH004	Army Reserve Centre, Watling Street, Bexleyheath	400-800m walking distance to Local Centre	2	<3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	>960 m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Crayford Sites

Crayford area includes three development clusters and a total of 7 sites around the Local Centre of Crayford.

Development Cluster CCR5: Crayford East

This cluster consists of one site to the east of Maiden Lane. The site has a PTAL of 1A, with the only nearby bus service being the 428 service on Crayford Way that connects Crayford and Erith.

The site is beyond a reasonable walking distance of Crayford Local Centre (1300m). There is a riverside path on the north bank of the River Cray that connects Thames Road with the centre of Crayford

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
CR007	Land to the north of the River Cray, east of Maiden Lane, Crayford	>800m walking distance to Local Centre	1B	<3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	>960 m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Development Cluster CCR6: Crayford Town

This cluster consists of one site situated on the eastern edge of Crayford Local Centre, north of the railway line. The site has a PTAL of 3, with bus stops on Crayford Road for the 96, 428 and 492.

The site is within a short walking distance of Crayford Local Centre (350m, 5 minutes) and there are pedestrian refuge island crossings on the A207 and Station Road for access to the station and local shops.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
NEW001	74 Crayford Road	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	400m - 800m	Step-free access Less busy	<480 m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Development Cluster CCR7: Crayford Station

This cluster consists of five sites situated on the south-eastern edge of Crayford Local Centre, north of the railway line. The sites have PTALs of 2 and 3, with bus stops on Crayford Road and Roman Way for the 96, 428 and 492 services.

The sites are within a short walking distance of Crayford Local Centre (0–400m, 0–5 minutes) and there are controlled crossings on the A207 for access to local shops. There is a short length of riverside cycle route adjacent to the Aldi car park between Roman Way and Crayford Road.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
CR001	Tower Retail Park	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	0m-400m	No step-free access Less Busy	<480 m walk	<1 standing passenger per m^2 from nearest station	<200m walk
CR003	Sainsbury's Crayford, Stadium Way	<400m walking distance to Local Centre	2	<3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	<480 m walk	<1 standing passenger per m^2 from nearest station	<200m walk
CR004	Crayford Greyhound Stadium	<400m walking distance to Local Centre	2	<3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	<480 m walk	<1 standing passenger per m^2 from nearest station	<200m walk
CR005	Former Electrobase/Wheatsheaf Works, Maxim Road, Crayford	<400m walking distance to Local Centre	2	<3min/km delay on road No Bus Priority	0m-400m	Step-free access Less busy	480m - 960m walk	<1 standing passenger per m^2 from nearest station	<200m walk
NEW009	London Road, Crayford	<400m walking distance	3	<3min/km delay on road	0m-400m	Step-free access	480m -	<1 standing passenger	<200m walk

		to Local Centre		No Bus Priority		Less busy	960m walk	per m2 from nearest station	

Bexley Village Sites

Bexley Village area includes two development clusters and a total of 2 sites around the Local Centre of Bexley Village.

Development Cluster CBX1: Bexley Village North

The cluster consists of one site by the A2 at the Black Prince interchange, north of Bexley Village Local Centre. The site has PTAL of 3, with local bus services 132, 229, 492, B12 connecting to Bexley Village and Bexleyheath Local Centres.

The site is within moderate walking distance (10 minutes' walk. 640m) of Bexley Village but the location suffers from high levels of traffic during the peak period. There is a pelican crossing from the hotel across Southwold Road and this connects via the footway on the south side of the A2 to a footbridge over the A2 to Rochester Drive.

There is a cycle route in both directions from the Hartford Road junction along Bourne Road and up Gravel Hill as far at Latham Road. This is mainly advisory cycle lanes with cycle track links to uncontrolled crossings of the side approaches at the two major roundabouts.

Development Cluster CBX2: Bexley Village

This cluster consists of one site, near Bexley Village Local Centre. The site has PTAL of 3, with the centre served by four bus services: 132, 229, 492 and B12, connecting to Sidcup, Blackfen and Bexleyheath Local Centres. The site is near the railway station.

The local centre is not well-suited to walking, with narrow footways and busy traffic though there are zebra crossings of all main roads. There are no cycling routes or facilities in the Local Centre.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
BX001	Bexley High Street car park	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	>800 m	No step-free access Busy	<480 m walk	<1 standing passenger per m^2 from nearest station	<200m walk

Sidcup Sites

Sidcup area includes one development cluster and a total of 66 sites, around the Local Centre of Sidcup Station.

Development Cluster CSI1: Sidcup Station

This cluster consists of five sites, near Sidcup Station Local Centre. The sites have PTALs ranging from 3 to 4, with the centre served by seven bus services: 51, 160, 229, 233, 269, 286 and 492, connecting to Sidcup, Bexleyheath and Bromley Local Centres. Sidcup Railway Station is within the cluster.

All sites are within walking distance (0-3 minutes' walk 0-200m) of the Local Centre of Sidcup Station. The centre is well-suited to walking, with wide footways along Station Road (the main road) and signalised crossings. There are no cycle routes or facilities in the local area.

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
SID001	Co-op Food, Station Road, Sidcup	<400m walking distance to Local Centre	4	<3min/km delay on road No Bus Priority	>800 m	Step-free access Less busy	<480 m walk	<1 standing passenger per m^2 from nearest station	<200m walk
SID002	Travis Perkins Builders Merchant, 2 Hurst Road, Sidcup	<400m walking distance to Local Centre	4	<3min/km delay on road No Bus Priority	>800 m	Step-free access Less busy	<480 m walk	<1 standing passenger per m^2 from nearest station	<200m walk
SID004	Former Lamorbey Baths, 155-159 Station Road, Sidcup	<400m walking distance to Local Centre	4	<3min/km delay on road No Bus Priority	>800 m	Step-free access Less busy	<480 m walk	<1 standing passenger per m^2 from nearest station	<200m walk
SID005	Old Farm Avenue Car Park, Station Road, Sidcup	<400m walking distance to Local Centre	3	<3min/km delay on road No Bus Priority	>800 m	Step-free access Less busy	<480 m walk	<1 standing passenger per m^2 from	<200m walk

Site Ref	Site Name	1 Proximity to Local Centre	2 PTAL Level	3 Highway delay to Local Centre	4 Proximity to cycle network	5 Quality train station	6 Proximity to railway services	7 Passenger comfort	8 Proximity to bus network
								nearest station	
SID006	Marlowe House, Station Road, Sidcup	<400m walking distance to Local Centre	4	<3min/km delay on road No Bus Priority	>800 m	Step-free access Less busy	<480 m walk	<1 standing passenger per m^2 from nearest station	<200m walk
NEW012	Longlands Road, Sidcup	<400m walking distance to Local Centre	4	<3min/km delay on road No Bus Priority	>800 m	Step-free access Less busy	<480 m walk	<1 standing passenger per m2 from nearest station	<200m walk

Chapter 11 Conclusion

11.7. The qualitative assessment of identified sites has been used to consider their in transport terms. It has enabled a more in-depth consideration of the character of the development locations and informed the selection of the site allocations where appropriate.

Chapter 12 – Site by Site Analysis

Introduction

12.1 This Chapter sets out how site-based transport analysis has been undertaken for each of the shortlisted housing site allocations. The analysis looks at a range of key issues on the local transport network and considers whether the envisaged development of any one site is likely to be acceptable overall in transport terms. Each assessment includes a road safety accident plot which details the level of accidents within 500m of each site. Where appropriate, the assessments highlight where a site might benefit from future transport investment (e.g. Bus Transit or DLR extension) and where planning obligations might contribute towards delivery costs of particular transport interventions or mitigation measures.

12.2 Detailed assessments were carried out for all the March 2020 Large Sites except those that already had planning permission and, therefore, had already been assessed as part of a planning application. This chapter sets out summarised information for the 23 sites considered to be potentially suitable and deliverable within the Local Plan period and which are therefore proposed as allocated sites for residential development.

Site Assessments

12.3 A standard form has been developed for this assessment and is reproduced in Figure 12.1. at the end of this chapter. All completed site assessments sites are shown in Appendix E. These assessments were informed by the Connectivity Analysis and RAG analysis outputs (from Chapter 11 and Appendix D) in addition to other site-based evidence.

12.4 The key findings of the Transport Analysis report have been summarised within Table 12.1 below.

Table 12.1 Site Transport Analysis Summary for Final Site List

Site	Site Name	Acceptable in transport terms?	Main assessment summary
BH001	Former educational playing fields for Upland Primary School		Station is within reasonable walking distance and no significant barriers that need to be addressed
BH002	Former Bexley CCG Offices and GP Practice, Erith Road		Station is within reasonable walking distance and no significant barriers that need to be addressed
BH005	Cinema/restaurants/bingo Car Park Broadway Bexleyheath		Acceptable in principle. Level of acceptable development would need to be determined by a Transport Assessment and parking demand survey. Site in a sustainable location
BH010	EDF Energy Site, Broadway, Bexleyheath		Bus and rail within acceptable walking distance from site. No significant barriers that need to be addressed

Site	Site Name	Acceptable in transport terms?	Main assessment summary
BH012	Builders Merchants Rowan Road Bexleyheath		Bus and rail within acceptable walking distance from site. Significant potential for improving pedestrian/cycle links
BH016	Buildbase 15-17 Pickford Lane Bexleyheath		Need to retain adequate vehicular access for the other properties on Pickford Lane that currently use the access leading to Pickford Close. Bus and rail within acceptable walking distance from site
BV001	ASDA and B&Q Lower Road Belvedere		Part of site may possibly be required to deliver DLR. Acceptability would need to be determined by a Transport Assessment and parking demand survey. Bus and rail within acceptable walking distance from site
BV002	Belvedere Family Centre and Utilities Sub-station		Acceptable in principle, but should be confirmed by a Transport Assessment. Bus and rail within acceptable walking distance from site
BV004	Railway Place Shops, Station Road, Belvedere		Acceptable in principle, but should be confirmed by a Transport Assessment. Bus and rail within acceptable walking distance from site
BV007	SGN Belvedere Holder Station, Yarnton Way, Belvedere		Part of site may possibly be required to deliver DLR. Acceptability would need to be determined by a Transport Assessment. pedestrian/cycle improvements would make the rail station accessible
BV010	Monarch Works Station Road North, Belvedere		Bus and rail within acceptable walking distance from site. Possible direct access to final Bus Rapid Transport route
BV012	Crabtree Manorway South Industrial Area, Belvedere		Significant improvements would need to come forward as part of any proposal Acceptability would need to be determined by a Transport Assessment.
BV013	Former Woodside School, Halt Robin Road, Belvedere		Bus and rail within acceptable walking distance from site. Improvements required to existing pedestrian and cycle links
CR001	Tower Retail Park, Crayford		Possible implications for local road network Acceptability would need to be determined by a Transport Assessment and parking survey.
CR003	Sainsburys, Stadium Way, Crayford		Crayford High Street/Crayford Way junction close to capacity. Acceptability would need to be determined by a Transport Assessment, which should consider further traffic improvements onto the highway
CR005	Former Electrobase /Wheatsheaf Works, Maxim Road, Crayford		Crayford High Street/Crayford Way junction close to capacity. Acceptability would need to be determined by a Transport Assessment, which should consider further traffic improvements onto the highway

Site	Site Name	Acceptable in transport terms?	Main assessment summary
ER006	Erith Western Gateway		Acceptability would need to be determined by a Transport Assessment. Bus and rail within acceptable walking distance from site
ER007	Erith Town Centre (Pier Road West and Erith House)		Acceptability would need to be determined by a Transport Assessment. Bus and rail within acceptable walking distance from site
ER008	Erith Town Centre (Riverside Shopping Centre)		Acceptability would need to be determined by a Transport Assessment. Bus and rail within acceptable walking distance from site
ER011	Morrisons James Watt Way Erith		Existing surface car parks within site boundary. Acceptability would need to be determined by a Transport Assessment and parking survey
ER012	Erith Riverside (East side) Wheatley Terrace Road Erith		Acceptability would need to be determined by a Transport Assessment. Bus and rail within acceptable walking distance from site
TA002	Crossrail south east section project land Felixstowe Road		Sustainable location. Transport Assessment will need to focus on bicycle storage and possible extensions to controlled parking measures
TA003	Lesnes Estate, Wolvercote Road, Thamesmead		Acceptability would need to be determined by a Transport Assessment, which will need to focus on non-car modes of transport

Green = Acceptable, Amber = Requires mitigation

Conclusion

12.5 All of the sites examined would or could be made acceptable in transport terms. There are a number of sites situated close to traffic sensitive locations, where greater mitigation is likely to be required to make them acceptable and detailed investigation will be needed to confirm its nature and extent. These are marked in amber in the summary table.

12.6 Any potential development proposals will need to have a strong emphasis on transport solutions based on walking, cycling and public transport use. In most cases redevelopment of the shortlisted sites would offer opportunities to improve or provide new pedestrian and cycle links.

12.7 Whilst the site-based assessments do not generally indicate that individual developments are wholly dependent on the delivery of any specific transport schemes, each site will need to have regard to the cumulative impacts of other development proposals within each locality. Sites within the Lower Belvedere and Erith areas may need to take into account future aspirations for DLR and Bus Rapid Transit provision.

Figure 12.1 – Standard site analysis form

General Transport Analysis: Site xxx

Potential Scale of Development: x residential units

Acceptability of Development

Acceptability of Development – Issues	Acceptability of Development – Comments
What level of development will be (or could be made) acceptable in transport terms (allowing for different transport assumptions). Can the proposed development be made acceptable in transport terms?	

Site Access Arrangements

Site Access Arrangements – Issues	Site Access Arrangements – Comments
Traffic Access	
Public Transport Access	
Walking and Cycling Analysis	
In principle, is there enough evidence now that potential site access arrangements can/will be suitable and sufficient?	
How should barriers/gaps be addressed?	

Site Access Arrangements – Issues	Site Access Arrangements – Comments
How could the site contribute to local accessibility/permeability?	

Impact on Transport Network

Impact on Transport Network of Development - Issues	Impact on Transport Network of Development – Comments
What mitigation is likely to be in place anyway (general mode shift measures, specific local interventions) during the plan period?	
What other potential mitigation measures are likely to be required? For vehicles, public transport, walking and cycling (generally, site specific)	
[Check: are such improvements physically achievable?]	
What are the barriers to better connectivity – and are there potential PTAL uplifts that could otherwise be captured?	
What further work will be needed for assessing impact on the transport network (now or at pre-app stage)?	

Timing and Phasing

Timing and Phasing – Issues	Timing and Phasing – Comments
Transport schemes that must be in place prior to development coming forward?	
If Yes; provide details and specify potential impact on timing/phasing	

Developer Contributions

Developer Contributions - Issues	Developer Contributions – Comments
Any S106/CIL contributions expected to be required from the development towards specific infrastructure?	
If Yes; provide details	

Road Safety

Severity of Accident	Number of Accidents within 500m of the site (Jan 2016-Dec 2018)
Slight	
Serious	
Fatal	

Chapter 13 – Conclusions

Introduction

13.1 The purpose of this chapter is to draw together the main conclusions of the LPTA which has been produced to comply with government guidance on the development of a robust transport evidence base. The document has assessed the transport implications of the local plan as it has developed through to the submission stage and includes a comprehensive analysis of the current transport context in the borough, future proposals and commitments and the impact of proposed development sites. It has done so in the context of significant uncertainty resulting from the pandemic and its impact on travel behaviour and acknowledges the need to plan flexibly and monitor regularly to ensure policy approaches remain relevant and up to date.

13.2 The document has been developed in consultation with key transport stakeholders and seeks to address responses received as part of the Regulation 18 and 19 consultation stages as well as Duty to Cooperate meetings and other relevant discussions.

Bexley's Transport Network

13.3 Bexley's transport network is dominated by radial routes into and out of London and problematic orbital routes which suffer from distinct pinch points and bottle necks particularly where they cross rail and strategic road routes. The borough is considered to be atypical as compared to other London Boroughs as it relies solely on national rail and bus networks for its public transport provision. These options are plagued by issues of reliability and resilience leading to high car ownership and reliance, reinforced by diverse travel patterns reflecting the dispersed nature of local services and facilities.

13.4 In terms of future changes to the network, this is driven by the Mayors Transport Strategy which aims to see 80% of all trips in London use sustainable modes achieved through the creation of healthy streets and investment in public transport as well as the development of new homes and jobs in appropriate locations. This aspiration is reflected in a range of ongoing initiatives within Bexley including accessibility improvements in town centres and industrial areas and enhancements to the cycle network. In terms of public transport, a range of schemes are being promoted or supported including bus priority projects, improvements to the national rail network, the delivery of the Elizabeth Line to Abbey Wood and the implementation of improved river crossings at Silvertown and in the lower Thames estuary. Initiatives are also being progressed to make better use of the existing network through the use of technology, as well as improving safety and air quality.

Policy Approaches

13.5 The policy approaches set out in the Regulation18 document have been reviewed in the light of national and regional policy and in the context of the responses to the Regulation 18 consultation. A series of alterations made at the Regulation 19 stage have been set out which sought to respond

effectively to higher level requirements and the consultation comments received, as well as reflect local circumstances as identified in the evidence base. Representations received at the Regulation 20 stage have also been referenced and further modifications to particular policy approaches outlined.

13.6 As well as existing and confirmed transport infrastructure, a number of emerging transport schemes have been identified for safeguarding as they are essential to the delivery of growth proposals in the local plan, including Thames Road Dualling and Crossrail. Others are less advanced but are proposed to be further developed to support additional growth in the future. To ensure these emerging schemes are not prejudiced at an early stage, site-based policies will look to: ensure built development does not preclude the progression of any scheme and, where possible, positively supports it. This includes proposals such as a DLR extension to Belvedere and bus rapid transit between North Greenwich and Slade Green.

13.7 Despite these initiatives, it is clear that Bexley remains highly reliant on the car for many trips due to the relatively narrow choice of public transport modes and destinations and the dispersed nature of local services and facilities, many of which are poorly served by modes of transport other than the car. Allied to this is the strong interrelationship between the availability of parking, the provision of family housing and parking stress on local roads with associated repercussions for congestion, highway safety and the progression of sustainable transport initiatives. Local evidence strongly suggests that some flexibility in the maximum residential parking standards set out in the London Plan is justified in certain circumstances. These relate particularly to family housing in poorly served areas of PTAL 2 (outside of identified sustainable development locations) and the Bexley Riverside opportunity area, where a lack of planning and investment in improving infrastructure make the London Plan's hugely ambitious residential standard inappropriate.

Site Assessments

13.8 In considering the quantitative impacts of proposed development sites on the highway network and air quality, a methodology was developed which analysed the trip generation assumed to arise from two emerging lists of large (over 0.25ha) housing sites; one generated in March 2020, the other one in August 2020 following further information gathered and refinement. By assigning these trips to the road network the impact on six key junctions within the main growth areas could be assessed for the base year (2021), a local plan horizon (2036) without development and a local plan base year (2036) with development. This was considered a robust, worst-case scenario of impacts as it assumed a similar mode split to developments in recent years when in practice these will change through the plan period away from the car and towards more sustainable modes as policies engage.

13.9 The results showed that all six junctions will be at or over capacity by the horizon year based on the March 2020 figures. The August 2020 site list was not the subject of junction modelling but showed a smaller number of development sites and a 25% reduction in total site capacity whilst the distribution of growth across the borough was the same in broad terms. Moreover, the final housing trajectory is now available and shows a further decline in the number of large residential development sites and associated capacity whilst the distribution across the borough is again broadly the same. This reaffirms the robust, worst-case nature of the initial modelling, which

together with the expected mode shift through the plan period and the ability to modify junctions to deal with issues arising through developer contributions and the Councils annual road improvement programmes, provides assurance that the impact of development on the road network is manageable.

13.10 Recent strategic modelling of junctions on the SRN outside of the borough has revealed a moderate impact on relevant junctions even assuming existing travel habits are maintained. This will inform further discussions with regional partners on required mitigation at these junctions.

13.11 The air quality assessment used the trip generation figures derived for each of the large site lists to estimate pollution levels. The London Atmospheric Emissions Inventory (LAEI) model was used to calculate air quality impacts in terms of NO_x, PM_{10}, PM_{25} and CO_2. The results show an increase in each pollutant across the plan period. However, these figures need to be interpreted in the context of policy impacts on mode share and the repercussions of separate air quality legislation to meet government commitments on emissions reduction by 2036 and net zero by 2050. These measures include the banning of new petrol and diesel cars by 2030 and the electrification of vehicles and their supply chains. At a London and borough level, policies are also proposed to improve air quality from new developments whilst measures put in place as part of the establishment of a borough wide air quality management area have shown pollutant levels falling consistently at monitoring locations since 2017. In this context it is considered that development proposals arising from the plan will be at least air quality neutral across the plan period.

13.12 All identified large residential sites which do not have planning permission have been the subject of a detailed connectivity assessment and site appraisal to understand their transport characteristics and acceptability for development in transport terms. This informed the selection of the 23 residential allocations which appear in the submission Draft Local Plan. All the selected sites are considered acceptable in transport terms, although a number are close to traffic sensitive locations and are likely to require greater mitigation than others whilst all sites will be expected to consider the cumulative impacts of other developments within their locality. All schemes will be required to promote sustainable transport modes, improve associated facilities, and minimise the use of the car. Some will also need to ensure they do not preclude, and where possible positively promote, future transport schemes such as Bus Rapid Transit and DLR.