GLAECONOMICS

Working Paper 18

Borough Employment Projections to 2026

The detailed methodology

By Duncan Melville and Margarethe Theseira

Transport for London

LONDON DEVELOPMENT AGENCY

MAYOR OF LONDON

copyright

Greater London Authority
October 2006

Published by
Greater London Authority
City Hall
The Queen's Walk
London SE1 2AA
www.london.gov.uk
enquiries **020 7983 4000**
minicom **020 7983 4458**

ISBN **1-85261-933-3**
978-1-85261-933-6

Cover photograph

This publication is printed on recycled paper.

For more information about this publication, please contact:
GLA Economics
telephone 020 7983 4922
email glaeconomics@london.gov.uk

GLA Economics provides expert advice and analysis on London's economy and the economic issues facing the capital. Data and analysis from GLA Economics form a basis for the policy and investment decisions facing the Mayor of London and the GLA group. The unit is funded by the Greater London Authority, Transport for London and the London Development Agency.

Contents

Introduction

The distribution of employment across London by borough is in principle influenced by a myriad of different factors. Research has been undertaken for GLA Economics into the influence of three principal factors:

- Historic trends – reflecting the past revealed preference of employers for locating jobs in particular boroughs. This research was undertaken by Volterra Consulting (henceforth, Volterra).
- Site capacity – reflecting the expected availability of business sites for jobs to locate in across London. This research was undertaken by Roger Tym and Partners (henceforth, RTP).
- Transport Accessibility – reflecting the changes in accessibility across London expected to flow from various improvements in London's transport infrastructure. This research was undertaken by Colin Buchanan and Partners (henceforth, CBP).

This working paper together with the associated technical papers set out the detail on how these three pieces of research were undertaken and the methodology for combining them into a single unified set of borough level employment projections. In addition, the impact of errors in the original employment data supplied to us by Experian Business Strategies (EBS) is assessed and the adjustments made to the projections to counter the impact of these errors are set out. The full details of our analysis of the original and corrected EBS employment data are also set out in an associated technical paper. This working paper supplements GLA Economics Current Issues Note No 9 published in May 2006, which set out the results of this exercise.

It should be emphasised that when we are talking about employment in this paper we are referring to workplace employment, that is the number of jobs in workplaces in the individual boroughs regardless of whether they are filled by the residents of those boroughs, other Londoners or by commuters from outside London. The figures presented **do not** measure the number of employed residents in these boroughs.

Trend based employment projections

This Volterra research built on their London wide sectoral trend based projections as published in GLA Economics Working Paper 14[1]. For each borough, Volterra identified employment sectors which have historically accounted for ten per cent or more of that borough's total employment. They then also constructed a residual series covering the remaining sectors in the borough. Clearly the actual coverage of this residual series varies between different boroughs depending on their industrial structures. The trends in these sectors and the residual series in each individual borough were then analysed and projected forward. This generated a series for employment by borough for the period 2004-2026 based on actual data up to 2003. In order to ensure consistency with Volterra's London wide projections, the sum of the 33 boroughs was constrained so that it equalled the projection for London wide total employment as given in GLA Economics Working Paper 14. The full details of this research are set out in Employment Projections Technical Paper 1[2].

The results of this research for 2006 and five year intervals up to 2026, together with the actual data for 2001-2003, are shown in Table 1. The results in Table 1 are based on those set out in Employment Projections Technical Paper 1 but adjusted to take account of the error in the original employment data from EBS as discussed in Employment Projections Technical Paper 4[3].

[1] GLA Economics Working paper 14: Working Future – Employment projections for London by sector
[2] Employment Projections Technical Paper 1, "Trend Based Employment Forecasts for London by Borough", by Volterra Consulting Ltd
[3] Employment Projections Technical Paper 4, "Data issues: How data errors and corrections from Experian Business Strategies are dealt with in the GLA's employment triangulation process" by GLA Economics

Table 1: Trend based borough employment projections

	Actual '000s			Projection '000s				
Borough	**2001**	**2002**	**2003**	**2006**	**2011**	**2016**	**2021**	**2026**
Barking & Dagenham	55	51	53	53	53	52	51	50
Barnet	148	142	141	143	149	157	164	171
Bexley	80	79	80	79	79	80	81	82
Brent	118	114	113	115	116	116	116	116
Bromley	119	118	123	124	126	129	131	133
Camden	285	281	277	284	300	318	335	353
City	331	317	316	325	343	364	383	402
Croydon	158	154	154	155	154	150	148	144
Ealing	130	129	131	134	135	136	136	137
Enfield	115	113	115	116	116	116	116	116
Greenwich	74	72	76	79	82	84	86	88
Hackney	95	94	95	96	98	100	101	103
Hammersmith & Fulham	123	122	124	133	147	162	176	190
Haringey	71	71	74	75	76	75	74	73
Harrow	85	84	87	88	91	94	96	99
Havering	91	91	93	95	98	101	104	107
Hillingdon	191	184	187	191	199	210	220	230
Hounslow	146	142	137	139	142	146	149	153
Islington	170	168	173	184	202	219	235	252
Kensington & Chelsea	145	141	136	140	154	172	189	207
Kingston	83	79	78	79	82	85	89	92
Lambeth	129	129	138	142	149	155	161	168
Lewisham	74	74	78	82	85	88	90	92
Merton	82	81	80	82	84	86	88	90
Newham	79	77	76	78	79	79	80	80
Redbridge	88	87	90	93	96	99	101	104
Richmond	86	84	85	86	89	92	95	98
Southwark	175	167	164	167	174	181	188	196
Sutton	75	74	76	78	81	85	88	91
Tower Hamlets	153	155	161	177	208	243	274	307
Waltham Forest	68	66	67	66	65	64	63	62
Wandsworth	127	127	132	138	148	158	166	175
Westminster	597	583	572	588	615	642	666	692
London	**4547**	**4449**	**4481**	**4603**	**4816**	**5039**	**5240**	**5450**

Source: Volterra Consulting

Site capacity based employment projections

The research carried out by RTP supplied the GLA with projections for the additional amount of site capacity that was expected to come on stream in boroughs before 2006, between 2006 and 2011, between 2011 and 2016, and between 2016 and 2021. The full details of RTP's research is given in Employment Projections Technical Paper 2[4]. These were given in terms of the additional employment that could potentially be accommodated within these new business sites. These employment capacity by borough figures were broken down into office, industrial and rest of the economy (e.g. retail, hotels and leisure). The method below uses RTP's figures excluding those for industrial employment capacity. Overall industrial employment in London is expected to keep declining into the future. This will lead to a release of surplus industrial land to other uses. Our expectation, given London's acute need for additional housing, is that the vast majority of this land will be used for housing rather than other forms of employment.

These employment capacity figures were translated into employment projections for 2006, 2011, 2016, 2021 and 2026[5] for London's 33 boroughs using a method similar to that which RTP has previously used to produce site capacity based employment projections. The algebra of this approach is as follows:

For the initial period to 2006:

$$\Delta ce_{i,\,2006} = (\Delta c_{i,\,2006}) / (\Sigma \Delta c_{i,\,2006}) * \Delta E_{L\ 2006}$$

For subsequent periods:

$$\Delta ce_{i,\,t} = (\Delta c_{i,\,t} + (\Delta c_{i,\,t-5} - \Delta ce_{i,\,t-5})) / (\Sigma \Delta c_{i\,t} + \Sigma(\Delta c_{i,\,t-5} - \Delta ce_{i,\,t-5})) * \Delta E_{L\ t}$$

where:

$\Delta ce_{i,\,t}$ is the projected site capacity based change in employment in borough i in the five years up to time t (except for 2006 where the interval is three years from the last actual data point of 2003).

$\Delta c_{i,\,t}$ is RTP's employment capacity projections for borough i in the five years up to time t (except for 2006 where the interval is three years from the last actual data point of 2003).

$\Sigma \Delta c_{i,\,t}$ is the sum of these borough employment capacity projections for all of London.

$\Delta E_{L\ t}$ is the projected change in employment in the whole of London in the five years up to time t (except for 2006 where the interval is three years from the last actual data point of 2003) from Volterra's London wide sectoral projections as set out in GLA Economics Working Paper 14.

$\Delta c_{i,\,t-5} - \Delta ce_{i,\,t-5}$ is the spare employment capacity in borough i left unfilled from the previous five year period.

$\Sigma(\Delta c_{i,\,t-5} - \Delta ce_{i,\,t-5})$ is the sum of this spare capacity for all of London.

This method allocates job increases to boroughs in accordance with their respective share of the overall new employment capacity coming on stream in the whole of London. Box 1 provides an illustration of this method using the City of London as an example.

[4] Employment Projections Technical Paper 2, "London Employment Sites Database, Technical Note and Results" by Roger Tym and Partners.

[5] The RTP figures extended only as far as 2021. For the period 2021-26 the distribution of the amount of available employment capacity was assumed to be the same as for the preceding 2016-21 period.

Box 1: Site capacity based employment projections using the City of London as an example

Step 1. Change in employment to 2006

RTP's updated London Employment Sites Database (LESD) suggests that new non-industrial employment capacity amounting to around 67,000 jobs will come on stream in the City by 2006. This equates to 14.8 per cent of all new non-industrial employment capacity coming on stream in London by 2006. The latest Volterra trend projections for London show an increase of around 122,000 in employment between the last actual (2003) and 2006. Accordingly, the City is allocated 14.8 per cent of this, or around 18,000 jobs. This leaves around 49,000 of unused capacity (= 67,000 – 18,000) to be carried forward to the next period.

Step 2. Change in employment to 2011

This 49,000 is added onto the 46,000 jobs worth of new non-industrial employment capacity that the new LESD has coming on stream in the City between 2006 and 2011. After similar calculations are performed for the other 32 boroughs, this 95,000 of new employment capacity represents 21.5 per cent of all London non-industrial employment capacity. The Volterra London wide projections give an increase in employment between 2006 and 2011 of around 213,000. Accordingly, the City is allocated 21.5 per cent of this, or around 46,000 jobs. This leaves around 49,000 of unused capacity (=95,000 – 46,000) to be carried forward to the next period.

Step 3. Change in employment to 2016

This 49,000 is added onto the around 700 of new non-industrial employment capacity that the new LESD has coming on stream in the City between 2011 and 2016. After similar calculations are performed for the other 32 boroughs, this 50,000 of new employment capacity represents 12.2 per cent of all London non-industrial employment capacity. The Volterra London wide projections give an increase in employment between 2011 and 2016 of around 222,500. Accordingly, the City is allocated 12.2 per cent of this, or 27,000 jobs. This leaves 23,000 of unused capacity (= 50,000 – 27000) to be carried forward to the next period.

Step 4. Change in employment to 2021

This 23,000 is added onto the around 900 of new non-industrial employment capacity that the new LESD has coming on stream in the City between 2016 and 2021. After similar calculations are performed for the other 32 boroughs, this 24,000 of new employment capacity represents 7.7 per cent of all London employment capacity. The Volterra London wide projections give an increase in employment between 2016 and 2021 of around 202,000. Accordingly, the City is allocated 7.7 per cent of this, or 15,500 jobs. This leaves around 8,000 of unused capacity (=23,000 – 15,500) at 2021.

Step 5. Change in employment to 2026

The new LESD only has figures up to 2021. In order to generate a projection for the last five year period we simply assume that the City takes the same percentage of the total London wide increase in jobs, 7.7 per cent, that it did for the preceding 2016-2021 period. The Volterra London wide projections give an increase in employment between 2021 and 2026 of around 210,000. Accordingly, the City is allocated 7.7 per cent of this, or around 16,000 jobs.

Step 6. From changes to levels

The above steps give the following changes to employment in the City

City	Change in Employment
2003-6	18,000
2006-11	46,000
2011-16	27,000
2016-21	15,500
2021-26	16,000

In 2003, the level of employment in the City was 316,000 (to the nearest thousand). Combining this with the figures in the above table gives the following projections for the level of employment in the City. All figures to the nearest thousand.

City	Level of Employment (000s)
2003	316
2006	334
2011	380
2016	407
2021	423
2026	439

The results of applying this method for 2006 and five year intervals up to 2026, together with the actual data for 2001-2003, are shown in Table 2.

Table 2: Site capacity based borough employment projections

	Actual '000s			Projection '000s				
Borough	**2001**	**2002**	**2003**	**2006**	**2011**	**2016**	**2021**	**2026**
Barking & Dagenham	55	51	53	55	60	68	73	78
Barnet	148	142	141	142	143	152	161	171
Bexley	80	79	80	81	84	89	92	96
Brent	118	114	113	115	121	125	128	132
Bromley	119	118	123	124	125	126	129	132
Camden	285	281	277	280	286	297	305	314
City	331	317	316	334	380	407	423	439
Croydon	158	154	154	156	163	171	177	183
Ealing	130	129	131	133	135	136	146	156
Enfield	115	113	115	117	120	123	130	137
Greenwich	74	72	76	83	96	104	110	116
Hackney	95	94	95	98	102	106	110	114
Hammersmith & Fulham	123	122	124	129	138	144	147	151
Haringey	71	71	74	74	75	90	99	108
Harrow	85	84	87	87	88	89	92	94
Havering	91	91	93	95	98	101	102	104
Hillingdon	191	184	187	190	197	202	205	209
Hounslow	146	142	137	141	147	156	164	172
Islington	170	168	173	177	182	187	193	198
Kensington & Chelsea	145	141	136	137	139	140	141	141
Kingston	83	79	78	78	78	81	83	85
Lambeth	129	129	138	139	141	144	146	148
Lewisham	74	74	78	79	80	82	87	91
Merton	82	81	80	81	82	84	88	92
Newham	79	77	76	79	83	99	122	147
Redbridge	88	87	90	90	91	92	92	93
Richmond	86	84	85	86	88	90	91	92
Southwark	175	167	164	172	185	200	216	233
Sutton	75	74	76	76	77	78	79	80
Tower Hamlets	153	155	161	183	214	240	259	279
Waltham Forest	68	66	67	68	70	71	72	73
Wandsworth	127	127	132	137	144	149	153	156
Westminster	597	583	572	585	605	617	626	634
London	**4547**	**4449**	**4481**	**4603**	**4816**	**5039**	**5240**	**5450**

Source: GLA Economics calculations based on data from Roger Tym and Partners

Transport accessibility based employment projections

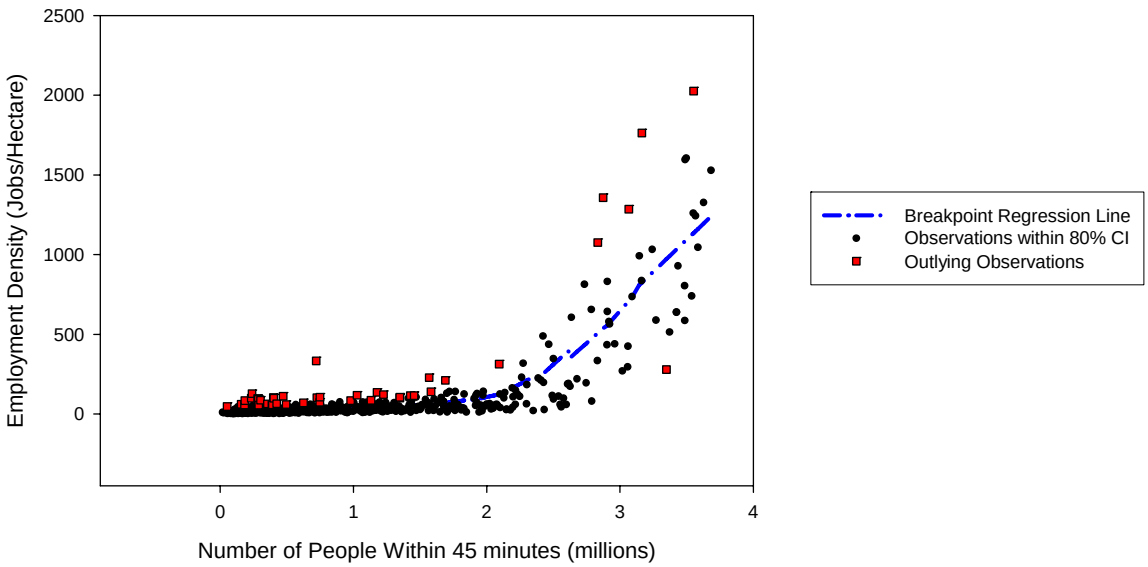
Colin Buchanan and Partners (CBP) were commissioned by GLA Economics to investigate how expected employment growth might be distributed according to future changes in accessibility. The full details of this research are set out in Employment Projections Technical Paper 3[6]

Figure 1 shows the relationship between accessibility and employment density by ward for the whole of London. At low levels of accessibility employment density increases slowly with increases in accessibility until a certain level of accessibility is reached thereafter the rate of increase in employment density rises very substantially.

Assumed future improvements in London's transport infrastructure in line with the Mayor's Transport Strategy would improve the accessibility of many of London's wards. These changes in accessibility are transformed into potential changes in employment density. This was done using the curve in Figure 1, which represents the average relationship between employment density and accessibility. For wards in central London the level of accessibility is already high and, given the shape of the curve in Figure 1, small improvements in accessibility would lead to large increases in employment density. In reality, it is probably unlikely that employment in these areas can rise by that much. So the changes in employment were capped in areas that have very high levels of accessibility.

Individual wards lie either above or below the line showing the average relationship between employment density and accessibility in Figure 1. The method used maintained the position of each ward relative to this accessibility curve. Areas that had a higher employment density than suggested by their accessibility were assumed to maintain that advantage in the future and those that have lower existing employment density are assumed to maintain that disadvantage in the future. This reflects the fact that employment density in a ward will depend not just on the level of accessibility, but also on a myriad of other factors. The approach used implicitly assumes that these factors continue to keep an individual ward in its current position relative to the accessibility curve shown in Figure 1.

Figure 1: Employment Density against Accessibility



[6] Employment Projections Technical Paper 3, "Employment Growth and Distribution", by Colin Buchanan and Partners

CBP look at how a fixed amount of employment growth of 541,000 jobs[7] between 2002 and 2016 might be distributed across London according to the accessibility changes derived from each of six transport scenarios.

The CBP study provided projections of the change in employment by 2016 based on the following improvements in London's transport infrastructure:

- East London Line Extension
- Docklands Light Railway Extension
- Thameslink 2000
- Crossrail
- PPP improvements to London Underground

These were converted into projected employment levels for the 33 London boroughs at 2006, 2011, 2016, 2021 and 2026 using assumptions about when various projects would come on stream as set out in Table 3.

Table 3: Assumed timings for infrastructure projects

Project	Projections Assumption
East London Line Extension	Half capacity in place by 2010 Other half by 2016
Crossrail	Line up and running by 2016
Thameslink 2000	In place by 2011
Underground PPP	Improvements gradually phasing in between now and 2016.

Table 3 is based on information obtained from the TfL website supplemented by advice from the GLA Transport team.

We also had to constrain CBP's numbers to an increase of 559,000 between 2003 and 2016 in line with our latest projections for all of London as set out in GLA Economics Working Paper 14, rather than 541,000 between 2002 and 2016 which was our London control total when CBP carried out their research. The projections for 2021 and 2026 are based on the distribution of accessibility across London being the same as at 2016.

Table 4 shows the employment projections based on changes in accessibility.

[7] Job growth is consistent with that projected in the GLA Economics Working Paper 11: Working London, Employment projections for London by sector, 2004

Table 4: Accessibility based employment projections

	Actual '000s			Projections '000s				
Borough	**2001**	**2002**	**2003**	**2006**	**2011**	**2016**	**2021**	**2026**
Barking and Dagenham	55	51	53	55	56	58	59	61
Barnet	148	142	141	143	150	151	155	159
Bexley	80	79	80	80	80	85	86	88
Brent	118	114	113	116	119	122	125	128
Bromley	119	118	123	123	125	125	126	127
Camden	285	281	277	291	308	331	350	370
City of London	331	317	316	317	323	325	328	332
Croydon	158	154	154	154	156	156	156	157
Ealing	130	129	131	134	137	143	147	151
Enfield	115	113	115	116	117	117	118	119
Greenwich	74	72	76	78	81	83	85	87
Hackney	95	94	95	97	102	108	112	117
Hammersmith and Fulham	123	122	124	130	138	146	153	162
Haringey	71	71	74	76	80	83	86	89
Harrow	85	84	87	90	92	94	97	99
Havering	91	91	93	94	94	97	99	100
Hillingdon	191	184	187	188	194	198	203	207
Hounslow	146	142	137	141	145	149	153	157
Islington	170	168	173	182	195	204	216	227
Kensington and Chelsea	145	141	136	145	159	171	184	197
Kingston upon Thames	83	79	78	78	78	78	79	79
Lambeth	129	129	138	146	173	180	195	211
Lewisham	74	74	78	80	86	87	91	94
Merton	82	81	80	81	84	84	86	87
Newham	79	77	76	79	85	104	115	125
Redbridge	88	87	90	91	91	102	107	111
Richmond upon Thames	86	84	85	86	86	87	88	88
Southwark	175	167	164	177	200	218	238	259
Sutton	75	74	76	76	76	76	77	77
Tower Hamlets	153	155	161	172	194	236	263	291
Waltham Forest	68	66	67	68	69	71	72	73
Wandsworth	127	127	132	136	142	146	151	157
Westminster	597	583	572	584	600	623	641	660
Total	**4547**	**4449**	**4481**	**4603**	**4816**	**5039**	**5240**	**5450**

Source: GLA Economics calculations based on data from Colin Buchanan and Partners

Putting the three projections together: Triangulation

In order to illustrate the differences that result from projecting borough level employment on the three bases set out so far, Figures 2a and 2b show the projected number of jobs in London's 33 boroughs at 2016 and 2026 according to the three methods. Figures 2a and 2b reveal that for some boroughs the three methods produce rather different numbers at 2016. There are six boroughs for which the highest of the three projections exceeds the lowest by more than 30,000 at 2016; City of London (82,000), Southwark (37,000), Lambeth (36,000), Camden (34,000), Kensington and Chelsea and Islington (both at 32,000).

The largest percentage differences at 2016 are for the following boroughs where there is at least a 20 percent difference between the highest and lowest projections; Newham (32%), Barking and Dagenham (31%), Greenwich, City of London and Lambeth (each at 25%), Kensington and Chelsea (23%), Southwark and Haringey (both at 20%).

Figure 2a: Projected jobs at 2016: Three approaches (Barking and Dagenham to Hillingdon)

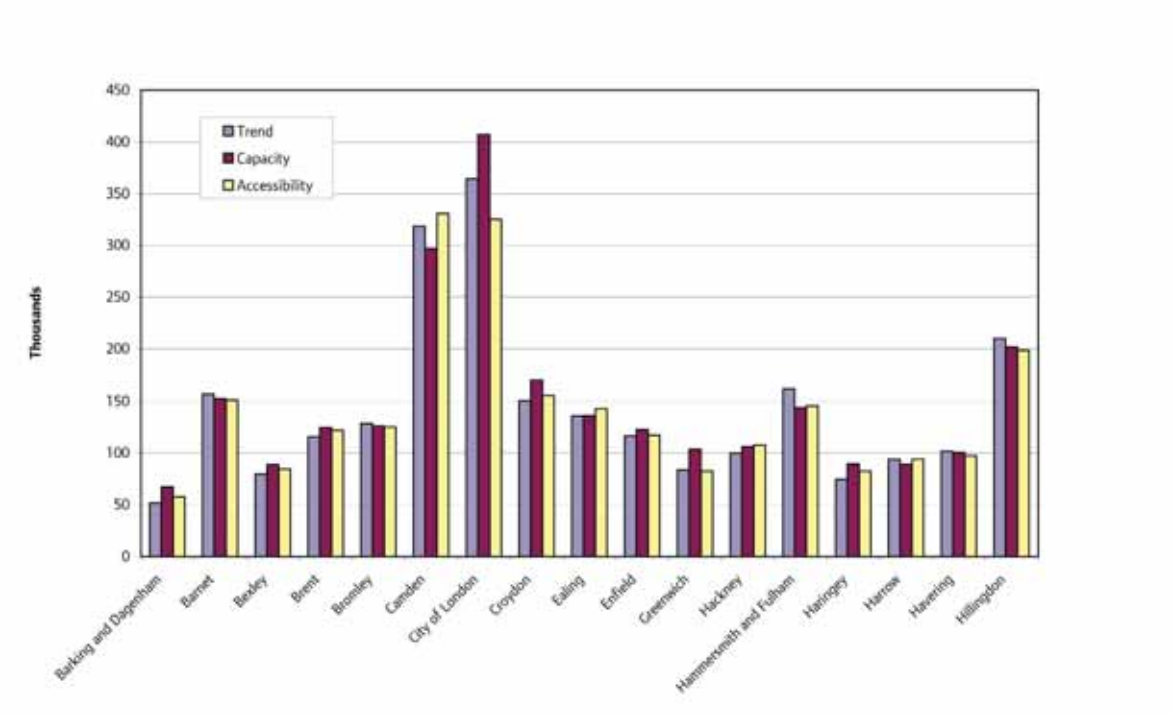
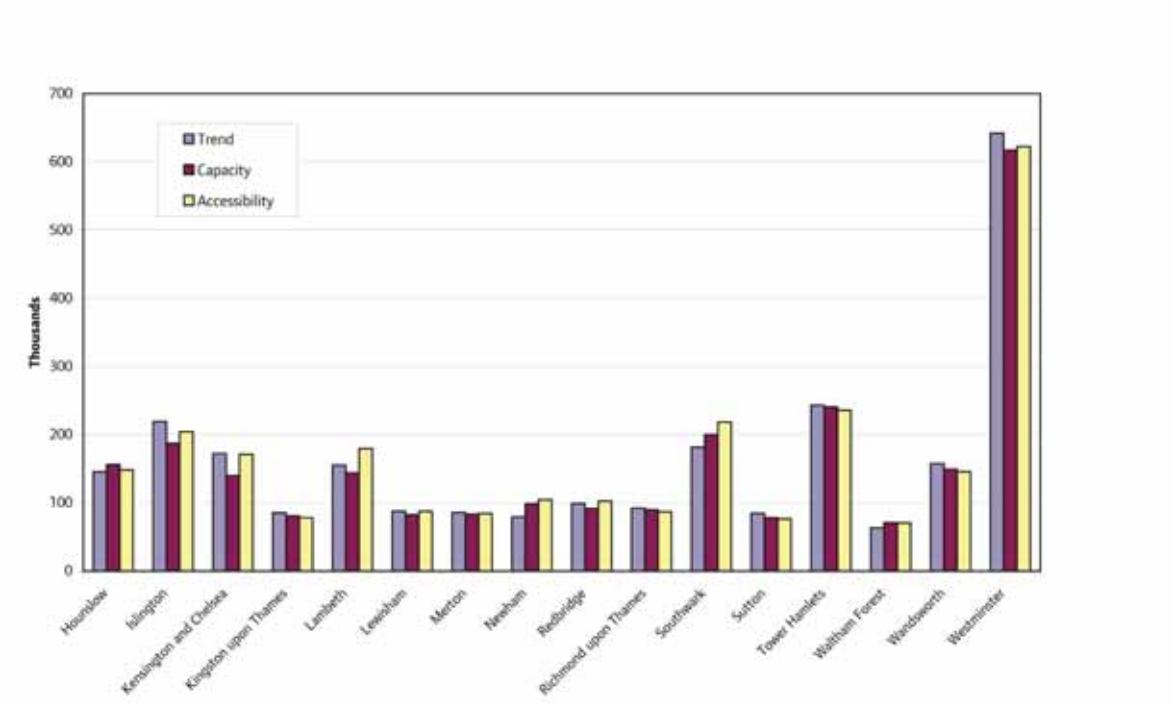


Figure 2b: Projected jobs at 2016: Three approaches (Hounslow to Westminster)
n.b. Note different scale between Figures 2a and 2b



Similarly Figures 3a and 3b show that there are also some considerable differences at 2026 for some boroughs. Eight boroughs had a range of more than 50,000 from the lowest of the three projections to the highest. The City of London had the largest range at 107,000, followed by Newham (67,000), Kensington and Chelsea (65,000), Southwark (63,000), Lambeth (62,000), Westminster and Camden (both at 57,000) and Islington (54,000).

Figure 3a: Projected jobs at 2026: Three approaches (Barking and Dagenham to Hillingdon)

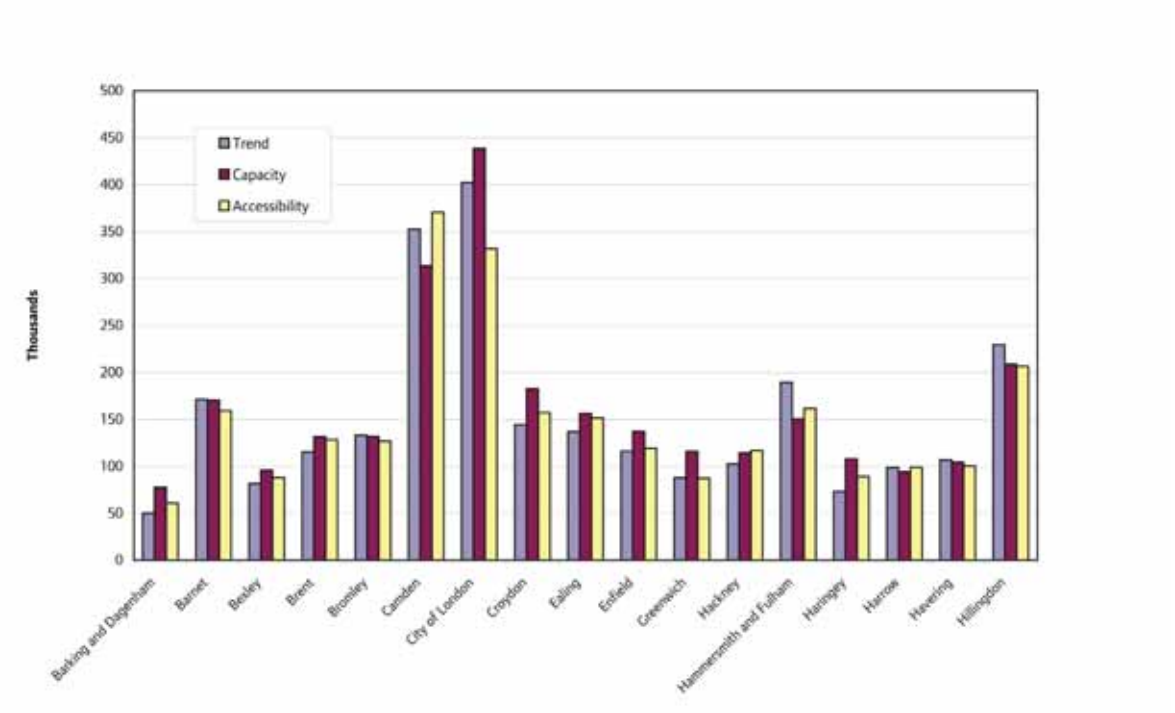
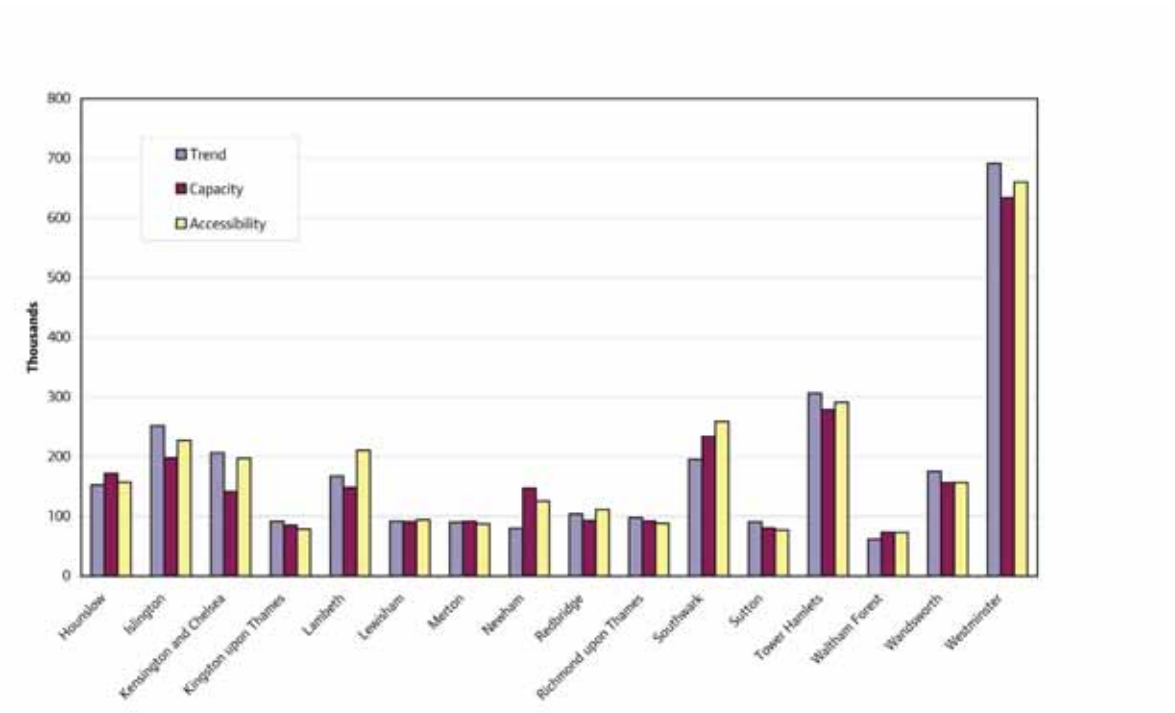


Figure 3b: Projected jobs at 2026: Three approaches (Hounslow to Westminster)
n.b. Note different scale between Figures 3a and 3b



These large differences for some boroughs emphasises the need for some rules to combine the three different projections into a single set of projections that can be used for strategic planning purposes.

Combining the trend, site capacity and accessibility based projections

Relatively good transport accessibility and, or a plentiful supply of business space can be seen as factors that will attract employers to locate jobs in particular boroughs. Similarly relatively poor transport accessibility and, or a relative scarcity of business space can be seen as factors that will repel employers from locating jobs in a particular place.

Improved transport accessibility widens the pool of labour from which an employer can draw at a given location. This should enable the employer to hire labour at lower cost and, or achieve a better match of workers to the jobs on offer raising productivity levels relative to what would be the case with lower levels of accessibility and so smaller pools of labour to recruit from. A ready availability of sites over and above the trend projections should lead to some adjustment in rent levels compared to those in other parts of London where sites are less readily available.

For some boroughs expected future improvements in accessibility and additions to the availability of business sites suggest that they will experience increases in employment greater than they have seen in the past. An example is Newham. Newham experienced almost continually falling employment in the 25 years to 1995. Between 1995 and 2001 employment grew before falling back slightly between 2001 and 2003 as the London economy experienced a slowdown. Overall in 2003, the level of employment in Newham was below the levels seen in the early 1980s and especially the early 1970s. Between now and 2026 Newham looks set to become a much more attractive location for business as a result of large projected increases in both site capacity and improved accessibility. Hence it seems reasonable to expect that employment in Newham will grow rather faster than as projected in the trend based projections which show employment increasing from just 76,000 to 80,000 between 2003 and 2026.

Equally there are other boroughs where historically employment has grown quite fast, but where the projected increases in site capacity and, or accessibility may make them a relatively less attractive business location than they have been in the past. Hence employment in these boroughs may reasonably be expected to grow at slower pace than the trend based projections. A potential example is Kensington and Chelsea. Employment in Kensington and Chelsea has grown rapidly in the last 20 years from around 100,000 to around 140,000. The trend projections have employment continuing to increase rapidly, reaching 207,000 by 2026. The accessibility based projections show a similar increase to 197,000 by 2026. However the site capacity based projections show an increase to just 141,000 by 2026 as little additional business space is expected to come on stream in the borough in the next 20 years. Hence it appears that future employment growth in Kensington and Chelsea may be constrained by a relative shortage of business sites leading presumably to a rise in rents in the borough relative to other parts of London reducing the attractiveness of the borough as a business location. This raises the issue of how we might expect businesses and individuals to respond if the location of jobs in a particular borough runs up against either a relative scarcity of business sites or potentially insufficient transport accessibility.

Exceeding the site capacity based projections

Site capacity based projections rest on assumptions about the number of buildings that are or are expected to be on particular sites (plot ratios) plus assumptions about the average amount of floor space per employee. With regard to "plot ratios", SDS Technical Report 21[8] notes that plot ratios can vary widely depending on the number of floors a building on a particular sized plot has and other factors such as the extent of landscaping and car parking facilities. However it seems plausible that plot ratios can be varied much more easily for new developments than for the existing stock of offices, factories etc. Hence the focus here on floorspace-employment ratios.

A priori it seems plausible that employers could respond to a relative scarcity of sites in a location that they would otherwise favour to locate in by squeezing in more workers into a given floorspace. SDS Technical Report 21 states that average floorspace per worker figures "conceal a significant variation in actual figures". This report also indicates that the adoption of new working practices (such as hot desking, home working) reduces the amount of office space per worker required by between 9 per cent for Administration Centres to 16 per cent for Sales Offices. Other factors that were found to be associated with variations in employment density included firm size – employment density rising with size; the length of time a company had occupied a particular establishment – density falling with longer occupation times; and tenure with leasehold properties being more densely occupied than owner occupied offices.

The report also details floorspace per worker figures for both offices and industrial use for all London's boroughs. There is a wide degree of variation in these figures across boroughs. However the extreme ends of the distributions are driven by special factors. If we instead focus on the middle third of the distribution then we find that office floorspace per worker varies from 13m^2 to 16m^2 – a difference of around 20 per cent. The equivalent variation in industrial floorspace per worker is even greater from 40m^2 to just under 60m^2 a difference of more than 30 per cent.

More recently RTP have undertaken research on the business space for the LDA. Their draft report[9] indicated wide variation in employment densities as shown in Table 5. The figures in brackets show the percentage difference between the higher or lower quartile and the median. The extent of variation in employment densities reported by RTP is affected by some premises being seriously under occupied.

Table 5: Distribution of employment densities

m^2 per worker	Lower Quartile	Median	Higher Quartile
Office	10.7 (-37%)	17.0	26.3 (55%)
Factory	23.7 (-46%)	43.7	70.1 (60%)
Garage	27 (-49%)	52.4	101.0 (93%)
Warehousing	23.6 (-45%)	43.2	85.3 (97%)

Source: RTP, GLA Economics calculations

[8] "Demand and Supply of Business Space in London", SDS Technical Report 21, August 2002 report produced by Roger Tym and Partners.
[9] "The Use of Business Space in London", Draft Report November 2005 by Roger Tym and Partners for the London Development Agency.

Given this evidence it would not be unreasonable to assume that the site capacity based projections could potentially be exceeded by up to 10 percent if the trend based or the accessibility based employment projections exceed the site capacity based one. Indeed this is a conservative assumption given the evidence reported and one could easily argue for a greater degree of variation.

Going beyond the transport accessibility projections

The measure of accessibility used by CBP is the population within 45 minutes travelling time of the destination. This does not take account of the issue of capacity and overcrowding. Other work by CBP suggests that for areas of central London it is capacity constraints that are likely to restrict future employment growth rather than accessibility.

In addition, the 45 minute cut off point was chosen by CBP because this is the measure of accessibility that in the past has best correlated with employment densities across London. However this cut off point only captures the average relationship. Some individuals already commute longer than 45 minutes into work and Table 6 shows that people are willing to commute for longer to jobs in central London

Table 6: Usual travel to work time by location of employment

	Central London	Rest of Inner London	Outer London	All London
10 mins or less	4.3	11.6	21.3	13.2
11 to 20 mins	6.2	19	26.2	17.7
21 to 30 mins	11.7	18.4	20.2	16.9
31 to 40 mins	11.5	8	6.9	8.7
41 to 50 mins	16.4	13.4	8	12.1
51 to 60 mins	23.7	15.9	9.1	15.7
More than 60 mins	26.3	13.7	8.5	15.7
Average (mins)	56	42	32	42

Source: Labour Force Survey, Autumn 2003

Figure 4. Average travel times to workplace location by borough

Source: London Area Transport Survey

More detailed information on average travel times to workplace location by borough is available from London Area Transport Survey. This shows shorter travel times relative to that in Table 6 because it only covers trips starting inside the M25. The data is shown in Figure 4. The picture that emerges is consistent with that shown in Table 6. The longest journey times are to the central London boroughs of the City and Westminster, and inner London boroughs tend to have longer journey times than outer London boroughs.

On the basis of this data we allow for individuals' willingness to travel longer to central London by allowing the employment projections to exceed the accessibility based projections by 20 per cent for Westminster and the City as a matter of course.

If accessibility is the "constraint" then we increase the accessibility based employment projections by 10 per cent for Camden, Islington, Kensington and Chelsea, Tower Hamlets, Hammersmith and Fulham, Southwark and Lambeth and then compare with the other employment projections for these boroughs. These are also boroughs which as Figure 4 above shows also display significantly longer travel times to jobs located in them, albeit to a lesser extent than the City and Westminster.

Summary of "Rules" for Projections

The above rationale leads to the following rules for projecting employment. These are summarised in Table 7.

Table 7: Rules for projecting employment

Ordering of projections	Projection Rule	Comments
If Trend > Capacity	At Trend projection if Trend < Capacity + 10% for all boroughs. At Capacity + 10% if trend is above this enhanced level of capacity	The trend projection is feasible if employers have scope to squeeze in extra workers. If not then the capacity constrains employment after allowing for such squeezing in.
If Trend > Accessibility	To Accessibility projection for most boroughs. To Trend if Trend < Accessibility + 10% for Camden, Islington, Kensington and Chelsea, Tower Hamlets, Hammersmith and Fulham, Southwark, and Lambeth. To Accessibility +10% for Camden, Islington, Kensington and Chelsea, Tower Hamlets, Hammersmith and Fulham, Southwark, and Lambeth, if Trend > Accessibility +10% for these boroughs.	The trend projection for certain inner London boroughs is feasible if workers are willing to travel for longer into them. Otherwise the accessibility based projection constrains employment. For certain inner London boroughs it constrains employment after allowing for some additional willingness to travel on the part of workers.
Trend > both Capacity and Accessibility.	Use rules above. Constrained to whichever is lowest.	Again trend achieved if feasible allowing for squeezing of workers / additional willingness to travel on the part of workers. Otherwise the lowest of the other two projections determines employment.
Trend < Capacity	To Capacity based projection	A plentiful supply of site capacity increases the attractiveness of the location so that historic performance can be bettered.
Trend < Accessibility	To Accessibility based projection.	Improved accessibility increases the attractiveness of the location so that historic performance can be bettered.
Trend < both Capacity and Accessibility.	To the lowest of the Capacity and Accessibility based projections.	The historic trend can be bettered, but only to the extent allowed by one of the two attraction factors.

The Results

The above rules were used to produce borough level employment figures for 2006, 2011, 2016, 2021 and 2026. The sum of the projected levels of employment in all 33 boroughs at each date was then compared with the projected London wide level of employment from the Volterra London wide trend projections. This sum was constrained to be equal to the Volterra London wide projection by pro-rataing the borough levels figures as necessary by an equal amount. The resulting figures are our finalised triangulated numbers as given in GLA Economics current issues note 9 – Borough Employment projections to 2026. They are set out in Table 8.

Table 8: Triangulated Employment Projections by Borough

	Actual '000s			Projections '000s				
Borough	**2001**	**2002**	**2003**	**2006**	**2011**	**2016**	**2021**	**2026**
Barking & Dagenham	55	51	53	54	55	56	59	61
Barnet	148	142	141	142	145	148	153	159
Bexley	80	79	80	79	78	83	85	88
Brent	118	114	113	115	114	119	123	128
Bromley	119	118	123	122	122	122	125	127
Camden	285	281	277	286	300	323	340	353
City	331	317	316	331	369	382	390	398
Croydon	158	154	154	153	152	152	155	157
Ealing	130	129	131	132	134	140	141	151
Enfield	115	113	115	115	114	115	117	119
Greenwich	74	72	76	77	78	81	84	87
Hackney	95	94	95	96	100	105	111	117
Hammersmith & Fulham	123	122	124	132	143	157	166	172
Haringey	71	71	74	76	74	81	85	89
Harrow	85	84	87	89	89	91	95	99
Havering	91	91	93	93	91	95	98	100
Hillingdon	191	184	187	187	189	194	200	207
Hounslow	146	142	137	140	140	145	151	157
Islington	170	168	173	180	196	208	216	224
Kensington & Chelsea	145	141	136	142	155	158	160	162
Kingston	83	79	78	77	76	77	78	79
Lambeth	129	129	138	145	158	162	166	167
Lewisham	74	74	78	79	84	85	90	94
Merton	82	81	80	80	82	82	85	87
Newham	79	77	76	79	83	101	113	125
Redbridge	88	87	90	90	89	93	95	96
Richmond	86	84	85	85	84	85	87	88
Southwark	175	167	164	176	187	202	220	240
Sutton	75	74	76	75	74	75	76	77
Tower Hamlets	153	155	161	186	203	240	271	306
Waltham Forest	68	66	67	67	65	67	69	71
Wandsworth	127	127	132	135	138	143	150	157
Westminster	597	583	572	588	656	672	689	706
Greater London	4547	4449	4481	4603	4816	5039	5240	5450

source: Greater London Authority

Future borough level employment projections

It is intended to update the GLA borough level employment projections on an annual basis using the most recently available data available for updating the trend projections. The accessibility and site capacity employment projections will be updated on a less frequent basis as both of these projections are based on developments with longer lead times.

The next release of the GLA borough level employment projections will be by February 2007.

Other formats and languages

For a large print, Braille, disc, sign language video or audio-tape version of this document, please contact us at the address below:

Public Liaison Unit
Greater London Authority
City Hall, The Queen's Walk
London SE1 2AA

Telephone 020 7983 4100
Minicom 020 7983 4458
www.london.gov.uk

You will need to supply your name, your postal address and state the format and title of the publication you require. If you would like a copy of this document in your language, please phone the number or contact us at the address above.

Chinese

如果需要您母語版本的此文件，
請致電以下號碼或與下列地址聯絡

Vietnamese

Nếu bạn muốn có văn bản tài liệu
này bằng ngôn ngữ của mình, hãy
liên hệ theo số điện thoại hoặc địa
chỉ dưới đây.

Greek

Αν θέλετε να αποκτήσετε αντίγραφο του παρόντος εγγράφου στη δική σας γλώσσα, παρακαλείστε να επικοινωνήσετε τηλεφωνικά στον αριθμό αυτό ή ταχυδρομικά στην παρακάτω διεύθυνση.

Turkish

Bu belgenin kendi dilinizde
hazırlanmış bir nüshasını
edinmek için, lütfen aşağıdaki
telefon numarasını arayınız

Punjabi

ਜੇ ਤੁਹਾਨੂੰ ਇਸ ਦਸਤਾਵੇਜ਼ ਦੀ ਕਾਪੀ ਤੁਹਾਡੀ ਆਪਣੀ ਭਾਸ਼ਾ ਵਿਚ ਚਾਹੀਦੀ ਹੈ, ਤਾਂ ਹੇਠ ਲਿਖੇ ਨੰਬਰ 'ਤੇ ਫ਼ੋਨ ਕਰੋ ਜਾਂ ਹੇਠ ਲਿਖੇ ਪਤੇ 'ਤੇ ਰਾਬਤਾ ਕਰੋ:

Hindi

यदि आप इस दस्तावेज की प्रति अपनी
भाषा में चाहते हैं, तो कृपया निम्नलिखित
नंबर पर फोन करें अथवा नीचे दिये गये
पते पर संपर्क करें

Bengali

আপনি যদি আপনার ভাষায় এই দলিলের প্রতিলিপি
(কপি) চান, তা হলে নীচের ফোন্ নম্বরে
বা ঠিকানায় অনুগ্রহ করে যোগাযোগ করুন।

Urdu

اگر آپ اِس دستاویز کی نقل اپنی زبان میں
چاھتے ھیں، تو براہ کرم نیچے دئے گئے نمبر
پر فون کریں یا دیئے گئے پتے پر رابطہ کریں

Arabic

إذا أردت نسخة من هذه الوثيقة بلغتك، يرجى
الاتصال برقم الهاتف أو مراسلة العنوان
أدناه

Gujarati

જો તમને આ દસ્તાવેજની નકલ તમારી ભાષામાં
જોઈતી હોય તો, કૃપા કરી આપેલ નંબર ઉપર
ફોન કરો અથવા નીચેના સરનામે સંપર્ક સાધો.