

TECHNICAL NOTE

Job Name: South Essex Strategic Growth Locations Study
Job No: 43910
Note No: 1
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Subject: **Trip Generation & Predicted Travel Behaviour**

1. Introduction

- 1.1. This Technical Note has been prepared by Peter Brett Associates LLP (PBA) to outline the methodology used to prepare the trip rates and trip generation assessment for the South Essex Growth Locations Study.
- 1.2. Trip Rates have been calculated as part of the wider South Essex study, to calculate the predicted number of trips per dwelling from each anticipated land use by all modes of travel.
- 1.3. The trip generation was calculated based on the expected number of dwellings located in each growth area. This technical note includes the following items:
 - Summary of Strategic Development Potential
 - Trip Rate Calculation / Site Selection
 - Trip Generation
 - Trip Distribution
 - Mode Share
 - Trip Generation by Mode
 - Car Journey Analysis
 - Train Journey Analysis
 - Summary.
- 1.4. For the purpose of this study all analysis has been undertaken on the basis that the Lower Thames Crossing (LTC) will be constructed. The difference in unit numbers between the 'with LTC' and 'without LTC' scenario is approximately 3,000 for all the urban extensions and 3,000 for new settlements, therefore if the LTC is decided to not be progressed then this analysis should be revisited.

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2. Summary of Strategic Development Potential

2.1. The number of units proposed for each New Settlement and Urban Extension is set out below.

Urban Extensions

2.2. The 16 areas across South Essex identified for growth through Urban Extension, as well as their strategic development potential both with and without the Lower Thames Crossing infrastructure implemented, are shown in Table 2-1.

Table 2.1: Strategic Development Potential of Urban Extensions

Urban Extension	Development Potential	
	With LTC	Without LTC
Aveley	2,909	2,909
Basildon	14,914	14,914
Billericay	20,929	20,929
Brentwood	27,304	27,304
Chafford Hundred	800	800
Corringham	7,833	7,833
Grays	9,048	12,206
Hadleigh	2,768	2,768
Hockley	10,747	10,747
Rayleigh	9,372	9,372
Rochford	11,948	11,948
Shenfield	2,810	2,810
South Benfleet	1,518	1,518
Southend	10,274	10,274
Stanford-le-Hope	9,392	9,392
Wickford	6,200	6,200
TOTAL	148,767	151,925

New Settlements

2.3. The 7 New Settlement sites identified in the study, as well as their strategic development potential both with and without Lower Thames Crossing infrastructure implemented, are shown in Table 2-2.

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Table 2.2: Strategic Development Potential of New Settlement Sites

New Settlement	Development Potential	
	With LTC	Without LTC
Fairglen	12,919	12,919
Southend North East	7,396	7,396
Crays Hill	10,520	10,520
Ingatestone	10,711	10,711
East Tilbury	7,645	9,444
South Ockendon	6,543	7,827
West Horndon	13,807	13,807
TOTAL	69,542	72,624

- 2.4. For each New Settlement site and Urban Extension, trip rates have been applied to the total number of units proposed for each development to generate a total 24-hour two-way person trip number, as described in the following section.

3. Trip Rate Calculation / Site Selection

- 3.1. Initially, comparable sites for which data could be obtained were chosen for the following site types:

- Urban Intensification – areas where there is potential for redevelopment such as urban centres, residential estates, vacant / derelict land, and non-conforming uses, rather than exploring established suburban developments. Also, areas where land availability is constrained and where urban environments have older development areas that are coming to the end of their lifespan, or will do in the next 30 years;
- Proximity to Rail Stations – development within 800m of an existing railway station; and
- Garden Villages – located away from urban areas.

- 3.2. Comparable sites were not restricted to those within South Essex but includes sites in areas with similar proximity and connectivity to London in some cases. **Table 3.1** outlines the comparable sites selected and the site type they were used for.

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Table 3.1 – Comparable Sites

Site Type	Site
Urban Intensification	Bridge Hospital Site, Witham
	Former Advanced Laundry, Ongar Road, Brentwood
	Highwood Hospital, Brentwood
	Land to the Rear of King's Chase, Brentwood
	Bypass Nurseries Site, Cowdray Avenue, Colchester
	Hythe Development, Maudlyn Road, Colchester
	St Mary Fields, Southway, Colchester
Proximity to Rail Stations	Land to the Rear of King's Chase, Brentwood
	Land North and South of Barn Hill, Wickford
	Land South of Mill Hill, Braintree
	Land Rear of Former Warley Hospital Site, Brentwood
	Heybridge Moat House Hotel, Roman Road, Heybridge
	Development South East of Colchester Town Station
Garden Village	Great Noley

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- 3.3. The methodology used to calculate trip rates for each selected site in **Table 3.1** is outlined below.
- 1) The calculation required a person trip rate per dwelling to be derived. Rather than using the 2011 census to obtain this data, which only provides commuter travel patterns at a high-level, the National Travel Survey (NTS) was used so as to obtain travel patterns for all ages, not just those travelling for work.
 - 2) Using the NTS, a trip rate per person was derived for each of the three age ranges (0-16, 17-64 and 65 and over) in the data set and for each journey purpose for each of the MSOAs where the selected sites in **Table 3.1** are located. This gave a person trip rate per person for each MSOA and an understanding of how many trips each person would make in the AM peak, PM peak and over a 24-hour period for each of the selected sites.
 - 3) The 2011 census was then interrogated to give a total number of people in each of the three age ranges (0-16, 17-64 and 65 and over) and a total number of households in each MSOA of the selected sites in Table 3.1. This gave a total number of people per age range, per household.
 - 4) By combining Steps 1, 2 & 3 above, that is to say, combining the trip rate per person with the number of people per age range, per household, gave a total two-way person trip rate per dwelling for each of the selected sites and, as an average of these trip rates, for each type of residential site in the AM peak, PM peak and over a 24-hour period.
 - 5) The 2011 census was then used to obtain a % mode share by distance for each type of residential site, as shown in Table 3-2.

Table 3-2: Multi-Modal and Total Person Trip Rates

Mode Share	Garden Village	Urban Intensification	Proximity to Rail Stations
Underground, Metro, Light Rail or Tram	0.0146	0.0540	0.0518
Train	0.7025	1.0968	1.3092
Bus, Minibus or Coach	0.1630	0.2836	0.2148
Taxi	0.0105	0.0283	0.0184
Motorcycle, Scooter or Moped	0.0418	0.0433	0.0428
Driving a Car or Van	5.2132	2.5402	2.8533
Passenger in a Car or Van	0.3721	0.2394	0.2471
Bicycle	0.0857	0.1717	0.1391
On Foot	0.4871	1.3453	1.0742
Other Method of Travel to Work	0.0105	0.0159	0.0125
TOTAL PERSON TRIP RATE	7.1010	5.8184	5.9630

- 3.4. These multi-modal trip rates were then applied to the proposed total number of units for each development site both with and without the Lower Thames Crossing in place to generate total two-way trip numbers over a 24-hour period.
- For all New Settlement sites, with the exception of West Horndon, 'Garden Village' trip rates were used.
 - For West Horndon, 'Proximity to Rail Stations' trip rates were used.

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- For all 16 Urban Extension areas, 'Urban Intensification' trip rates were used

4. Trip Generation

4.1. As stated above, the multi-modal trip rates were applied to the proposed total number of units for each proposed development site. The total number of person trips for each Urban Extension area and New Settlement site are shown in Tables 4.1 and 4.2 respectively, including the 24 hr trips and peak hour number of trips.

4.2. The peak hr number of trips were calculated using the following percentages of full day trips based on data obtained from NTS:

- Urban Extensions – 13%
- New Settlements – 14%

Table 4.1: Total Person Trips for Urban Extensions

Urban Extensions	Total 2-way Person Trips – 24Hr		Total AM Peak Hr (08:00-09:00) Trips	
	With LTC	Without LTC	With LTC	Without LTC
Aveley	Units: 2,909	Units: 2,909	Units: 2,909	Units: 2,909
	16,925	16,925	2,300	2,300
Basildon	Units: 14,914	Units: 14,914	Units: 14,914	Units: 14,914
	86,774	86,774	11,794	11,794
Billericay	Units: 20,929	Units: 20,929	Units: 20,929	Units: 20,929
	121,778	121,778	16,550	16,550
Brentwood	Units: 27,304	Units: 27,304	Units: 27,304	Units: 27,304
	158,864	158,864	21,591	21,591
Chafford Hundred	Units: 800	Units: 800	Units: 800	Units: 800
	4,655	4,655	633	633
Corryingham	Units: 7,833	Units: 7,833	Units: 7,833	Units: 7,833
	45,577	45,577	6,194	6,194
Grays	Units: 9,048	Units: 9,048	Units: 9,048	Units: 12,206
	52,642	52,642	7,155	9,652
Hadleigh	Units: 2,768	Units: 2,768	Units: 2,768	Units: 2,768
	16,107	16,107	2,189	2,189
Hockley	Units: 10,747	Units: 10,747	Units: 10,747	Units: 10,747
	62,528	62,528	8,498	8,498
Rayleigh	Units: 9,372	Units: 9,372	Units: 9,372	Units: 9,372
	54,531	54,531	7,411	7,411
Rochford	Units: 11,948	Units: 11,948	Units: 11,948	Units: 11,948
	69,521	69,521	9,448	9,448
Shenfield	Units: 2,810	Units: 2,810	Units: 2,810	Units: 2,810
	16,348	16,348	2,222	2,222

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Urban Extensions	Total 2-way Person Trips – 24Hr		Total AM Peak Hr (08:00-09:00) Trips	
	With LTC	Without LTC	With LTC	Without LTC
South Benfleet	<i>Units: 1,518</i>	<i>Units: 1,518</i>	<i>Units: 1,518</i>	<i>Units: 1,518</i>
	8,835	8,835	1,200	1,200
Southend	<i>Units: 10,274</i>	<i>Units: 10,274</i>	<i>Units: 10,274</i>	<i>Units: 10,274</i>
	59,778	59,778	8,124	8,124
Stanford-le-Hope	<i>Units: 9,392</i>	<i>Units: 9,392</i>	<i>Units: 9,392</i>	<i>Units: 9,392</i>
	54,648	54,648	7,427	7,427
Wickford	<i>Units: 6,200</i>	<i>Units: 6,200</i>	<i>Units: 6,200</i>	<i>Units: 6,200</i>
	36,072	36,072	4,903	4,903

Table 4.2: Total Person Trips for New Settlement Sites

New Settlement	Total 2-way Person Trips – 24Hr		Total Peak Hr Trips	
	With LTC	Without LTC	With LTC	Without LTC
Fairglen	<i>Units: 12,919</i>	<i>Units: 12,919</i>	<i>Units: 12,919</i>	<i>Units: 12,919</i>
	91,740	91,740	13,216	13,216
Southend North-East	<i>Units: 7,396</i>	<i>Units: 7,396</i>	<i>Units: 7,396</i>	<i>Units: 7,396</i>
	52,518	52,518	7,566	7,566
Crays Hill	<i>Units: 10,520</i>	<i>Units: 10,520</i>	<i>Units: 10,520</i>	<i>Units: 10,520</i>
	74,700	74,700	10,762	10,762
Ingatestone	<i>Units: 10,711</i>	<i>Units: 10,711</i>	<i>Units: 10,711</i>	<i>Units: 10,711</i>
	76,058	76,058	10,958	10,958
East Tilbury	<i>Units: 7,645</i>	<i>Units: 9,444</i>	<i>Units: 7,645</i>	<i>Units: 9,444</i>
	54,289	67,060	7,821	9,661
South Ockendon	<i>Units: 6,543</i>	<i>Units: 7,827</i>	<i>Units: 6,543</i>	<i>Units: 7,827</i>
	46,465	55,583	6,694	8,007
West Horndon	<i>Units: 13,807</i>	<i>Units: 13,807</i>	<i>Units: 13,807</i>	<i>Units: 13,807</i>
	82,331	82,331	11,205	11,205

5. Trip Distribution

5.1. To obtain data for journey destinations, the 2011 Census Journey to Work data was again interrogated to understand the distance to the destinations of trips for those living in the Middle Layer Super Output Areas (MSOAs) of the sites outlined in **Section 2**. The destinations were then categorised into:

- Less than one mile away;
- Between one and five miles away;

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- In Central London – defined by the London Government Act 1963’s definition of ‘Inner London Boroughs’ which included the following London Boroughs:
 - City of London;
 - London Borough of Camden
 - Royal Borough of Greenwich
 - London Borough of Hackney
 - London Borough of Hammersmith and Fulham
 - London Borough of Islington
 - Royal Borough of Kensington and Chelsea
 - London Borough of Lambeth
 - London Borough of Lewisham
 - London Borough of Southwark
 - London Borough of Tower Hamlets
 - London Borough of Wandsworth
 - City of Westminster.
- Anywhere else.

5.2. The percentage of those travelling to each destination category was obtained so that the total number of trips could be assigned to those destinations. A mode share to each destination category was then obtained for these categories.

6. Mode Share

- 6.1. Journey to Work data was obtained from the 2011 Census for each of the sites outlined in **Section 2**, to give a mode share for each of the sites. The total number of people travelling to work by the following modes was obtained to give an overall percentage mode share for each site:
- Underground, metro, light rail or tram;
 - Train;
 - Bus, minibus or coach;
 - Taxi;
 - Motorcycle, scooter or moped;
 - Driving a car or van;
 - Passenger in a car or van;
 - Bicycle;
 - On foot; and

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- Other method of travel to work. L
- 6.2. Data for 'working mainly from home' was removed from the dataset.
- 6.3. The results of the analysis showing the % of people travelling by different modes for each urban extension and new settlement are shown in **Table 6.1**.
- 6.4. Notably locations along the Greater Anglia Rail line, Billericay, Brentwood, Hockley, Rayleigh, Shenfield and Ingatestone have the highest % of people using the train.
- 6.5. The new settlement location in Northeast Southend showed the largest % of people walking to work, suggesting that in this area many people work locally.

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Table 6.1: Percentage Mode Share for each Location

	Underground, metro, light rail or tram	Train	Bus, minibus or coach	Taxi	Motorcycle, scooter or moped	Driving a car or van	Passenger in a car or van	Bicycle	On foot	Other
Urban extension areas – With LTC										
Aveley	2.70%	9.94%	5.59%	0.45%	1.49%	67.68%	6.43%	1.33%	4.16%	0.23%
Basildon	0.89%	25.66%	1.73%	0.57%	0.96%	59.88%	4.23%	1.24%	4.75%	0.10%
Billericay	0.72%	31.65%	2.06%	0.26%	0.43%	54.01%	3.40%	0.85%	6.58%	0.03%
Brentwood	1.64%	25.40%	3.54%	0.16%	0.66%	55.58%	4.64%	1.23%	6.95%	0.19%
Chafford Hundred	3.00%	23.42%	2.50%	0.30%	1.54%	60.24%	4.02%	0.94%	3.94%	0.11%
Corringham	0.45%	9.46%	4.33%	0.23%	1.06%	68.69%	5.43%	1.51%	8.67%	0.19%
Grays	1.09%	10.72%	4.32%	0.47%	0.89%	65.43%	7.41%	2.09%	7.16%	0.42%
Hadleigh	0.19%	14.16%	4.67%	0.19%	0.98%	65.51%	4.91%	2.15%	7.15%	0.09%
Hockley	0.23%	24.83%	1.89%	0.19%	0.61%	61.31%	4.05%	1.08%	5.63%	0.17%
Rayleigh	0.43%	24.06%	2.96%	0.19%	0.83%	61.29%	4.28%	1.02%	4.87%	0.05%
Rochford	0.39%	13.97%	3.46%	0.34%	0.83%	64.61%	5.50%	2.34%	8.33%	0.24%
Shenfield	1.64%	25.40%	3.54%	0.16%	0.66%	55.58%	4.64%	1.23%	6.95%	0.19%
South Benfleet	0.46%	24.61%	3.06%	0.34%	0.96%	58.97%	4.67%	0.96%	5.78%	0.19%
North Southend	0.51%	17.48%	5.82%	0.35%	0.67%	54.83%	5.91%	3.72%	10.24%	0.48%
Stanford-le-Hope	0.36%	17.58%	2.45%	0.27%	0.99%	68.07%	4.81%	1.05%	4.30%	0.12%

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	Underground, metro, light rail or tram	Train	Bus, minibus or coach	Taxi	Motorcycle, scooter or moped	Driving a car or van	Passenger in a car or van	Bicycle	On foot	Other
Wickford	0.56%	20.58%	2.78%	0.26%	0.65%	60.66%	4.30%	1.82%	8.29%	0.09%
New settlement areas – With LTC										
Fairglen	0.43%	24.06%	2.96%	0.19%	0.83%	61.29%	4.28%	1.02%	4.87%	0.05%
Southend North East	0.30%	11.90%	5.00%	0.40%	1.00%	52.40%	6.20%	3.80%	18.70%	0.20%
Crays Hill	1.00%	19.77%	2.21%	0.28%	0.80%	64.92%	4.41%	1.00%	5.37%	0.24%
Ingatestone	1.11%	29.10%	1.86%	0.05%	0.32%	55.36%	3.02%	0.97%	7.98%	0.23%
East Tilbury	0.73%	18.46%	0.94%	0.17%	0.66%	69.35%	4.30%	1.19%	4.02%	0.17%
South Ockendon	2.88%	18.26%	4.89%	0.46%	1.14%	61.14%	4.57%	1.28%	5.16%	0.22%
West Horndon	1.18%	14.24%	1.26%	0.27%	1.10%	72.93%	5.10%	0.63%	3.14%	0.16%

7. Trip Generation by Mode

- 7.1. The total trip generation by mode has been calculated by using the journey to work mode share data for each location and multiplying this by the trip generation figures for 17-64 year olds. The census 2011 mode share is for work purposes and is based on the geographic location (proximity to rail stations, surrounding amenities, other land uses, etc.), therefore it provides a good indication of travel behaviour for each area to be used in the assessment of modal trips. In addition, it was assumed that 0-16yr olds and 65yrs and older would not be travelling to work.
- 7.2. The total 24 hr trip generation for persons travelling to work for each area is shown on Table 7.1 and the total peak hour trip generation for persons travelling to work for each area is shown on Table 7.2.
- 7.3. The results indicate that the new developments will create a significant number of trips by all modes of travel, with significant pressure on the existing train and road networks. In order to cater for this demand significant infrastructure improvements will be required, together with a need to encourage travel by more sustainable modes of travel such as walking and cycling.

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Table 7.1: Total 24hr Trip Generation for Travel to Work by Mode

	Underground, metro, light rail or tram	Train	Bus, minibus or coach	Taxi	Motorcycle, scooter or moped	Driving a car or van	Passenger in a car or van	Bicycle	On foot	Other
Urban extension areas – With LTC										
Aveley	181	665	374	30	100	4,525	430	89	278	15
Basildon	305	8,795	593	195	329	20,524	1,450	425	1,628	34
Billericay	346	15,224	991	125	207	25,980	1,635	409	3,165	14
Brentwood	1,029	15,939	2,221	100	414	34,877	2,912	772	4,361	119
Chafford Hundred	55	431	46	6	28	1,108	74	17	72	2
Corringham	81	1,703	780	41	191	12,366	978	272	1,561	34
Grays	227	2,229	898	98	185	13,605	1,541	435	1,489	87
Hadleigh	12	901	297	12	62	4,168	312	137	455	6
Hockley	57	6,133	467	47	151	15,143	1,000	267	1,391	42
Rayleigh	93	5,182	638	41	179	13,202	922	220	1,049	11
Rochford	107	3,836	950	93	228	17,742	1,510	643	2,287	66
Shenfield	106	1,640	229	10	43	3,589	300	79	449	12
South Benfleet	16	859	107	12	34	2,058	163	34	202	7
North Southend	120	4,127	1,374	83	158	12,947	1,395	878	2,418	113
Stanford-le-Hope	78	3,795	529	58	214	14,694	1,038	227	928	26

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	Underground, metro, light rail or tram	Train	Bus, minibus or coach	Taxi	Motorcycle, scooter or moped	Driving a car or van	Passenger in a car or van	Bicycle	On foot	Other
Wickford	80	2,932	396	37	93	8,643	613	259	1,181	13
New settlement areas – With LTC										
Fairglen	156	8,719	1,073	69	301	22,210	1,551	370	1,765	18
Southend North East	62	2,469	1,037	83	207	10,870	1,286	788	3,879	41
Crays Hill	295	5,833	652	83	236	19,156	1,301	295	1,584	71
Ingatestone	333	8,742	559	15	96	16,632	907	291	2,397	69
East Tilbury	157	3,959	202	36	142	14,872	922	255	862	36
South Ockendon	529	3,351	897	84	209	11,221	839	235	947	40
West Horndon	384	4,631	410	88	358	23,717	1,659	205	1,021	52

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Table 7.2: Total Peak Hour Trip Generation for Travel to Work by Mode

	Underground, metro, light rail or tram	Train	Bus, minibus or coach	Taxi	Motorcycle, scooter or moped	Driving a car or van	Passenger in a car or van	Bicycle	On foot	Other
Urban extension areas – With LTC										
Aveley	23	86	49	4	13	588	56	12	36	2
Basildon	40	1,143	77	25	43	2,668	188	55	212	4
Billericay	45	1,979	129	16	27	3,377	213	53	411	2
Brentwood	134	2,072	289	13	54	4,534	379	100	567	15
Chafford Hundred	7	56	6	1	4	144	10	2	9	0
Corringham	11	221	101	5	25	1,608	127	35	203	4
Grays	29	290	117	13	24	1,769	200	56	194	11
Hadleigh	2	117	39	2	8	542	41	18	59	1
Hockley	7	797	61	6	20	1,969	130	35	181	5
Rayleigh	12	674	83	5	23	1,716	120	29	136	1
Rochford	14	499	124	12	30	2,307	196	84	297	9
Shenfield	14	213	30	1	6	467	39	10	58	2
South Benfleet	2	112	14	2	4	268	21	4	26	1
North Southend	16	537	179	11	21	1,683	181	114	314	15
Stanford-le-Hope	10	493	69	8	28	1,910	135	29	121	3

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	Underground, metro, light rail or tram	Train	Bus, minibus or coach	Taxi	Motorcycle, scooter or moped	Driving a car or van	Passenger in a car or van	Bicycle	On foot	Other
Wickford	10	381	51	5	12	1,124	80	34	154	2
New settlement areas – With LTC										
Fairglen	22	1,221	150	10	42	3,109	217	52	247	3
Southend North East	9	346	145	12	29	1,522	180	110	543	6
Crays Hill	41	817	91	12	33	2,682	182	41	222	10
Ingatestone	47	1,224	78	2	13	2,328	127	41	336	10
East Tilbury	22	554	28	5	20	2,082	129	36	121	5
South Ockendon	74	469	126	12	29	1,571	117	33	133	6
West Horndon	54	648	57	12	50	3,320	232	29	143	7

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8. Car Journey Analysis

- 8.1. Journeys by car have been analysed by reviewing the mode share for journeys travelling to the destinations as detailed in section 5, which include:
- Less than one mile away
 - Between one and five miles away
 - In Central London
 - Anywhere else.
- 8.2. The results for the number of people by distance travelled by car in the peak hour are shown on Table 8.1.
- 8.3. The results show that for South Essex approximately 16% of the trips by car for travel to work are for journeys less than 1 mile. These are trips that could potentially be made by other more sustainable modes, such as walking or cycling or using public transport.

Table 8.1: Distance Travelled to Work by Car

Location	Distance Travelled by Car in Peak Hr				Total Cars
	< 1 mile	1-5 Miles	To / From London	To / From Everywhere else	
Urban extension areas – With LTC					
Aveley	94	220	15	260	588
Basildon	427	997	66	1,178	2,668
Billericay	541	1,262	84	1,491	3,377
Brentwood	726	1,695	113	2,001	4,534
Chafford Hundred	23	54	4	64	144
Corringham	257	601	40	710	1,608
Grays	283	661	44	781	1,769
Hadleigh	87	203	13	239	542
Hockley	315	736	49	869	1,969
Rayleigh	275	641	43	757	1,716
Rochford	369	862	57	1,018	2,307
Shenfield	75	174	12	206	467

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Location	Distance Travelled by Car in Peak Hr				
	< 1 mile	1-5 Miles	To / From London	To / From Everywhere else	Total Cars
South Benfleet	43	100	7	118	268
North Southend	269	629	42	743	1,683
Stanford-le-Hope	306	714	47	843	1,910
Wickford	180	420	28	496	1,124
New settlement areas – With LTC					
Fairglen	498	1,162	253	1,372	3,285
Southend North East	244	569	145	672	1,629
Crays Hill	429	1,002	206	1,184	2,821
Ingatestone	373	870	210	1,028	2,481
East Tilbury	333	778	150	919	2,180
South Ockendon	251	587	128	693	1,660
West Horndon	531	1,241	270	1,465	3,508

9. Train Journey Analysis

- 9.1. Train journey analysis has been undertaken to determine the predicted number of people likely to travel by train in the peak hour to understand the impact this will have on the existing train network.
- 9.2. The distribution of the total person trips by train from each New Settlement and Urban Extension has been determined using the Journey to Work (Origin-Destination) data from the 2011 census for the Middle Super Output Area (MSOA) for where the site is located.
- 9.3. The MSOAs selected for the 7 New Settlement site are stated below.
 - Fairglen: Rochford 006
 - Southend North - East: Southend-on-Sea 006
 - Crays Hill: Basildon 009
 - Ingatestone: Brentwood 002

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- East Tilbury: Thurrock 013
- South Ockendon: Thurrock 006
- West Horndon: Thurrock 004

9.4. The MSOAs selected for the 16 Urban Extensions are stated below.

- Aveley: Thurrock 008
- Basildon: Basildon 021
- Billericay: Basildon 002 & Basildon 004
- Brentwood: Brentwood 003 & Brentwood 004
- Chafford Hundred: Thurrock 020
- Corringham: Thurrock 002
- Grays: Thurrock 009
- Hadleigh: Castle Point 005
- Hockley: Rochford 003
- Rayleigh: Rochford 006
- Rochford: Rochford 004
- Shenfield: Brentwood 003
- South Benfleet: Castle Point 007
- Southend: Southend-on-Sea 009
- Stanford-le-Hope: Thurrock 005
- Wickford: Basildon 005

9.5. For each location the percentage of people travelling by train to Central London destinations for work was determined. The results of the analysis are shown on Table 9.1.

Table 9.1: Total Predicted Train Journeys into London

Location	24hrs Train Trips	Peak Hr Train Trips	% of train trips into London	No. of Peak Hr Train Trips
Urban extension areas – With LTC				
Aveley	665	86	0.81	70
Basildon	8,795	1,143	0.84	960
Billericay	15,224	1,979	0.89	1770
Brentwood	15,939	2,072	0.89	1849

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Location	24hrs Train Trips	Peak Hr Train Trips	% of train trips into London	No. of Peak Hr Train Trips
Chafford Hundred	431	56	0.89	50
Corringham	1,703	221	0.83	184
Grays	2,229	290	0.88	254
Hadleigh	901	117	0.86	101
Hockley	6,133	797	0.79	631
Rayleigh	5,182	674	0.90	609
Rochford	3,836	499	0.57	285
Shenfield	1,640	213	0.87	185
South Benfleet	859	112	0.76	85
North Southend	4,127	537	0.82	440
Stanford-le-Hope	3,795	493	0.67	328
Wickford	2,932	381	0.68	260
New settlement areas – With LTC				
Fairglen	8,719	1,221	0.90	1,102
Southend North East	2,469	346	0.76	262
Crays Hill	5,833	817	0.91	739
Ingatestone	8,742	1,224	0.85	1,035
East Tilbury	3,959	554	0.75	418
South Ockendon	3,351	469	0.74	346
West Horndon	4,631	648	0.85	551

TECHNICAL NOTE

10. Summary

- 10.1. The results of the trip generation analysis for each of the urban extensions and new settlement locations suggest the following:
- Locations close to Greater Anglia Rail line have higher % train trips into London.
 - Locations in the southern areas of South Essex, Chafford Hundred, Corringham, Stanford-le-Hope and East Tilbury have higher % car usage for journeys to work.
 - Large demand for trains along Greater Anglia line between Brentwood and Rayleigh. (Approx. 7km between stations).
 - Approx. 16% car trips less than 1 mile.
 - Developments will create a significant number of car trips based on existing data showing a need for road improvements and a mode shift to more sustainable travel modes.
 - Developments will create a significant number of train trips based on existing data showing a need for upgrades to be made to the existing train network to accommodate the increased demand.