

ROYAL BERKSHIRE FIRE & RESCUE SERVICE

ORH Final Report: Population Coverage



Introduction

1. ORH Limited has been asked by the Royal Berkshire Fire & Rescue Service (RBFRS) to undertake modelling in relation to population coverage, comparing the modelled base position with a proposed new deployment of appliances.
2. ORH has undertaken a number of analysis and modelling projects for RBFRS. A recent report (BF9 – East Berkshire Modelling, August 2013) assessed the impact on the service for a proposed deployment option around Ascot, Bracknell and Slough stations.
3. This paper undertakes an assessment of the coverage to population for the current and proposed option; the approach taken is outlined in the methodology section below.
4. Modelled results are presented in the form of coverage maps and tables outlining the population that fall within and outside of response time targets.

Methodology

5. The proposed option involves removing retained crewed appliances from Ascot and Bracknell, and relocating the second wholetime pump from Slough to Ascot. Appendix **A1** presents the modelled base position and Appendix **A2** the proposed option.
6. Two approaches have been used to assess the population coverage for the base position and the proposed option, which are:
 - Range coverage maps – This assumes that pumping appliances are 100% available and no simultaneous activity occurs. Aggregated 24-hour travel times are used and RDS appliances at Ascot and Bracknell are assumed to be unavailable in the base position (given their high levels of unavailability).
 - Simulation modelling coverage – This modelling approach takes into account the availability of appliances and simultaneous activity. Travel times and appliance availability vary by time of day.
7. Population figures have been taken from the 2011 census data. According to the data, 863,024 people reside within Berkshire. Results are presented at

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FIGURE 1 POPULATION COVERAGE - RESPONSE MODELLING RESULTS

Area	Modelled option	Target			
		1st Appliance Within 8 Minutes	1st Appliance Within 10 Minutes	2ndAppliance Within 10 Minutes	2ndAppliance Within 12 Minutes
<i>Berkshire -wide</i>	Base Position	563,232	698,670	540,409	690,903
	Proposed Option	573,333	708,115	536,759	698,871
	Difference	10,101	9,445	-3,650	7,968
<i>Slough</i>	Base Position	76,797	88,063	84,850	90,176
	Proposed Option	70,481	84,181	63,768	84,683
	Difference	-6,316	-3,882	-21,082	-5,493
<i>Ascot</i>	Base Position	3,665	9,435	3,751	10,936
	Proposed Option	21,454	22,949	14,089	21,134
	Difference	17,789	13,514	10,338	10,198
<i>Bracknell</i>	Base Position	63,986	72,587	43,380	65,326
	Proposed Option	65,146	74,235	56,323	73,406
	Difference	1,160	1,648	12,943	8,080
<i>All Others*</i>	Base Position	419,791	531,801	409,865	529,549
	Proposed Option	417,247	529,885	404,021	524,561
	Difference	-2,544	-1,916	-5,844	-4,989

*All Other Areas includes all areas in Berkshire not reported individually:
Caversham Road, Crowthorne, Dee Road, Hungerford, Lambourn, Langley, Maidenhead, Mortimer, Newbury,
Pangbourne, Wargrave, Whitley Wood, Windsor, Wokingham, Wokingham Road.

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Service-wide level and by historical station grounds (adjusted where stations have closed).

Results

8. Maps highlighting the coverage from appliances in East Berkshire for the base position and proposed option are presented in Appendix **B**. Areas are highlighted if they fall within 8 or 10 minutes for 1st appliance, or within 10 or 12 minutes for 2nd appliance.
9. The following four maps have been produced to illustrate the coverage:
 - 1st Appliance – Base Position (Appendix **B1**).
 - 1st Appliance – Proposed Option (Appendix **B2**).
 - 2nd Appliance – Base Position (Appendix **B3**).
 - 2nd Appliance – Proposed Option (Appendix **B4**).
10. Tables showing the population that fall within and outside the response targets are presented in Appendix **C**. These are the results associated with simulation modelling and are summarised in Figure **1** opposite. Modelled results are considered to be more representative of the population that fall inside and outside the targets than the range coverage maps.
11. The Berkshire-wide results are presented in Appendix **C1**. The result of moving from the base position to the proposed option improves 1st appliance cover, with a net gain of 10,101 and 9,445 of the population within the targets of 8 and 10 minutes respectively. Coverage of population for 2nd appliance improves against the 12 minute target (net increase of 7,968 – 0.9%), but deteriorates against the 10 minute target (net decrease of 3,650 – 0.4%).
12. Results are presented by station areas in Appendix **C2**. Significant improvements in Ascot and Bracknell are offset by deterioration in cover in Slough. The majority of all other areas within Berkshire are unaffected by the change in deployment in East Berkshire. There is some reduction in cover reported against 'all other' areas, which is mainly associated within the station areas of Windsor and Langley.

Summary

13. This paper has presented the population cover modelling results associated with a deployment option for East Berkshire as put forward by RBFRS. Comparisons between the base position and the proposed option have been highlighted.
14. The modelling has shown that providing a wholetime appliance at Ascot would improve Service-wide cover for 1st appliance. However there is deterioration in cover, particularly for 2nd appliance, in Slough and other areas (Windsor, Langley and Bucks) associated with the removal of the second pump from Slough station.

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Appendices

A Crew Deployment Maps

A1 Base Position

A2 Proposed Option

B Range Cover Maps

B1 1st Appliance Cover – Base Position

B2 1st Appliance Cover – Proposed Option

B3 2nd Appliance Cover – Base Position

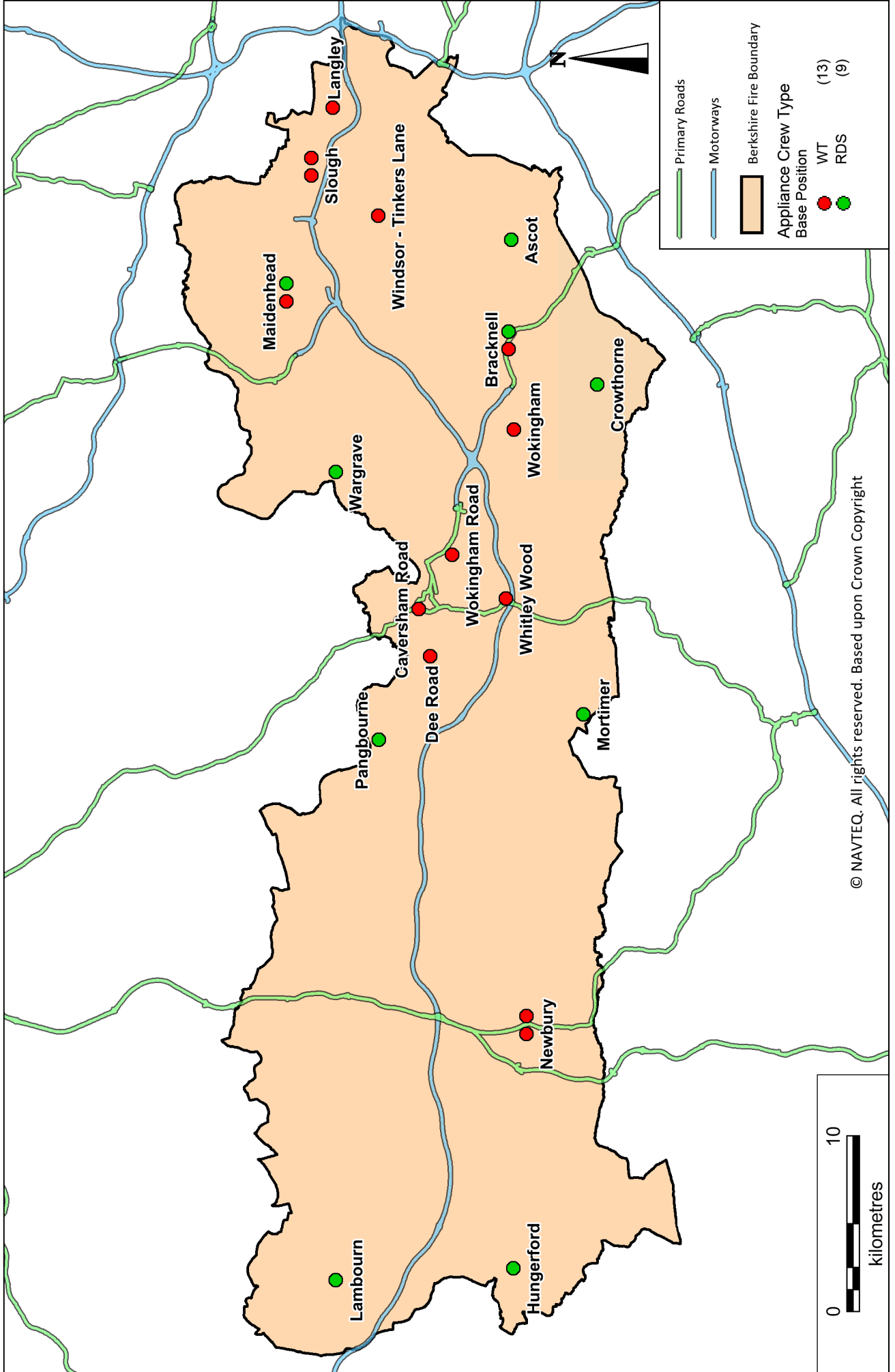
B4 2nd Appliance Cover – Proposed Option

C Modelled Cover – Population Within Target

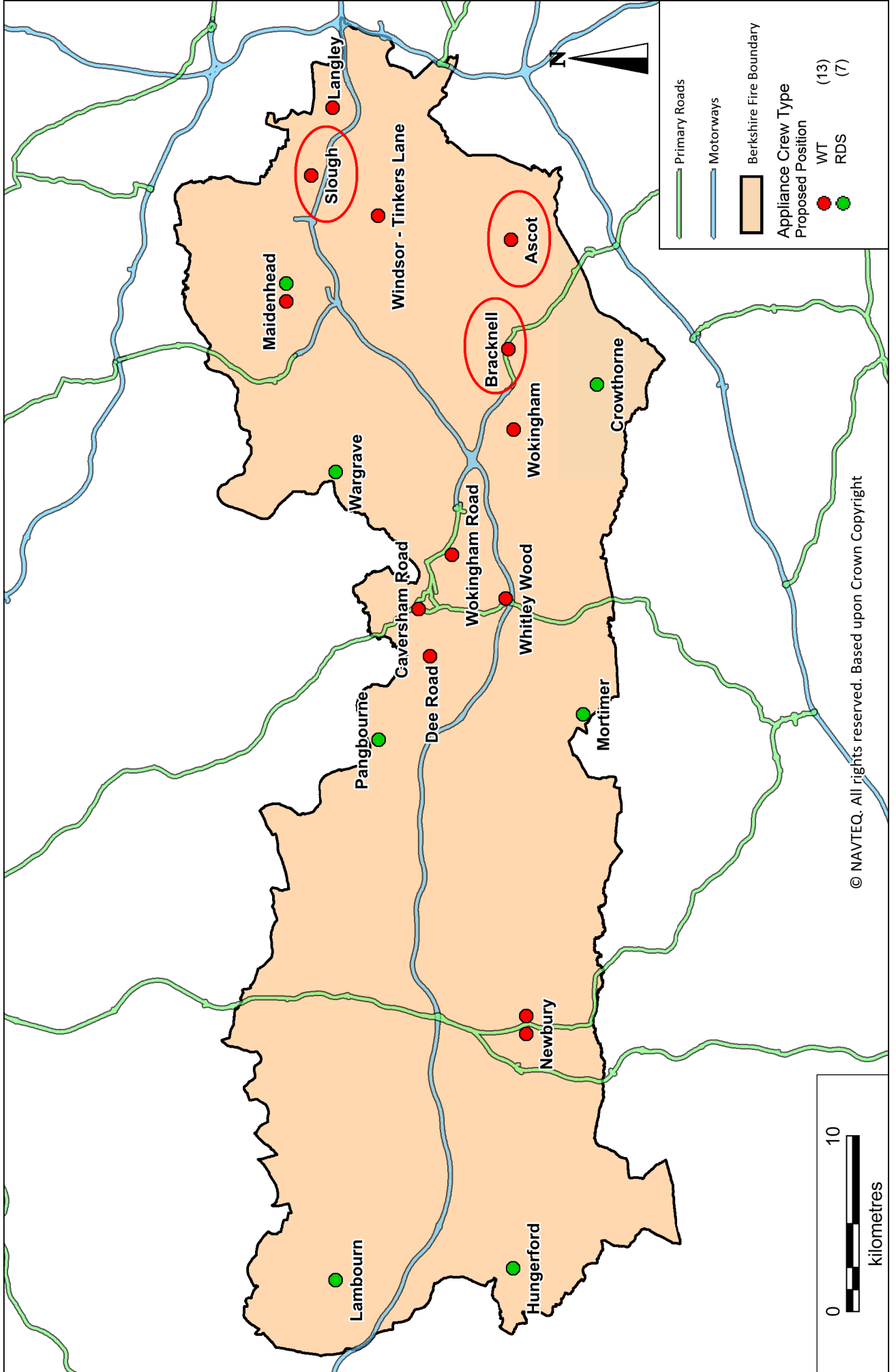
C1 Berkshire-wide

C2 Cover by Area

Base Position - Appliances and Crew Type

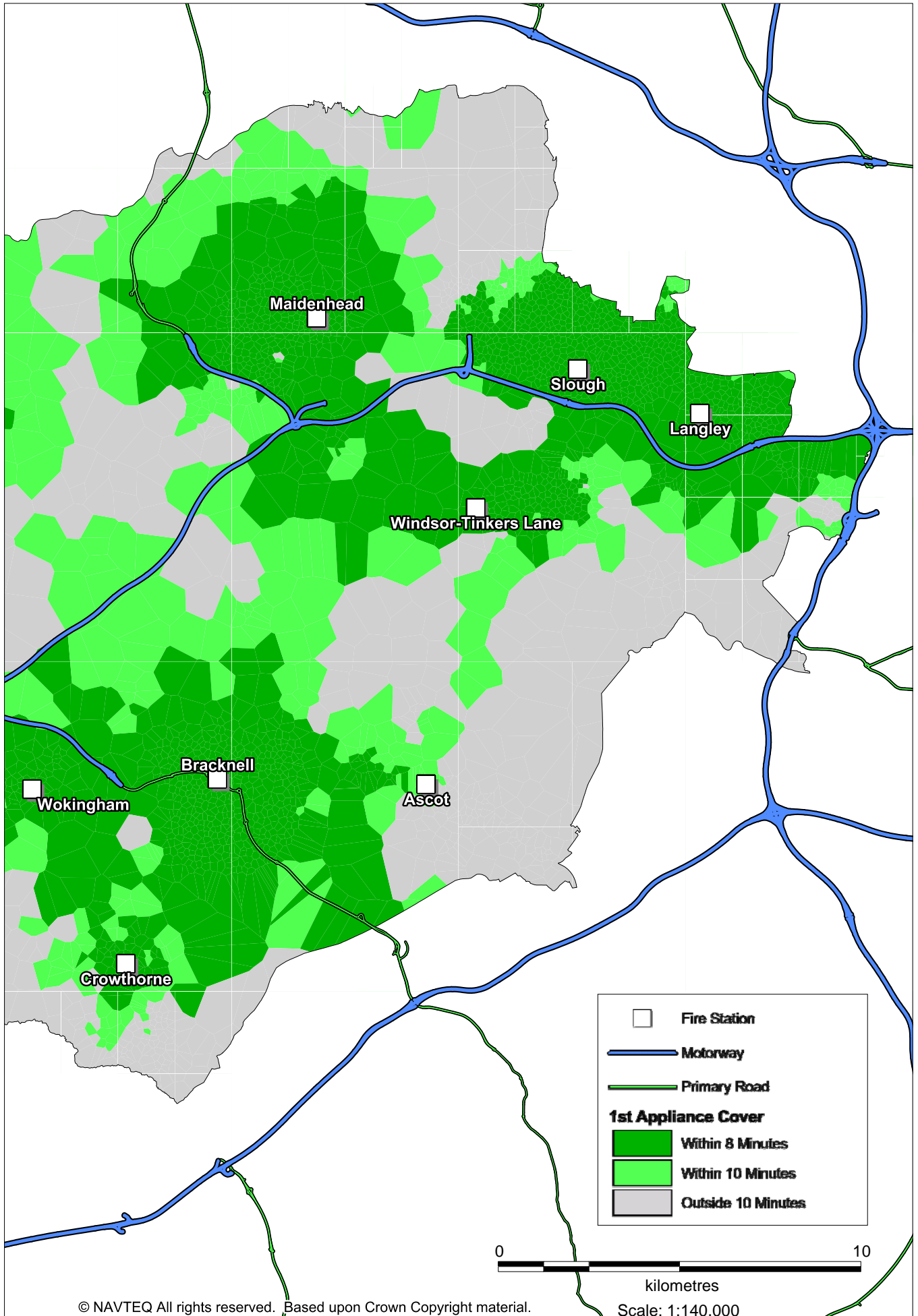


Proposed Option - Appliances and Crew Type

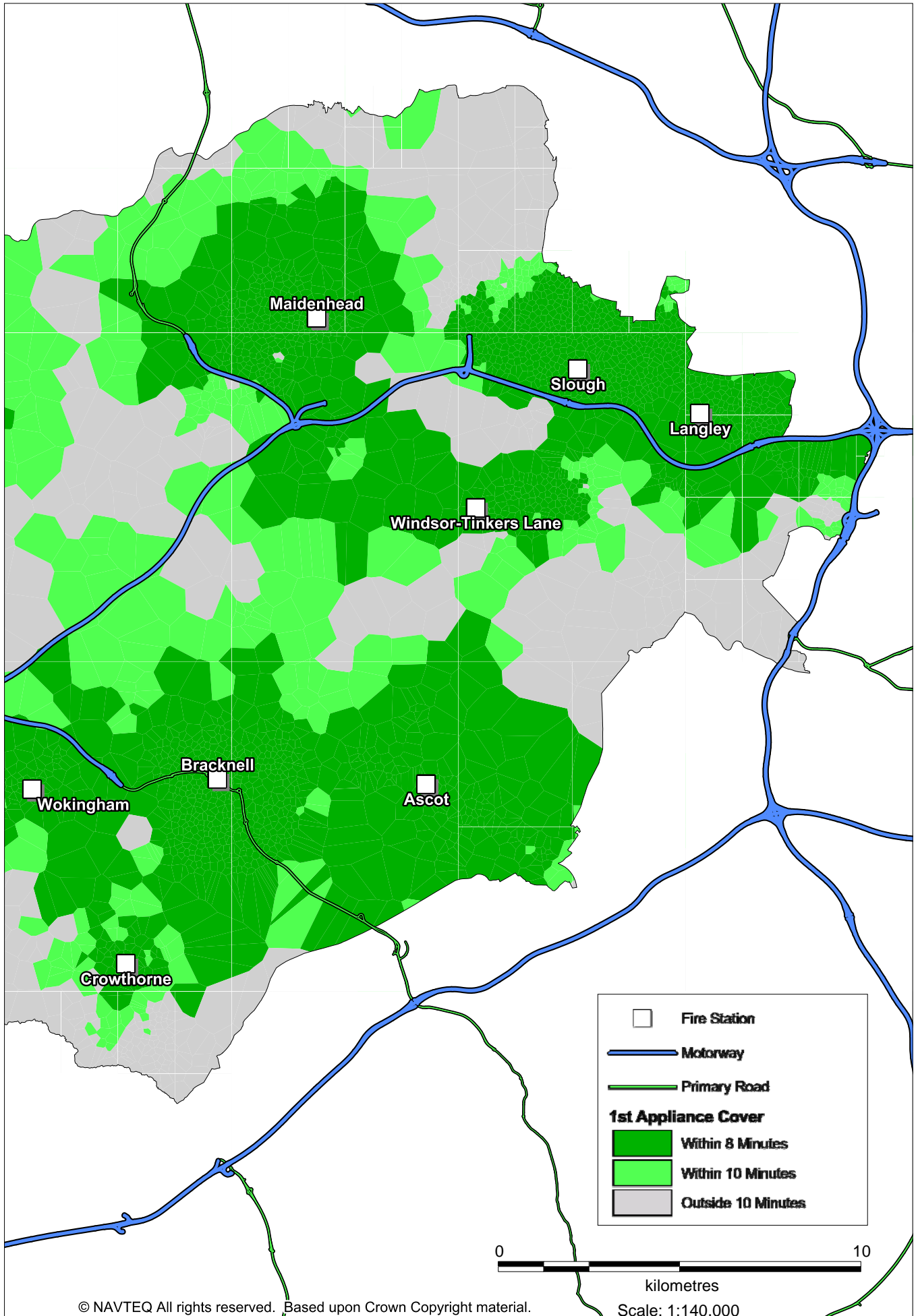


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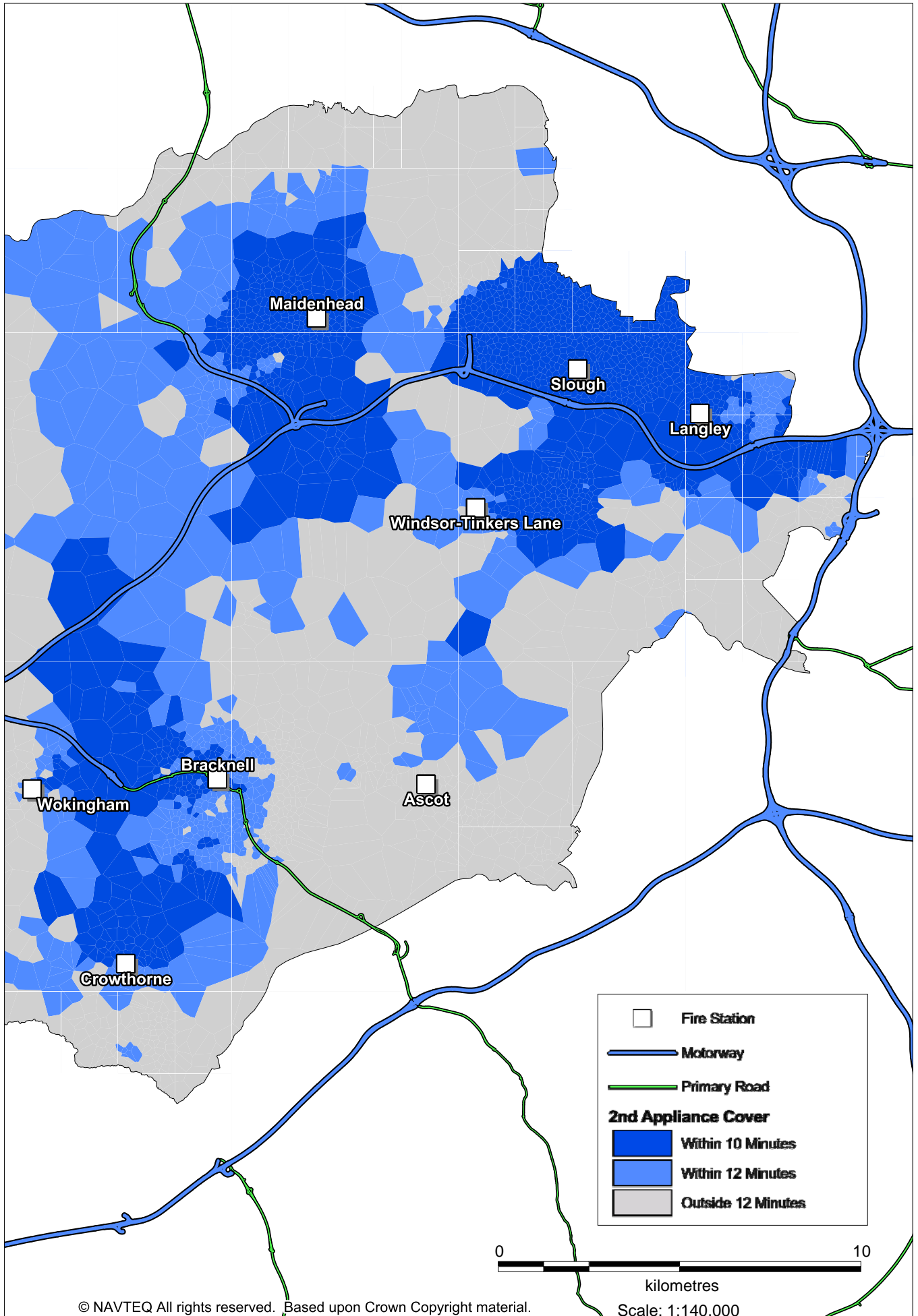
Base Position East Berkshire - 1st Appliance Cover



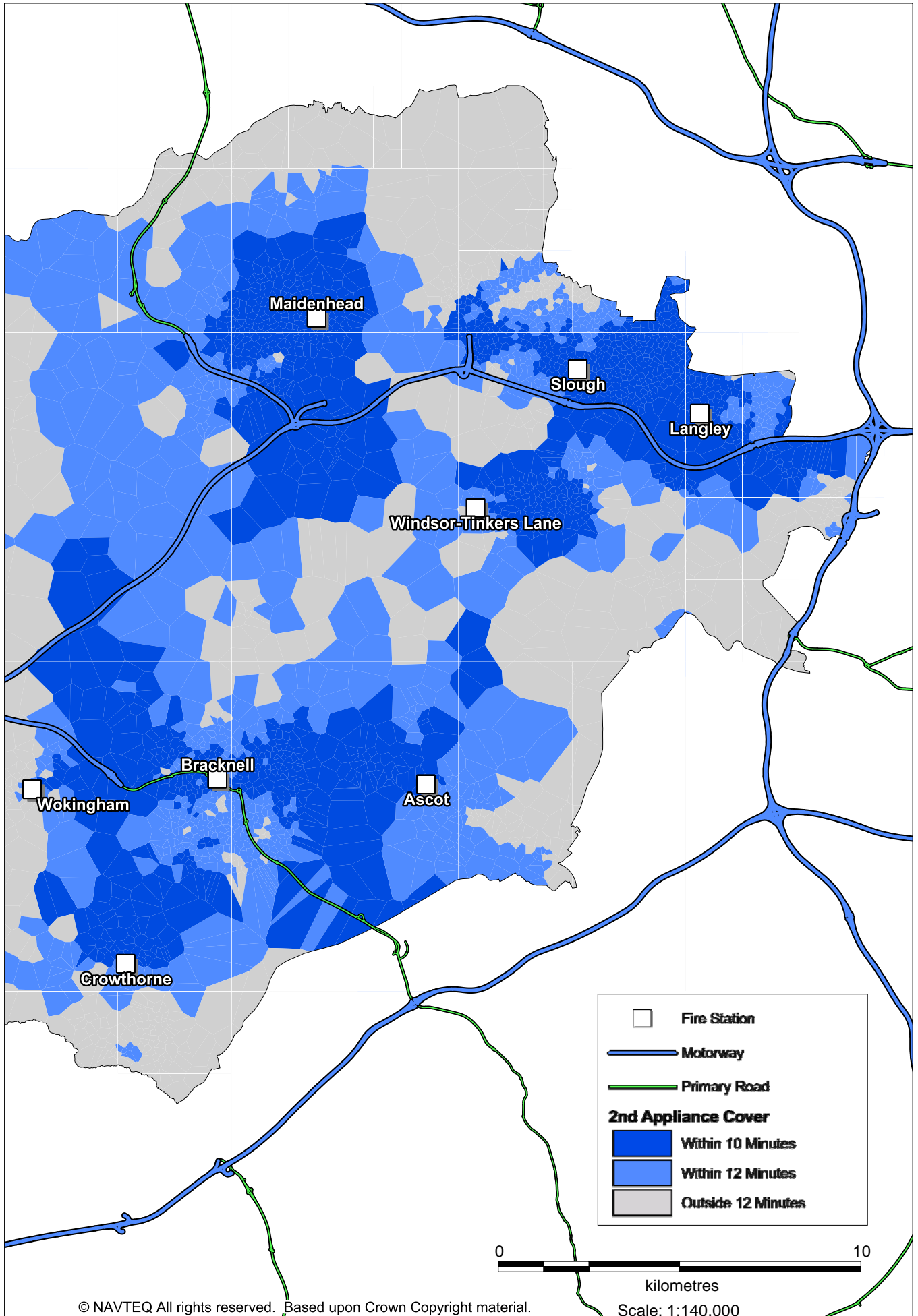
Proposed Deployment East Berkshire - 1st Appliance Cover



Base Position East Berkshire - 2nd Appliance Cover



Proposed Deployment East Berkshire - 2nd Appliance Cover



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Population Coverage
Modelling Results
 Population Within and Outside of Target

	Target			
	1st Appliance Within 8 Minutes	1st Appliance Within 10 Minutes	2ndAppliance Within 10 Minutes	2ndAppliance Within 12 Minutes
Berkshire-wide				
Within Target in Base and Proposed Position	553,623	691,779	509,408	678,392
Outside Target in Base and Proposed Position	280,083	148,018	295,265	151,642
Outside Target in Base Position, Within Target in Proposed Position	19,710	16,336	27,350	20,479
Within Target in Base Position, Outside Target in Proposed Position	9,609	6,891	31,000	12,511
Base Position Total Within Target	563,232	698,670	540,409	690,903
Base Position Total Outside Target	299,793	164,355	322,616	172,121
Proposed Position Total Within Target	573,333	708,115	536,759	698,871
Proposed Position Total Outside Target	289,692	154,910	326,266	164,153
Difference Within Target	10,101	9,445	-3,650	7,968
Within Target in Base and Proposed Position	64.1%	80.2%	59.0%	78.6%
Outside Target in Base and Proposed Position	32.5%	17.2%	34.2%	17.6%
Outside Target in Base Position, Inside Target in Proposed Position	2.3%	1.9%	3.2%	2.4%
Inside Target in Base Position, Outside Target in Proposed Position	1.1%	0.8%	3.6%	1.4%
Base Position Total Inside Target	65.3%	81.0%	62.6%	80.1%
Base Position Total Outside Target	34.7%	19.0%	37.4%	19.9%
Proposed Position Total Inside Target	66.4%	82.1%	62.2%	81.0%
Proposed Position Total Outside Target	33.6%	17.9%	37.8%	19.0%
Difference Within Target	1.2%	1.1%	-0.4%	0.9%

Population Coverage
Modelling Results
 Population Within and Outside of Target

Slough

	Target		
	1st Appliance Within 8 Minutes	1st Appliance Within 10 Minutes	2nd Appliance Within 12 Minutes
Within Target in Base and Proposed Position	70,465	84,164	84,654
Outside Target in Base and Proposed Position	16,271	5,004	2,879
Outside Target in Base Position, Within Target in Proposed Position	16	17	29
Within Target in Base Position, Outside Target in Proposed Position	6,332	3,899	5,522
Base Position Total Within Target	76,797	88,063	90,176
Base Position Total Outside Target	16,287	5,021	2,908
Proposed Position Total Within Target	70,481	84,181	84,683
Proposed Position Total Outside Target	22,603	8,903	8,401
Difference Within Target	-6,316	-3,882	-5,493

Slough

	Target		
	1st Appliance Within 8 Minutes	1st Appliance Within 10 Minutes	2nd Appliance Within 12 Minutes
Within Target in Base and Proposed Position	75.7%	90.4%	90.9%
Outside Target in Base and Proposed Position	17.5%	5.4%	3.1%
Outside Target in Base Position, Inside Target in Proposed Position	0.0%	0.0%	0.0%
Inside Target in Base Position, Outside Target in Proposed Position	6.8%	4.2%	5.9%
Base Position Total Inside Target	82.5%	94.6%	96.9%
Base Position Total Outside Target	17.5%	5.4%	3.1%
Proposed Position Total Inside Target	75.7%	90.4%	91.0%
Proposed Position Total Outside Target	24.3%	9.6%	9.0%
Difference Within Target	-6.8%	-4.2%	-5.9%

Ascot

	Target		
	1st Appliance Within 8 Minutes	1st Appliance Within 10 Minutes	2nd Appliance Within 12 Minutes
Within Target in Base and Proposed Position	3,630	9,372	10,866
Outside Target in Base and Proposed Position	2,084	562	2,369
Outside Target in Base Position, Within Target in Proposed Position	17,825	13,577	10,268
Within Target in Base Position, Outside Target in Proposed Position	35	63	70
Base Position Total Within Target	3,665	9,435	10,936
Base Position Total Outside Target	19,908	14,138	12,637
Proposed Position Total Within Target	21,454	22,949	21,134
Proposed Position Total Outside Target	2,119	625	2,439
Difference Within Target	17,789	13,514	10,198

Ascot

	Target		
	1st Appliance Within 8 Minutes	1st Appliance Within 10 Minutes	2nd Appliance Within 12 Minutes
Within Target in Base and Proposed Position	15.4%	39.8%	46.1%
Outside Target in Base and Proposed Position	8.8%	2.4%	10.1%
Outside Target in Base Position, Inside Target in Proposed Position	75.6%	57.6%	43.6%
Inside Target in Base Position, Outside Target in Proposed Position	0.2%	0.3%	0.3%
Base Position Total Inside Target	15.5%	40.0%	46.4%
Base Position Total Outside Target	84.5%	60.0%	53.6%
Proposed Position Total Inside Target	91.0%	97.4%	89.7%
Proposed Position Total Outside Target	9.0%	2.6%	10.3%
Difference Within Target	75.5%	57.3%	43.3%

Population Coverage
Modelling Results
 Population Within and Outside of Target

	Target		
	1st Appliance Within 8 Minutes	1st Appliance Within 10 Minutes	2ndAppliance Within 12 Minutes
Within Target in Base and Proposed Position	63,375	71,764	63,901
Outside Target in Base and Proposed Position	14,546	5,245	5,472
Outside Target in Base Position, Within Target in Proposed Position	1,772	2,471	9,505
Within Target in Base Position, Outside Target in Proposed Position	611	823	1,425
Base Position Total Within Target	65,986	72,587	65,326
Base Position Total Outside Target	16,318	7,716	14,977
Proposed Position Total Within Target	65,146	74,235	73,406
Proposed Position Total Outside Target	15,157	6,068	6,897
Difference Within Target	1,160	1,648	8,080

	Target		
	1st Appliance Within 8 Minutes	1st Appliance Within 10 Minutes	2ndAppliance Within 12 Minutes
Within Target in Base and Proposed Position	78.9%	89.4%	79.6%
Outside Target in Base and Proposed Position	18.1%	6.5%	6.8%
Outside Target in Base Position, Inside Target in Proposed Position	2.2%	3.1%	11.8%
Inside Target in Base Position, Outside Target in Proposed Position	0.8%	1.0%	1.8%

Base Position Total Inside Target	79.7%	90.4%	54.0%	81.3%
Base Position Total Outside Target	20.3%	9.6%	46.0%	18.7%
Proposed Position Total Inside Target	81.1%	92.4%	70.1%	91.4%
Proposed Position Total Outside Target	18.9%	7.6%	29.9%	8.6%
Difference Within Target	1.4%	2.1%	16.1%	10.1%

	Target		
	1st Appliance Within 8 Minutes	1st Appliance Within 10 Minutes	2ndAppliance Within 12 Minutes
Within Target in Base and Proposed Position	416,154	526,478	518,971
Outside Target in Base and Proposed Position	247,182	137,208	140,922
Outside Target in Base Position, Within Target in Proposed Position	98	271	677
Within Target in Base Position, Outside Target in Proposed Position	2,630	2,106	5,493
Base Position Total Within Target	418,784	528,584	524,465
Base Position Total Outside Target	247,280	137,479	141,599
Proposed Position Total Within Target	416,252	526,749	519,648
Proposed Position Total Outside Target	249,812	139,314	146,416
Difference Within Target	-2,532	-1,835	-5,849

	Target		
	1st Appliance Within 8 Minutes	1st Appliance Within 10 Minutes	2ndAppliance Within 12 Minutes
Within Target in Base and Proposed Position	62.5%	79.0%	77.9%
Outside Target in Base and Proposed Position	37.1%	20.6%	21.2%
Outside Target in Base Position, Inside Target in Proposed Position	0.0%	0.0%	0.1%
Inside Target in Base Position, Outside Target in Proposed Position	0.4%	0.3%	0.8%
Base Position Total Inside Target	62.9%	79.4%	61.3%
Base Position Total Outside Target	37.1%	20.6%	38.7%
Proposed Position Total Inside Target	62.5%	79.1%	60.4%
Proposed Position Total Outside Target	37.5%	20.9%	39.6%
Difference Within Target	-0.4%	-0.3%	-0.9%

	Target		
	1st Appliance Within 8 Minutes	1st Appliance Within 10 Minutes	2ndAppliance Within 12 Minutes
Within Target in Base and Proposed Position	416,154	526,478	518,971
Outside Target in Base and Proposed Position	247,182	137,208	140,922
Outside Target in Base Position, Within Target in Proposed Position	98	271	677
Within Target in Base Position, Outside Target in Proposed Position	2,630	2,106	5,493
Base Position Total Within Target	418,784	528,584	524,465
Base Position Total Outside Target	247,280	137,479	141,599
Proposed Position Total Within Target	416,252	526,749	519,648
Proposed Position Total Outside Target	249,812	139,314	146,416
Difference Within Target	-2,532	-1,835	-5,849

	Target		
	1st Appliance Within 8 Minutes	1st Appliance Within 10 Minutes	2ndAppliance Within 12 Minutes
Within Target in Base and Proposed Position	62.5%	79.0%	77.9%
Outside Target in Base and Proposed Position	37.1%	20.6%	21.2%
Outside Target in Base Position, Inside Target in Proposed Position	0.0%	0.0%	0.1%
Inside Target in Base Position, Outside Target in Proposed Position	0.4%	0.3%	0.8%
Base Position Total Inside Target	62.9%	79.4%	61.3%
Base Position Total Outside Target	37.1%	20.6%	38.7%
Proposed Position Total Inside Target	62.5%	79.1%	60.4%
Proposed Position Total Outside Target	37.5%	20.9%	39.6%
Difference Within Target	-0.4%	-0.3%	-0.9%

All Other Areas*

*All Other Areas includes all areas in Berkshire not reported individually:
 Caversham Road, Crowtherne, Dee Road, Hungerford, Lambourn, Langley, Maidenhead, Mortimer, Newbury, Pangbourne, Wargrave, Whitley Wood, Windsor, Wokingham, Wokingham Road.

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