Emergency Service Planning
Fire and Rescue Services

Norfolk Fire and Rescue Service

Provision of IRMP Service Change Modelling

Final Report

ORH/NfF/5
17 April 2019

PLAN. PREPARE. **PERFORM.**

This document has been produced by ORH for Norfolk Fire & Rescue Service on 17 April 2019. This document can be reproduced by Norfolk Fire & Rescue Service, subject to it being used accurately and not in a misleading context. When the document is reproduced in whole or in part within another publication or service, the full title, date and accreditation to ORH must be included.

ORH is the trading name of Operational Research in Health Limited, a company registered in England with company number 2676859.

ORH's quality management system is ISO 9001:2015 certified: recognition of ORH's dedication to maintaining high quality services for its clients.

ORH's information security management system is ISO 27001:2017 certified: evidence of ORH's commitment to implementing international best practice with regard to data security.

This document is intended to be printed double-sided. As a result, some of the pages in the document are intentionally left blank.

Disclaimer

The information in this report is presented in good faith using the information available to ORH at the time of preparation. It is provided on the basis that the authors of the report are not liable to any person or organisation for any damage or loss which may occur in relation to taking, or not taking, action in respect of any information or advice within the document.

Accreditations

Other than data provided by Norfolk Fire & Rescue Service, this report also contains data from the following sources:

EXECUTIVE SUMMARY

i. This the Final Report for the Provision of Integrated Risk Management Plan (IRMP) Service Change Modelling for Norfolk Fire and Rescue Service's (NFRS) new IRMP 2020 to 2023.

ii. NFRS provided historical incident and resource data, which ORH then analysed to quantify current service delivery characteristics, provide insights into study objectives, and establish parameters for the model validation process.

iii. The demand rate, pump availability and response profile used in the model were based on averages for 2016/17 to 2017/18. However, the geographical profile of incidents used an eight-year sample to provide a robust distribution.

iv. ORH's simulation model was populated with inputs derived from analysis of the current service profile, and travel times were calibrated against actual journeys to reflect the real-life behaviour of NFRS appliances. ORH created an availability profile for each pump in the model to replicate differences in availability throughout the day and by day of week.

v. ORH modelled a number of potential service changes to identify optimal use of resources in Norfolk.

vi. Location optimisation modelling identified that Sprowston fire station is optimally located to respond to the future demand growth in the Norwich Growth Triangle.

vii. Simulation modelling of moving Swaffham fire station to Turbine Way identified a very small impact on first response times and no impact on second response times.

viii. Merging Wymondham and Hethersett fire stations at Farrier Close reduces the first response time to RTCs in the Wymondham area, but there is an increase to other incident types. The impact is greater on second response performance due to the reduction in pumps.

ix. Tidal crewing starting at North Earlham and moving to Sprowston has a slightly greater adverse effect on average first response times than the other way around, but these impacts are small, and average second response in Norwich improves.

x. Optimal locations for officers to respond from produce coverage of 81% of the population in 20 minutes' drive from three sites, and 95% coverage from five sites.

xi. The opening of the third river crossing in Great Yarmouth will improve average second response times in the area. Removing either of the retained pumps at Gorleston or Great Yarmouth has a similar adverse impact on response performance in both areas, but these are not as great as the improvement from the third river crossing. The response impacts of tidal crewing between Great Yarmouth and Gorleston stations are similar, but response times in the Great Yarmouth area are better than in the Gorleston area.

Contents

Figure 1-1: Requirement Specification

NFRS wish to model a number of potential service changes and identify the optimal use of resources, specifically:

1. The achievability of a new geographic emergency response standard to measure the attendance times for the first appliance for *Fire Life Risk* and *Life Risk Other*. The definition of urban and rural will be the ONS definition. The modelling will be based on historical data and a new list of incident types that categorise *Fire Life Risk*.

2. The optimal location of Sprowston fire station to take account of the Broadland Northway and the Joint Core Strategy of the Greater Norwich Growth Board. Optimal location will take into account improved emergency response times to the conurbations North of Norwich and the impacts on workloads and emergency response standards for the other two fire stations in Norwich. Where possible, the optimal location will also be tested against the potential for a Norwich Western Link road.

3. The effect on the current and proposed emergency response standards of moving Swaffham fire station from West Acre Road, Swaffham, PE37 7NG to Turbine Way, Swaffham.

4. The effect on the current and proposed emergency response standards of closing Wymondham fire station and Hethersett fire station to be replaced by a new fire station at Farrier Close, Wymondham.

5. The effect on current and proposed emergency response standards of tidal crewing between Sprowston and North Earlham fire station. Tidal crewing is when appliances come together for staffing between 08:30 and 09:30 and 17:30 and 18:30 before an appliance is sent to North Earlham and Sprowston fire station.

6. The optimal location for officers to be stationed to provide a response to those incidents categorised as level 2 incidents based on historical data and the location of tip tier COMAH sites and other high risk sites.

7. The opportunities to a) improve emergency response times and b) be more efficient in our repose provision with the planned construction of a third river crossing in Great Yarmouth.

1 INTRODUCTION

Context

1.1 This the Final Report for the Provision of Integrated Risk Management Plan (IRMP) Service Change Modelling for Norfolk Fire and Rescue Service's (NFRS) new IRMP 2020 to 2023.

1.2 NFRS wished to assess and model potential changes to the service and provided a specification of requirements, as set out in Figure **1-1**.

1.3 This report summarises the outcomes of the analysis of NFRS's current service provision and the modelling of each requirement.

Methodology

1.4 To build an understanding of NFRS's current operations, historical incident and resource data were collected for 1 April 2013 to 31 March 2018.

1.5 The data was analysed to quantify current service delivery characteristics, provide insights into study objectives, and provide parameters for the model validation process. Demand analysis focused on incidents within Norfolk where at least one pumping appliance from NFRS attended. This was validated against NFRS's internal reporting.

1.6 ORH also collected data for the modelling requirements in relation to:

- Proposed station locations
- Office of National Statistics (ONS) Urban Rural Classification by Output Area (OA)
- Major housing developments and road network changes of the Norwich Western Link road and the third river crossing in Great Yarmouth

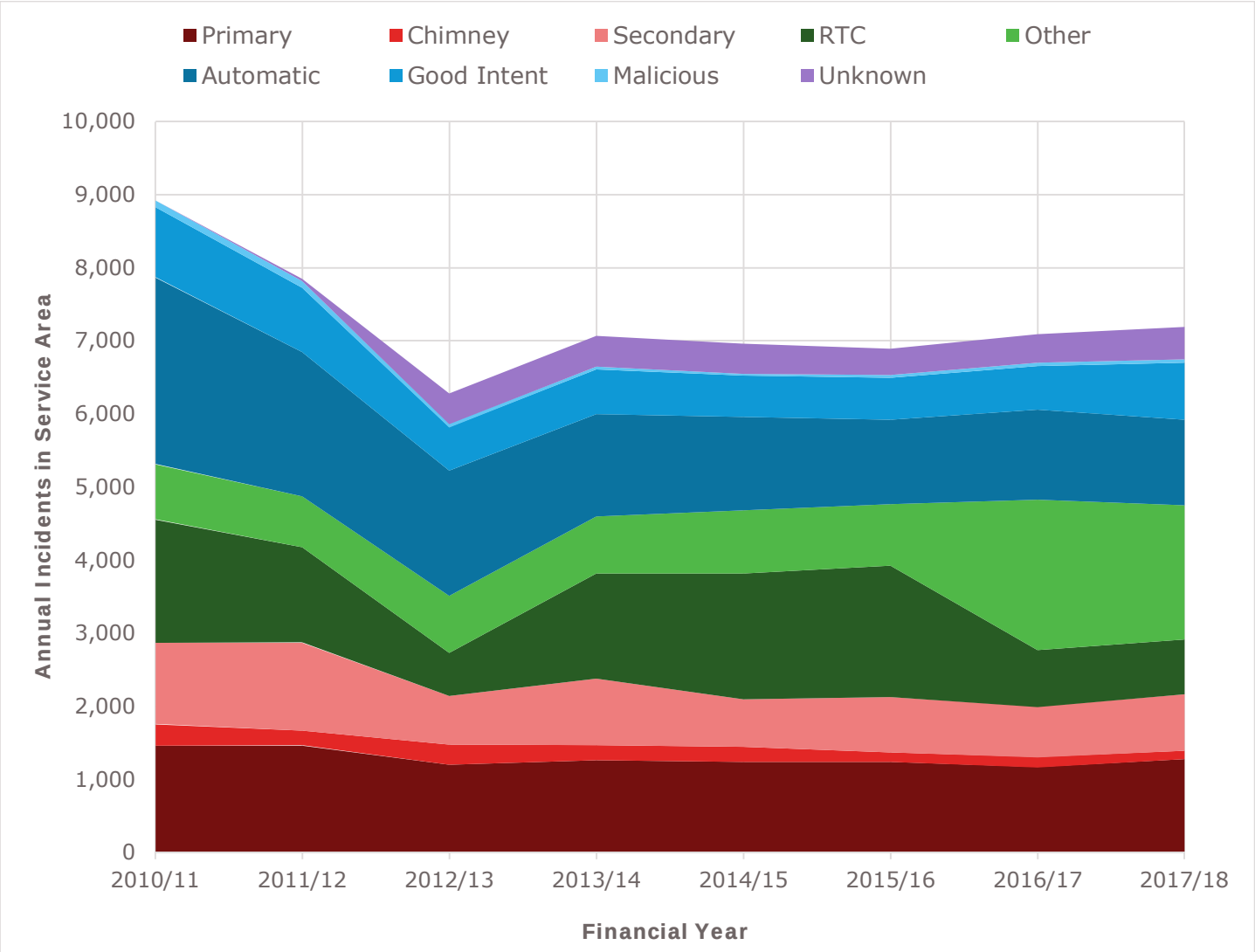
1.7 Simulation and optimisation models (see Appendix **A**) were set up to replicate current operations. A process of calibration was undertaken, ensuring that actual observed operations matched the outputs of the models. Once this process was completed, the modelling of requirements could be undertaken with confidence that they would be reflected in reality.

1.8 ORH used modelling to address the following questions:

- Where is the optimal location for Sprowston fire station in the future?
- What is the impact on response performance of moving Swaffham fire station?
- What is the impact on response performance of merging Wymondham and Hethersett fire stations?

- What is the impact on response performance of tidal crewing between Sprowston and North Earlham fire stations, and Great Yarmouth and Gorleston fires stations?
- Where are the optimal locations for officers to respond from?
- What is the impact on response performance of removing pumps in the Great Yarmouth area when a third bridge is constructed?

Figure 2-1: Incident Historical Trend



Incident Category	Sub Category	Financial Year								Average
		10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	
Fire	Primary	16%	19%	19%	18%	18%	18%	16%	18%	32%
	Chimney	3%	3%	4%	3%	3%	2%	2%	2%	
	Secondary	12%	15%	11%	13%	9%	11%	10%	11%	
Special Service	RTC	19%	17%	9%	20%	25%	26%	11%	10%	32%
	Other	8%	9%	12%	11%	12%	12%	29%	25%	
False Alarm	Automatic	29%	25%	27%	20%	18%	17%	17%	16%	36%
	Good Intent	11%	11%	9%	9%	8%	8%	8%	11%	
	Malicious	1%	1%	1%	1%	0%	1%	1%	1%	
	Unknown	0%	0%	7%	6%	6%	5%	5%	6%	
All Incidents		100%	100%	100%	100%	100%	100%	100%	100%	100%

2 CURRENT SERVICE PROFILE

The average availability of all the pumping appliances across Norfolk was 83% over the last two years, but the low availability of some pumps was reflected in their low number of responses.

The demand rate and profile used in the model were based on the average number of incidents that occurred in 2016/17 to 2017/18 across Norfolk, which was 7,138 incidents per year. However, the geographical profile used an eight-year sample to give a robust distribution.

Resources

Current Deployments

2.1 NFRS currently has three stations with wholetime crews, five stations with mixed crews, and 34 stations with retained crews, providing a total of 51 pumping appliances across the service (see Appendix **B1**).

Availability

2.2 NFRS's retained pump availability data is only recorded as an overall proportion of time. Availability in the last financial year varies from 50% (Fakenham second pump and Outwell first pump) to 99% (Attleborough) (see Appendix **B2a**).

2.3 ORH's simulation model replicates responses to incidents throughout the day by day of week to replicate higher unavailability during the weekday. NFRS and ORH agreed a typical day-by-hour profile of retained availability, which was applied to each pump's overall unavailability (see Appendix **B2b**).

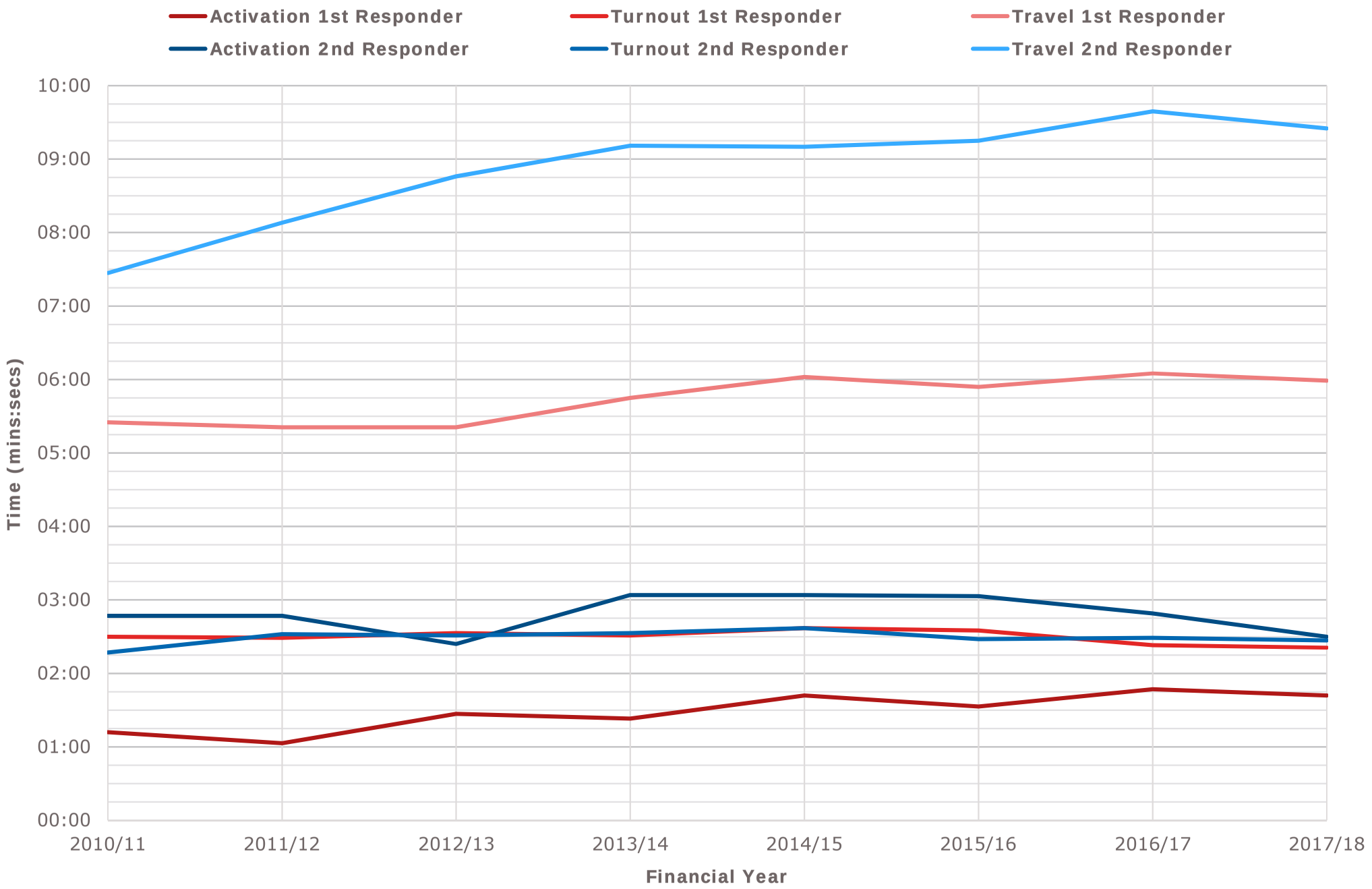
Demand

2.4 The annual number of incidents across NFRS remained around 7,000 over the last five years (see Figure **2-1**). The proportion of automatic false alarms decreased from 29% in 2010/11 to 16% in 2017/18. The number of RTCs and other special service incidents changed between 2015/16 and 2016/17, due to re-classification. Therefore, the demand rate used in the model was based on the number of incidents that occurred from 1 April 2016 to 31 March 2018.

2.5 Demand peaked between 16:00 and 20:00 at over 1.2 incidents per hour, and was lowest at 04:00 with 0.3 incidents per hour (see Appendix **B3a**). Fire incidents peaked at 17:00 and false alarms at 18:00, whereas special service incidents had an earlier peak at 16:00 and high demand from 10:00 to 13:00.

2.6 The geographical distribution of demand in the model used the eight-year dataset to ensure that sufficient incidents were included for a robust modelling position. The highest concentration of fire incidents were typically in the more urban areas, with special service incidents distributed along the main roads (Appendix **B3b**).

Figure 2-2: Call Components by Responder Order and Year



2.7 NFRS currently reports attendance performance using initial incident type for its Emergency Response Standard (ERS), but this is being reviewed. ORH's modelling uses the final incident type (Stop Code), as this is the most appropriate measure for defining risk for modelling purposes. Only 32% of *fire – life risk* incidents were finally classified as primary fires, whereas 46% were classed as automatic false alarms. However, 49% of *fire – non-life risk* were finally classed as secondary fires. For *other emergencies – life risk*, 62% were classed as RTCs and 31% as other special service incidents (see Appendix **B3c**).

Response Profile

Station Workload

2.8 NFRS pumps made 10,272 initial attendances in 2017/18, which is slightly greater than the previous five years (see Appendix **B4a**). Earlham was the most utilised station over the last few years, with 1,160 initial responses to incidents in 2017/18. West Walton was the least utilised station in 2017/18 with 29 initial responses, but Outwell had only 7 initial responses in 2016/17.

Call Components

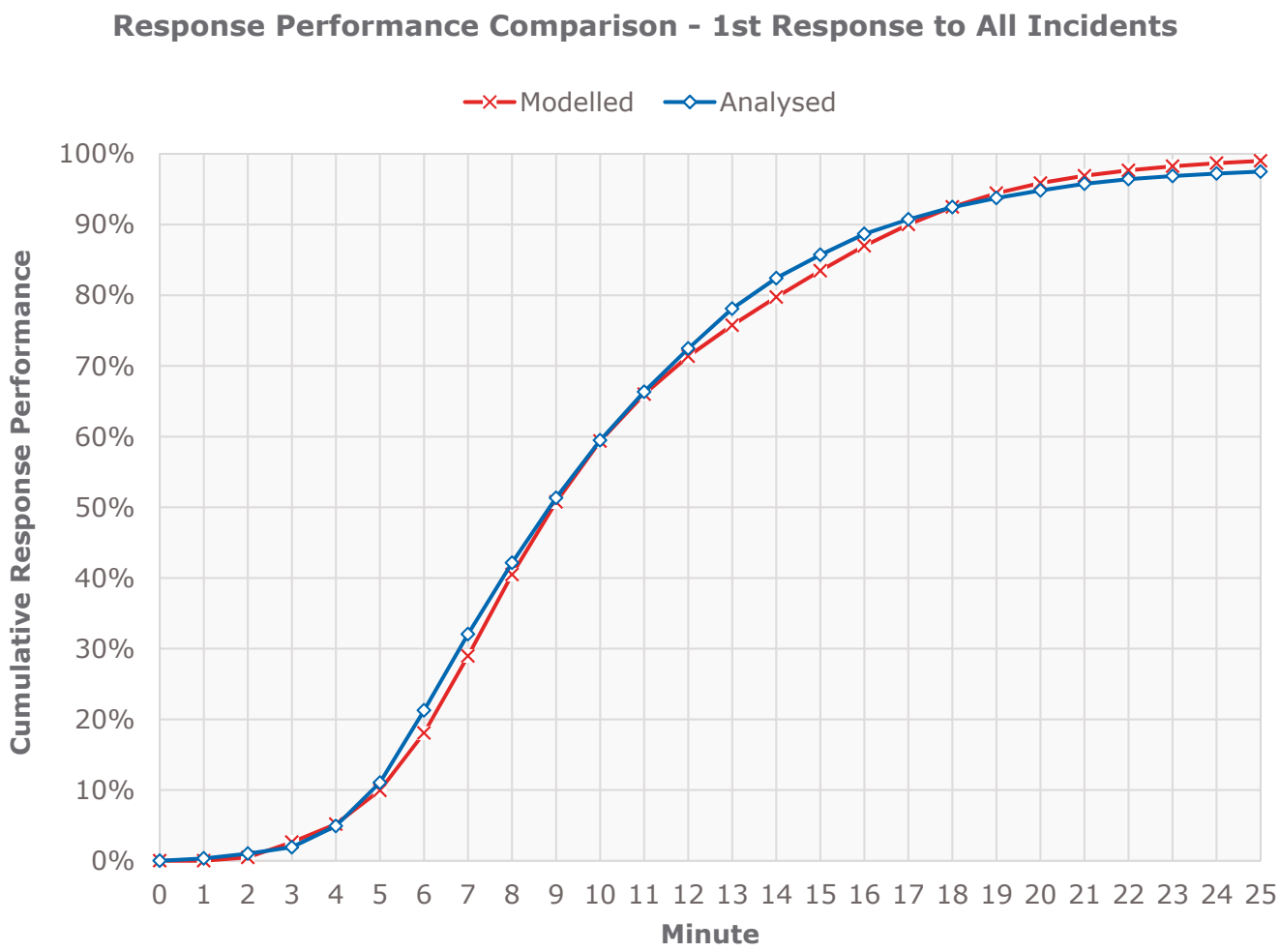
2.9 NFRS has proposed measuring attendance performance from time of call, instead of from the time the first vehicle was assigned. Average control activation times for the first response increased from 1m0s in 2011/12 to 1m45s in 2016/17. The average activation time for the second response to all incidents was highest in 2013/14 at 3m04s, but decreased to 2m30s in 2017/18 (see Figure **2-2**).

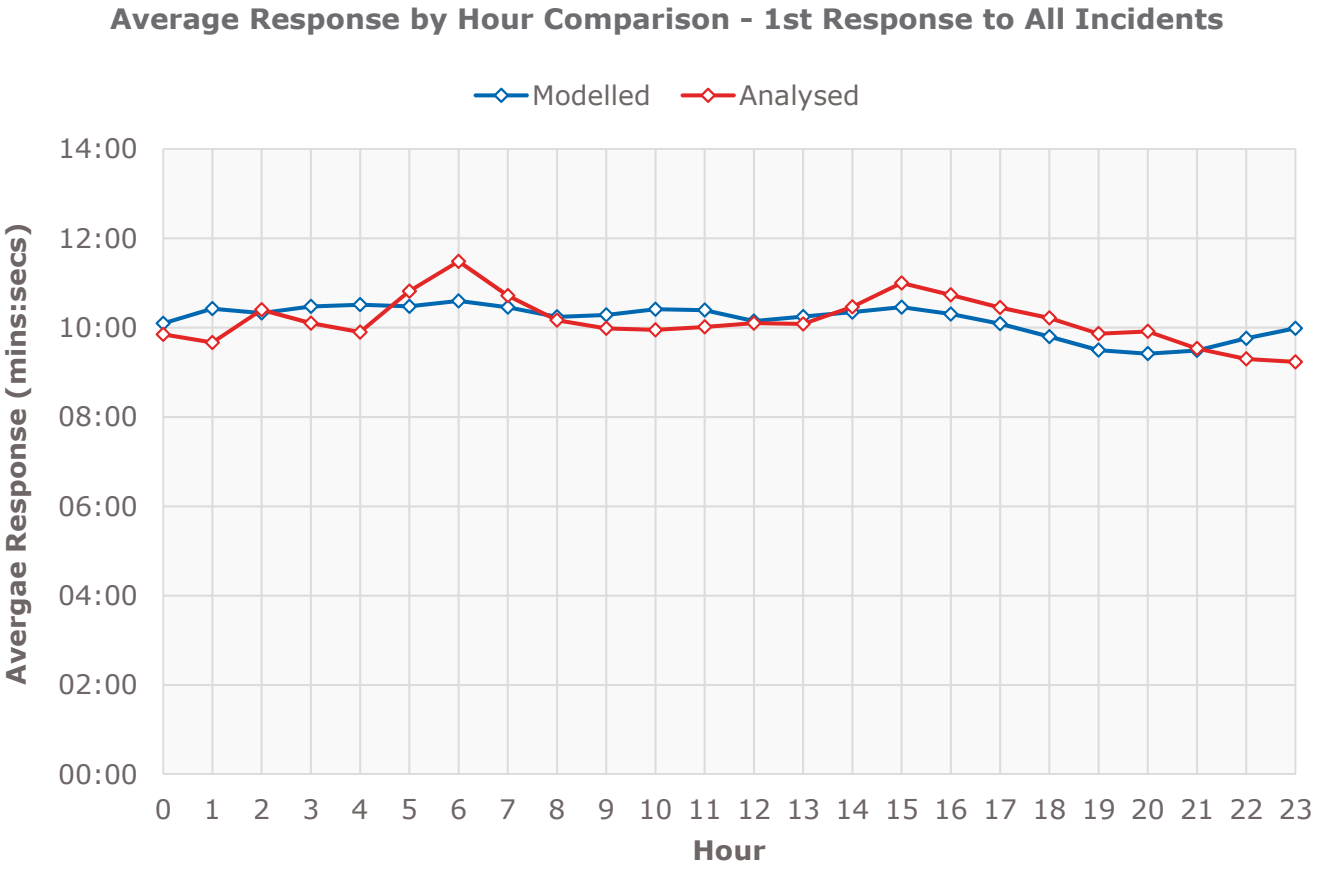
2.10 By incident type, incidents classed as *non-emergencies* for ERS have an average first response activation time of 7m39s, and are predominantly finally categorised as other special service incidents (see Appendix **B4b**).

2.11 Crew turnout times were very similar for first and second responses over the last eight years (see Figure **2-2**). By hour of the day, the average turnout time for retained pumps varied from just under three and a half minutes at 20:00 to over six minutes at 03:00 (see Appendix **B4c**). Wholetime pumps had an average turnout time of under a minute from 08:00 to 21:00, but around 1m40s between 01:00 and 07:00. The variation in turnout time by callsign by time of day was used in the model.

2.12 Average travel time to scene for the first response was around six minutes for the last four years, but the second response travel time increased to 9m39s in 2016/17. Travel times to scene increased for all ERS categories in all areas, urban and rural (see Appendix **B4d**).

Figure 3-1: Model Validation





3 MODEL SETUP

The purpose of the model validation process is to ensure that ORH's simulation model is reflective of the real-life behaviour of NFRS appliances.

In order to achieve this the model was populated with inputs derived from analysis of the current service profile, and travel times were calibrated against actual journeys.

There was a close correspondence between the validated model and the actual analysed position. This can be seen in the measures of response performance.

Model Validation

3.1 ORH's simulation model, FireSim, was populated using parameters derived from the data analysis work. Analysed demand, location and job cycle time profiles, together with service data on resource levels, types and deployment locations, were used as model inputs.

3.2 In addition to these datasets, ORH calibrated travel times for Norfolk using commercially available software. The process involves 'noding' the area with key points in relation to the road network, station locations and incident distributions. Initially, 'average' traffic conditions were assigned to the road classifications. The travel times were calibrated from service data to reflect both lights-and-sirens and normal speeds, by time of day and day of week.

3.3 The demand in the model includes initial attendances to incidents and excludes relief attendances. Relief attendances were taken into account in the model as 'unavailability' to ensure that the entire workload of appliances was accounted for.

3.4 ORH validated the model by day and hour, by comparing model outputs (for example, response performance and vehicle workload) to actual analysed values in the sample period (see Figure **3-1**).

3.5 Model validation showed a good match in terms of the distribution of response times and service-wide averages, as well as station workload. The model could therefore be used with confidence to explore the effects of changes in such factors as demand, deployment numbers, deployment locations and changes to the road network.

Modelled Base Position

Attendance Performance Reporting

3.6 The first step in modelling is to create a base position to use for resource planning purposes. The base position uses the same measures for response times as NFRS's proposed response standards to compare the modelled results to.

Figure 3-2: Modelled Base Position

Reporting Area	Average 1st Response Time						Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	All Incidents	Primary Fire	RTC	All Incidents
Attleborough	07:48	06:46	08:45	07:45	07:41	**07:47**	15:20	14:47	**15:05**
Dereham	09:00	09:30	08:23	08:19	11:24	**09:22**	15:30	12:59	**15:12**
Diss	09:13	08:26	10:08	09:06	12:59	**10:12**	13:17	15:21	**12:54**
Downham Market	11:51	11:19	10:26	09:37	10:51	**10:20**	21:45	22:09	**20:16**
Gorleston	06:46	06:48	06:53	07:28	08:43	**07:39**	10:51	10:49	**11:25**
Great Yarmouth	05:41	05:49	05:12	05:44	06:38	**06:02**	09:45	06:23	**10:25**
Kings Lynn	08:01	08:17	07:13	07:17	08:23	**07:51**	10:37	09:51	**10:17**
North Walsham	10:03	12:12	10:21	09:53	10:50	**10:31**	15:38	14:42	**15:58**
Norwich	06:41	06:53	07:00	07:02	08:26	**07:25**	09:38	10:05	**10:27**
Thetford	09:06	10:22	08:01	09:49	09:02	**09:32**	14:10	12:17	**15:11**
Wymondham	09:12	08:59	10:48	08:41	11:55	**09:37**	12:55	10:40	**11:51**
Urban	07:20	07:47	07:17	07:25	08:36	**07:48**	10:55	10:37	**11:23**
Rural Town	10:50	11:00	11:15	10:45	12:12	**11:15**	16:06	15:24	**16:29**
Village/Hamlet	13:30	13:48	12:47	13:48	16:42	**14:13**	19:09	16:47	**18:48**
NFRS-wide	**09:58**	**09:54**	**10:57**	**09:16**	11:06	**10:09**	**14:40**	**14:55**	**14:49**

Reporting Area	1st Response - % within 10 mins						2nd Response - % within 15 mins		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	All Incidents	Primary Fire	RTC	All Incidents
Attleborough	84.6%	91.7%	78.9%	89.0%	79.5%	**85.4%**	40.0%	73.3%	**57.8%**
Dereham	67.4%	69.2%	57.9%	67.6%	64.4%	**66.2%**	64.0%	77.8%	**69.7%**
Diss	60.0%	82.4%	66.7%	78.2%	65.8%	**72.3%**	66.7%	50.0%	**71.8%**
Downham Market	39.1%	37.5%	66.7%	68.5%	57.7%	**59.2%**	0.0%	0.0%	**5.3%**
Gorleston	93.9%	90.1%	90.9%	89.7%	79.2%	**87.1%**	88.8%	95.2%	**88.7%**
Great Yarmouth	97.2%	93.1%	97.8%	96.7%	89.1%	**93.6%**	87.9%	100.0%	**85.5%**
Kings Lynn	82.7%	74.1%	81.5%	90.8%	80.6%	**83.6%**	90.2%	90.0%	**86.9%**
North Walsham	62.5%	30.0%	40.0%	64.7%	62.4%	**60.6%**	44.4%	80.0%	**51.5%**
Norwich	91.4%	90.3%	83.8%	89.3%	82.1%	**87.1%**	93.2%	93.8%	**91.4%**
Thetford	68.5%	55.3%	60.6%	54.9%	57.9%	**58.6%**	65.4%	89.5%	**63.5%**
Wymondham	66.7%	72.2%	60.0%	75.3%	58.5%	**69.2%**	73.3%	100.0%	**86.3%**
Urban	85.5%	80.1%	80.9%	86.0%	79.2%	**82.9%**	85.1%	89.4%	**84.6%**
Rural Town	51.0%	48.2%	41.8%	53.6%	47.6%	**49.9%**	50.7%	50.0%	**51.5%**
Village/Hamlet	16.8%	19.0%	22.3%	19.3%	14.9%	**18.4%**	26.9%	42.1%	**32.6%**
NFRS-wide	**56.8%**	**58.7%**	**42.3%**	**67.2%**	58.9%	**59.5%**	**58.9%**	**56.0%**	**60.9%**

3.7 The base position for modelling uses:

- Average turnout times and availability for each pump for the last two financial years (2016/17 to 2017/18)
- Incident geographical distribution for eight financial years (2010/11 to 2017/18)

3.8 Attendance times are measured for:

- Average response time (mean time) and percentage of responses with target time, for first and second pump, from time of call
- Urban areas, rural towns, rural villages and hamlets, and NFRS-wide (see Appendix **C1**)
- Primary fires, secondary fires, RTCs, other incidents, all incidents

Average Response Times

3.9 The average first response time to all incidents NFRS-wide is 10m09s and the average second response time to all incidents NFRS-wide is 14m49s (see Figure **3-2**).

3.10 There are large variations in average response times between urban areas due to the different crewing types of pumps and the number of pumps at each station, as well as a difference in incident distribution.

Responses within Target

3.11 The model was set up to measure the percentage of first responses within 10 minutes by stop code and the percentage of second responses within 15 minutes. Overall 59.5% of all first responses are attended within 10 minutes of time of call, and 60.9% of all second responses are attended within 15 minutes. For primary fires 56.8% of first responses are within 10 minutes and 58.9% of second responses are within 15 minutes.

Station Workload

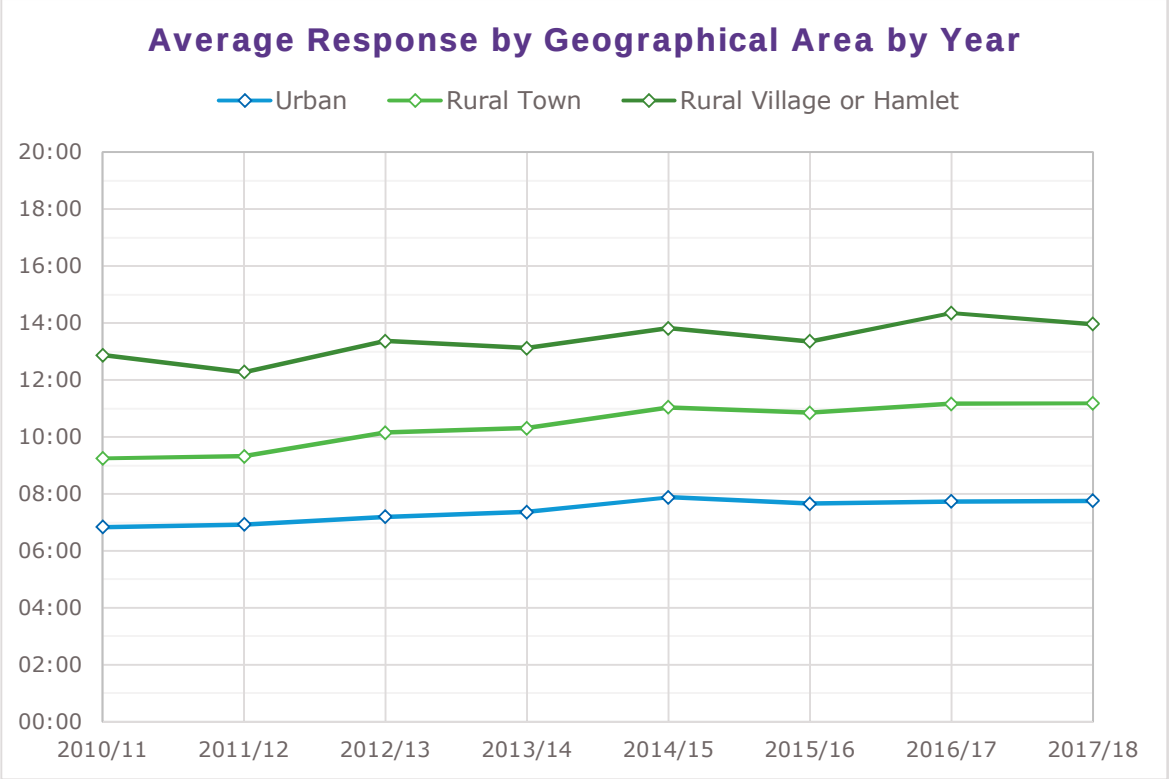
3.12 The modelled station workload matches the two-year average well. Earlham station has the highest number of annual responses to incidents at 1,117 and Outwell station has the lowest number of responses at 27. The workload for over-the-border pumps is reported for responses into Norfolk in Appendix **C2**.

Figure 4-1: Tool Interface

Clock Start:	**Time of Call**
Response Measure:	**Average Response**
Initial Incident Category:	**Overall**
Final Incident Category:	**Overall**
Final Incident Sub Category:	**Overall**
Responder Number:	**1**

Average Response by Geographical Area by Year

Geographical Area	Financial Year								Overall	Average Annual Incidents
	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18		
Urban	**06:50**	**06:56**	**07:12**	**07:22**	**07:53**	**07:40**	**07:44**	**07:45**	**07:24**	**3,946**
Rural	**11:44**	**11:19**	**12:16**	**12:16**	**12:56**	**12:32**	**13:14**	**12:59**	**12:23**	**3,326**
Rural Town	09:15	09:19	10:09	10:19	11:03	10:51	11:10	11:11	10:23	1,092
Rural Village or Hamlet	12:53	12:16	13:22	13:08	13:49	13:22	14:21	13:58	13:21	2,234
Overall	**09:07**	**08:52**	**09:23**	**09:40**	**10:21**	**10:02**	**10:10**	**10:02**	**09:40**	**7,272**



4 OUTPUTS

The optimal location for Sprowston fire station in the future is its current site.

There is a very small impact on first response times if Swaffham station is moved to Turbine Way, and no impact on second response times.

Merging Wymondham and Hethersett fire stations at Farrier Close reduces the first response time to RTCs in the Wymondham area, but there is an increase to other incident types. The impact is greater on second response performance due to the reduction in pumps.

Tidal crewing starting at North Earlham and moving to Sprowston has a slightly greater adverse effect on average first response times than the other way around, but these impacts are small and average second response in Norwich improves.

Optimal locations for officers to respond from produce coverage of 81% of the population in 20 minutes' drive from three sites, and 95% coverage from five sites.

The opening of the third river crossing in Great Yarmouth will improve average second response times in the area. Removing either of the retained pumps at Gorleston or Great Yarmouth has a similar adverse impact on response performance in both areas, but these are not as great as the improvement from the third river crossing. The response impacts of tidal crewing between Great Yarmouth and Gorleston stations are similar, but response times in the Great Yarmouth area are better than in the Gorleston area.

1. Achievability of New Urban and Rural Response Standard

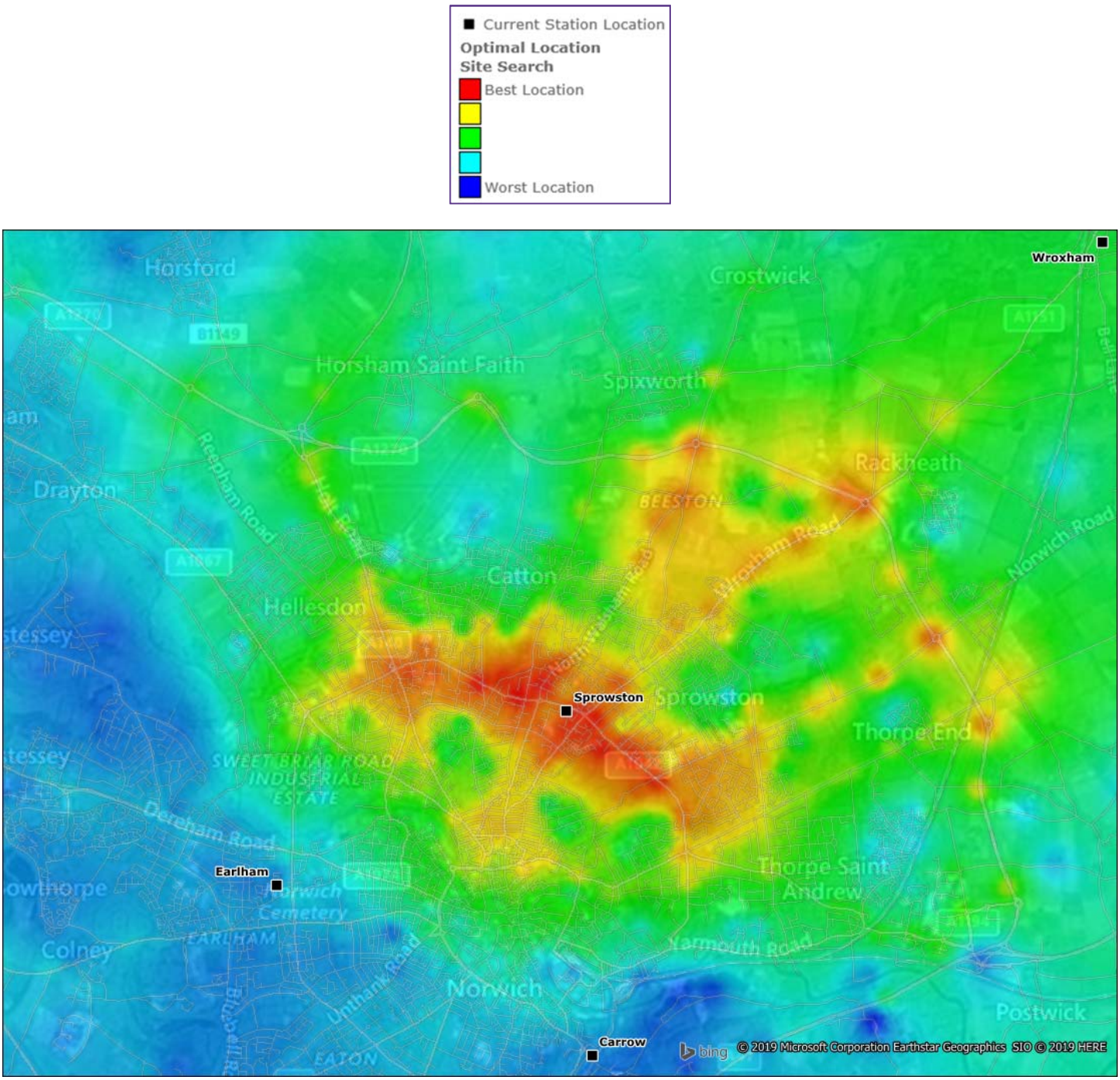
4.1 ORH analysed the response performance achieved against different measures to assess the achievability of new urban and rural response standards.

4.2 The main output of this requirement was a spreadsheet tool which was handed over to NFRS. This was to enable the performance achieved depending on a range of considerations to be investigated to inform the proposed NFRS response standards going forward (see Figure **4-1**).

4.3 There are five adjustable parameters in the tool:

- **Clock Start** – Response time calculation from Time of Call, Time Vehicle Assigned or Time Vehicle Mobile
- **Response Measure** – Average Time or Percentage within 4-20 minutes
- **Initial Incident Category** – All or individual categories
- **Final Incident Category** – All or individual categories by sub category
- **Responder Number** - First, second or third appliance on scene

Figure 4-2: Sprowston Optimal Location



2. Optimal Location for Sprowston Fire Station

Sprowston Optimisation Methodology

4.4 Additional demand was added across the Norwich Growth Triangle (NGT) area using a profile similar to incidents in the Norwich area. The Joint Core Strategy for the Broadland, Norwich and South Norfolk Local Plan target is to complete 36,820 dwellings by 2026, but the ONS Mid-2016 Sub-National Population Projections do not take significant housing growth into account (see Appendix **D1**).

4.5 The number of incidents across NFRS has remained similar over the last five years with low population growth. It is anticipated that the high housing growth areas will create additional demand in line with similar areas.

4.6 The future road network in the NGT is unknown, so the current road network with the Broadland Northway and potential routes for a Norwich Western Link Road were added to the road network for use in the location optimisation (see Appendix **D2**).

4.7 All stations except Sprowston were fixed in the model with their current deployments and turnout times. An additional optimal site for a wholetime pump was found using the current turnout time and availability of Sprowston's pump.

Performance Impacts of Demand Increase in NGT

4.8 The additional demand in the NGT increases workload for Norwich appliances, leading to a small increase in response times in Norwich. However, because Sprowston responds to the additional demand, which is located in the rural village/hamlet area, the average first response time decreases from 14m13s in the base position to 14m05s (see Appendix **D3**).

4.9 The workload at Norwich stations increases by a combined 189 additional responses per year (5.8% more responses); the majority of these responses are completed by Sprowston appliances. Wroxham annual responses increase from 119 to 156.

Norwich Western Link Road Changes

4.10 The four possibilities for the development of the Norwich Western Link road were included in the Sprowston location optimisation modelling. Each road option was modelled, and the impacts on response performance and workload were negligible. This modelling used the road network based on Option A because it is the largest change to the infrastructure of the road network.

Location Optimisation

4.11 Optimisation modelling was used to identify the optimal location to minimise average response times with the estimated NGT demand included. The model identified the current Sprowston fire station as the optimal location (see Figure **4-2**).

Figure 4-3: Relocating Swaffham Station Results

Average Response Performance from Relocating Swaffham Station

Reporting Area	Average 1st Response Time						Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire	RTC	**All Incidents**
Urban	07:20	07:47	07:17	07:25	08:36	**07:48**	10:55	10:37	**11:23**
Rural Town	10:53	11:04	11:17	10:49	12:15	**11:18**	16:06	15:24	**16:29**
Village/Hamlet	13:31	13:49	12:48	13:48	16:42	**14:14**	19:09	16:47	**18:48**
NFRS-wide	**09:59**	**09:55**	**10:58**	**09:17**	**11:07**	**10:10**	**14:40**	**14:55**	**14:49**

Impact from Base Position

Reporting Area	Average 1st Response Time Impact						Average 2nd Response Time Impact		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire	RTC	**All Incidents**
Urban	00:00	00:00	00:00	00:00	-00:00	**00:00**	00:00	00:00	**00:00**
Rural Town	00:03	00:04	00:02	00:04	00:03	**00:03**	00:00	00:00	**00:00**
Village/Hamlet	00:01	00:01	00:01	00:00	00:00	**00:01**	00:00	00:00	**00:00**
NFRS-wide	**00:01**	**00:01**	**00:01**	**00:01**	**00:01**	**00:01**	**00:00**	**00:00**	**00:00**

Station Workload

Station	Changes in Responses from Base Position	Predicted Average Annual Responses
Swaffham	-3	105
Kings Lynn North	1	605
Kings Lynn South	1	482
Watton	1	152
Overall	**0**	**10,450**

3. Relocating Swaffham Fire Station

Swaffham Simulation Modelling

4.12 ORH modelled relocating Swaffham's retained pump with its current availability and turnout time from the current station location (West Acre Road) to Turbine Way (see Appendix **E1**). All other stations were modelled as normal.

Relocating Station Results

4.13 There is a small increase to average first response times in rural areas. The largest adverse impact is 0m4s on average first response to secondary fires and false alarms in rural town areas. There is no impact on average second response times as a result of moving Swaffham station from West Acre Road to Turbine Way (see Figure **4-3**).

4.14 There is little change in the number of initial responses to incidents from Swaffham station when it moves from West Acre Road to Turbine Way.

4. Merging Wymondham and Hethersett Fire Stations

Wymondham Simulation Modelling

4.15 Modelling the merging of Wymondham and Hethersett fire stations at Farrier Close (see Appendix **F1**) was undertaken in three stages to show the impact of each change:

(a) Two pumps at new site and one pump at Hethersett

(b) Two pumps at new site and no pump at Hethersett

(c) One pump at new site and no pump at Hethersett

4.16 Pumps at Farrier Close were modelled with current average turnout time and availability for Wymondham pumps.

Merging Stations Results

4.17 Moving both Wymondham pumps from the current station location on London Road to Farrier Close (see Appendix **F2**):

- Increases average first response time to secondary fires in Wymondham by 0m59se and to false alarms by 0m24s
- Reduces average first response time to RTCs in Wymondham by 0m55s and average second response time to RTCs by 0m46s
- Increases average first response time to RTCs in Attleborough by 0m21s and average second response time to Primary Fires by 1m19s

4.18 Removing the pump at Hethersett (see Appendix **F3**):

- Has little impact on the response times in Wymondham, but slightly reduces the improvement to average second response time to RTCs

Figure 4-4: One Wymondham Pump at Farrier Close and No Pump at Hethersett Results

Average Response Performance

Reporting Area	Average 1st Response Time						Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire	RTC	**All Incidents**
Attleborough	07:54	06:50	09:07	07:49	07:47	**07:54**	16:51	-	**16:36**
Norwich	06:42	06:54	07:02	07:03	08:27	**07:26**	09:41	10:11	**10:31**
Wymondham	09:41	10:11	10:20	09:26	12:29	**10:16**	17:42	14:48	**16:58**
Urban	07:21	07:49	07:18	07:27	08:37	**07:49**	11:04	10:49	**11:34**
Rural Town	10:52	11:03	11:17	10:48	12:17	**11:18**	16:09	15:29	**16:32**
Village/Hamlet	13:31	13:49	12:48	13:51	16:43	**14:14**	19:15	16:55	**18:56**
NFRS-wide	**09:59**	**09:56**	**10:58**	**09:18**	**11:08**	**10:11**	**14:47**	**15:04**	**14:58**

Impact from Base Position

Reporting Area	Average 1st Response Time						Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire	RTC	**All Incidents**
Attleborough	00:06	00:04	00:22	00:04	00:06	**00:07**	01:31	-	**01:31**
Norwich	00:01	00:01	00:02	00:01	00:01	**00:01**	00:03	00:06	**00:04**
Wymondham	00:29	01:12	-00:28	00:45	00:34	**00:39**	04:47	04:08	**05:07**
Urban	00:01	00:02	00:01	00:02	00:01	**00:01**	00:09	00:12	**00:11**
Rural Town	00:02	00:03	00:02	00:03	00:05	**00:03**	00:03	00:05	**00:03**
Village/Hamlet	00:01	00:01	00:01	00:03	00:01	**00:01**	00:06	00:08	**00:08**
NFRS-wide	**00:01**	**00:02**	**00:01**	**00:02**	**00:02**	**00:02**	**00:07**	**00:09**	**00:09**

- Increases average first and second response times in Rural Towns, Rural Villages and Hamlets, and Norwich by a few seconds

4.19 The final position of only having one pump at Farrier Close (see Figure **4-4**):

- Reduces the improvement to average first response times to RTCs in Wymondham
- Increases average first response times to all other incidents in Wymondham and all incidents by 39 seconds
- Has a significant impact on average second response times in Wymondham, increasing by over five minutes to all incidents
- Increases average second response times in Rural and Urban areas with a service-wide impact to all incidents of nine seconds

4.20 The impacts on station workload are (see Appendix **F4**):

- Moving Wymondham station to Farrier Close increases the number of initial responses to incidents at the station by 14 responses
- There is a small knock-on effect for the surrounding stations, with the number of responses from Attleborough station increasing and Carrow and Earlham decreasing
- Removing Hethersett station increases the workload at Wymondham station the most by 73 initial responses (87 from the base position)
- Removing the second pump at Farrier Close reduces the number of initial responses from Wymondham station, but this is still 11 more than the base position
- The workload for Attleborough station increases to 269 initial responses when there is only one pump at Farrier Close

5. Tidal Crewing between Sprowston and North Earlham Fire Stations

Tidal Crewing Simulation Methodology

4.21 The effect on proposed emergency response standards of tidal crewing between Sprowston and North Earlham fire stations was modelled using simulation modelling. Tidal crewing is when appliances come together for staffing between 08:30 and 09:30, and between 17:30 and 18:30, before an appliance is sent to North Earlham or Sprowston fire station.

4.22 For each day of the week, the tidal crewed pump was modelled as:

- 09:30 to 09:45 – travels from Sprowston to North Earlham
- 09:45 to 17:15 – responds from North Earlham station
- 17:15 to 17:30 – travels from North Earlham to Sprowston

Figure 4-5: Norwich Tidal Crewing Average Response Time Comparison

Impact of Earlham Crew Deployed from Sprowston from Base Position

Reporting Area	Average 1st Response Time						Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire	RTC	**All Incidents**
Norwich	00:05	00:04	00:06	00:06	00:05	**00:05**	-00:02	-00:04	**-00:01**
Urban	00:02	00:01	00:02	00:03	00:02	**00:02**	-00:02	-00:02	**-00:01**
Rural Town	00:00	00:00	00:00	00:00	00:00	**00:00**	-00:01	-00:02	**-00:01**
Village/Hamlet	-00:02	-00:01	-00:02	-00:02	-00:02	**-00:02**	-00:02	-00:02	**-00:02**
NFRS-wide	**00:00**	**00:00**	**-00:01**	**00:01**	**00:01**	**00:01**	**-00:01**	**-00:02**	**-00:01**

Impact of Sprowston Crew Deployed from Earlham from Base Position

Reporting Area	Average 1st Response Time						Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire	RTC	**All Incidents**
Norwich	00:05	00:08	00:07	00:04	00:07	**00:06**	-00:04	-00:07	**-00:06**
Urban	00:03	00:03	00:03	00:02	00:04	**00:03**	-00:02	-00:03	**-00:03**
Rural Town	00:00	00:00	00:00	00:00	00:00	**00:00**	00:00	00:01	**00:01**
Village/Hamlet	00:00	00:01	00:01	00:00	00:01	**00:01**	00:01	00:01	**00:01**
NFRS-wide	**00:02**	**00:02**	**00:02**	**00:01**	**00:02**	**00:02**	**-00:01**	**00:00**	**-00:01**

- 17:30 to 18:30 – responds from Sprowston station
- 18:30 to 18:45 – travels from Sprowston to North Earlham
- 18:45 to 08:15 – responds from North Earlham station
- 08:15 to 08:30 – travels from North Earlham to Sprowston
- 08:30 to 09:30 – responds from Sprowston station

4.23 While the tidal crewed pump is travelling between stations, it is available to respond to incidents. All other NFRS pumps were modelled as responding as normal, including the retained pump at North Earlham.

Earlham Crew Deployed from Sprowston Results

4.24 When the wholetime pumps start at Sprowston, average first response time will increase by 0m05s in Norwich to 7m30s and by 0m01s NFRS-wide to 10m10s. There will be small improvements to average second response times as a result of Earlham's tidal crewing (see Appendix **G1a**).

4.25 In Norwich, the percentage of first responses in 10 minutes to primary fires will be 90.4% and to all incidents 86.1%. The percentage of second responses in 15 minutes to primary fires will be 93.1% and to all incidents 91.2% (see Appendix **G1b**).

4.26 The workload of the two Earlham pumps will increase slightly by 22 initial responses to incidents to 1,139 responses per year. Sprowston's workload will decrease slightly by 20 responses to 1,027 responses per year. The effect of Earlham's tidal crewing will have a small impact on the surrounding stations and a small knock-on effect to other stations (see Appendix **G1c**).

Sprowston Crew Deployed from Earlham Results

4.27 The simulation modelling was repeated with the Sprowston and North Earlham wholetime pumps both starting at North Earlham and one pump travelling to Sprowston.

4.28 Average first response time will increase by 0m06s in Norwich to 7m31s and by 0m03s NFRS-wide to 10m11s. There will be small improvements to average second response times as a result of Sprowston's tidal crewing (see Appendix **G2a**).

4.29 In Norwich, the percentage of first responses in 10 minutes to *primary fires - building* will be 91.4%, to *primary fires – other* will be 87.6% and to all incidents 85.8%. The percentage of second responses in 15 minutes to both *primary fires – building* and *primary fires – other* will be 93.6% and to all incidents 91.5% (see Appendix **G2b**).

4.30 Sprowston's workload will increase slightly by 55 initial responses to incidents to 1,102 responses per year. The workload of the two pumps at Earlham will decrease slightly by 65 responses to 1,052 responses per year. The effect of Sprowston's tidal crewing will have a small impact on the surrounding stations and a small knock-on effect to other stations crewing (see Appendix **G2c**).

Figure 4-6: Optimal Officer Locations Coverage

Officer Locations	Modelled Scenario		
	Blank Canvas Locations	Optimal Existing Stations	Minimise Time Stations
3 Sites	Swaffham	Swaffham	Kings Lynn South
	Old Buckenham	Attleborough	Sprowston
	Bloefield	Acle	Gorleston
4 Sites	Kings Lynn	Kings Lynn South	Kings Lynn South
	Watton	Watton	Thetford
	Saxthorpe	Aylsham	Sprowston
	Bloefield	Acle	Gorleston
5 Sites	Kings Lynn	Kings Lynn South	Kings Lynn South
	Watton	Watton	Thetford
	Saxthorpe	Long Stratton	Dereham
	Long Stratton	Aylsham	Sprowston
	Acle	Acle	Gorleston

Modelled Scenario	% of Coverage within 20 minutes		
	3 Sites	4 Sites	5 Sites
Blank Canvas Locations	80.9%	90.4%	95.0%
Optimal Existing Stations	72.1%	83.1%	90.9%
Minimise Time Stations	68.0%	78.7%	85.0%

Modelled Scenario	50% Coverage Time		
	3 Sites	4 Sites	5 Sites
Blank Canvas Locations	15.0 mins	13.5 mins	13.5 mins
Optimal Existing Stations	17.0 mins	15.5 mins	14.5 mins
Minimise Time Stations	13.0 mins	11.0 mins	10.0 mins

Tidal Crewing Comparison

4.31 There is a slightly greater adverse effect on average first response times from tidal crewing starting at North Earlham and moving to Sprowston fire station, than the other way around. However, these impacts are small and average second response in Norwich is better (see Figure **4-5**).

4.32 The changes in workload are slightly greater with tidal crewing starting at North Earlham and moving to Sprowston fire station, but the workload of the three wholetime stations in Norwich is similar.

6. Optimal Locations for Officers

4.33 Optimisation modelling was undertaken to find three, four and five officer locations across Norfolk.

4.34 The location optimisation criteria was to find the best locations for attending a life risk incident and COMAH/high risk site within 20 minutes of booking mobile. Life risk incidents and COMAH/high risk sites were treated as equivalent risk.

4.35 The results for three scenarios were covered:

- 'Blank Canvas' – any location across Norfolk, maximised in 20 minutes
- Existing Stations – selected only from current station locations, maximised in 20 minutes
- Minimise Time Stations – selected only from current station locations, to minimise average response time

Three Sites

4.36 The optimal three sites selected by the 'Blank Canvas' scenario are West Swaffham, Old Buckenham and Bloefield, and cover 81% of life risk incidents and high risk sites in 20 minutes' drive time. The optimal stations are close to these sites at Swaffham, Attleborough and Acle, but the coverage reduces to 72%. The three stations that minimise the average response time are located in the large towns at Kings Lynn South, Sprowston and Gorleston. Coverage from these sites in 20 minutes is 68% (see Figure **4-6**).

4.37 The coverage of incidents and catchments of three sites are shown on the maps in Appendix **H1**.

Four Sites

4.38 The optimal four sites selected by the 'Blank Canvas' scenario are Kings Lynn, Watton, Saxthorpe and Bloefield, and cover 90% of life risk incidents and high risk sites in 20 minutes' drive time. Of the optimal four stations, only Acle was selected in the three site scenario. The other stations selected are Kings Lynn South, Watton and Aylsham, and coverage improves to 83%. The scenario of minimising the average time adds Thetford to the previous three stations selected, and coverage in 20 minutes' drive time increases to 79%.

Figure 4-7: Third River Crossing Average Response Time Comparison

Impact of Permanent Bridge Access from Base Position

Reporting Area	Average 1st Response Time Impact					Average 2nd Response Time Impact		
	Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
Gorleston	-00:02	-00:03	-00:02	-00:03	**-00:03**	-01:03	-01:14	**-01:10**
Great Yarmouth	-00:04	-00:06	-00:03	-00:03	**-00:03**	-00:50	-00:33	**-00:47**
Urban	-00:01	-00:01	-00:01	00:00	**-00:01**	-00:12	-00:10	**-00:13**
Rural Town	00:00	00:00	00:00	00:00	**00:00**	-00:05	-00:08	**-00:05**
Village/Hamlet	00:00	-00:00	00:00	00:00	**00:00**	-00:02	-00:01	**-00:02**
NFRS-wide	**00:00**	**-00:01**	**00:00**	**00:00**	**00:00**	**-00:07**	**-00:04**	**-00:08**

Impact of Bridge with Restricted Access from Base Position

Reporting Area	Average 1st Response Time Impact					Average 2nd Response Time Impact		
	Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
Gorleston	-00:02	-00:03	-00:02	-00:03	**-00:03**	-00:59	-01:09	**-01:05**
Great Yarmouth	-00:04	-00:06	-00:03	-00:02	**-00:03**	-00:47	-00:31	**-00:44**
Urban	-00:01	-00:01	-00:01	00:00	**-00:01**	-00:11	-00:09	**-00:12**
Rural Town	00:00	00:00	00:00	00:00	**00:00**	-00:05	-00:07	**-00:05**
Village/Hamlet	00:00	00:00	00:00	00:00	**00:00**	-00:02	-00:01	**-00:02**
NFRS-wide	**00:00**	**-00:01**	**00:00**	**00:00**	**00:00**	**-00:07**	**-00:04**	**-00:07**

4.39 The coverage of incidents and catchments of four sites are shown on the maps in Appendix **H2**.

Five Sites

4.40 Of the optimal five sites selected by the 'Blank Canvas' scenario, three are the same as for four sites – Kings Lynn, Watton and Saxthorpe. The other two sites are Long Stratton and Acle. These five sites cover 95% of life risk incidents and high risk sites in 20 minutes' drive time. The optimal five stations scenario also adds Long Stratton station to the four-site scenario and increases coverage to 91%. The scenario of minimising the average time adds Dereham to the previous four stations selected and coverage improves to 85%.

4.41 The coverage of incidents and catchments of four sites are shown on the maps in Appendix **H3**.

Officer Optimal Locations Comparison

4.42 Of the three modelled scenarios, the 'Blank Canvas' optimal officer locations provide the best cover to life risk incidents and high risk sites in 20 minutes' drive time. If officers need to respond from existing stations, then coverage decreases. However, if officers are located in the centre of towns, then the average response time will be faster, with 50% of life risk incidents and high risk sites being within 13 minutes' drive of three stations and 10 minutes' drive time of five stations (see Figure **4-6**). The cumulative coverage graphs indicate that for optimising within a specific time, the choice of target time can have a large impact on the locations selected.

7. Response Provision in Great Yarmouth

Great Yarmouth Simulation Methodology

4.43 Simulation modelling runs were undertaken to assess the opportunities for improving emergency response times and efficiency of response provision in Great Yarmouth with the planned construction of the third river crossing.

4.44 The scenarios modelled were:

- Impact of the additional third crossing – Accessible 24/7 and Assumed Inaccessibility
- Pump removals – Each pump removed individually from Great Yarmouth and Gorleston
- Tidal crewing – Great Yarmouth to Gorleston and Gorleston to Great Yarmouth

Third River Crossing

4.45 The planned bridge is to be built over the River Yare, linking the A47 at Harfrey's Roundabout on the western side with South Denes Road on the eastern side (see Appendix **I1**). Subject to development consent, the bridge will be operational by

Figure 4-8: Appliance Removals - Average Response Time Impact Comparison

Bridge Restricted Access: Average Response Performance

Scenario	Reporting Area	Average 1st Response Time					Average 2nd Response Time		
		Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
'Do Nothing' Scenario	Gorleston	06:44	06:45	06:51	07:25	**07:36**	09:52	09:40	**10:20**
	Great Yarmouth	05:37	05:43	05:09	05:42	**05:59**	08:58	05:52	**09:41**
	NFRS-wide	**09:58**	**09:53**	**10:57**	**09:16**	**10:09**	**14:33**	**14:51**	**14:42**

Impact from 'Do Nothing' Scenario

Remove **GOR RDS** Pump	Gorleston	00:09	00:10	00:08	00:09	**00:09**	00:23	00:16	**00:23**
	Great Yarmouth	00:06	00:07	00:07	00:06	**00:07**	00:23	00:21	**00:22**
	NFRS-wide	**00:01**	**00:01**	**00:01**	**00:01**	**00:01**	**00:03**	**00:01**	**00:03**
Remove **GYA RDS** Pump	Gorleston	00:05	00:07	00:05	00:06	**00:06**	00:16	00:11	**00:15**
	Great Yarmouth	00:08	00:09	00:07	00:07	**00:08**	00:41	00:28	**00:41**
	NFRS-wide	**00:01**	**00:01**	**00:01**	**00:01**	**00:01**	**00:03**	**00:02**	**00:03**
Remove **GOR WT** Pump	Gorleston	01:42	01:49	01:44	01:48	**01:48**	02:47	03:14	**02:55**
	Great Yarmouth	00:17	00:17	00:17	00:15	**00:17**	02:27	03:00	**02:35**
	NFRS-wide	**00:07**	**00:08**	**00:05**	**00:08**	**00:08**	**00:19**	**00:15**	**00:21**
Remove **GYA WT** Pump	Gorleston	00:21	00:21	00:17	00:18	**00:19**	02:44	03:13	**02:51**
	Great Yarmouth	02:01	01:57	01:44	02:05	**02:00**	02:45	03:10	**02:54**
	NFRS-wide	**00:08**	**00:10**	**00:05**	**00:08**	**00:09**	**00:21**	**00:15**	**00:23**

early 2023. The planned bridge will be unavailable to cross when it opens to allow taller river traffic through.

4.46 The planned bridge and connecting roads were added to the road network in the model. The road speed limit was assumed to be 40 mph in line with the surrounding current roads.

4.47 It is anticipated that the bridge will open 15 times per day for 5 minutes at a time *(source: BBC)*. ORH has modelled the bridge as opening between 09:00 and 21:00 to assess the greatest impact on response times when demand is highest. The modelling assumes that NFRS will know whether the bridge is open or closed before mobilising and will choose which route to take accordingly.

Impact of Bridge Accessibility

4.48 Firstly, the third river crossing was modelled with permanent access to assess the impact of the bridge, then the bridge was modelled with restricted access (see Figure **4-7**).

4.49 There is an improvement of over one minute to average second response times in Gorleston when the bridge is permanently accessible. There is a similar, but slightly smaller, improvement to average second response times in Great Yarmouth. The proportion of incidents responded to within 10 minutes for first response and within 15 minutes for second response is currently over 80% in Gorleston and Great Yarmouth, and there is a small improvement to these measures with the addition of the third river crossing (see Appendix **I2**).

4.50 The effect of the bridge with restricted access is small, and there is still a large improvement to average second response times compared to first response (see Appendix **I3**).

Appliance Removals

4.51 Removing either retained pump at Gorleston or Great Yarmouth has a similar adverse impact on average first response times in both areas. There is a larger impact on average second response times in Great Yarmouth when the retained pump is removed, but second response times remain faster than in Gorleston (see Figure **4-8**).

4.52 Removing either wholetime pump at Gorleston or Great Yarmouth has a similar large adverse impact on average second response times in both areas. There is a larger impact on average first response times in Great Yarmouth when the wholetime pump is removed.

4.53 The percentage impact on first responses in 10 minutes is largest to false alarms in Gorleston when the Gorleston wholetime pump is removed, reducing from 90.2% to 65.0% (see Appendix **I4a**).

4.54 The impacts of station workload are smallest when the retained pump at Gorleston is removed, and largest when the wholetime pump at Great Yarmouth is removed (see Appendix **I4b**).

Figure 4-9: Great Yarmouth Tidal Crewing Average Response Time Impact Comparison

Impact of Gorleston Crew Deployed from Great Yarmouth from Base Position

Reporting Area	Average 1st Response Time Impact					Average 2nd Response Time Impact		
	Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
Gorleston	00:08	00:09	00:13	00:09	**00:10**	-00:02	-00:01	**-00:01**
Great Yarmouth	00:00	-00:01	-00:01	-00:01	**-00:01**	-00:06	-00:09	**-00:07**
Urban	00:01	00:01	00:01	00:01	**00:01**	-00:01	-00:01	**-00:01**
Rural Town	00:00	00:00	00:00	00:00	**00:00**	-00:01	-00:01	**-00:01**
Village/Hamlet	00:00	00:00	00:00	00:00	**00:00**	00:00	00:00	**00:00**
NFRS-wide	**00:00**	**00:00**	**00:00**	**00:01**	**00:01**	**-00:01**	**00:00**	**-00:01**

Impact of Great Yarmouth Crew Deployed from Gorleston from Base Position

Reporting Area	Average 1st Response Time Impact					Average 2nd Response Time Impact		
	Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
Gorleston	-00:01	-00:01	-00:01	-00:01	**-00:01**	-00:11	-00:15	**-00:12**
Great Yarmouth	00:11	00:10	00:11	00:12	**00:11**	00:08	00:03	**00:07**
Urban	00:01	00:01	00:01	00:01	**00:01**	00:00	-00:01	**-00:01**
Rural Town	00:00	00:01	00:00	00:00	**00:00**	00:00	-00:01	**00:00**
Village/Hamlet	00:00	00:00	00:00	00:00	**00:00**	00:00	00:00	**00:00**
NFRS-wide	**00:01**	**00:01**	**00:00**	**00:01**	**00:01**	**00:00**	**00:00**	**00:00**

Tidal Crewing Simulation Modelling

4.55 For each day of the week, the tidal crewed pump was modelled as:

- 09:30 to 09:45 – travels from Great Yarmouth to Gorleston
- 09:45 to 17:15 – responds from Gorleston station
- 17:15 to 17:30 – travels from Gorleston to Great Yarmouth
- 17:30 to 18:30 – responds from Great Yarmouth station
- 18:30 to 18:45 – travels from Great Yarmouth to Gorleston
- 18:45 to 08:15 – responds from Gorleston station
- 08:15 to 08:30 – travels from Gorleston to Great Yarmouth
- 08:30 to 09:30 – responds from Great Yarmouth station

4.56 The modelling results for tidal crewing of Gorleston crew deployed from Great Yarmouth are set out in Appendix **I5a**.

4.57 The simulation modelling was repeated with the Great Yarmouth and Gorleston wholetime pumps both starting at Gorleston and one pump travelling to Great Yarmouth. The modelling results for this scenario are set out in Appendix **I5b**.

4.58 All other NFRS pumps were modelled as responding as normal, including the retained pumps at Great Yarmouth and Gorleston.

Tidal Crewing Comparison

4.59 There is a similar adverse effect on average first response times as a result of tidal crewing from Great Yarmouth and Gorleston in the opposite areas. Average second response times are better in Gorleston when tidal crewing starts there, but second response times are slower in Great Yarmouth (see Figure **4-9**).

4.60 The changes in workload are slightly greater with tidal crewing starting at Great Yarmouth and moving to Gorleston fire station, but the workload of the two stations is more closely aligned than when the tidal crew starts at Gorleston and moves to Great Yarmouth (see Appendix **I5c**).

Appendices

A	Methodology Overview
B	Current Service Profile
C	Model Setup
D	Optimal Location for Sprowston Fire Station
E	Relocating Swaffham Fire Station
F	Merging Wymondham and Hethersett Fire Stations
G	Tidal Crewing between Sprowston and North Earlham Fire Stations
H	Optimal Locations for Officers
I	Response Provision in Great Yarmouth

Norfolk Fire and Rescue Service

Provision of IRMP Service Change Modelling

Final Report

17 April 2019

ORH/NfF/5

PLAN. PREPARE. **PERFORM.**

A Methodology Overview

A1 Simulation

A2 Optimisation

Simulation

ORH Approach

KEY BENEFITS

- Produces evidence-based solutions to a range of planning questions
- Supports management decision-making when presenting a case for change
- Provides a risk-free environment to quickly test many different options
- Quantifies the impacts on performance of potential changes to service delivery

Answering complex planning questions using simulation modelling

THE CHALLENGE

All emergency services must make difficult decisions about how to deploy resources to provide the best response to the public, factoring in financial pressures, time constraints and other competing issues. Before implementing changes to operations, emergency services should take an evidence-based approach in order to understand the potential impacts on response performance and workload. ORH's market-leading simulation models enable ambulance, fire and police services to make informed decisions in a risk-free environment.

> ***ORH modelled the deployment of ambulance operational resources to assist the organisation in achieving contracted response times. ORH's work also informed property investment decisions for ambulance depots over the next eight years. The approach was robust and relevant to our specific circumstances."***
>
> Chief Executive Officer, Australian Ambulance Service

ORH'S APPROACH

ORH's models replicate the key characteristics of an emergency service, and predict future behaviour and performance under a variety of different scenarios. We analyse service data in detail to understand current behaviour and provide inputs for the model in terms of demand, resources and response strategies. The model is also supplied with detailed travel time data, calibrated against actual journeys. Vehicles within the model respond to incident demand according to proximity and dispatch protocols.

We have designed each of our models to examine the different operational practices across all emergency services, for example:

- **Ambulance:** clinical specialities at medical facilities and changes to vehicle and skill mix.
- **Fire:** specialist appliances and multi-vehicle dispatch strategies.
- **Police:** mobile patrols and the balance of emergency and non-emergency incidents.

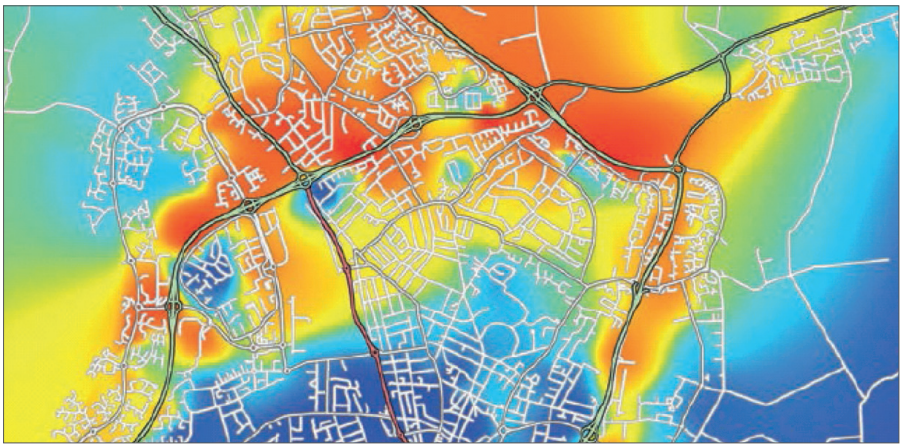
ORH's experienced consultants use the simulation models to address a wide range of 'what if?' planning questions, including:

- How will future demand changes affect performance?
- Where are the best locations for adding or removing resources?
- What impacts do new response or dispatch protocols have on vehicle workload?

Crucially, the models can assess questions individually or in combination to give a full picture of the impacts on response performance and utilisation. Detailed outputs include performance by time of day, maps of response times and the breakdown of workload by incident type.

Optimisation

ORH Approach



KEY BENEFITS

- Proven approach successfully applied for hundreds of emergency services
- Identify optimal sites for stations and standby points
- Highlight the best locations within a local area
- Take account of specific targets, objectives or operational constraints
- Practical support for implementation

Optimising response locations for emergency services

THE CHALLENGE

Identifying and evaluating optimal locations for stations and resources is a highly complex procedure. For an example scenario where an emergency service wants to place 20 resources across 15 stations, there are over 1.4 billion potential combinations to consider. If the service is not restricted to existing locations, the numbers become astronomical. Some of the questions that emergency services need to answer include:

- Where is the optimal site to relocate an old station, merge existing stations or build an additional station?
- How many locations are required to meet response standards?
- Where should stations be located to meet future demand?
- What is the optimal balance between stations and standby points?

> ***"ORH determined optimum locations for new and existing fire stations using accurate modelling tools, and helped us to identify the most efficient use of our resources,***
>
> Assistant Chief Officer,
> UK Fire & Rescue Service

ORH'S APPROACH

ORH's unique and powerful program, OGRE, optimises the locations of sites, quickly determining which options best achieve the objectives. In order to do this it uses a sophisticated genetic algorithm to assess configurations.

ORH designed OGRE to answer a range of optimisation questions, taking account of issues that are specific to each emergency service. The bespoke optimisation process addresses the following:

- **Response standards:** minimise average response times or maximise the number of incidents within specific timeframes?
- **Risk factors:** assess coverage to incident locations or apply a risk-based approach that can include multiple factors?
- **Resources:** the types of vehicle that contribute to coverage, and whether multiple responders are required?
- **Restrictions:** are there any fixed current locations, and can new sites be located anywhere within the area?

To deliver solutions, ORH's experienced consultants work closely with clients to specify their requirements, understand the constraints and iteratively develop outcomes. Using simulation modelling, we fully test all potential options to quantify the impacts on response times and vehicle workload.

The outcomes from the process include:

- Service-wide maps to identify optimal sites and compare to current response locations.
- Detailed impacts on response performance and vehicle workload.
- Site-search maps that highlight the best options for potential sites within the local area.

B Current Service Profile

B1 Current Deployments

B2 Availability

B2a Pump Availability: 24/7 Average

B2b Availability Profile

B3 Demand

B3a Hourly Profile

B3b Geographical Distribution

B3c Initial Incident Type vs Final Incident Type

B4 Response Profile

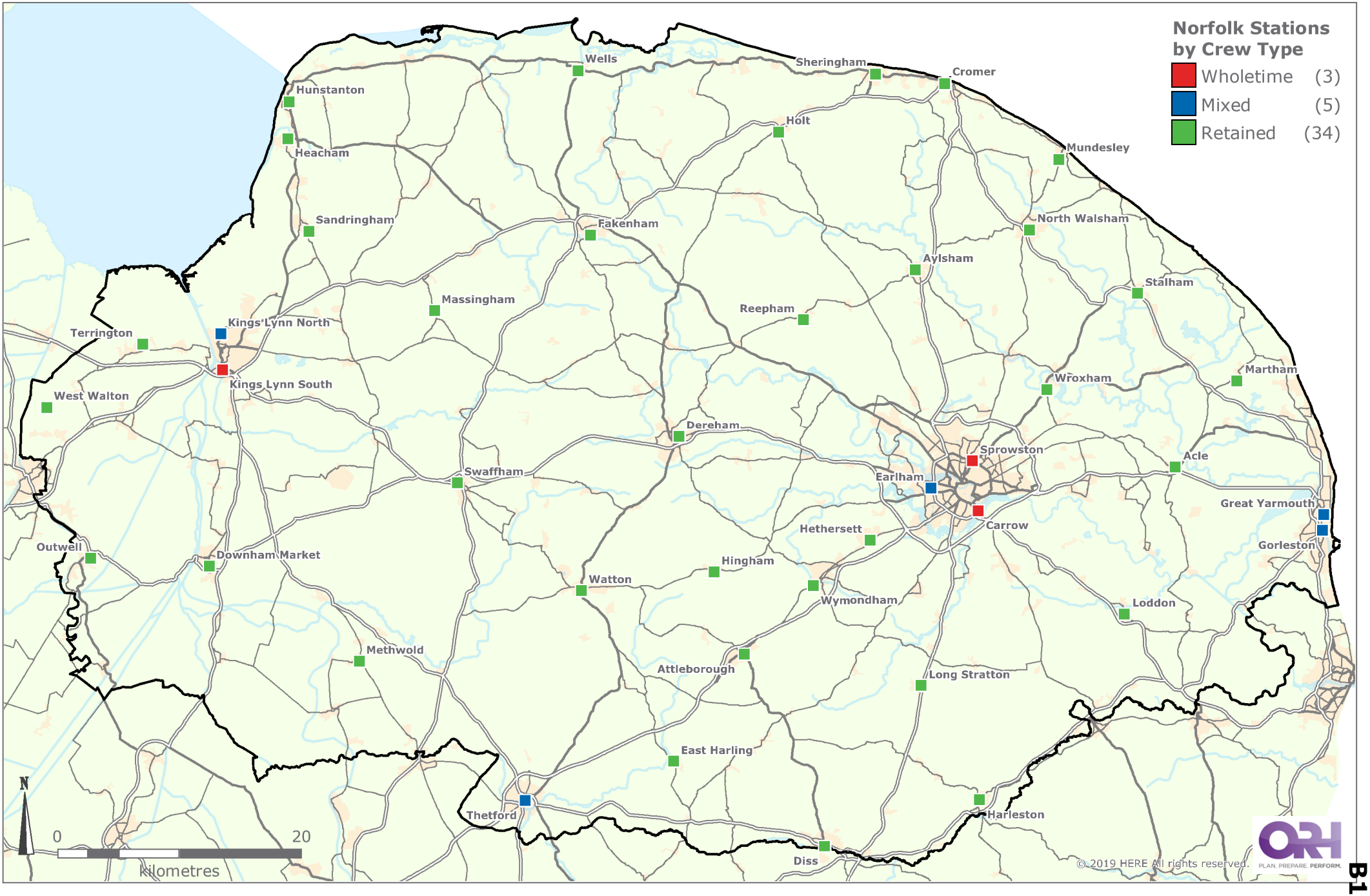
B4a Responses by Station

B4b Average 1st Response by ERS and Final Incident Category

B4c Average Turnout by Crew Type by Hour

B4d Average Travel Time by ERS Category and Area

Current Deployments

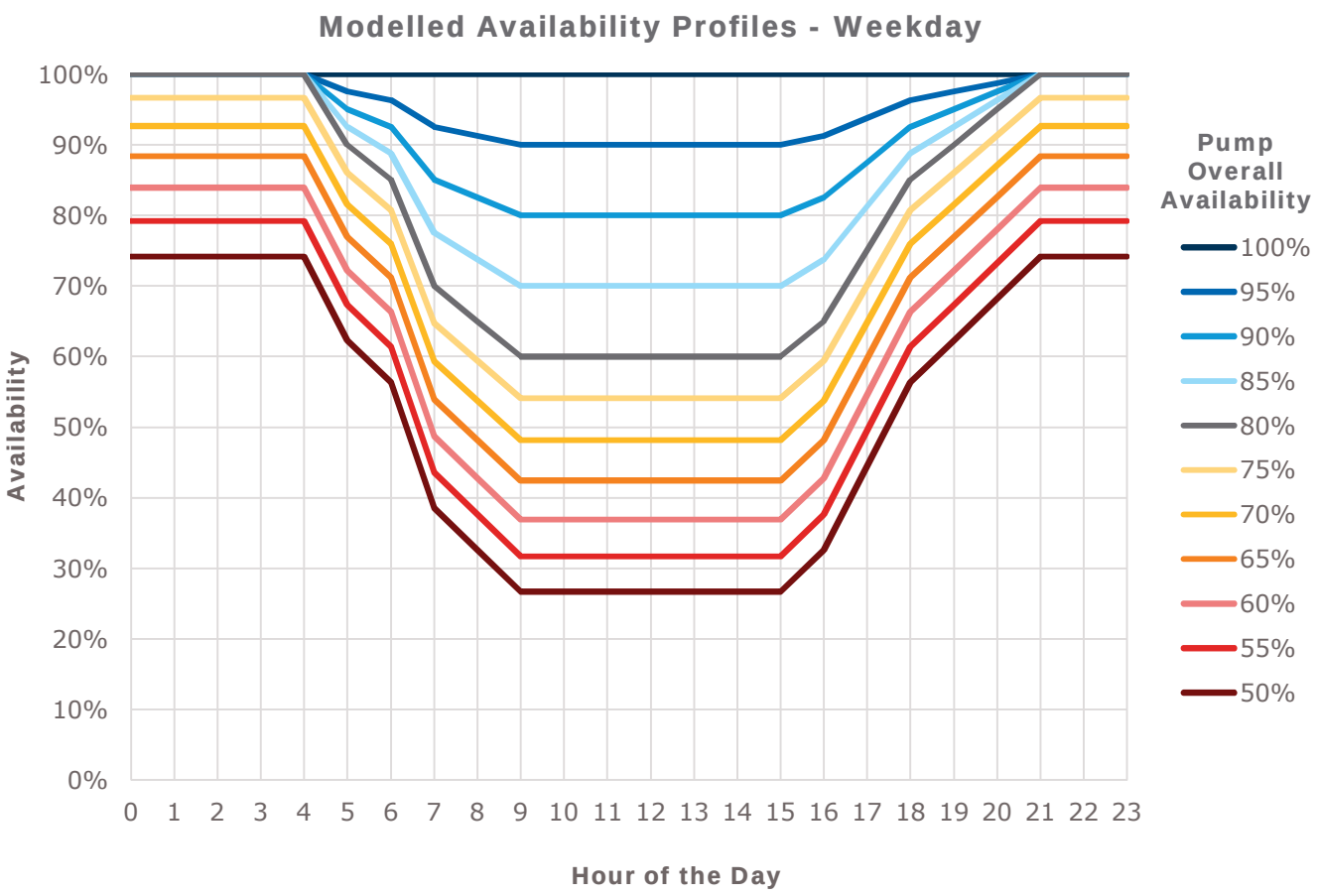


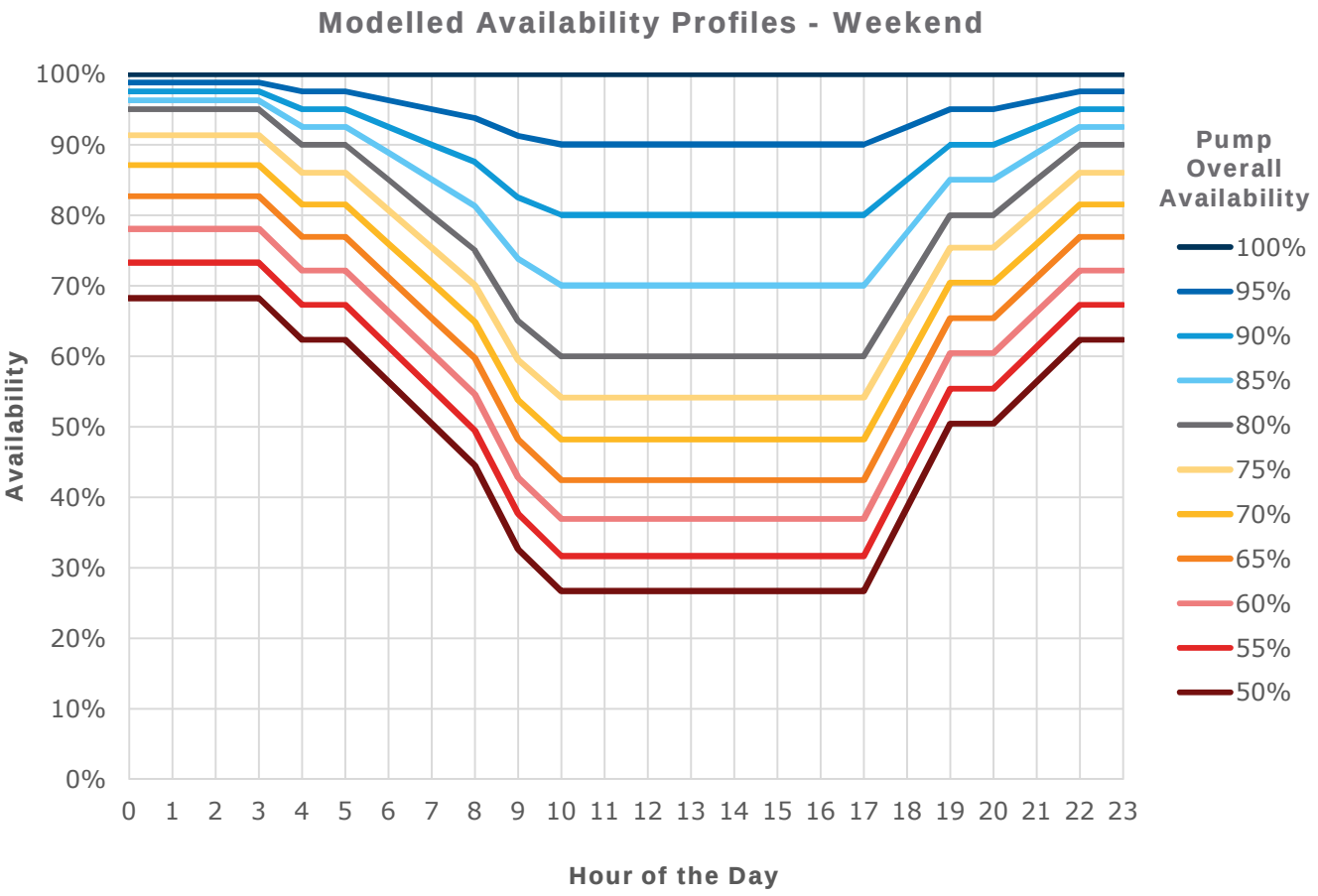
B1

Pump Availability: 24/7 Average

ShiftId	Crew Type	2016/2017	2017/2018	Average
CARP7	Wholetime	99.5%	99.6%	**99.5%**
ERLP1	Wholetime	99.7%	99.6%	**99.7%**
GORP7	Wholetime	99.4%	99.8%	**99.6%**
GYAP1	Wholetime	99.8%	99.8%	**99.8%**
KLNP1	Wholetime	98.6%	99.3%	**99.0%**
KLSP7	Wholetime	99.5%	99.4%	**99.4%**
SPRP1	Wholetime	99.5%	99.5%	**99.5%**
THEP7	Wholetime	99.1%	99.0%	**99.1%**
ACLP8	Retained	69.1%	58.0%	**63.5%**
ATTP1	Retained	99.8%	99.1%	**99.5%**
AYLP1	Retained	97.2%	96.1%	**96.7%**
CROP1	Retained	84.4%	87.0%	**85.7%**
DERP1	Retained	99.5%	98.6%	**99.0%**
DERP2	Retained	71.9%	55.3%	**63.6%**
DISP1	Retained	98.1%	97.4%	**97.7%**
DISP2	Retained	74.3%	69.5%	**71.9%**
DMKP1	Retained	92.7%	90.2%	**91.4%**
EHAP3	Retained	59.6%	52.9%	**56.3%**
ERLP3	Retained	67.4%	68.8%	**68.1%**
FAKP1	Retained	98.1%	96.9%	**97.5%**
FAKP2	Retained	63.4%	50.5%	**56.9%**
GORP3	Retained	82.4%	88.2%	**85.3%**
GYAP8	Retained	83.1%	57.9%	**70.5%**
HARP3	Retained	95.9%	97.6%	**96.8%**
HEAP1	Retained	85.1%	75.1%	**80.1%**
HETP3	Retained	73.1%	86.6%	**79.8%**
HINP3	Retained	62.4%	71.8%	**67.1%**
HOLP1	Retained	96.2%	95.2%	**95.7%**
HUNP1	Retained	81.1%	87.1%	**84.1%**
KLNP8	Retained	93.7%	95.6%	**94.6%**
LODP8	Retained	80.6%	76.0%	**78.3%**
LSTP1	Retained	94.0%	96.3%	**95.1%**
MARP8	Retained	89.6%	84.8%	**87.2%**
MASP3	Retained	67.5%	77.9%	**72.7%**
METP8	Retained	61.8%	74.8%	**68.3%**
MUNP3	Retained	96.6%	92.3%	**94.4%**
NWAP3	Retained	80.1%	85.0%	**82.6%**
OUTP3	Retained	6.9%	49.5%	**28.2%**
REEP3	Retained	72.1%	71.6%	**71.8%**
SANP1	Retained	90.3%	76.2%	**83.2%**
SHEP8	Retained	97.3%	97.4%	**97.3%**
STAP1	Retained	95.5%	96.2%	**95.9%**
SWAP1	Retained	84.5%	58.9%	**71.7%**
TERP1	Retained	61.5%	73.2%	**67.4%**
THEP8	Retained	77.4%	54.3%	**65.8%**
WATP1	Retained	94.8%	92.1%	**93.4%**
WELP8	Retained	80.8%	81.9%	**81.3%**
WROP8	Retained	77.9%	84.2%	**81.0%**
WWAP1	Retained	70.1%	65.5%	**67.8%**
WYMP1	Retained	94.9%	97.9%	**96.4%**
WYMP2	Retained	67.7%	71.1%	**69.4%**
Overall Average		**83.6%**	**82.9%**	**83.3%**

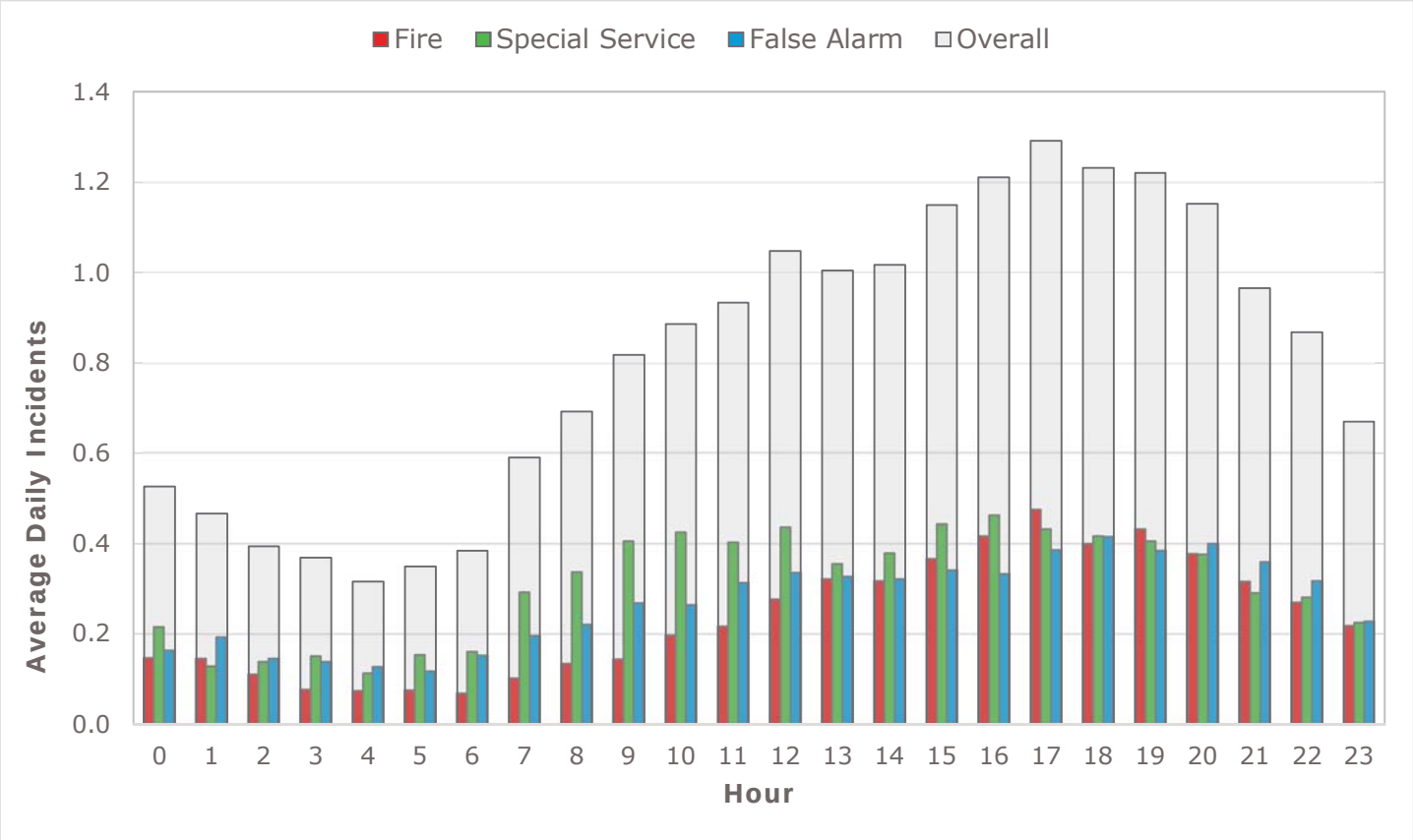
Availability Profile





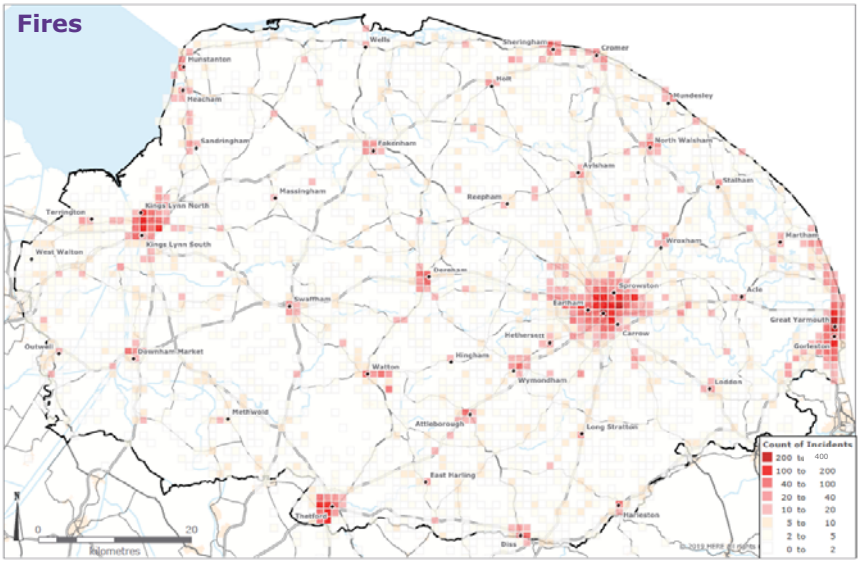
Hourly Profile

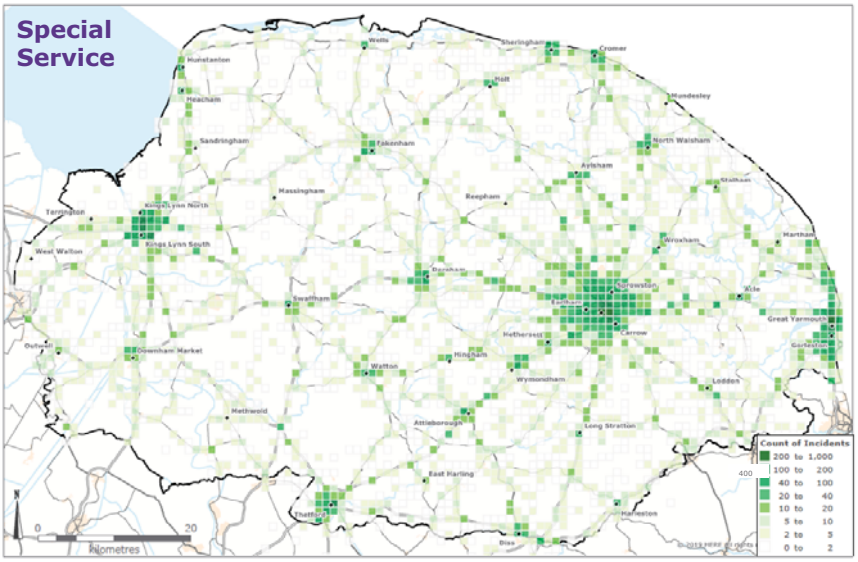
April 2016 to March 2018

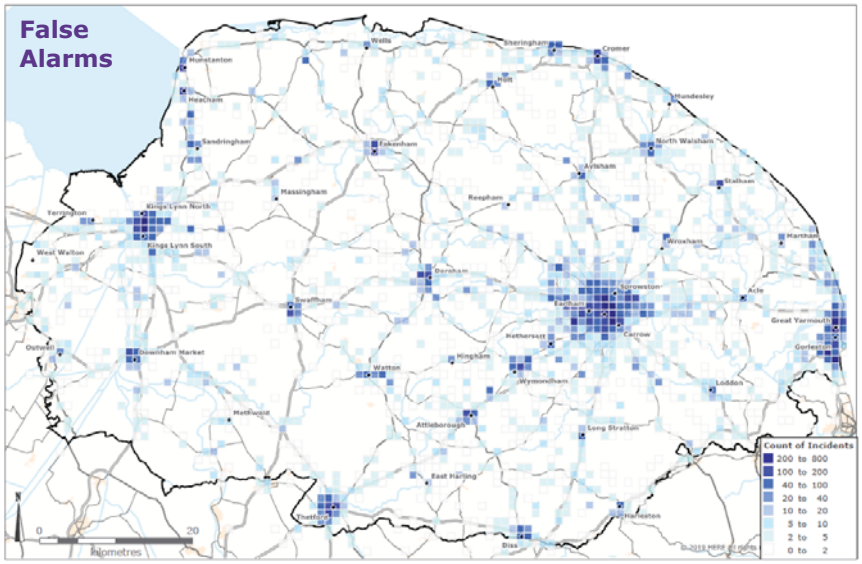


Geographical Distribution

April 2010 to March 2018







Initial Incident Type vs Final Incident Type

Incidents in Service Area

All Incidents

ERS Category	Fire			Special Service		False Alarm				Overall
	Primary Fire	Chimney Fire	Secondary Fire	RTC	Other	Automatic	Good Intent	Malicious	Unknown	
Fire - Life Risk	8,468	86	847	554	263	12,343	2,402	230	1,578	26,771
Fire - Non Life Risk	1,290	1,473	5,833	1	30	2	2,467	105	609	11,810
Other Emergencies - Life Risk	383	0	21	9,451	4,744	131	344	49	174	15,297
Non-Emergencies	2	0	0	28	3,047	0	39	7	11	3,134
Excluded from ERS	134	3	58	14	437	10	258	37	103	1,054
Unknown	7	0	3	9	90	5	42	2	0	158
Overall	10,284	1,562	6,762	10,057	8,611	12,491	5,552	430	2,475	58,224

% by Incident Category

ERS Category	Fire			Special Service		False Alarm				Overall
	Primary Fire	Chimney Fire	Secondary Fire	RTC	Other	Automatic	Good Intent	Malicious	Unknown	
Fire - Life Risk	31.6%	0.3%	3.2%	2.1%	1.0%	46.1%	9.0%	0.9%	5.9%	100.0%
Fire - Non Life Risk	10.9%	12.5%	49.4%	0.0%	0.3%	0.0%	20.9%	0.9%	5.2%	100.0%
Other Emergencies - Life Risk	2.5%	0.0%	0.1%	61.8%	31.0%	0.9%	2.2%	0.3%	1.1%	100.0%
Non-Emergencies	0.1%	0.0%	0.0%	0.9%	97.2%	0.0%	1.2%	0.2%	0.4%	100.0%
Excluded from ERS	12.7%	0.3%	5.5%	1.3%	41.5%	0.9%	24.5%	3.5%	9.8%	100.0%
Unknown	4.4%	0.0%	1.9%	5.7%	57.0%	3.2%	26.6%	1.3%	0.0%	100.0%
Overall	17.7%	2.7%	11.6%	17.3%	14.8%	21.5%	9.5%	0.7%	4.3%	100.0%

Responses by Station

Station	Financial Year								2-year Average
	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	
Acle	105	106	73	111	104	88	89	58	**74**
Attleborough	188	185	133	248	242	219	252	210	**231**
Aylsham	162	172	113	148	173	139	128	124	**126**
Carrow	-	633	1,012	1,091	1,011	1,054	1,072	1,135	**1,104**
Cromer	204	170	123	170	134	145	133	150	**142**
Dereham	373	333	244	316	340	277	410	399	**405**
Diss	182	173	134	156	149	177	178	158	**168**
Downham Market	242	162	174	181	187	170	176	177	**177**
Earlham	987	1,076	1,040	1,105	1,018	1,087	1,073	1,160	**1,117**
East Harling	124	123	103	115	68	60	85	46	**66**
Fakenham	312	255	216	280	228	247	226	216	**221**
Gorleston	110	92	61	124	587	579	608	615	**612**
Great Yarmouth	1,749	1,440	1,122	1,066	722	747	784	788	**786**
Harleston	90	87	85	99	102	86	96	104	**100**
Heacham	117	79	70	60	74	68	86	77	**82**
Hethersett	93	130	124	135	131	128	105	137	**121**
Hingham	103	93	66	97	97	70	65	49	**57**
Holt	145	133	109	144	156	126	99	125	**112**
Hunstanton	136	110	79	86	95	103	99	108	**104**
Kings Lynn	*1,331*	*1,122*	*909*	*1,088*	*745*	-	-	-	***0***
Kings Lynn North	-	-	-	-	81	500	585	621	**603**
Kings Lynn South	-	-	-	-	91	519	480	479	**480**
Loddon	131	106	90	100	94	111	95	75	**85**
Long Stratton	117	113	91	118	109	124	140	111	**126**
Martham	121	113	79	97	120	114	125	97	**111**
Massingham	83	78	53	65	58	48	47	66	**57**
Methwold	104	83	71	81	80	59	55	72	**64**
Mundesley	60	73	59	69	86	103	107	82	**95**
North Walsham	126	122	116	123	94	129	132	132	**132**
Norwich City	*1,758*	*553*	-	-	-	-	-	-	***0***
Outwell	140	100	77	66	21	8	7	45	**26**
Reepham	118	85	67	57	62	59	60	69	**65**
Sandringham	126	143	98	108	154	96	78	67	**73**
Sheringham	129	130	111	134	154	167	221	189	**205**
Sprowston	1,012	1,098	862	1,016	941	934	1,011	1,083	**1,047**
Stalham	141	113	122	104	113	91	113	109	**111**
Swaffham	194	146	106	91	108	142	130	85	**108**
Terrington	74	73	47	61	56	34	38	47	**43**
Thetford	460	455	382	425	467	494	454	398	**426**
Watton	168	183	142	191	188	159	161	141	**151**
Wells	58	79	56	67	46	41	77	78	**78**
West Walton	57	35	26	30	41	39	43	29	**36**
Wroxham	116	94	74	104	102	96	95	143	**119**
Wymondham	284	268	179	197	259	228	245	218	**232**
Overall	**12,330**	**10,917**	**8,898**	**10,124**	**9,888**	**9,865**	**10,263**	**10,272**	**10,268**

Average 1st Response by ERS and Final Incident Category

April 2016 to March 2018

Activation Time

ERS Category	Fire			Special Service		False Alarm				All Incidents
	Primary	Chimney	Secondary	RTC	Other	Automatic	Good Intent	Malicious	Unknown	
Fire - Life Risk	01:10	01:28	01:37	01:16	01:45	01:05	01:24	01:34	01:23	**01:12**
Fire - Non-Life Risk	01:30	01:07	01:18	-	-	-	01:32	01:16	01:37	**01:23**
Other Emerg. - Life Risk	-	-	-	01:23	01:41	01:11	01:38	01:21	01:49	**01:36**
Non-Emergencies	-	-	-	-	07:44	-	-	-	-	**07:39**
Excluded from ERS	01:49	-	01:31	-	03:44	-	01:46	-	02:05	**02:36**
All Incidents	**01:13**	**01:08**	**01:21**	**01:23**	**02:58**	**01:05**	**01:31**	**01:28**	**01:32**	**01:45**

Turnout Time

ERS Category	Fire			Special Service		False Alarm				All Incidents
	Primary	Chimney	Secondary	RTC	Other	Automatic	Good Intent	Malicious	Unknown	
Fire - Life Risk	02:29	03:50	02:57	02:38	02:51	02:28	02:01	01:48	02:14	**02:26**
Fire - Non-Life Risk	02:31	03:14	02:12	-	-	-	02:27	02:14	02:13	**02:23**
Other Emerg. - Life Risk	-	-	-	02:42	02:04	02:37	02:03	01:01	02:42	**02:17**
Non-Emergencies	-	-	-	-	02:11	-	-	-	-	**02:11**
Excluded from ERS	02:19	-	02:27	-	02:17	-	02:22	-	02:15	**02:19**
All Incidents	**02:29**	**03:17**	**02:19**	**02:42**	**02:07**	**02:29**	**02:13**	**01:49**	**02:16**	**02:22**

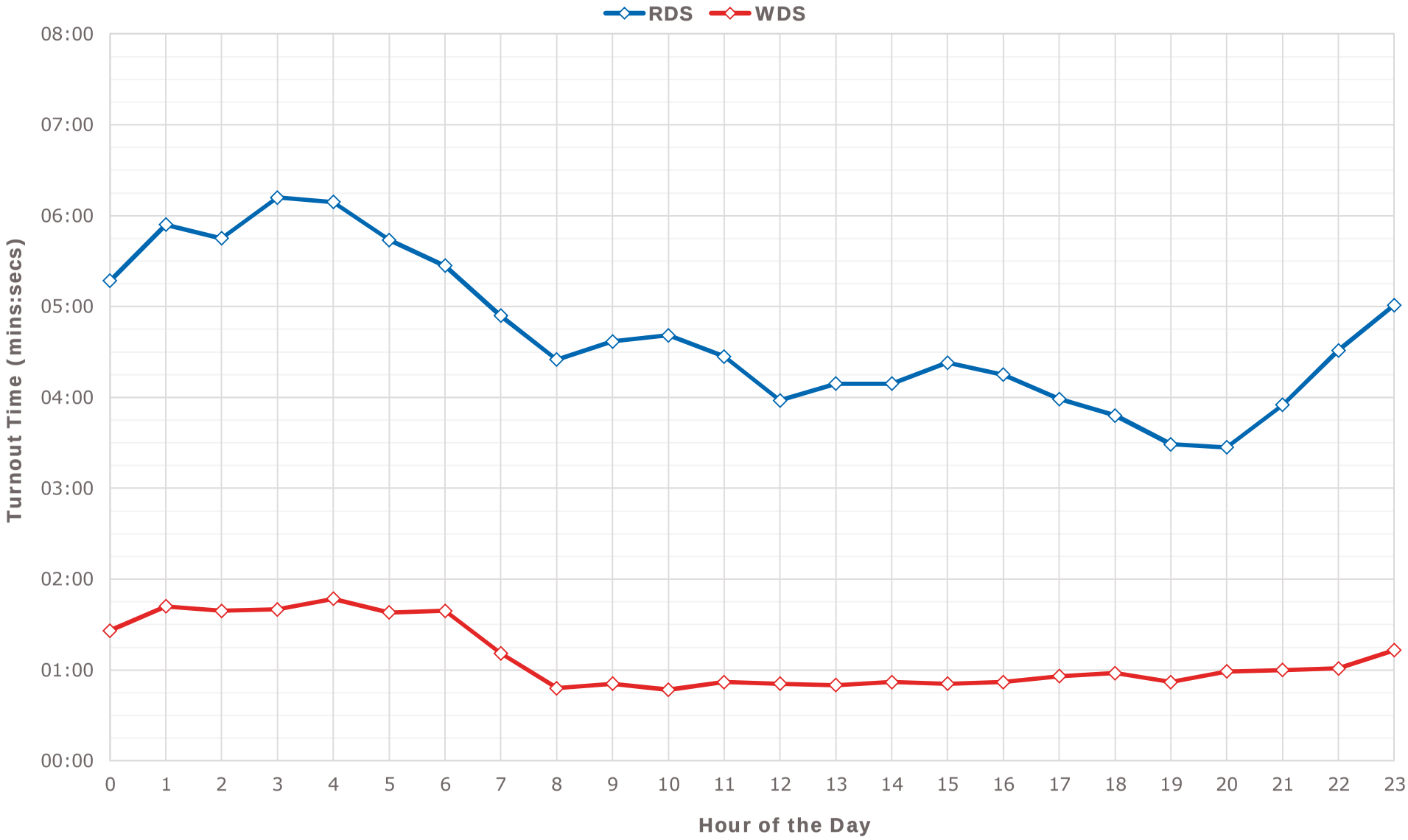
Travel Time

ERS Category	Fire			Special Service		False Alarm				All Incidents
	Primary	Chimney	Secondary	RTC	Other	Automatic	Good Intent	Malicious	Unknown	
Fire - Life Risk	06:09	06:30	06:58	06:48	08:24	05:09	05:27	04:41	05:55	**05:45**
Fire - Non-Life Risk	06:51	08:40	06:03	-	-	-	06:57	04:35	06:27	**06:36**
Other Emerg. - Life Risk	-	-	-	06:48	05:24	05:17	06:03	04:07	05:39	**05:50**
Non-Emergencies	-	-	-	-	07:27	-	-	-	-	**07:28**
Excluded from ERS	07:48	-	07:29	-	06:06	-	05:50	-	07:03	**06:17**
All Incidents	**06:14**	**08:31**	**06:12**	**06:48**	**05:54**	**05:09**	**06:08**	**04:37**	**06:06**	**06:02**

Note: Figures were excluded when based on 10 or fewer responses.

Average Turnout Time by Crew Type by Hour

April 2016 to March 2018



B4c

Average Travel Time by ERS Category and Area

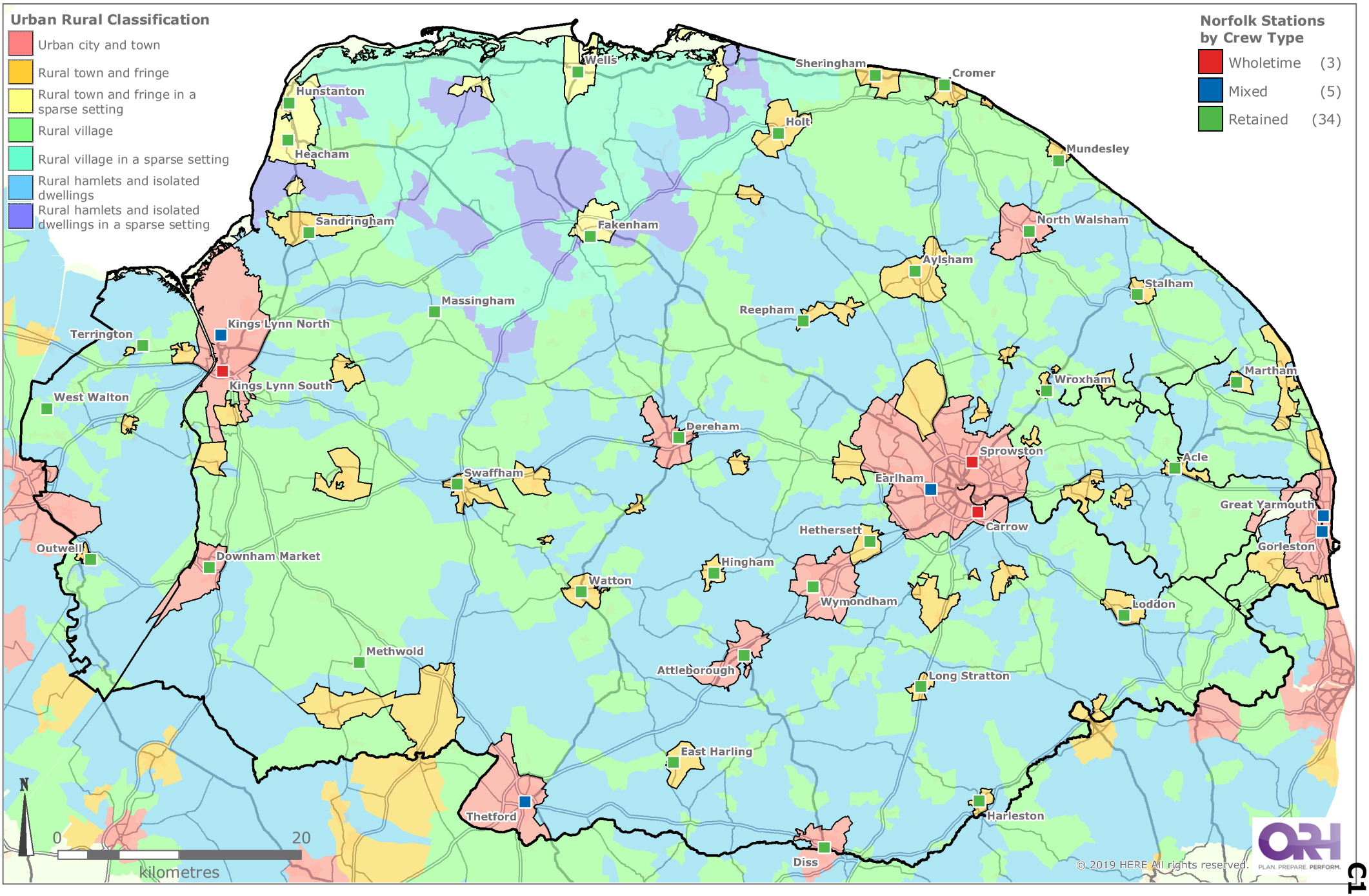
Area	Financial Year							
	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18
Fire - Life Risk	**04:46**	**04:53**	**04:55**	**05:17**	**05:23**	**05:26**	**05:46**	**05:45**
Urban	03:58	04:12	04:14	04:16	04:19	04:19	04:29	04:35
Rural Town	03:48	04:05	04:01	04:33	05:14	05:26	05:43	05:42
Rural Village or Hamlet	07:44	07:17	07:26	08:12	08:12	08:05	08:36	08:31
Fire - Non Life Risk	**05:52**	**05:50**	**05:50**	**05:57**	**06:29**	**06:03**	**06:40**	**06:32**
Urban	04:23	04:35	04:21	04:29	04:41	04:37	04:58	04:52
Rural Town	05:00	05:13	05:32	06:01	06:27	05:29	06:16	06:41
Rural Village or Hamlet	08:14	08:03	08:11	08:18	08:53	08:30	09:17	09:07
Other Emerg. - Life Risk	**06:10**	**05:48**	**05:49**	**06:16**	**06:25**	**06:21**	**05:51**	**05:52**
Urban	04:26	04:20	04:18	04:26	04:40	04:32	04:29	04:28
Rural Town	05:22	05:27	05:19	06:01	05:42	05:52	05:56	05:58
Rural Village or Hamlet	07:56	07:21	07:32	07:47	08:03	08:01	08:35	08:15
Non-Emergencies	**05:22**	**05:41**	**06:16**	**06:27**	**07:52**	**06:40**	**07:54**	**07:01**
Urban	04:32	04:51	04:47	04:55	06:32	05:08	05:22	05:18
Rural Town	04:31	05:33	06:08	06:10	06:45	06:01	09:06	07:09
Rural Village or Hamlet	08:07	07:49	09:39	10:27	10:49	12:20	11:31	11:09

C Model Setup

C1 Urban Rural Classification

C2 Base Position Workload

Urban Rural Areas



C1

Base Position Workload

Station	Average Annual Responses
Acle	74
Attleborough	232
Aylsham	126
Carrow	1,104
Cromer	139
Dereham	405
Diss	199
Downham Market	178
Earlham	1,117
East Harling	66
Fakenham	221
Gorleston	617
Great Yarmouth	789
Harleston	105
Heacham	82
Hethersett	121
Hingham	57
Holt	113
Hunstanton	104
Kings Lynn North	604
Kings Lynn South	481
Loddon	86
Long Stratton	126
Martham	111
Massingham	57
Methwold	64
Mundesley	95
North Walsham	132
Outwell	27
Reepham	65
Sandringham	70
Sheringham	206
Sprowston	1,047
Stalham	111
Swaffham	108
Terrington	43
Thetford	441
Watton	151
Wells	78
West Walton	38
Wroxham	119
Wymondham	232
OTB stations	119
Overall	**10,450**

D Optimal Location for Sprowston Fire Station

D1 Housing Allocations and Population Projections

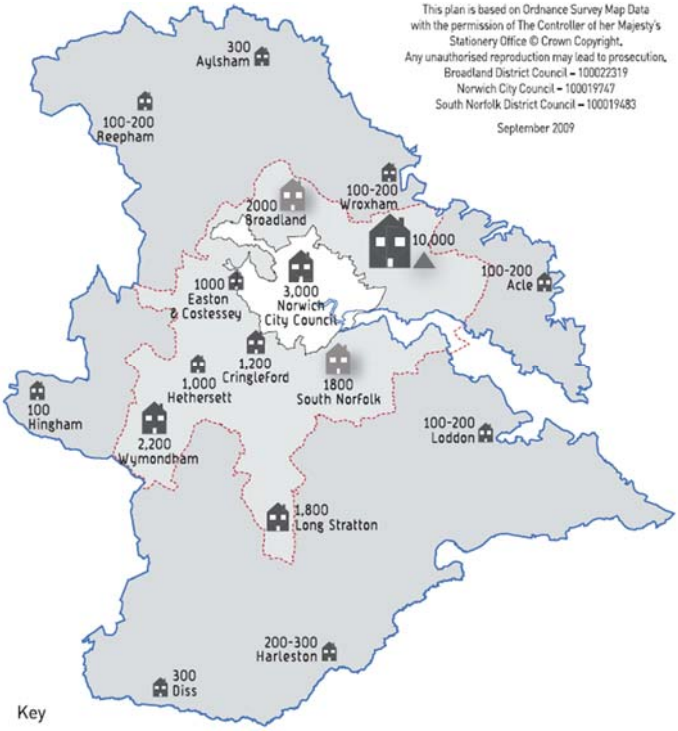
D2 Broadland Northway and Potential Routes for a Norwich Western Link Road

D3 Norwich Growth Triangle Demand Increase Performance Impacts

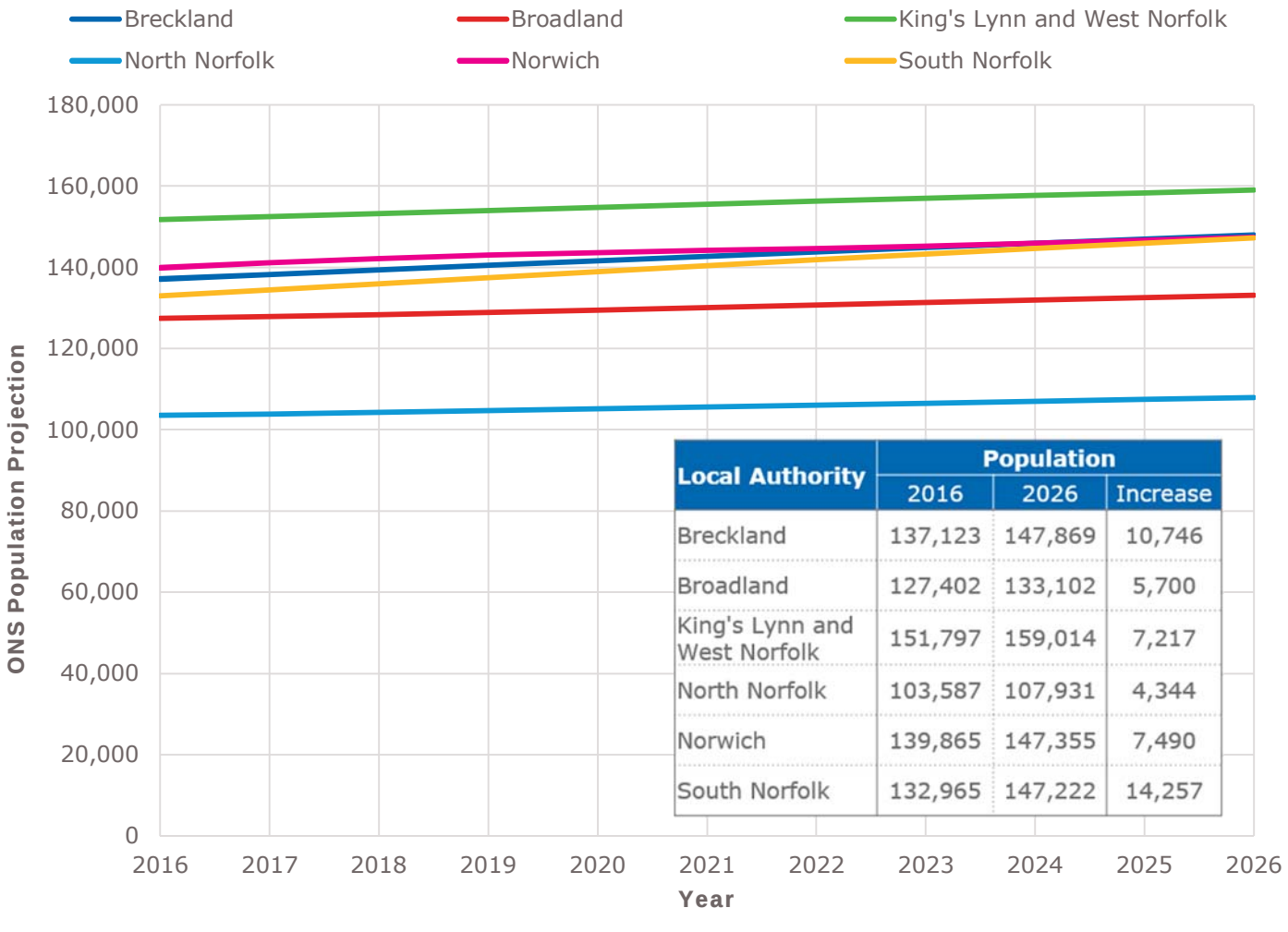
Housing Allocations

Main Housing Allocations
25,300-25,800

- Joint Core Strategy Area
- Norwich Policy Area
- Proposed New Housing
- Proposed Housing in unspecified locations in the Norwich Policy Area
- Norwich built-up area
- Old Catton, Sprowston, Rackheath, Thorpe St. Andrew Growth Triangle

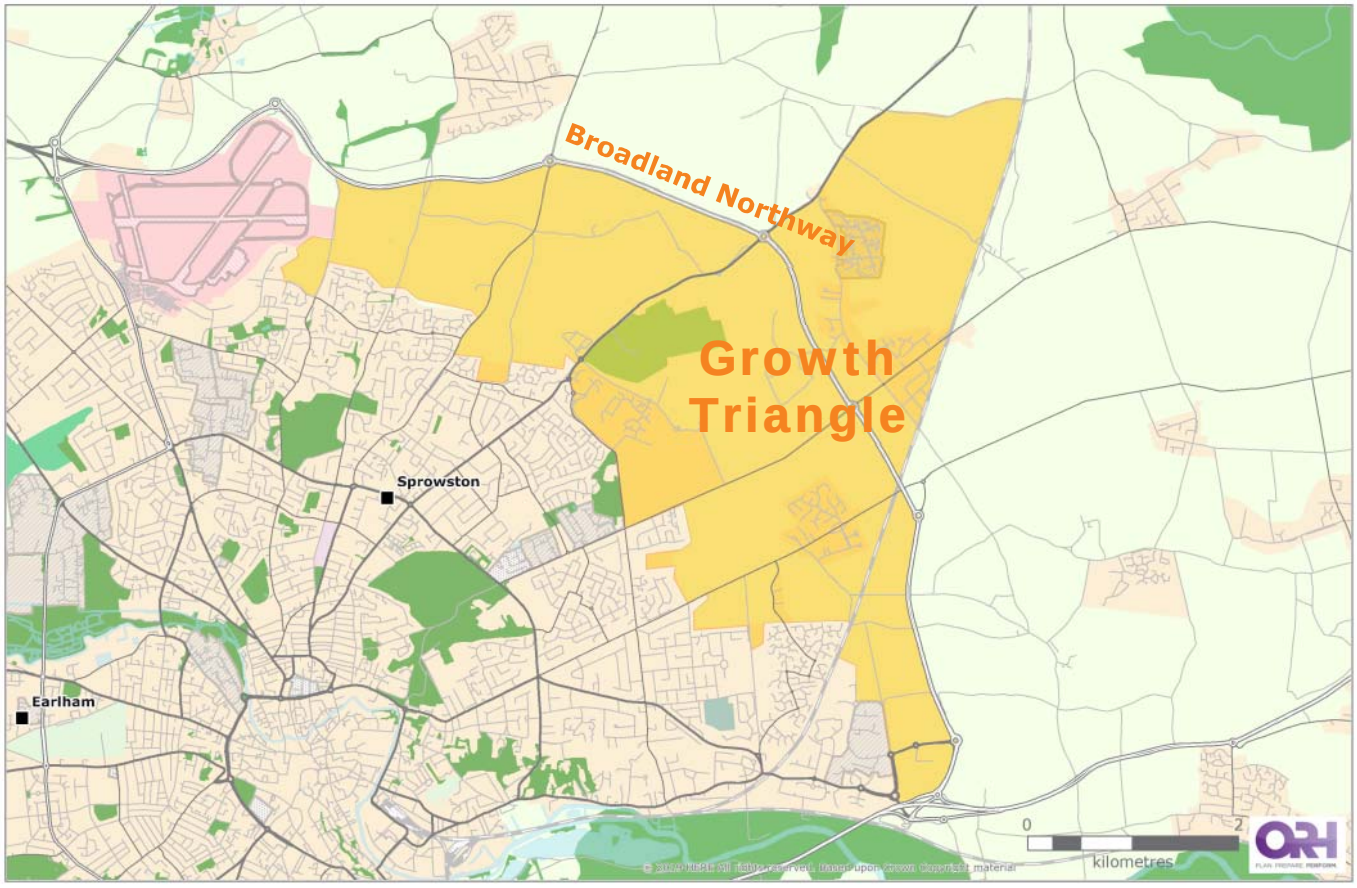


Population Projections

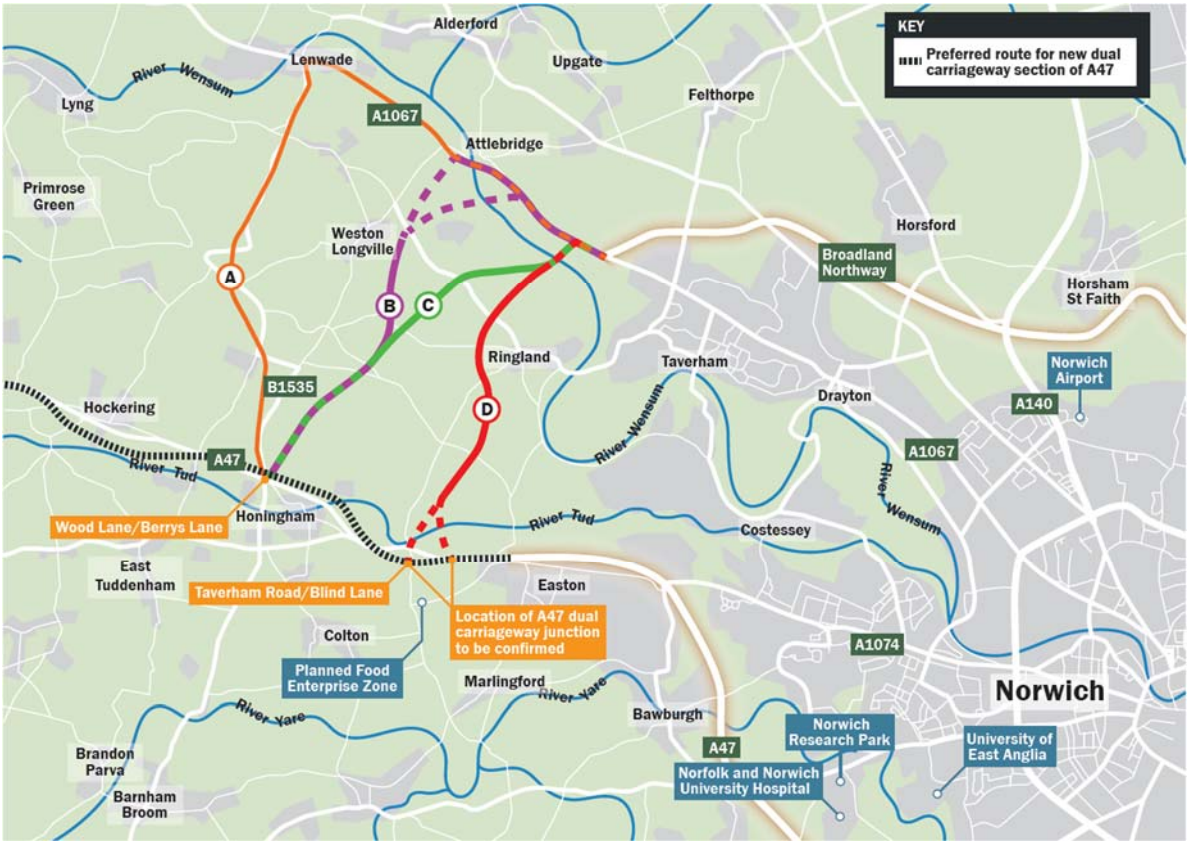


Local Authority	Population		
	2016	2026	Increase
Breckland	137,123	147,869	10,746
Broadland	127,402	133,102	5,700
King's Lynn and West Norfolk	151,797	159,014	7,217
North Norfolk	103,587	107,931	4,344
Norwich	139,865	147,355	7,490
South Norfolk	132,965	147,222	14,257

Broadland Northway



Potential Routes for a Norwich Western Link Road



Norwich Growth Triangle Demand Increase Performance Impacts

Average Response Performance

Reporting Area	Average 1st Response Time						Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	All Incidents	Primary Fire	RTC	All Incidents
Norwich	06:45	06:57	07:05	07:05	08:31	**07:29**	09:43	10:30	**10:35**
Urban	07:21	07:48	07:18	07:26	08:38	**07:49**	10:57	10:46	**11:26**
Rural Town	10:51	11:06	11:15	10:48	12:13	**11:17**	16:04	15:26	**16:28**
Village/Hamlet	13:24	13:41	12:39	13:37	16:33	**14:05**	19:01	16:38	**18:39**
NFRS-wide	**09:58**	**09:55**	**10:51**	**09:17**	**11:07**	**10:10**	**14:40**	**14:50**	**14:49**

Impact from Base Position

Reporting Area	Average 1st Response Time Impact						Average 2nd Response Time Impact		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	All Incidents	Primary Fire	RTC	All Incidents
Norwich	00:04	00:04	00:05	00:03	00:05	**00:04**	00:05	00:25	**00:08**
Urban	00:01	00:01	00:01	00:01	00:02	**00:01**	00:02	00:09	**00:03**
Rural Town	00:01	00:06	00:00	00:03	00:01	**00:02**	-00:02	00:02	**-00:01**
Village/Hamlet	-00:06	-00:07	-00:08	-00:11	-00:09	**-00:08**	-00:08	-00:09	**-00:09**
NFRS-wide	**00:00**	**00:01**	**-00:06**	**00:01**	**00:01**	**00:01**	**00:00**	**-00:05**	**-00:00**

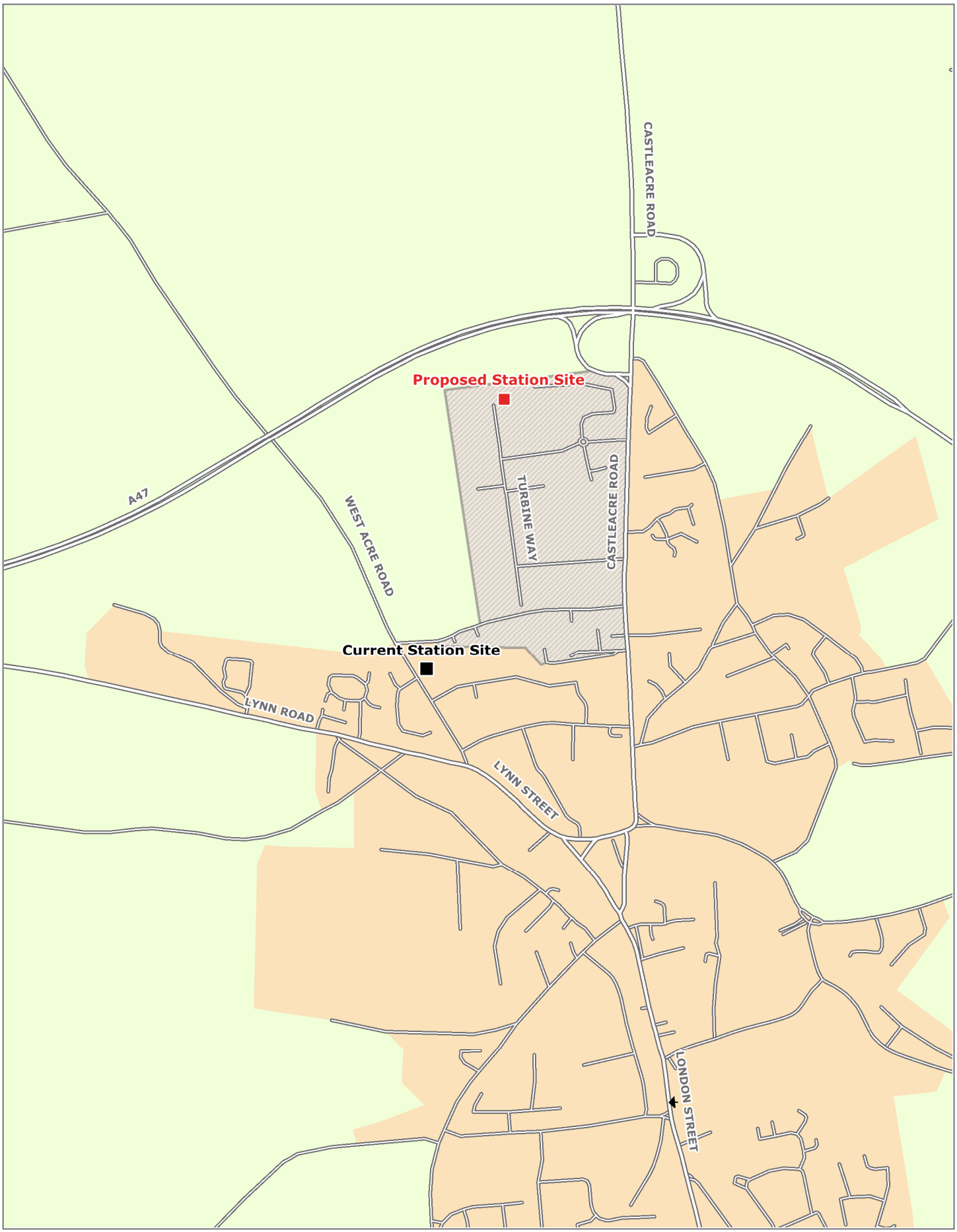
Station Workload

Station	Changes in Responses from Base Position	Predicted Average Annual Responses
Carrow	38	1,141
Earlham	28	1,144
Sprowston	123	1,170
Wroxham	37	156
Overall	**221**	**10,671**

E Relocating Swaffham Fire Station

E1 Proposed Swaffham Fire Station Location

Proposed Swaffham Fire Station Location



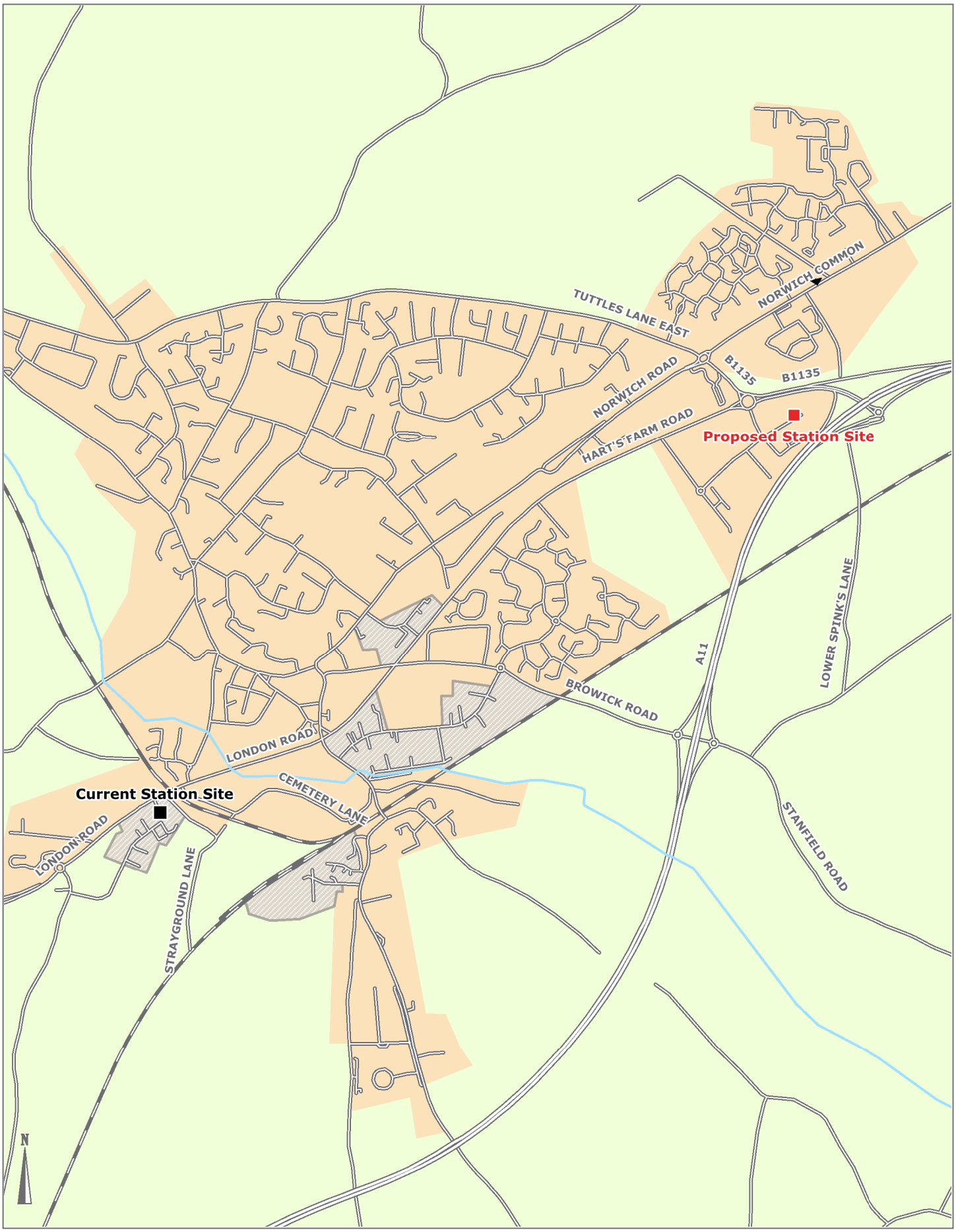
0 1

miles

PLAN. PREPARE. PERFORM.

F Merging Wymondham and Hethersett Fire Stations

Proposed Wymondham Fire Station Location



Both Wymondham Pumps moved to Farrier Close and 1 Pump at Hethersett

Average Response Performance

Reporting Area	Average 1st Response Time						Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire	RTC	**All Incidents**
Attleborough	07:53	06:48	09:06	07:48	07:45	**07:52**	16:40	-	**16:23**
Norwich	06:41	06:53	06:59	07:01	08:25	**07:24**	09:36	10:02	**10:25**
Wymondham	09:18	09:58	09:53	09:05	12:03	**09:54**	12:49	09:54	**11:49**
Urban	07:20	07:48	07:16	07:26	08:36	**07:48**	10:56	10:39	**11:24**
Rural Town	10:49	10:59	11:14	10:44	12:10	**11:14**	16:03	15:21	**16:26**
Village/Hamlet	13:30	13:48	12:47	13:49	16:42	**14:13**	19:11	16:47	**18:49**
NFRS-wide	**09:58**	**09:55**	**10:56**	**09:16**	**11:06**	**10:09**	**14:40**	**14:55**	**14:49**

Impact from Base Position

Reporting Area	Average 1st Response Time Impact						Average 2nd Response Time Impact		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire	RTC	**All Incidents**
Attleborough	00:05	00:02	00:21	00:03	00:04	**00:05**	01:19	-	**01:18**
Norwich	00:00	00:00	-00:01	-00:01	-00:01	**-00:01**	-00:02	-00:03	**-00:02**
Wymondham	00:06	00:59	-00:55	00:24	00:08	**00:17**	-00:06	-00:46	**-00:02**
Urban	00:00	00:01	-00:01	00:01	00:00	**00:00**	00:01	00:02	**00:01**
Rural Town	-00:01	-00:01	-00:01	-00:01	-00:02	**-00:01**	-00:03	-00:03	**-00:03**
Village/Hamlet	00:00	00:00	00:00	00:01	00:00	**00:00**	00:02	00:00	**00:01**
NFRS-wide	**00:00**	**00:01**	**-00:01**	**00:00**	**00:00**	**00:00**	**00:00**	**00:00**	**00:00**

Both Wymondham Pumps moved to Farrier Close and no Pump at Hethersett

Average Response Performance

Reporting Area	Average 1st Response Time						Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire	RTC	**All Incidents**
Attleborough	07:53	06:48	09:06	07:48	07:45	**07:52**	16:40	-	**16:23**
Norwich	06:41	06:54	07:01	07:02	08:26	**07:25**	09:39	10:08	**10:29**
Wymondham	09:19	09:57	09:55	09:05	12:04	**09:55**	12:47	10:03	**11:49**
Urban	07:20	07:48	07:17	07:26	08:36	**07:49**	10:57	10:41	**11:25**
Rural Town	10:52	11:02	11:16	10:47	12:16	**11:18**	16:04	15:23	**16:27**
Village/Hamlet	13:31	13:49	12:47	13:51	16:43	**14:14**	19:11	16:48	**18:50**
NFRS-wide	**09:59**	**09:55**	**10:57**	**09:18**	**11:07**	**10:10**	**14:41**	**14:57**	**14:51**

Impact from Base Position

Reporting Area	Average 1st Response Time Impact						Average 2nd Response Time Impact		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire	RTC	**All Incidents**
Attleborough	00:05	00:02	00:21	00:03	00:04	**00:05**	01:19	-	**01:18**
Norwich	00:00	00:01	00:01	00:00	00:00	**00:00**	00:01	00:03	**00:02**
Wymondham	00:07	00:58	-00:53	00:24	00:09	**00:18**	-00:08	-00:37	**-00:02**
Urban	00:00	00:01	00:00	00:01	00:00	**00:01**	00:02	00:04	**00:02**
Rural Town	00:02	00:02	00:01	00:02	00:04	**00:03**	-00:02	-00:01	**-00:02**
Village/Hamlet	00:01	00:01	00:00	00:03	00:01	**00:01**	00:02	00:01	**00:02**
NFRS-wide	**00:01**	**00:01**	**00:00**	**00:02**	**00:01**	**00:01**	**00:01**	**00:02**	**00:02**

Merging Wymondham and Hethersett Fire Stations

Station Workload

Station	Change in Responses from Base Position			Predicted Average Annual Responses		
	1. Both Pumps Move	2. Hethersett Removed	3. 1 Pump at Farrier Close	1. Both Pumps Move	2. Hethersett Removed	3. 1 Pump at Farrier Close
Hethersett	-3	-121	-121	118	0	0
Diss	1	1	2	199	199	200
Watton	1	1	2	152	152	153
Wroxham	-1	1	2	118	120	121
Dereham	-1	1	3	404	405	407
East Harling	1	1	3	67	67	69
Thetford	2	2	3	443	443	444
Sprowston	-3	1	4	1,044	1,048	1,051
Long Stratton	-1	1	7	125	127	133
Hingham	0	1	8	57	58	65
Wymondham	14	87	11	245	319	243
Earlham	-12	6	20	1,104	1,122	1,137
Carrow	-12	10	25	1,092	1,113	1,129
Attleborough	14	18	37	246	250	269
Overall	**0**	**0**	**0**	**10,450**	**10,450**	**10,450**

G Tidal Crewing between Sprowston and North Earlham Fire Stations

G1 Earlham Crew Deployed From Sprowston Results

G1a Average Response Performance

G1b Response Performance Target

G1c Station Workload

G2 Sprowston Crew Deployed From Earlham Results

G2a Average Response Performance

G2b Response Performance Target

G2c Station Workload

Earlham Crew Deployed From Sprowston

Average Response Performance

Modelled Base Position

Reporting Area	Average 1st Response Time						Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire	RTC	**All Incidents**
Norwich	06:41	06:53	07:00	07:02	08:26	**07:25**	09:38	10:05	**10:27**
Urban	07:20	07:47	07:17	07:25	08:36	**07:48**	10:55	10:37	**11:23**
Rural Town	10:50	11:00	11:15	10:45	12:12	**11:15**	16:06	15:24	**16:29**
Village/Hamlet	13:30	13:48	12:47	13:48	16:42	**14:13**	19:09	16:47	**18:48**
NFRS-wide	**09:58**	**09:54**	**10:57**	**09:16**	**11:06**	**10:09**	**14:40**	**14:55**	**14:49**

Earlham Crew Deployed From Sprowston

Reporting Area	Average 1st Response Time						Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire	RTC	**All Incidents**
Norwich	06:46	06:57	07:06	07:08	08:31	**07:30**	09:36	10:01	**10:26**
Urban	07:22	07:48	07:19	07:28	08:38	**07:50**	10:53	10:35	**11:22**
Rural Town	10:50	11:00	11:15	10:45	12:12	**11:15**	16:05	15:22	**16:28**
Village/Hamlet	13:28	13:47	12:45	13:46	16:40	**14:11**	19:07	16:45	**18:46**
NFRS-wide	**09:58**	**09:54**	**10:56**	**09:17**	**11:07**	**10:10**	**14:39**	**14:53**	**14:48**

Difference

Reporting Area	Average 1st Response Time Impact						Average 2nd Response Time Impact		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire	RTC	**All Incidents**
Norwich	00:05	00:04	00:06	00:06	00:05	**00:05**	-00:02	-00:04	**-00:01**
Urban	00:02	00:01	00:02	00:03	00:02	**00:02**	-00:02	-00:02	**-00:01**
Rural Town	00:00	00:00	00:00	00:00	00:00	**00:00**	-00:01	-00:02	**-00:01**
Village/Hamlet	-00:02	-00:01	-00:02	-00:02	-00:02	**-00:02**	-00:02	-00:02	**-00:02**
NFRS-wide	**00:00**	**00:00**	**-00:01**	**00:01**	**00:01**	**00:01**	**-00:01**	**-00:02**	**-00:01**

Earlham Crew Deployed From Sprowston

Response Performance Target

Modelled Base Position

Reporting Area	1st Response - % within 10 minutes						2nd Response - % within 15 minutes		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	All Incidents	Primary Fire	RTC	All Incidents
Norwich	91.4%	90.3%	83.8%	89.3%	82.1%	87.1%	93.2%	93.8%	91.4%
Urban	85.5%	80.1%	80.9%	86.0%	79.2%	82.9%	85.1%	89.4%	84.6%
Rural Town	51.0%	48.2%	41.8%	53.6%	47.6%	49.9%	50.7%	50.0%	51.5%
Village/Hamlet	16.8%	19.0%	22.3%	19.3%	14.9%	18.4%	26.9%	42.1%	32.6%
NFRS-wide	**56.8%**	**58.7%**	**42.3%**	**67.2%**	**58.9%**	**59.5%**	**58.9%**	**56.0%**	**60.9%**

Earlham Crew Deployed From Sprowston

Reporting Area	1st Response - % within 10 minutes						2nd Response - % within 15 minutes		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	All Incidents	Primary Fire	RTC	All Incidents
Norwich	90.4%	89.5%	82.7%	88.1%	81.2%	86.1%	93.1%	93.7%	91.2%
Urban	85.1%	79.8%	80.5%	85.5%	78.7%	82.4%	85.1%	89.5%	84.6%
Rural Town	51.0%	48.2%	41.8%	53.6%	47.6%	49.9%	50.9%	50.3%	51.7%
Village/Hamlet	17.1%	19.1%	22.8%	19.6%	15.1%	18.6%	27.1%	42.4%	32.8%
NFRS-wide	**56.7%**	**58.6%**	**42.4%**	**66.9%**	**58.7%**	**59.3%**	**59.0%**	**56.2%**	**61.0%**

Difference

Reporting Area	1st Response Impacts - % within 10 minutes						2nd Response Impacts - % within 15 mins		
	Primary Fire	Secondary Fire	RTC	False Alarm	Other	All Incidents	Primary Fire	RTC	All Incidents
Norwich	-0.9%	-0.8%	-1.1%	-1.1%	-1.0%	-1.0%	-0.1%	-0.1%	-0.2%
Urban	-0.4%	-0.3%	-0.4%	-0.5%	-0.5%	-0.5%	0.0%	0.1%	0.0%
Rural Town	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.3%	0.2%
Village/Hamlet	0.3%	0.2%	0.4%	0.3%	0.2%	0.3%	0.3%	0.3%	0.2%
NFRS-wide	**-0.1%**	**-0.1%**	**0.1%**	**-0.3%**	**-0.2%**	**-0.2%**	**0.1%**	**0.3%**	**0.1%**

Earlham Crew Deployed From Sprowston

Station Workload

Station	Change in Responses from Base Position	Predicted Average Annual Responses
Sprowston	-20	1,027
Kings Lynn North	-3	601
Kings Lynn South	-2	479
Wroxham	-2	117
Attleborough	-1	231
Aylsham	-1	125
Diss	-1	198
Downham Market	-1	177
Fakenham	-1	220
Gorleston	-1	616
Great Yarmouth	-1	787
Lowestoft South	-1	13
Sheringham	-1	205
Stalham	-1	110
Thetford	-1	440
Wymondham	1	232
Hethersett	8	129
Carrow	10	1,113
Earlham	22	1,139
Overall	**0**	**10,450**

Sprowston Crew Deployed From Earlham

Average Response Performance

Modelled Base Position

Reporting Area	Average 1st Response Time							Average 2nd Response Time			
	Primary Fire - Building	Primary Fire - Other	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire - Building	Primary Fire - Other	RTC	**All Incidents**
Norwich	06:39	06:47	06:53	07:00	07:02	08:26	**07:25**	09:32	10:16	10:05	**10:27**
Urban	07:04	07:52	07:47	07:17	07:25	08:36	**07:48**	10:41	12:11	10:37	**11:23**
Rural Town	10:38	11:30	11:00	11:15	10:45	12:12	**11:15**	15:59	16:39	15:24	**16:29**
Village/Hamlet	13:36	13:26	13:48	12:47	13:48	16:42	**14:13**	19:14	19:06	16:47	**18:48**
NFRS-wide	**09:29**	**10:48**	**09:54**	**10:57**	**09:16**	**11:06**	**10:09**	**14:10**	**16:29**	**14:55**	**14:49**

Sprowston Crew Deployed From Earlham

Reporting Area	Average 1st Response Time							Average 2nd Response Time			
	Primary Fire - Building	Primary Fire - Other	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire - Building	Primary Fire - Other	RTC	**All Incidents**
Norwich	06:44	06:54	07:01	07:07	07:06	08:33	**07:31**	09:28	10:13	09:58	**10:21**
Urban	07:07	07:55	07:50	07:20	07:27	08:40	**07:51**	10:39	12:10	10:34	**11:20**
Rural Town	10:39	11:30	11:00	11:17	10:46	12:13	**11:16**	16:00	16:40	15:25	**16:30**
Village/Hamlet	13:37	13:27	13:49	12:48	13:48	16:43	**14:14**	19:15	19:06	16:48	**18:49**
NFRS-wide	**09:31**	**10:49**	**09:56**	**10:59**	**09:17**	**11:08**	**10:11**	**14:10**	**16:29**	**14:55**	**14:48**

Difference

Reporting Area	Average 1st Response Time Impact							Average 2nd Response Time Impact			
	Primary Fire - Building	Primary Fire - Other	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire - Building	Primary Fire - Other	RTC	**All Incidents**
Norwich	00:05	00:07	00:08	00:07	00:04	00:07	**00:06**	-00:04	-00:04	-00:07	**-00:06**
Urban	00:03	00:03	00:03	00:03	00:02	00:04	**00:03**	-00:02	-00:01	-00:03	**-00:03**
Rural Town	00:01	00:01	00:00	00:00	00:00	00:00	**00:00**	00:01	00:00	00:01	**00:01**
Village/Hamlet	00:01	00:01	00:01	00:01	00:00	00:01	**00:01**	00:01	00:00	00:01	**00:01**
NFRS-wide	**00:02**	**00:02**	**00:02**	**00:02**	**00:01**	**00:02**	**00:02**	**-00:01**	**00:00**	**-00:00**	**-00:01**

Sprowston Crew Deployed From Earlham

Response Performance Target

Modelled Base Position

Reporting Area	1st Response - % within 10 minutes							2nd Response - % within 15 minutes			
	Primary Fire - Building	Primary Fire - Other	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire - Building	Primary Fire - Other	RTC	**All Incidents**
Norwich	92.4%	89.0%	90.3%	83.8%	89.3%	82.1%	**87.1%**	93.3%	93.5%	93.8%	**91.4%**
Urban	88.4%	79.4%	80.1%	80.9%	86.0%	79.2%	**82.9%**	86.6%	76.7%	89.4%	**84.6%**
Rural Town	53.8%	41.6%	48.2%	41.8%	53.6%	47.6%	**49.9%**	49.9%	54.8%	50.0%	**51.5%**
Village/Hamlet	15.7%	17.6%	19.0%	22.3%	19.3%	14.9%	**18.4%**	25.3%	28.2%	42.1%	**32.6%**
Overall	**62.3%**	**47.3%**	**58.7%**	**42.3%**	**67.2%**	**58.9%**	**59.5%**	**62.4%**	**45.8%**	**56.0%**	**60.9%**

Sprowston Crew Deployed From Earlham

Reporting Area	1st Response - % within 10 minutes							2nd Response - % within 15 minutes			
	Primary Fire - Building	Primary Fire - Other	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire - Building	Primary Fire - Other	RTC	**All Incidents**
Norwich	91.4%	87.6%	88.7%	82.7%	88.2%	80.5%	**85.8%**	93.6%	93.6%	93.7%	**91.5%**
Urban	87.9%	78.8%	79.6%	80.5%	85.5%	78.4%	**82.3%**	86.7%	76.8%	89.4%	**84.7%**
Rural Town	53.7%	41.5%	48.2%	41.7%	53.6%	47.6%	**49.9%**	49.9%	54.8%	50.1%	**51.6%**
Village/Hamlet	15.7%	17.6%	19.4%	22.9%	19.8%	15.5%	**18.9%**	25.2%	28.2%	42.2%	**32.7%**
Overall	**62.0%**	**47.0%**	**58.5%**	**42.4%**	**67.0%**	**58.6%**	**59.3%**	**62.4%**	**45.8%**	**56.1%**	**61.0%**

Difference

Reporting Area	1st Response Impact - % within 10 minutes							2nd Response Impact - % within 15 minutes			
	Primary Fire - Building	Primary Fire - Other	Secondary Fire	RTC	False Alarm	Other	**All Incidents**	Primary Fire - Building	Primary Fire - Other	RTC	**All Incidents**
Norwich	-0.9%	-1.4%	-1.6%	-1.1%	-1.1%	-1.7%	**-1.3%**	0.2%	0.1%	-0.1%	**0.1%**
Urban	-0.5%	-0.5%	-0.5%	-0.4%	-0.5%	-0.8%	**-0.6%**	0.1%	0.0%	0.1%	**0.1%**
Rural Town	-0.1%	-0.1%	0.0%	-0.1%	0.0%	0.0%	**0.0%**	0.0%	0.0%	0.1%	**0.1%**
Village/Hamlet	0.0%	0.0%	0.4%	0.5%	0.5%	0.5%	**0.5%**	-0.2%	-0.1%	0.1%	**0.1%**
Overall	**-0.3%**	**-0.3%**	**-0.2%**	**0.2%**	**-0.2%**	**-0.3%**	**-0.2%**	**0.0%**	**0.0%**	**0.1%**	**0.1%**

Sprowston Crew Deployed From Earlham

Station Workload

Station	Change in Responses from Base Position	Predicted Average Annual Responses
Earlham	-65	1,052
Hethersett	-5	116
Wymondham	-2	230
Acle	1	75
Aylsham	1	127
North Walsham	1	133
Stalham	1	111
Wroxham	3	122
Carrow	11	1114
Sprowston	55	1102
Overall	**0**	**10,450**

H Optimal Locations for Officers

H1 Three Sites

H1a Blank Canvas Locations Coverage and Catchments

H1b Existing Stations Maximised Coverage and Catchments

H1c Minimise Time Stations Coverage and Catchments

H1d Drive Time Coverage

H2 Four Sites

H2a Blank Canvas Locations Coverage and Catchments

H2b Existing Stations Maximised Coverage and Catchments

H2c Minimise Time Stations Coverage and Catchments

H2d Drive Time Coverage

H3 Five Sites

H3a Blank Canvas Locations Coverage and Catchments

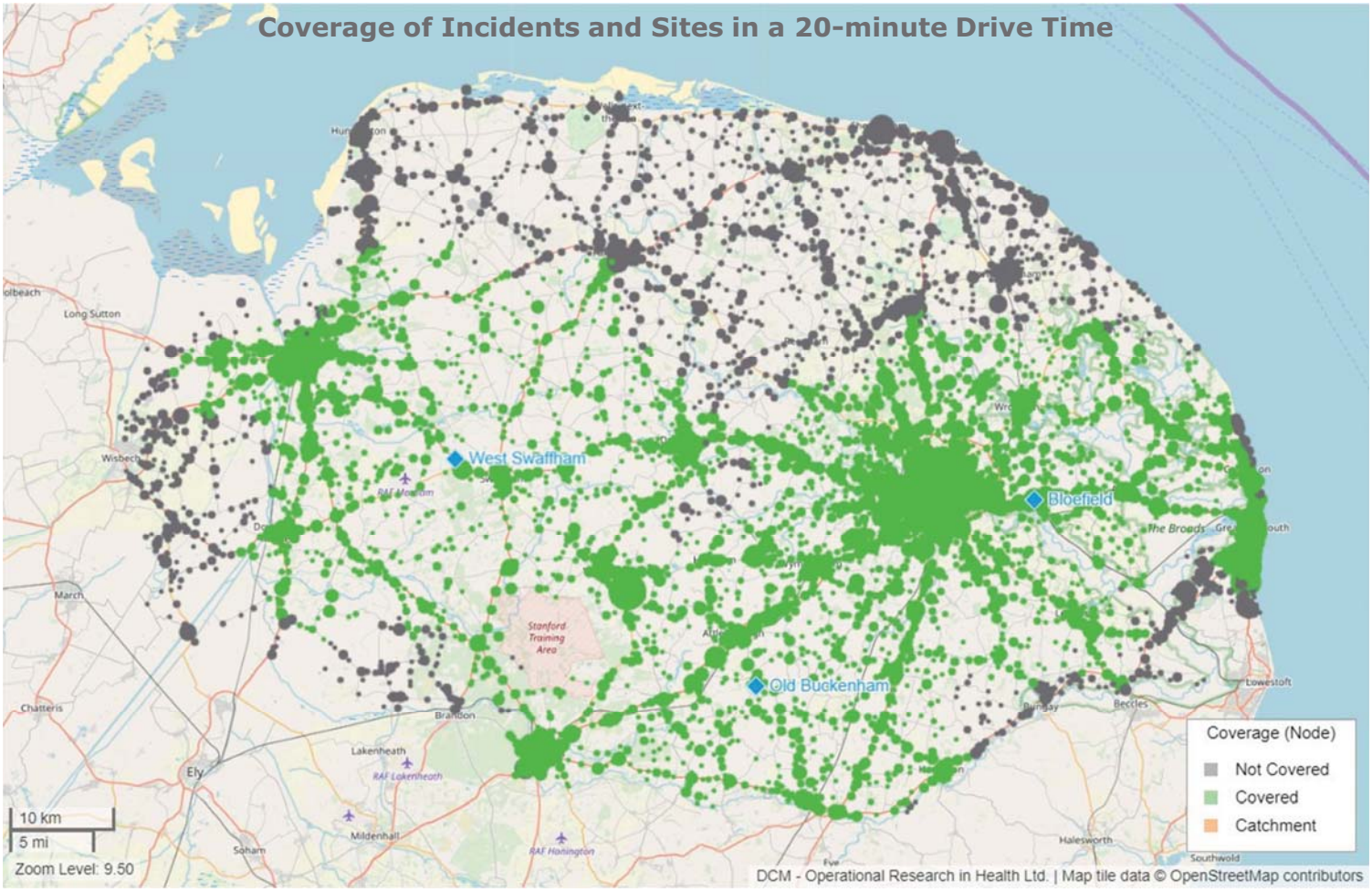
H3b Existing Stations Maximised Coverage and Catchments

H3c Minimise Time Stations Coverage and Catchments

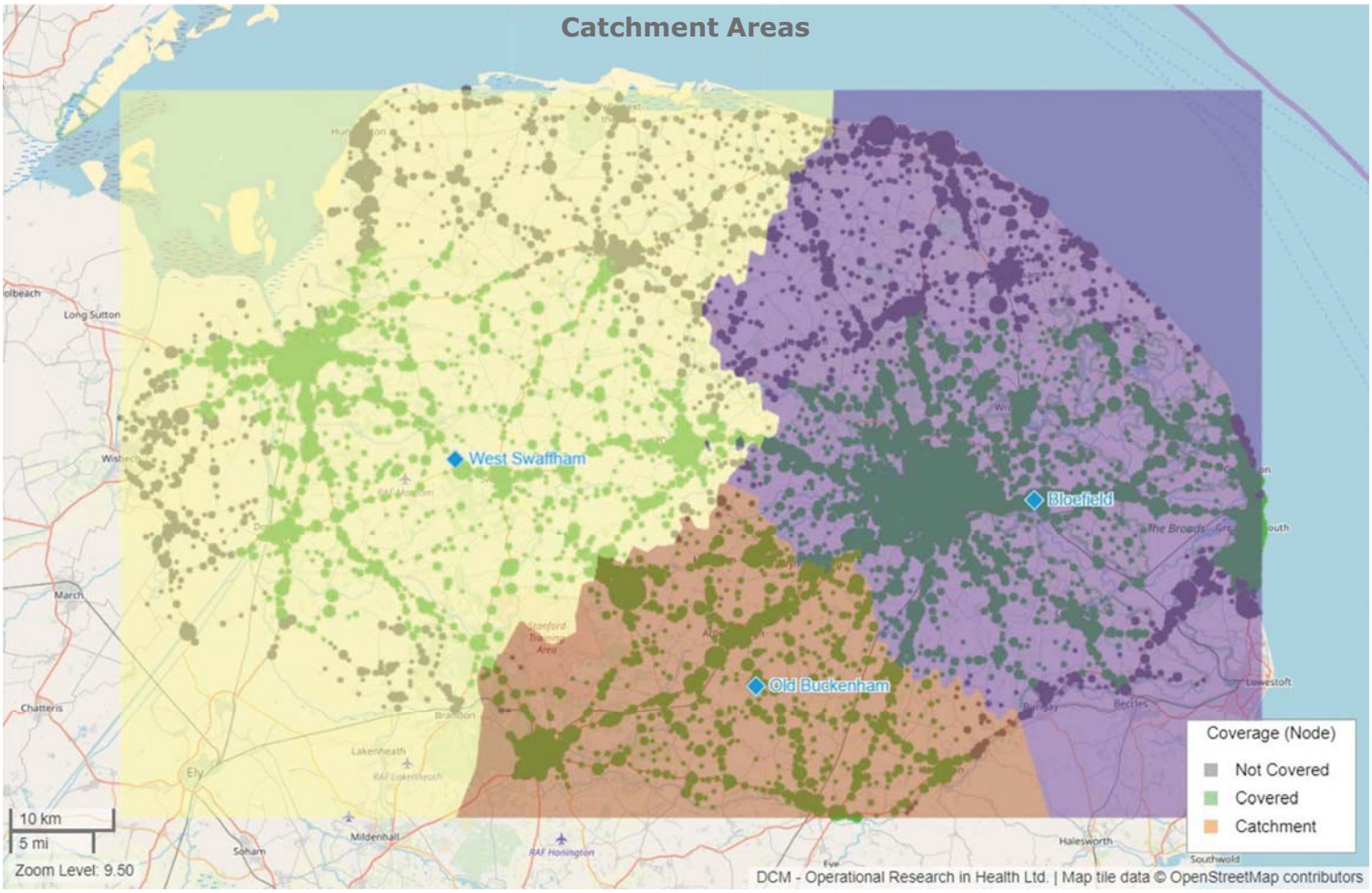
H3d Drive Time Coverage

3 Sites for Officers: Blank Canvas Locations

Coverage of Incidents and Sites in a 20-minute Drive Time

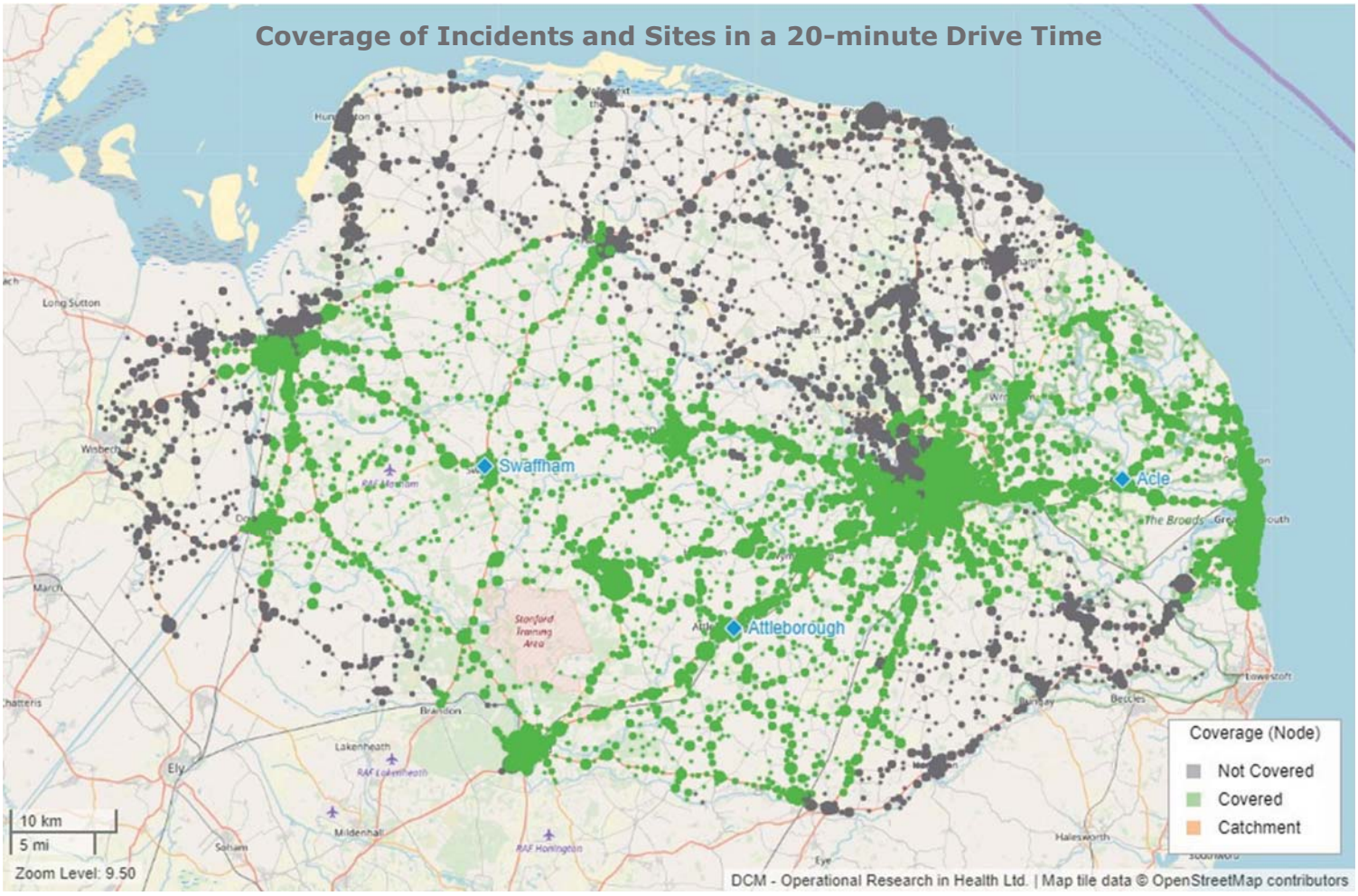


Catchment Areas

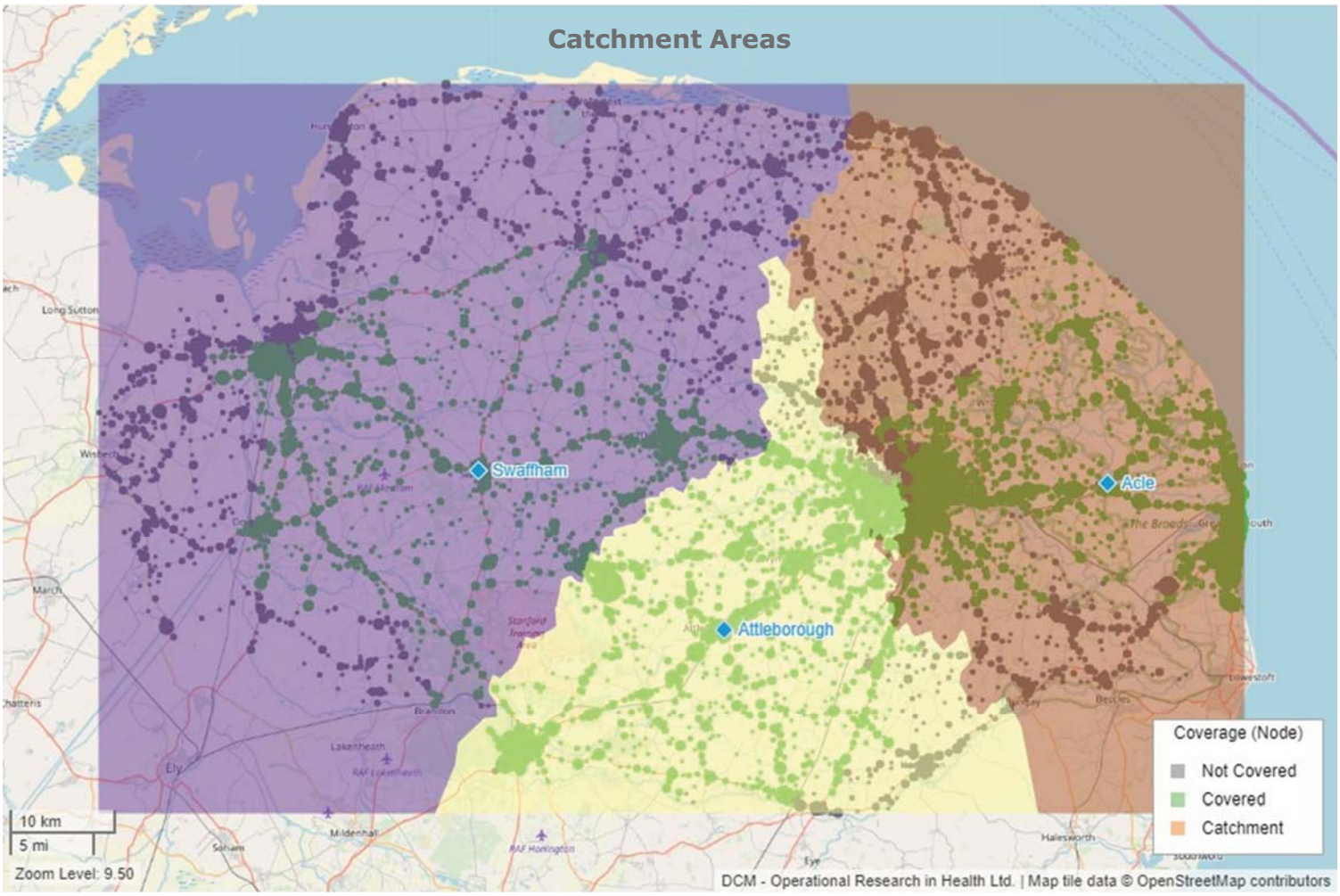


3 Sites for Officers: Existing Stations Maximised

Coverage of Incidents and Sites in a 20-minute Drive Time

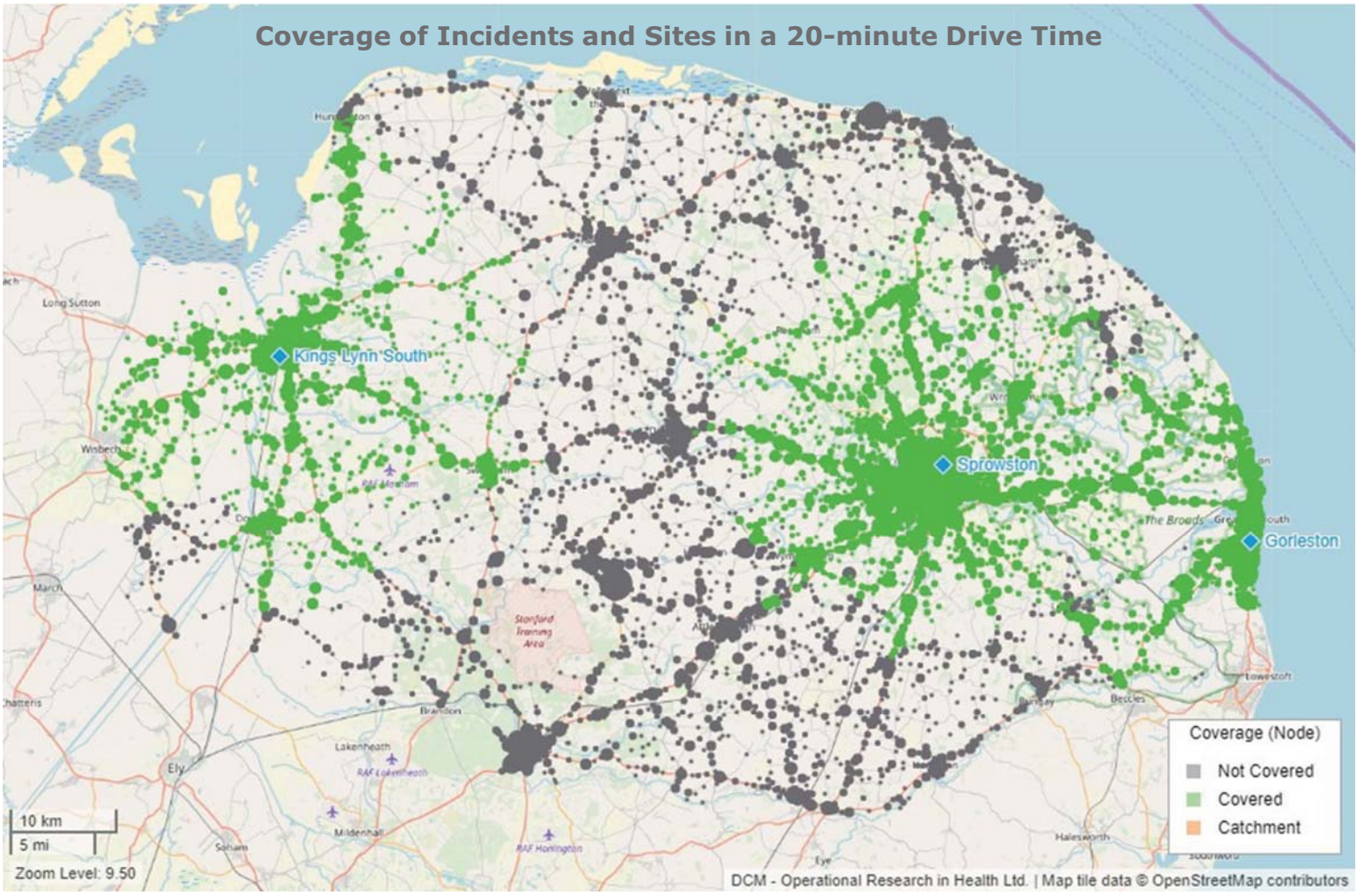


Catchment Areas

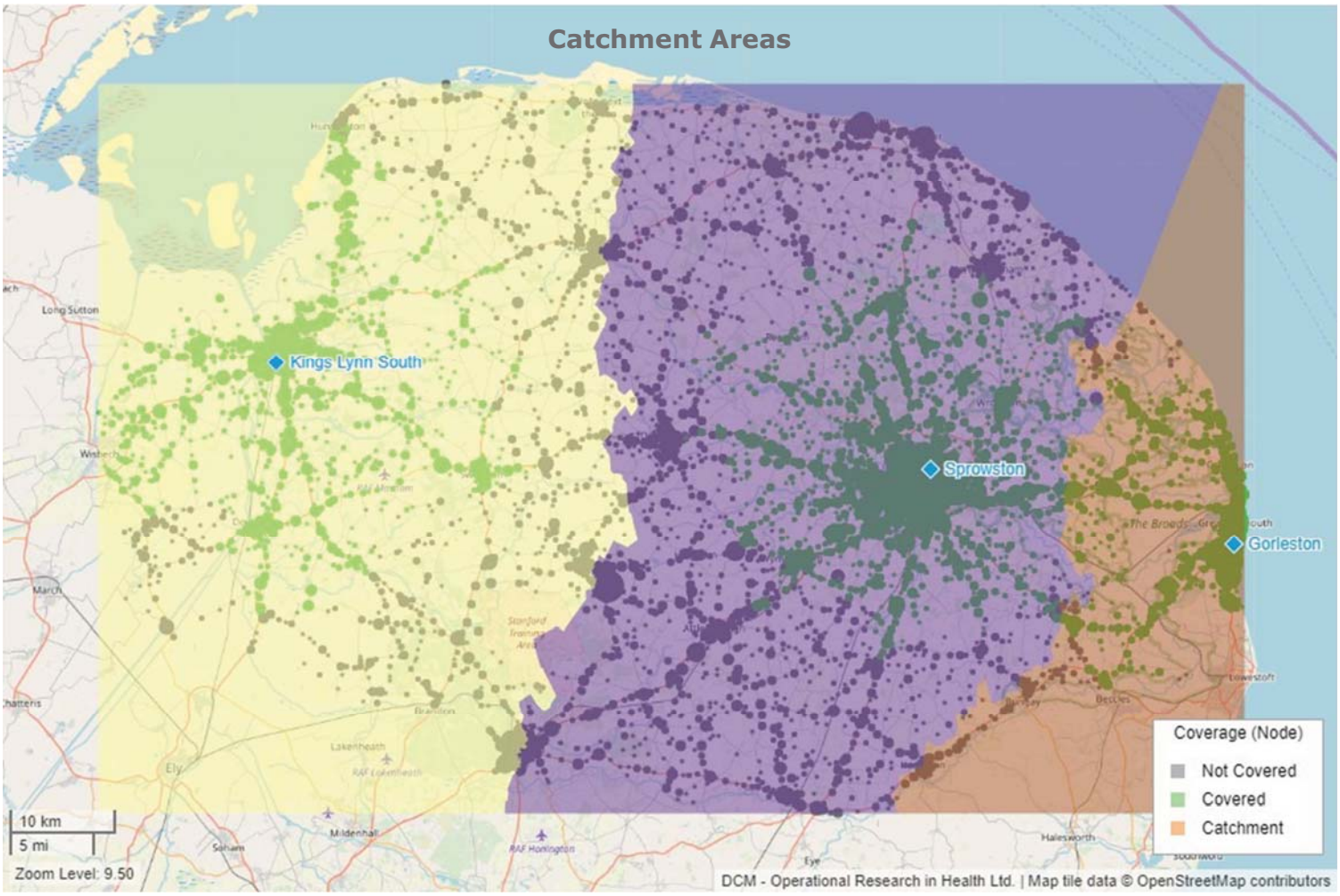


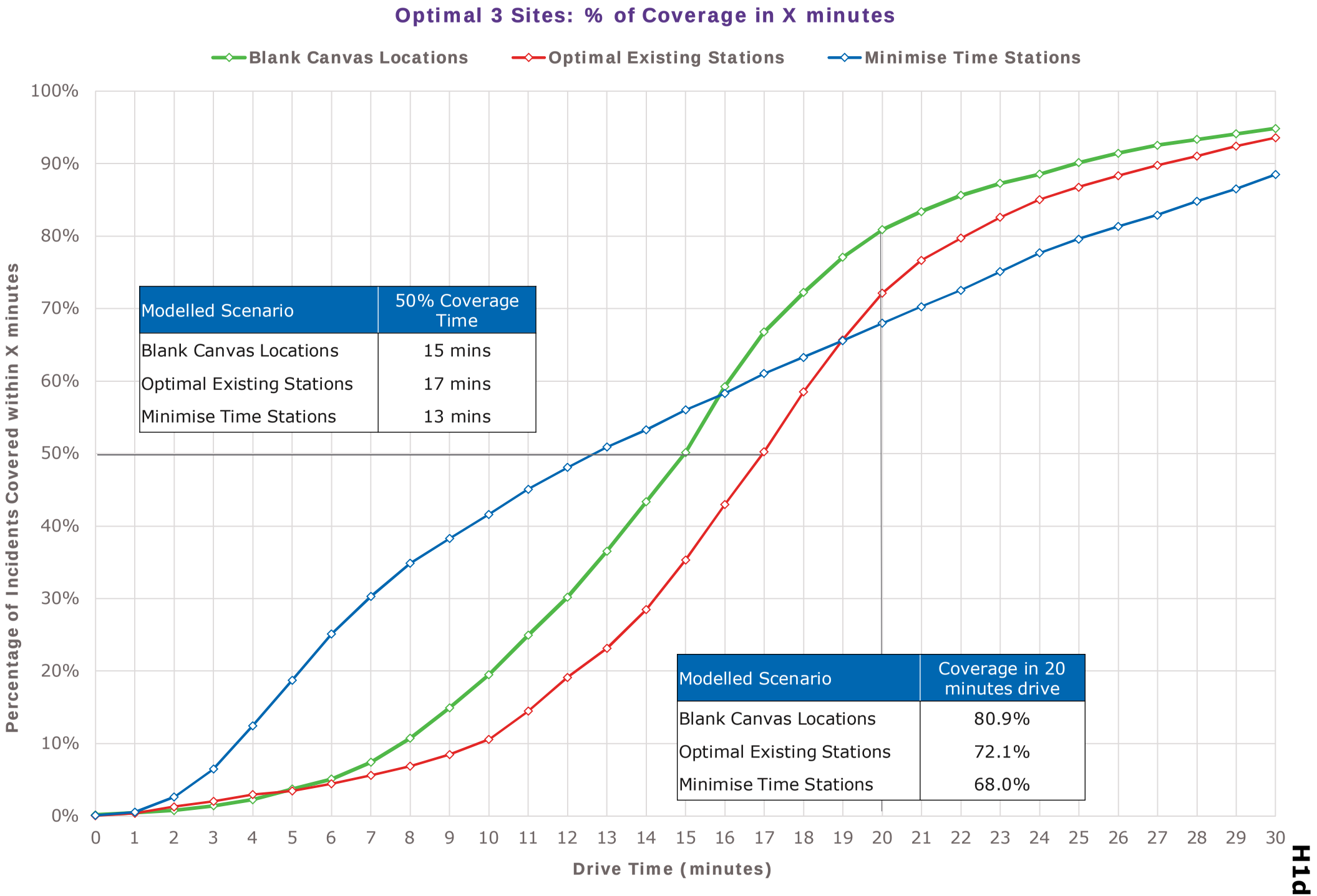
3 Sites for Officers: Minimise Time Stations

Coverage of Incidents and Sites in a 20-minute Drive Time



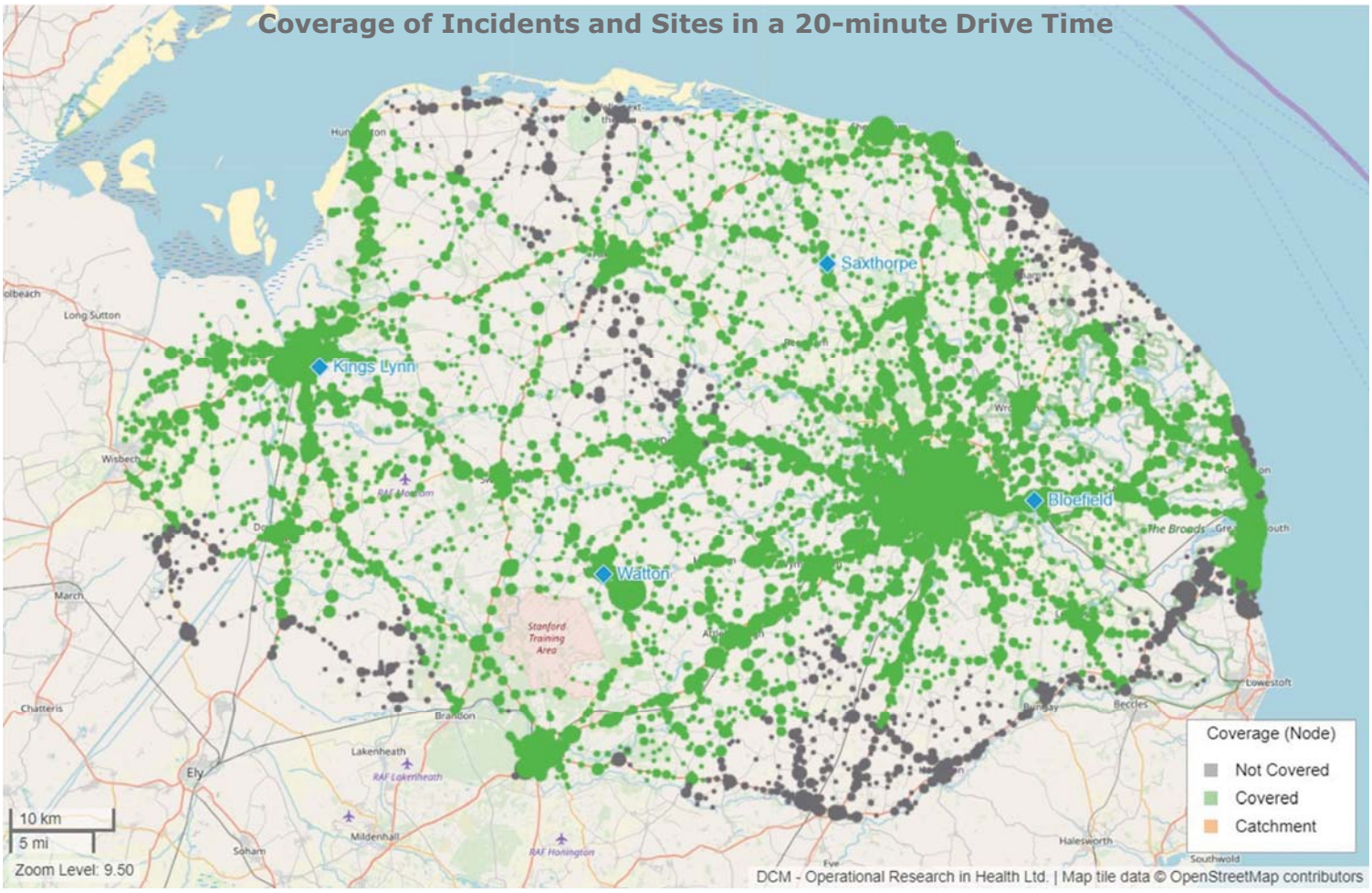
Catchment Areas



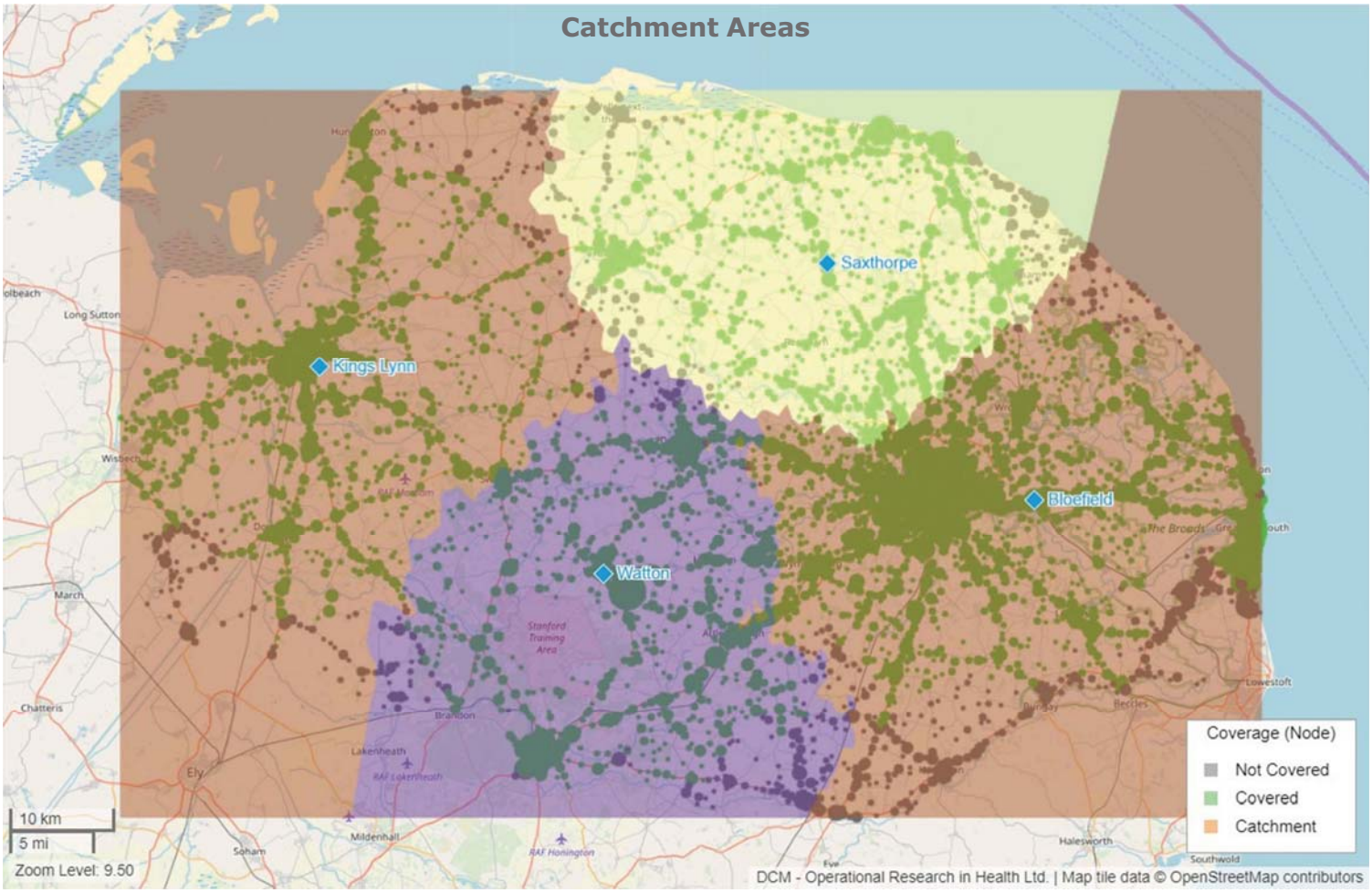

Optimal 3 Sites: % of Coverage in X minutes
Blank Canvas Locations
Optimal Existing Stations
Minimise Time Stations
Percentage of Incidents Covered within X minutes
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Drive Time (minutes)
Modelled Scenario | 50% Coverage Time
Blank Canvas Locations | 15 mins
Optimal Existing Stations | 17 mins
Minimise Time Stations | 13 mins
Modelled Scenario | Coverage in 20 minutes drive
Blank Canvas Locations | 80.9%
Optimal Existing Stations | 72.1%
Minimise Time Stations | 68.0%
H1d

4 Sites for Officers: Blank Canvas Locations

Coverage of Incidents and Sites in a 20-minute Drive Time

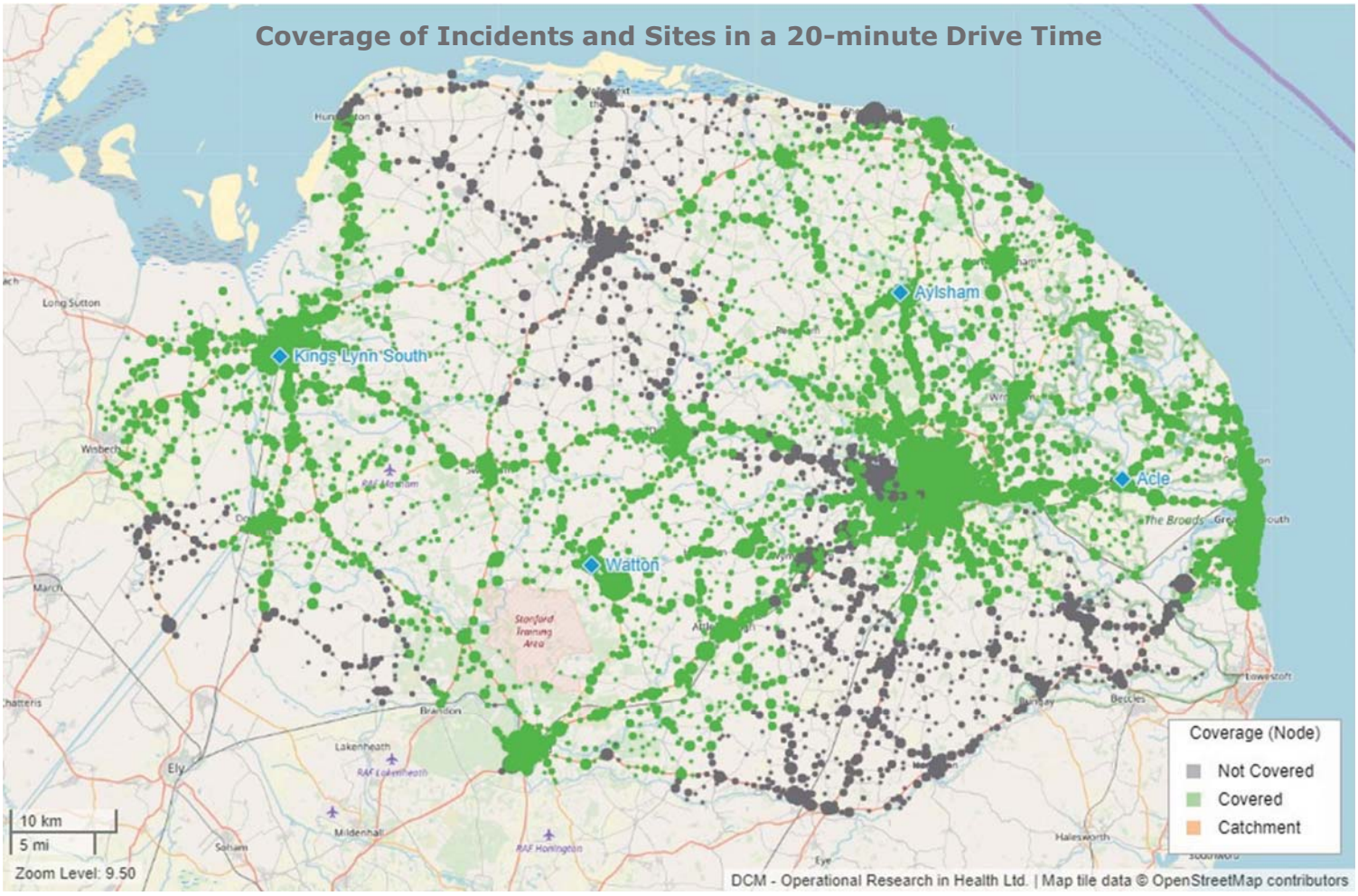


Catchment Areas

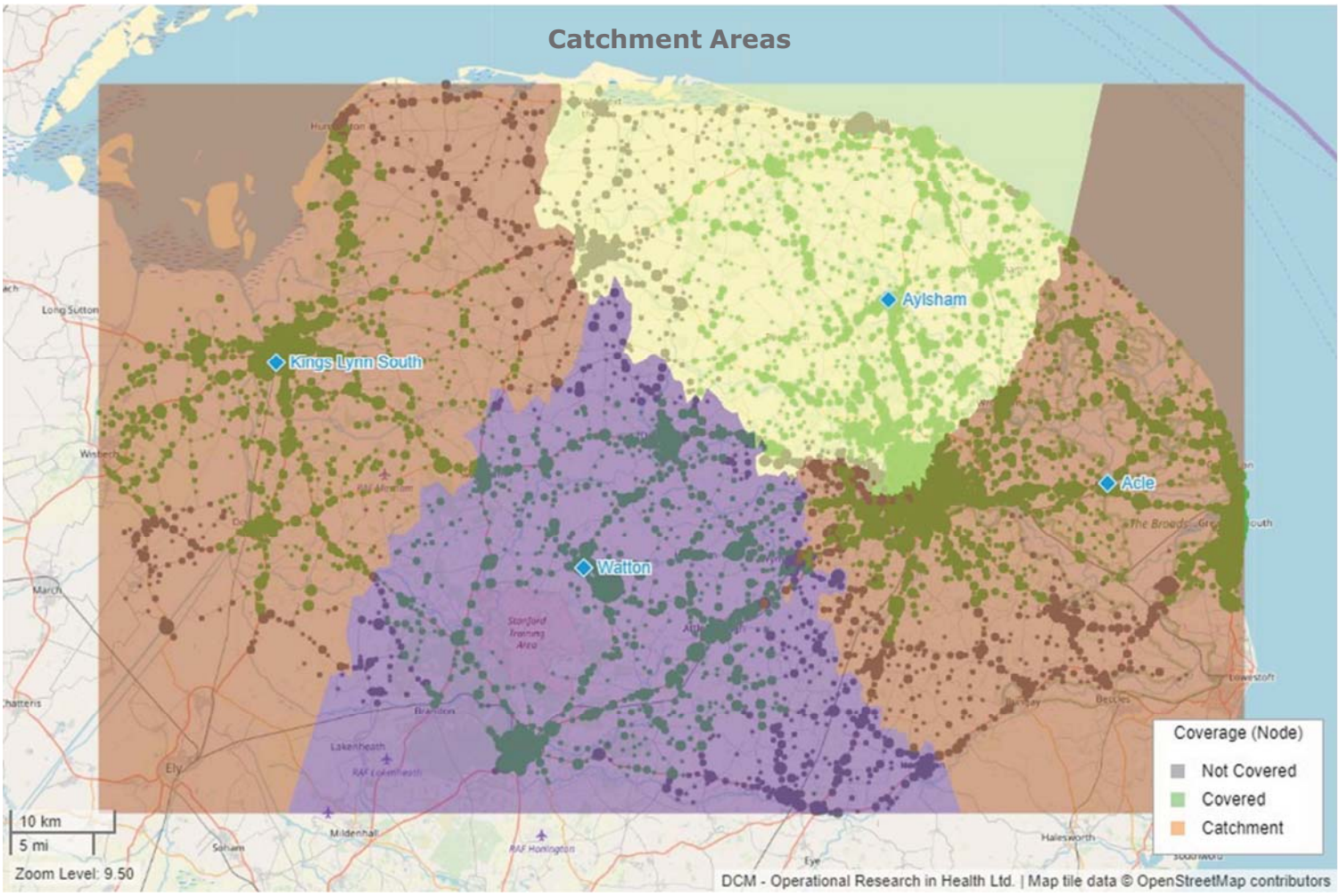


4 Sites for Officers: Existing Stations Maximised

Coverage of Incidents and Sites in a 20-minute Drive Time

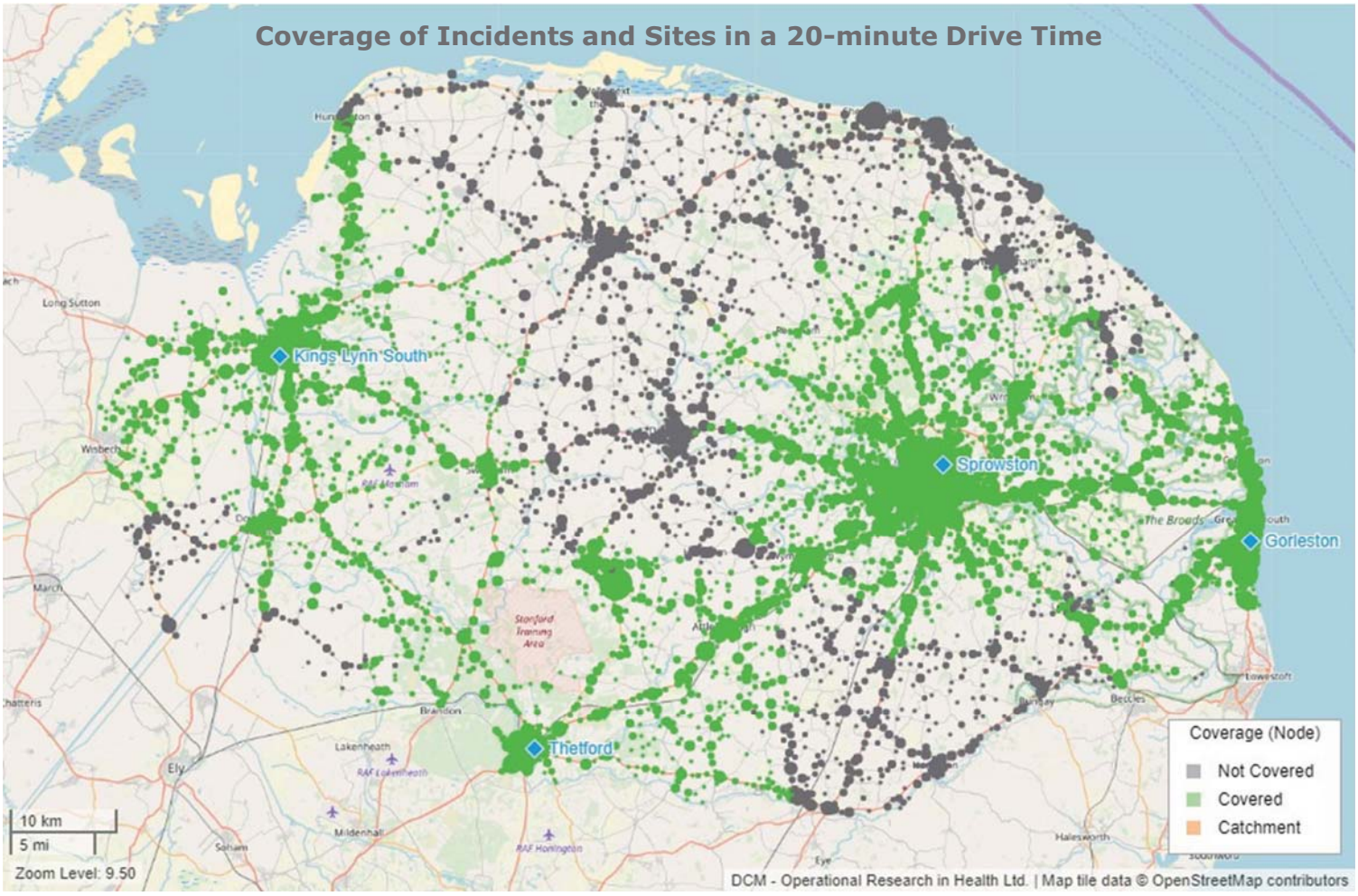


Catchment Areas

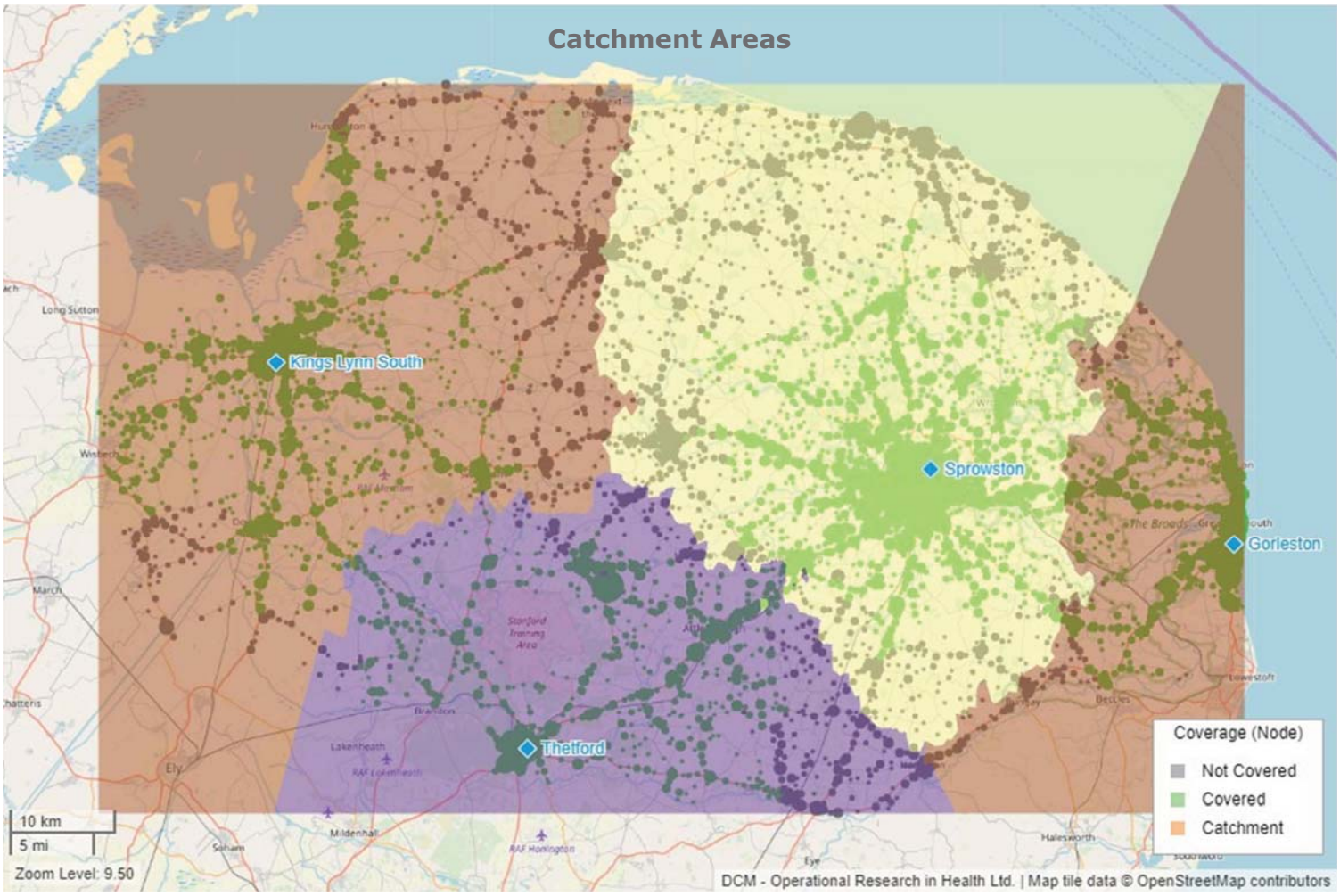


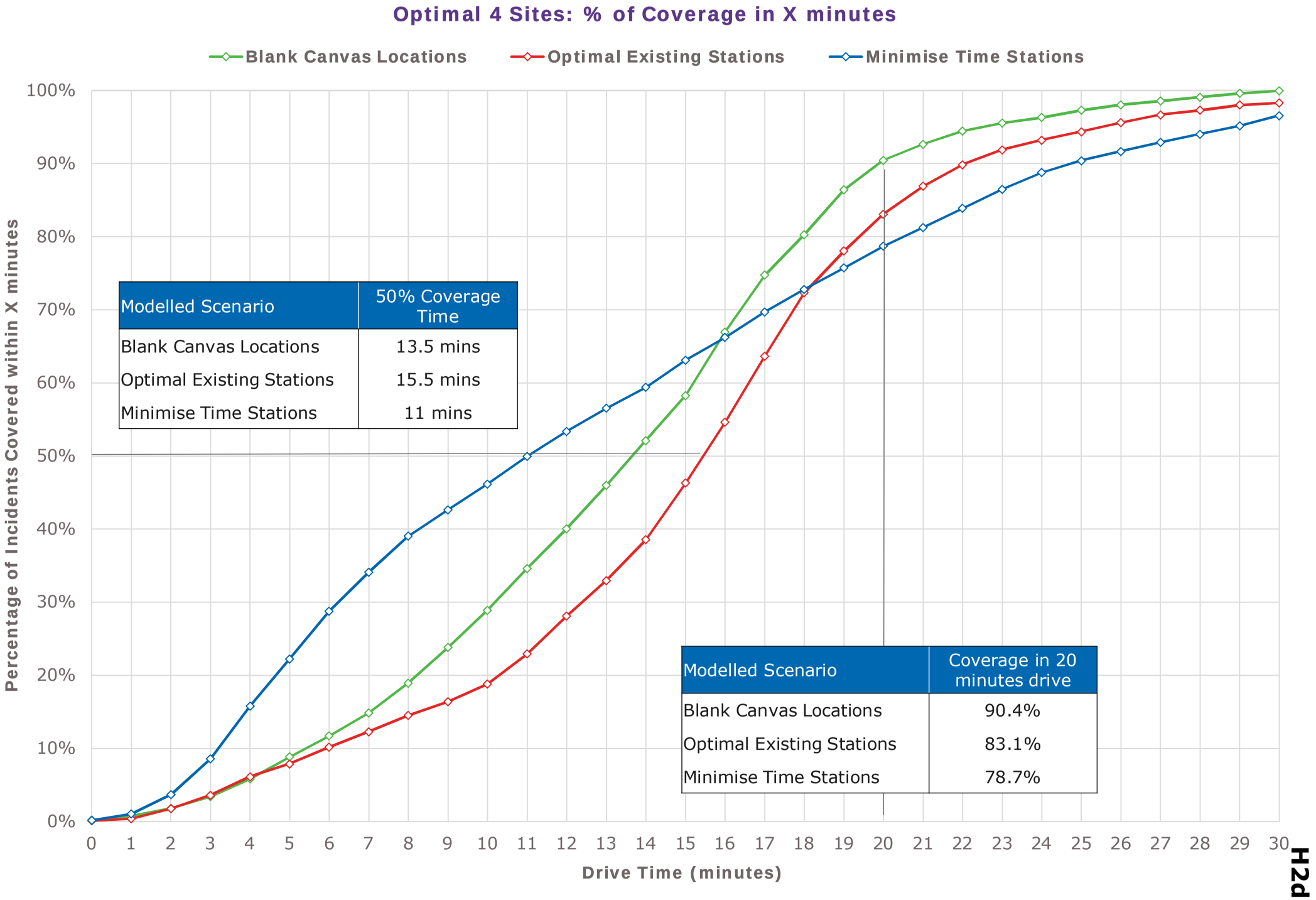
4 Sites for Officers: Minimise Time Stations

Coverage of Incidents and Sites in a 20-minute Drive Time



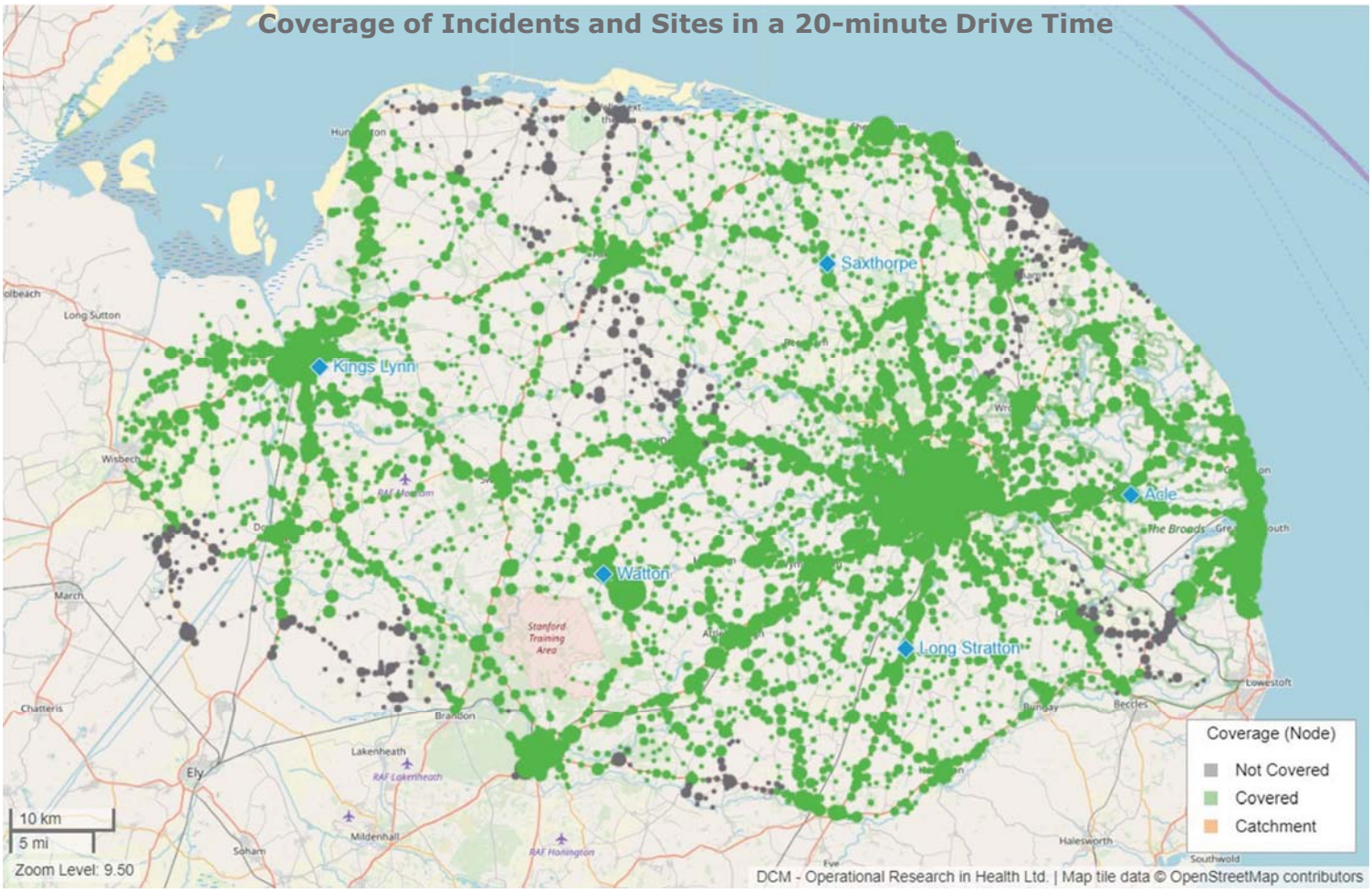
Catchment Areas



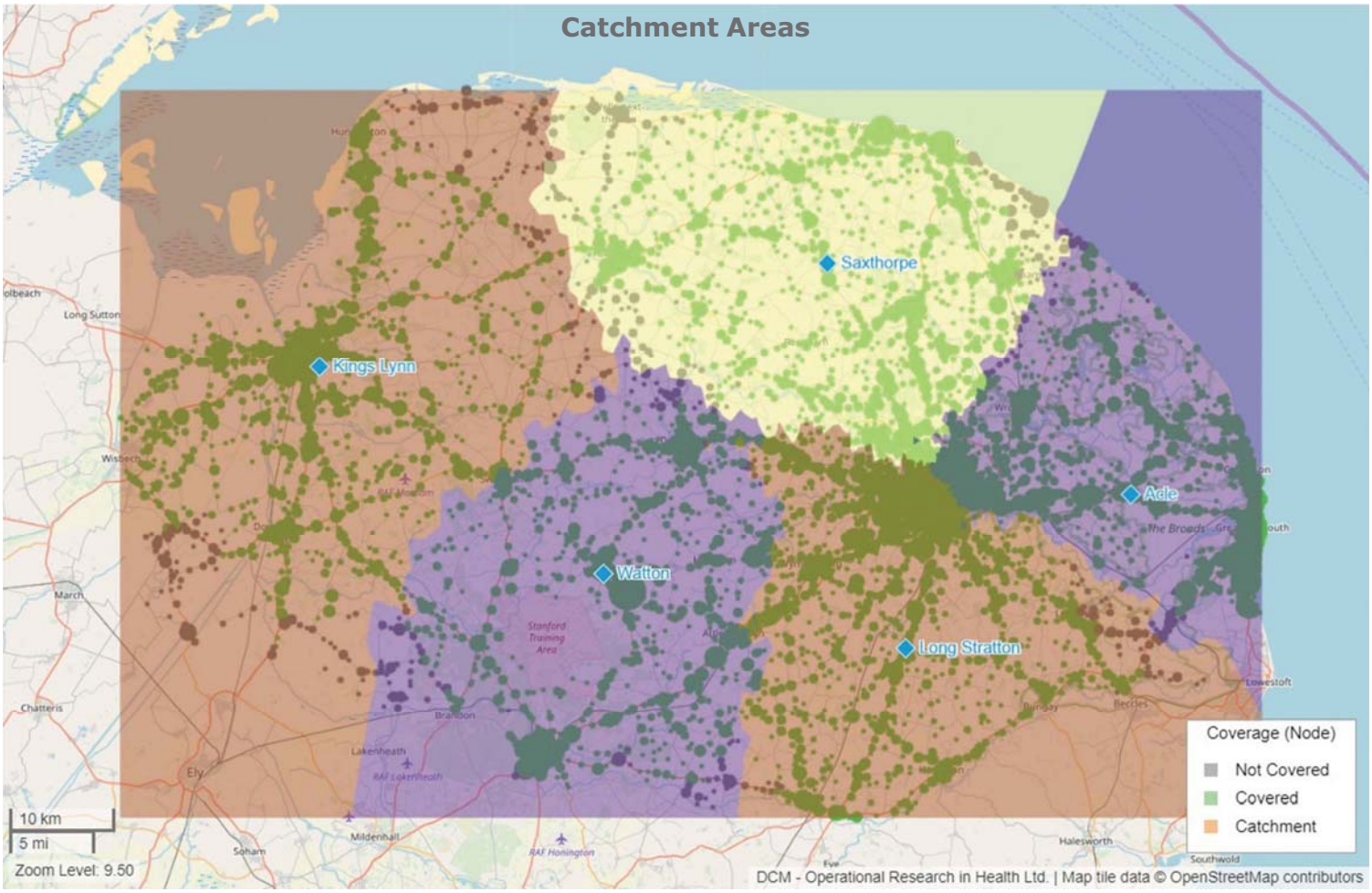

Optimal 4 Sites: % of Coverage in X minutes
Blank Canvas Locations
Optimal Existing Stations
Minimise Time Stations
Percentage of Incidents Covered within X minutes
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Drive Time (minutes)
Modelled Scenario | 50% Coverage Time
Blank Canvas Locations | 13.5 mins
Optimal Existing Stations | 15.5 mins
Minimise Time Stations | 11 mins
Modelled Scenario | Coverage in 20 minutes drive
Blank Canvas Locations | 90.4%
Optimal Existing Stations | 83.1%
Minimise Time Stations | 78.7%
H2d

5 Sites for Officers: Blank Canvas Locations

Coverage of Incidents and Sites in a 20-minute Drive Time

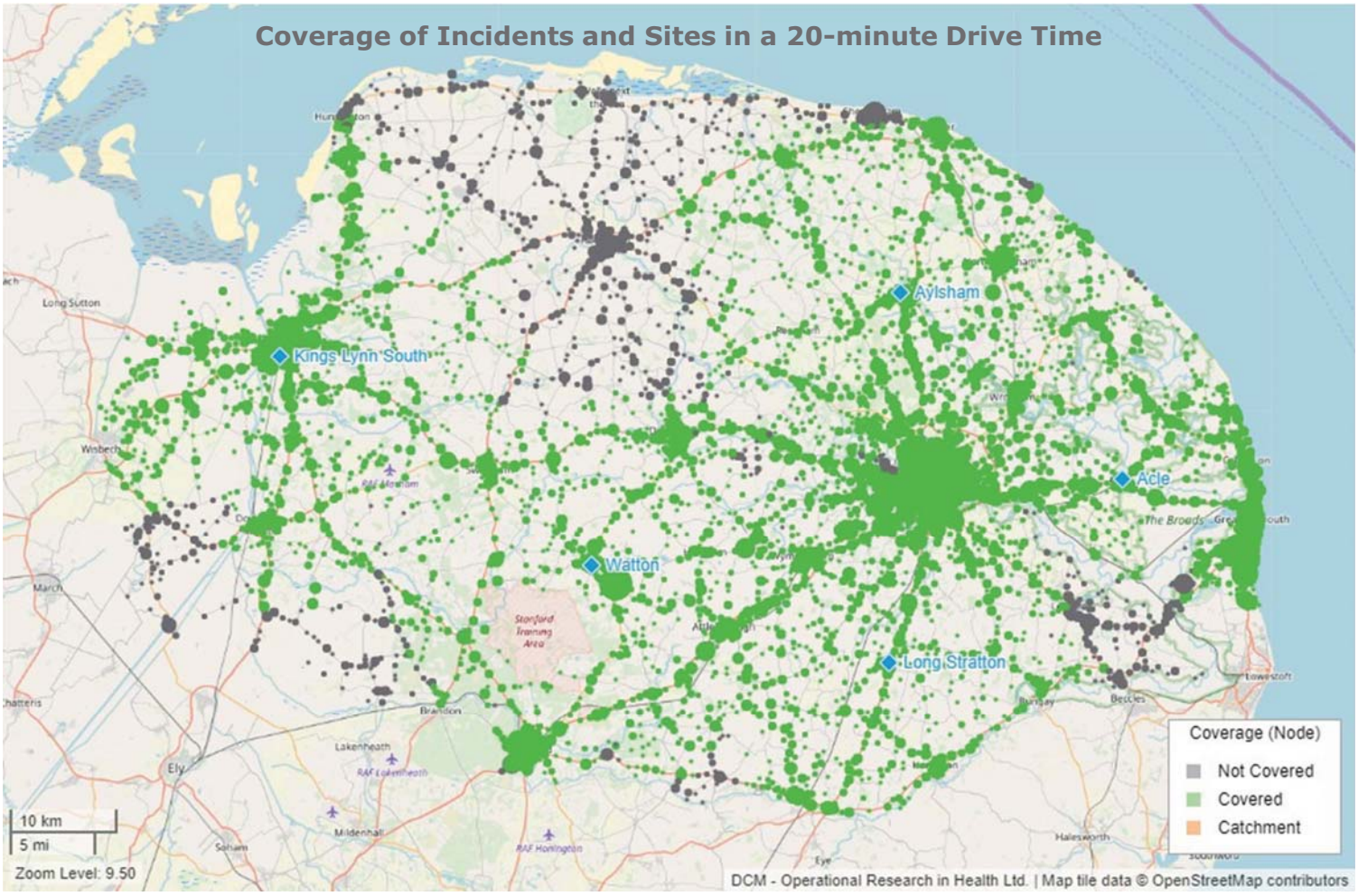


Catchment Areas

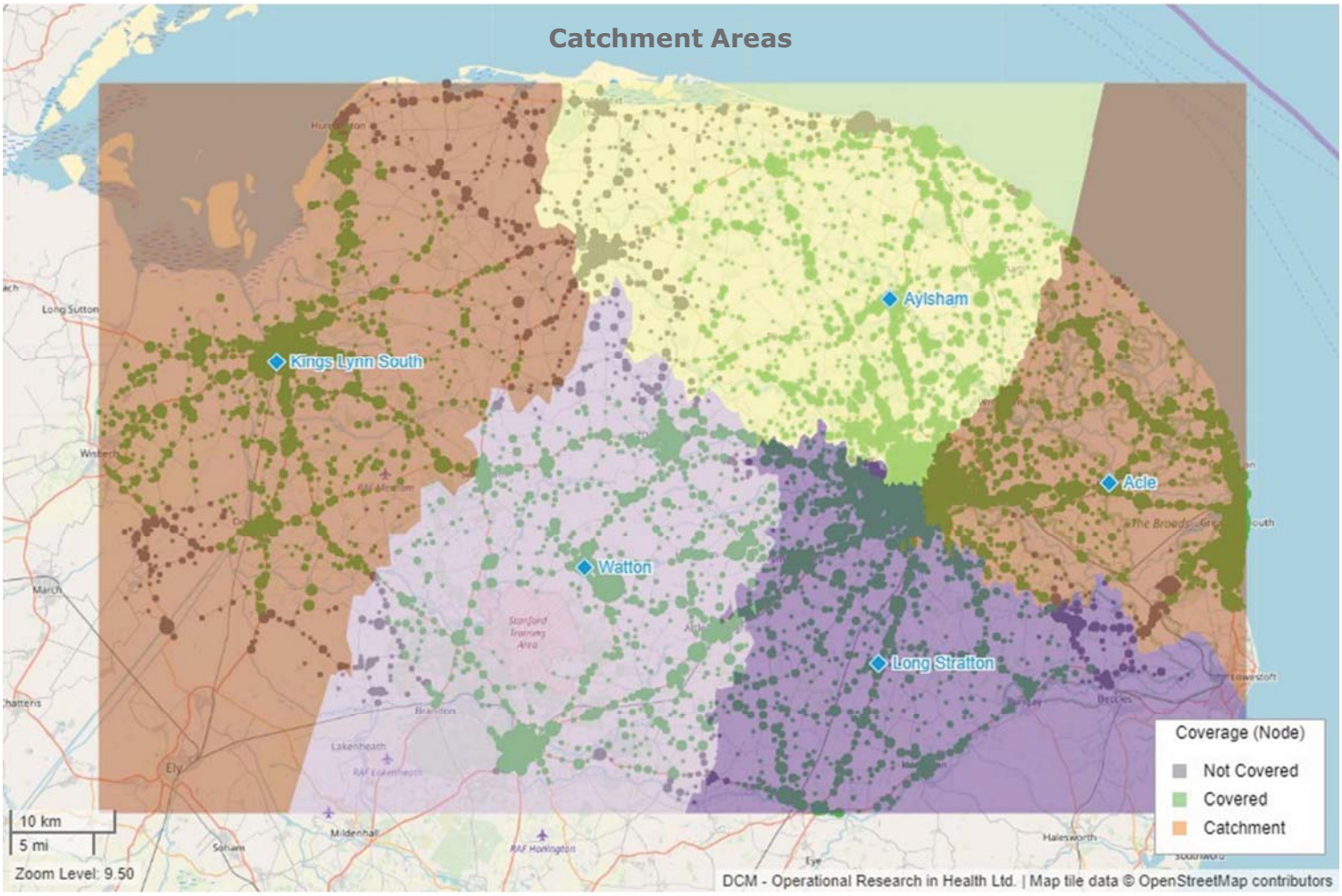


5 Sites for Officers: Existing Stations Maximised

Coverage of Incidents and Sites in a 20-minute Drive Time

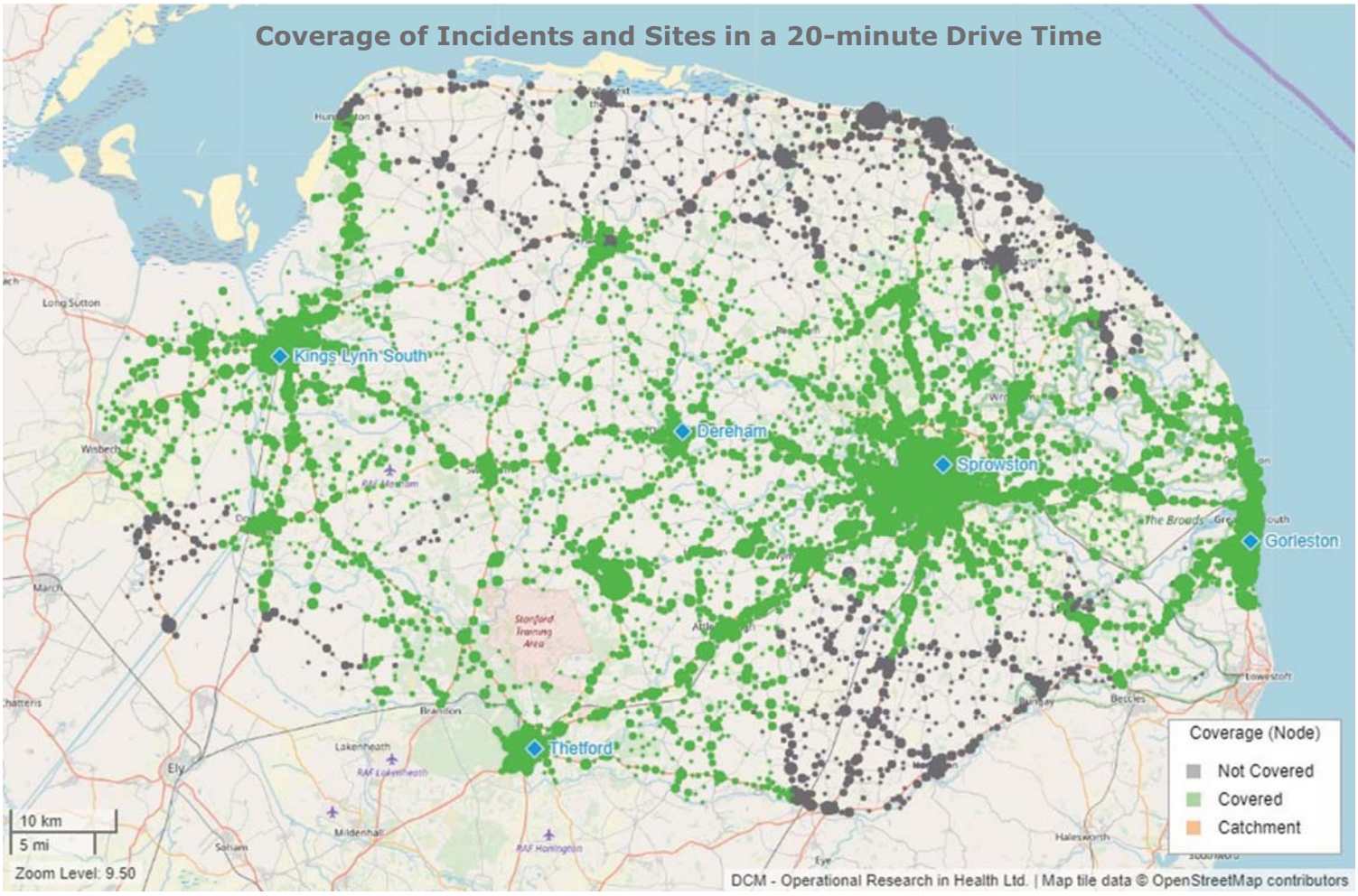


Catchment Areas

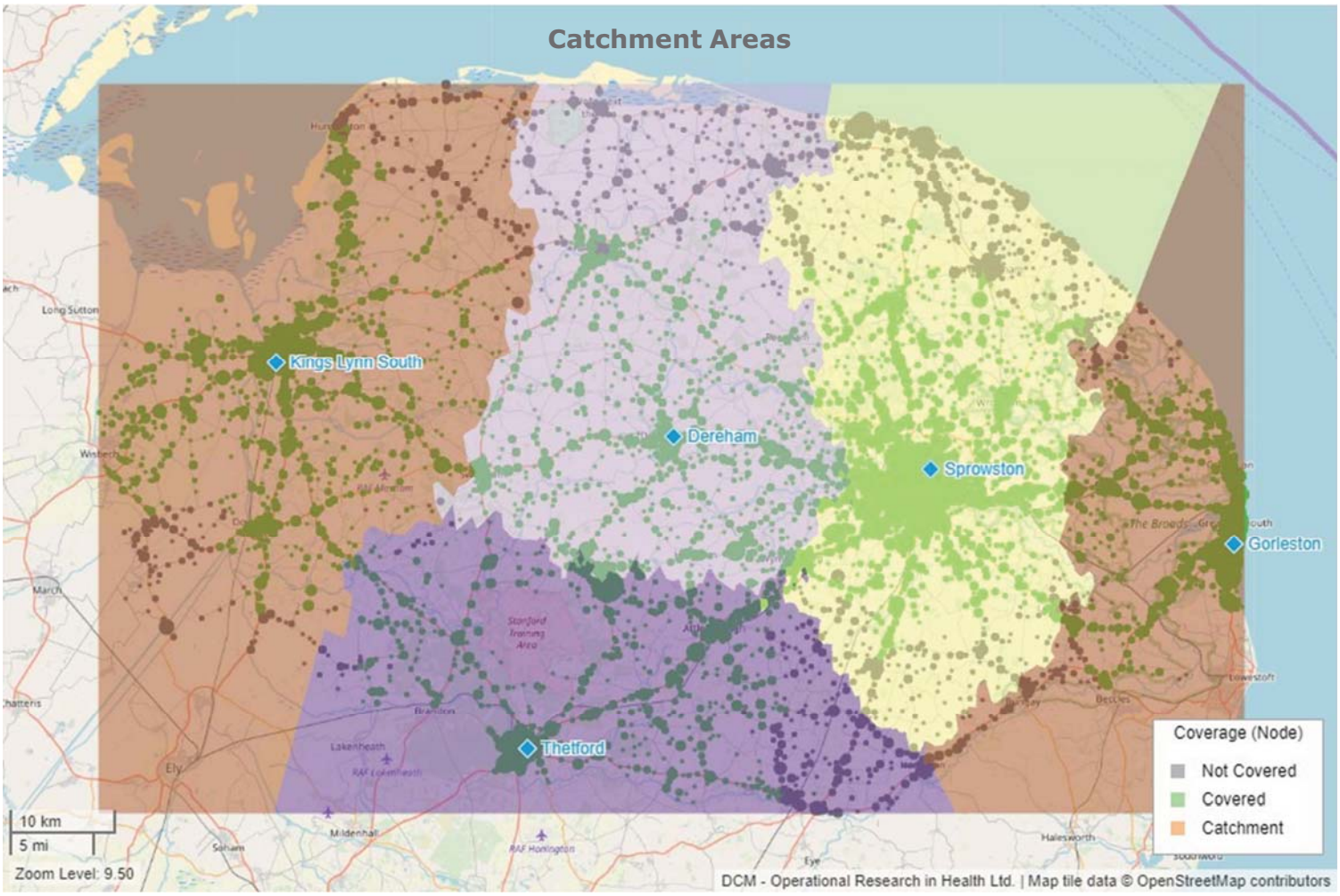


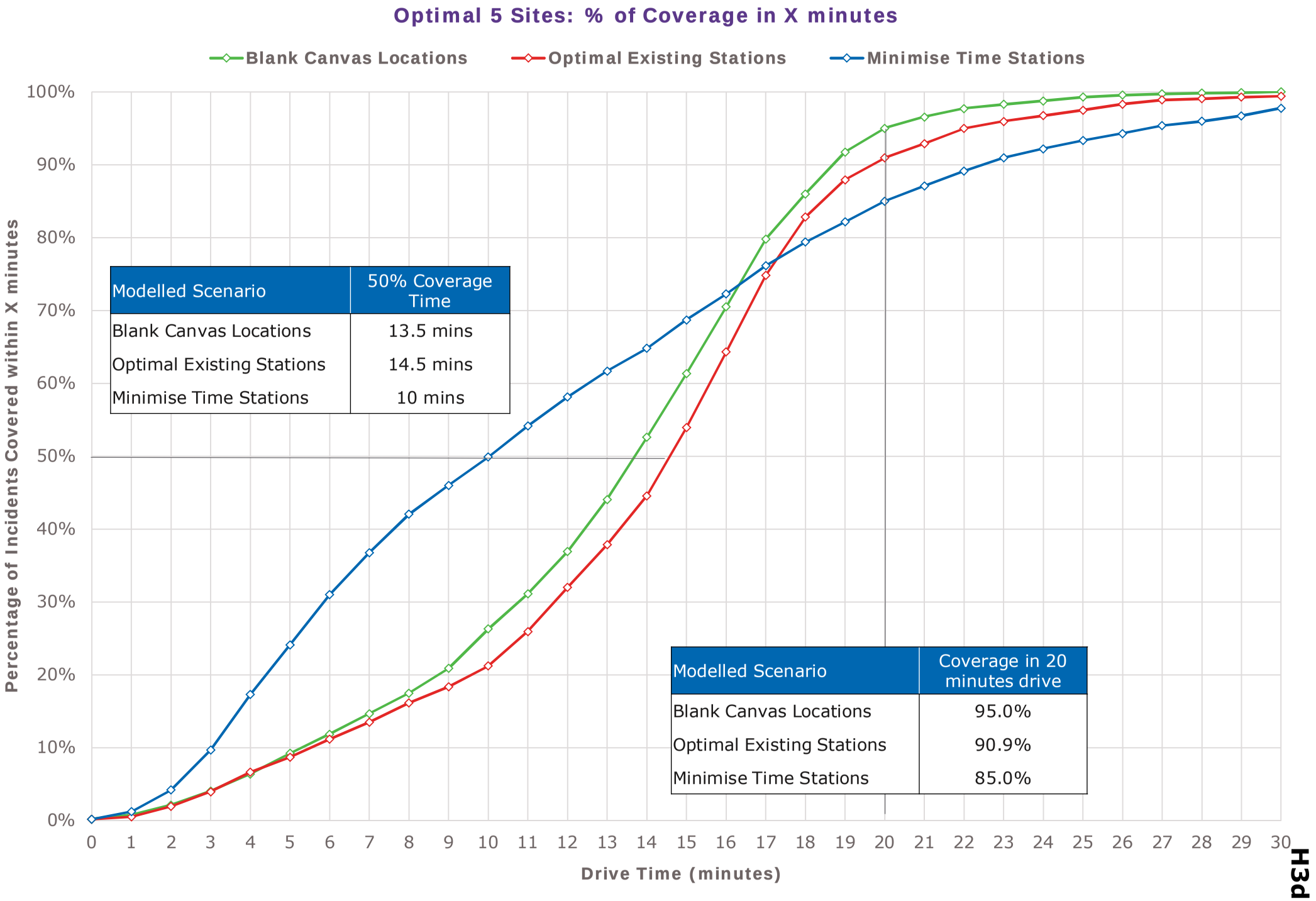
5 Sites for Officers: Minimise Time Stations

Coverage of Incidents and Sites in a 20-minute Drive Time



Catchment Areas




Optimal 5 Sites: % of Coverage in X minutes
Blank Canvas Locations
Optimal Existing Stations
Minimise Time Stations
Percentage of Incidents Covered within X minutes
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Drive Time (minutes)
Modelled Scenario | 50% Coverage Time
Blank Canvas Locations | 13.5 mins
Optimal Existing Stations | 14.5 mins
Minimise Time Stations | 10 mins
Modelled Scenario | Coverage in 20 minutes drive
Blank Canvas Locations | 95.0%
Optimal Existing Stations | 90.9%
Minimise Time Stations | 85.0%
H3d

I Response Provision in Great Yarmouth

Third River Crossing

3rd River Crossing in Great Yarmouth - Impact of Permanent Bridge Access

Response Performance

Reporting Area	Average 1st Response Time					Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
Average Response Performance								
Gorleston	06:44	06:45	06:51	07:25	**07:36**	09:48	09:35	**10:15**
Great Yarmouth	05:37	05:43	05:09	05:41	**05:59**	08:55	05:50	**09:38**
Urban	07:19	07:46	07:16	07:25	**07:47**	10:43	10:27	**11:10**
Rural Town	10:50	11:00	11:15	10:45	**11:15**	16:01	15:16	**16:24**
Village/Hamlet	13:30	13:48	12:47	13:48	**14:13**	19:07	16:46	**18:46**
NFRS-wide	**09:58**	**09:53**	**10:57**	**09:16**	**10:09**	**14:33**	**14:51**	**14:41**
Impact from Current Road Network Position								
Gorleston	-00:02	-00:03	-00:02	-00:03	**-00:03**	-01:03	-01:14	**-01:10**
Great Yarmouth	-00:04	-00:06	-00:03	-00:03	**-00:03**	-00:50	-00:33	**-00:47**
Urban	-00:01	-00:01	-00:01	-00:00	**-00:01**	-00:12	-00:10	**-00:13**
Rural Town	-00:00	-00:00	-00:00	-00:00	**-00:00**	-00:05	-00:08	**-00:05**
Village/Hamlet	-00:00	-00:00	-00:00	-00:00	**-00:00**	-00:02	-00:01	**-00:02**
NFRS-wide	**-00:00**	**-00:01**	**-00:00**	**-00:00**	**-00:00**	**-00:07**	**-00:04**	**-00:08**

Reporting Area	1st Response - % within 10 minutes					2nd Response - % within 15 minutes		
	Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
Performance within Target								
Gorleston	94.5%	90.7%	91.5%	90.3%	**87.6%**	89.1%	95.7%	**90.9%**
Great Yarmouth	97.5%	93.8%	98.0%	97.0%	**94.2%**	88.1%	100.1%	**85.9%**
Urban	85.6%	80.2%	81.0%	86.1%	**83.0%**	85.1%	89.6%	**84.9%**
Rural Town	51.0%	48.3%	41.8%	53.6%	**50.0%**	52.0%	51.4%	**52.5%**
Village/Hamlet	16.8%	19.0%	22.4%	19.3%	**18.4%**	27.0%	42.1%	**32.7%**
NFRS-wide	**56.8%**	**58.8%**	**42.3%**	**67.2%**	**59.6%**	**59.1%**	**56.2%**	**61.2%**
Impact from Current Road Network Position								
Gorleston	0.6%	0.6%	0.6%	0.6%	**0.6%**	0.3%	0.5%	**2.3%**
Great Yarmouth	0.4%	0.7%	0.2%	0.3%	**0.6%**	0.2%	0.0%	**0.4%**
Urban	0.1%	0.1%	0.2%	0.1%	**0.1%**	0.1%	0.2%	**0.3%**
Rural Town	0.0%	0.1%	0.0%	0.0%	**0.0%**	1.3%	1.4%	**1.0%**
Village/Hamlet	0.0%	0.0%	0.0%	0.0%	**0.0%**	0.1%	0.1%	**0.1%**
NFRS-wide	**0.1%**	**0.1%**	**0.1%**	**0.1%**	**0.1%**	**0.2%**	**0.3%**	**0.3%**

Station Workload

Station	Changes in Responses from Base Position	Predicted Average Annual Responses
Gorleston	-30	587
Great Yarmouth	31	820
Overall	**0**	**10,450**

3rd River Crossing in Great Yarmouth - Impact of Bridge with Restricted Access

Response Performance

Reporting Area	Average 1st Response Time					Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
Average Response Performance								
Gorleston	06:44	06:45	06:51	07:25	07:36	09:52	09:40	10:20
Great Yarmouth	05:37	05:43	05:09	05:42	05:59	08:58	05:52	09:41
Urban	07:19	07:46	07:16	07:25	07:47	10:44	10:28	11:11
Rural Town	10:50	11:00	11:15	10:45	11:15	16:01	15:17	16:24
Village/Hamlet	13:30	13:48	12:47	13:48	14:13	19:07	16:46	18:46
NFRS-wide	**09:58**	**09:53**	**10:57**	**09:16**	**10:09**	**14:33**	**14:51**	**14:42**
Impact from Current Road Network Position								
Gorleston	-00:02	-00:03	-00:02	-00:03	-00:03	-00:59	-01:09	-01:05
Great Yarmouth	-00:04	-00:06	-00:03	-00:02	-00:03	-00:47	-00:31	-00:44
Urban	-00:01	-00:01	-00:01	-00:00	-00:01	-00:11	-00:09	-00:12
Rural Town	-00:00	-00:00	-00:00	-00:00	-00:00	-00:05	-00:07	-00:05
Village/Hamlet	-00:00	-00:00	-00:00	-00:00	-00:00	-00:02	-00:01	-00:02
NFRS-wide	**-00:00**	**-00:01**	**-00:00**	**-00:00**	**-00:00**	**-00:07**	**-00:04**	**-00:07**

Reporting Area	1st Response - % within 10 minutes					2nd Response - % within 15 minutes		
	Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
Performance within Target								
Gorleston	94.5%	90.7%	91.4%	90.2%	87.6%	89.1%	95.7%	90.8%
Great Yarmouth	97.5%	93.7%	98.0%	97.0%	94.1%	88.1%	100.0%	85.9%
Urban	85.6%	80.2%	81.0%	86.1%	83.0%	85.1%	89.5%	84.9%
Rural Town	51.0%	48.3%	41.8%	53.6%	50.0%	51.9%	51.3%	52.5%
Village/Hamlet	16.8%	19.0%	22.4%	19.3%	18.4%	26.9%	42.1%	32.7%
NFRS-wide	**56.8%**	**58.8%**	**42.3%**	**67.2%**	**59.5%**	**59.1%**	**56.2%**	**61.2%**
Impact from Current Road Network Position								
Gorleston	0.6%	0.6%	0.5%	0.6%	0.5%	0.3%	0.5%	2.1%
Great Yarmouth	0.4%	0.6%	0.2%	0.3%	0.6%	0.2%	0.0%	0.4%
Urban	0.1%	0.1%	0.2%	0.1%	0.1%	0.1%	0.2%	0.3%
Rural Town	0.0%	0.1%	0.0%	0.0%	0.0%	1.2%	1.3%	0.9%
Village/Hamlet	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%
NFRS-wide	**0.1%**	**0.1%**	**0.1%**	**0.1%**	**0.1%**	**0.2%**	**0.2%**	**0.3%**

Station Workload

Station	Changes in Responses from Base Position	Predicted Average Annual Responses
Gorleston	-28	589
Great Yarmouth	29	818
Overall	**0**	**10,450**

Appliance Removal Options

Bridge Restricted Access: Target Time Response Performance

Scenario	Reporting Area	1st Response % within 10 mins					2nd Response % within 15 mins		
		Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
'Do Nothing' Scenario	Gorleston	94.5%	90.7%	91.4%	90.2%	**87.6%**	89.1%	95.7%	**90.8%**
	Great Yarmouth	97.5%	93.7%	98.0%	97.0%	**94.1%**	88.1%	100.0%	**85.9%**
	NFRS-wide	**56.8%**	**58.8%**	**42.3%**	**67.2%**	**59.5%**	**59.1%**	**56.2%**	**61.2%**

Impact from 'Do Nothing' Scenario

Remove **GOR RDS** Pump	Gorleston	-0.8%	-0.9%	-0.8%	-0.6%	**-0.6%**	-1.9%	-1.6%	**-1.9%**
	Great Yarmouth	-0.5%	-0.6%	-0.6%	-0.4%	**-0.5%**	-1.9%	-2.0%	**-1.7%**
	NFRS-wide	**-0.1%**	**-0.1%**	**0.0%**	**-0.1%**	**-0.1%**	**-0.2%**	**-0.1%**	**-0.2%**
Remove **GYA RDS** Pump	Gorleston	-0.5%	-0.5%	-0.6%	-0.4%	**-0.4%**	-1.5%	-1.2%	**-1.4%**
	Great Yarmouth	-0.9%	-1.1%	-1.1%	-0.9%	**-1.0%**	-1.6%	-1.6%	**-1.8%**
	NFRS-wide	**-0.1%**	**-0.1%**	**-0.1%**	**-0.1%**	**-0.1%**	**-0.2%**	**-0.1%**	**-0.2%**
Remove **GOR WT** Pump	Gorleston	-17.8%	-15.0%	-13.7%	-25.2%	**-23.5%**	-8.6%	-10.2%	**-10.3%**
	Great Yarmouth	-1.7%	-1.6%	-2.3%	-1.6%	**-1.8%**	-9.3%	-11.6%	**-10.4%**
	NFRS-wide	**-1.1%**	**-1.0%**	**-0.6%**	**-1.5%**	**-1.4%**	**-1.3%**	**-1.4%**	**-1.5%**
Remove **GYA WT** Pump	Gorleston	-1.9%	-1.6%	-1.9%	-1.7%	**-1.7%**	-8.4%	-10.2%	**-10.2%**
	Great Yarmouth	-11.4%	-10.8%	-12.1%	-9.7%	**-10.3%**	-9.2%	-11.8%	**-10.6%**
	NFRS-wide	**-0.6%**	**-0.7%**	**-0.5%**	**-0.6%**	**-0.7%**	**-1.4%**	**-1.5%**	**-1.6%**

Appliance Removal Options

Station Workload

Station	Average Annual Responses 'Do Nothing'	Impact on Responses from 'Do Nothing' Scenario			
		Remove **GOR RDS** Pump	Remove **GYA RDS** Pump	Remove **GOR WT** Pump	Remove **GYA WT** Pump
Gorleston	589	-53	65	-330	322
Great Yarmouth	818	22	-87	265	-392
Acle	73	12	9	20	21
Martham	111	10	7	23	29
Overall	**10,450**	0	0	0	0

Gorleston Crew Deployed From Great Yarmouth

Reporting Area	Average 1st Response Time					Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
Average Response Performance								
Gorleston	06:52	06:54	07:04	07:35	07:46	09:50	09:38	10:19
Great Yarmouth	05:37	05:42	05:08	05:41	05:58	08:52	05:43	09:34
Urban	07:20	07:47	07:18	07:25	07:48	10:43	10:27	11:10
Rural Town	10:50	11:00	11:15	10:45	11:15	16:00	15:16	16:23
Village/Hamlet	13:30	13:48	12:47	13:48	14:13	19:07	16:46	18:46
NFRS-wide	**09:58**	**09:54**	**10:57**	**09:16**	**10:09**	**14:33**	**14:51**	**14:41**
Impact from 'Do Nothing' Position								
Gorleston	00:08	00:09	00:13	00:09	00:10	-00:02	-00:01	-00:01
Great Yarmouth	-00:00	-00:01	-00:01	-00:01	-00:01	-00:06	-00:09	-00:07
Urban	00:01	00:01	00:01	00:01	00:01	-00:01	-00:01	-00:01
Rural Town	00:00	00:00	00:00	00:00	00:00	-00:01	-00:01	-00:01
Village/Hamlet	00:00	00:00	00:00	00:00	00:00	-00:00	-00:00	-00:00
Service-wide	**00:00**	**00:00**	**00:00**	**00:01**	**00:01**	**-00:01**	**-00:00**	**-00:01**

Reporting Area	1st Response % within 10 mins					2nd Response % within 15 mins		
	Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
Performance within Target								
Gorleston	92.9%	89.5%	90.1%	87.7%	85.3%	89.2%	95.8%	90.8%
Great Yarmouth	97.5%	93.8%	98.0%	97.0%	94.2%	88.1%	100.0%	86.0%
Urban	85.5%	80.1%	80.9%	85.9%	82.8%	85.2%	89.6%	84.9%
Rural Town	50.9%	48.3%	41.6%	53.6%	49.9%	52.1%	51.5%	52.7%
Village/Hamlet	16.8%	18.9%	22.4%	19.3%	18.4%	27.0%	42.2%	32.7%
NFRS-wide	**56.7%**	**58.7%**	**42.3%**	**67.1%**	**59.4%**	**59.1%**	**56.3%**	**61.3%**
Impact from 'Do Nothing' Position								
Gorleston	-1.6%	-1.2%	-1.4%	-2.5%	-2.3%	0.1%	0.1%	0.1%
Great Yarmouth	0.0%	0.1%	0.1%	0.0%	0.0%	0.0%	0.1%	0.1%
Urban	-0.1%	-0.1%	-0.1%	-0.2%	-0.2%	0.0%	0.0%	0.0%
Rural Town	0.0%	0.0%	-0.2%	0.0%	0.0%	0.2%	0.2%	0.3%
Village/Hamlet	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
NFRS-wide	**-0.1%**	**-0.1%**	**-0.1%**	**-0.1%**	**-0.1%**	**0.1%**	**0.0%**	**0.1%**

Great Yarmouth Crew Deployed From Gorleston

Reporting Area	Average 1st Response Time					Average 2nd Response Time		
	Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
Average Response Performance								
Gorleston	06:43	06:44	06:51	07:24	07:36	09:41	09:25	10:08
Great Yarmouth	05:48	05:53	05:21	05:54	06:10	09:06	05:55	09:48
Urban	07:20	07:47	07:17	07:26	07:48	10:44	10:27	11:11
Rural Town	10:50	11:01	11:15	10:45	11:15	16:01	15:16	16:24
Village/Hamlet	13:30	13:48	12:47	13:48	14:13	19:07	16:46	18:46
NFRS-wide	**09:58**	**09:54**	**10:57**	**09:16**	**10:09**	**14:33**	**14:51**	**14:42**
Impact from 'Do Nothing' Position								
Gorleston	-00:01	-00:01	-00:01	-00:01	-00:01	-00:11	-00:15	-00:12
Great Yarmouth	00:11	00:10	00:11	00:12	00:11	00:08	00:03	00:07
Urban	00:01	00:01	00:01	00:01	00:01	-00:00	-00:01	-00:01
Rural Town	00:00	00:01	00:00	00:00	00:00	-00:00	-00:01	-00:00
Village/Hamlet	00:00	00:00	00:00	00:00	00:00	-00:00	-00:00	-00:00
NFRS-wide	**00:01**	**00:01**	**00:00**	**00:01**	**00:01**	**-00:00**	**-00:00**	**-00:00**

Reporting Area	1st Response % within 10 mins					2nd Response % within 15 mins		
	Primary Fire	Secondary Fire	RTC	False Alarm	**All Incidents**	Primary Fire	RTC	**All Incidents**
Performance within Target								
Gorleston	94.6%	90.8%	91.5%	90.4%	87.7%	89.1%	95.8%	90.9%
Great Yarmouth	96.5%	92.8%	96.5%	96.1%	93.2%	88.0%	100.0%	85.8%
Urban	85.5%	80.1%	80.9%	86.0%	82.9%	85.1%	89.6%	84.9%
Rural Town	51.0%	48.3%	41.8%	53.6%	50.0%	51.9%	51.3%	52.5%
Village/Hamlet	16.8%	19.0%	22.4%	19.3%	18.4%	27.0%	42.1%	32.7%
NFRS-wide	**56.8%**	**58.7%**	**42.3%**	**67.2%**	**59.5%**	**59.1%**	**56.2%**	**61.2%**
Impact from 'Do Nothing' Position								
Gorleston	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Great Yarmouth	-1.0%	-0.9%	-1.4%	-0.9%	-0.9%	-0.1%	0.0%	0.0%
Urban	-0.1%	-0.1%	-0.1%	-0.1%	-0.1%	0.0%	0.0%	0.0%
Rural Town	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-0.1%	0.0%
Village/Hamlet	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
NFRS-wide	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Tidal Crewing

Station Workload

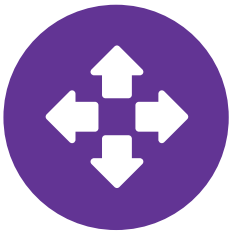
Gorleston Crew Deployed From Great Yarmouth

Station	Changes in Responses from 'Do Nothing' Scenario	Predicted Average Annual Responses
Gorleston	80	668
Great Yarmouth	-79	739
Acle	0	73
Martham	-1	110
Overall	**0**	**10,450**

Great Yarmouth Crew Deployed From Gorleston

Station	Changes in Responses from 'Do Nothing' Scenario	Predicted Average Annual Responses
Gorleston	-46	543
Great Yarmouth	46	863
Acle	0	73
Martham	1	111
Overall	**0**	**10,450**

Emergency Service Planning



Optimising Locations

Software Solutions

FIND OUT MORE

You can find out more about our range of services at:
www.orhltd.com

If you would like to talk to one of our consultants please call:
+44(0)118 959 6623

Or click:
orh@orhltd.com

Alternatively write to us at:
ORH
3 Queens Road, Reading, Berkshire RG1 4AR, UK

PLAN. PREPARE. **PERFORM.**