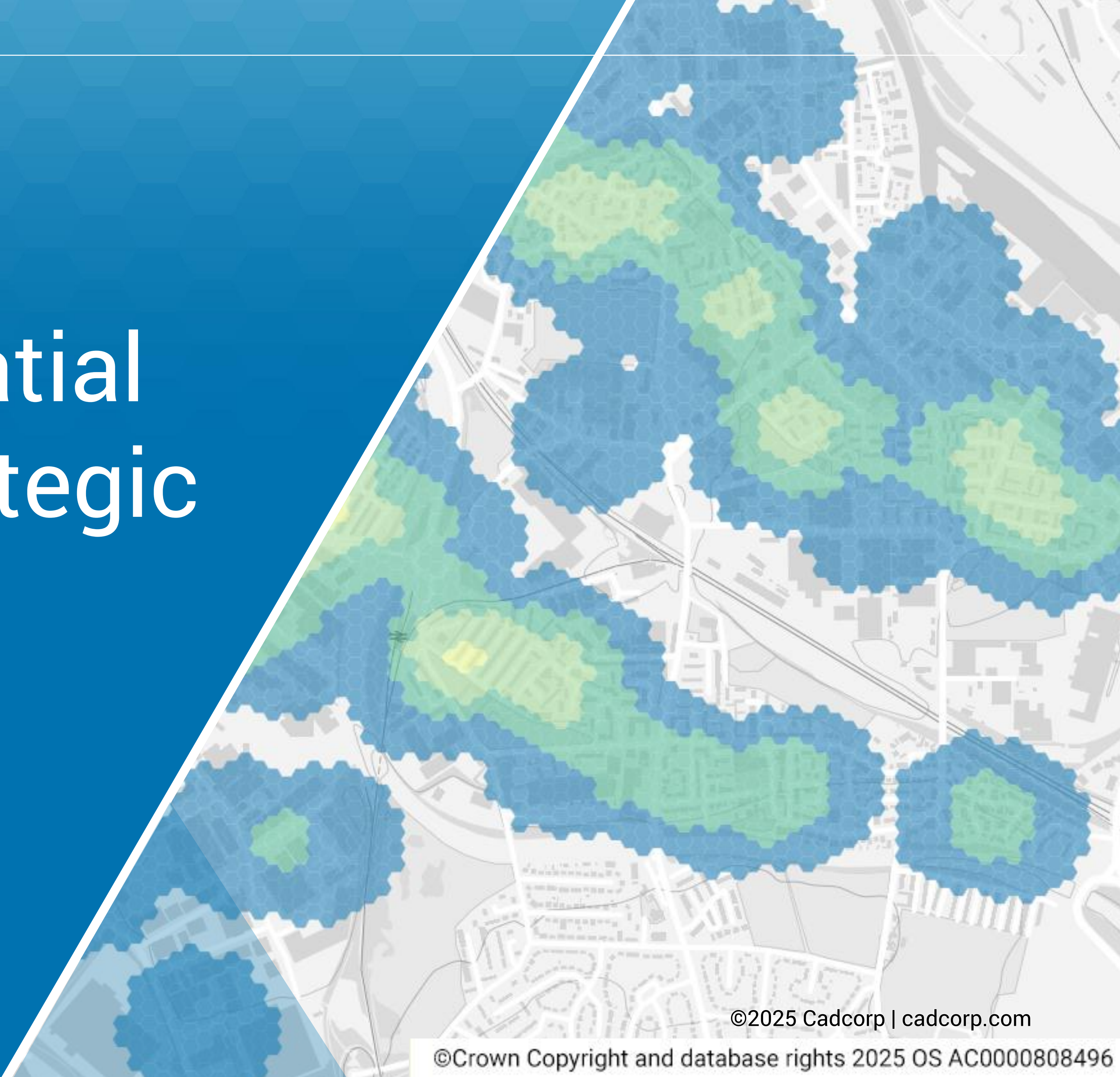
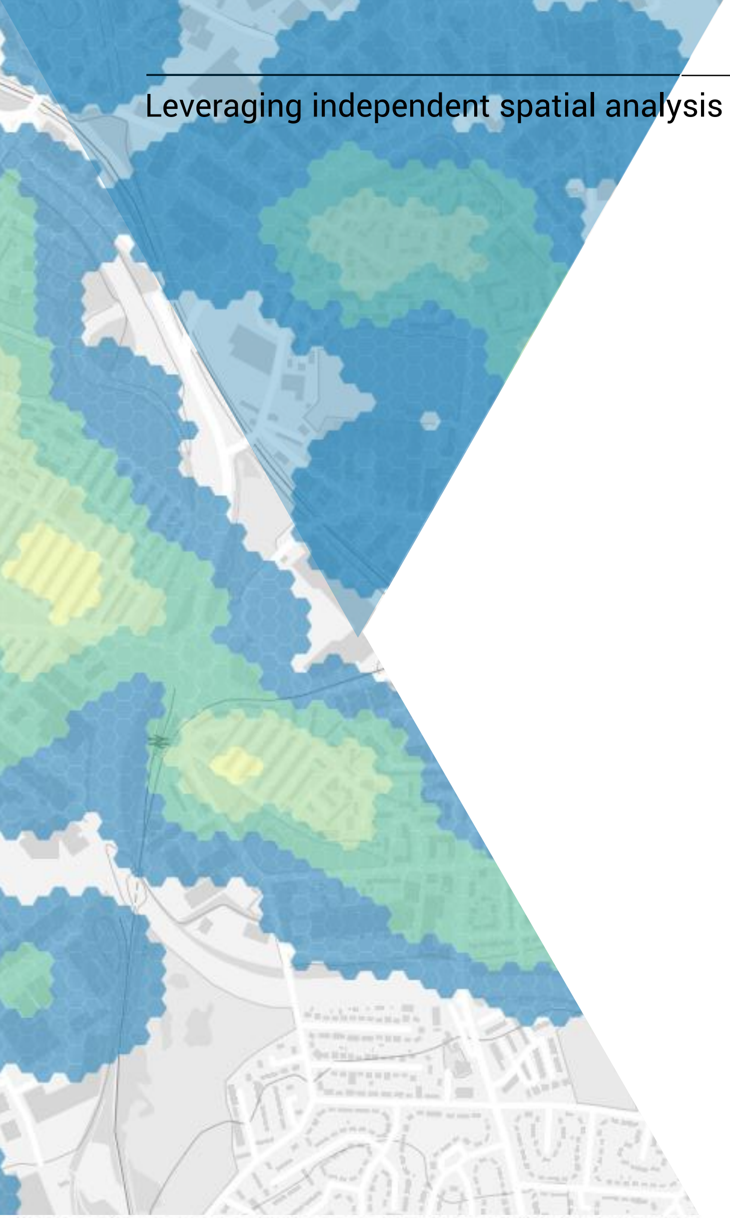
October 2025

Leveraging independent spatial analysis for strategic planning

Gemma Polmear

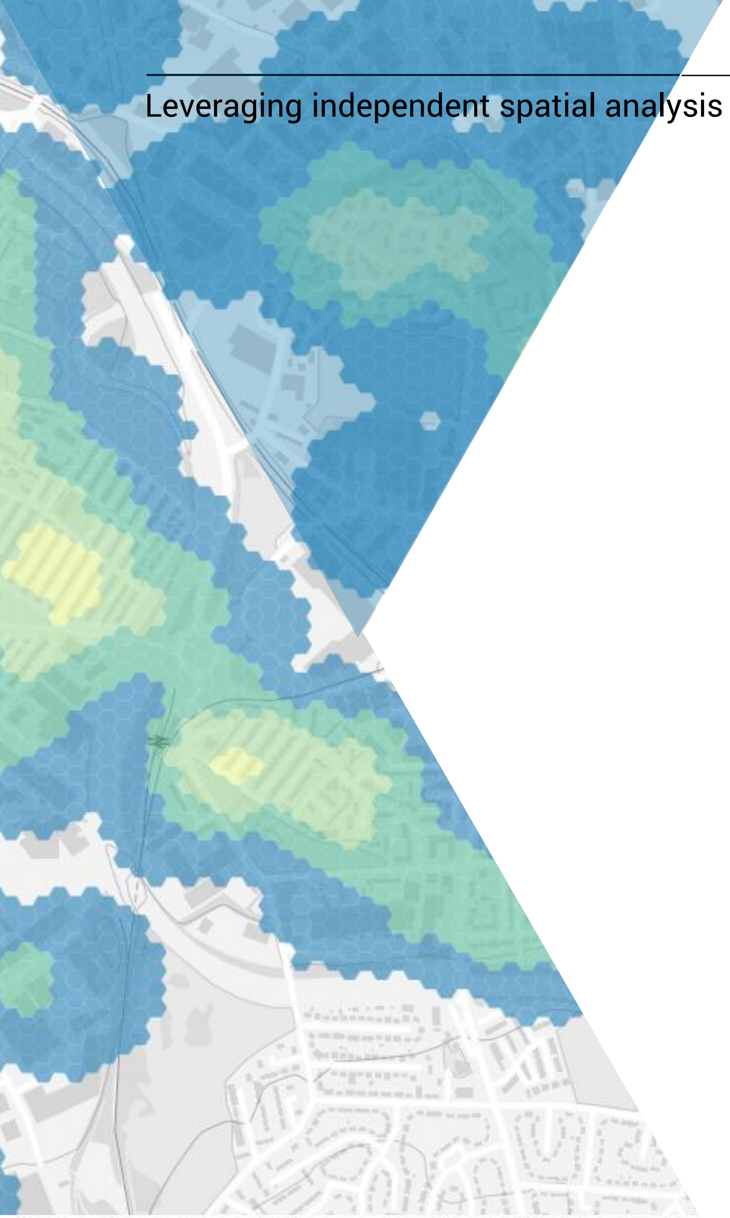
Cadcorp®
An NEC Company





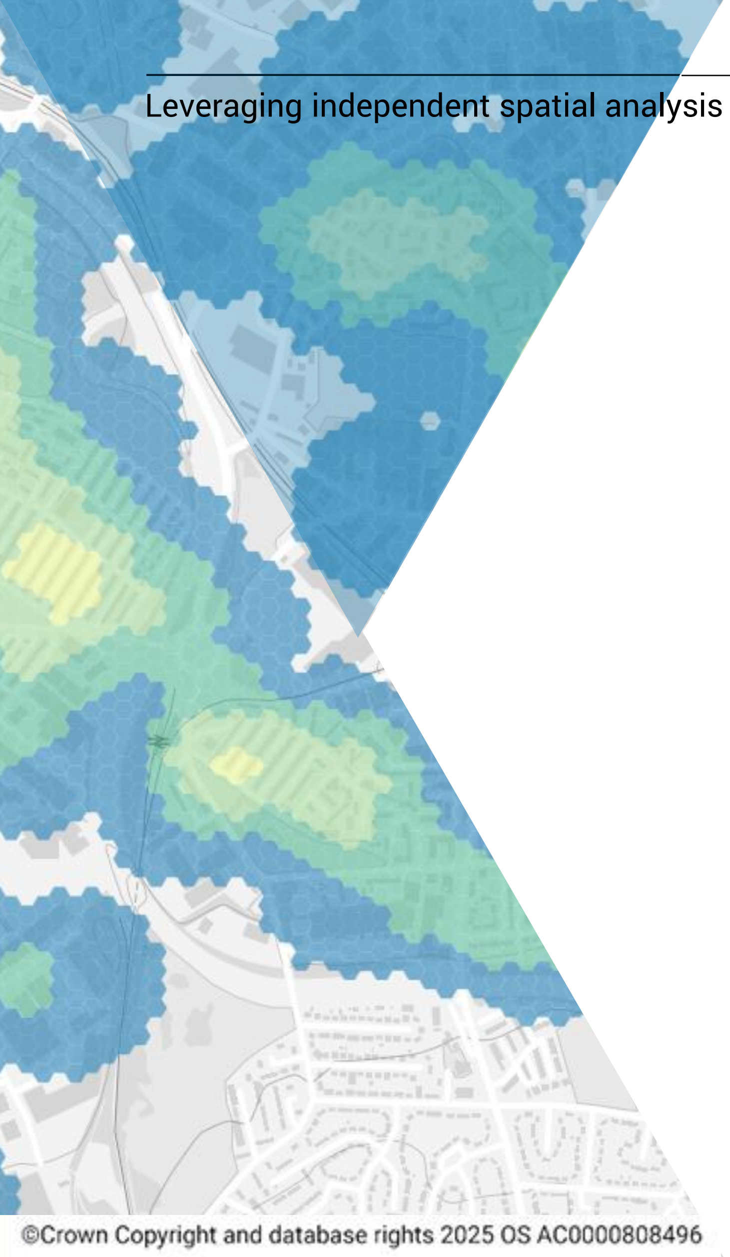
Introduction

- **Spatial analysis is a hugely powerful tool for emergency services**
- **Optimal placement of resources is key to strategic planning**
- **Corporate responsibility to undertake evidence-based decision making**
- **Precise and accurate modelling is fundamental**



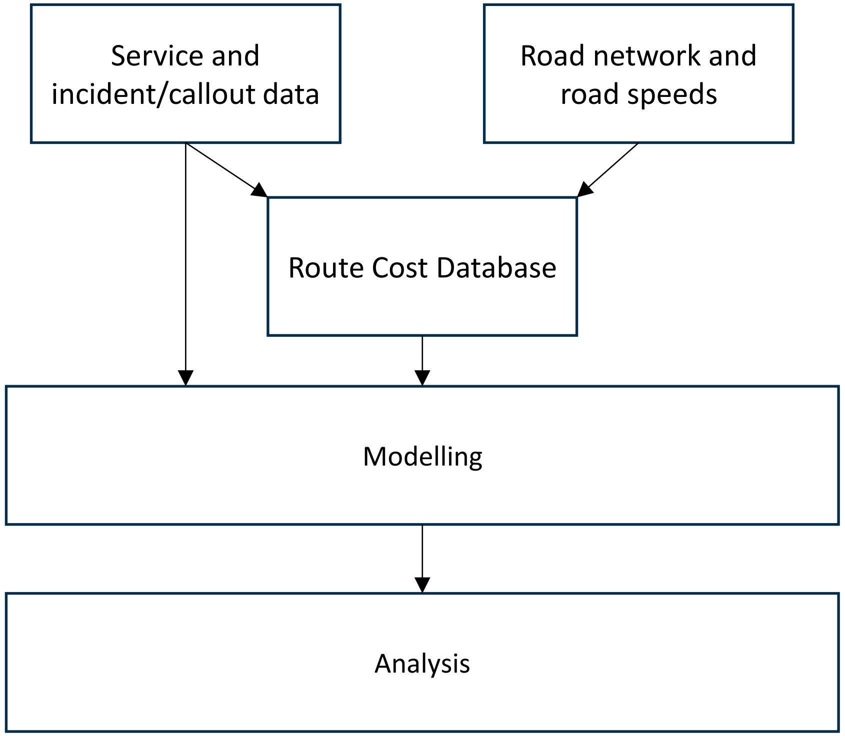
Cadcorp Workload Modeller

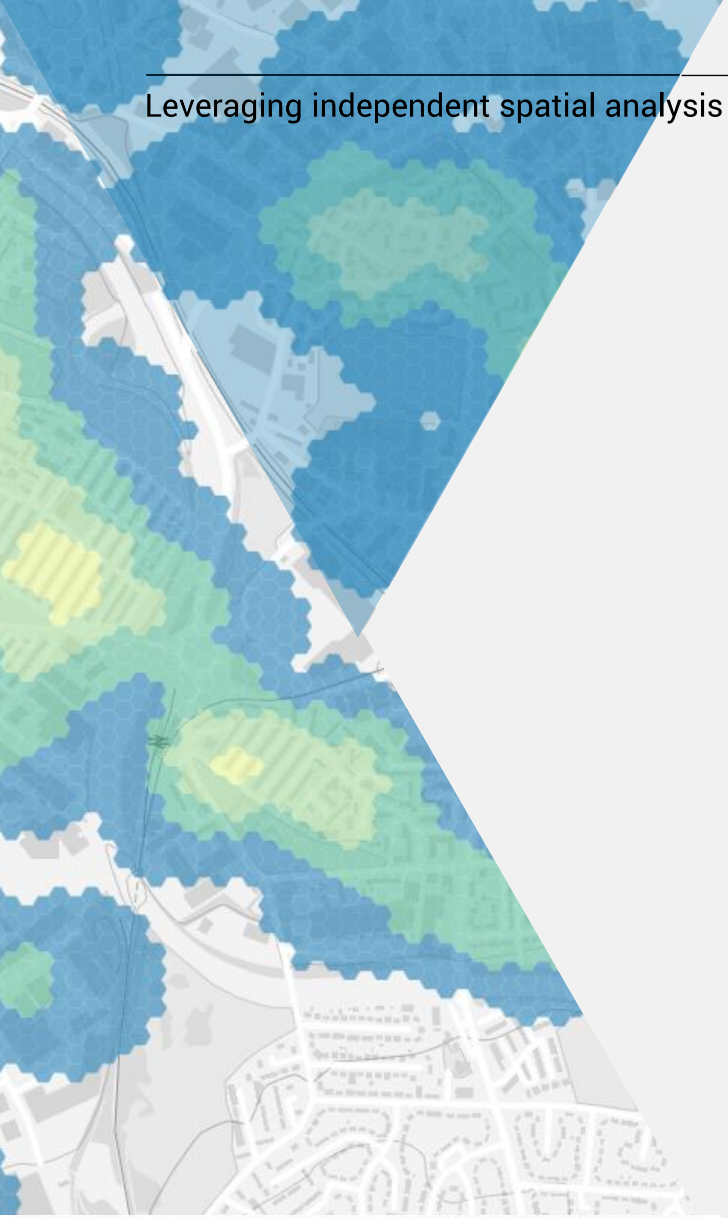
- **Advanced application with compelling outputs that can drive decision making**
- **Accuracy and precision of data inputs control results**
- **Attention to detail is paramount**
- **Scrutinise everything and refine where possible**
- **Methodology guidance for making the most of Workload Modeller**
  - Individual work packages form building blocks for improved modelling



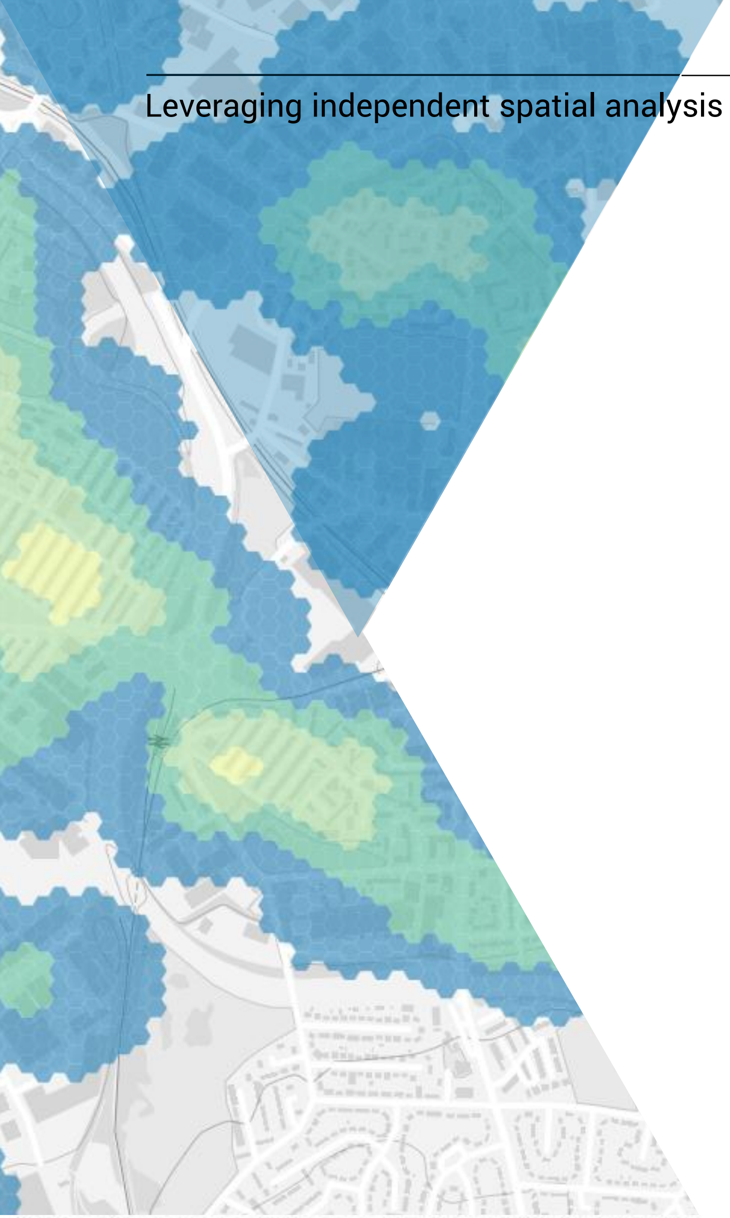
Workload Modelling methodology

- **Overview of the process**





Workload Modelling methodology



Breaking into blocks

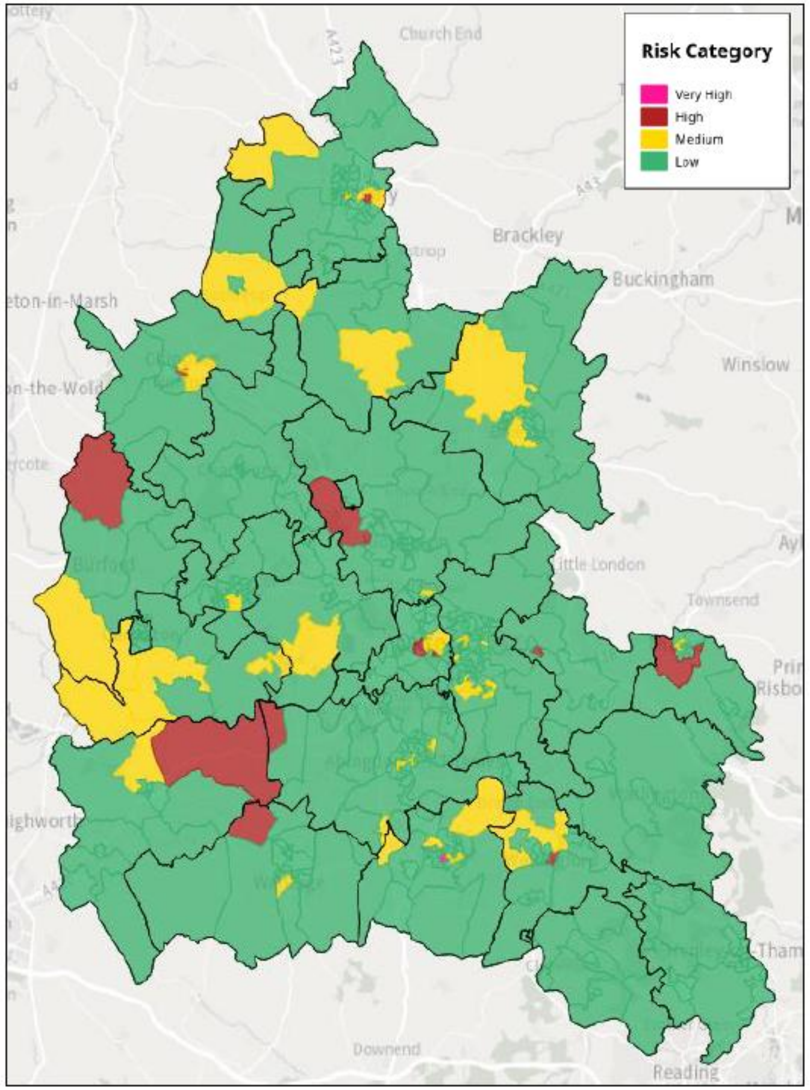
Service and incident/callout data

Cleanse as much as possible

Snap stations to road network in the correct location

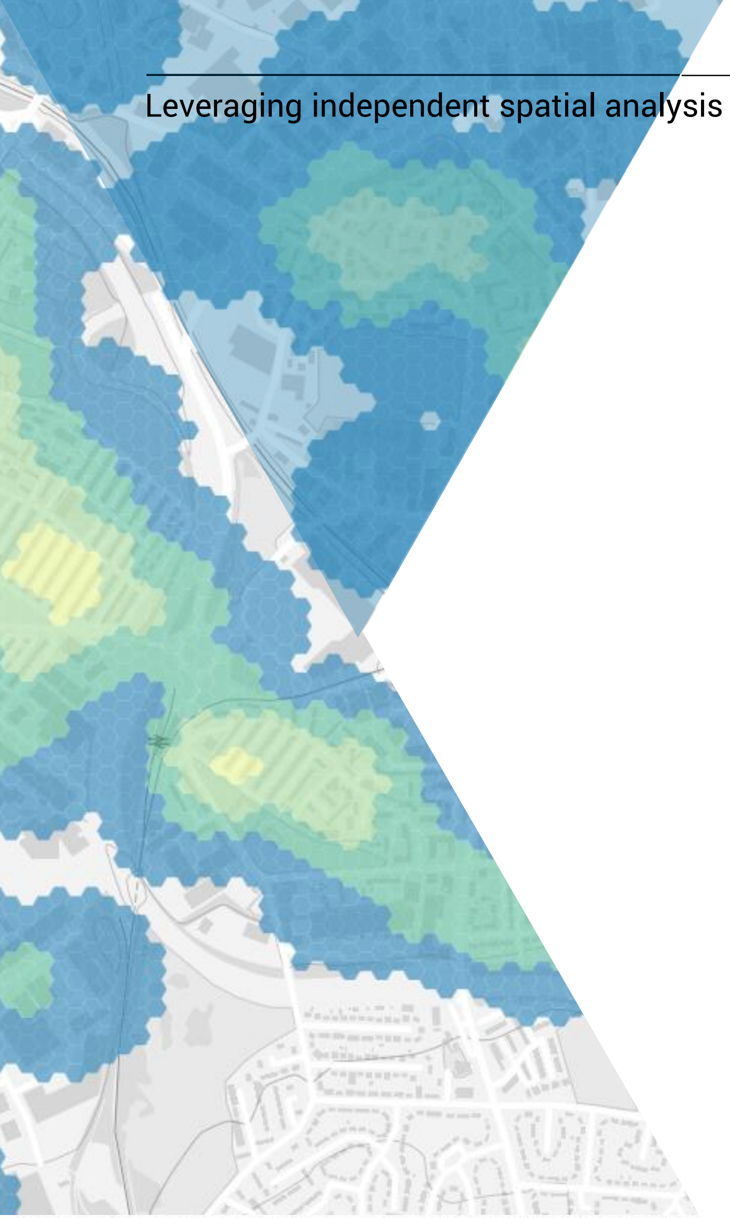
Add value

Integrate geographical Risk data to break down analysis by risk level


Risk Category
Very High
High
Medium
Low
Church End
Brackley
Buckingham
Winslow
Little London
Townsend
Downend
Reading

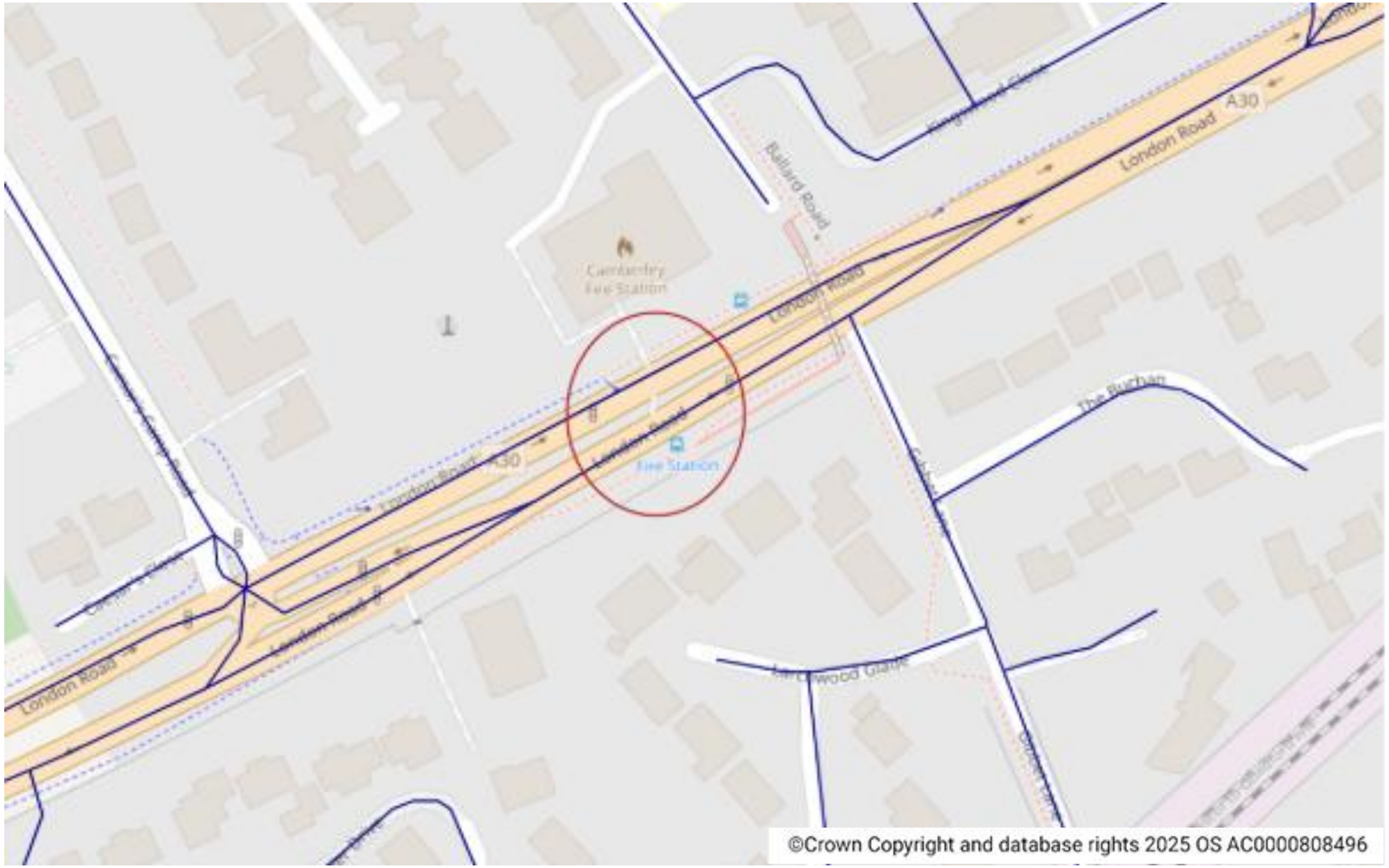
Breaking into blocks

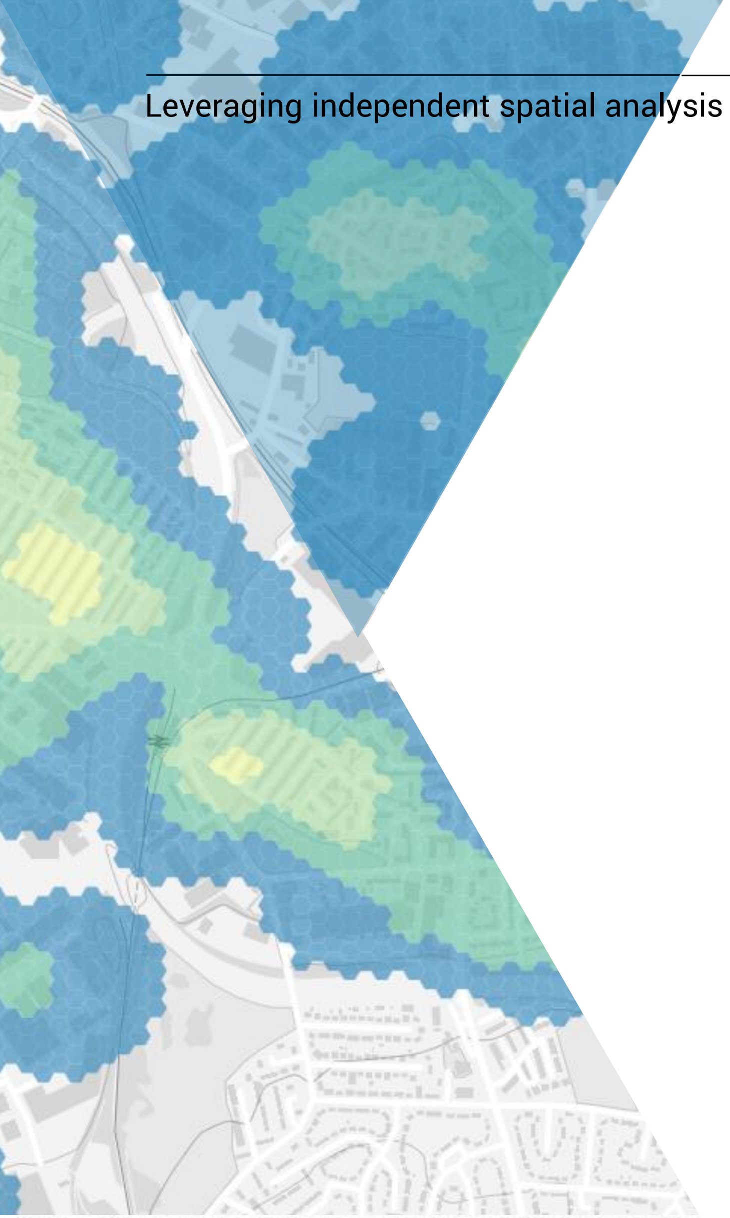
Road network and road speeds



OS NGD Roads → Average speed data

Check dual carriageway right turns from stations


London Road
A30
Canterbury Fire Station
Fire Station
Ballard Road
The Buchan
©Crown Copyright and database rights 2025 OS AC0000808496



Breaking into blocks

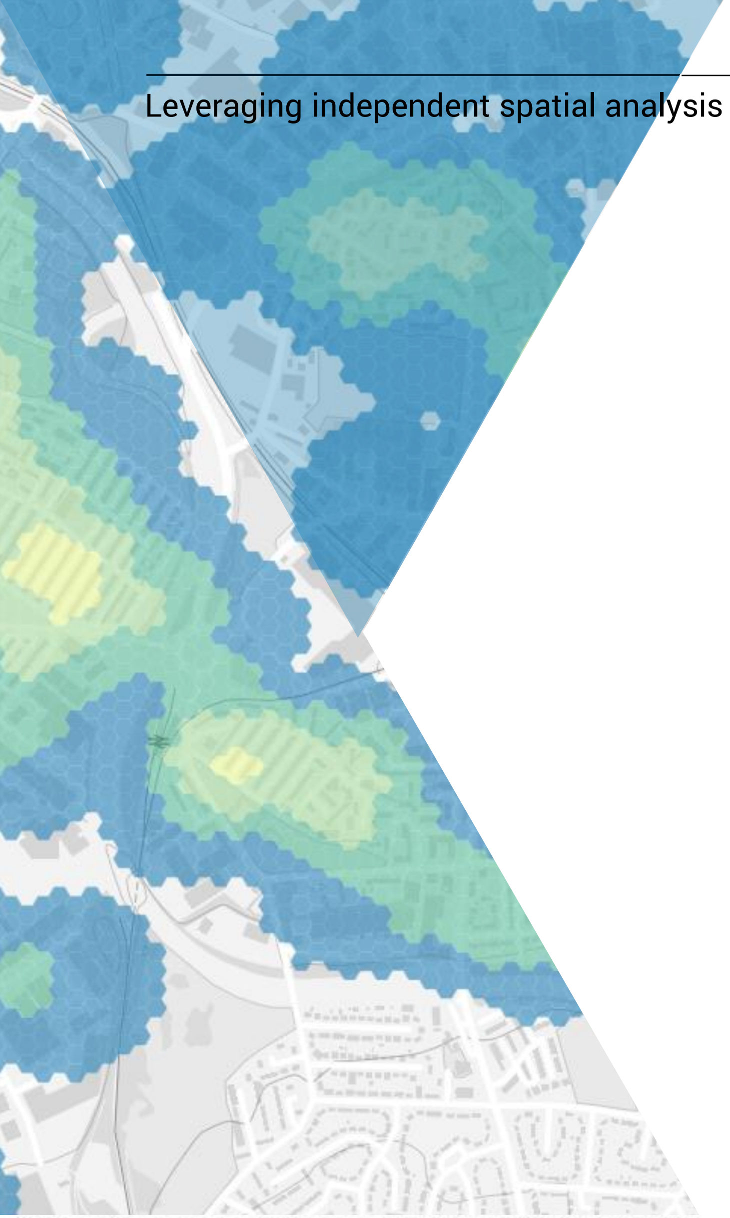
Road network and road speeds

OS NGD Roads

Average speed data

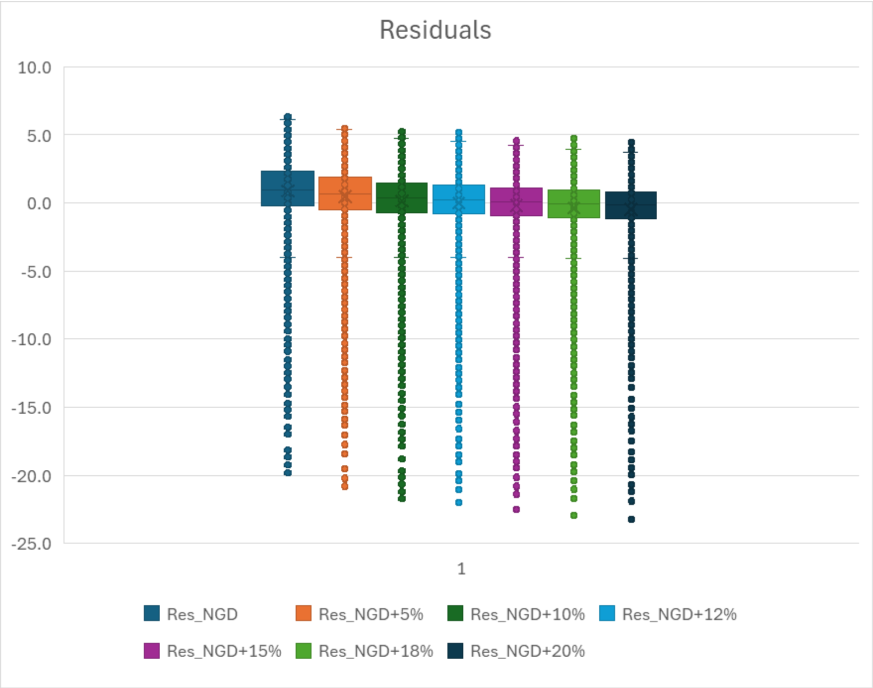
Check dual carriageway right turns from stations

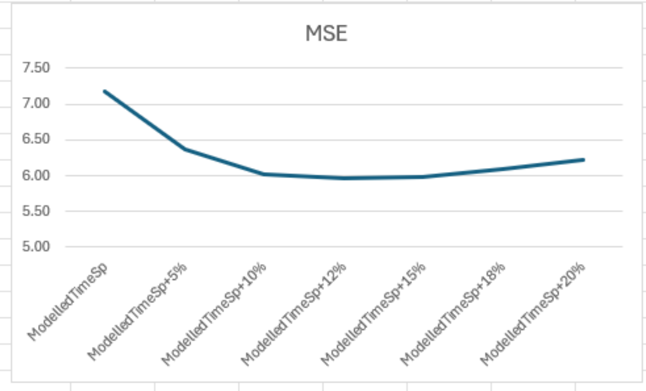
Road speed analysis for blue light response

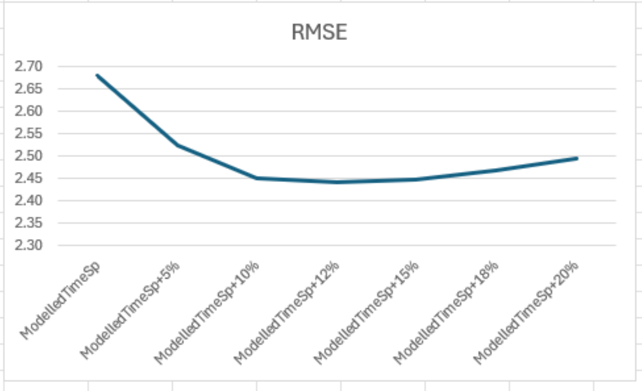


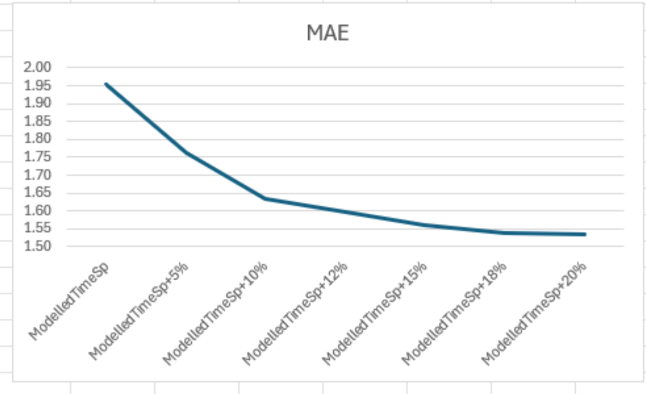
Road speed analysis

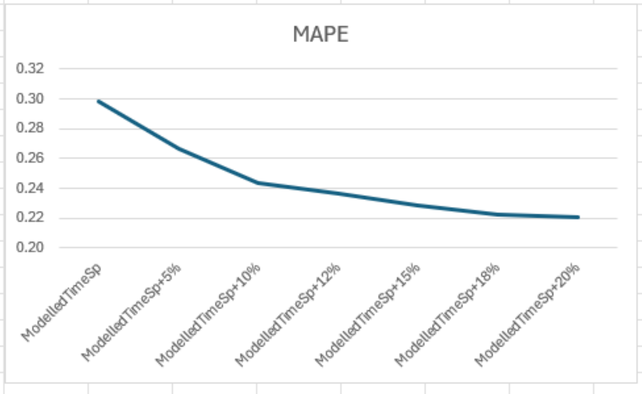
- **Comparing modelled road speeds with historic blue light journey times**
- **Modify road speeds accordingly for modelling**
- **Subset of callouts**
    - Mobilised from home station (status code or AVLS data) = known start point of journey
    - Mobilised to a definitive addressable location (building) = known end point of journey
    - Compare with modelled journey time from RCDB (relevant time of day speed)
    - Stats and analysis to choose best speed option



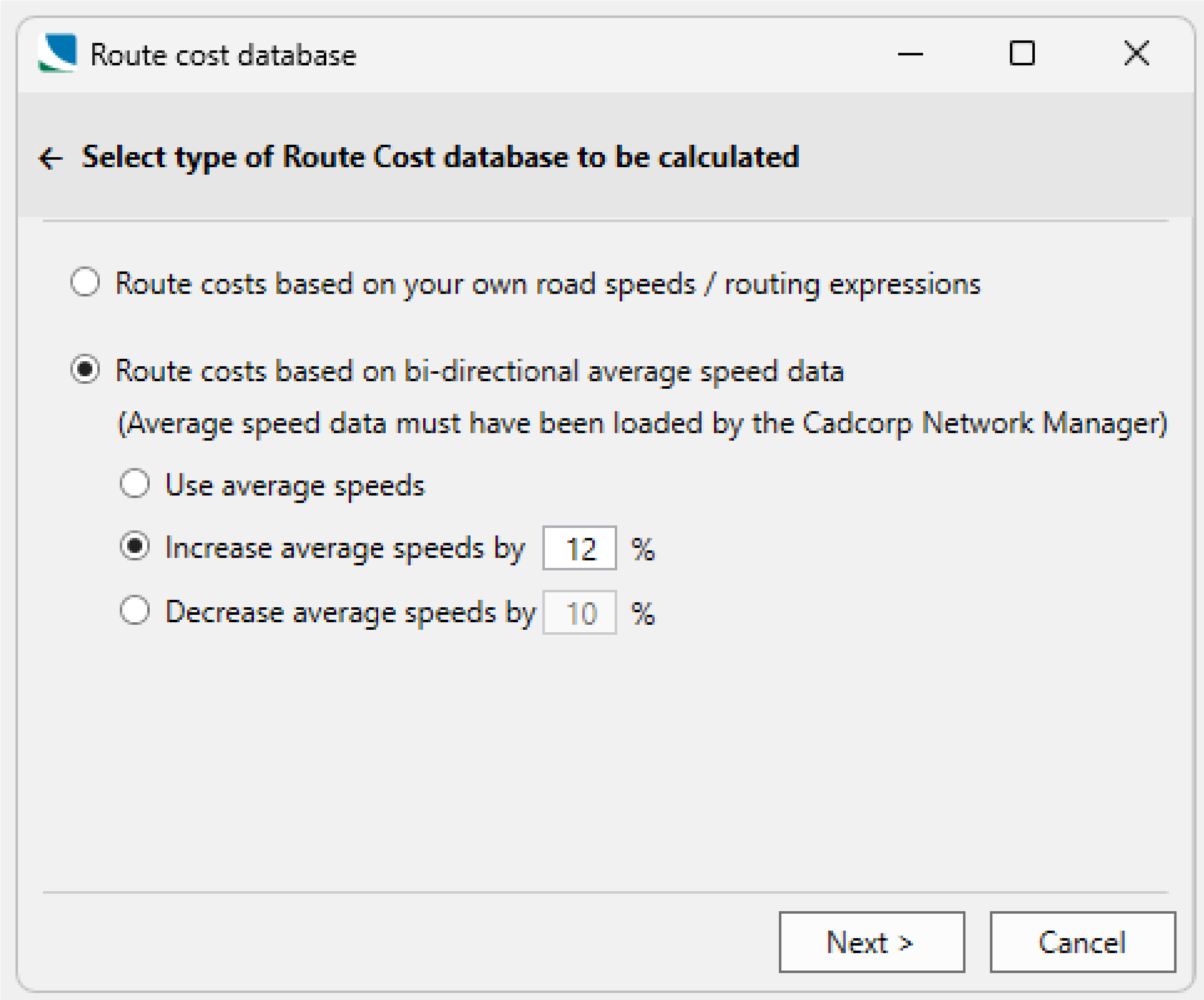






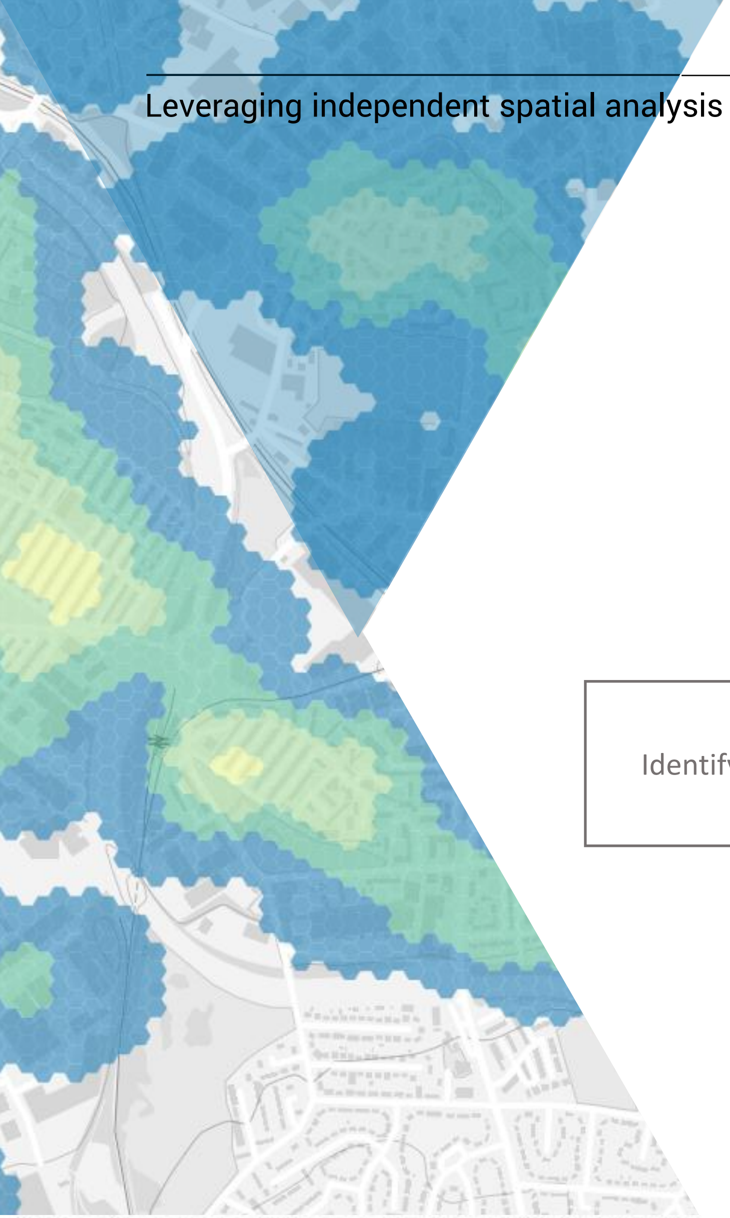


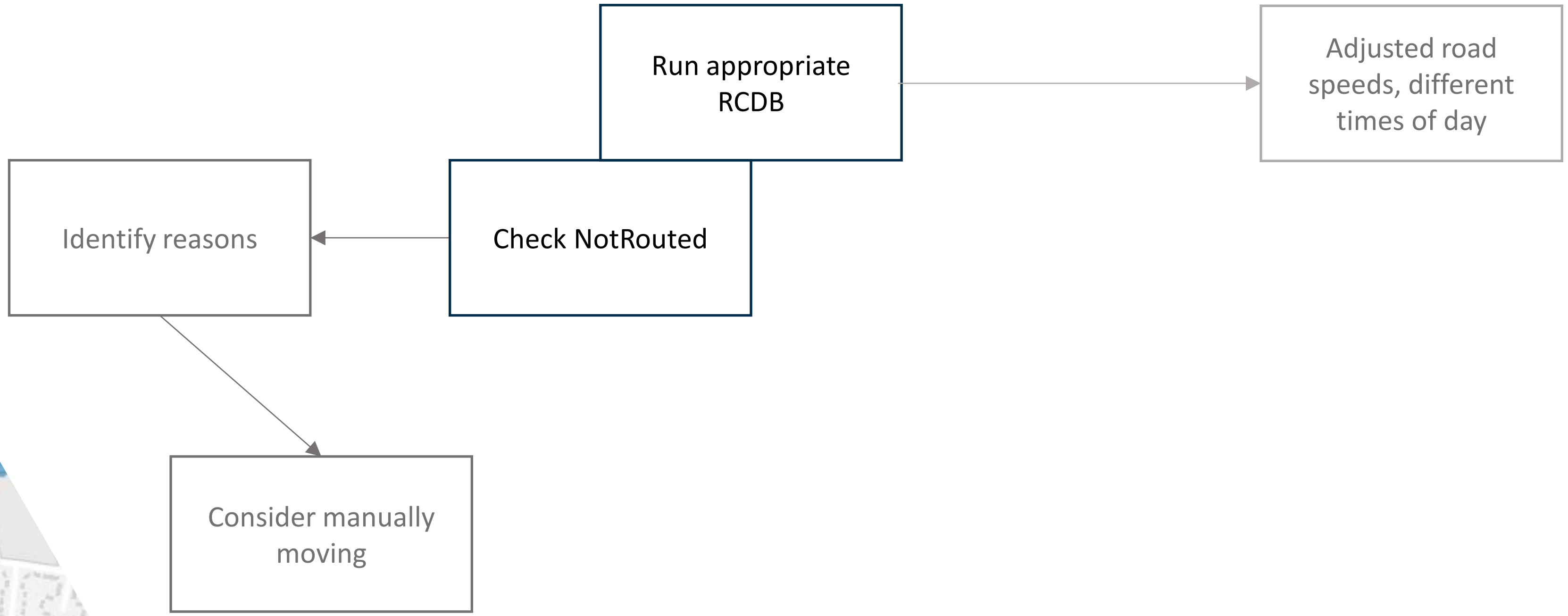
	ModelledTimeSp	ModelledTimeSp+5%	ModelledTimeSp+10%	ModelledTimeSp+12%	ModelledTimeSp+15%	ModelledTimeSp+18%	ModelledTimeSp+20%
MSE	7.18	6.38	6.01	5.97	5.99	6.10	6.22
RMSE	2.68	2.53	2.45	2.44	2.45	2.47	2.49
MAE	1.95	1.76	1.63	1.60	1.56	1.54	1.54
MAPE	0.30	0.27	0.24	0.24	0.23	0.22	0.22
Median Residual	0.96	0.64	0.35	0.23	0.08	-0.08	-0.17

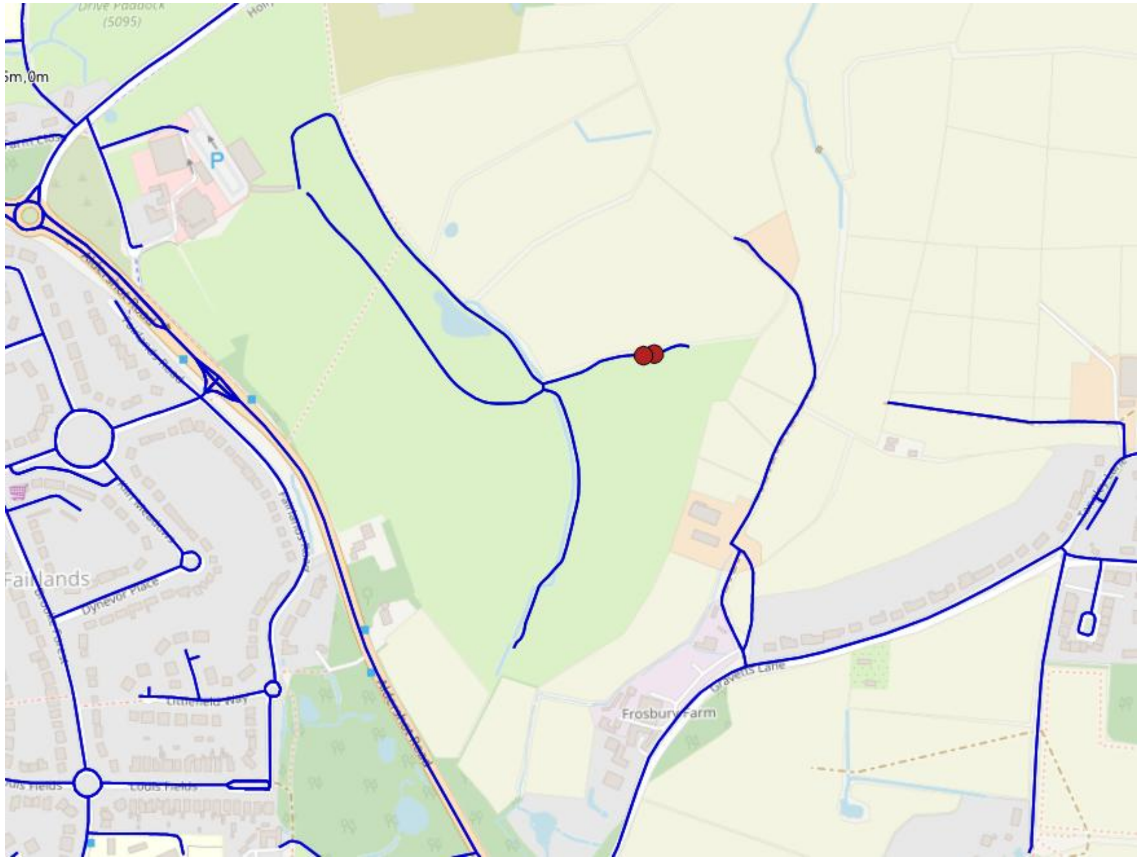

Route cost database
Select type of Route Cost database to be calculated
Route costs based on your own road speeds / routing expressions
Route costs based on bi-directional average speed data
(Average speed data must have been loaded by the Cadcorp Network Manager)
Use average speeds
Increase average speeds by 12 %
Decrease average speeds by 10 %
Next >
Cancel

Breaking into blocks

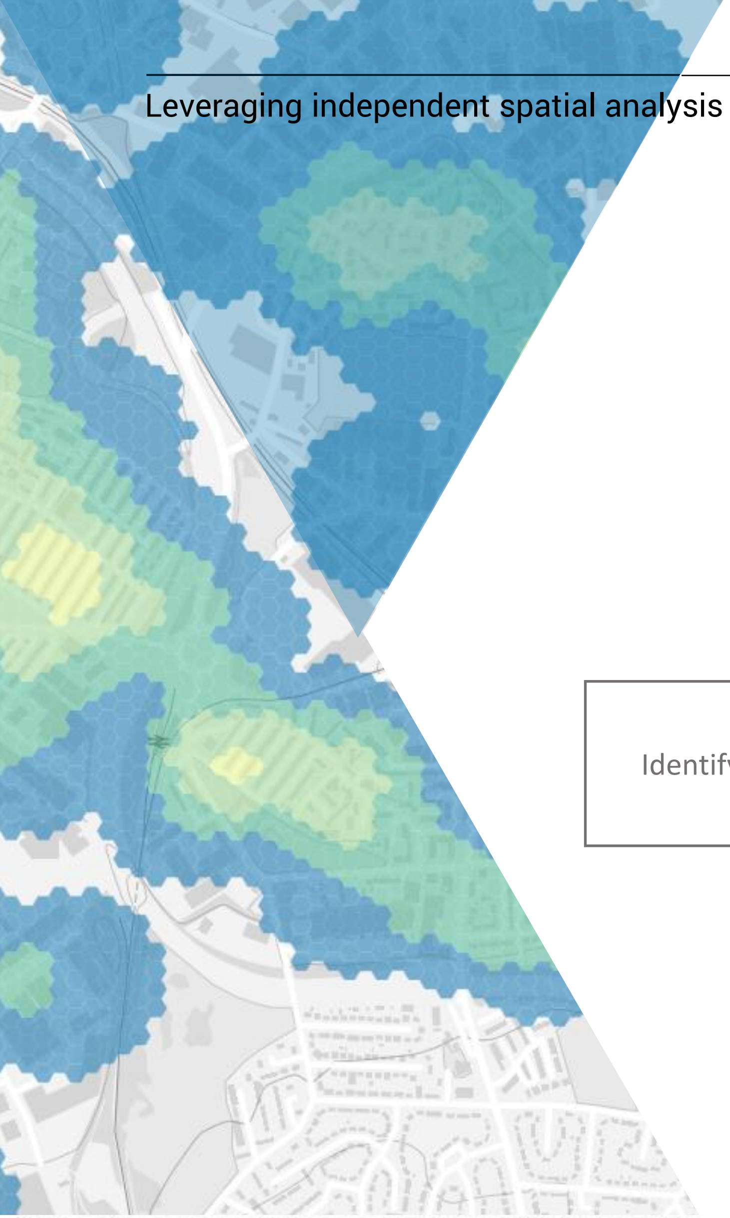
Route Cost Database






Fairlands
Dynevor Place
Frosbury Farm
Gravetts Lane


Old Woking bunker
River Wey



Breaking into blocks

Route Cost Database

Run appropriate RCDB

Adjusted road speeds, different times of day

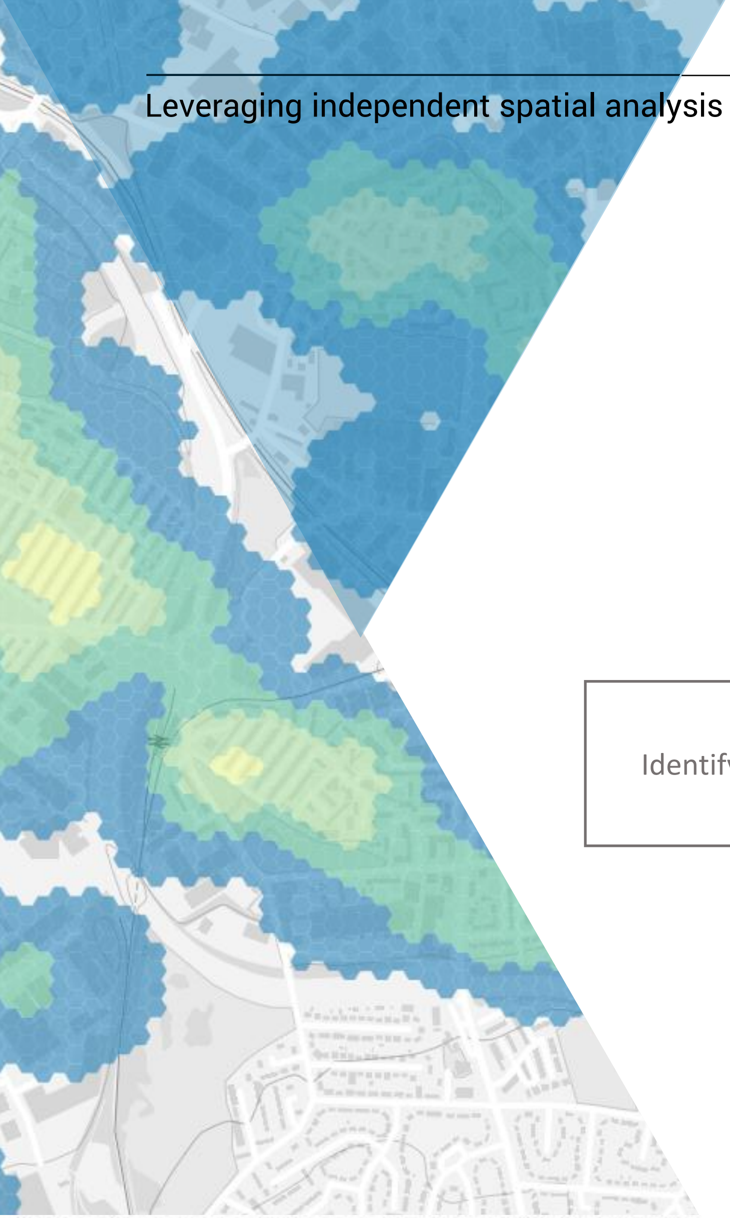
Identify reasons

Check NotRouted

Check NotSnapped

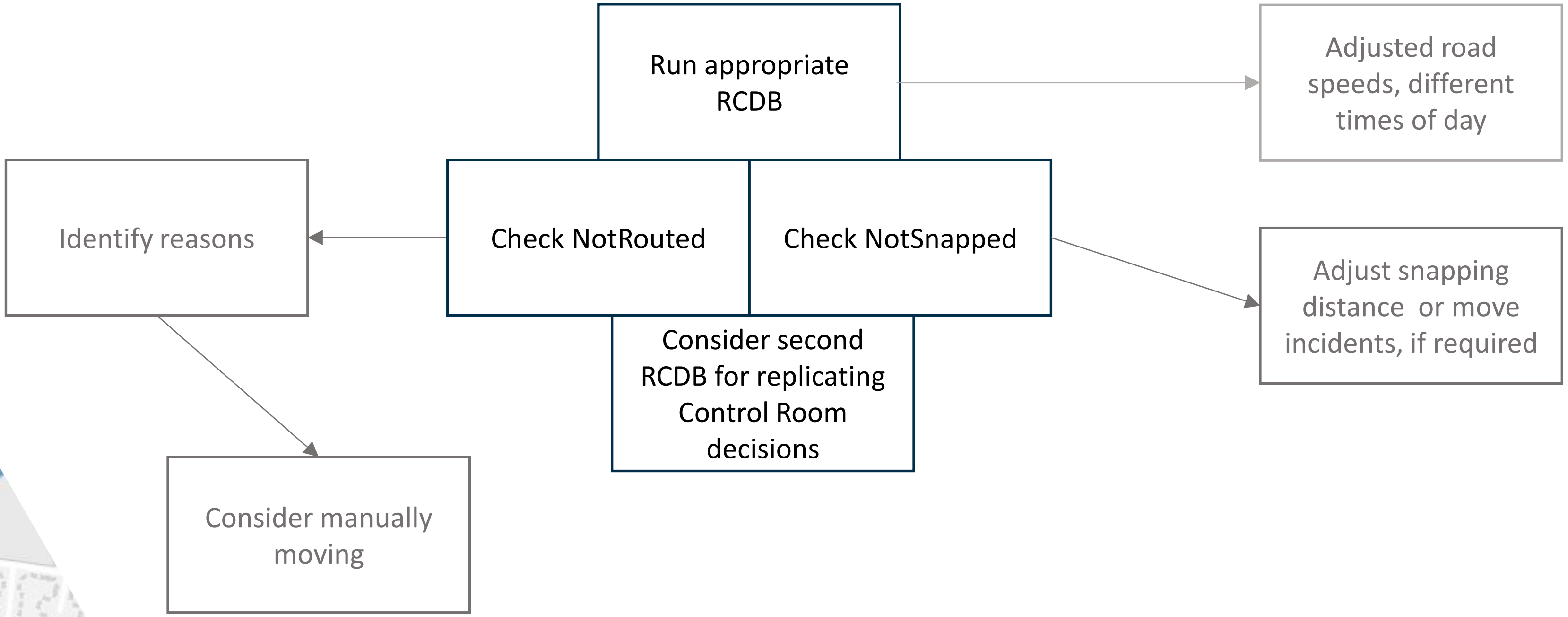
Adjust snapping distance or move incidents, if required

Consider manually moving

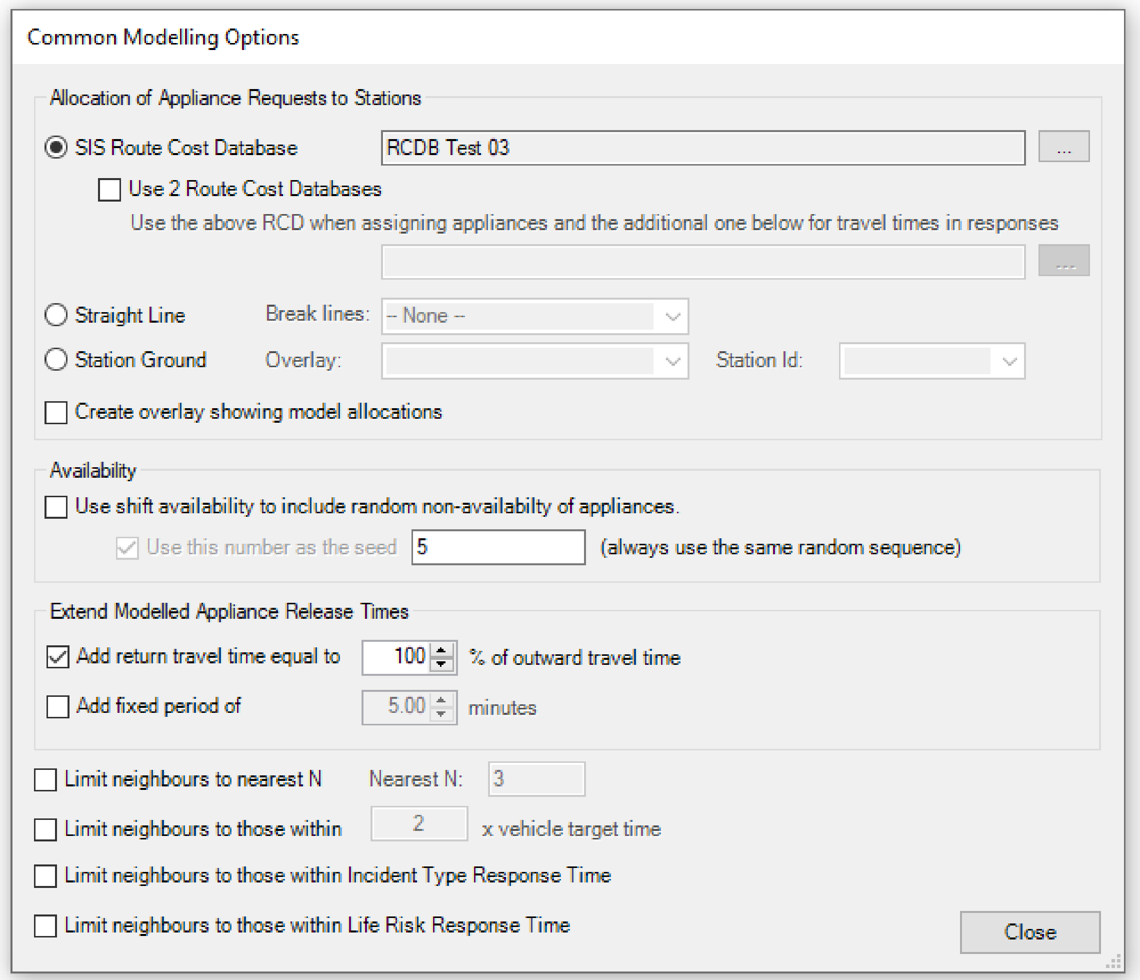


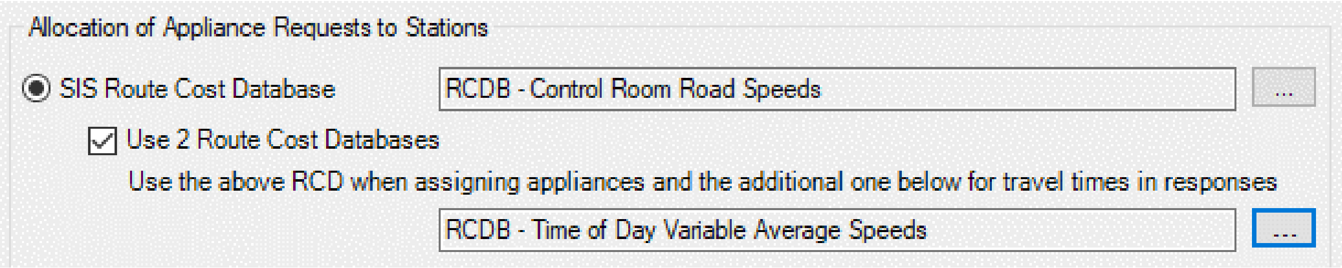
Breaking into blocks

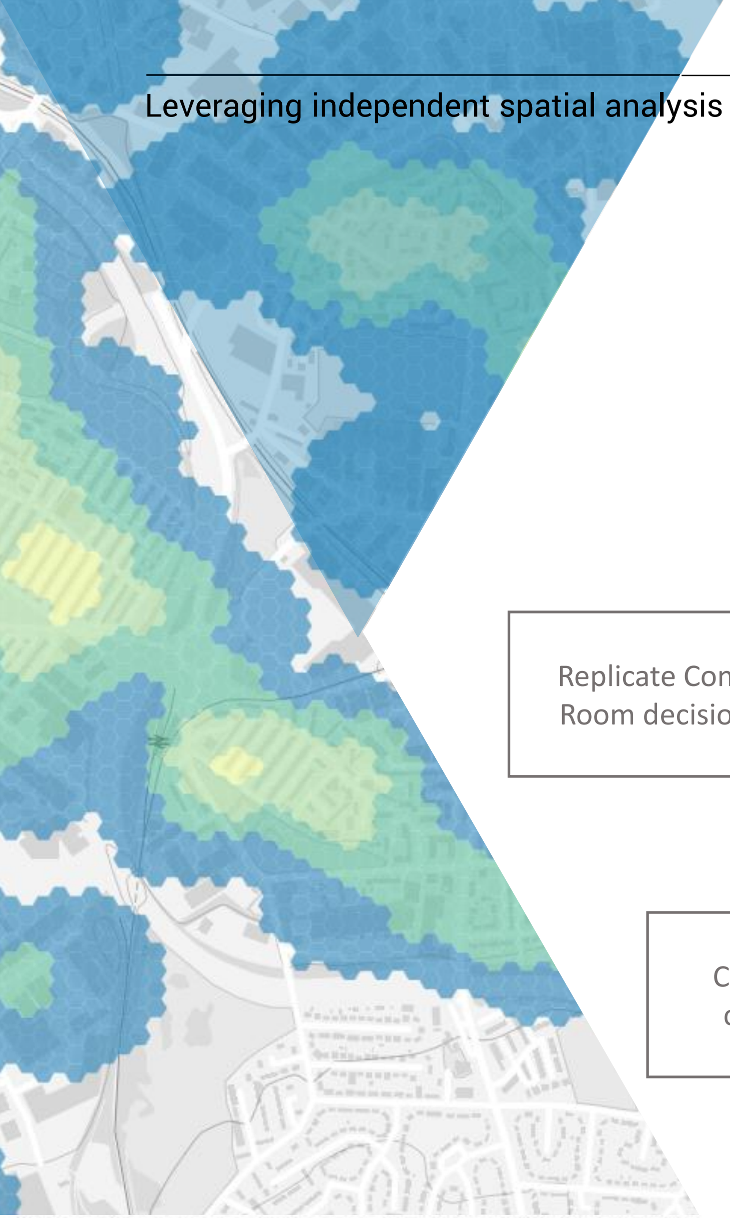
Route Cost Database



Leveraging independent spatial analysis for strategic planning







Breaking into blocks

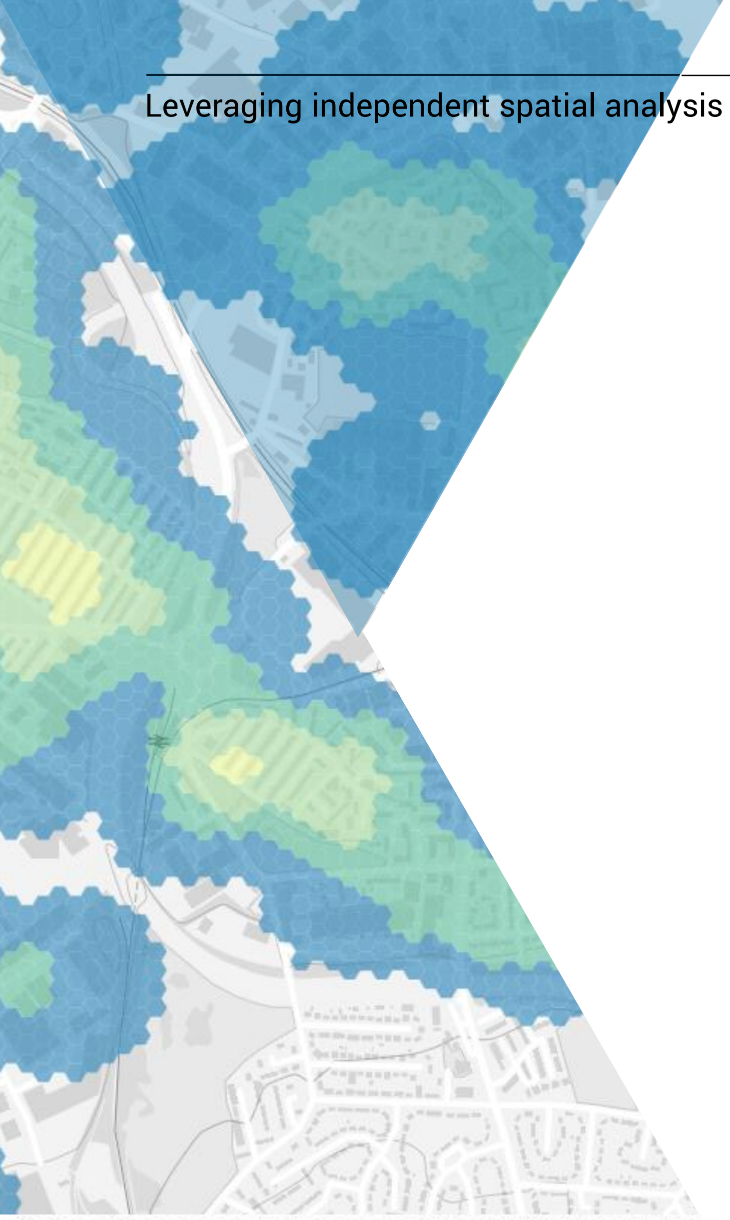
Modelling

Setup shifts

Turnout times

Replicate Control Room decisions?

Calculate from callout data?



Turnout Times

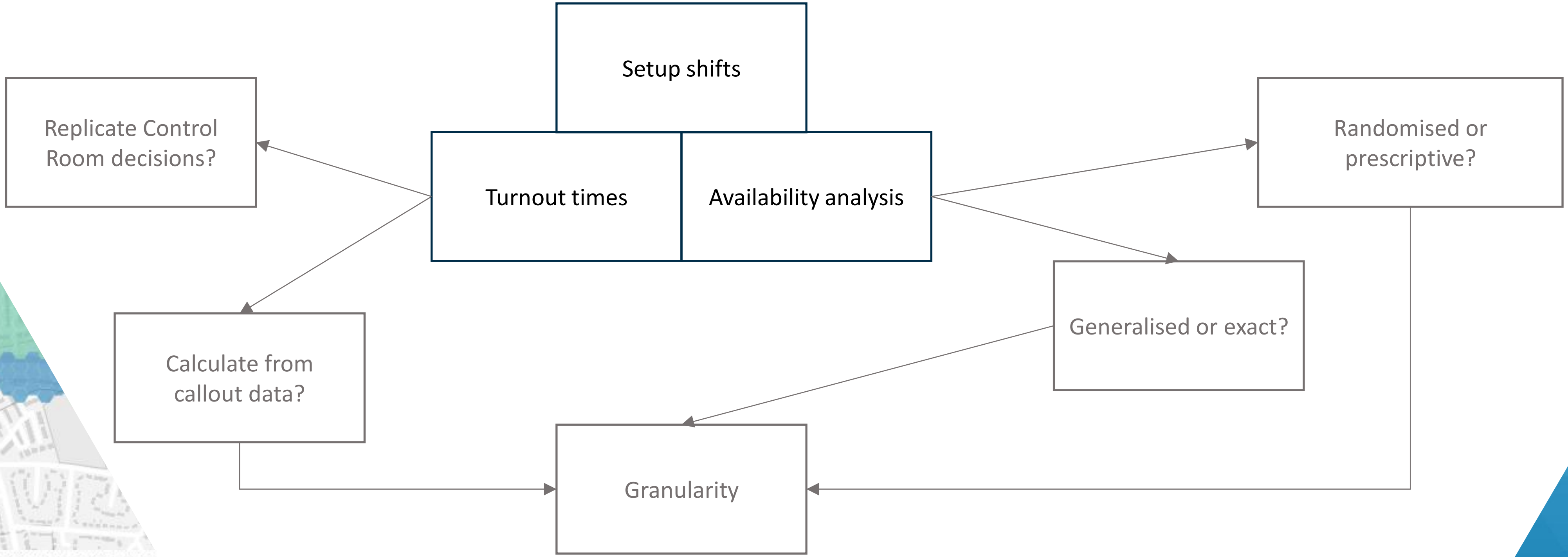
- **Calculate from callout data**
  - Different turnout times for different appliances
  - Overall average
  - Variable turnout times on different days of the week
    - Weekdays/Weekends
    - Each day of the week
    - Each day of the modelling period (calendar)
  - Variable turnout times at different times of day
    - Day/night
    - More granular periods – Morning, Daytime, Evening, Night, Overnight
    - Hourly
  - Look for significant differences

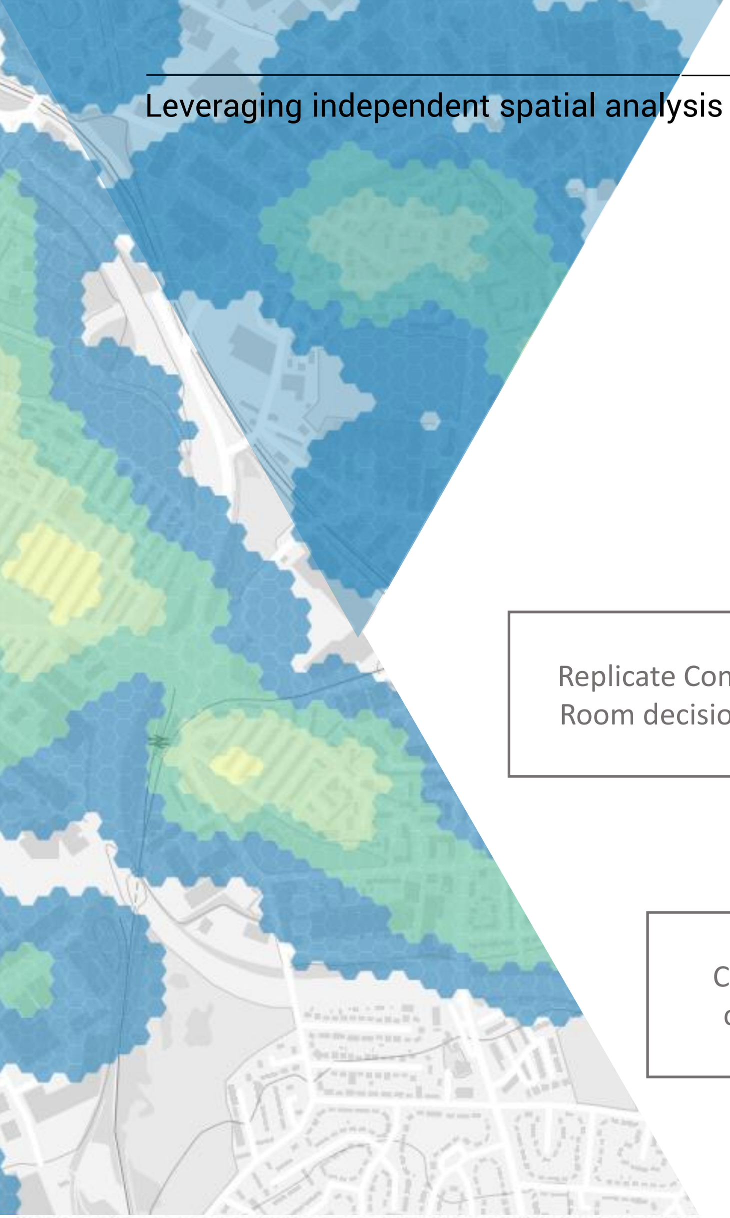
pk	ShiftId	ShiftElementDayOfWeek	ShiftElementStart	ShiftElementEnd	ShiftElementReactionTime	ShiftElementAvailability
2906	25	Monday	00:00:00	23:59:59	1.4	100
2907	25	Tuesday	00:00:00	23:59:59	1.4	100
2908	25	Wednesday	00:00:00	23:59:59	1.4	100
2909	25	Thursday	00:00:00	23:59:59	1.4	100
2910	25	Friday	00:00:00	23:59:59	1.4	100
2911	25	Saturday	00:00:00	23:59:59	1.4	100
2912	25	Sunday	00:00:00	23:59:59	1.4	100

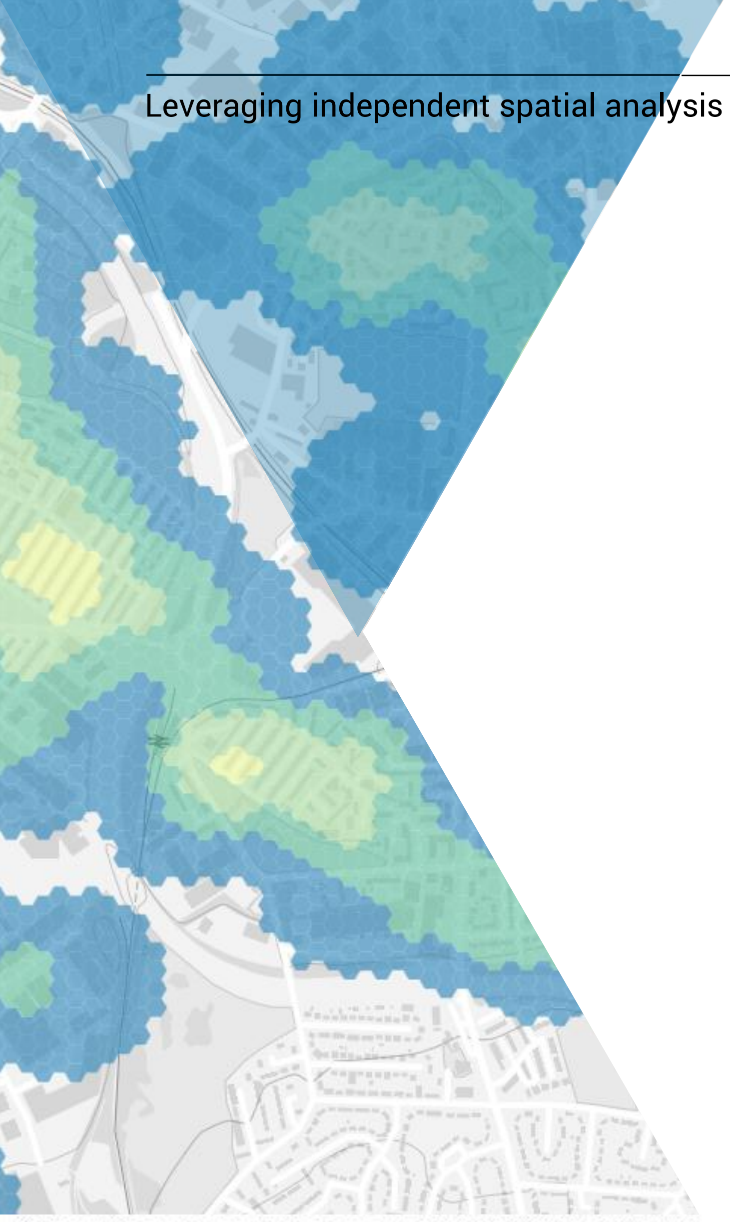
pk	ShiftId	ShiftElementDayOfWeek	ShiftElementStart	ShiftElementEnd	ShiftElementReactionTime	ShiftElementAvailability
3081	27	Monday	00:00:00	05:59:59	6.1	100
3082	27	Monday	06:00:00	08:59:59	5	100
3083	27	Monday	09:00:00	17:59:59	1.8	100
3084	27	Monday	18:00:00	22:59:59	5.5	100
3085	27	Monday	23:00:00	23:59:59	6.1	100
3086	27	Tuesday	00:00:00	05:59:59	6.1	100
3087	27	Tuesday	06:00:00	08:59:59	5	100
3088	27	Tuesday	09:00:00	17:59:59	1.8	100
3089	27	Tuesday	18:00:00	22:59:59	5.5	100
3090	27	Tuesday	23:00:00	23:59:59	6.1	100
3091	27	Wednesday	00:00:00	05:59:59	6.1	100
3092	27	Wednesday	06:00:00	08:59:59	5	100
3093	27	Wednesday	09:00:00	17:59:59	1.8	100
3094	27	Wednesday	18:00:00	22:59:59	5.5	100
3095	27	Wednesday	23:00:00	23:59:59	6.1	100
3096	27	Thursday	00:00:00	05:59:59	6.1	100
3097	27	Thursday	06:00:00	08:59:59	5	100
3098	27	Thursday	09:00:00	17:59:59	1.8	100
3099	27	Thursday	18:00:00	22:59:59	5.5	100
3100	27	Thursday	23:00:00	23:59:59	6.1	100
3101	27	Friday	00:00:00	05:59:59	6.1	100
3102	27	Friday	06:00:00	08:59:59	5	100
3103	27	Friday	09:00:00	17:59:59	1.8	100
3104	27	Friday	18:00:00	22:59:59	5.5	100
3105	27	Friday	23:00:00	23:59:59	6.1	100
3106	27	Saturday	00:00:00	05:59:59	6.1	100
3107	27	Saturday	06:00:00	08:59:59	5	100
3108	27	Saturday	09:00:00	17:59:59	4	100
3109	27	Saturday	18:00:00	22:59:59	5.5	100
3110	27	Saturday	23:00:00	23:59:59	6.1	100
3111	27	Sunday	00:00:00	05:59:59	6.1	100
3112	27	Sunday	06:00:00	08:59:59	5	100
3113	27	Sunday	09:00:00	17:59:59	4	100

Breaking into blocks

Modelling

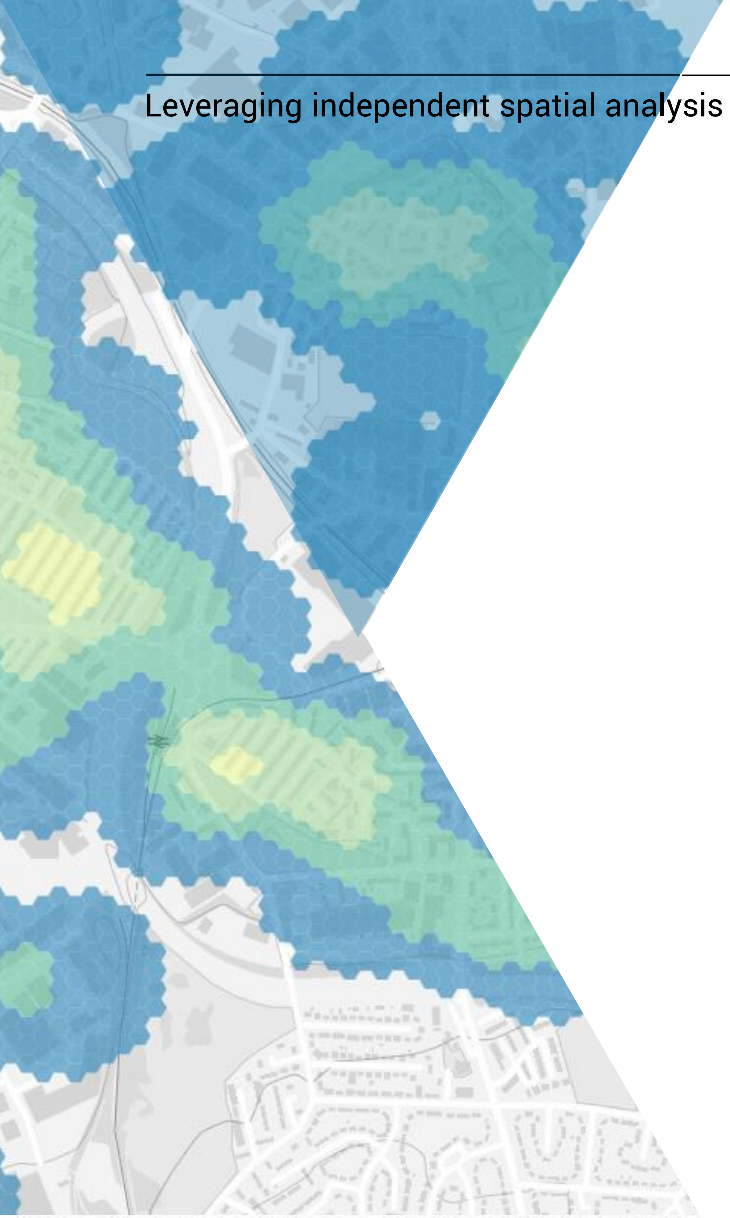






Availability Analysis

- **Prescribed availability (no random element)**
  - Weekly or rolling shift
    - Weekly shift repeats on a weekly basis
    - Rolling shift repeats after n days
  - Rolling shift can run for up to 10,000 days
    - Doesn’t have to repeat
    - Daily calendar – leave out times where appliance is unavailable
  - Varying levels of granularity



Availability Analysis

- **Random availability**
  - Can also be weekly or rolling shift of varying granularity
  - Result is applied for the entire shift element, so granularity makes a big difference

60% Availability: 24 hour shift

Day	Start	End	% Avail	Reaction
Monday	00:00:00	23:59:59	60	2
Tuesday	00:00:00	23:59:59	60	2
Wednesday	00:00:00	23:59:59	60	2
Thursday	00:00:00	23:59:59	60	2
Friday	00:00:00	23:59:59	60	2
Saturday	00:00:00	23:59:59	60	2
Sunday	00:00:00	23:59:59	60	2

60% Availability: 24 hour shift

Time of Day	Shift Element Length (hours)	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8		Day 9		Day 10	
		Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)
00:00 – 23:00 (00:00, 01:00, 02:00, 03:00, 04:00, 05:00, 06:00, 07:00, 08:00, 09:00, 10:00, 11:00, 12:00, 13:00, 14:00, 15:00, 16:00, 17:00, 18:00, 19:00, 20:00, 21:00, 22:00, 23:00)	24	20	24	43	24	47	24	13	24	8	24	89	0	21	24	92	0	81	0	97	0
Total available hours for day		24		24		24		24		24		0		24		0		0		0	

60% Availability: 1 hour shift

Day	Start	End	% Avail	Reaction
Monday	00:00:00	00:59:59	60	2
Monday	01:00:00	01:59:59	60	2
Monday	02:00:00	02:59:59	60	2
Monday	03:00:00	03:59:59	60	2
Monday	04:00:00	04:59:59	60	2
Monday	05:00:00	05:59:59	60	2
Monday	06:00:00	06:59:59	60	2
Monday	07:00:00	07:59:59	60	2
Monday	08:00:00	08:59:59	60	2
Monday	09:00:00	09:59:59	60	2
Monday	10:00:00	10:59:59	60	2
Monday	11:00:00	11:59:59	60	2
Monday	12:00:00	12:59:59	60	2
Monday	13:00:00	13:59:59	60	2
Monday	14:00:00	14:59:59	60	2
Monday	15:00:00	15:59:59	60	2

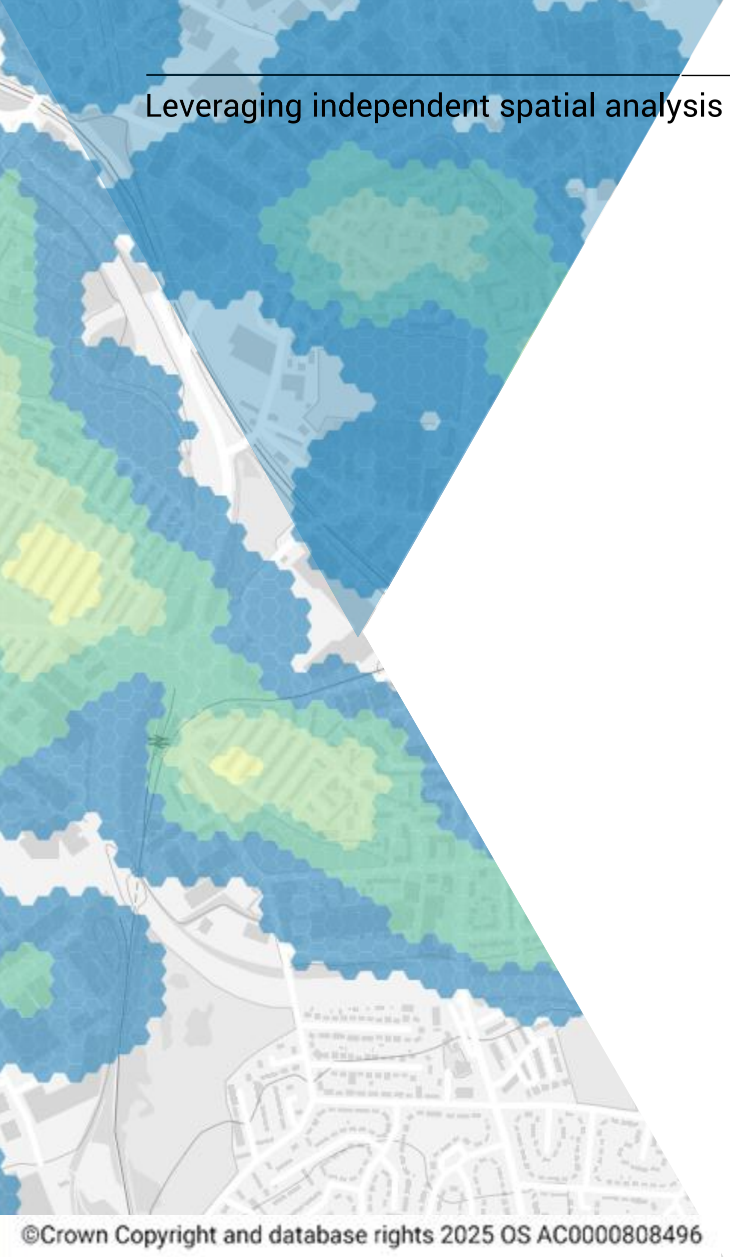
Cadcorp®
An NEC Company

60% Availability: 1 hour shift

Time of Day	Shift Element Length (hours)	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8		Day 9		Day 10	
		Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)
00:00	1	6	1	87	0	86	0	60	1	9	1	5	1	69	0	26	1	11	1	86	0
01:00		19	1	76	0	59	1	45	1	83	0	72	0	67	0	9	1	62	0	13	1
02:00		4	1	50	1	52	1	70	0	53	1	53	1	33	1	65	0	52	1	87	0
03:00		55	1	83	0	72	0	39	1	9	1	30	1	90	0	26	1	96	0	38	1
04:00		70	0	61	0	99	0	91	0	26	1	17	1	40	1	61	0	91	0	67	0
05:00		61	0	12	1	12	1	22	1	100	0	95	0	92	0	52	1	44	1	39	1
06:00		9	1	76	0	78	0	66	0	29	1	9	1	69	0	20	1	92	0	97	0
07:00		49	1	50	1	42	1	44	1	80	0	42	1	93	0	34	1	89	0	26	1
08:00		14	1	66	0	46	1	44	1	14	1	74	0	15	1	70	0	32	1	52	1
09:00		25	1	7	1	84	0	37	1	49	1	67	0	49	1	75	0	65	0	1	1
10:00		2	1	98	0	86	0	52	1	42	1	31	1	16	1	87	0	46	1	14	1
11:00		34	1	52	1	34	1	79	0	14	1	30	1	14	1	95	0	17	1	51	1
12:00		64	0	83	0	63	0	97	0	10	1	70	0	94	0	18	1	74	0	3	1
13:00		66	0	20	1	38	1	56	1	65	0	72	0	81	0	18	1	84	0	15	1
14:00		95	0	76	0	45	1	67	0	50	1	39	1	4	1	65	0	36	1	74	0
15:00		44	1	50	1	49	1	58	1	47	1	34	1	15	1	49	1	38	1	68	0
16:00		79	0	52	1	5	1	46	1	21	1	100	0	9	1	7	1	28	1	26	1
17:00		81	0	75	0	72	0	66	0	37	1	57	1	63	0	36	1	69	0	64	0
18:00		15	1	99	0	2	1	42	1	38	1	6	1	67	0	42	1	29	1	94	0
19:00		74	0	28	1	24	1	79	0	24	1	89	0	30	1	72	0	8	1	89	0
20:00		25	1	38	1	58	1	41	1	28	1	87	0	67	0	35	1	11	1	27	1
21:00		17	1	15	1	68	0	39	1	75	0	90	0	43	1	90	0	69	0	40	1
22:00		62	0	50	1	32	1	4	1	25	1	46	1	44	1	10	1	99	0	2	1
23:00		9	1	36	1	39	1	23	1	10	1	15	1	29	1	51	1	84	0	20	1
Total available hours for day		15		13		15		16		19		14		13		15		12		15	

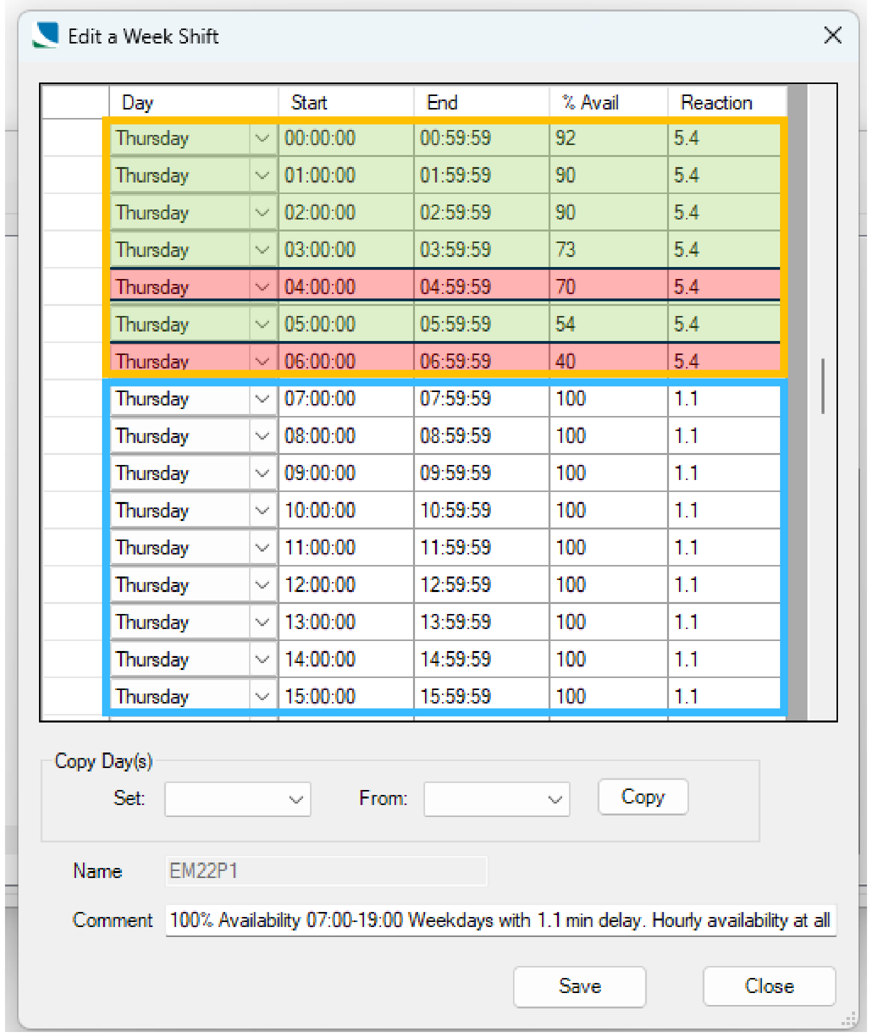
Time of Day	Shift Element Length (hours)	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8		Day 9		Day 10	
		Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)
00:00	24	20	24	43	24	47	24	13	24	8	24	89	0	21	24	92	0	81	0	97	0
01:00																					
02:00																					
03:00																					
04:00																					
05:00																					
06:00																					
07:00																					
08:00																					
09:00																					
10:00																					
11:00																					
12:00																					
13:00																					
14:00																					
15:00																					
16:00																					
17:00																					
18:00																					
19:00																					
20:00																					
21:00																					
22:00																					
23:00																					
Total available hours for day		24		24		24		24		24		0		24		0		0		0	

Time of Day	Shift Element Length (hours)	Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Day 8		Day 9		Day 10	
		Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)	Random Number	Time available (hours)
00:00	1	6	1	87	0	86	0	60	1	9	1	5	1	69	0	26	1	11	1	86	0
01:00		19	1	76	0	59	1	45	1	83	0	72	0	67	0	9	1	62	0	13	1
02:00		4	1	50	1	52	1	70	0	53	1	53	1	33	1	65	0	52	1	87	0
03:00		55	1	83	0	72	0	39	1	9	1	30	1	90	0	26	1	96	0	38	1
04:00		70	0	61	0	99	0	91	0	26	1	17	1	40	1	61	0	91	0	67	0
05:00		61	0	12	1	12	1	22	1	100	0	95	0	92	0	52	1	44	1	39	1
06:00		9	1	76	0	78	0	66	0	29	1	9	1	69	0	20	1	92	0	97	0
07:00		49	1	50	1	42	1	44	1	80	0	42	1	93	0	34	1	89	0	26	1
08:00		14	1	66	0	46	1	44	1	14	1	74	0	15	1	70	0	32	1	52	1
09:00		25	1	7	1	84	0	37	1	49	1	67	0	49	1	75	0	65	0	1	1
10:00		2	1	98	0	86	0	52	1	42	1	31	1	16	1	87	0	46	1	14	1
11:00		34	1	52	1	34	1	79	0	14	1	30	1	14	1	95	0	17	1	51	1
12:00		64	0	83	0	63	0	97	0	10	1	70	0	94	0	18	1	74	0	3	1
13:00		66	0	20	1	38	1	56	1	65	0	72	0	81	0	18	1	84	0	15	1
14:00		95	0	76	0	45	1	67	0	50	1	39	1	4	1	65	0	36	1	74	0
15:00		44	1	50	1	49	1	58	1	47	1	34	1	15	1	49	1	38	1	68	0
16:00		79	0	52	1	5	1	46	1	21	1	100	0	9	1	7	1	28	1	26	1
17:00		81	0	75	0	72	0	66	0	37	1	57	1	63	0	36	1	69	0	64	0
18:00		15	1	99	0	2	1	42	1	38	1	6	1	67	0	42	1	29	1	94	0
19:00		74	0	28	1	24	1	79	0	24	1	89	0	30	1	72	0	8	1	89	0
20:00		25	1	38	1	58	1	41	1	28	1	87	0	67	0	35	1	11	1	27	1
21:00		17	1	15	1	68	0	39	1	75	0	90	0	43	1	90	0	69	0	40	1
22:00		62	0	50	1	32	1	4	1	25	1	46	1	44	1	10	1	99	0	2	1
23:00		9	1	36	1	39	1	23	1	10	1	15	1	29	1	51	1	84	0	20	1
Total available hours for day		15		13		15		16		19		14		13		15		12		15	



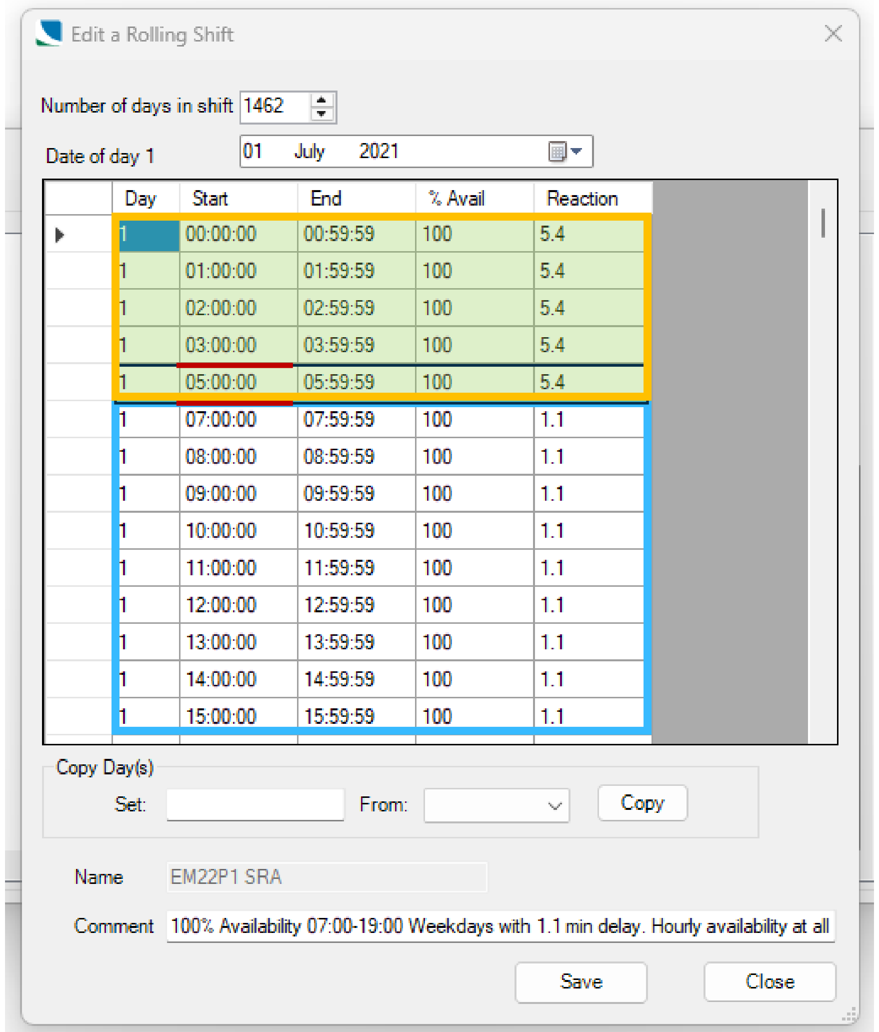
Availability Analysis

- **Random availability**
  - Can also be weekly or rolling shift of varying granularity
  - Result is applied for the entire shift element, so granularity makes a big difference
  - Can generate random availability while modelling
    - May be different each time
    - No longer comparing like for like scenarios
  - New tool to pre-generate a rolling shift based on a weekly shift with random availability
    - Generates a calendar for the entire modelling period which can be reused in different models



Day	Start	End	% Avail	Reaction
Thursday	00:00:00	00:59:59	92	5.4
Thursday	01:00:00	01:59:59	90	5.4
Thursday	02:00:00	02:59:59	90	5.4
Thursday	03:00:00	03:59:59	73	5.4
Thursday	04:00:00	04:59:59	70	5.4
Thursday	05:00:00	05:59:59	54	5.4
Thursday	06:00:00	06:59:59	40	5.4
Thursday	07:00:00	07:59:59	100	1.1
Thursday	08:00:00	08:59:59	100	1.1
Thursday	09:00:00	09:59:59	100	1.1
Thursday	10:00:00	10:59:59	100	1.1
Thursday	11:00:00	11:59:59	100	1.1
Thursday	12:00:00	12:59:59	100	1.1
Thursday	13:00:00	13:59:59	100	1.1
Thursday	14:00:00	14:59:59	100	1.1
Thursday	15:00:00	15:59:59	100	1.1

Create SRA Rolling Shift



Day	Start	End	% Avail	Reaction
1	00:00:00	00:59:59	100	5.4
1	01:00:00	01:59:59	100	5.4
1	02:00:00	02:59:59	100	5.4
1	03:00:00	03:59:59	100	5.4
1	05:00:00	05:59:59	100	5.4
1	07:00:00	07:59:59	100	1.1
1	08:00:00	08:59:59	100	1.1
1	09:00:00	09:59:59	100	1.1
1	10:00:00	10:59:59	100	1.1
1	11:00:00	11:59:59	100	1.1
1	12:00:00	12:59:59	100	1.1
1	13:00:00	13:59:59	100	1.1
1	14:00:00	14:59:59	100	1.1
1	15:00:00	15:59:59	100	1.1

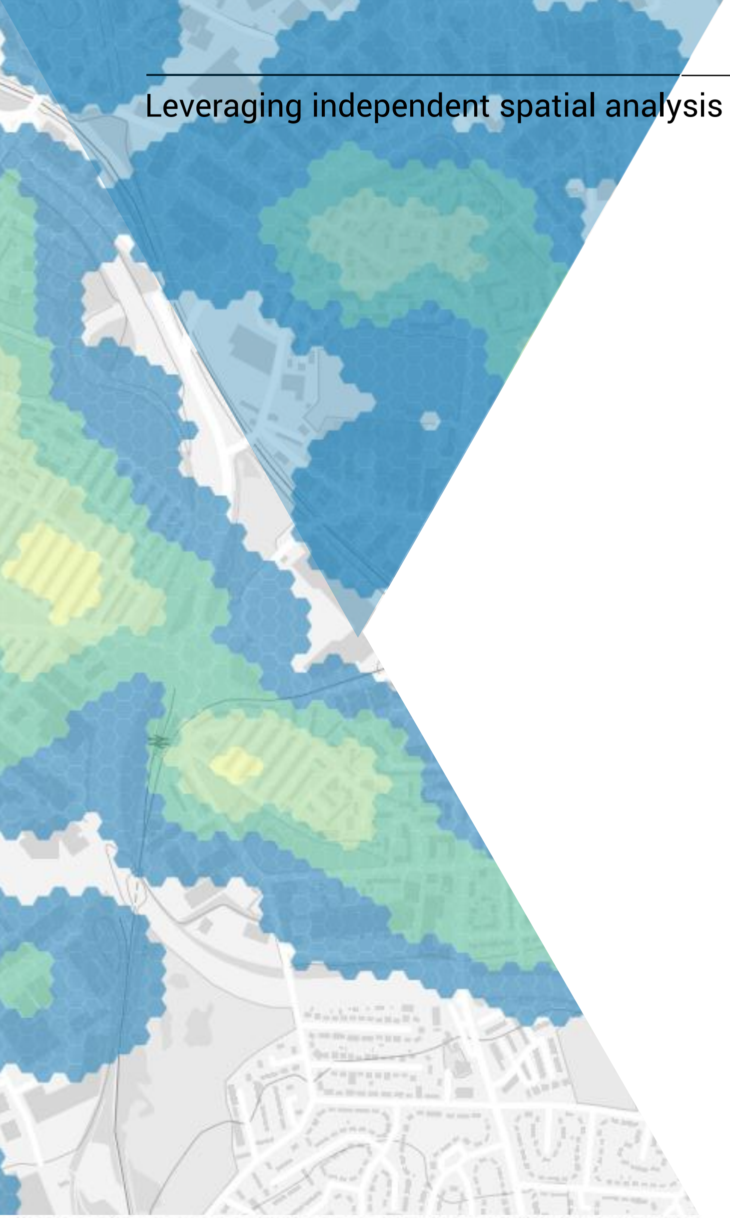
Breaking into blocks

Analysis

Model Comparisons

Base Case and scenarios

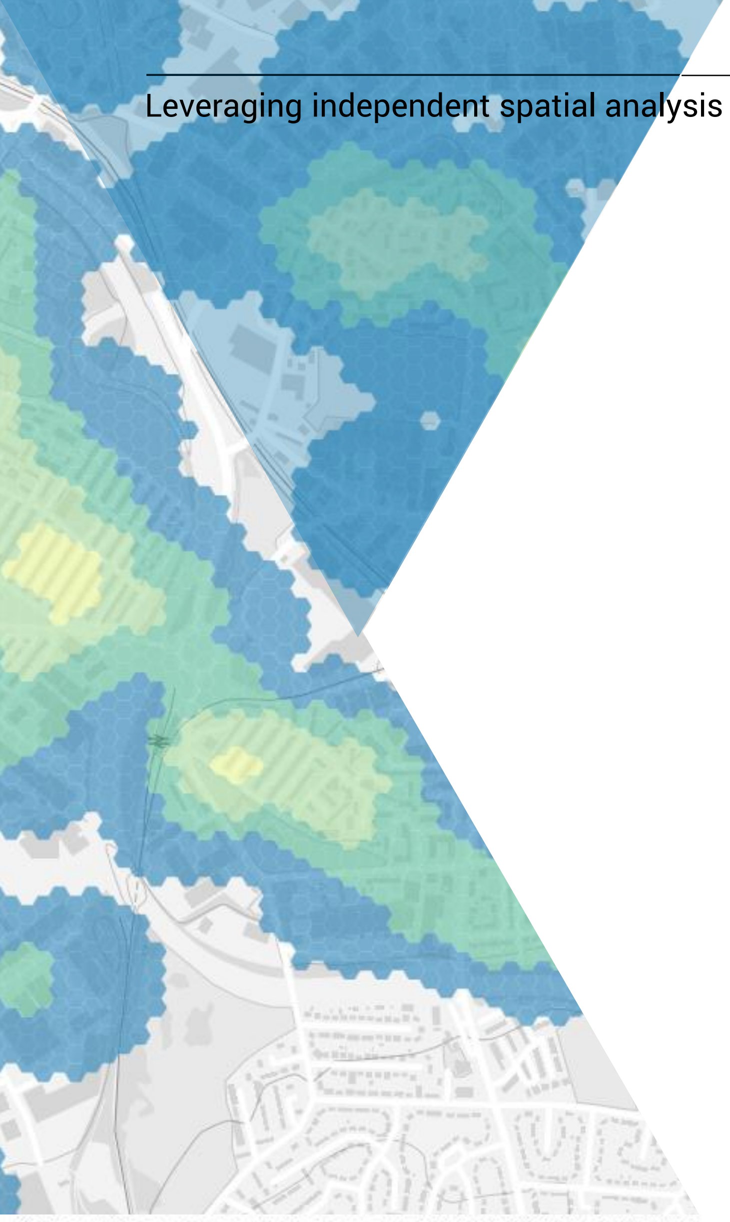
Equalised station model



Equalised Station Model

- **Gives a holistic view of stations and demand**
- **Aiming to rank each station based only on the value of its location, not its current resources**
  - Identical resources at each station (e.g. one wholetime appliance)
- **Analysing contribution to overall attendance performance**
  - Individual scenario models, based on the Equalised Station Model, each with one of the stations removed
  - Examine performance of each scenario compared to full Equalised Station Model, to determine which removals have the most detrimental impact

Model	Incidents in High Risk Areas			Difference		
	Mean 1st Pump Attendance Time (mins)	% of Incs in 11 minutes	% of Incs in 14 minutes	Mean 1st Pump Attendance Time (mins)	% of Incs in 11 minutes	% of Incs in 14 minutes
		Target: 80	Target: 95		Target: 80	Target: 95
Base Case: tblMO_Equalised_All_Stations	5.9	**87.0**	94.3	-	-	-
Station 4 removed	7.0	74.9	87.9	1.1	-12.1	-6.4
Station 5 removed	6.0	**86.8**	93.8	0.1	-0.2	-0.6
Station 6 removed	6.9	78.3	89.9	1.0	-8.7	-4.4
Station 7 removed	6.0	**86.7**	94.2	0.0	-0.3	-0.1
Station 8 removed	6.0	**86.4**	94.4	0.1	-0.6	0.1
Station 9 removed	6.0	**86.8**	94.1	0.0	-0.2	-0.2
Station 10 removed	5.9	**87.0**	94.3	0.0	0.0	0.0
Station 11 removed	6.2	**86.5**	94.0	0.2	-0.5	-0.4
Station 12 removed	6.0	**86.8**	94.2	0.0	-0.2	-0.1
Station 13 removed	6.0	**86.8**	94.2	0.0	-0.2	-0.1
Station 14 removed	6.9	78.3	88.3	1.0	-8.7	-6.0
Station 15 removed	6.0	**86.7**	93.9	0.0	-0.3	-0.5
Station 17 removed	6.0	**86.8**	94.2	0.0	-0.2	-0.1
Station 24 removed	8.3	66.0	78.1	2.3	-21.0	-16.2
Station 25 removed	5.9	**87.1**	94.3	0.0	0.1	0.0
Station 26 removed	6.2	**84.1**	90.9	0.3	-2.8	-3.4
Station 27 removed	6.2	**85.7**	93.5	0.2	-1.2	-0.8
Station 28 removed	6.0	**86.5**	94.1	0.0	-0.5	-0.3
Station 29 removed	5.9	**87.0**	94.3	0.0	0.0	0.0
Station 30 removed	7.1	75.9	93.3	1.2	-11.0	-1.0
Station 31 removed	6.0	**86.6**	93.2	0.1	-0.4	-1.1
Station 32 removed	6.0	**86.9**	94.2	0.0	-0.1	-0.1
Station 33 removed	6.3	**84.1**	91.2	0.4	-2.8	-3.1
Station 34 removed	6.1	**85.8**	93.0	0.1	-1.1	-1.3
Station 35 removed	7.9	69.8	86.3	2.0	-17.2	-8.0

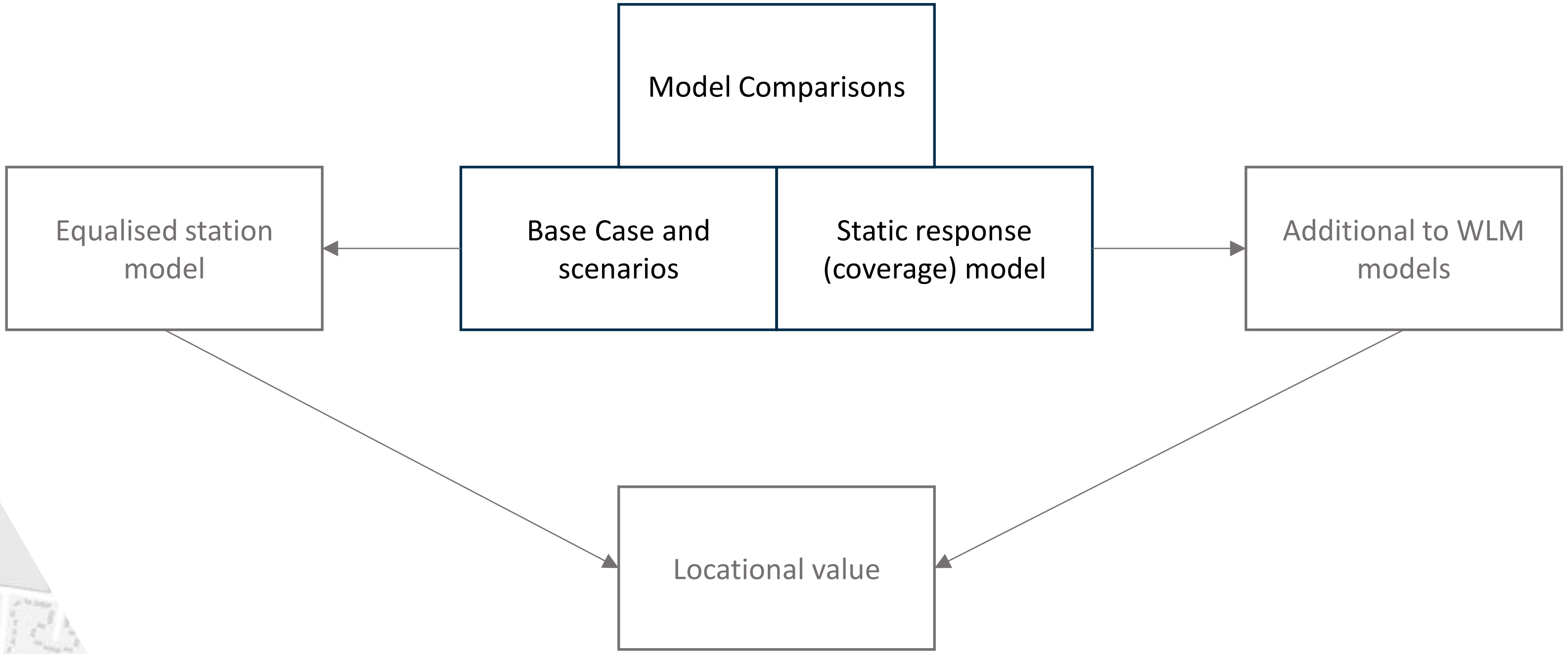


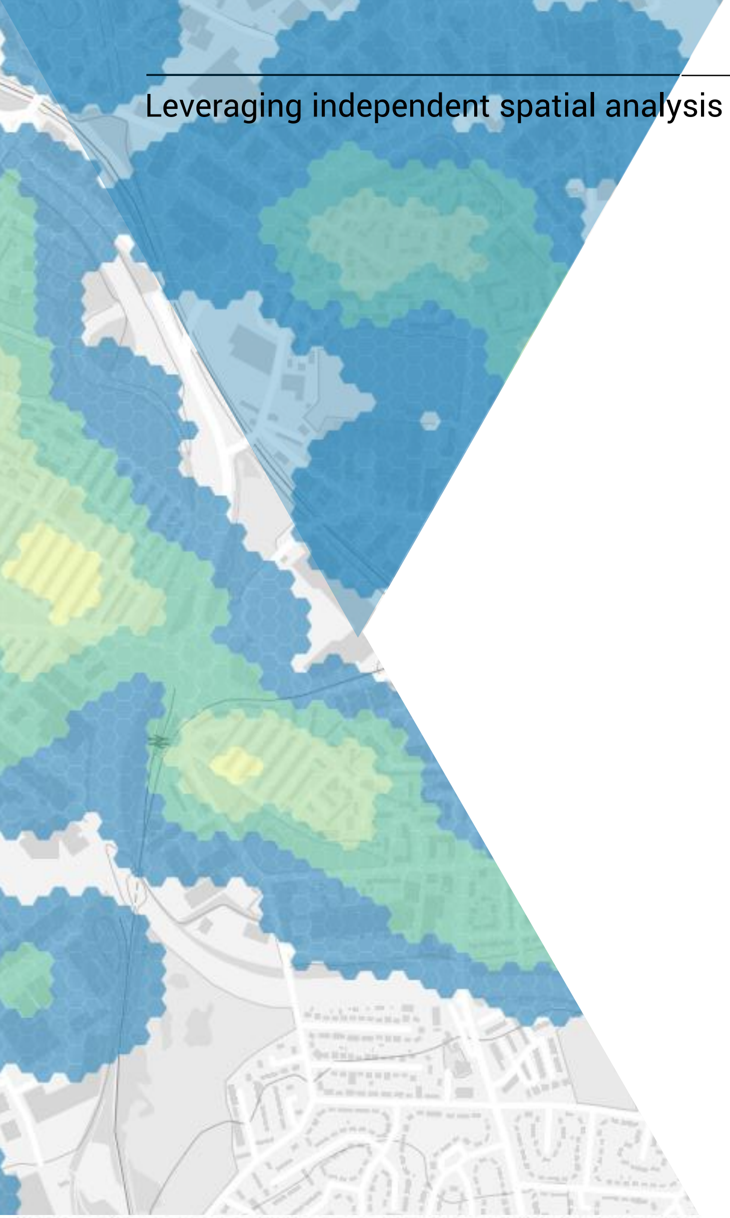
Equalised Station Model

- **Gives a holistic view of stations and demand**
- **Aiming to rank each station based only on the value of its location, not its current resources**
  - Identical resources at each station (e.g. one wholetime appliance)
- **Analysing contribution to overall attendance performance**
  - Individual scenario models, based on the Equalised Station Model, each with one of the stations removed
  - Examine performance of each scenario compared to full Equalised Station Model, to determine which removals have the most detrimental impact
- **Locational value at different times of the day/days of the week**

Week Days	Percentage of Time Period's Mobilisations Assigned to each Station																									
Time	4	5	6	7	8	9	10	11	12	13	14	15	17	24	25	26	27	28	29	30	31	32	33	34	35	
00:00:00	6.5%	1.1%	2.1%	1.9%	2.2%	5.8%	4.5%	3.2%	2.4%	4.5%	1.2%	1.7%	1.1%	18.3%	6.3%	2.2%	2.4%	1.7%	2.1%	1.9%	3.2%	2.2%	14.1%	2.6%	4.9%	100%
01:00:00	6.4%	0.8%	2.2%	1.7%	1.7%	5.5%	5.0%	3.0%	1.7%	3.5%	1.2%	1.6%	1.5%	21.2%	6.0%	2.1%	2.2%	1.3%	2.1%	1.9%	3.1%	1.8%	15.3%	2.7%	4.3%	100%
02:00:00	5.0%	0.9%	2.3%	2.2%	1.5%	5.5%	4.2%	2.8%	1.8%	3.3%	2.0%	1.5%	1.4%	19.7%	5.8%	2.0%	3.1%	1.9%	1.9%	2.2%	3.9%	2.3%	15.0%	2.7%	4.9%	100%
03:00:00	5.6%	0.7%	1.9%	1.6%	2.1%	6.0%	4.7%	1.7%	2.0%	3.6%	1.7%	1.3%	0.9%	19.9%	6.7%	2.5%	3.2%	2.2%	3.1%	1.9%	3.1%	2.3%	13.8%	2.8%	4.7%	100%
04:00:00	5.2%	0.6%	2.2%	1.6%	2.8%	7.1%	5.8%	2.3%	2.2%	4.2%	1.9%	2.1%	1.0%	18.1%	5.4%	2.8%	2.8%	2.2%	2.9%	2.2%	2.9%	2.2%	12.9%	2.0%	4.8%	100%
05:00:00	6.7%	0.7%	1.8%	1.4%	3.1%	7.1%	5.6%	3.1%	2.3%	4.2%	1.3%	1.4%	1.1%	17.2%	6.6%	2.0%	2.4%	1.2%	2.6%	2.3%	3.1%	3.1%	11.6%	2.4%	5.6%	100%
06:00:00	7.8%	0.6%	1.9%	1.2%	2.1%	5.7%	5.9%	3.1%	1.7%	3.5%	1.5%	1.2%	0.9%	18.1%	5.8%	2.2%	2.5%	1.5%	3.0%	2.7%	2.7%	2.5%	13.5%	3.1%	5.1%	100%
07:00:00	8.5%	1.4%	1.5%	1.3%	2.1%	5.7%	5.5%	3.2%	1.6%	2.9%	1.1%	1.2%	0.9%	17.2%	7.5%	2.3%	3.0%	1.8%	2.7%	2.5%	2.9%	1.9%	12.8%	3.2%	5.4%	100%
08:00:00	7.0%	1.5%	1.9%	1.4%	2.1%	4.9%	4.5%	3.1%	1.8%	3.8%	1.3%	1.6%	1.7%	15.2%	7.8%	2.9%	2.9%	2.0%	2.5%	2.4%	2.8%	1.9%	13.7%	3.2%	6.0%	100%
09:00:00	7.2%	0.9%	2.3%	1.5%	2.6%	6.1%	5.1%	3.5%	2.5%	3.7%	1.3%	1.6%	1.6%	14.0%	7.1%	2.5%	3.0%	1.8%	2.2%	2.0%	3.3%	1.9%	13.1%	3.3%	5.9%	100%
10:00:00	7.6%	1.1%	2.3%	1.2%	2.2%	5.4%	5.7%	3.1%	1.8%	3.4%	1.4%	2.0%	1.2%	14.2%	7.9%	2.9%	3.5%	2.2%	3.0%	2.2%	3.0%	2.3%	12.9%	2.5%	5.0%	100%
11:00:00	6.3%	0.9%	2.0%	1.5%	2.4%	5.7%	5.0%	3.1%	2.2%	3.6%	1.7%	1.9%	1.7%	13.8%	7.2%	2.3%	3.5%	2.3%	3.6%	1.8%	2.5%	2.5%	14.4%	2.6%	5.4%	100%
12:00:00	6.9%	1.1%	2.4%	1.3%	2.8%	5.6%	5.6%	2.7%	2.4%	3.0%	1.8%	2.2%	1.6%	12.8%	6.9%	2.4%	3.2%	1.6%	3.4%	2.5%	3.2%	2.4%	14.0%	2.8%	5.5%	100%
13:00:00	6.3%	1.2%	2.8%	1.8%	2.5%	6.1%	5.9%	2.8%	2.4%	3.8%	1.6%	2.1%	1.4%	12.3%	6.2%	2.7%	3.3%	1.5%	3.0%	2.3%	3.7%	2.3%	13.5%	3.1%	5.3%	100%
14:00:00	6.4%	1.3%	2.4%	1.6%	2.8%	5.4%	5.8%	3.1%	2.3%	3.9%	1.9%	2.5%	1.3%	11.1%	6.8%	2.7%	3.5%	1.9%	2.6%	2.6%	3.2%	2.7%	12.9%	3.5%	5.8%	100%
15:00:00	6.3%	1.3%	2.4%	1.7%	2.4%	5.6%	5.8%	3.6%	2.6%	3.6%	1.8%	2.1%	1.4%	11.6%	6.3%	2.4%	3.5%	2.2%	2.5%	2.6%	4.1%	2.8%	12.5%	3.1%	5.8%	100%
16:00:00	7.1%	1.5%	2.2%	1.6%	2.5%	6.0%	6.4%	3.6%	2.7%	4.2%	1.9%	2.1%	1.5%	11.3%	6.4%	2.3%	3.2%	1.9%	2.2%	2.5%	3.7%	1.9%	12.8%	3.0%	5.2%	100%
17:00:00	6.9%	1.3%	2.1%	1.6%	2.5%	5.3%	5.5%	3.7%	2.7%	4.5%	1.9%	2.6%	1.5%	12.0%	7.1%	3.0%	3.2%	2.1%	2.4%	2.4%	3.1%	1.9%	12.7%	3.0%	5.1%	100%
18:00:00	6.9%	1.4%	2.2%	1.6%	2.2%	5.3%	5.7%	3.0%	2.1%	4.8%	1.7%	2.4%	1.3%	12.9%	6.5%	2.9%	3.4%	2.1%	2.3%	2.4%	3.5%	2.0%	13.7%	3.0%	5.0%	100%
19:00:00	5.9%	1.3%	1.7%	1.8%	2.5%	5.7%	5.9%	2.6%	2.1%	4.4%	1.7%	2.3%	1.6%	13.6%	6.7%	2.9%	3.0%	2.3%	2.7%	2.4%	3.2%	1.9%	13.6%	3.3%	4.8%	100%
20:00:00	5.9%	1.1%	1.6%	1.5%	2.7%	5.8%	5.5%	2.6%	2.2%	3.1%	1.4%	2.0%	1.4%	15.2%	7.4%	2.4%	2.8%	1.8%	2.1%	2.6%	3.7%	1.9%	14.8%	3.2%	5.2%	100%
21:00:00	7.0%	1.1%	1.6%	1.4%	2.1%	5.2%	5.0%	2.7%	2.4%	3.3%	1.2%	2.1%	1.3%	14.7%	6.9%	2.5%	3.0%	1.6%	2.4%	2.3%	3.3%	2.0%	16.4%	3.1%	5.3%	100%
22:00:00	6.0%	1.1%	1.7%	1.6%	1.8%	5.2%	5.1%	3.3%	2.2%	4.1%	1.5%	2.6%	1.1%	15.7%	6.0%	2.7%	3.0%	1.8%	3.0%	2.2%	3.2%	2.4%	15.1%	3.0%	4.5%	100%
23:00:00	5.9%	1.1%	1.9%	1.8%	2.2%	5.1%	4.5%	3.0%	2.5%	4.5%	1.4%	2.1%	0.8%	17.4%	5.7%	2.7%	3.0%	2.1%	2.4%	2.0%	3.5%	2.1%	15.5%	2.7%	4.3%	100%

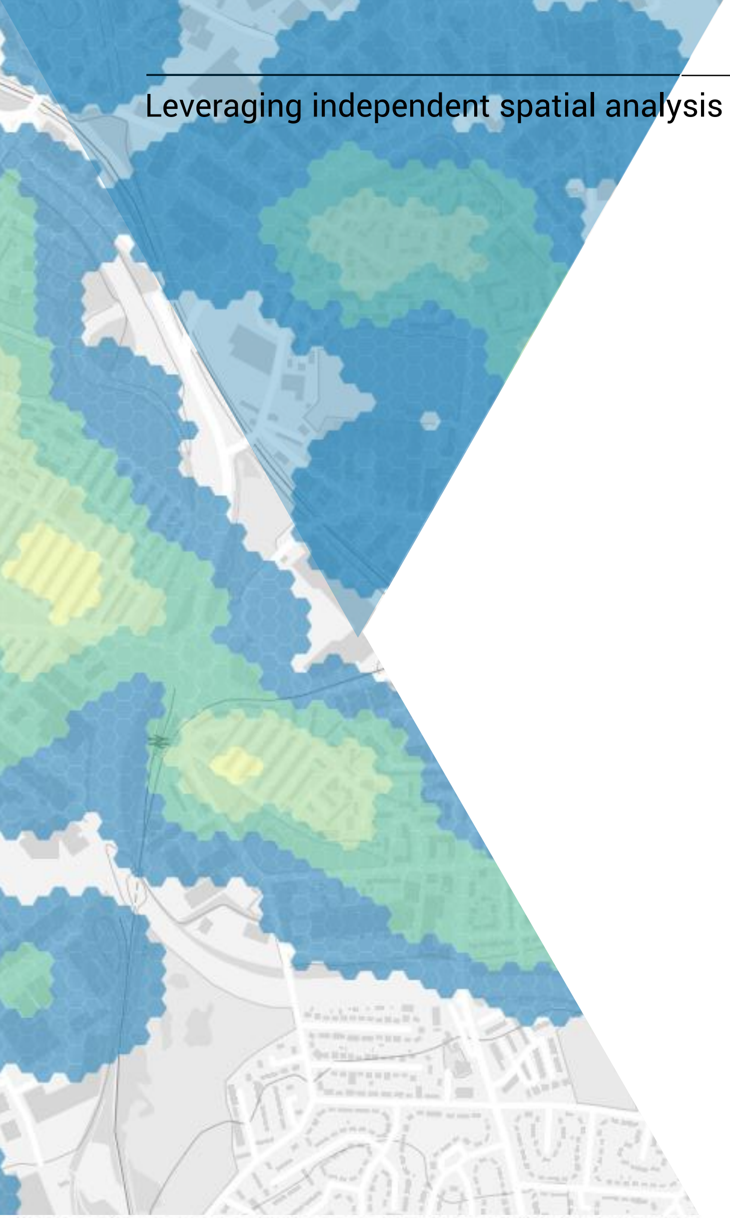
Breaking into blocks





Static Response Model

- **Workload Modeller focuses on locations where incidents have previously happened**
  - Quieter areas are not represented in Workload Modeller analysis
- **Coverage and attendance times are important, even in quieter locations**
- **Continuous, polygon-based map of the operational area**
  - Arrival time of each appliance (turnout plus drive time)
- **Identify variations in coverage and response times**



Summary

- **Workload Modelling has many elements**
  - Each one should be thoroughly examined and maximised
  - 90% of a modelling project can be preparation, before any final modelling is actually undertaken
- **Complementary tools add value**
  - Risk Modeller
  - Static Response Model
  - Statistical analysis
- **Cadcorp can provide consultancy support for individual or multiple work packages, including the entire project**

t. 01438 747 996 | e. info@cadcorp.com | w. cadcorp.com