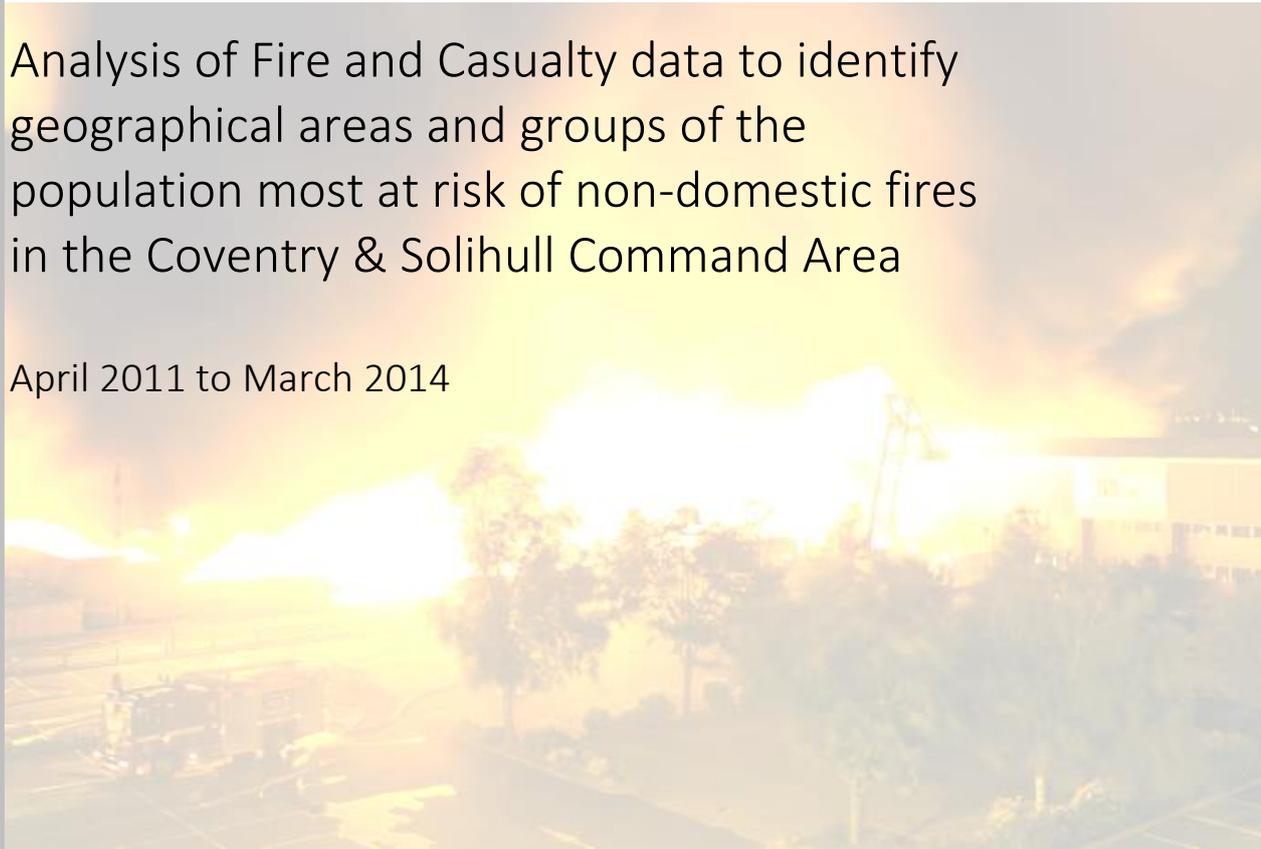


NON-DOMESTIC PROPERTY FIRES IN COVENTRY & SOLIHULL

Analysis of Fire and Casualty data to identify geographical areas and groups of the population most at risk of non-domestic fires in the Coventry & Solihull Command Area

April 2011 to March 2014



Data Intelligence Hub
2014

Introduction

This report presents the results of the analysis of primary fires at non-domestic premises in Coventry & Solihull Command Area between April 2011 and March 2014.

During this time period there were 258 accidental and 89 deliberate fires at non-domestic premises in the Command Area.

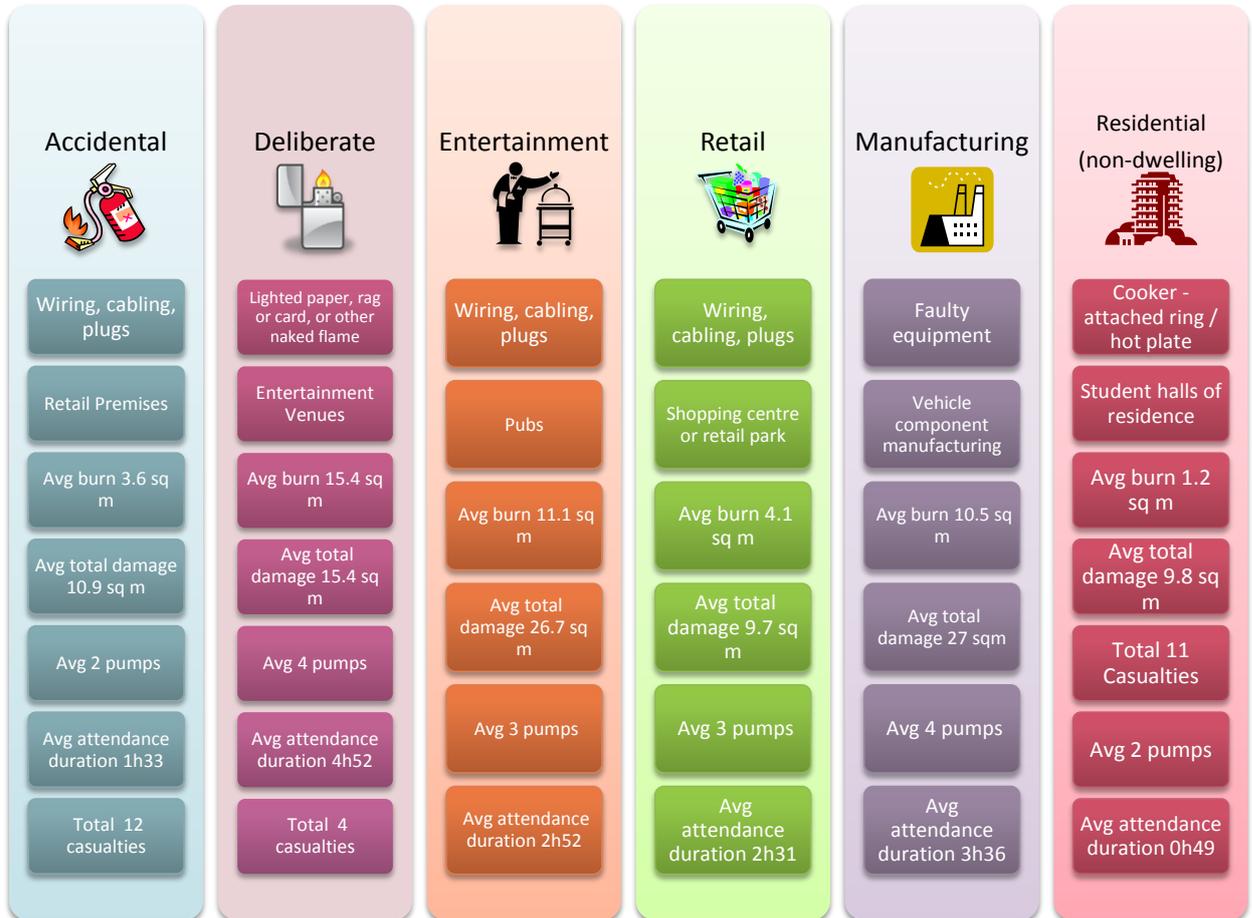
There are currently approximately 15,127 non domestic properties in Coventry, and 6,221 in Solihull¹.

Although non-domestic property fires are fewer than dwelling fires, the impact of fire in non-domestic buildings extends further than just the effects on the business or owner of the property. The economic impact on the business for instance may in turn indirectly affect life, as unemployed people are more at risk of accidental dwelling fires due to their being at home for longer periods of time.

¹ Extract from the Gazetteer, October 2014

Summary

The figure below summarises the main features of different types of incidents:

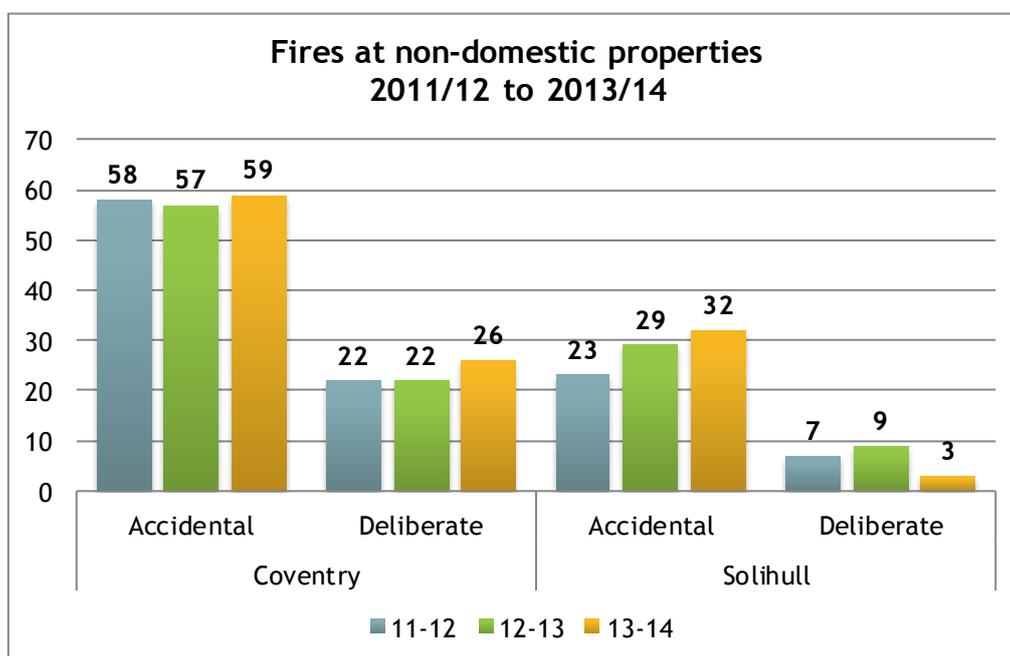


Overview

Between April 2011 and March 2014 there were 258 accidental and 89 deliberate fires at non-domestic premises in Coventry & Solihull, resulting in 15 injuries and one fatality.

In the last three financial years, accidental fires at non-domestic premises in Coventry & Solihull have increased by approximately 6% each year, resulting in a 12.3% increase when comparing 2013/14 to 2011/12. This is despite an overall reduction of 19% over the same three years for the Brigade.

Solihull experienced an increase in accidental incidents, while Coventry saw a small rise in deliberate fires:



As numbers are so small, it is difficult to precisely identify which specific category this rise in accidental incidents has originated from, if any.

The most notable increase is in the 'Electricity supply' source of ignition group, with 16 more incidents in 2013/14 compared to 2011/12, in particular in the 'wiring, cabling, plugs' category, which increased by 12 incidents.

Two property types saw a year-on-year increase of more than three incidents: Purpose built office / administration buildings (+4 in 2012/13 and +2 in 2013/14), and student halls of residence (+3 and +2 incidents).

The small increase in 2013/14 for Coventry's deliberate fires is counter-balanced by Solihull's reduction; for the command area as whole deliberate fires have remained stables with around 30 incidents each year.

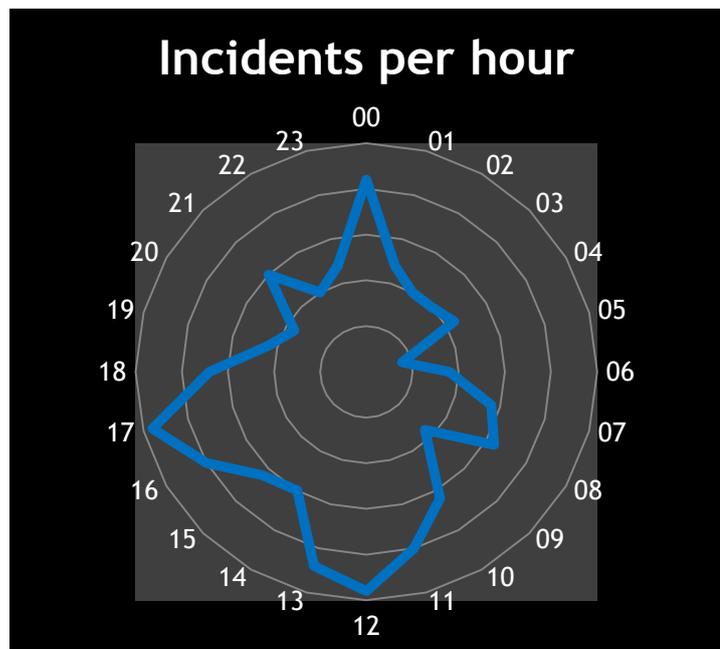
Temporal analysis

The table below illustrates the temporal distribution of non-domestic fires in Coventry & Solihull:

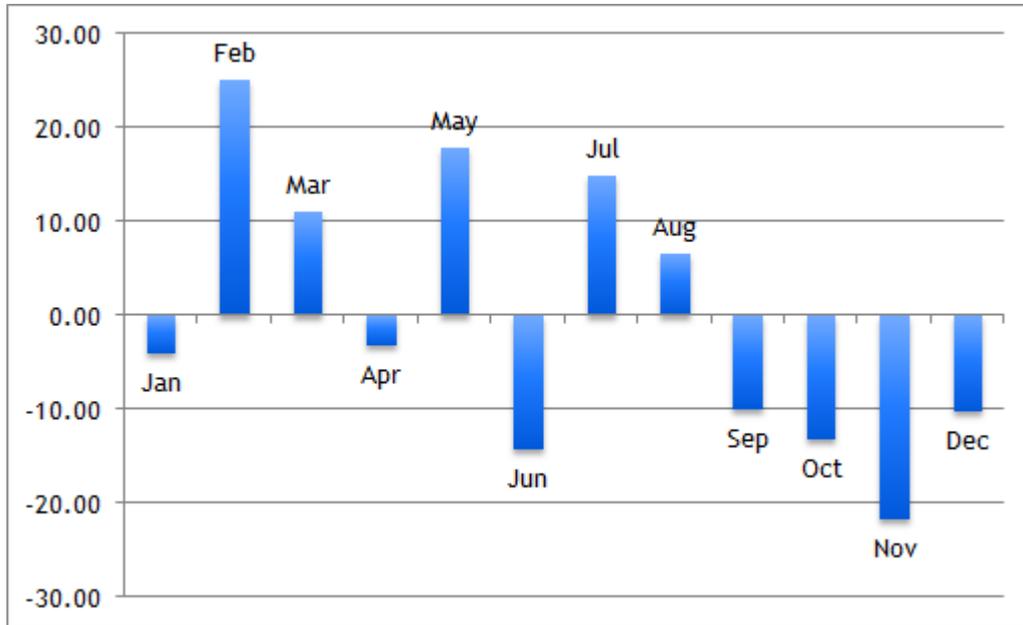
Day / Hour	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Monday	Yellow	Green	Green	Yellow	Yellow	Green	Yellow	Green	Green	Green	Yellow													
Tuesday	Yellow	Green	Green	Green	Green	Green	Yellow																	
Wednesday	Yellow	Green	Green	Green	Green	Green	Yellow																	
Thursday	Yellow	Green	Green	Green	Green	Green	Yellow																	
Friday	Yellow	Green	Green	Green	Green	Green	Yellow																	
Saturday	Yellow	Green	Green	Green	Green	Green	Yellow																	
Sunday	Yellow	Green	Green	Green	Green	Green	Yellow																	

The highest number of incident tends to be between 17'00 and 18'00 on Sunday.

The graph on the right illustrates how incidents are distributed throughout the 24h day. This suggests that fires at non-domestic properties are more likely around **lunch time**, and **between 17'00 and 18'00**.



The chart below is the seasonality chart for non-domestic fires in Coventry & Solihull. If the column is a positive number (above the 0) then the number of incidents in that month is higher than expected, if the column is a negative number then the number of incidents in that month is lower than expected (the values on the vertical (y) axis are relative values).

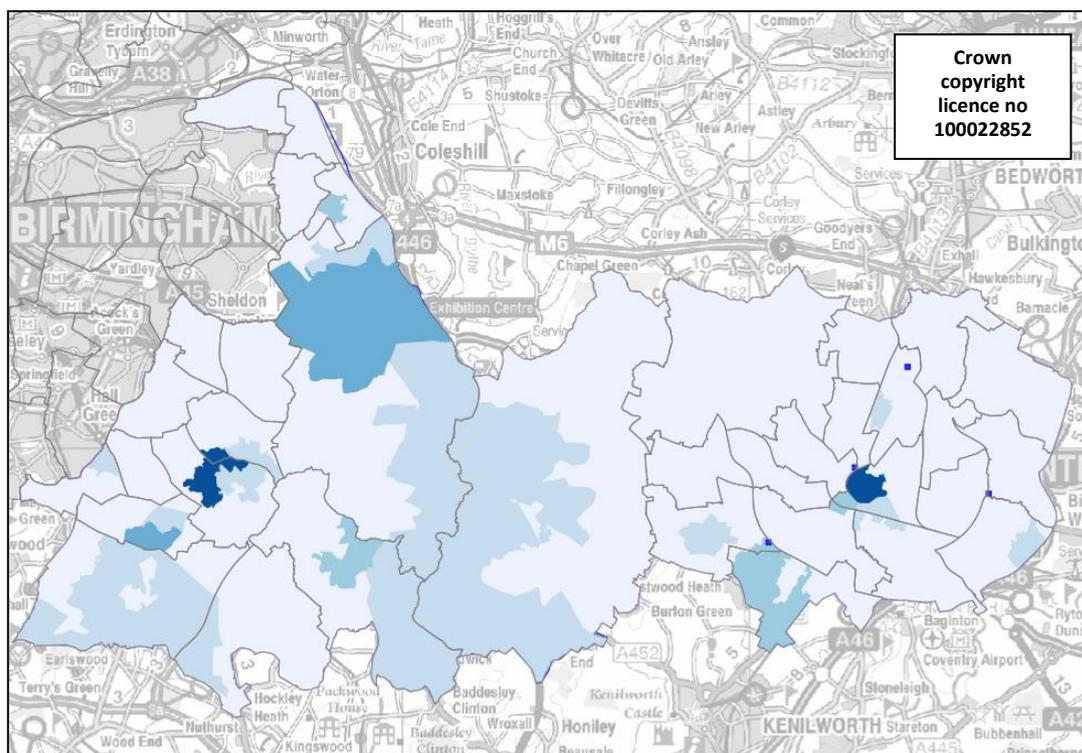


It shows that non-domestic fires are most likely to take place in **February, May** and **July**.

Location

An overall risk score for each property type group was obtained using a harm matrix and a probability matrix². This risk score was then used to rank LSOAs (Lower Super Output Areas) in both boroughs to identify geographical areas which may be more at risk.

The map below shows that, overall, the areas most at risk of fires in non-domestic buildings are Coventry city centre and Solihull town centre. This is heavily influenced by the number of retail and entertainment premises in those areas, as both these property types are within the high-scoring range.



Property type

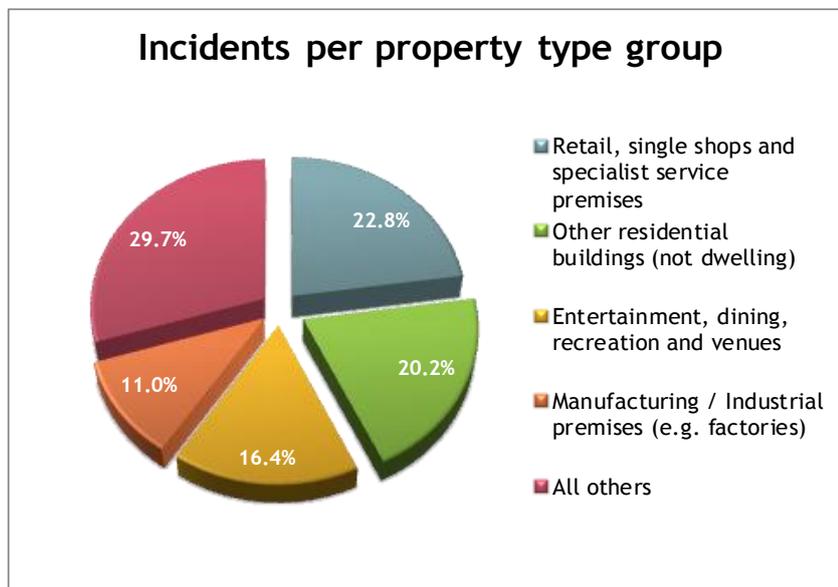
23 incidents were located at old people's homes; however, further investigation showed that 17 of those addresses were incorrectly classified and were actually sheltered housing. Sheltered housing is within the 'dwelling' property category and therefore those 17 incidents were not included in the analysis.

There were also a further six incidents where the property type was incorrectly selected as "nursing / care home" instead of sheltered housing. Those were also excluded.

² See Appendix B

Overview

Four property type groups accounted for 70.3% of incidents, while the remaining 29.7% were spread over 13 others:



These four property type groups also obtained the highest risk score, as shown in the table in Appendix B.

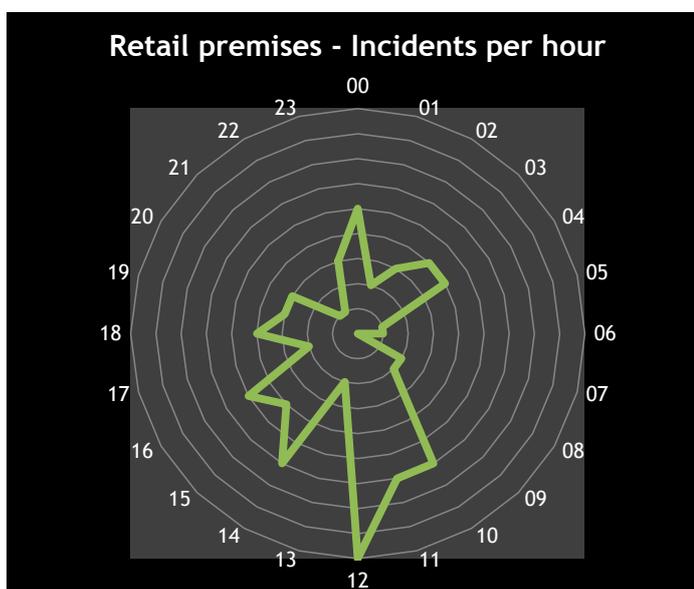
Retail premises

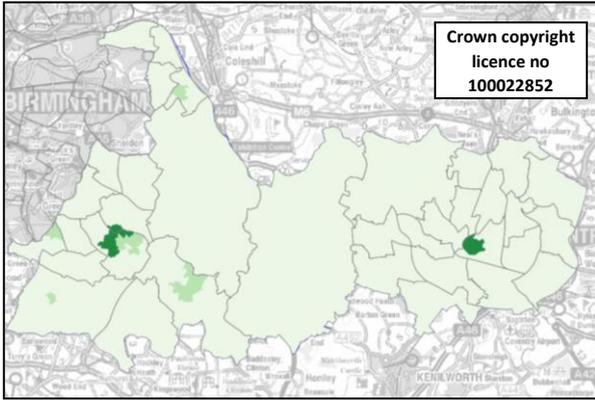
There were 79 primary fires at retail premises: 65 accidental and 14 deliberate.

Within the 'Retail' group, **shopping centre/retail park** was the type of property with the most incidents (11), followed closely by department store (10).

The graph to the right shows that incidents at retail premises tend to take place **between 10'00 and 13'00**.

Fires at these premises were mostly due to **faulty electrical equipment or appliances**.





The map on the left shows that the areas the most at risk of fires in retail premises are **Coventry city centre** and **Solihull town centre**.

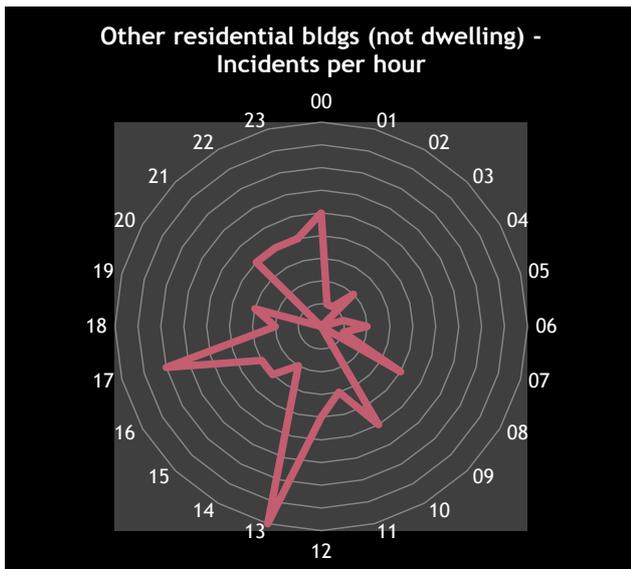
This is due to the concentration of retail premises in these areas.

The average cost of a commercial claim between 2004 and 2013 was £14,829³.

The total cost of fires at retail premises in the last three financial years in Coventry & Solihull can be estimated at £1.2m.

Other residential buildings (not dwelling)

There were 70 incidents at non-dwelling residential buildings: 60 accidental and 10 deliberate fires.



The graph on the left shows that incidents at non-dwelling residential buildings peak **between 13'00 and 14'00, and between 17'00 and 18'00**

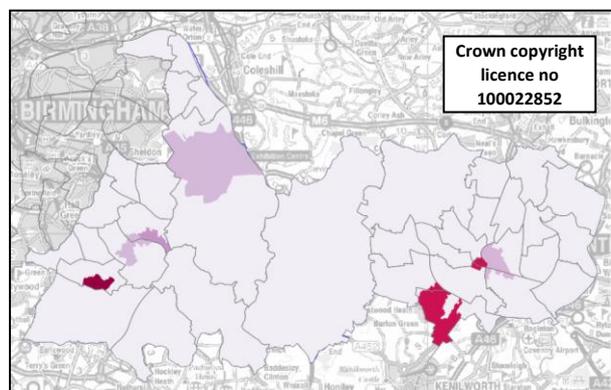
Student halls of residence accounted for almost a third of fires at non-domestic residential buildings. **Cooking** appliances were the main source of ignition for these incidents, especially cooking left on or unattended.

Based on figures provided by the Association of British Insurers, the total cost of fires at non-dwelling residential

buildings in the last three financial years in Coventry & Solihull can be estimated at just over £1m.

The map on the right shows that parts of **Shirley** in Solihull and **Canley** and near the city centre in Coventry are most at risk of fires in non-dwelling residential premises. This is due to **care/nursing homes** in the former and **student halls of residence** for the latter.

Entertainment venues

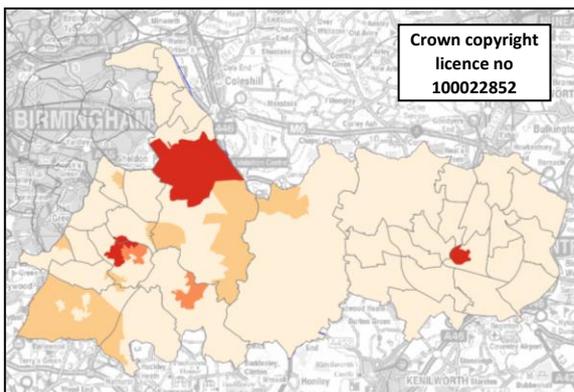
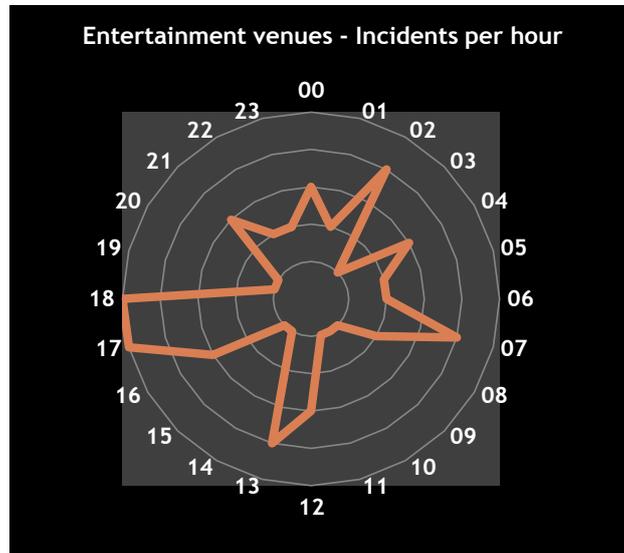


³ Based on data provided by the Association of British Insurers (ABI) in October 2014

There were 57 primary fires at entertainment venues in Coventry & Solihull: 32 accidental incidents and 25 deliberate.

The graph to the right shows that incidents at entertainment venues peak **between 17'00 and 19'00**.

Almost a third of incidents took place at **pubs** (18 incidents).



The map to the left shows that areas most at risk of fire in entertainment venues are in **Coventry city centre, Solihull town centre, and Bickenhill**. The prominence of the latter is linked to the presence of the NEC.

The total cost of fires at entertainment venues in the last three financial years in Coventry & Solihull can be estimated at £854,258.

Entertainment venues incurred the most extensive average **burn damaged area** and second most extensive average **total damaged area** of the four top property type groups:

Property Type Group	Average burn damaged area (sq m)	Average total damaged area (sq m)	No. of incidents
Retail, single shops and specialist service premises	4.1	9.7	79.0
Other residential buildings (not dwelling)	1.2	9.8	70.0
Entertainment, dining, recreation and venues	11.1	26.7	57.0
Manufacturing / Industrial premises (e.g. factories)	10.5	27.0	38.0

10 of the deliberate fires at entertainment venues were at **vacant premises**, representing 40% of deliberate incidents at entertainment venues. This is likely to account for the larger damaged areas, as fires in unoccupied buildings are less likely to be noticed at an early stage. Fires at vacant buildings would also be less of a response priority should there be ongoing incidents involving risk to life, therefore giving more time for fire, smoke, etc to spread.

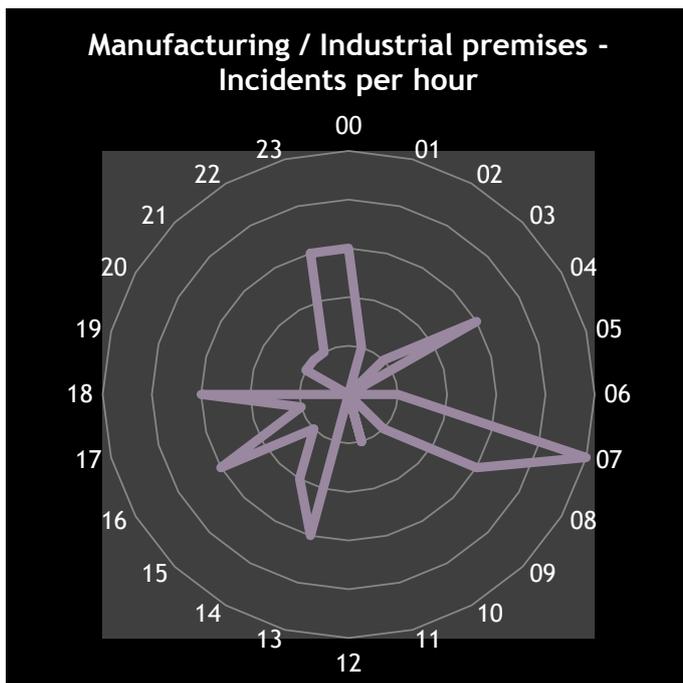
Six of the 10 incidents at vacant premises were at **pubs**, and all were in **Coventry**. Most were repeat locations: three incidents at the Jolly Collier in Henley, two at The Grange in Upper Stoke, and two at the Foleshill Social Club.

Together with manufacturing / industrial premises, entertainment venues used, on average, the most equipment, in particular BA, hosereel, and main jets.

Manufacturing / industrial premises

There were 38 incidents at manufacturing / industrial premises: 33 accidental and five deliberate.

Predictably, **faulty industrial equipment** is the main source of ignition.



The graph to the left shows incidents at manufacturing / industrial premises peak in the early morning.

Almost a third of incidents were located at premises manufacturing **vehicle components**, including four incidents at the IAC Group premises on the Elmdon trading estate in Solihull, three of which involved the same type of equipment (injection moulding machine).

Incidents at manufacturing / industrial properties resulted in the most **total damage**, which is likely due to the size of the premises, as factories tend to cover larger areas.

Incidents at manufacturing / industrial premises also had the highest average **attendance duration** (3hrs 36min, compared to 1hr 55 min overall) and the highest average **number of appliances** attending with four, compared to three overall (this includes PRLs, TRVs and BRVs only).

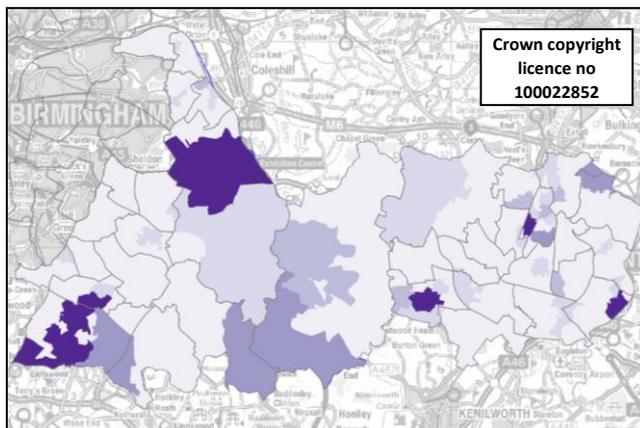
Together with entertainment venues, manufacturing / industrial premises used, on average, the most equipment, in particular BA, hosereel, and main jets.

This suggests that incidents at this type of properties place a greater demand on the Brigade, despite their lower number.

The map to the right shows several areas at risk of fire at manufacturing / industrial premises:

In Solihull, the **Elmdon** trading estate is likely to be a reason for the Bickenhill area being highlighted, and areas of **Blythe** ward are also at risk.

In Coventry, the industrial estates in **Tile Hill**, **Binley**, and **Kingfield Road** are most at risk.



Based on figures provided by the Association of British Insurers, the total cost of fires at manufacturing/industrial premises in the last three financial years in Coventry & Solihull can be estimated at £563,505.

Waste / Recycling:

There were only two incidents at waste / recycling facilities⁴, one in Coventry and one in Solihull.

It should be noted that waste / recycling facilities are not currently recorded under one single property type heading, therefore identifying such premises in the data requires manual searching for keywords in the address as well as in the property types, which may lead to some incidents not being included. Scrap yards are not included in non-domestic properties as they are recorded as 'outdoors FDR' locations; neither are secondary fires at non-domestic properties included.

There are 31 permitted waste sites⁵ in the Coventry & Solihull command area, at which a large fire could therefore result in major transport disruption for the region. One is located near the Coventry canal, and could therefore have an environmental impact. There were also a further four permitted waste sites located within 150 m of a railway.⁶

⁴ 'Recycling' is found by searching for the words Recycling, Scrapyard, Metal, Waste, Plastic, Environmental, and Incinerator in the address fields and the property types (apart from manufacturing premises).

⁵ Data from the Environment Agency

⁶ See Appendix for list

Heritage sites:

There are 89 grade I and II* listed buildings in Coventry & Solihull, approximately 77 of which are non-domestic buildings, including shops, offices, churches, pubs and schools.

Historical buildings are at heightened risk of fire for a variety of reasons: they are often built from easily-ignited materials, they may have open fires and chimneys which can be in poor condition, their status as listed properties may prevent modifications such as fire doors to be installed, and in some cases they are situated in isolated surroundings delaying the firefighters' arrival.

Two incidents were identified as having taken place at grade I and II* non-domestic buildings in Coventry & Solihull command area, one in each borough.

Source of ignition

Accidental fires

The greatest ignition source for accidental fires was **wiring, cabling and plugs**. Due to recording practices, analysis of the appliances or apparatus the wires, cables and plugs were connected to, is not possible.

It's also the source of ignition which saw the greatest year-on-year increase: +7 incidents in 2012/13 compared to the previous year, and +5 in 2013/14 compared to 2012/13.

There were 31 **cooking incidents at non-dwelling residential properties**, including 17 at student halls of residence.

When taking into account the number of incidents and the average resulting damaged area, incidents caused by electricity supply ('wiring, cabling, plugs' and 'Apparatus - batteries, generators') and non-cooking domestic style appliances (such as tumble dryers, audio equipment, or fridge/freezers) resulted in an above average damage both in burn damage and overall.

The table below shows the average total and burn damage and the number of incidents for source of ignition groups with at least 15 incidents over the period analysed. The top ones are highlighted in red:

Source of Ignition group	Avg Total Damage in sq. m.	Avg Burn Damage in sq.m.	No. of Incidents
Electricity supply	11.8	4.8	59
Cooking appliance	9.9	0.6	56
Electric Lighting	6.2	0.6	43
Industrial equipment	9.8	2.3	28
Heating equipment	3.3	1.1	18
Other domestic style appliance	22.6	14.7	15
Grand Total	10.9	3.6	258

Most incidents in **Coventry** were caused by **cooking appliances** (46 incidents, 26.4% of Coventry accidental incidents, which is likely in part due to student halls of residence), followed by electricity supply (35 incidents, 20.1%).

For **Solihull**, **electricity supply** was the main source of ignition group (24 incidents, 28.6%), followed by electric lighting (22 incidents, 26.2%).

Deliberate fires

Almost half of deliberate fires at non-domestic premises were started using ‘lighted paper, rag or card, or other naked flame’ (48.3%).

This source of ignition also resulted in all three of the deliberate incidents’ casualties.

Damage

Deliberate fires resulted in more damage than accidental incidents:

Motive	Average of Overall Damage	Average of Burn Damage
Accidental	10.9	3.6
Deliberate	38.1	15.4
Grand Total	17.9	6.6

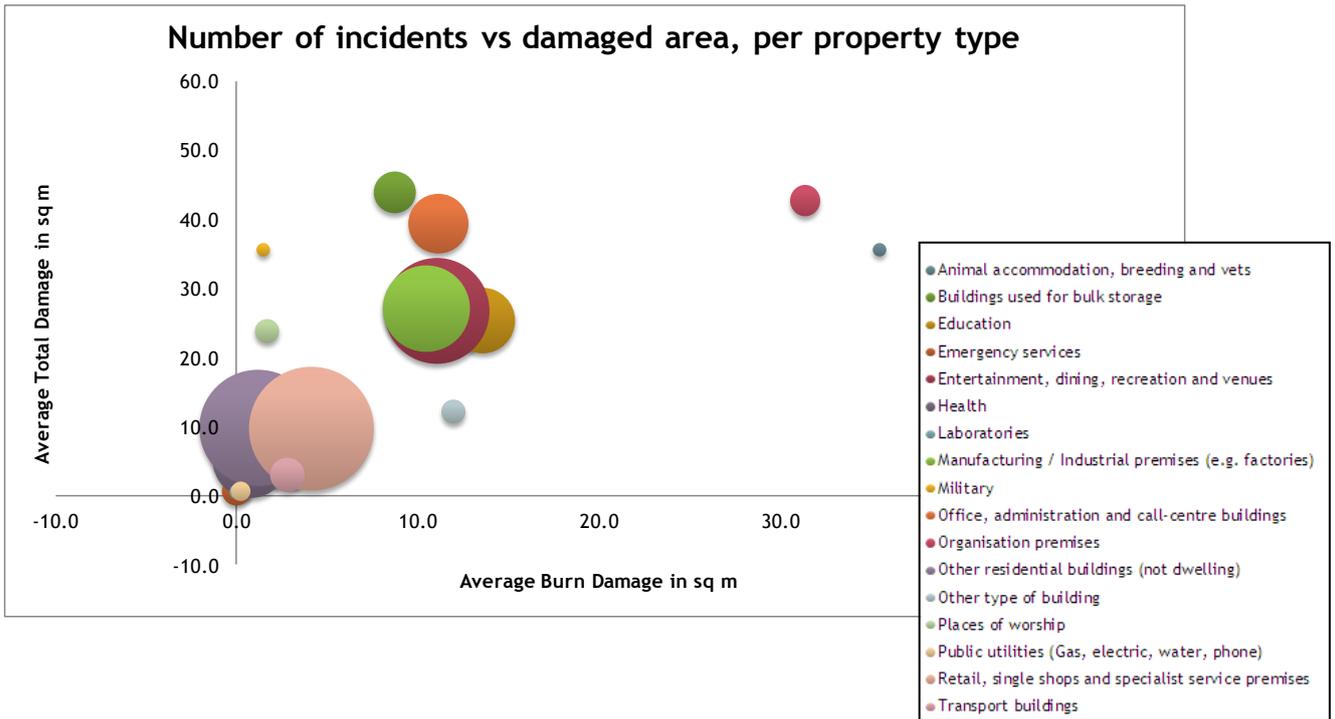
This is likely at least in part due to the larger proportion of vacant and under construction properties in the deliberate fire category (31.5%). As vacant and under construction properties are more likely to be empty for long period of times, they are at heightened risk of fire, including an increased risk from accumulation of junk mail for town centre shops or from the attraction to arsonists or intruders setting fires due to the secluded location of industrial premises.

Average burn damage was slightly higher in Solihull (7.7 sq m) than Coventry (6.1 sq m). This may be due to slightly longer attendance times to incidents in Solihull.

Overall damage was more uniform, with 18.1 sq m for Coventry and 17.5 sq m for Solihull.

In the graph below each bubble represents a different group of property types; the size of the bubble represents the number of incidents, and it is plotted along a vertical axis for the average total damaged area and a horizontal axis for the average burn damaged area.

It shows that property types with the greater number of incidents tend to suffer minimal damage.



Smoke alarms and fixed fire fighting systems

Predictably, average burn and overall damage were higher where there was no working alarm. 73.5% of incidents were at properties where there was a working alarm.

Over a third of **entertainment** venues and a quarter of **retail** premises did not have a smoke alarm fitted in the property.

Only 14.1% of incidents (49) were at properties where a fixed fire fighting system was installed. The most common were sprinklers (6.1%, mainly in manufacturing / industrial and retail premises), followed by dry risers (4.6%, mostly at health-related properties).

Of the 21 premises that were sprinklered at the time of the fire, the sprinklers did not operate on 16 occasions, although 12 of those were because the fire products did not reach the detector.

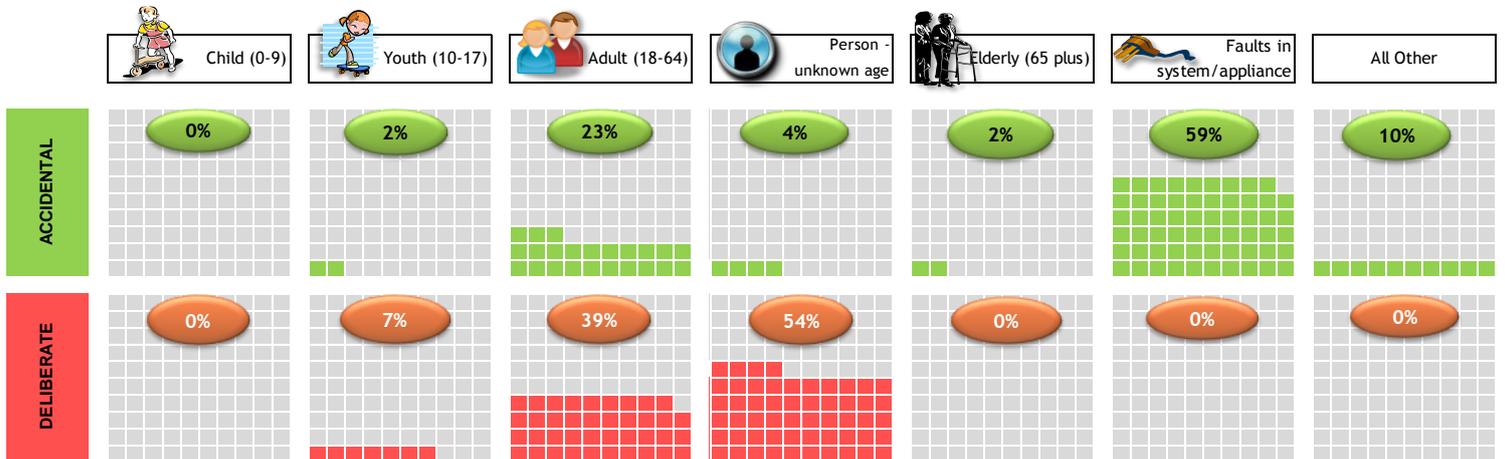
Demographics

People were most likely to be present in non-dwelling **residential buildings** at the time of an incident. Likewise, evacuations were also most numerous from this type of property: 30.4% of unassisted evacuees and 75% of assisted evacuees vacated the premises as a result of fires in non-dwelling residential properties, in particular hotels / motels, student halls of residence, and old people's homes.

There were very few casualties resulting from fires at non-domestic premises, with just 20 injuries and one fatality over the three years analysed.

Caused by:

Most accidental incidents were caused by faults in a system or appliance, while for most deliberate fires the person was either not identified or was an adult:



APPENDIX B – Risk Scoring

A risk score was developed based on the above analysis in order to identify which property type groups were most at risk of fire.

There are two components which make up the total risk score: the harm score and the probability score (see next pages for matrices).

Each property type group is given a harm and a probability score, which are then multiplied to form a total score.

This allows us to then rank the property type groups in order of risk: High, Medium and Low.

The overall risk score was also used to rank LSOAs (Lower Super Output Areas) in both boroughs to identify geographical areas which may be more at risk.

This was done by multiplying the number of total properties of each type (obtained from the Gazetteer) by the total risk score for that type for each LSOA, therefore giving us a score for each property type for that LSOA. Adding them up provides the total score for that LSOA.

Level of harm matrix

To identify what the harm factor is for each property type group, five separate factors were looked at to establish the overall impact of fires at different property types:

Factor	Level of harm	score	Definition
Physical - Victim (Owners/ residents of property)	Death	4	Is this type of incident likely to result in the death or serious injury of an individual; or in less serious injury?
	Serious Injury	3	
	Minor Injury	2	
	None	1	
Psychological - Community	Extremely concerned	4	What level of psychological impact is this type of incident likely to have on the community as a whole?
	Significantly Concerned	3	
	Fairly concerned	2	
	Minor concern	1	
Economic - WMFS	Very High	4	How much economic impact does this type of incident have on your organisation (e.g. time cost, number of appliances, etc)
	High	3	
	Medium	2	
	Low	1	
Economic - Victim (Owners/ residents of property)	Very High	4	How much economic impact does this type of incident have on the victim? (e.g. damage size, cost of repairs, etc)
	High	3	
	Medium	2	
	Low	1	
Environmental	Very High	4	what is the likely environmental impact of this type of incident?
	High	3	
	Medium	2	
	Low	1	

Each property type group was scored on each of the factors above, to provide a total harm score.

Probability Matrix

The probability score is obtained using a sliding scale as displayed below:

Proportion of Total Number of Incidents	Level of control or reduction	Score
10% and over	Uncontrolled (increasing)	18
	Controlled (stable)	17
	Reduction	16
8% and over	Uncontrolled (increasing)	15
	Controlled (stable)	14
	Reduction	13
6% and over	Uncontrolled (increasing)	12
	Controlled (stable)	11
	Reduction	10
4% and over	Uncontrolled (increasing)	9
	Controlled (stable)	8
	Reduction	7
2% and over	Uncontrolled (increasing)	6
	Controlled (stable)	5
	Reduction	4
1% and over	n/a	3
0.5% and over	n/a	2
0% and over	n/a	1

Each property type is given score based on the proportion of the total number of incidents it represents.

Total Score

Below is the calculated risk score for each property type group for the Coventry & Solihull Command Area:

Property Type Groups	Level of harm score	Probability Score	Overall Risk Score	Level of Risk
Manufacturing / Industrial premises (e.g. factories)	15	17	255	High
Other residential buildings (not dwelling)	12	18	216	High
Entertainment, dining, recreation and venues	12	16	192	High
Retail, single shops and specialist service premises	12	16	192	High
Education	12.5	11	137.5	Medium
Health	8	15	120	Medium
Office, administration and call-centre buildings	8.5	9	76.5	Medium
Buildings used for bulk storage	10	4	40	Low
Organisation premises	12.5	3	37.5	Low
Transport buildings	7.5	3	22.5	Low
Places of worship	9.5	2	19	Low
Emergency services	6	3	18	Low
Other type of building	7	2	14	Low
Heritage	13	1	13	Low
Public utilities (Gas, electric, water, phone)	6.5	2	13	Low
Animal accommodation, breeding and vets	11.5	1	11.5	Low