Surrey Fire and Rescue Service: Evaluative review of the community risk management.
Commissioned by Surrey Fire and Rescue Service, completed by Nottingham Trent University.

9

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Contents

Contents

Summary of the review process

Surrey Fire and Rescue Service (SFRS) identified a need for an external third party to review their Community Risk Management process and develop a short report outlining key findings. Specifically, they wanted the report to be an accessible, focused review of their processes ahead of public consultation scheduled for 2024. This has been undertaken by Nottingham Trent University with the outputs including this report and a short video explaining a summary of key findings created as part of this project.

Surrey Fire and Rescue Service identified five areas of activity to quality assure and review. These are whether:

1. the data sets used in the process are appropriate and how they have been used.

2. the outputs of community risk profiles are justified from the evidence gathered.

3. the proposed Community Risk Management Plans have been developed using the evidence available, and how these used the datasets and community risk profiles to inform their basis.

4. the planned process of public consultation is appropriate, specifically how the public are engaged, the inclusivity and reach of the proposed plans and how these consultations will include the outputs from the datasets and community risk profiles to inform and scaffold the public feedback of public consultation.

5. the proposals in public consultation met the risks identified through the process shaped by the outputs from the data sets and community risk profiles.

Dr James Hunter completed steps 1 and 2, Professor Rowena Hill completed step 3 and Rich Pickford completed step 4. All three NTU staff members completed step 5 and co-authored this report and the summary video.

The corresponding author for the report is Professor Rowena Hill.

9

Page 277

9

Datasets and documents included in the review

To undertake this review, we have examined both publicly available documents and SFRS analytical process documents. These have included documents in four broad clusters:

1. Documents relating to the methodology used throughout the process

- Working assumptions of the approach (including principles, strategic aims of the process, and ethical approach).
- The process of staff inclusion in the process (including analysis of staff consultation survey).
- Modelling assumptions undertaken with the data sets and the process by which that modelling was completed.
- Surrey incident data used in the analysis.
- Analysis of the risk context and headlines.
- Datasets included in the analysis of the numerical risk assessment (taken from the Surrey FRS Community Risk Profile 2023):
    - Home Office: detailed analysis of fires attended by FRS England 21/22.
    - 2011 Census.
    - 2021 Census.
    - Mosaic data.
    - SFRS incident data (Vision).
    - SFRS Fire Investigation reports.
    - Institute of Public Care: projecting older people population information.
    - Institute of Public Care: projecting adult needs and service information.
    - Public health data: local tobacco control profiles.
    - Home Office: Fire and rescue incident level dataset England dwelling fires.
    - Office for National Statistics Opinion and Lifestyle Survey.
    - Index of Multiple Deprivation 2019.
    - Experian data.
    - NHS Exeter data.
    - Oxygen data.
    - Home Office: Fire and rescue incident level dataset England dwelling fires.
    - Data Police UK.
    - Department for Transport.
    - Surrey Safer Roads Partnership.
    - Surrey County Council's Road Safety Team.
    - Road Safety Statistics: STATS19.
    - Home Office Fire Statistics data tables.

9

- ° Statista.
- ° SCC countryside site parking data: Environment, Transportation and Infrastructure.
- ° Environment Agency flood zone maps.
- ° National Water Safety Forum: Water Incident Database.
- ° Companies House.
- ° High-rise premises SFRS data.
- ° High-rise NFCC data.
- ° Historic England.
- ° Department for Energy Security and Net Zero: Renewable Energy Planning Database.
- ° Paul Christensen, Newcastle University data, NFCC.
- ° EV Fire Safe website.
- ° Department for Energy Security and Net Zero: Heat Networks Planning Database: April 2023.
- ° Government National Security and Risk Assessment Register.
- ° The Surrey Local Resilience Forum.
- ° Surrey Local Resilience Forum Community Risk Register.
- ° SCC land planning and development department.
- ° Surrey 2050 Place Ambition.
- ° Surrey Development Forum.

- Surrey Index Model – identifying risks at Surrey County Council level (46 selected indicators to look at priorities aligned to the Community Vision 2030) includes:
  - ° Anti-social behaviour – 20-21 Police UK.
  - ° Claiming out of work Benefits (Benefit combinations includes SDA, CA, PC, CA, UC, JSA, ESA, IB) – August
  - ° Disability benefit (DLA) – August 20 Department for Work and Pensions.
  - ° Households in poverty – 2013/2014 Office for National Statistics.
  - ° Housing Benefit – November 2020 – Department for Work and Pensions.
  - ° Learning Disabilities prevalence – 2017/2018 House of Commons Library – NHS digital.
  - ° Overcrowded housing – Census 2011.
  - ° Pensioner living alone – Census 2011.
  - ° Pensioners in poverty (Pension Credit) – August 20 – Department for Work and Pensions.
  - ° People with mental health issues – August 20 – Department for Work and Pensions (IB).
  - ° Population aged 65+ 2019 – Office for National Statistics.
  - ° Percentage of children in poverty (after housing costs).
  - ° Social rented housing – Census 2011.
  - ° Total crime offences – 20-21 Police UK.
  - ° Unemployment benefit – Department for Work and Pensions.
  - ° Universal Credit.
  - ° Violent crime and sexual offences – 20-21 Police UK.

Page 280

- - Working age benefit claimants (benefit combinations).
  - Workless through sickness benefit (IB, ESA).
- Met Office UK Climate Projections: climate analysis tool that forms part of the Met Office Hadley

2. Documents relating to the outputs of the community risk profiles

- Mapping of resources over time.
- Geographical plots of specific risks over time.
- Community risk profiles.

3. Documents relating to the development of the community risk management plan proposals

- Modelling of proposed risk management plans.
- Assumptions and principles used to develop the plans from the risk profiles.
- Centre Climate Programme.
- Datasets used in the planning assumptions.
- Temporal and spatial analysis of integrated data.
- Overall summary conclusions of the analysis undertaken.
- Internal presentations outlining decision making regarding the community risk profiles.

4. Documents relating to the development of the community engagement proposals

- Community Risk Management Plan engagement overview.
- Analysis of the community survey (pre-analysis, data gathering, rather than consultation post-profile and plan development).
- SLT meeting minutes related to the CRMP.

9

Page 281

Evaluation of Surrey Fire and Rescue Service community risk profiling

This part of the review examines the development of the Surrey Fire and Rescue Service (SFRS) Community Risk Profile (CRP) 2023 including the data used, the application of the National Fire Chiefs Council/Operational Research in Health Limited Model (NFCCORH) National Risk Methodology approach, and the analysis undertaken to identify the scale, spatial distribution, and drivers of demands for service across the county. The narrative presented here is divided into two separate components.

Firstly, a review of the development and appropriateness of the CRP 2023 is provided to determine its' fitness for purpose. The second part of the discussion then sets out several areas for SFRS to consider in relation to aspects of the data employed and the analysis undertaken that might further enhance the evidence base currently provided by the CRP 2023.

Community Risk Profile 2023: Fitness for purpose

The CRP is designed to provide an annual assessment of the calls for service demand that SFRS is likely to face based on the fire, flood, and road traffic collisions risk profile across Surrey as a whole, and within specific localities. The CRP has been developed using two specific approaches to the realisation of a people/places/premises/products risk framework based on: (a) the spatial and temporal analysis of fire, floods, and road traffic collisions data and trends across different time periods; and (b) an analysis of specific potential drivers of calls for demand based on an interrogation of the local risk profile of different localities within Surrey utilising the significant risk factors identified within the NFCCORH national model.

The application of the NFCCORH approach is currently undertaken at a neighbourhood level (lower super output area), but SFRS have indicated that they are exploring the development of a micro-level risk profile at the property level (the NFCCORH Unique Property Reference Number [UPRN] Model).

Our overall view is that the CRP delivers a high-quality evidence base that can be effectively used, both to shape long-term strategic thinking and planning, and to suitably inform operational resource allocation and management to provide an appropriate response to the concentrated fire, flood and road traffic collision risks faced by SFRS within specific parts of their jurisdictional area. More specifically, the CRP is underpinned by the appropriate use of:

- up to date official national and local data sources, alongside the integration of specific bespoke datasets such as the National Risk Register, Surrey Local Resilience Forum Community Risk Register, and the Surrey Index Model to inform the overall understanding of SFRS in terms of scale and dimensions of risk they face across the county. This approach not only enables SFRS to assess the volume and location of the service-specific risks they are required to respond to, but also enables them to see how reducing the fire, flood, and road traffic collisions incidents (and the drivers of these incidents) contributes to the attainment of wider societal outcomes and policy goals embedded within the Community Vision for Surrey in 2030.

- an appropriate robust level of analysis that identifies significant trends and relationships relating to the scale, spatial distribution, temporal patterns of all the relevant types of incidents (and the drivers of these) that make-up the overall calls for service faced by SFRS. This analysis is broken down to consider (a) specific types of demand (e.g. accidental fires, deliberate fires, road traffic collisions, flooding incidents, etc.) and (b) specific types of drivers of call for services (e.g. neighbourhoods with an over-representation of households with greater fire risk characteristics, deprivation levels, age/size/function of premises, road traffic volumes, car parking and tourist hot spots, etc.).

- an analytical perspective that draws on historical incident trends to derive estimates of current risk levels faced by SFRS, whilst seeking to realise a long-term assessment of the

changing risk profile of the county. These may arise from changes in the demographic profile of the local population (e.g. through an analysis of immigration levels), increases in the number of households with greater fire risk profiles, meteorological projection around precipitation levels, and new developments in the growth and changing function of specific localities within Surrey that will alter the scale and concentration of call for service faced by SFRS in the future.

Community Risk Profile 2023: Areas for consideration

This component of the CRP review explores additional data sources and types of analysis that SFRS might wish to consider as potential ways for further enhancing their risk profile evidence base. It is important that these suggestions are not seen as criticisms of the current robust risk profile methodology adopted by SFRS. They are merely a series of suggestions designed to bring new insights into the nature of fire risk hotspots and the drivers of fire, flood, and road traffic incidents. Furthermore, the evaluation undertaken by the review team is based on the documentation provided, and conversations with members of SFRS. The CRP 2023 will clearly draw on pieces of data and analysis that do not feature within the final public facing version of this document. It may well therefore be the case that some of the suggestions that appear below have already been implemented by the SFRS analysts in constructing the CRP.

Additional data and data sources

The existing CRP 2023 draws on an appropriate set of official national and local data sources. The datasets employed are the latest available for the respective separate indicators of risk incorporated into the modelling and analysis that informs the construction of the risk profile. There is a clear acknowledgment that the modelling and analysis will have to be re-run to take account of the latest available Census 2021 data at the neighbourhood level since the NFCCOHR, Surrey Local Resilience Forum Community Risk Register, and the Surrey Index Model draw heavily on the decennial Census as a data source. Implicit in the need to update the existing analysis that underpins the CRP is an assumption that the spatial distribution of incidents and drivers will need to be mapped and modelled using the lower super output area (LSOA) boundaries for 2021.

Although in many instances the 2011 and 2021 LSOA boundaries remain the same, there are likely to be several additional statistical neighbourhoods created by the merging of existing 2011 LSOAs, and the creation of new 2021 LSOAs to take account of population changes (as well as the discontinuation of some existing 2011 LSOA neighbourhoods).

Three areas where the SFRS analytical team might consider drawing on additional data sources (and hence expand the existing analytical framework) are:

- Neighbourhood types and area classifications
- Space Syntax
- Points of interest

Neighbourhood types and area classifications

The function of individual neighbourhoods shapes the type of people living within these areas, the economic and social activities that take place, the daily inflow and outflow of individuals, the scale and types of deprivation that are present, and levels of social cohesion and community engagement. There is an extensive literature that has already identified the impact of place-based characteristics (structural [physical environment, buildings], infrastructural [roads, streetscape], neighbourhood stigma [social class, housing type and tenure], public services [quality and cost], environmental [topographical, pollution], proximity to other neighbourhoods and services [transport links], ability to influence local decision-making [political networks and political engagement], support networks [presence of family and social networks], competition for

scarce resources and initiatives, neighbourhood connection and expectations on educational outcomes, unemployment, health and disability, access to housing, and crime victimisation and offending.) These different types of neighbourhood effects compound the advantages or disadvantages experienced by individuals based on their physical and ascribed characteristics, circumstances, and lifestyles. Whilst the application of neighbourhood effects to an analysis of fire risk is at a more fledgling stage (see Beaulieu et al, 2019 for a notable exception), the ideas underpinning this approach clearly have some applicability in understanding the drivers of the spatial distribution of fire, flood and road traffic collision incidents (and certain aspects e.g., physical buildings are already incorporated into the NFCCOHR national model).

Whilst it is possible to use data to measure specific types of potential neighbourhood effect, a composite approach to capturing
neighbourhood function and characteristics can be achieved by using area classifications. These classify different neighbourhoods across the country into a number of different area types based on using multiple socio-economic indicators and cluster analysis to identify localities that are similar to one another. Examples of different types of free open- source area classifications available to SFRS include:

- the ONS area classifications (which are based on socio-economic characteristics and are available at a local authority, lower super output area, and output area level)

- the Spatial Signatures (available at lower super output area and output area level) and Urban Morphology (available at output area) area classifications developed by the Consumer Data Research Centre (CDRC)

These latter classifications take into account the function and built environment of neighbourhoods as well as socio-economic characteristics. An analysis of the spatial concentration of accidental and deliberate fires, flooding, road traffic collisions, and household types that are strongly related to higher levels of risk might:

- reveal some important links between risk and prevalence of different types of incident

- provide a ready-made classification of different types of priority neighbourhoods that can be used in planning and resourcing responses to calls for service

Space Syntax

Within the existing CRP 2023, there are elements of analysis which seek to explore, for example, the impact of traffic flows on the prevalence of road traffic collisions, or the number of visits to certain locations and the spatial distribution of wildfire hot spots. More generally, different levels of pedestrian and traffic movement that create (or reduce) the opportunity structures that shape the likelihood of fire incidents or road traffic collisions – as well as the presence or absence of social guardianship that might create the potential for perpetrators to desist from engaging in arson – may be a potential useful additional piece of analysis to undertake in order to explore the drivers of calls for service. One approach to measuring pedestrian and traffic movement at the street level is Space Syntax, which is based on analysing the connectivity levels of each specific street segment to other parts of the road network. This methodology enables the identification of 'hot' and 'cold' street segments, and was developed by researchers at UCL who have now provided free access to the Space Syntax pedestrian and traffic movement scores for streets segments across the United Kingdom.

Points of Interest

The opportunity structures that shape the risk of fire incidents are likely to reflect a combination of risky facilities, risky places, and population movement. The scale of the latter is likely to be influenced by the presence of specific facilities and spaces that either attract or repel people from specific locations. The Ordnance Survey's Points of Interest data set enables the user to access the geocoded location of every type of facility (e.g. bars, pubs, restaurants, fast food outlets, schools, hospitals, transport hubs, etc.) and space (e.g. sports grounds, parks, open green spaces,

Page 284

cemeteries, etc.) within every local authority area. This POI data has already been employed to measure the impact of crime generators (which attract potential victims) and crime attractors (which attract potential offenders) on the spatial concentration of crime hot spots within specific street segments and neighbourhoods. Using this data to undertake an analysis of spatial patterns of deliberate fires may provide additional clues as to the presence or absence of risky facilities and places within certain neighbourhoods both in relation to the identification of the drivers of greater levels of fire risk, as well as the means of identifying which neighbourhoods and communities would benefit from targeted fire risk and prevention advice and initiatives.

Using additional denominators

Throughout the CRP, population and property denominators have been employed to transform the raw data into, for example, rates of fire incidents per 10,000 population to control for the different number of individuals living within different localities across Surrey. This is an appropriate strategy where the incident (or driver of these incidents) has a clear 'population' connection and individuals or households is the appropriate denominator to employ. There are a number of elements included within the analysis presented in the CRP, where the deployment of an alternative denominator might prove beneficial. For example, in the analysis of the spatial distribution of road traffic collisions across the county, transforming the raw data into the number of these type of incidents per street segment, or specific types of street segment, might reveal a slightly different geographical distribution of this problem. For example, the analysis of road traffic collision hot spots clearly identifies the prevalence of the main hot spots within the northern part of the county.

This, however, is an 'expected' finding given the proliferation of major highways within this part of Surrey as opposed to further south in the county. Expressing road traffic collisions per number of vehicles using specific highways or roads, or per traffic journeys being made on each route, might serve to highlight locations where the volume of traffic may not be the sole driver of greater number of road traffic collisions. The creation of this type of measure may also aid the identification of locations where specific roads are generating an over-represented number of road traffic collisions relative to the volume of traffic using these routes (and hence the requirement for traffic management or speed restriction initiatives which are not solely focused on high traffic volumes).

Alternatively, using location quotients as a form of measure that identifies the relative share of total road traffic collisions across Surrey found on each street segment relative to the share of total vehicle journeys made within Surrey on the same street segment, may aid the identification of alternative types of risky roads that is not driven simply by the volume to traffic. Roads (or road segments) with a location quotient score greater than one would indicate that the number of road traffic collisions is over-represented relative to the number of vehicle journeys being made. This would identify parts of the road network which might merit some form of intervention which would not form a priority area for action if the road traffic collision hot spots are being simply defined based on the volume (rather than the over- or under-representation) of incidents.

In a similar fashion, the analysis of the spatial distribution of wildfire incidents that appears later on within the CRP correctly explores the relationship between their prevalence and the number of tourists, or the availability of car parks (which act as a tourist generator).

Analysing the spatial distribution of wildfire hot spots based on the number of incidents per 1000 tourists or vehicles using a specific car park may add an additional level of insight into the locations generating higher levels of call for service.

Implementation of the NFCCOHR national model to create the Surrey-level risk profile

As we would expect, the development of a Surrey-level fire, floods and road traffic collisions risk model, and the specific drivers of risk within the county, draws heavily on the NFCCOHR national risk model. This model represents the currently definitive holistic analysis of the drivers of risk and was commissioned specifically by the NFCC to provide a

9

good benchmark comparator model that could be employed by
individual FRS to generate local versions of the national risk model across neighbourhoods or properties within their jurisdiction.

There are two considerations with the adoption of the NFCCOHR model to identify the scale and location of fire risk across Surrey that should be noted:
risk factors may not universally apply in the Surrey context (i.e. factors which shape the spatial distribution of fire incidents at an all-England level because they encompass every different type of locality found across the country do not constitute an important factor within Surrey
the relative importance of these national level risk factors may not reflect the weighting that should be attached to specific risk factors based on a Surrey-level form of modelling and analysis (i.e. households containing members aged 65 plus may not shape the level of accidental fire risk within a specific local context to the same degree as they do nationally).

The first of these issues is partially acknowledged already within the CRP by the commentary that identifies that the risk factors identified within the NFCCOHR model are heavily driven by different aspects of deprivation levels – and that deprivation levels are in reality much lower within many areas of Surrey. This appears to raise the idea that the Surrey version of the NFCCOHR model may over-emphasise the importance of deprivation as a risk factor. If the number of accidental or deliberate fire incidents is lower within Surrey compared to other FRS areas, then this may well be explained by the relative greater levels of affluence within many parts of the county. However, it is possible that if the number of fire incidents is not significantly lower in the Surrey FRS area, then the absence of high levels of deprivation may point to a different set of factors that are shaping the scale or spatial concentration of fire incidents.

9

Secondly, there may be factors which are unique to Surrey which are not included in the NFCCOHR methodological approach because these factors are not present within a sufficient number of neighbourhoods and properties within other FRS areas across England – but which might be important factors that need to be included within the Surrey version of the national model. Running a Surrey only level analysis of the spatial distribution of fire incidents may not only identify a different set of risk factors but may also expose findings that suggest that the relative weightings attached to specific risk factors based on the national model may over- or under-emphasise the relative importance of these same risk factors at the local level across the different neighbourhoods that make up the county. Surrey FRS should therefore undertake a Surrey version of the analysis to enable a check of the relevance and applicability of the risk findings and weightings identified within the national model to determine the degree of congruence between the national and Surrey-only sets of findings.

Drivers of fire, flood, and road traffic collision incidents

The analysis of risk presented with the CRP appropriately draws heavily on the risk factors identified within the NFCCOHR national model. There are, however, a couple of areas where the analysis presented within the CRP requires some clarification, or the adoption of a slightly different approach. Firstly, the CRP correctly explores future calls for service scenarios by examining the impact of population change arising from immigration levels. It is possible, however, that changes in the level of risk might also be shaped by natural population changes, and internal migration from within and beyond Surrey. The current focus on immigration is relevant in the context of additional demands being faced by SFRS in relation to
community engagement, language barriers, and other related issues.

The narrative here, however, also appears to imply (but does not demonstrate with the provision of any evidence) that the scale of fire risk will increase as a result of immigration because of the presence of greater numbers of households with fire risk characteristics amongst certain ethnic minority groups compared with the indigenous population. It would be useful to: present some evidence on the distribution of these types of at- risk households across different ethnic groups, and to identify that immigration is primarily drawing new arrivals into the county from these same ethnic groups, in order to justify the focus on immigration; and break down and reframe the analysis

Page 286

around population turnover that includes natural population change and internal migration, rather than simply immigration to enrich and strength the evidence-base around this specific factor.

In exploring the geographical pattern of deliberate fires in Surrey, the relationship between these types of incident and street crime levels have been analysed within the CRP. In this context, it may be worth considering that the location of crime hot spots varies by different offence types (i.e. high crime areas do not necessarily contain high levels of each type of crime) – and therefore focusing on a specific crime type might be more appropriate than focusing on the overall level of crime.

Furthermore, and to strengthen this argument, an examination of the offender population would quickly reveal that most offenders appear within the criminal justice system for one or two rather than multiple offence types. Burglars may also be shop theft offenders, but they are not the same cohort of offenders that commit violent or sexual offences. By way of example within a fire context and building on data in the version of the CRP shared with the review team, further analysis of the distinctive characteristics of arson offenders and identifying the concentration of individuals with these specific profiles within neighbourhoods may be a more effective way of predicting potential arson hot spots (alongside the use of arson incidents) than simply utilising the volume of total crime incidents at the street level.

Types of analysis undertaken

The final issue explored within this component of the CRP review concerns the type of analysis undertaken and presented within the Surrey risk profile. The discussion presented here focuses on both the type of hot spot analysis undertaken, and the identification of specific factors that shape the risk profile of specific localities across the county.

Identifying alternative types of risk/incident hot spots

Much of the analysis presented in the CRP focuses on the identification of hot spots based on an analysis of the concentration of the volume of incidents. There is a clear operational rationale, alongside meeting public expectations concerning the disproportionate allocation of resources within certain parts of the county, for concentrating on the volume of incidents across neighbourhoods. The discussion above has, however, already suggested the need to consider identifying hot spots in areas where there is an over-representation of types of incidents e.g., road traffic collisions to identify potential priority areas when the yardstick being employed is based on volume of incidents.

A third approach to hot spot mapping involves the identification of neighbourhoods which 'buck the trend' in terms of the levels of incidents occurring within them relative to the number of incidents taking place within immediately surrounding localities. This builds on the idea of Tobler's first law of geography that promulgates the observation that localities which are closer to one another are more similar than localities that are farther apart. This would lead us to expect neighbouring localities to have similar fire risk and fire incident profiles to the areas immediately around them. Undertaking a Moran's I spatial autocorrelation analysis enables the identification of neighbourhoods whose profile either matches or does not match that of their neighbours - and thus confirms or refutes our expectations.

Neighbourhoods with high risk/incident profiles surrounded by neighbourhoods with equally high risk/incident profiles – or neighbourhoods with low risk/incident profiles surrounded by neighbourhoods with equally low risk/incident profiles would confirm our expectations. However, this type of analysis will also reveal neighbourhoods whose profile bucks the prevailing trend within the localities which they border. This can be in terms of the number of fire incidents being much smaller than in surrounding areas (raising the question, what is it about this locality that is suppressing the expected number of fire incidents?) – or situations in which the number of fire incidents being higher than surrounding neighbourhoods (raising the question, what are the opportunity structures within this
neighbourhood that are resulting in a greater number of fire incidents than expected?).

Page 287

Identifying the spatial concentration of fire incidents

The current focus on the identification and analysis of fire incident (and risk) hot spots within the CRP directly identifies the presence of hot spots within certain areas of the county. The CRP, however, does not appear to undertake any evaluation of how concentrated these hot spots are, and whether the scale of concentration and the location of hot spots changes over time. Within the analysis of crime hot spots, studies evaluating the law of crime concentration have consistently identified that between 2-6 per cent of street segments, or neighbourhoods, account for around fifty per cent of crime incidents – and that this scale of concentration remains consistent over time in terms of both scale and location. Identifying the spatial concentration of fire incident hot spots would therefore raise a similar possibility for the optimal deployment of limited resources within a small proportion of locations. By comparing the share of fire incidents in each street segment (or neighbourhood) with the share of total street segments (or neighbourhoods) that each represents, it is possible to arrive at a single quantitative indicator (in the form of a Gini Coefficient score) that captures whether fire incidents are evenly distributed (a Gini Coefficient score closer to zero) or concentrated within a few locations (a Gini Coefficient score closer to one). An explanation of the law of crime concentration, and how to undertake a Gini Coefficient based analysis of the spatial concentration of crime incidents is provided by Bernasco and Steenbeek (2016). The methodology outlined here could easily be applied to the spatial concentration of fire incidents.

A baseline approach to identifying specific risk characteristics

The NFCCOHR national model enables the user to identify specific risk factors that increase the potential for fire, flooding, or road traffic collision incidents to concentrate within certain localities. A complimentary approach to use that could identify those localities that might require a greater level of resources being devoted to higher levels of call for service is to employ a baseline model. This would involve initially identifying either the population or neighbourhood characteristics of those households or areas that experience no, or the fewest, number of incidents. These household or neighbourhood types can then be used as a baseline against. This would identify the types of households or areas that experience much higher numbers of incidents relative to the baseline group. This enables the identification of the relative prevalence of incidents across different household and neighbourhood types, and hence the concentration of fire risk and incidents within specific population groups or neighbourhoods. This type of analysis might provide additional insights in situations where the incident trends are increasing or decreasing and requires the need to explore whether this increase or decrease is uniformly distributed across all household or neighbourhood types. If it can be identified that specific households or neighbourhoods are the location for the greater concentration of incidents (whilst the overall trend for incidents is downwards), then this creates the potential for a limited pool of resources and initiatives to be concentrated in locations where they are most needed.

Testing the usefulness of the Surrey version of the national NFCCOHR model

The CRP identifies both risk and incident hot spots across the county within the CRP. To develop this further, giving consideration to theneed to undertake analysis which compares the predicted fire hot spots against the subsequent actual location of fire incidents

a) to test the validity of the Surrey CRP; and

b) as a risk understanding/fire reduction learning mechanism where the number of actual fires is greater or lower than predicted – and the questions this raises about why the gap between predicted and actual fire levels exist, could offer further understanding.

Although the methodological approach employed to generate the NFCCOHR uses real incident and location data to train the model to secure the best explanatory fit that can identify the significant risk factors, from a fire reduction or resource allocation perspective, the efficacy of the local Surrey risk model in accurately predicting the location and drivers of risk needs to be regularly tested. This enables not only the suitability of this model as the basis for shaping strategic thinking and operational deployment of resources but can also act as a mechanism for identifying the emergence of underlying changes in the funct profile of specific neighbourhoods across

Surrey. This could result in an increasing gap between the predicted and actual location of fire, flooding, and road traffic collision incidents.

9

Community Risk Management Plans

Given that we have accepted that the datasets, the assumptions with which they were treated with, and the profiles generated from the datasets are a sound approach, the next step is to review how these have informed the development of the risk management plans. This shall now be considered.

Given that the multiple stages of information aggregation and data analysis is generated and integrated across a number of datasets and sources, the challenge frequently becomes how to track and include the information without loss of nuance and granularity of meaning when producing the profiles. Having reviewed the process through the stages of development, there is no evidence of information loss between the stages of the process. The analysis at each stage has clear audit trails from the assumption/findings, back to the source information. Where findings have been synthesised or aggregated together, this has been completed in a rational, logical and coherent manner following typical conventions and methods to do so with transparency. This is to be commended.

As described in the sections above in this report, the review of the data used, the analysis of that data, the integration of the findings, and subsequent profiles, are robustly evidenced and have been completed according to conventional methods and well recognised approaches. The NFCC approach has been included within the wider Surrey approach, which is an important step to establish national consistency and sector learning. We commend the way in which the datasets have been used to establish the profiles, the way in which the aims have been used to create a shared, consistent, transparent and explicit decision making and policy application approach, and, the inclusion of the NFCC approach.

Organisational wide, core work within public services needs to be inclusive, transparent and accessible to the staff, the public, and those to who the service is accountable to. It is quite rare in these processes to be able to access so clearly the strategic aims and ambitions that the process is designed to achieve within the context of Surrey, not only at the initial stage, but also clearly shaping the work throughout. Through the process it was clear these strategic aims were active and used to shape and refine the content. The aims were clearly defined, specific to the organisation, and referenced the wider county objectives, and were also contained, referenced and embedded explicitly and consistently throughout the process. This is to be commended.

Throughout the documents, process and public facing documents, there is reference to the strategic aims, but also the wider application to the work, responsibilities and partnerships with, and collective efforts of, other local public service strategic priorities (e.g. council) and other risk workings (e.g. LRF work). This means residents should be assured that the profiles sit complimentary to the Surrey public service and partners context. This also ensures that the strategic objectives of partners, and what the partnership working means for the public of Surrey is contained within the Surrey FRS approach. The explicit comparison and integration of these wider contexts within this process demonstrates that the team are working in a principled and ethical way, not just delineating the process in the areas of their statutory obligations, but by considering how public needs can be recognised by the Surrey CRP process. We commend this approach.

Page 290

Lastly, we would like to reiterate that the suggestions in the section above are simply made to further develop or enhance the already strong approach taken by Surrey FRS. The approach undertaken is to be commended and we see no issues with this full and comprehensive approach of developing data to risk profiles.

9

Page 291

Planned process of public consultation

Due to the planned consultation process for the Community Risk Profile falling outside of the widow this review period undertaken by NTU we have been unable to review the consultation process. Despite this we have engaged with staff designing the process and discussed their developing approach which is being developed alongside the Consultation Institute to gain certification on leading practice for designing and delivering consultations with stakeholders. We did not see evidence of this certification as the application process was underway during the review but are assured by the plan to undertake certification through a formal process as long as learning is embedded and shared across the service for key stakeholders.

We note that the consultation on the CRMP is due to run for 12 weeks across Surrey in May dependant on local and national election purdah timelines which are being planned for with a primary and secondary consultation period being considered. At the time of writing this report, a timeline and key stakeholder list was in development that was focused on creating a flexible and organic system to draw a broad and deep response from those the Community Risk Profile would impact on. The review team feels this is an appropriate and robust process.

Community Survey Review

In preparation for the review the team were able to access the Surrey Fire and Rescue Community Survey Full Report which was published in April 2023 that was used to inform the development of the CRMP and to gain an early insight into what really matters to residents and the risks that residents can identify in their area. The report is clear and articulates a valuable approach to seek feedback from residents. Whilst the response rate was not high. 0.08% of residents, based on current census population data, provided a broad and evenly distributed return from residents across Surrey. We noted that social media had been used to engage diverse groups online but did not see any specific focus on groups Surrey Fire and Rescue may consider as more prone to require their services. We would also recommend consideration of groups that are often described as hard to engage either due to language, health access or distrust with formal organisations beyond the focus on younger people. The review team noted that if resources had allowed a wider dissemination strategy across online platforms, local radio and television may also have boosted the response rate. It was noted in the survey report that accessibility had been considered with the use of an easy reader system. We would also hope that future consultations use this system and consider the option for translations of the survey to be available to residents who would prefer to share feedback in a language that is not English.

Within the report the review team also noted that some questions shared in the report such as *How confident are you in Surrey FRSs ability to deliver response work?* were weighted with more positive response options and without a neither agree or disagree option available to residents. We recognise advice was sought by an internal team when constructing the questionnaire and in the future we would suggest the use of a more balanced response options to this type of question set for the consultation to enhance confidence in the results.

We also noted that the report contained no conclusions or recommendations within it. This reduced our ability to review lessons and next steps for how this survey would impact on the

development of the CRMP. The separation of actions and findings is often deliberate to allow decision makers to use findings to formulate actions within a linked process as we have noted through minutes of meetings.

Community Engagement Conclusions

Despite the timetable restricting the review team's ability to formally review documentation of the process for consultation it appears that robust and structured plans are in place to undertake the consultation for the CRMP by Surrey FRS. Our review of meeting minutes and the community survey from 2023 highlights a clear process and stakeholder buy-in for these key aspects of the CRMP. We hope the suggested areas to consider from the community survey can be considered for the public consultation when it is made live in 2024.

9

Page 294

Review conclusions

The review team believes that Surrey FRS has undertaken a robust process to develop the CRMP for Surrey following our engagement with staff and our review of shared documentation. A selection of suggestions has been shared across each aspect of the review process which the team may wish to reflect on as they move forward in future iterations, but we are assured that the process undertaken has not only reflected the requirements of the CRP but also goes further to ensure it fits within the wider strategic objectives of Surrey FRS and partners for Surrey.

The fact Surrey FRS have undertaken to quality assure this process should be commended as it reiterates their attempts to be inclusive, transparent and accessible to the staff, the public, and those to who the service is accountable to as a service.

9 We hope the CRP is a valuable tool for Surrey FRS now and in the future as it continues to mitigate and tackle risks and incidents for the people and organisations of Surrey.

About the authors

Professor Rowena Hill

Rowena Hill is Professor of Resilience, Emergencies and Disaster Science with over 20 years researching alongside the UK emergency and resilience structures. Her research focus is on collective resilience, wellbeing and risk. She has successfully delivered previous projects with the NFCC such as the national risk methodologies work, wellbeing national project, projects supporting transition into retirement, and projects exploring death by suicide in the fire and rescue service. She has also worked with and NPCC, namely as the embedded scientist of the C19 National Foresight Group for the Civil Contingencies portfolio and the embedded scientist for the Climate Change portfolio. She is the chair of the National Fire Chiefs Council Academic Collaboration, Evaluation and Research Group, sat on the NFCC Definition of Risk Board, the Health and Wellbeing Board, the Academic Reference Group for HMICFRS, and is the National Honorary Research Lead for the Fire Fighters Charity. She recently undertook a part time secondment to the Department of Levelling Up Housing and Communities.

Dr James Hunter

James Hunter leads the Quantitative and Spatial Criminology Research Group, is Co-Director of the Work, Informalisation, and Place Research Centre and a member of the Centre for Offending, Prevention and Engagement (COPE). James's research interests concern understanding crime victimisation risk and inequalities and how we can use this knowledge to shape crime reduction interventions. He recently completed a project examining whether visible burglar alarms increase victimisation risk which was commissioned by the Home Office. He also designed the predicted burglary neighbourhood maps that underpinned the Home Office's Safer Street Fund. The National Crime Agency used his predictive analysis to identify which hand car washes to target in a crackdown on labour exploitation, human trafficking and modern slavery as part of Operation Aidant last year. He has previously worked on the development of a Mapping Health Toolkit for the Chartered Institute for Environmental Health, which is designed to help local councils in England contribute to Joint Strategic Needs Assessments and develop public health profiles for their localities. Other recent work includes the development of the Community Engagement Area Classification (CEAC) (funded by the Home Office/College of Policing) that classifies neighbourhoods into different community engagement 'rich' and 'poor' localities to enable police forces and officers to target their community engagement initiatives more effectively. He has also built a data and decision-making resource for Essex Community Safety Partnerships to reduce instances of Violence Against Women and Girls (project MINERVA). This project has established new knowledge and policy learning with Essex colleagues on where VAWG takes place, the differences in hot spot and fear of crime locations, and the factors shaping the different streets where male and female VAWG incidents occur.

Rich Pickford

Rich is the manager of Nottingham Civic Exchange, the universities Think Tank located in the School of Social Science. The Civic Exchange facilitates the translation and exchange of academic knowledge and expertise for local, regional and national partners helping to be a civic neighbour to Nottingham communities and influence national policy. Rich also works to understand and tackle labour exploitation having led work with the National Crime Agency to utilise data and insights from our research through Operation Aidant in 2022 and through work with external partners to

understand licensing and multi-agency approaches to modern slavery. He has worked on the NFCC Health and Wellbeing project, the Fire Fighters Charity projects and also the MINERVA project to explore VAWG with Safer Essex and Essex police. Alongside NTU's Vice Chancellor he has undertaken research on higher level skills development and is engaged in debates on good work and the economic future of the region. Through the Covid-19 pandemic he worked alongside the C19 National Foresight Group with Professor Hill and also conducted an evaluation of the National Emergencies Trust's first activation. He also runs our Civic Exchange external community relationships for the university and ensures we have a voice and give voice to the communities of Nottingham in local and national policy spaces.

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