ESSEX COUNTY FIRE & RESCUE SERVICE

STRATEGIC ASSESSMENT OF RISK 2019

A SAFER ESSEX

Eighth Edition
Version 10.1
20 August 2019

Contents

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V9.3	31 August 2018	Charles Thomas	Seventh Edition
V9.4	2 October 2018	Charles Thomas	Narrative around dwellings planned for Essex, New RTC data. Tilbury greenpower added.
V10	30 June 2019	Charles Thomas	Eighth Edition. Minor changes to all chapters. Additional content in Ch 2, (Base case incident statistics), Ch 3 Demography, Ch 4 Prevention, Protection and Response, Ch5 (Road Traffic Collision update), Ch 11, (Internal Governance and Multi-Agency response in Essex).
V10.1	20 August 2019	Charles Thomas	Chapter 1 and Appendix C amended following the publication of the National Security Risk Assessment 2019. Risk numbers replaced by NSRA 2019 numbers in Appendix C.

The initial date of publication determines how up-to-date source data is. Sources publish at various times throughout a year.

THIS EDITION SERVES THE IRMP 2020 – 2024. A FULL AND FORMAL REVIEW OF THE SAOR WILL OCCUR IN EARLY 2024 AS A PRELUDE TO THE NEXT IRMP, 2024 – 2028.

DATA ADJUSTMENTS TO THE SAOR WILL OCCUR WHEN STATISTICAL DATASETS AS LISTED ABOVE BECOME AVAILABLE FROM GOVERNMENT DEPARTMENTS/AGENCIES.

EXECUTIVE SUMMARY

This is the eighth edition of the Strategic Assessment of Risk, (SAOR). It furthers the requirement to ensure that risk management is driving the decision making process for Essex County Fire & Rescue Service, (ECFRS), at all levels. This document makes a primary contribution to the Integrated Risk Management Plan (IRMP) for ECFRS.

The Introduction identifies the main legislation under which Fire Authorities and Fire & Rescue Services operate. This includes reference to the Fire & Rescue national framework for England.

Chapter 1 introduces Risk in general. It refers to National Risk Register, and subordinate Risk Registers, including the Essex Resilience Forum, (ERF), Community Risk Register, (CRR), and the SAOR, (this document), and provides an overview of the Political, Economic, Social, Technological, Legislative and Environmental, (PESTLE), issues to consider. Chapter 1 underpins the integrated risk management planning process.

Chapter 2 focuses on some general statistics to put ECFRS operational response into context. This includes "weight of attack" statistics to support greater understanding of turnouts, and incident types.

Chapter 3 looks at Demography. This includes a brief Essex[1] profile. The chapter also looks at new housing projections, density, and population aging. Housing numbers present a significant increase between 2033 and 2037. Combine this data with Exeter data for more value.

Chapter 4 covers Prevention and Protection; that is Service involvement in wider societal matters around people, vulnerabilities and criminal activity.

Chapter 5 covers the Land, Sea and Air Transport Infrastructure in Essex. There is an emphasis on the impact of road traffic collisions (RTC). The Service has a significant part to play in RTC reduction and in particular those involving young people. The Department for Transport places an average value on the prevention of one fatal accident at just over £2m and a serious injury at £237,527, (all roads) (2017 statistics).

Chapter 6 relates to industrial and other infrastructure, and to incidents that may require a significant ECFRS attendance involving gas, petrochemicals or Chemical, Biological, Radiological Nuclear, (CBRN) or an event under the Radiation (Emergency Preparedness and Public Information) Regulations 2001, (REPPIR).

Chapter 7 considers the Environment and in particular our relationship with water. Essex is the driest County in the UK. The chapter includes an outline of the Essex river systems. The Service must consider the environmental impact in any response, e.g. where firewater runs off to, or the impact of a controlled burn.

Chapter 8 takes account of Human and Animal Health. Whilst not considered a high risk, Swine 'Flu' is in the very recent past. Within a generation, the UK has experienced widespread and severe Foot and Mouth disease.

Chapter 9 deals with Terrorism.

Current Threat Level		
International terrorism in the UK (1 March 2018)	Northern Ireland-related terrorism in Northern Ireland (1 March 2018)	Northern Ireland-related terrorism for Great Britain (1 March 2018)
Severe	**Severe**	**Moderate**

[1] For the purposes of this document Essex is a reference to the Administrative County of Essex, and Thurrock and Southend on Sea Unitary Authorities, and used throughout the SAOR.

SEVERE means that a terrorist attack is highly likely. **MODERATE** means that an attack is possible, but not likely.

Chapter 10 provides some context to the economic environment and health & wellbeing in Essex. It briefly describes some economic details. It provides a signpost to relevant and various reports, and refers to the South East Local Enterprise Partnership.

Chapter 11 refers to governance, collaboration, and operational matters, such as interoperability.

INTRODUCTION

This is the eighth edition of the SAOR, and the second produced under the Police, Fire and Crime Commissioner Governance arrangements.

In chronological order, the main legislative arms under which a Fire and Rescue Authority and a Service operate are:

- The Health and Safety at Work etc. Act (1974)
- Police and Criminal Evidence Act 1984
- Water Resources Act (1991)
- The Human Rights Act (1998)
- Management of Health and Safety at Work Regulations (1999)
- The Fire and Rescue Services Act 2004
- The Civil Contingencies Act 2004
- The Civil Contingencies Act 2004 (Contingency Planning) Regulations 2005
- The Regulatory Reform (Fire Safety) Order 2005
- Emergency Services (Obstruction) Act 2006
- The Fire & Rescue Services (Emergencies)(England) Order 2007
- Policing and Crime Act 2017
- Fire and Rescue Authorities Health, safety and welfare framework for the operational Environment[2]

In addition to the statutory duties under the above, under section 21 of the Fire and Rescue Services Act 2004, the Secretary of State must prepare a Fire and Rescue National Framework. [3] *The Framework:*

- *must set out priorities and objectives for fire and rescue authorities in connection with the discharge of their functions;*
- *b) may contain guidance to fire and rescue authorities in connection with the discharge of any of their functions; and*
- *c) may contain any other matter relating to fire and rescue authorities or their functions that the Secretary of State considers appropriate.*

Every fire and rescue authority must have regard to the Framework in carrying out their functions. Every authority must publish an annual statement of assurance of compliance with the Framework.

The priorities in the 2018 Framework are for fire and rescue authorities:

- *to make appropriate provision for fire* ***prevention and protection*** *activities and* ***response*** *to fire and rescue related incidents;*
- ***to identify and assess the full range of foreseeable fire and rescue related risks their areas face;***
- ***to collaborate*** *with emergency services and other local and national partners to increase the efficiency and effectiveness of the service they provide;*
- *to be accountable to communities for the service they provide; and,*
- *to develop and maintain a workforce that is professional, resilient, skilled, flexible and diverse.*

Paragraph 4.6.i of the Framework refers to the production of an Integrated Risk Management Plan, (IRMP).

[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/209362/HSFrameworkJunecombined.pdf

[3] https://www.gov.uk/government/publications/fire-and-rescue-national-framework-for-england--2?utm_source=e64fb916-2c23-40f3-920a-f1f46f357d28&utm_medium=email&utm_campaign=govuk-notifications&utm_content=immediate

*Each plan **must**:*

- *reflect up to date risk analyses including an assessment of all foreseeable fire and rescue related risks that could affect the area of the authority;*
- *demonstrate how prevention, protection and response activities will best be used to prevent fires and other incidents and mitigate the impact of identified risks on its communities, through authorities working either individually or collectively, in a way that makes best use of available resources;*
- *outline required service delivery outcomes including the allocation of resources for the mitigation of risks;*
- *set out its management strategy and risk-based programme for enforcing the provisions of the Regulatory Reform (Fire Safety) Order 2005 in accordance with the principles of better regulation set out in the Statutory Code of Compliance for Regulators, and the Enforcement Concordat;*
- *cover at least a three-year time span and be reviewed and revised as often as it is necessary to ensure that the authority is able to deliver the requirements set out in this Framework;*
- *reflect effective consultation throughout its development and at all review stages with the community, its workforce and representative bodies and partners; and*
- *be easily accessible and publicly available.*

The SAOR underpins and informs the IRMP process by identifying risks and possible mitigations (at the strategic level only) in order to assist with the identification of any gaps in capabilities and/or capacity. (New risks, *per se*, are unlikely to emerge, though scale may change.) This will lead to "closing the loop" around prevention, protection and operational response. Protection and Prevention are key parts of ECFRS's service delivery strategy. These activities seek to minimise the requirement for emergency response. The residual risk remaining after Prevention and Protection is what Response planning considers. Response is fundamentally about the optimum use of appropriately trained and led Firefighters, with the right equipment, in the right place, at the right time.

The SAOR also cross-references risks to the ERF CRR. (Refer to the Integrated Risk Management Planning risk register at **Appendix C**.)

Consideration of the Framework is throughout and specifically included in **Chapter 11.**
This SAOR provides a wider context on the challenges that ECFRS faces in Greater Essex, using the most up-to-date data available **at the time of publication**[4]**.** Data is dynamic, and any document introducing data sets will require date stamping. Recognising this is important in order to conduct annual reviews of actions recommended.

Department managers should consider the points below in relation to their use of the SAOR:

- Informing the Strategic Risk Register.
- Gap analysis and the identification of possible improvements to capabilities.
- Likely future demands or reduction in demands on the Service.
- The preparation of the IRMP.
- The preparation of operational and procedural documents.
- Better informed business-planning processes.
- Pointers for better engagement with key partners.

The SAOR draws on the requirements around the IRMP processes, including references to legislation.

[4] Data and figures become available at different times. The SAOR does not use a single date as a point of reference.

AIM

To continue the identification of the potential risks and existing issues, (e.g. population clusters, risk areas in general, and demographics), that could require fire and rescue service intervention.

(The intervention could be in the form of prevention or protection activity to reduce the likelihood of the risk materialising and as such the occasions at which a response is required. The intervention could also entail an operational response from ECFRS, either alone, or as part of multi-agency arrangements. **Concurrent incident management may also be required at a large scale.** (On 2 May 2013 an exercise at Stansted Airport, which could have been a live event given the nature of the exercise, was overlapped by an incident involving the attendance of 12 pumps and Urban Search & Rescue, (USAR), coincidentally at an industrial site approximately 13 road miles from Stansted Airport.))

OBJECTIVES

- To understand the current issues and likely future trends of demography, house building, industry, and transport infrastructure within Essex.
- To take account of the National Risk Register.
- To take account of the ERF CRR.
- To assess likely risks to which ECFRS may have to respond if prevention and protection do not work and to identify improvements in capabilities.
- To understand the potential for two Level 3 incidents occurring concurrently, which may or may not be connected, and which may involve a strategic stretch to ECFRS. (Initial response and subsequent reliefs, etc.) **(See above in AIM.)**
- To provide a platform for business and financial planning.

The schematic on **page 11** further describes the links from national to Service risk management, with highlights around Service business processes.

The text in the following chapters contains electronic links where possible and appropriate to national and local sources.

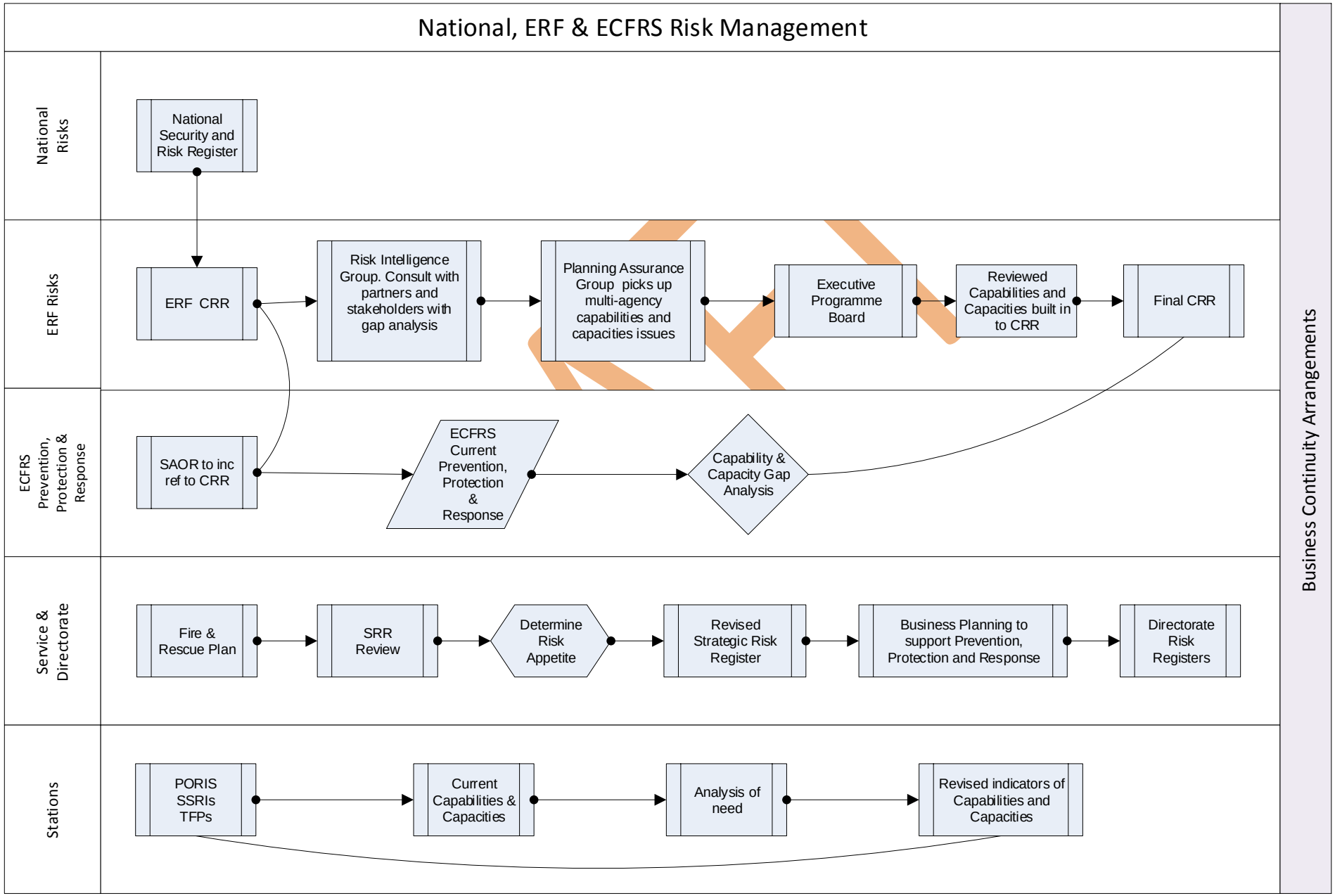
Appendix A contains narrative around the Risk Matrix, Likelihood and Consequence, (Impact).

Appendix B identifies the ECFRS Stations and Crewing Systems.

Appendix C contains the Integrated Risk Management Planning Risk Register.

Appendix D provides a full Sources and Bibliography of all the documents referred to, including electronic links.

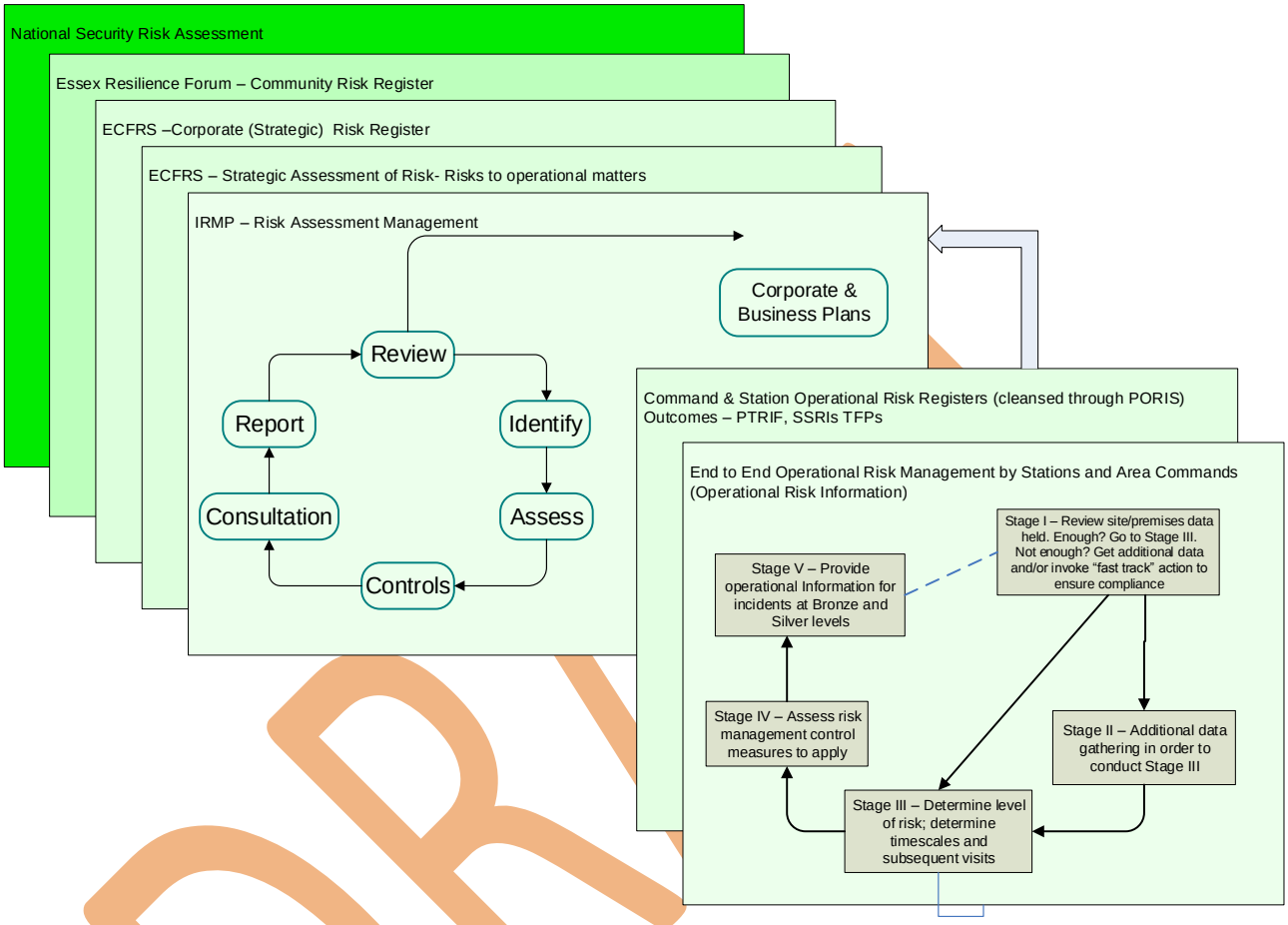
Appendix E provides a list of acronyms.


National, ERF & ECFRS Risk Management
National Risks
National Security and Risk Register
ERF Risks
ERF CRR
Risk Intelligence Group. Consult with partners and stakeholders with gap analysis
Planning Assurance Group picks up multi-agency capabilities and capacities issues
Executive Programme Board
Reviewed Capabilities and Capacities built in to CRR
Final CRR
ECFRS Prevention, Protection & Response
SAOR to inc ref to CRR
ECFRS Current Prevention, Protection & Response
Capability & Capacity Gap Analysis
Service & Directorate
Fire & Rescue Plan
SRR Review
Determine Risk Appetite
Revised Strategic Risk Register
Business Planning to support Prevention, Protection and Response
Directorate Risk Registers
Stations
PORIS SSRIs TFPs
Current Capabilities & Capacities
Analysis of need
Revised indicators of Capabilities and Capacities
Business Continuity Arrangements

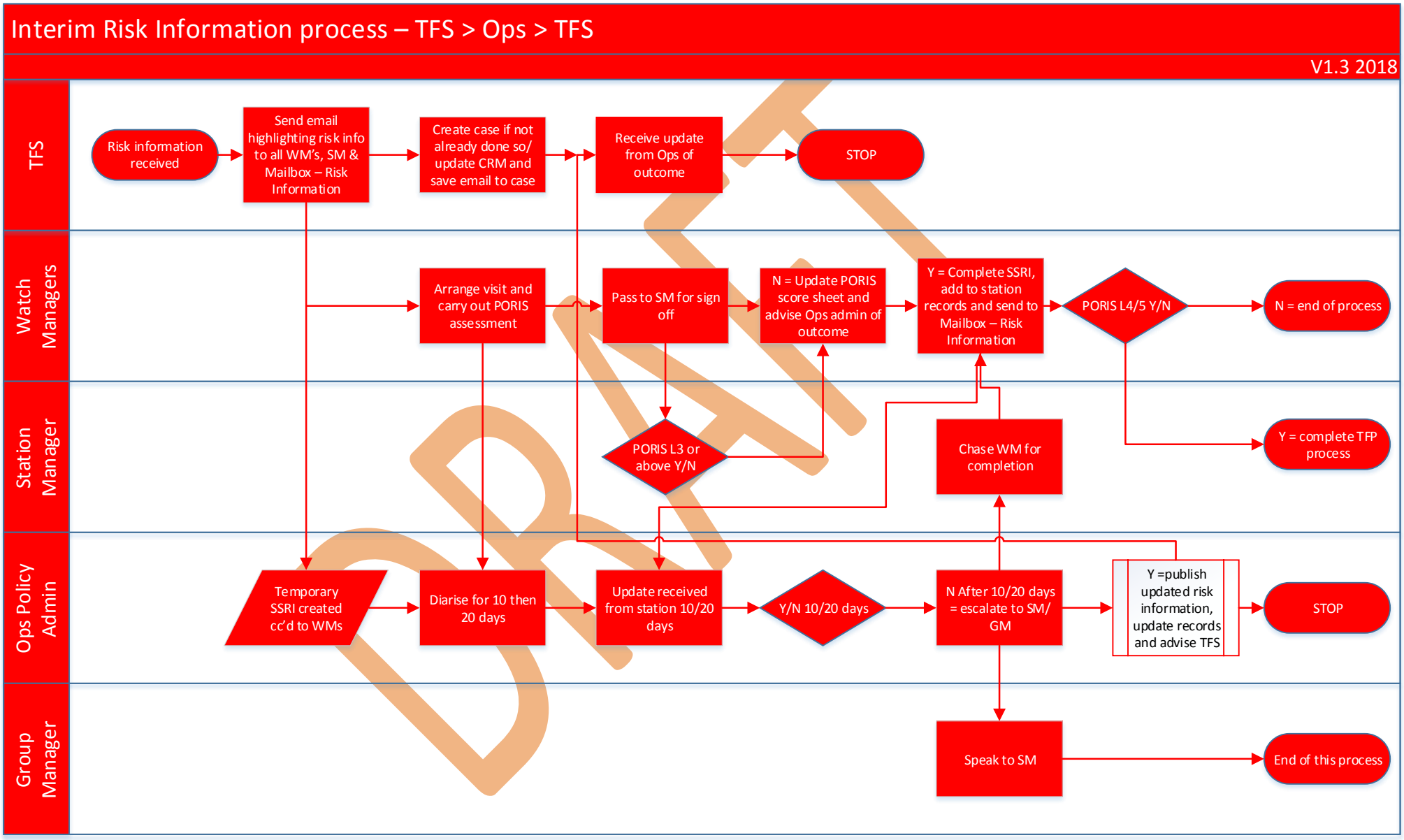
CHAPTER 1: RISK – GENERAL

1.1 THE STRATEGIC MANAGEMENT OF RISK

The manner in which ECFRS manages its response to various risks is part of a continuum of risk management from the National Security Risk Assessment 2019, to the ERF CRR and finally to organisational strategic, tactical and operational risk registers, represented as follows:



The diagram on the next page illustrates the (interim) risk information process outlines in the right hand pane above.


Interim Risk Information process – TFS > Ops > TFS
V1.3 2018
TFS
Watch Managers
Station Manager
Ops Policy Admin
Group Manager
Risk information received
Send email highlighting risk info to all WM's, SM & Mailbox – Risk Information
Create case if not already done so/ update CRM and save email to case
Receive update from Ops of outcome
STOP
Arrange visit and carry out PORIS assessment
Pass to SM for sign off
N = Update PORIS score sheet and advise Ops admin of outcome
Y = Complete SSRI, add to station records and send to Mailbox – Risk Information
PORIS L4/5 Y/N
N = end of process
Y = complete TFP process
PORIS L3 or above Y/N
Chase WM for completion
Temporary SSRI created cc'd to WMs
Diarise for 10 then 20 days
Update received from station 10/20 days
Y/N 10/20 days
N After 10/20 days = escalate to SM/ GM
Y =publish updated risk information, update records and advise TFS
STOP
Speak to SM
End of this process
DRAFT

1.2 NATIONAL SECURITY RTISK ASSESSMENT 2019

1.2.1 The Government published its National Security Risk Assessment, (NSRA), on 1 August 2019. This is an **"Official – Sensitive"** document with limited access[5]. The NSRA is of vital operational importance as it encourages contingency planning, and is strategically important as a framework for risk management decision making.

1.2.2 The NSRA includes 131 malicious and non-malicious risks, reflecting a changing risk landscape. Risks fall into ten family themes. The ERF will amend the CRR to take account of the changes to risk data content and the revised numbering system in the NSRA.

1.3. RISK MANAGEMENT

1.3.1 **Risk Matrix.** The risk matrix is at **Appendix A.** This demonstrates a 5 x 5 matrix with values against Likelihood and Consequence, (Impact). These values enable some quantitative evaluations of the various risks faced in order to provide a context for each risk.[6]

1.3.2 **Risk Register.** A partial reproduction of the Service IRMP Risk Register is at the end of each Chapter to provide some context. The full IRMP Risk Register, at **Appendix C**, includes references to the ERF CRR, where appropriate.

1.3.3 **Methodology.** Service managers should review:

- Risk descriptions – Are these accurate?
- Triggers – Is the list complete? More? Less? Variations?
- Operational consequences – More? Less? Variations?
- Strategic consequences. Long-term resource/financial/business planning issues?
- Opportunities – can ECFRS turn a threat into an opportunity?

1.3.4 Next, as new pieces of work:

- Controls – What Controls does the Service currently have?
- Assess scores against the Likelihood and Impact values for ECFRS.
- Recommend proposed controls, (which will affect Directorate/Department Business Plans as a complementary activity possibly over a four-year business plan period.)

1.4 INTEGRATED RISK MANAGEMENT PLANNING GUIDANCE

1.4.1 In August 2008, the Department of Communities & Local Government, (DCLG)[7], published an extant suite of Integrated Risk Management Planning Guidance documents on:

- Business Continuity Management
- Environmental Protection
- Protection of Heritage Buildings & Structures
- Community Safety
- Equality & Diversity
- Road Traffic Collision Reduction
- Wildfire

[5] See the Resilience Manager for sight of risks.
[6] See Appendix A, and Annex B to of Risk Management Part III – Risk Management Guidance 2016 available at http://servicenet/_img/docs/pdf_1478605185.pdf
[7] With effect from 1 April 2016, the Home Office took on full responsibility for Fire. See **11.13**

1.5 STRATEGIC RISKS

1.6.1 Six broad headings group strategic risks, often referred to as PESTLE. This is an acronym for of Political, Economic, Social, Technological, Legislative and Environmental. **Figure 3** below illustrates possible triggers under each heading.

1.6 OPERATIONAL RISK GUIDANCE FOR THE FIRE & RESCUE SERVICE

1.6.1 It is appropriate to provide some context around operational risk and its relationship with strategic risk.

1.6.2 Fire and Rescue Service personnel operate in a dynamic and sometimes hazardous environment. The activities covered include incidents involving rescue, fire, water, height, RTCs, chemicals, biological hazards, radiation and acts of terrorism, all performed in various forms of weather. ECFRS is responsible, under legislation and Regulations, for developing policies and procedures and to provide information, instruction, training and supervision to its personnel about reasonably foreseeable hazards and the control measures used to reduce the risks arising from them.

1.6.3 The National Operational Guidance, (NOG), Programme, to which every FRS subscribes, sets out to provide FRS with sufficient knowledge about the potential hazards personnel could encounter when attending incidents. Fire and rescue services should ensure that policies, procedures and training cover all of the hazards and control measures contained in this guidance.

https://fireandrescue-public.sharepoint.com/

1.6.4 The Fire and Rescue Service Operational Guidance – Operational Risk Information, (the Guidance[8]), published in April 2012, provides robust yet flexible guidance on developing and maintaining a consistent approach to managing, processing and using strategic and tactical operational risk information. A high frequency of departure from good practice may become, in time, less of an occasional operational issue and more of a systemic, (strategic), problem.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/5914/2124406.pdf

1.7. POPULATION DATA

1.7.1 The last Census Day was 27 March 2011. The Office for National Statistics (ONS) first release date was 16 July 2012. Mid-year estimates for 2018 published in June 2019 provide an update. The figures in **Ch3, 3.2.2**, reflect that release.

[8] Otherwise known as PORIS

Figure 3 - PESTLE – STRATEGIC RISKS – (External Context)

Political The overall political situation	Change of Central Government policy, including structural changes to the Fire & Rescue Service in England and Wales. Failure to deliver central government policy. Change of local policy or priorities. Unfulfilled promises to communities. Political conflict (County/Unitary/District Authorities/PFCC) – Lobbying Stability of political situation (hung Parliament) Impact of Election cycle at all levels including for the PFCC. Local government devolution. Failure in the decision making structure leading to bad decisions. Fraud, corruption, lack of strategic focus Poor and/or slow response to innovate or adapt to modernisation Leadership issues Reputation management (damage to organisational credibility, adverse corporate media attention, etc.) Terrorism/New Dimensions Regulatory Inspection (audit process) Governance arrangements – Change management – Multi agency working arrangements.
Economic The overall national local and Service specific economic situation	Comprehensive Spending Review. Uncertainty beyond 2024. Changes to funding mechanisms/calculations – self-imposed reductions in spending and introduction of different funding model(s). Inflation (or Deflation) – EU Exit. Interest Rate fluctuations (Increase)/Foreign exchange rates – EU Exit. Significant loss of assets. General taxation changes. Trade tariffs – EU Exit. Treasury Management – investments and reforms, internal budgetary pressures. Borrowing, lending, investments and investment rates. Budgetary position because of central government grant reductions / reduced Council tax base. Demand predictions (e.g. as a consequence IRMP). Competition between suppliers and the effect on procurement. General economic climate, external macro level economic changes – EU Exit. Unrecorded liabilities. Value/cost of capital or assets. Missed opportunities. Immediate impact of civil emergencies. Government changes to Welfare funding and Council Tax benefit. National Conditions of Service negotiations on Pay and Pension affecting Service Budget forecasts. Impact of weather related events that cause an increased use of On-call firefighters, i.e. costs to the Service. Fire Fighter Pensions.

Social County demographics and socio-economic trends that could impact on Service delivery	Societal impacts and changes – needs, expectations, opinions and attitudes, lifestyles, growing and more diverse population – failing to take account, (IRMP outcomes), world events, brand choices, education, trends generally, (local) history. Ethnic/Religious factors. Ethical issues. Not recognised as an employer of choice. Failure to understand/track demographic profiles. Residential patterns and profile (e.g. Commuter, HMO, elderly (care), public/private mix, state of, and increase of, housing stock). General community health. Crime statistics / Fire related crime. Disadvantaged, vulnerable, or hard to reach groups or communities. Increase in "at risk" groups due to the economic climate (Un)Employment. Missed or minimal Third Sector involvement. Partnerships – Failure to spot opportunities, or failing arrangements (shared services). Rural/Domestic fire risks. Inter-operability / Major incident response. Non-domestic fire risks. Transportation risks.
Technological Service capacity to adapt to change of pace/scale of technological change	Technology strategy inadequate/obsolete. Technological change/advance and capacity to process. Technological demands – customer needs and expectations. Finance on the sustainability /adoption of new technologies/ability to work with partners etc. Current/future use/reliance on technology – Mobile data. Current or proposed technology partners. Current performance and reliability (delivering objectives). Condition of architecture/infrastructure/staffing. Life span / obsolescence date identified. Security and standards, e.g. compliance, back-up, recovery (sites), confidentiality, compatible equivalent security systems allowing data transfer etc. Business Continuity and Recovery planning. Support to innovation / adaptation & change management. Procurement of best technology to deliver objectives, with sustainability. Failure to communicate (at all/effectively). Technical advances in service delivery equipment/passive fire safety/support functions. Impact of security requirements on Business as Usual (BAU).

Legislative Failing to respond to current or potential changes in national or European Law or Regulations	New primary & secondary legislation – National/European Law/Regulations – EU EXIT. Exposure to Regulators – e.g. auditors/inspectors, intervention – Fireground safety. Annual Assessment – Use of Resources; Direction of Travel; Governing the business; managing finances, current climate, corporate killing, Home Office/NFCC/CFOA guidance. Statutory duty to cooperate, targets, performance and annual report. European Directive – Procurement – EU EXIT. Responsiveness to criticism. Fire & Rescue Services Act 2004 – How we conduct our business. Fire & Rescue Services (Emergencies)(England) Order 2007 Regulatory Reform (Fire Safety) Order 2005 – Enforcement of fire safety in the workplace. Civil Contingencies Act 2004 – Preparedness & Response, Business Continuity, Resilience, Policing & Crime Act 2017 HMICFRS Inspections Kerslake - Manchester Hackitt - Grenfell Emergency Planning. Statutory duty to cooperate, targets, performance and annual report. Employment Law. Environmental Law. Breach of Health and Safety at Work etc. Act 1974 Crime & Disorder Act 1998 – Section 17. Equality Act 2010 – Compliance. Fire & Rescue national framework for England 2018. Regulation 28/29 Reports. Judicial Review. NOG/Improvement notices. Compliance with the Joint Emergency Services Interoperability Programme (JESIP) Care Act 2014 (Adults) Children Act 1989 Adoption and Children Act 2002 Data Protection Act 2018, EU Data Protection Regulation and Freedom of Information
Environmental Consequences of the Service's strategic objectives (energy efficiency, pollution, etc.)	Nature of environment (urban, rural, mixed). Ecology. Land use – green belt, brown field, (high density) residential sites Stakeholder values. Waste disposal and recycling issues. Exposure to drainage problems/flooding/erosion/subsidence/landslip Impact of civil emergency (e.g. flood). Traffic problems/congestion Town Planning, (Dwellings), Transportation. Pollution, emissions, noise. Climate change. Energy efficiency. ECFRS affected because of operational response. CBRN event.

See also Risk Management Policy and Strategy 2018 at:

http://servicenet/_img/docs/pdf_1539687234.pdf

CHAPTER 2: BASE CASE

2.1 GENERAL STATISTICS

2.1.1 The following statistics provide some foundation figures for ECFRS[9].

Calls handled per control operator, fires, false alarms and non-fire incidents in Essex						
Activity		**1/4/14 – 31/3/15**	**1/4/15 – 31/3/16**	**1/4/16 – 31/3/17**	**1/4/17 – 31/3/18**	**1/4/18 – 31/3/19**
Average number of fire control staff (FTE)		37	29	32.5	32.5	32.5
Total number of calls handled		27,715	26,375	30,785	31,903	32,571
Calls handled per fire control staff		749	909.5	947	981.6	1002.2
Total number of fires		3,919	4,477	5,323	4,783	4937
Total number of false alarms		5,807	5,841	6,129	6,335	6292
Non-fire incidents	Road Traffic Collisions	1,369	1,375	1,306	1,219	1,063
	Other (e.g. Animal Rescue)	2,023	2,224	3,364	3,283	3,221

Home Fire Risk Checks by Fire and Rescue Personnel or Partners and smoke alarms/ automatic fire suppression systems installed in Essex[10]					
Activity	**1/4/16 – 31/3/17**	**1/4/17 – 31/3/18**	**1/4/18 – 31/3/19**		
Number of Home Safety visits (Total)	9,492	8,505	8,430		
Home Safety visits to +65/Smoker/Living alone	6,613 (70%)	5,931 (70%)	8,122 (96.35%)		
Smoke alarms installed: 1. Standard alarms	13,619	9,072	9,757		
2. Sensory (Strobe & vibrating pad)	427	913 (333 base units & 580 alarms)	862		

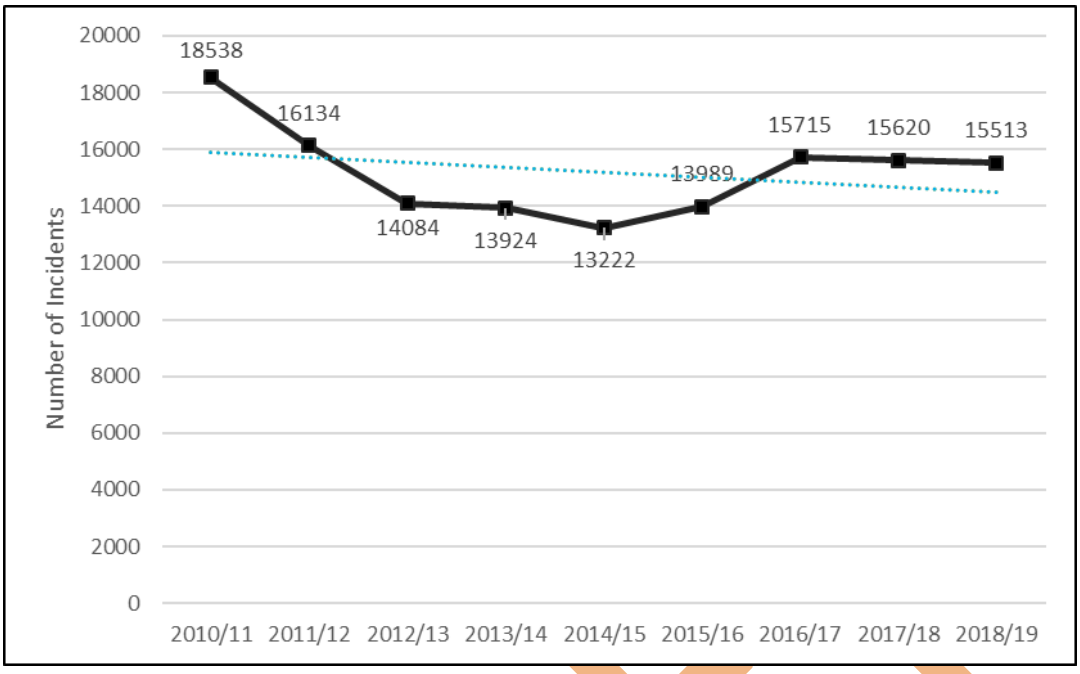
Numbers of Participants in Education Events					
	1/4/14 – 31/3/15	**1/4/15 – 31/3/16**	**1/4/16 – 31/3/17**	**1/4/17 – 31/3/18**	**1/4/18 – 31/3/19**
Firebreak	522	459	437	657	646
DofE & Cadets	125	137	147	170	139
JFS	100	80	90	85	73
Total	**747**	**676**	**674**	**912**	**858**
Schools Educ.	117,147	135,452	147,006	202,281	228,279

* 1 Apr 15 – 20 Jan 16 only.

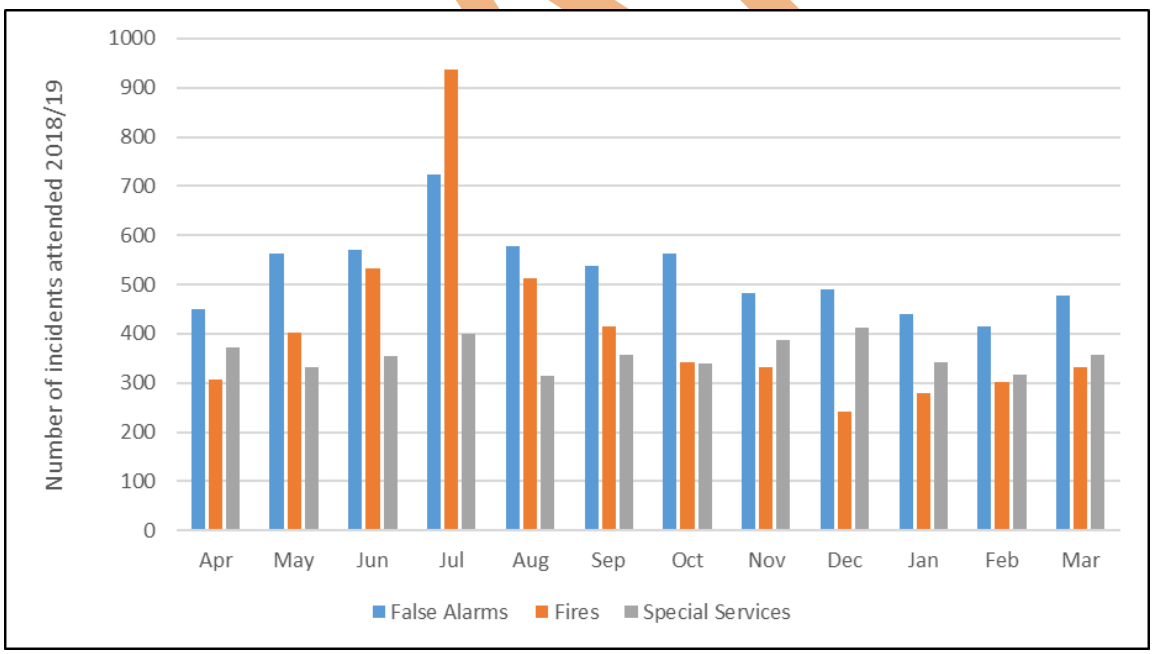
[9] Also see "Analysis of Accidental Dwelling Fires in Essex: Auxiliary Report v1.2. Previous five years only. http://servicenet/Department_Information/Performance_Management__Improvement/Analysis/

[10] The careful targeting of resources has reduced the numbers of checks but increased the number of vulnerable dwellings visited.

2.1.2 The number of incidents attended by ECFRS has been reducing in recent years and 2018-19 has shown a very slight decrease on 2017/18. In 2018/19 the Service attended 15,513 incidents.

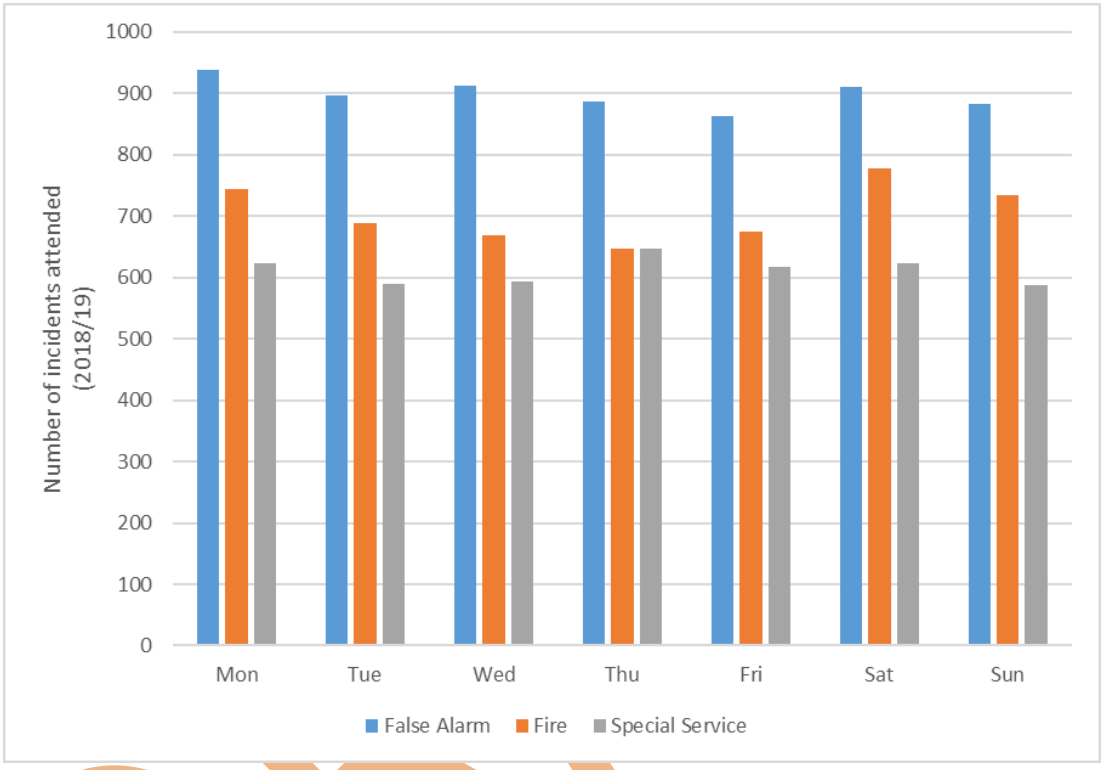


2.1.4 Analysis continues to show that ECFRS attended a greater number of incidents in the summer months, with the key reason being fire and false alarms.

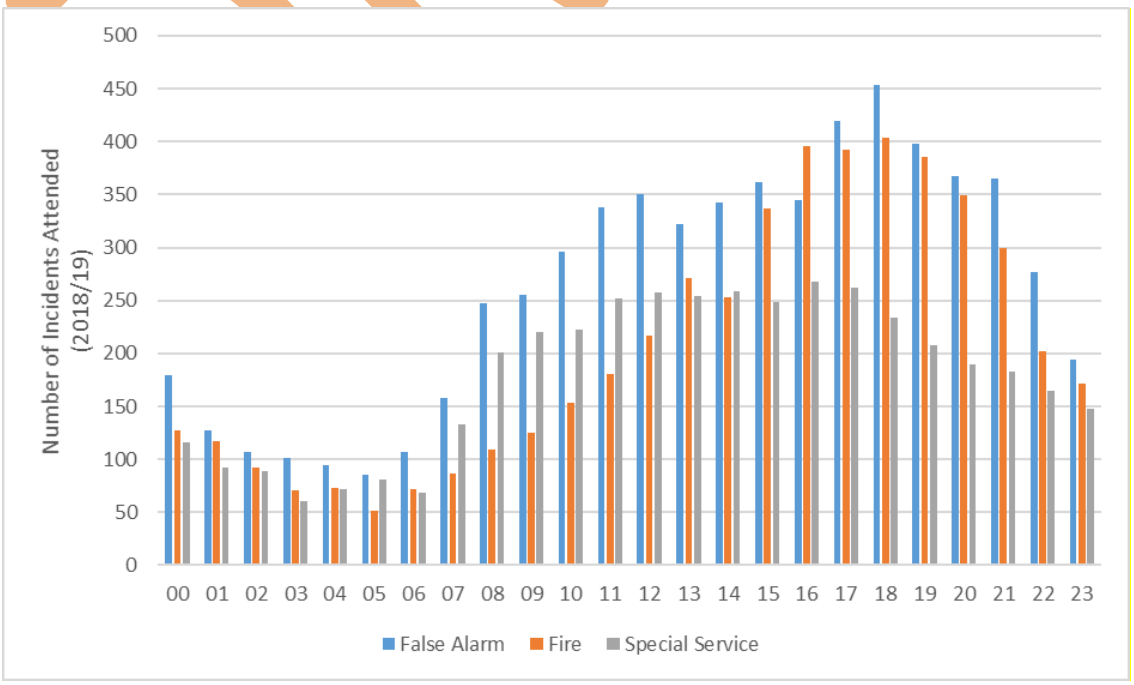


2.1.5 With respect to day of week and hour of day:

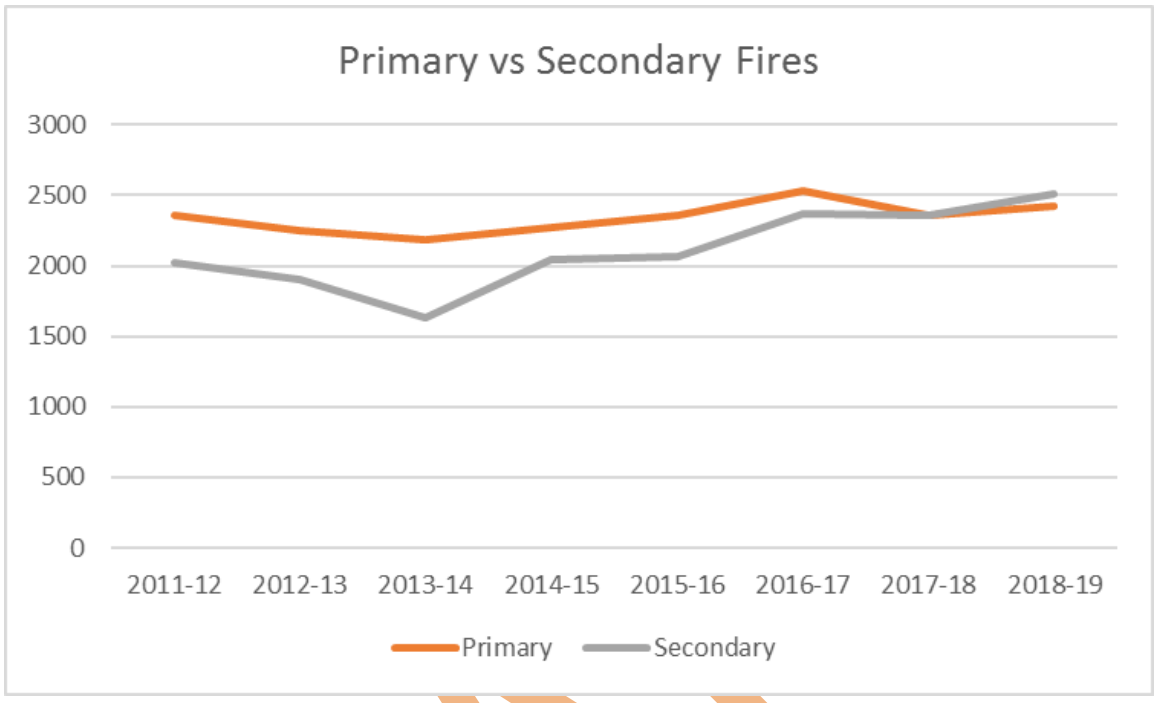
- Fires peak over a weekend, particularly on a Saturday.
- ECFRS attended most incidents between the hours of 4pm and 7pm.
- False Alarm incidents happened mainly between 4pm and 8pm.
- Fire incidents rose gradually throughout the day peaking during the late afternoon and evening between 4pm and 7pm.
- Special Service incidents were most common between 8am and 7pm, peaking between 11am and 4pm.



By Hour of Day

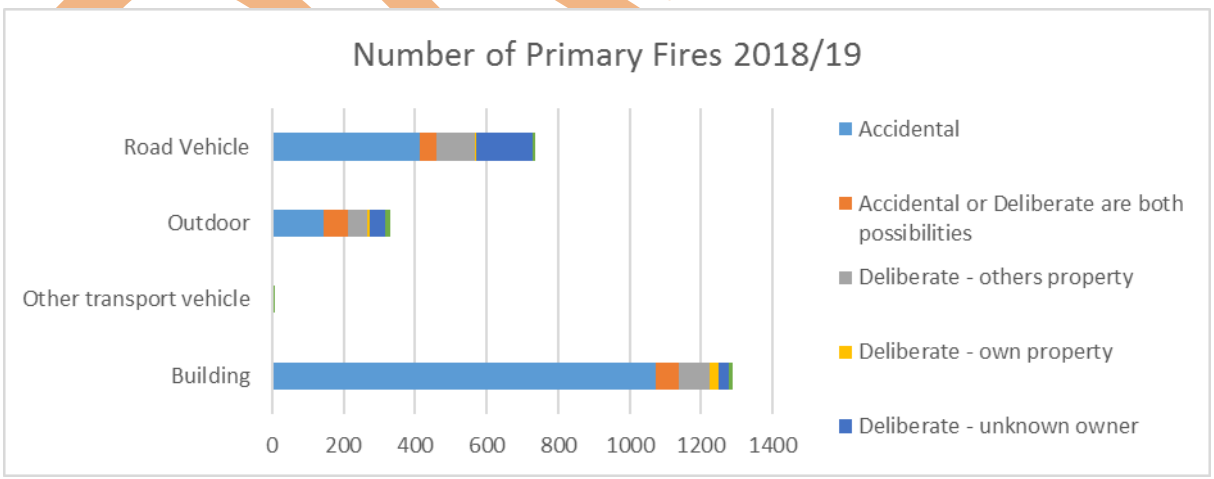


2.1.6 Primary Fires and Secondary Fires have both had a slight increase in 2018/19, and for the first time, there have been more secondary than primary fires.

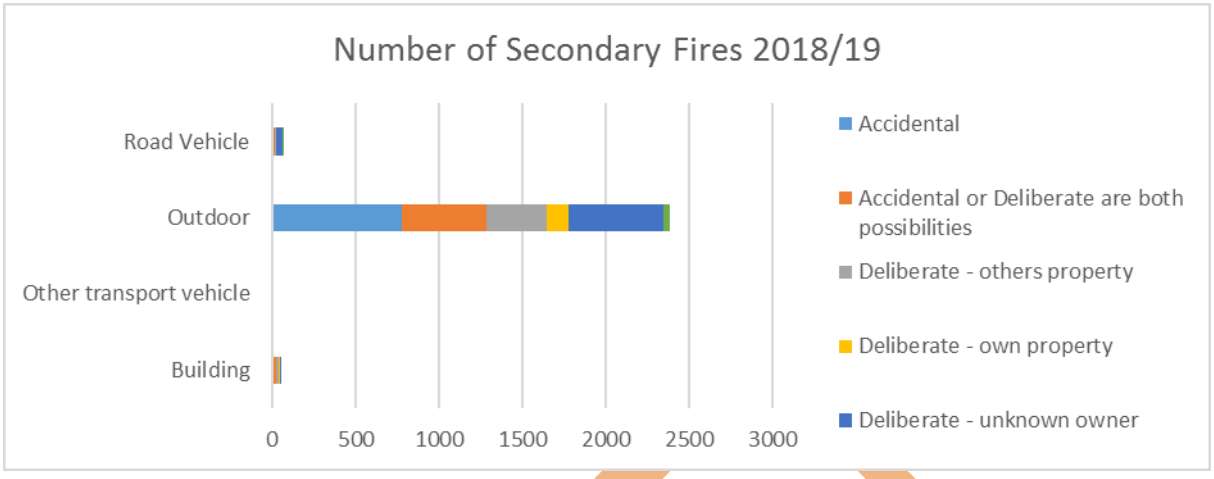


2.1.8 The charts that follow show the breakdown of Primary and Secondary Fires in 2018-19.

2.1.9 With respect to Primary Fires, Accidental Dwelling Fires comprised the largest group amounting to 45% of the total. Deliberate fires account for 22% of all Primary Fires with buildings being the most common type.

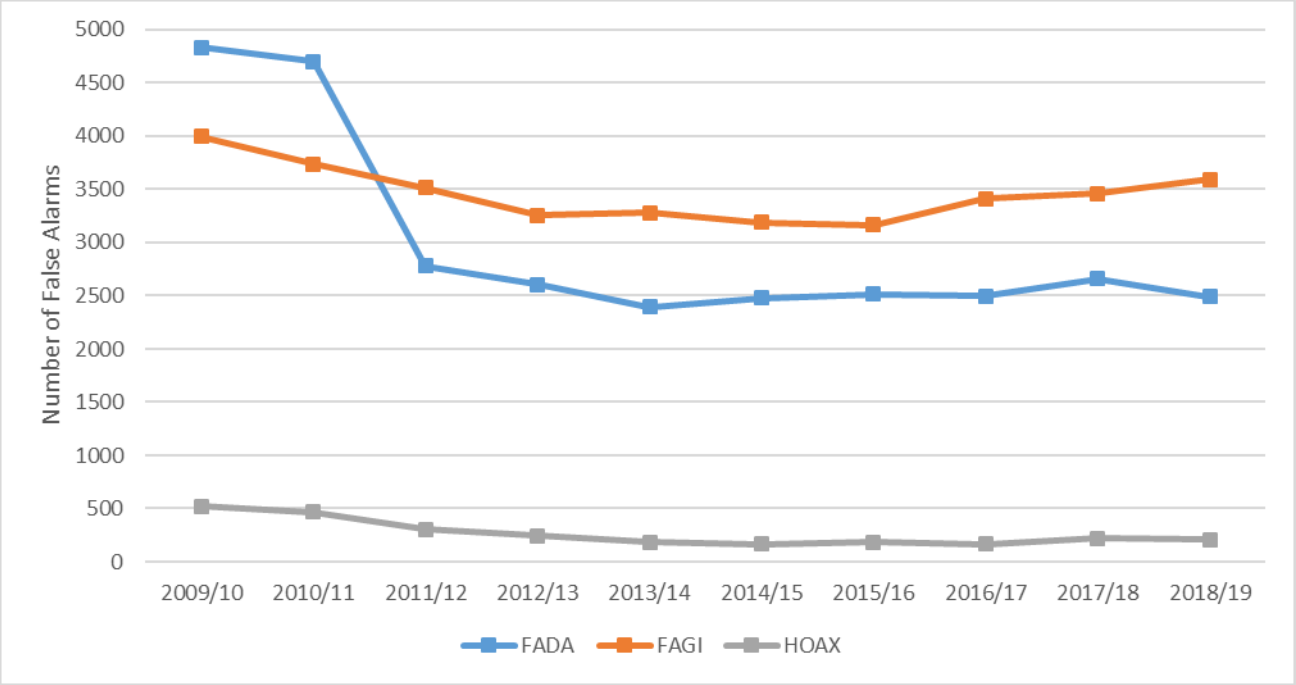


2.1.10 With respect to Secondary Fires in 2018/19, deliberate fires accounted for 30% of the total. Outdoor fires comprised of 95% of all fires. Accidental outdoor fires accounted for 31% and deliberate outdoor fires comprised 42% of the total.



Primary and Secondary fire breakdown

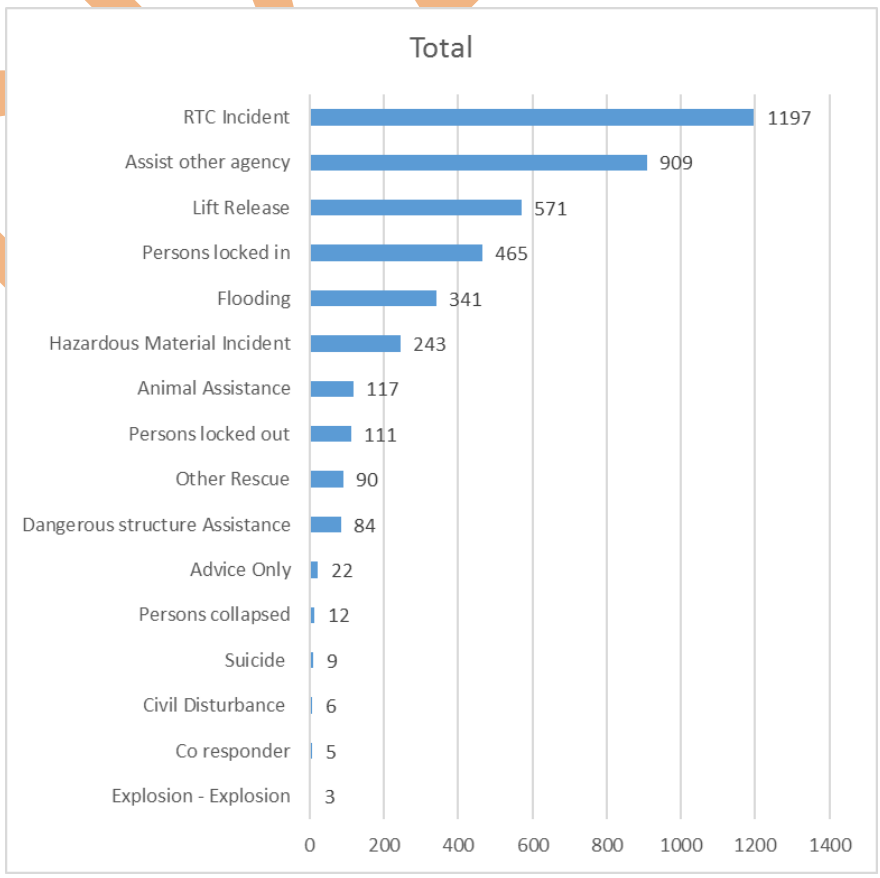
2.1.11 False alarms 'good intent' (FAGI) accounted for 57% of false alarms attended in 2018/19, false alarms due to apparatus (FADA) 40%, and hoax calls, 3%.

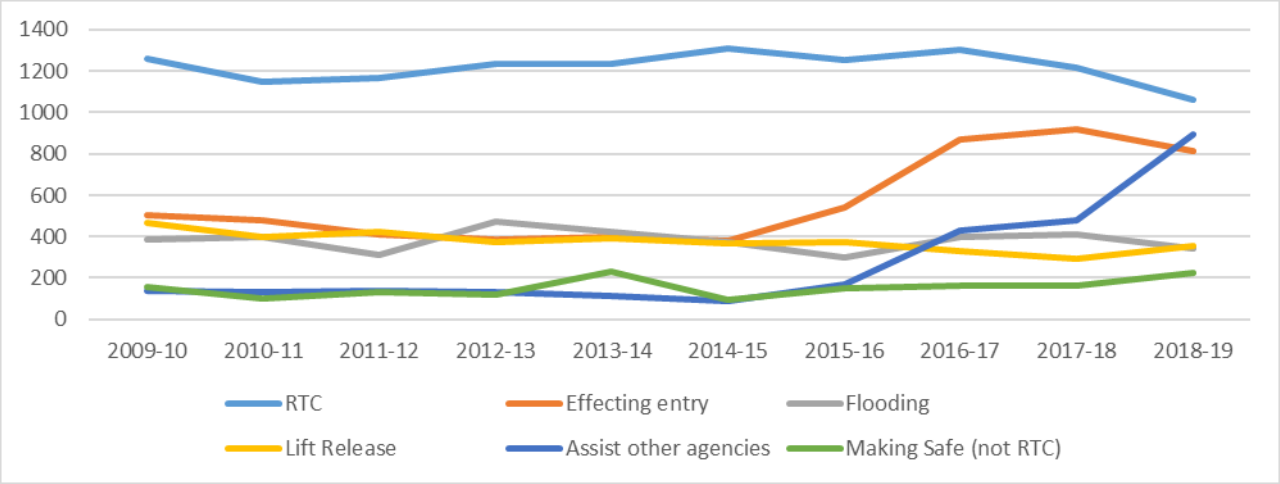


Definitions

Primary Fire - includes all fires in buildings, vehicles and most outdoor structures or any fire involving casualties, rescues or fires attended by five or more appliances.
Secondary Fire – An incident that did not occur at a Primary location, was not a chimney fire in an occupied building, did not involve casualties (otherwise categorised as a Primary incident) and was attended by four or fewer appliances (otherwise categorised as a Primary incident). (An appliance is counted if either the appliance, equipment from it or personnel riding on it, were used to fight the fire)
Chimney fire - Any fires in buildings where the fire was contained within the chimney structure and did not involve casualties, rescues or attendance by five or more appliances.
Accidental - Caused by accident or carelessness (not thought to be deliberate). Includes fires that accidentally get out of control e.g. fire in a grate or bonfires Includes fires started by children unless there is evidence to suggest otherwise.
Deliberate – own property - Where a fire is started deliberately. Own property refers to the normal occupiers – including a child in their own house.
Deliberate – others property - Where a fire is started deliberately by somebody not an occupier of the property. This includes fires in non-residential buildings where the owner is not involved e.g. fires in office buildings, fires in barns, cars.
Deliberate – unknown owner - Where a fire is started deliberately but it cannot be determined whether it was own or others property.
Not known - Use where there is general uncertainty about the cause or motivation of the fire. Only use if necessary.

2.1.12 The most prevalent single incident type within the Emergency Special Services, (ESS), category is road traffic collisions (RTCs) which account for 29% of the total ESS. This figure incorporates only RTCs attended by ECFRS during 2018/19 and does not include all collisions occurring in the County over this period. The following chart provides a more detailed breakdown of all ESS incidents in 2018/19.



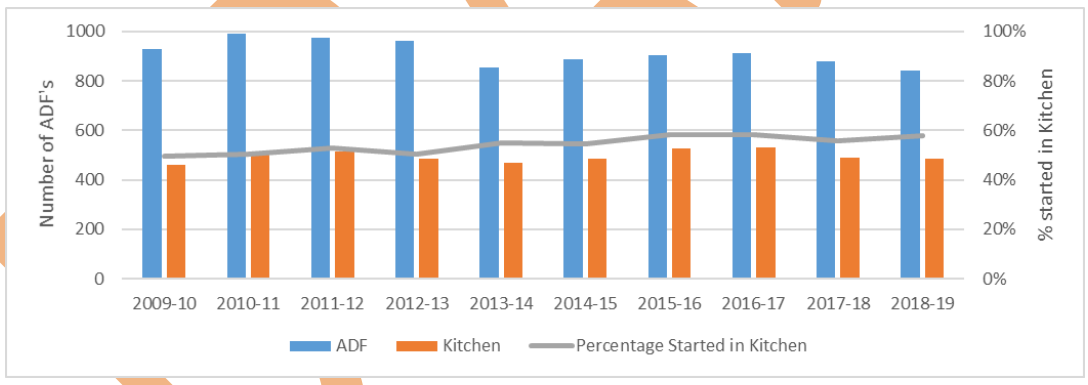


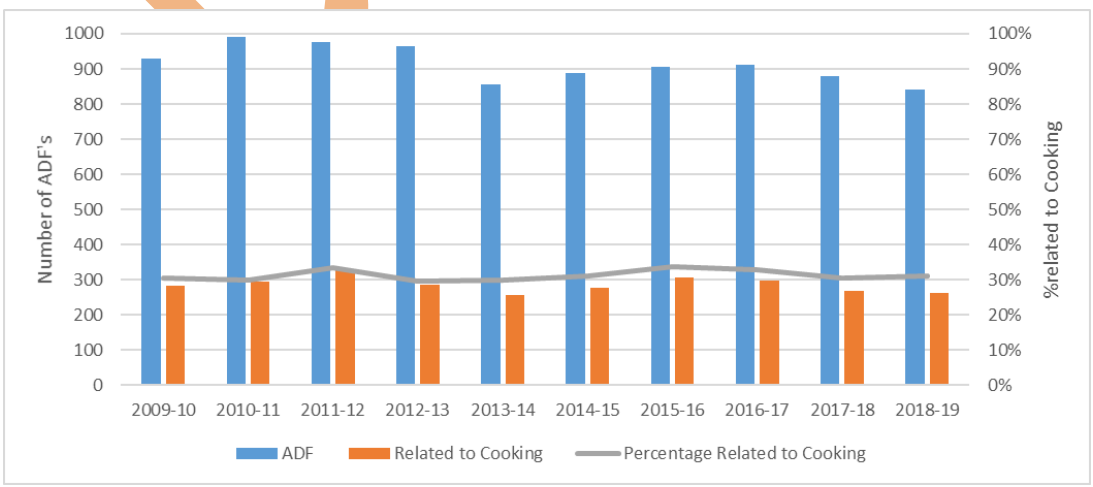
2.2 ACCIDENTAL DWELLING FIRES

Kitchen fires and cooking-related fires: April 2010 to March 2019

Our data shows that Accidental Dwelling fires (ADFs) are more likely to start in the kitchen than any other location. The numbers of ADFs have continued to reduce slowly, while the number of Kitchen Fires has remained steady. This meant that in 2018/19, 58% of all ADFs started in the kitchen. This is a slight increase on the 56% last year.

Causes of fire: Cooking-related fires are the single most common cause of fire in the home. The vast majority of these occur in the kitchen with a smaller number occurring in bedsits and open-plan areas of the home.





CHAPTER 3: PEOPLE – DEMOGRAPHY

3.1 OVERVIEW

3.1.1 This Chapter describes the human makeup of Essex. It identifies the Essex population and its distribution in spatial, age group, and diversity terms. This Chapter relates to **Chapter 5 Land, Sea and Air Infrastructure**.

3.2 POPULATION

3.2.1 Essex is the largest fire authority, by population, in the East of England and the second largest shire Authority in England and Wales, (including the statistics from the two Unitary Authority areas).

3.2.2 **Figure 3 – Essex Population Figures – Data from Office of National Statistics Table Mid-Year Estimates: Population Estimates by single year of age and sex for local authorities in the UK, mid-2018 as at 26 June 2019** [11]

England – 55.97 m

Local Authorities	All Ages	All 0 - 8	Male 9 - 15	Female 09 - 15	Male 16 - 18	Female 16 - 18	Male 19 - 24	Female 19 - 24+	All 25 - 64+	All 65 - 80	All 81 +	Median Age
Basildon	185,862	22,776	8,262	7,711	3,208	3,075	5,991	5,921	96,996	24,127	7,795	39.3
Braintree	151,561	16,230	6,542	6,352	2,647	2,396	4,408	3,926	78,585	23,512	6,963	43.5
Brentwood	76,550	7,957	3,162	3,176	1,371	1,286	2,221	2,134	39,682	11,114	4,447	43.3
Castle Point	90,070	8,428	3,482	3,340	1,446	1,441	2,993	2,561	43,645	17,635	5,099	46.9
Chelmsford	177,079	19,035	7,682	7,136	3,001	2,816	5,431	5,301	92,798	25,446	8,433	41.7
Colchester	192,523	21,210	7,671	7,280	3,177	2,977	9,789	8,564	98,686	25,567	7,602	37.9
Epping Forest	131,137	14,455	5,337	5,030	2,123	2,108	3,983	3,762	68,606	19,040	6,693	42.7
Harlow	86,594	11,880	3,912	3,616	1,432	1,366	2,946	2,634	45,523	9,747	3,538	37.5
Maldon	64,425	5,717	2,496	2,363	1,077	986	1,866	1,684	32,171	12,611	3,454	48.7
Rochford	86,981	7,981	3,600	3,370	1,423	1,463	2,772	2,568	43,778	15,283	4,743	46.1
Tendring	145,803	13,572	5,382	5,160	2,219	2,055	4,318	3,798	66,230	32,680	10,389	50.4
Uttlesford	89,179	9,815	4,010	3,892	1,709	1,550	2,370	2,217	46,234	13,170	4,212	44.0
Southend	182,463	20,661	7,696	7,273	3,009	1,940	4,780	5,512	94,778	26,096	9,001	41.6
Thurrock	172,525	23,664	8,220	7,975	3,030	1,885	4,658	5,382	92,051	18,696	5,092	36.9
Totals	**1,832,752**[12]	**203,381**	**77,454**	**73,674**	**30,872**	**29,225**	**60,234**	**55,964**	**939,763**	**274,724**	**87,461**	**42.9**

[11] The 2018 Mid-Year estimates used throughout this Edition of the SAOR.

[12] The Edge Analytics Greater Essex Demographic Forecast Phase 4 2013 projects a population of 1,909,252 for 2021.

3.3 DEMOGRAPHIC CHALLENGES – HOMES & SPACES

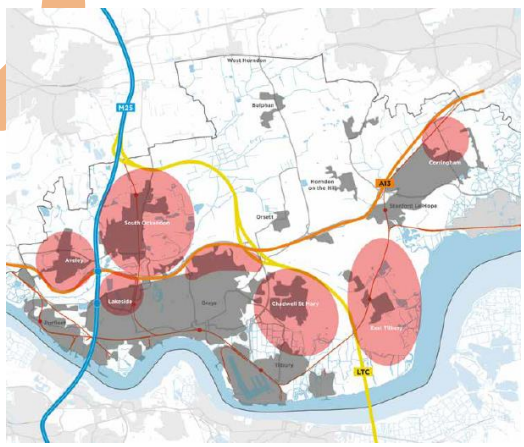
3.3.1 Population growth and creeping urbanisation is a big challenge. Current expectations are that by 2031, the East of England will be to be the second fastest growing region in England, with a population increase of more than 25% from 2001. During this period, Essex is expected to see the highest numerical change of all counties in the East, absorbing some 324,000 additional residents.

3.3.2 Planning Authorities are replacing their District Local Plans. The table below identifies the projected residential dwellings[13] taken from Evidence Base documentation from Planning Policy web pages of Essex Councils'. These provide for an increase in housing stock between 2021 and 2037. These figures will be refined as Planning Authorities[14] publish revised Local Plans. Three illustrations serve as an example of potential development.

Thames Gateway South Essex (2014-2037)	
Basildon	17,549 – 19,251
Castle Point	7,498 – 9,430
Rochford	7,176 – 9,016
Southend	21,919 – 26,036
Thurrock *	32,000 #
North West Essex (2011-2033)	
Uttlesford	13,332[15]
Epping Forest	12,573
Harlow **	13,000
Other Essex	
Brentwood	7,600
Chelmsford	21,893 to 2037
Colchester	14,720 2017 - 2033
Maldon	4,650 (minimum) by 2029
Tendring	9,974 – 10,924 to 2031/32
Braintree	15,892 – 2033

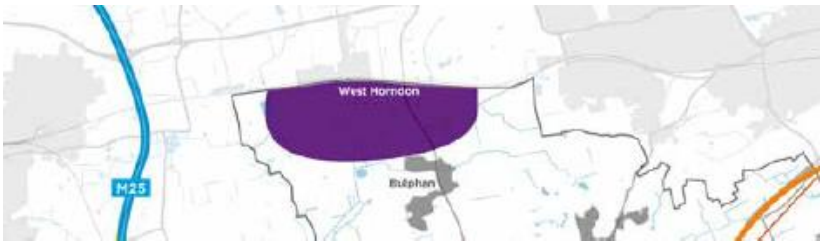
ADDITIONAL DWELLINGS BY 2022/37
Upto 210,317 **This figure is an aggregate of the projected housing growth in the adjoining table, using the highest figure where growth shows two potential values.**
The Thurrock figure may increase to 46,000 new dwellings if a shortfall of new housing occurs elsewhere in Essex (Not included above).

* Potential Urban extensions – Illustrative only. (Housing numbers may extend to 46,000new homes)
Arena Essex site – Upto 2,500 dwellings, 1, 2, and 3-bedroom units and supporting infrastructure. Planning application submitted November 2018.
Others

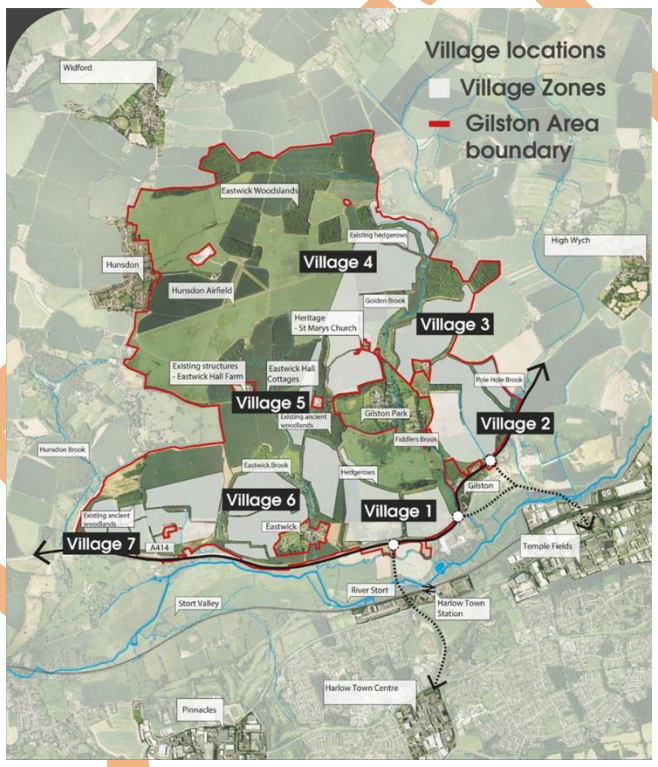


[13] This includes flatted accommodation. All figures are approximate.
[14] Last checked January 2019.
[15] Because the housing markets of these areas are heavily inter-related, Uttlesford Council, in conjunction with East Herts, Epping Forest and Harlow Councils, jointly commissioned a Strategic Housing Market Assessment, (SHMA), undertaken by Opinion Research Services.

West Horndon – Upto 10,000 homes near the C2C London (Fenchurch Street – Shoeburyness line.



** The Gilston Development[16] is to be built just north of Harlow but over the Herts/Essex boarder. The development will involve 10,000 new homes over 20 years, representing a significant project. This will also involve a new junction, 7A, on the M11. Discussions with Herts FRS took place in June 2018. Herts FRS state that it will not reach Gilston in 10 minutes. There will be a high reliance on Harlow appliances being called on 13/16 arrangements. This is a development to monitor.



3.3.3 Clearly, a significant amount of development is planned upto 2037. Consider now where those sites are. What will they consist of in terms of dwellings, commerce and industry, together with the required infrastructure to support? How might they may relate to the location of our assets as currently deployed? The answers to these questions, and others, is required in order to inform the IRMP and fire cover review to ensure that our resources are located within the developing areas for ECFRS to meet target response times. The next IRMP will set the foundation for the following IRMP at least.

3.4 POPULATION AGEING

A big challenge for Essex is its increasing population and the increasing age of its citizens.

3.4.1 Essex has an ageing population. The concentration of people over-65[17] will increase dramatically as the baby boom children of post-war settlers reach retirement. This nationwide issue will magnify in Essex.

[16] http://gilstonparkestate.com/about-gilston-park-estate

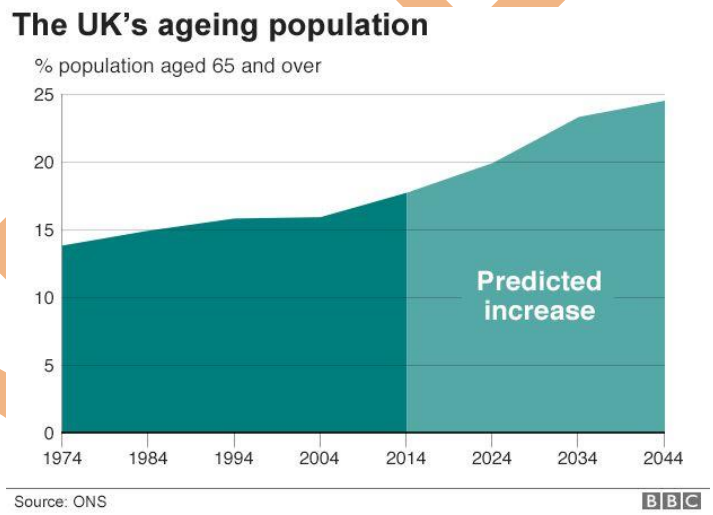
[17] The State retirement age is a moveable feast. The base age of 65 years is indicative only.

Around 12.43% (222,792) are aged between 55 and 64; 26.47% (485,248) are aged between 45 and 64; 19.76% are aged between 65 and 90+ (362,185).

3.4.2 This "age-shift" is due to past birth patterns – high birth rates post-war, and lower rates in the 1970s, 1980s and 1990s. Increased life expectancy affects this shift. Essex will see consequential increases in the over-65, over-75 and over-85 demographics.

3.4.3 Currently, Essex has a "working age"[18] population of 1,135,727 or approximately 62% of the total population. The declining ratio of young to old is likely to alter the structure of our economy significantly, presenting both challenges and opportunities. Press reports indicate that more 'pensionable age' people work than ever before. The impact of this will develop as the age demographic of the population continues to change.

3.4.4 As people age, their needs become more complex. At 65, the estimate is that one in six people has trouble with daily living, i.e. washing, dressing or eating. Using the Mid-Year Estimates for June 2018, for Essex, some 52,171 fall into the former category now, (65-84 yrs. of age). By the age of 85, three people in six have that trouble, (156,513). Similarly, for the over-85s, 49,159 people are in need**. The use of Exeter Data with population data will prove useful in gaining a better understanding of potentially vulnerable locations for targeted interventions.**



[18] That is a range of the population between the ages of 16 (about to enter the job market) and 65, (about to leave the job market based on an indicative State retirement age of 66.) This ignores those staying in the Education system, ally or in other parts of the UK.

3.5 POPULATION DENSITY

3.5.1 The table below identifies the population density based on the mid-year 2018 population estimates.

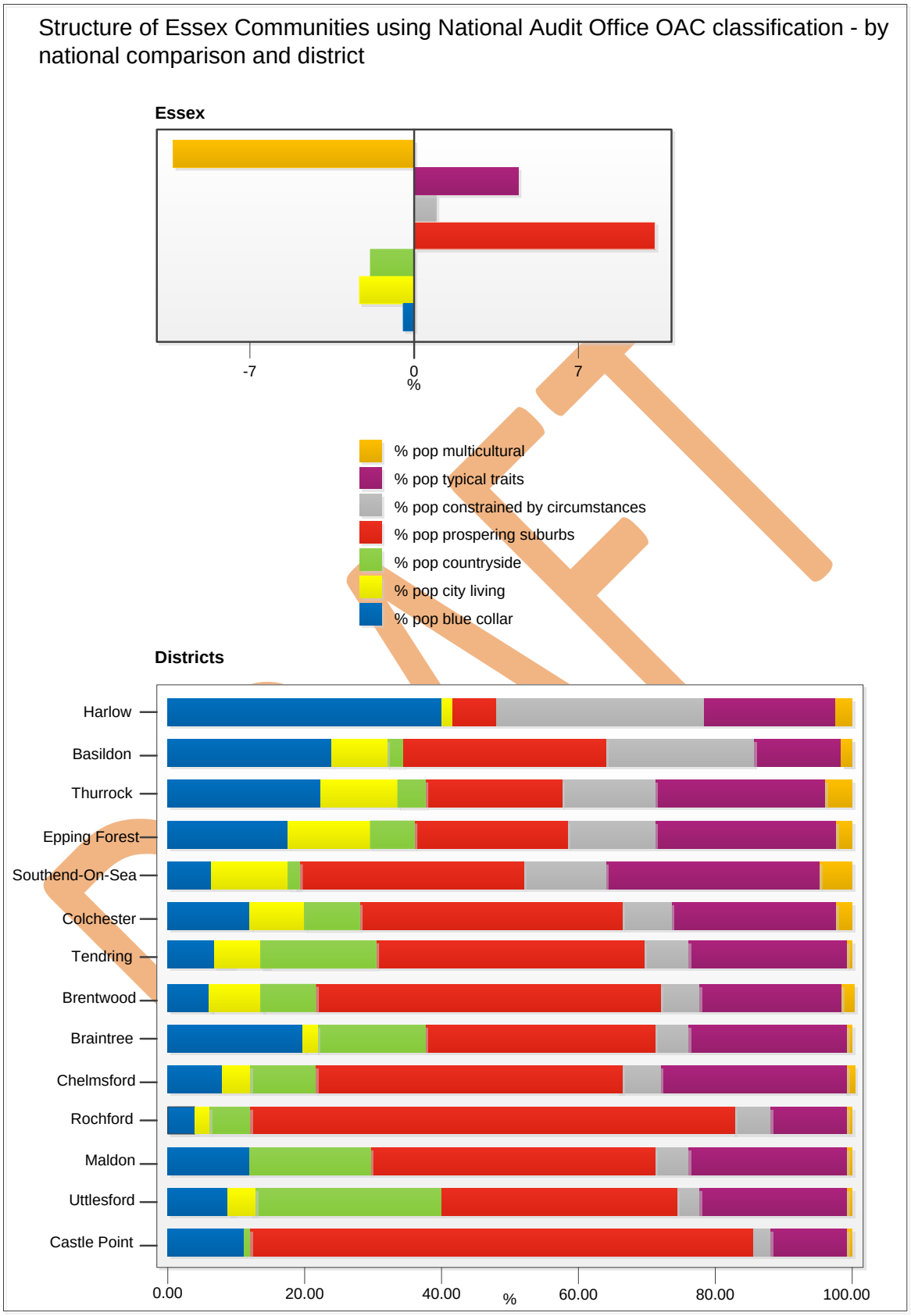
POPULATION DENSITY [19]

Name	Area (sq. km)	Estimated Population mid-2018	2018 people per sq. km
Greater Essex	3,669		
Basildon	110	185,862	1,689
Braintree	612	151,561	248
Brentwood	153	76,550	500
Castle Point	45	90,070	1,998
Chelmsford	339	177,079	523
Colchester	329	192,523	585
Epping Forest	339	131,137	387
Harlow	31	86,594	2,836
Maldon	359	64,425	180
Rochford	169	86,981	513
Tendring	338	145,803	432
Uttlesford	641	89,179	139
Southend-on-Sea	42	182,463	4,370
Thurrock	163	172,525	1,055

Refer to the Resilience Manager for further details of the ONS Mid-Year Estimates for 2018.

[19] Office of National Statistics Table MYE5 Population Density 2018 as at 26 June 2019.

3.6 THE STRUCTURE OF ESSEX COMMUNITIES BY OUTPUT AREA CLASSIFICATION (OAC)



Essex Trends 2011: Essex County Council

3.7 RISK SPECTRUM

3.7.1 **From paragraph 2.2**, Accidental Dwelling Fires (ADFs) In 2018/19, 58% of all ADFs started in the Kitchen. Cooking-related fires are the single most common cause of fire in the home. The vast majority of these occur in the kitchen with a smaller number occurring in bedsits and open-plan areas of the home.

3.8.2 Research and analysis has identified certain groups as being at greater risk of accidental dwelling fires and of kitchen fires in particular (the main cause of accidental fire in the home, both in Greater Essex and nationwide). (**See 4.2**.)

- Householders on low incomes living in social housing.
- Transient singles.
- Poorer elderly householders living in social housing.
- Couples and young singles in modern starter homes.
- Owner – occupiers in older style housing.
- Wealthier older households in rural locations and on town edges

3.7.3 The population increase will require land to build houses, (and supporting infrastructure). (**See 3.3**). The use of unsuitable land, (e.g. flood plain or similar), could lead to a rise in rescue incidents. **Understanding where growth locations are is vital in order to ensure that our fire cover meets societal requirements.**

3.7.4 Additional dwellings, and an increasing population, could lead to an increase in dwelling based incidents. (It is reasonable to assume that there will also be an increase in business premises – offices, warehouses, and (light) manufacturing – within Essex). There is a change in High Street use with increased conversion of commercial buildings to domestic use. Shop premises become vacant, then may be let for short-term use which may lead to abuse, particularly if left empty.

3.7.5 The shift in demography provides the demand/opportunity for increased Prevention and Protection measures whilst maintaining an appropriate Response capability relative to risk.

3.8 COMMENTARY

- The changing demographic in Essex (population and geography) requires our work to be agile enough to change delivery to meet need through careful analysis of the target group.
    - **Prevention**: The area of greatest work and expansion will be home safety – covering vulnerable groups, social housing and kitchen fires. This links in with an aging population and with housing stocks changing and the administration of care more in the home with less finance and pension. Meanwhile, appropriate advice to (social) landlords, homeowners and those in assisted housing with targeting those most vulnerable and at risk will continue along with building partnerships and collaborating with other agencies for the benefit of our communities.
    - **Protection**: There is a risk based inspection programme. ECFRS will assess the level of risk as new buildings are occupied, and programme audits depending on the outcome of the assessment, taking into account the risk of a particular premises compared to all other premises in Essex. If the risk profile changes due to development, we will rearrange our resources to meet this change.
    - **The "Grenfell Effect".** What legislative, (primary and secondary), changes are likely following the conclusion of the Grenfell Inquiry etc.? Will this cause an effect on ECFRS resources in order to comply, or seek the compliance of others?
    - **Response**: – Incident type and frequency. Subject to review because of these changes in 'audience'.

- New houses are 'safer' (when new). The Building Control/Planning profile should inform planning for Operational and Safer Communities resources. (Consider wooden framed dwellings used for ease and speed of construction.)
- An ageing population, (**See Figure 4 Pg 31**), requires community engagement and the delivery of Prevention activities to ensure it is meeting the needs of the Community. How we deliver home safety advice will have a huge part to play in the future safety of the residents of Essex. There is a sharp increase of care in the home. Targeting those most vulnerable through our partnerships with Care agencies will continue. The use of the F I R E model by care agencies to identify those most at risk from fire in the home is seeing an increase in Safe and Well home safety visit referrals across the County, with agencies doing the identifying and ECFRS carrying out the visit.
- ECFRS Safe and Well model is looking at the whole home safety package encompassing in the future:
    - Carbon monoxide.
    - Flood risks.
    - Slip, trips and falls.
    - Crime prevention.
    - Domestic Violence reduction.
    - Arson awareness.
    - Signposting.
- The Target partnership approach will ensure ECFRS is working with all agencies who support the vulnerable and those deemed at risk or will be at risk in the future. These partnerships will be with:
    - Doctors surgeries.
    - Pharmacies.
    - Hospital discharge.
    - Care providers.
    - Home helps.
    - Social care.
    - Meals on wheels' / meal providers.
- Statistically and similarly, an aging population suggests an increase in vulnerable old(er) people.
- An aging population will maintain mobility; they will be pedestrians, drive cars, ride motorbikes and take all forms of public transport.

Please see the partial risk register at the end of the Chapter and the full register at Appendix B.

3.9 LIKELIHOOD

The 'make-up' of the population of Essex determines, in a large part, the likelihood of fire and other incidents occurring. Vulnerable Adults and the elderly are involved more often than not and the numbers within those groups is increasing. The demographics of the latter indicate a significant rise in numbers over the next 15 years.

3.10 IMPACT

The potential for an increasing gap in communications with:

- The vulnerable, (old, aging, in need of support for one reason or another, e.g. young mothers, drug dependency).
- Increased ethnic diversity with larger numbers of people who do not speak English as a first, or second, language.
- Significant increased population in the 65+ age group, with an additional significant increase of the 85+ age group over the next decade and beyond.
- Increased ageing population in geographical areas of vulnerability, or living alone.

CHAPTER 4: PREVENTION AND PROTECTION

4.1 OVERVIEW

Prevention and protection activity is supported by a re-structure of the centralised team in Community Safety. This may cause some of the targeted activity to differ from the areas highlighted within this chapter. (May 2019)

4.1.1 Prevention and Protection precede Response by either seeking means to stop incidents occurring, or, by providing means to safeguard people if an incident does occur. This Chapter seeks to outline our activities in these areas, and some risks associated with this wider societal involvement. Likelihood and Impact are inherent in the paragraphs that follow. The Safer Communities function is being devolved to localised delivery within the Groups. Some core functions will remain however; the crewing arrangements that we are striving to achieve to 'protect the front line' is based upon using station-based personnel to greater effect. Station Managers will be attending Community Safety Partnership meetings and the GM's Local Strategic Partnership meetings. The intention is to apply localised initiatives that fall within role maps.

Prevention

4.1.2 We want to stop fires and other emergencies by working with people in the community, particularly those who are vulnerable. We also want to work with our partners to improve understanding of the risks that communities in Essex face and how we can minimise them. We do this by a programme of education and community engagement that is at the forefront of the services we deliver.

Protection

4.1.3 We work with businesses and partners across Essex to protect people from fire in their homes, at work, at leisure and on the roads of Greater Essex. Our protection work also supports businesses, helping to ensure that all premises are safe, comply with legal requirements, and have strong fire-safety measures to protect their assets, their employees and the public who may visit. When necessary we will take enforcement action against building owners or occupiers (or both) when fire safety is below standard.

4.1.4 More often than not, we work with other agencies in activities that cover the following:

- Vulnerable Persons.
- Criminal Activity.
    - Human Trafficking/ Modern day Slavery.
    - Gangs and Organised Crime.

4.1.5 See **Vulnerable People** and **Criminal Activity** below at **4.3** and **4.4/4.5** respectively for more detail.

4.2 RISK PROFILING

Understanding the Nature of the Risk

4.2.1 The aim of risk profiling is to ensure that we allocate resources to optimise opportunity and to contribute to risk mitigation – the right people in the right place (with the right resources) at the right time to benefit our communities and ECFRS. Where appropriate, delivery will be with partners and stakeholders within Essex. We want to:

- Reduce the number & ***severity of fires***, RTC's and other emergency incidents occurring.
- Reduce the ***severity of injuries*** in fires, RTC's and other emergency incidents.
- Reduce the commercial, economic and social impact of fires and other emergency incidents.

- Safeguard the environment and heritage (both built and natural).
- Provide value for money.

4.2.2 In order to achieve a detailed profile, it is vital to understand:

- Who – is most at risk?
- Where – what areas are most affected?
- What – type of calls/incidents is ECFRS attending? (Fire/AFA/Hoax/ESS/RTC)?
- Why – are the calls happening?
- How – can we effectively address the problems identified?
- By when – must an intervention be made?

4.2.3 It is already widely acknowledged that those at most need in a wide range of risk areas are also the hardest to reach. In order to ensure that resources are concentrated in the right way, it is necessary to ensure that the risk profile generates knowledge of the characteristics and needs of those at risk in order to inform decision-making and the allocation of resources, e.g., direct interventions, sponsoring local community groups, leaders, partners, and using media.

4.2.4 Typically, but not exclusively or exhaustively, those at risk from fire are:

- The elderly.
- Those in lower socio-economic groups.
- Persons from ethnic minorities.
- Families/lone parents with young children.
- Those who live in deprived neighbourhoods.
- Those whose first language is not English

4.2.5 The household characteristics with the highest incident rates of experiencing a domestic fire are -

- Multi-ethnic, low-income areas.
- Economically inactive residents, e.g. sick/disabled/students/carer.
- Residents dissatisfied with current accommodation or local area.
- Lone parents with dependent children.
- Households with a low/very low gross annual household income.

4.2.6 The household characteristics of those with the lowest levels of working smoke alarm ownership are with people:

- Living in a converted flat or maisonette.
- Affluent urbanites, town and city.
- Unemployed.
- Dissatisfied with their current accommodation.
- In a Black, Asian and Minority Ethnic (BAME) group.
- Living in private rented accommodation.
- With a low gross annual household income, of less than £5,000.

4.2.7 Household characteristics associated with both an increased risk of experiencing a domestic fire and a lesser likelihood of owning a working smoke alarm, (vulnerable households), are those:

- Frequently using candles.
- Frequently using room heaters.
- Dissatisfied with their accommodation.

4.2.8 Other types of vulnerable households that are vulnerable and require special attention are those: -

- Containing a smoker.
- With lowest incomes.
- With young residents i.e. aged 16 – 24 years old.
- Dissatisfied with their local area.

4.2.9 Other factors to take account of are:

- **The Age Profile:** The elderly, young residents, including single parent families, and children.
- **Ethnic Profile:** Overall 5 - 8% of the population are BAME. The spread across Essex is thin.
- **Dwelling Occupancy:** Freeholders, general rental, student rental, Adult Social care rental, Houses in Multiple Occupation. (HMOs), density of occupation.
- **Deprivation Profile:** A central Government methodology that factors in income, employment, health deprivation & disability, education, barriers to housing and services', living environment and crime, affluent and non-affluent areas and associated health.

4.2.10 The level of detail in a deprivation profile will be appropriate to that of the risk. Where needed the accuracy will be enhanced by looking at the national statistics by Lower Layer Super Output Areas (L-SOAs) referred to as "Small Areas". This has the advantage of highlighting small pockets of potential problems that may previously have been hidden by using ward or council boundary figures. Small Areas contain on average 1,500 people, with a minimum of 1,000 and are sub-divisions of current wards.

4.2.11 Though not exhaustive, the list below will be the type of factors that, if applicable to a small area, will increase its risk rating, i.e. where:

- A fatal fire has happened in the last five years.
- The percentage of over 65s is above 5% of the national average.
- The area is in the top third of the most deprived small areas.
- More than five house fires have occurred over the past two years.
- More than five RTC's occur in the same location per annum.
- One of our partners identifies this as a priority area.
- A proportion of ethnic residents is in excess of 100 people.
- The percentage of population for the area is 5% above the national average for those aged 15 years and below.

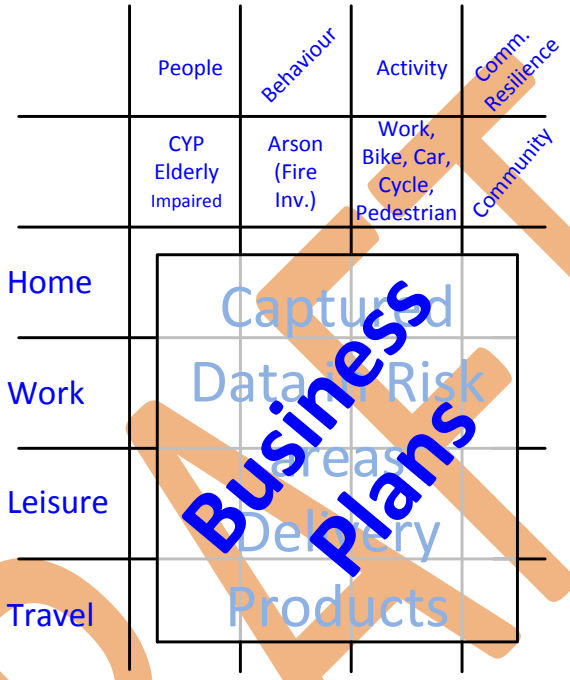
4.2.12 Risk profiling will use the broad data in the SAOR as a foundation to extract and expand on. Departments must drill down into specific geographic or community group areas to identify the specifics that will, collectively demand attention (resources) in order cancel (best case scenario) or mitigate the impacts of risks that materialise.

4.2.13 Risk profiling should link with the PORIS process. Headings in a profile may run as follows:

- The geographic area.
- The number of residents within.
- The numbers of households occupied.
- Percentages of the population.
- In good and/or bad health.
- Unemployed.
- Between 16 – 24 years old with no qualifications.
- BAME.
- Over 65.
- The level on the Deprivation Indices.
- Population density.
- Primary and secondary fire call analysis.

- Analysis of:
  - RTC.
  - Hoax calls.
  - AFA's.
  - ESS.

4.2.14 The desired effect is to produce a plan based on an Integrated Risk Management Plan referencing our Community Safety Strategy and all underpinned by the SAOR, leading to costed and integrated departmental business planning.



4.3 VULNERABLE PERSONS

4.3.1 The Care Act 2014 for the first time establishes legislation setting out specific safeguarding duties for local authorities and their partner agencies. The safeguarding duties apply to an adult who:

- Has needs for care and support (whether or not the local authority is meeting any of those needs).
- Is experiencing, or is at risk of, abuse or neglect.
- Because of those care and support needs, is unable to protect themselves from either the risk of, or the experience of, abuse or neglect.

4.3.2 The Children Act 1989 and the Adoption and Children Act 2002 govern local authorities' activities when engaging with children.

4.3.3 There are currently six safeguarding boards across Essex for vulnerable persons:

- The Essex Safeguarding Adults Board.
- The Essex Safeguarding Children Board.
- Southend Local Safeguarding Adults Board.
- Southend Local Safeguarding Children's Board.
- Thurrock Local Safeguarding Adults Board.
- Thurrock Local Safeguarding Children's Board.

4.3.4 The Southend, Essex and Thurrock (SET) safeguarding boards set out how agencies and individuals should work together to safeguard and promote the welfare of adults, children and young people through the SET Procedures. The target audience is professionals (including unqualified staff and volunteers) and front-line managers who have particular responsibilities for safeguarding and promoting the welfare of adults, children, and young people.

4.3.5 A vulnerable adult[20] is any person aged 18 or over who:

Is or maybe in need of a community care services by reason of mental, physical or learning disability, age or illness.

And who:

Is or maybe unable to take care of him or herself or unable to protect him or herself against significant harm or sexual exploitation.

They may include:

- People with a mental health problem or mental illness.
- People with a physical disability.
- People with sensory impairment.
- People with a learning disability.
- People who are frail and / or experiencing a temporary illness.
- Single parent families.

4.3.6 There are an estimated **57,000** declared[21] vulnerable adults in Essex. The ECFRS profile of **fire fatalities** in 2011[22] indicated that almost all fitted the profile of a vulnerable adult. The exceptions appear random and unpredictable. A simple analysis of a limited data set suggests that there are 10 'serious' injuries and 100 'slight' injuries for every fire fatality.

4.3.7 Fire fatalities occur all over Essex. Serious and slight injury tends to be more clustered and linked directly to volume. As a result, Basildon, Colchester, Southend and Harlow have the most.

Year	INCIDENT	ATTENDED BY	PERIOD	Age	Gender	Alarm?
16/17	21606055	Tillingham	2016/04	unknown	sex not known	no alarm - caravan
	21615218	Colchester	2016/09	90	male	alarm present - did not sound
	21643376	Loughton	2016/11	unknown	female	not known
	21643526	Clacton	2016/11	72	male	smoke alarm present - raised alarm
	21645760	Braintree	2016/12	42	female	not known
	21645760	Braintree	2016/12	12	female	not known
	21645955	Southend	2016/12	95	female	alarm present - too far from incident to sound
17/18	21751915	Old Harlow	2017/04	54	male	no alarm
	21753627	Basildon	2017/05	10	male	smoke alarm present - raised alarm
	21760935	Southend	2017/08	79	female	smoke alarm present - raised alarm
	21766455	Colchester	2017/11	50	male	no alarm
	21872060	Rayleigh Weir	2018/02	79	male	smoke alarm present

[20] Southend, Essex and Thurrock Safeguarding Adults Handbook
[21] Data via direct contact with the Safeguarding Adults Boards
[22] Analysis of Accidental Dwelling Fires in Essex – Report by Performance Management & Improvement October 2011

	21873475	Chelmsford	2018/03	90	male	smoke alarm present
	21874201	Witham	2018/03	unknown	female	smoke alarm present
18/19	21881275	Orsett	2018/07	22	male	in car - not dwelling
	21892456	Clacton	2018/12	unknown	male	smoke alarm present
	21994129	Clacton	2019/01	58	male	alarm present - did not sound
	21994451	Sible Hedingham	2019/02	unknown	male	light aircraft fire

4.4 CRIMINAL ACTIVITY - HUMAN TRAFFICKING/MODERN DAY SLAVERY

4.4.1 Human Trafficking is "the movement of people by means such as force, fraud, coercion or deception, with the aim of exploiting them. It is modern day slavery."[23]. The impact on the victim and the community can be high through personal impact to the victim; criminal implications (sexual victimisation; forced labour; links to violence and drug supply; and links to organised crime); and financial implications to the victim, community and economy. It is a crime against the person due to a violation of their human rights. In 2015, 3,266 people were identified in the UK as potential victims of trafficking. This was a 40% increase on those identified in 2014.

4.4.2 Modern-Day slavery is closely linked to human trafficking, as the people being trafficked will normally be forced to work. The forced work can take many forms from labour on farms, building sites or factories. This can include both adults and children. People may also be forced to work in in the sex industry as prostitutes or domestic servitude as nannies or domestic help. The reasons for trafficking humans may also include organ harvesting.

4.4.3 As part of their regular audit programme Technical Fire Safety, (TFS), Officers will attend commercial premises that may also incorporate sleeping accommodation. Whilst in most cases this accommodation will be provided for the occupier and their family or staff, there is the possibility that the accommodation may be used for criminal activity such as human trafficking and / or modern-day slavery.

4.4.4 TFS Officers receive training on how to recognise the signs of this criminal activity and how to deal with the situation and engaging with other relevant agencies. However, there is potential significant risk of injury to our Officers attending these premises both for audit purposes and operationally, as the premises may be overcrowded. As the accommodation is likely to be unregulated, the layout of the premises may have been changed and structural integrity compromised resulting in the potential for collapse and rapid-fire spread. The services to the premises (gas and electricity supply) and heating appliances may be in poor condition and or tampered with increasing the risk of electrocution, asphyxiation from carbon monoxide or fire. The normal escape routes and exits from the premises may be blocked or locked impeding the escape route in case of fire and there may also be a direct threat of violence from the 'traffickers' guarding the premises, as trafficking is often related to serious organised crime.

4.5 CRIMINAL ACTIVITY - GANGS AND YOUTH VIOLENCE IN ESSEX

4.5.1 In November 2011, the Government published 'Ending Gang and Youth Violence', a report which sets out the measures needed to tackle gang and youth violence, together with a series of national actions. The central message was that gang and youth violence can only be addressed by a coordinated approach, based on early intervention as well as enforcement, and the active involvement of every local agency to share information, resources and accountability.

[23] https://www.unseenuk.org/modern-slavery/human-trafficking

4.5.2 National government adopts the definition of a 'gang' as set out in the *Dying to Belong* report by the Centre for Social Justice. 'Gang' is defined as a relatively durable and predominantly street-based group of young people whom:

- See themselves, and are seen by others, as a discernible group.
- Engage in criminal activity and violence.
- Lay claim over territory.
- Have some form of structure.
- Are in conflict with other, similar, gangs.

4.5.3 Friendships and peer groups are an important part of growing up. Whilst some group- gatherings can lead to anti-social behaviour, this should not be confused with serious violence or criminal behaviour. The majority of young people in Essex describe key features of a 'gang' as having a degree of criminal activity, an organised structure with leaders, displaying violent behaviours and being in conflict with other groups or gangs. These factors all corroborate with the government's definition of gangs.

4.5.4 Knowledge and expertise within the Essex Youth Offending Service describes the development of 'satellite gangs' as an important and current challenge for Essex. Established and structured gangs moving to other areas, with the originator often being the settled street based gangs in London, form satellite gangs.

4.5.5 Overwhelmingly, in group-discussion, young people feel that better opportunities, more things to do and positive roles models could all influence young people from affiliation to gangs. Young people receiving services from Youth Offending also felt that having more things for children and young people to do might help prevent young people getting involved. Having more youth facilities and safe places for young people to go would help prevent them getting into "mischief".[24]

[24] Ending Gang and Youth Violence, Peer Review Report, Basildon, November 2015

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities
4. Changing demographics in Essex in the short and medium terms leading to a shift in age and potentially vulnerable population groupings.	• An aging population with a significant increase in older persons who will be entering the over 65s and the 80+ age groups in the next 5 and 10 years and considered to be potentially at higher risk from fire. • Increase in the number of immigrants/migrants living and working in Essex including BAME increasing the diversity of persons living in Essex. • Change in Local Authority provision for the elderly and wider vulnerable sections of our community.	• Unrepresentative workforce. • Increase in the number of un-wanted fire signals. • Increase in the number of fire deaths and injuries. • Greater demand for Community Safety services. • Increase in primary fires. • Greater demand for specialist skills (translators, community workers). • Greater demand on firefighting resources. • Difficulty in reaching high-risk groups. • Increase in the number of blue light movements. • Increased audit volumes for Technical Fire Safety. If staffing levels are not increased, a smaller percentage of high-risk premises will be inspected. • Potential increase in dwelling fires. • Difficulties in communication with an increasingly diverse community. • Increase in the number of vehicles driven by young and old persons leading to a potential increase in the numbers and frequency of RTCs/journeys/travel, notably in young people generally and Powered 2 Wheels in particular.	• Increase in economic loss. • Increase in Service costs. • Lack of available funding. • Lack of awareness amongst migrant community of services available. • Services not informed by local need. • Increase in enforcement action due to poor understanding of UK Regulations. • Lack of Service uptake. • Reduction in other activities i.e. training. • Negative impact on PIs. • Change in FRS 'Standing' or 'Brand' as a result of 'cultural' change in community. • Change in allocation of CS resources. • Increased use of natural resources, e.g. water • Increased care for sick and elderly in own homes NOT care facilities or hospices. • Need for more joined up thinking. • Wider use of inappropriate land for housing development. • Increase in HMOs. • More house building. • More business premises. • Increase in certain types of criminal activity. • Modern day slavery. • Human trafficking. • Additional training around human issues. • Greater need for data analysis to provide information to ensure activities are intelligence led.	• Health and Welfare. (Safe & Well Strategy). • Opportunities to improve the care of the elderly and the education of the young through the promotion of passive and proactive fire suppression/detection systems in domestic premises and the delivery of more intelligent and focussed road traffic safety education. • Opportunities for more diverse workforce. • Partnership working with other agencies to support mechanisms to manage a significantly larger older population, e.g. work with Planning Control/Building Control to design inherently safe environments. (Longer term proposition) • Data sharing between partners and stakeholders. • Increased Inter- and Multi-Agency Collaboration

CHAPTER 5: ROAD, SEA & AIR TRANSPORT INFRASTRUCTURE

5.1 OVERVIEW

5.1.1 Essex has an extensive and in places extremely busy transport network. Road and rail currently takes well over half a million people to and from work every day. Air transport from Stansted and Southend provides international connections for leisure and business purposes.

5.1.2 Vehicle miles statistics on Highways England, (HE), owned roads shows a significant use, as follows:

2018

Essex Roads	VM_24hr	VM_Daytime (06:00 to 20:00)
A1089	24,321,128	20,724,222
A12	960,949,867	844,311,994
A120	351,965,563	304,182,110
A13	114,027,740	91,228,803
M11	1,678,377,546	1,393,385,345
M25 & A282	2,020,879,790	1,677,678,825
Grand Total	**5,150,521,633**	**4,331,511,299**

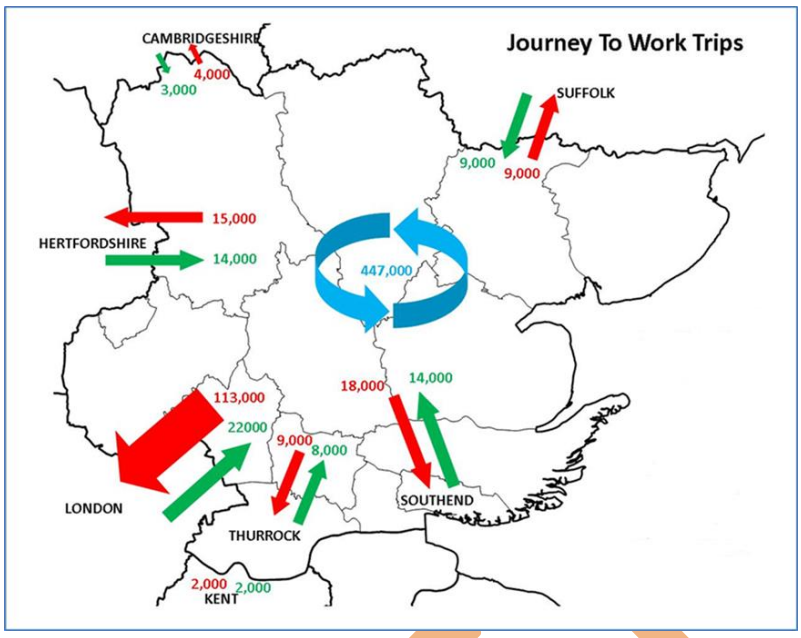
Jan – Feb 2019

Essex Roads	VM_24hr	VM_Daytime (06:00 to 20:00)
A1089	4,391,031	3,686,963
A12	160,653,367	140,141,170
A120	59,801,757	51,252,905
A13	19,078,479	15,460,002
M11	258,658,281	214,729,601
M25 & A282	313,125,729	260,124,879
Grand Total	**815,708,644**	**685,395,519**

HE road ownership extends along the A13 upto the A1089 for Tilbury, then the A1089 to the ASDA / docks roundabout.

5.2 COMMUTING BEHAVIOURS

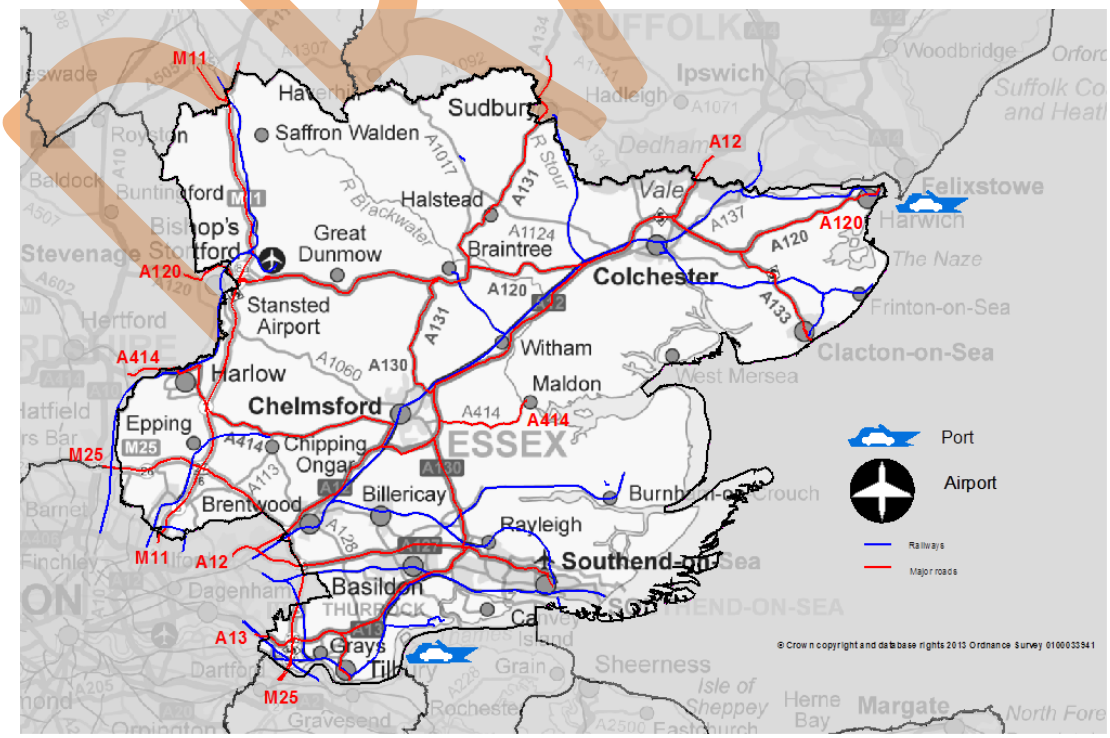
5.2.1 Demand for travel in Essex is high, reflecting the advantageous location of Essex and its capacity for trips to London, across the UK and internationally. The average Essex resident commuting distance is 14.5km, 4km above the national average, signifying the importance of London as a source of employment, particularly for those living to the west of the County. As can be seen below, more people currently commute out of Essex than commute in (with over 20,000 commuters travelling from Essex to the City of London alone each day). Apart from those who travel to London, journey to work data for Essex residents indicates that a high proportion of people live in close proximity to their place of work, with 30% of residents living less than 5km from their job.



5.2.2 This suggests that the major centres in Essex serve principally their own population and their associated rural catchment areas, providing jobs and services for local people. Commuting between the centres and neighbouring cities, boroughs or districts is relatively low, with the most significant movements being from Tendring to Colchester, Braintree to Chelmsford and Castle Point to Basildon.

5.3 ROAD TRANSPORT INFRASTRUCTURE

5.3.1 Large parts of Essex are, as indicated in **paragraph 3.2**, rural areas and the transport infrastructure crosses these. Even in more urbanised areas, some roads and rail tracks are in less accessible locations. Capability to access an Air or Rail related incident, (refer in particular to **paragraphs 5.11.9 and 5.11.17**), is a potential issue.



Routes of National Significance

5.3.2 The Department for Transport (DfT) regards the M25, M11, A12 and A13 (as far as Tilbury) to be transport routes of national significance[25]. The A120 is part of the Trans-European Network (TEN) connecting east coast ports with the rest of the UK, as far as Holyhead and the Republic of Ireland. These routes are working at, or near to, their capacity. Journeys can be unreliable, especially at peak times. With the increase in traffic through urban areas, necessitated by diversions, there is also an enhanced risk of accidents involving vehicles carrying hazardous cargos. (See also reference to **DP World London Gateway** on **page 62**).

5.3.3 A DfT 'network resilience' study highlighted the following sections as the greatest concern:

M25	North of Dartford River Crossing	A13	Purfleet to Stanford-Le-Hope[26]
M25	Brentwood (J28) to Epping (J27)	A13	Stanford-Le-Hope to Benfleet
M25	J23 to Epping (J27)	A12	Brentwood to Ingatestone
		A12	Chelmsford by-pass

Major Roads

5.3.4 Essex has 129km of motorway, 134km of trunk routes and 588km of principal roads[27]. The motorways are the M11 and the M25, with interchanges for other routes near Epping (M11) and, J28 (A12) Brentwood, J27 (A127) to Southend, and the A13/Thames River Crossing to Kent (M25). The A120 provides an important link between the M11, the A12 and the East Coast Port of Harwich. The A13 and the A127 provide the two primary routes between London and the south of Essex. The A130 provides a cross county link off the A13 at Benfleet to the A12 with a link to the Fairglen Interchange near Rayleigh, through Chelmsford to link with the A120 near Braintree. The A12 provides the main London to East Coast ports route.

5.3.5 The Dartford River crossing generates approximately **25m vehicle movements each year in either direction**.[28] The installation of an automatic charging system in 2014 saw the removal of booths and barriers to reduce congestion at the crossing[29]. Crossing between 10pm and 6am remains free. Traffic volumes have grown by 75% since opening the **QEII Bridge** in 1991.

[25] The Greater Essex Integrated County Strategy, December 2010.
[26] Work on the A13 is in hand at April 2019 between Orsett and Stanford-le-Hope to facilitate better HGV movement from DP World to the M25.
[27] Essex has approximately 7,500km of roads in total.
[28] Highways Agency RIU_SE
[29] Dart Charge requiring pre-payment, or a payment within 24hrs of crossing.

Transport tunnels

5.3.6 Essex has several major transport tunnels. Tunnels[30] provide additional operational hazards, including:

- Construction features.
- Inherent fire loading of the structure and facilities.
- Fire loading of the transport system and vehicles using it.
- Access to large numbers of the public (who may be unfamiliar with the tunnel).
- Effect of ventilation to the access structures.
- Communications.

5.3.7 The main transport tunnels[31] in Essex are:

- **Dartford River Crossing**: Two, two-lane road tunnels flowing Kent to Essex under the River Thames. Usually both tunnels operate northbound, but one in each direction if the **QE2 Bridge** (Essex to Kent**)** is unavailable. Usually the control to tunnel access is on the Kent side; however, if one tunnel is for Essex-Kent traffic, **there is no ability to control traffic into the tunnel in the event of an incident**. The tunnels are 1.4km long.
- **High Speed 1 Thames Tunnel**, 2.9km long, carrying separated twin bores "to" and "from" London. (**See 5.6.6**)
- **Stansted rail tunnel**: Carries the Stansted Express rail line on a short branch line from the West Anglia Main Line. The tunnel is a bi-directional rail tunnel, approx. 1.7km in length. Also known as Cooper's Lane Tunnel.
- **Stansted transit tunnel**: This tunnel is 3km long and completely within the boundary of Stansted Airport. It runs between the main terminal and the satellite terminals. It is only accessible after passing through security in the airport.
- **Bell Common Tunnel**: Carries the M25 between Epping (Junction 27) and Waltham Abbey (Junction 26). It is 505m long, and is a 'cut and cover' tunnel, a method involving digging a trench then building sidewalls after which a roof is placed over the top. Soil is then placed on top and vegetation allowed to grow. Recent refurbishment increased the width to four lanes with the fitting of a forced ventilation system.

5.3.8 ECFRS is likely to mobilise to an incident at the **Holmesdale Tunnel**, also situated on the M25, and a very short distance across the County border into **Hertfordshire**. The western end of the tunnel is part of Junction 25. This too is a cut and cover construction. The tunnel is 684m long. Refurbishment works (2007) lengthened the tunnel, with new lighting, fire protection and safety systems and an extra lane in each direction.

Proposed transport projects

5.3.9 There are some proposed projects, which may assist in improving reliability issues.

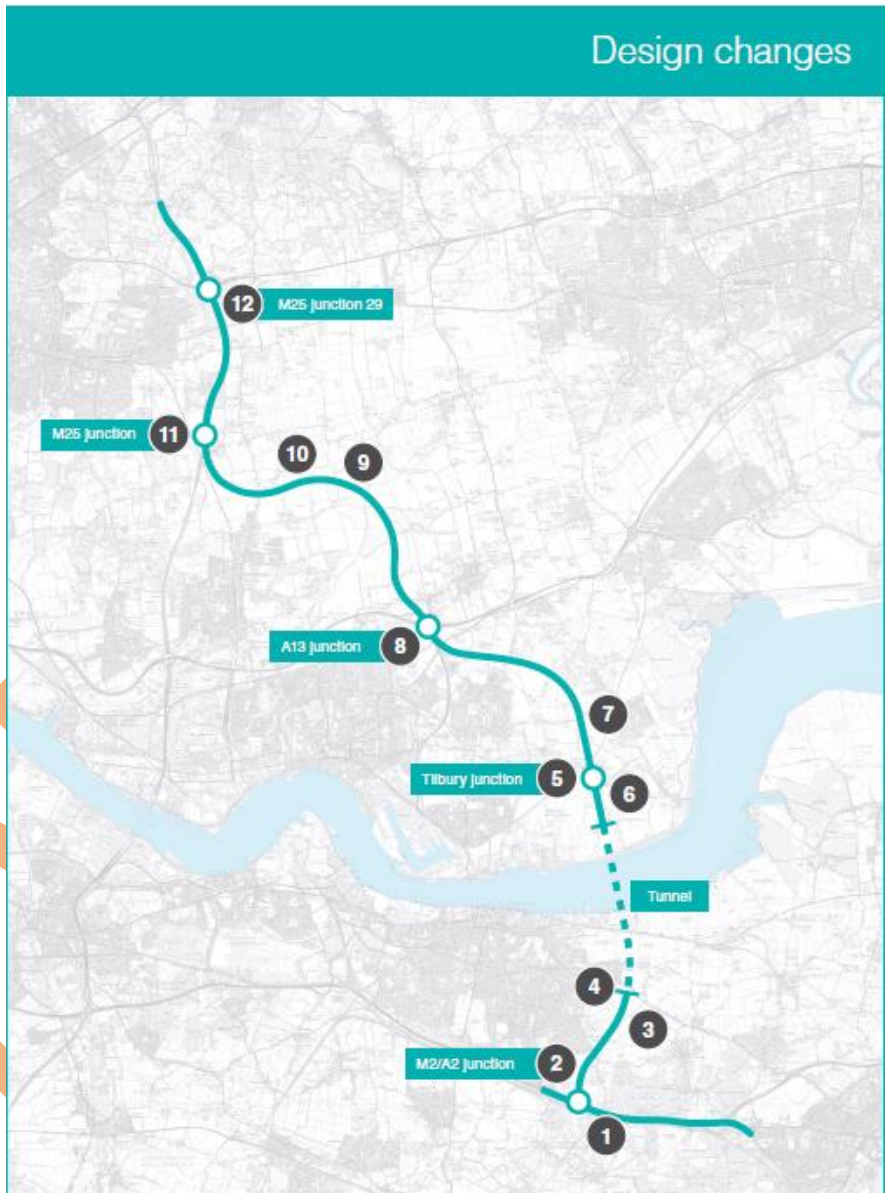
- Crossrail, increasing rail passenger capacity across London. (**See 5.6.8**)
- M25 SMART[32] Motorway capacity increases.
- A12 Chelmsford to A120 widening scheme (scheduled 2020)
- Essex County Council Highways schemes can be found at http://www.essexhighways.org/Transport-and-Roads/Highway-Schemes-and-Developments/Major-Schemes.aspx
- Southend Borough Council road schemes can be found at http://www.southend.gov.uk/roadworks
- Thurrock Council road schemes can be found at

[30] Refer to the appropriate National Operational Guidance
[31] See paragraph 5.6.6 regarding the Channel Tunnel Rail link.
[32] Using technology to manage motorway use, e.g. signs posting variable speed limits

https://www.thurrock.gov.uk/roads-and-pavements

- Lower Thames Crossing, to relieve pressure on the Dartford River Crossing. Route approved 12 April 2017. Still in consultation, with a proposed start in 2021 with planned completion in 2027.Start and End dates tbc.

Latest Proposed Route October 2018



Proposed Northern Portal (Essex to Kent)

Proposed Rest/Service Area, East Tilbury

Vehicle ownership in Essex

5.3.10 Greater Essex vehicle registrations for 2017 are on the following page.

Department for Transport statistics

https://www.gov.uk/government/statistical-data-sets/all-vehicles-veh01

Table VEH0105 (Amended for Essex)

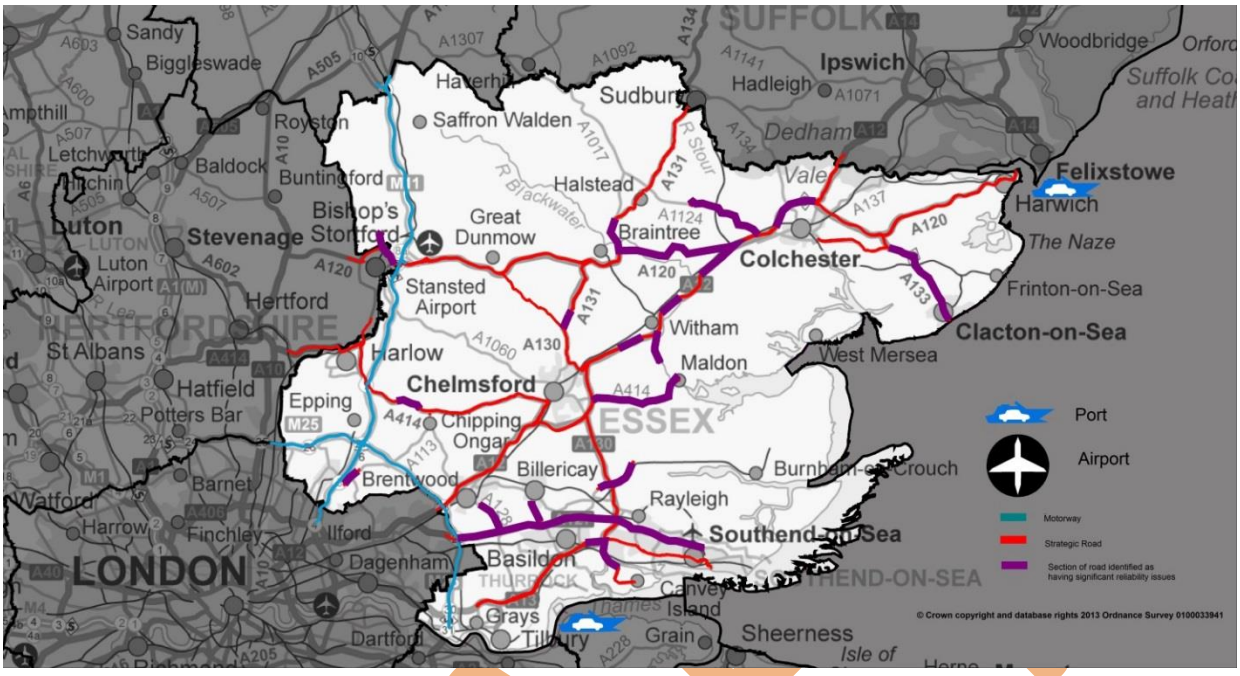
Thousands

LA	Cars	Motor cycles	Light goods	Heavy goods	Bus and coaches	Other vehicles [2]	Total	Of which: Diesel Cars	Of which: Diesel Vans
Southend	80.8	3.4	7.4	0.5	0.2	0.7	93.0	22.7	6.9
Thurrock UA	83.0	3.0	10.0	2.6	0.3	1.3	100.1	30.8	9.7
Essex	796.5	33.5	99.6	11.4	2.4	16.9	960.4	277.0	95.2
TOTAL	**960.3**	**39.9**	**117.0**	**14.5**	**3.0**	**18.9**	**1,153.4**	**330.5**	**111.7**
Basildon	91.0	3.3	11.8	1.4	0.3	1.4	109.3	30.5	11.4
Braintree	84.2	4.1	11.9	1.2	0.2	2.1	103.7	31.6	11.3
Brentwood	50.1	1.4	5.6	0.6	0.2	0.7	58.5	18.2	5.3
Castle Point	49.0	2.1	5.9	0.5	0.2	0.6	58.3	15.7	5.6
Chelmsford	95.8	3.8	10.3	1.6	0.3	1.8	113.6	32.5	9.8
Colchester	92.3	4.5	10.6	0.7	0.2	1.6	110.0	33.0	10.1
Epping Forest	72.1	2.4	9.3	0.8	0.2	1.9	86.8	24.0	8.8
Harlow	42.1	1.5	4.5	1.5	0.1	0.4	50.1	13.9	4.4
Maldon	39.7	1.9	6.7	0.8	0.1	1.4	50.6	14.8	6.4
Rochford	47.9	2.1	5.9	0.5	0.2	0.7	57.5	14.6	5.7
Tendring	76.3	3.8	9.7	1.0	0.2	2.1	93.2	26.5	9.3
Uttlesford	55.5	2.3	7.3	0.8	0.3	2.0	68.1	21.6	6.9
Unknown (3)	0.4	0.1	0.1	-	-	0.1	0.7	0.1	-

1. Vehicles are allocated to a local authority according to the postcode of the registered keeper. This is the keeper's address for privately owned vehicles of the company's registered address for company owned vehicles. Significant changes in the number of vehicles from year to year can often occur when companies with a large number of vehicles change their registered address.
2. Includes rear diggers, lift trucks, rollers, ambulances, Hackney Carriages, three wheelers and agricultural vehicles.
3. Refers to vehicles where the LA District geographical location cannot be allocated due to the postcode being incomplete.

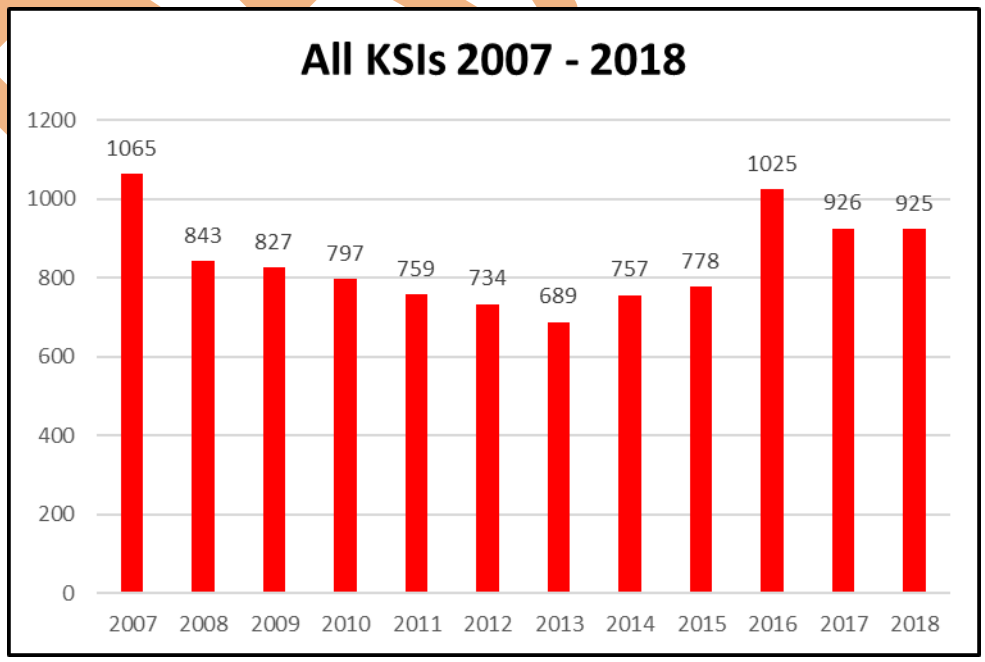
Source: DVLA/DfT Last updated 29 April 2019. Next update: April 2020

Sections of the road network likely to suffer from journey unreliability



5.4 ROAD TRAFFIC COLLISIONS IN ESSEX[33]

5.4.1 Road Traffic Collisions (RTCs) are a significant issue in Essex – between January and December 2018* there were 925 people killed or seriously injured (KSI) because of RTCs[34]. Whilst there has been a reduction in RTC KSIs since 2007, the number of people killed and seriously injured on our roads remains too high. Although there was a steady fall in the overall number of RTC KSIs from 2007, there has been a significant increase in KSI's since 2013 (from 689 KSIs in 2013 to 926 in 2018 – an increase of 34%). The chart below shows KSIs in Essex for the past 11 years:



[33] https://saferessexroads.org/collision-data/

[34] This figure is provisional as STATS19 data has yet to be signed off by the Department for Transport.

* 2018 Collision figures are provided by Essex Police and are provisional at the time of writing, (April 2019).

5.4.2 Data for 2018 shows the proportion of KSI for each of ECFRS target groups:

- Powered two wheeler collisions (21.4% of all KSI casualties)
- Crashes involving a young car driver aged 17 to 25 (7% of all KSI)
- Pedestrians (15.6% of all KSI)
- KSI casualties aged 0 to 17 (6% of all KSI)
- Pedal cycle KSI casualties (11% of all KSI)

Resources

5.4.3 Funding streams to support road safety activity have been under pressure nationally for some years.

5.4.4 The UK Government no longer sets KSI reduction targets for local authorities and other partners to achieve (despite robust reduction targets existing across the EU). Combined with the Government's austerity measures to reduce the national budget deficit this represents a significant challenge to all those involved with RTC reduction activities in Essex.

5.4.5 Notwithstanding this, organisations with responsibilities to reduce RTC KSI's in Essex remain committed and focussed to achieving sustainable reductions and have set challenging casualty reduction targets to help inform prevention activities. The 'Safer Essex Roads Partnership', (SERP), provides a co-ordinated approach to road safety and RTC reduction across the County.

5.4.6 SERP's purpose is to reduce death and serious injury on Essex roads to zero, an ambitious vision and one that cannot be tackled alone: each road user plays a part. SERP has set a challenging interim target to reduce death and serious injuries by 40% by 2020 (from the baseline average of 2005-2009). This equates to fewer than 607 deaths and serious injuries, and fewer than 4,108 slight injuries, by 2020. As a key SERP partner, ECFRS has adopted those targets.

5.4.7 Of fundamental importance is SERP's annual Joint Road Safety Delivery Plan, which contains all road safety prevention activities across all partners. The Plan is data-led and focuses on the priority road user risk groups.

5.4.8 Death and injury resulting from RTC's is tragic, emotional, and expensive; but it is preventable. Service involvement in effective and well-evaluated road safety activity not only protects the most vulnerable road users but also helps prevent the numbers of people killed or seriously injured on the roads from increasing. It will also reduce the economic and social costs that result from road traffic collisions.

5.4.9 Causes of RTCs, and the resultant KSI figures, support the corporate objective to focus on preventative activity in this area. The incidence of RTCs resulting from, e.g. speeding, drink/drug related driving, distraction and injuries as a consequence of, e.g. not wearing a seat belt, provide a basis for focused remedial/interventionist actions.

5.4.10 The ongoing significant risk profile of riders of powered two wheeled (P2W) vehicles in Essex provides a robust basis for intervention, promotion, education and assessed riding activity by ECFRS, delivered through its FireBike product.

5.4.11 The ability of ECFRS to effectively address these risks and help achieve sustained reductions in all RTC KSIs, with a particular focus on the high risk groups, is completely dependent on the availability of resources. This is from both within ECFRS itself and from external partners through the SERP and from other product sponsors (i.e. Cannon Motorcycles in respect of FireBikes and Essex Audi in respect of the Fire Car)..

5.5 ROAD PUBLIC TRANSPORT SYSTEMS

5.5.1 There are **37 listed operators of buses** with commercial routes throughout Essex[35]. Many rural areas of Essex have seen decreasing public transport services over the last decade and this has led to access problems and associated social isolation in the countryside.

5.5.2 The Greater Essex Integrated County Strategy recommends a focus on routes that serve:

- Rail and bus stations;
- Large employment sites/areas;
- New residential, commercial or business developments;
- Main town centres;
- Strategic park and ride sites.

5.6 RAIL TRANSPORT INFRASTRUCTURE

5.6.1 There are **343kms** of **railway line** in Essex and **79 railway stations**, including **seven** on the London Underground network. There are plans for a new station as part of the North Chelmsford development.

5.6.2 Network Rail is responsible for the overground track network, with Train Operating Companies (TOCs) operating passenger services on the network: Network Rail routes carry a heavy volume of passenger traffic, especially commuters to and from London. Passenger TOCs in Essex include:

- **Cross-Country Trains** – operating into the County from Birmingham New Street, via Cambridge, to Stansted Airport (Uttlesford District).
- **Abellio Greater Anglia** – operate all rail routes out of London Liverpool Street to Cambridge, Norwich, Southend, Harwich, Clacton and Walton (Pan-Essex).
- **C2C** – operates the route between London Fenchurch Street and Tilbury, Southend and Shoeburyness (Thurrock/Castle Point/Basildon Districts/Southend/Brentwood Boroughs).
- **Transport for London (TfL) –** responsible for London Underground including the route operating into Essex: Central Line between Buckhurst Hill and Epping (Epping Forest District). TfL began running Rail services between Shenfield and Liverpool Street from May 2015, as part of the Cross-Rail (Elizabeth Line) project. The opening of the completed line is dependent on financing. Eventually, a full through service from Shenfield to Reading should operate. The ambition is for upto 12 services an hour to allow passengers to travel through central London without changing trains.

5.6.3 Within Essex, electrified Network Rail routes on the 25Kv A.C. overhead network exist, with the exception of the branch line between Marks Tey and Sudbury. The Underground uses a four-rail system. The additional rail carries the electrical return that on third rail and overhead networks is provided by the running rails. The reason for this is that the return current, if allowed to flow through the running rails, would also tend to flow through the cast-iron tunnel segments. On the Underground, a top-contact third rail is beside the track, energised at +420 V DC and a top-contact fourth rail is centrally located between the running rails, at +210 V DC, which combine to provide a traction voltage of 630 V DC.

5.6.4 In cases where the lines are shared with mainline trains using a three-rail system (usually above ground and not within cast iron tunnel segments), the third rail is set at +630 V and the fourth rail at 0 V DC.

[35] http://www.essexhighways.org/uploads/files/Getting%20Around/Bus/local-bus-suppliers-march-2017.pdf

5.6.5 The routes between London and Manningtree/Harwich carry a high volume of freight traffic to and from the ports at Harwich and Felixstowe. Much of this traffic is containerised, and includes a wide variety of cargos, including hazardous substances.

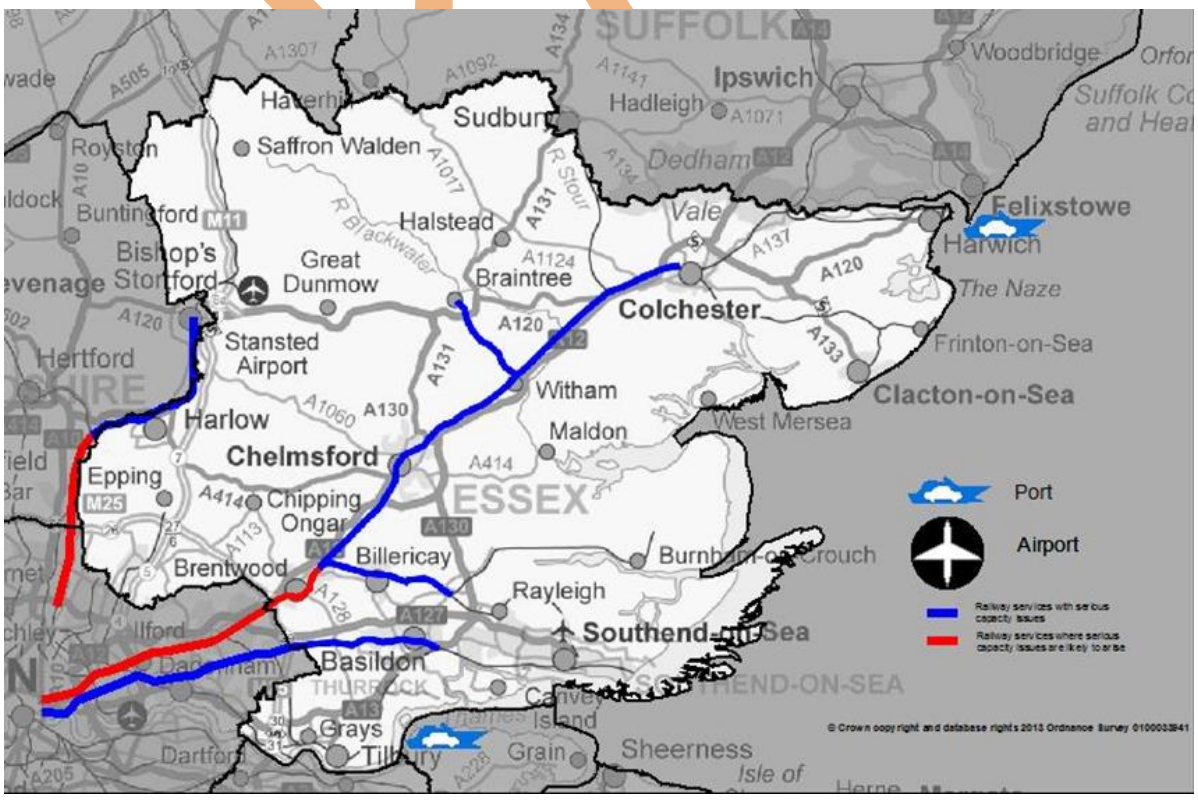
5.6.6 High-Speed 1 (HS1) (formerly the Channel Tunnel Rail Link, (CTRL)), operates from London St. Pancras through Stratford, to Ebbsfleet (Kent), and into Europe (Eurostar) at speeds of up to 300kph, (186mph). It runs on a 25kV 50 Hz OHLE system. The train is 394m long, containing 18 coaches and 2 driving units. At full capacity, the train can carry 750 passengers. The Javelin high-speed domestic rail service between Kent and London uses this line, with the Eurostar service running in the gaps in the domestic service. A large proportion of the route is underground, including the 2.9km long tunnel under the River Thames at Thurrock. There are separate “to” and “from” London bores. There is an access point to this tunnel in Purfleet. Additionally, a short section runs above ground in Purfleet, with dedicated access points. High Speed 1 runs in close proximity to the strategic M25/Thames River Crossing complex. Contingency plans for a multi-agency response to an incident along the line and specifically within the tunnel exist, exercised in 2010 due to “smoke” being seen in the tunnel. Both Kent FRS and ECFRS responded to this.

5.6.7 The Greater Essex Integrated County Strategy recommends an integrated approach at local rail stations, including:

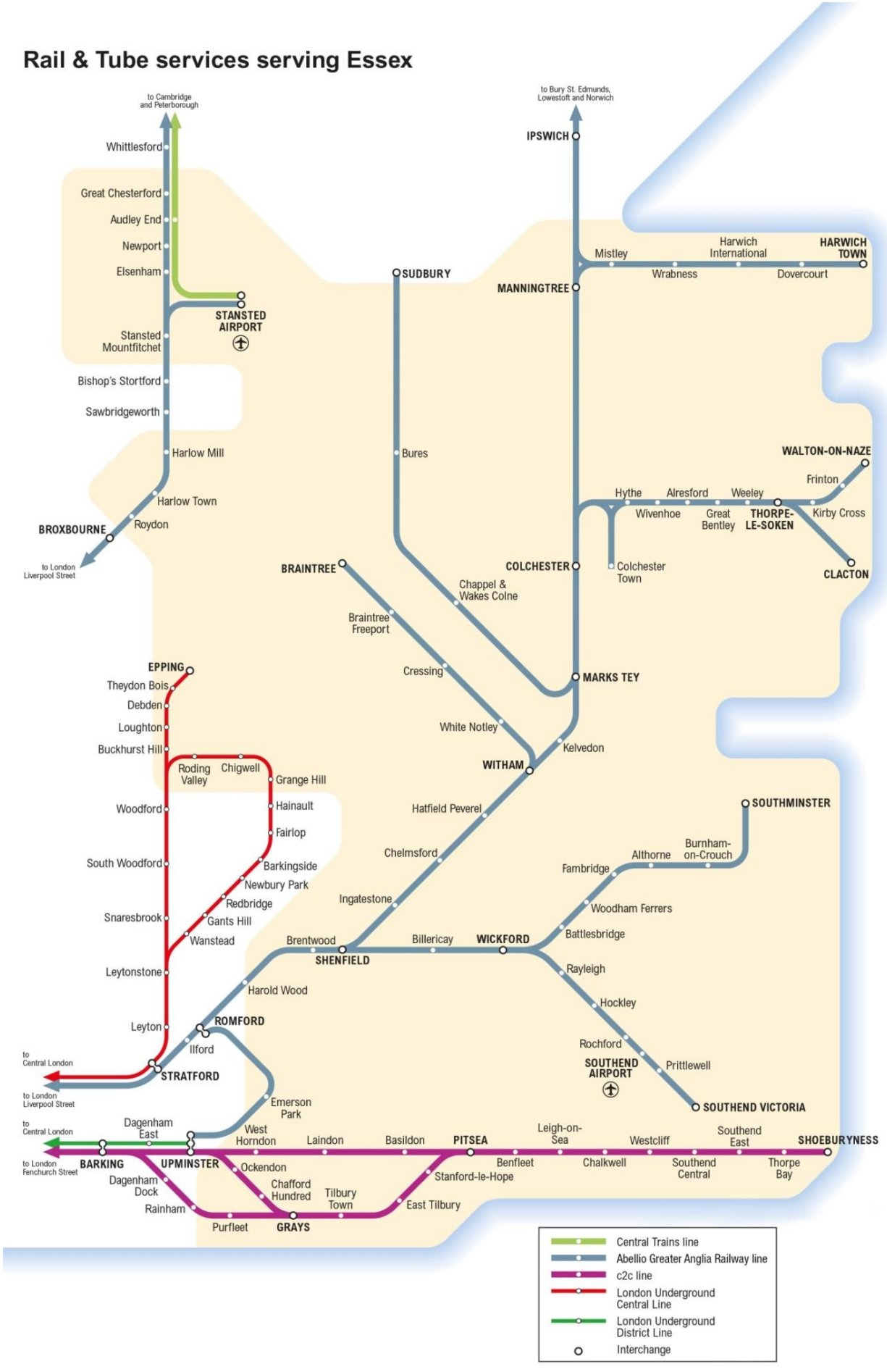
- Development of a new station north-east of Chelmsford;
- Improving facilities at Chelmsford City centre station;
- Improving access to both stations in Harlow;
- Using the Colchester Station Travel Plan as a model to apply at other large stations;
- Improving cycling and walking access to stations, including cycle parking.

5.6.8 DP World London Gateway will increase rail lines and freight moved by rail. (**See 5.7.4.3**).

5.6.9 Population increase and housing development across Essex over the next five to 20 years are indicative of a likely increase in passenger numbers.



Sections of the rail network with capacity issues


Rail & Tube services serving Essex
to Cambridge and Peterborough
Whittlesford
Great Chesterford
Audley End
Newport
Elsenham
STANSTED AIRPORT
Stansted Mountfitchet
Bishop's Stortford
Sawbridgeworth
Harlow Mill
Harlow Town
Roydon
BROXBOURNE
to London Liverpool Street
to Bury St. Edmunds, Lowestoft and Norwich
IPSWICH
Mistley
Harwich International
HARWICH TOWN
Wrabness
Dovercourt
SUDBURY
MANNINGTREE
Bures
WALTON-ON-NAZE
Frinton
Hythe
Alresford
Weeley
Wivenhoe
Great Bentley
THORPE-LE-SOKEN
Kirby Cross
CLACTON
BRAINTREE
COLCHESTER
Colchester Town
Chappel & Wakes Colne
Braintree Freeport
Cressing
MARKS TEY
White Notley
Kelvedon
WITHAM
EPPING
Theydon Bois
Debden
Loughton
Buckhurst Hill
Roding Valley
Chigwell
Grange Hill
Hainault
Fairlop
Barkingside
Newbury Park
Redbridge
Gants Hill
Wanstead
Woodford
South Woodford
Snaresbrook
Leytonstone
Leyton
Hatfield Peverel
Chelmsford
Ingatestone
Brentwood
SHENFIELD
Billericay
WICKFORD
SOUTHMINSTER
Burnham-on-Crouch
Althorne
Fambridge
Woodham Ferrers
Battlesbridge
Rayleigh
Hockley
Rochford
SOUTHEND AIRPORT
Prittlewell
SOUTHEND VICTORIA
Harold Wood
ROMFORD
Ilford
to Central London
STRATFORD
to London Liverpool Street
Emerson Park
to Central London
Dagenham East
West Horndon
Laindon
Basildon
PITSEA
Leigh-on-Sea
Westcliff
Southend East
SHOEBURYNESS
to London Fenchurch Street
BARKING
UPMINSTER
Ockendon
Benfleet
Chalkwell
Southend Central
Thorpe Bay
Dagenham Dock
Chafford Hundred
Tilbury Town
Stanford-le-Hope
Rainham
Purfleet
GRAYS
East Tilbury
Central Trains line
Abellio Greater Anglia Railway line
c2c line
London Underground Central Line
London Underground District Line
Interchange

Essex Rail Stations – Passenger Footfall 2017/18 and 2016/17 [36]

Station Name	District/Unitary	17/18 Entries & Exits	16/17 Entries & Exits	Change
Alresford	Tendring	61,752	69,720	-11.4%
Althorne	Maldon	40,788	44,538	-8.4%
Audley End	Uttlesford	1,011,626	930,960	8.7%
Basildon	Basildon	3,233,788	3,180,178	1.7%
Battlesbridge	Chelmsford	21,108	16,804	25.6%
Benfleet	Castle Point	3,680,038	3,844,366	-4.3%
Billericay	Basildon	3,030,166	3,070,934	-1.3%
Braintree	Braintree	746,514	788,006	-5.3%
Braintree Freeport	Braintree	78,160	82,698	-5.5%
Brentwood	Brentwood	2,992,072	2,883,890	3.8%
Bures	Braintree	58,680	62,838	-6.6%
Burnham-On-Crouch	Maldon	242,162	249,402	-2.9%
Chafford Hundred	Thurrock	2,817,546	2,723,610	3.4%
Chalkwell	Southend-On-Sea	1,968,412	1,562,918	25.9%
Chappel & Wakes Colne	Colchester	38,544	37,408	3.0%
Chelmsford	Chelmsford	8,619,956	8,536,968	1.0%
Clacton	Tendring	790,866	824,270	-4.1%
Colchester	Colchester	4,378,758	4,475,581	-2.2%
Colchester Town	Colchester	758,206	774,969	-2.2%
Cressing	Braintree	34,568	33,176	4.2%
Dovercourt	Tendring	174,788	173,364	0.8%
East Tilbury	Thurrock	443,966	411,358	7.9%
Elsenham	Uttlesford	246,268	219,542	12.2%
Frinton	Tendring	191,352	208,252	-8.1%
Grays	Thurrock	4,053,092	3,984,598	1.7%
Great Bentley	Tendring	76,770	81,140	-5.4%
Great Chesterford	Uttlesford	109,116	114,146	-4.4%
Harlow Mill	Harlow	232,932	227,756	2.3%
Harlow Town	Harlow	1,886,288	1,908,742	-1.2%
Harwich International	Tendring	105,802	90,506	16.9%
Harwich Town	Tendring	140,520	134,614	4.4%
Hatfield Peverel	Braintree	419,264	411,574	1.9%
Hockley	Rochford	718,934	960,116	-25.1% *
Hythe	Colchester	234,522	204,786	14.5%
Ingatestone	Brentwood	875,874	836,418	4.7%
Kelvedon	Braintree	844,570	865,706	-2.4%
Kirby Cross	Tendring	46,386	46,332	0.1%
Laindon	Basildon	2,287,322	2,202,032	3.9%
Leigh-On-Sea	Southend-On-Sea	2,232,070	2,341,028	-4.7%
Manningtree	Tendring	1,078,502	1,068,642	0.9%
Marks Tey	Colchester	577,550	557,456	3.6%

[36] http://orr.gov.uk/statistics/published-stats/station-usage-estimates Station Usage 2017-18 Data

Mistley	Tendring	71,082	77,606	-8.4%
Newport (Essex)	Uttlesford	184,798	176,142	4.9%
North Fambridge	Maldon	90,506	96,430	-6.1%
Ockendon	Thurrock	1,054,752	990,438	6.5%
Pitsea	Basildon	1,270,792	1,231,396	3.2%
Prittlewell	Southend	188,044	209,708	-10.3% *
Purfleet	Thurrock	673,780	707,390	-4.8%
Rayleigh	Rochford	1,310,668	1,819,832	-28.0% *
Rochford	Rochford	483,304	566,656	-14.7%
Roydon	Epping Forest	130,634	131,674	-0.8%
Shenfield	Brentwood	3,872,486	3,746,572	3.4%
Shoeburyness	Southend-On-Sea	746,526	745,762	0.1%
South Woodham Ferrers	Chelmsford	510,558	546,564	-6.6%
Southend Airport	Rochford	466,512	395,646	17.9% **
Southend Central	Southend-On-Sea	3,396,032	3,038,301	11.8%
Southend East	Southend-On-Sea	1,926,844	1,723,876	11.8%
Southend Victoria[37]	Southend-On-Sea	2,098,654	1,877,587	11.8%
Southminster	Maldon	136,904	148,402	-7.7%
Stanford-Le-Hope	Thurrock	1,109,214	1,135,044	-2.3%
Stansted Airport [38]	Uttlesford	8,934,250	7,632,108	17.1% **
Stansted Mountfitchet	Uttlesford	584,288	569,860	2.5%
Thorpe Bay	Southend-On-Sea	885,608	879,668	0.7%
Thorpe-le-Soken	Tendring	127,928	134,164	-4.6%
Tilbury Town	Thurrock	1,173,778	1,023,928	14.6%
Walton-On-Naze	Tendring	131,148	132,296	-0.9%
Weeley	Tendring	33,354	31,820	4.8%
West Horndon	Brentwood	416,398	402,954	3.3%
Westcliff	Southend-On-Sea	1,299,104	1,259,800	3.1%
White Notley	Braintree	11,438	10,552	8.4%
Wickford	Basildon	2,256,070	2,344,498	-3.8%
Witham	Braintree	2,331,630	2,343,972	-0.5%
Wivenhoe	Colchester	389,822	393,050	-0.8%
Wrabness	Tendring	30,526	24,172	21.3%

* Engineering works along the Southend Victoria branch line

** Increased airport passenger journeys

See also the pdf linked at https://orr.gov.uk/__data/assets/pdf_file/0011/39971/estimates-of-station-usage-2017-18-methodological-report.pdf

[37] The Southend on Sea stations, Chalkwell, Leigh on Sea, Shoeburyness, Southend Central, Southend East, Thorpe Bay and Westcliff {C2C}, and Southend Victoria, Prittlewell and Southend Airport {Abellio Greater Anglia} had a collective footfall of 14.03M in 2017/18

[38] Stansted Airport recorded the second highest footfall in the Region at 8.9M

5.7 PORTS & MARITIME INFRASTRUCTURE

5.7.1 Essex has three major ports within the County, with a fourth, Felixstowe, opposite Harwich and across the River Stour, the northern County boundary with Suffolk. Tilbury, the London Container Port and DP World (see below) are part of the Port of London.

Port of London Authority

5.7.2 The Port of London Authority, (PLA), is a Trust port and the Custodian of the tidal Thames. In 2018, the PLA saw 53.2m tonnes of goods handled, 9.9m passenger journeys, with 2.65m tonnes of inland waterways freight moved.[39]

Tilbury

5.7.3 The Port of Tilbury is a significant distribution centre, with access to the M25 orbital motorway and therefore the UK motorway network. In addition, there are direct rail connections within the Port, for access to the UK at large. The Port includes 130 companies employing 4000 people, handling 16M tonnes of cargo, including containers, paper, cruise, wood and cars. The Port handles around 1000 vessels each year. The Port is to develop "Tilbury 2" to the east of the existing Port and Tilbury Fort. The Lower Thames Crossing will have a link to Tilbury 2.

http://www.forthports.co.uk/tilbury-london/

5.7.3.1 The Port currently covers 344ha with 34 operational berths, and has over:

- Sixteen independent working terminals.
- 7.5km of quay.
- 500,000sqm of warehouse space.
- 7km of road within port estate with excellent transport access.

[39] Annual Report 2018 https://www.pla.co.uk/assets/polareport2018final.pdf

London Container Terminal

5.7.3.2 The Terminal is Europe's largest terminal for refrigerated containers, with 1,400 reefer plugs on terminal and access to a 25,000-pallet space cold store facility. The Terminal operates on a 24/7 basis. It handles both deepsea and shortsea containerships across berths inside the dock and at the deepwater riverside berth, which have depths alongside to 13.7 metres. The Terminal has a total of 1.72 km of berthage handling vessels of up to 10,000 Twenty Foot Equivalent Units, (TEUs).

Paper & Wood products

5.7.3.3 Tilbury is the UK's leading port for handling paper products with volumes of over 3 million tonnes per annum. The Port also handles significant quantities of forest products, offering over 10ha of dedicated undercover storage: transit sheds and distribution facilities, with a full range of commodities handled from sheet materials to specialist timber products, doors and mouldings. There is an on-site Wood Treatment Plant for sheet materials and timber.

General Cargo and Ro- Ro

5.7.3.4 Tilbury has a selection of diverse cargo handling facilities for all types of general cargo, a dedicated Vehicle Handling Centre for secure car storage, facilities for second hand vehicles: wheeled, tracked and agricultural plant. Tilbury has a throughput of over 300,000 TEUs per annum.

Grain and Animal Feed

5.7.3.5 The grain terminal at the Port is the largest in the UK, with 120,000 tonnes in capacity with over 200 separate silos for product segregation. Expansion is planned to increase this to 136,000 tonnes. Seventeen point two percent of the UK milling capacity comes through the grain terminal at Tilbury.

Bulk Products

5.7.3.6 The Port has a purpose built 'bulks' warehouse, capable of storing up to 60,000 tonnes of animal feed and other compatible agribulks. There are six bulk handling berths and around 3ha of bulk handling operations. Specialists in Aggregates/Cement, Animal Feed, Recycled/Biomass, and food products such as cocoa. There is an increased use of recycled materials powering renewable fuel power stations (Tilbury Green, Stobarts and Hadfield recycling in Tilbury Docks).

The London Cruise Terminal

5.7.3.7 The London Cruise Terminal is London's only deep-water, purpose-built cruise facility. It provides regular sailings from its 348m floating landing stage giving unrestricted ship access to all side doors. Increased volume in cruise liners visiting London. **In 2019, 52 visits are planned to the Terminal, with a total of 90, including other Piers and moorings on the Thames.**

Dubai Port London Gateway

5.7.3.8 This 186ha port is operating (with parts still under construction) on the former Shellhaven site near Stanford-le-Hope. This long-term project will complete around 2020 to 2025. Port activity has a considerable impact now in terms of construction traffic movements, and in terms of container lorry movements. Risks include:

- Cargo in storage and in transit (Hazardous materials).
- Ships alongside on fire.
- On site RTCs involving:
    - Worker personal vehicle movements.

- Tractor/trailer units.
- Fuel tanks for shore to ship refuelling.
- Cranes (working at height).
- Environmental pollution.
- Rescue from machinery at height.
- More off-site RTC's due to increased volume of HGV's, and the impact of A13 widening over next 12 months (to mid-2020).

5.7.3.9 DP World London Gateway currently has:

- Three berths
- Three deep-water berths.
- A capacity of 3.5m TEUs per annum.
- The capability to handle the Ultra Large Container Ships.
- 1,250m of quay and 24 giant quay cranes.
- 60 automatic stacking cranes
- 180 transaction bays for trucks
- Container yard capacity for 52,974 TEU
- A rail terminal with three rail mounted gantry cranes

5.7.3.10 The Port will deploy automated container handling systems and controls. The Port design provides significant improvement in handling speeds. Once completed, the Port will have Europe's largest logistics park (836,127sqm) adjacent to and integrated with the Port.

5.7.3.11 Two rail terminals in the Port, located immediately alongside the container handling areas, will handle deep-sea containers. The rail terminal will also be equipped to handle European containers and swap bodies for UK domestic and continental European flows, as well as deep-sea containers. DP World publishes a rail schedule on its web site.

5.7.3.12 This Port is directly adjacent to, and to the west of, the Thames Enterprise Park. (**See 6.2.7) For full specifications go to:**

https://londongateway.blob.core.windows.net/n2cms/upload/PDF/Port%20specs.pdf

Harwich Haven Authority

5.7.4 An Act of Parliament in 1863 established the Harwich Haven Authority (HHA) to safeguard the best natural haven on the east coast of England. Its jurisdiction covers the River Stour, the lower part of the River Orwell, Harwich Harbour and an area to seaward extending 12 nautical miles from the harbour entrance and covering 388 sq. km.

Harwich International Port

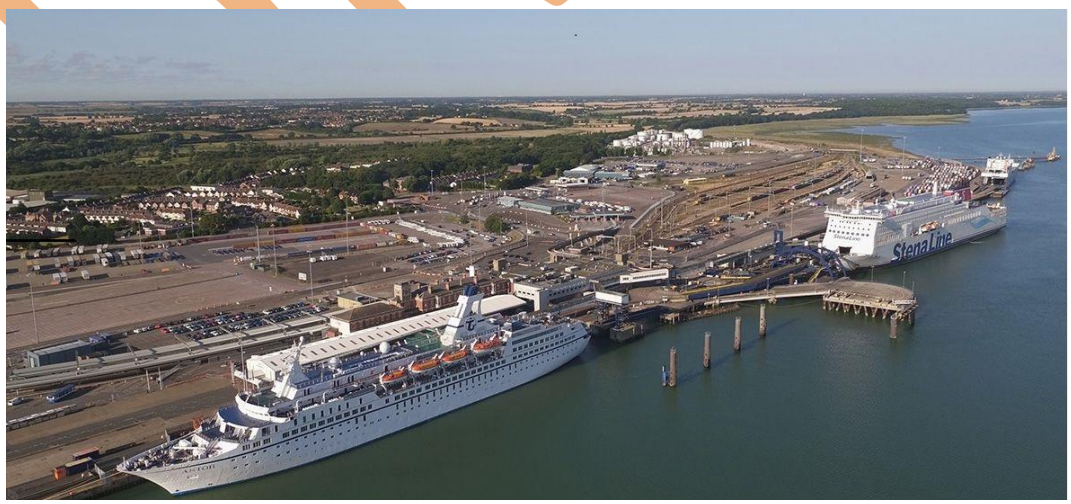
5.7.4.1 Harwich International Port is a multi-purpose freight and passenger port with road & rail links to the Midlands, London and the South East, covering 42ha, with:

- 2 Passenger/RoRo berths
- 1 Freight only RoRo berth
- 1 Container berth
- 1 Cruise ship berth length 320m
- 1 Bulk berth
- 1 Tanker berth
- A passenger walkway/boarding bridge, purpose-designed and built to meet the needs of the Stena Line vessels.

5.7.4.2 Approximately 1 million passengers pass through Harwich International Port every year, travelling on ferry services to the Netherlands and Denmark. The Port remains one of the UK's most important passenger ferry terminals. Two Stena Line Superferries, "Stena Britannica" and "Stena Hollandica", operate on the Harwich - Hook of Holland route. In addition, a purpose-built cruise terminal has passenger and luggage handling facilities. Harwich Port caters for cruises to Scandinavia and the Baltic, as well as Round-Britain and other European destinations.

5.7.4.3 The Port receives regular shipments from northern Europe, Cyprus, Libya, Algeria, Tunisia and Malta. The Port handles grain exports. In addition, dry bulk handling expertise also extends to cement, salt, rice and animal feedstuffs.

http://www.harwich.co.uk/



Vehicles

5.7.4.4 The Port handles trade vehicle imports and exports, and has 6ha of secure parking area.

Dry Bulk

5.7.4.5 The Port has a 6,000sq.m grain terminal. The grain store can hold up to 20,000 tonnes of product in segregated bays with a load rate of up to 1,700 tonnes per hour. A 4,800sq.m general warehouse has the capacity to store more than 20,000 tonnes of bulk-bagged product, or other general cargoes

Petrochemicals

5.7.4.6 Speciality hydrocarbons are imported and exported via Harwich through the 25ha Haltermann Carless Ltd site next to the Port, employing approximately 100 people. (**See also Chapter 6 Control of Major Accident Hazard sites**). **This site is the only fuel refining facility within Essex.**

5.7.4.7 Every year, Petrochem Carless distils upto 500,000 tonnes of condensates, mainly naphtha, kerosene and gas oils. Other similar products are imported for processing alongside these products to create a range of speciality products for industry.

5.7.4.8 Nine hectares of the site are currently undeveloped. Storage capacity totals 150,000 tonnes, in 175 storage tanks ranging from 5 tonnes to 1,300 tonnes. Vessels of up to 140m in length can berth at the dedicated deep-water tanker berth. A direct pipeline links the berth to the site.

Future Maritime Port Developments

5.7.4.9 A long-term project is the proposed Bathside Bay development of Harwich International Container Terminal, a £300 million deep-water container terminal, currently at the planning stage. There is no indication when this project will begin.

Crouch Harbour Authority

5.7.5 The Crouch Harbour Authority is the statutory harbour and navigation authority for the Rivers Crouch and Roach, controlling both pleasure and commercial use of the rivers. The Harbour Authority passes by-laws to regulate use and employs staff to enforce the by-laws. The Authority provides weather forecasts, tide tables and other important sailing information.

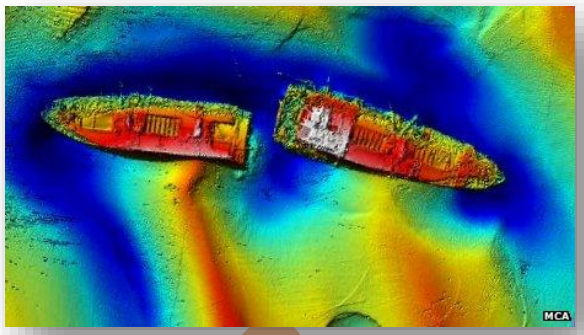
Other Ports

5.7.6 There are a number of smaller ports around the Essex coastline. These handle a variety of traffic including coal, grain, timber, chemicals, oil, fertilisers and general products. In addition, a large number of pleasure craft and yachts use the many marinas on the Essex coastline. (Fingringhoe, Rowhedge, and Wivenhoe on the River Colne, where there is a flood barrage, Maldon, at the confluence of the Rivers Chelmer and Blackwater, Mistley Quay on the River Stour, and Wallasea on the River Crouch.)

5.7.7 Several dedicated jetties exist at industrial sites on the Thames, which handle a range of materials, including petroleum-based products.

Thames Estuary & the SS Richard Montgomery

5.7.8 In 1944, the SS Richard Montgomery went aground in the Thames Estuary. The ship carried 1,400 tonnes of explosives. The wreck lies in approximately 15m of water, some 2km off Sheerness. The Maritime & Coastguard Agency, (MCA), monitors the wreck, registered as dangerous under the Protection of Wrecks Act 1973.



5.7.9 The MCA believes that the cargo is stable. Nonetheless, there are concerns that if an explosion took place, parts of the Isle of Sheppey, the Isle of Grain and more pertinent to Essex, Canvey Island and Southend could be impacted by a tidal wave causing flood.

5.8 AIR TRANSPORT INFRASTRUCTURE

5.8.1 The holding areas for Heathrow, Gatwick and London City Airports are in Essex air space, with navigation beacons/holding points at Clacton-on-Sea and Lambourne End, near Abridge. In addition, there are two major civil airports in Essex, namely London Stansted and London Southend. The Essex Police Eurocopter 135, operating as part of the National Police Air Service, is the probably busiest of its type in the world covering a large part of the East of England.

5.8.2 Two tables provide 2018 CAA data, available with more detail via the links at the footnote below. [40]

	Total Terminal and Transit Passengers	Total Aircraft Movements	Total Commercial Movements #	Total Non-Commercial Movements ##
London Stansted	27,996,116	201,614	189,889	11,725
London Southend	1,480,139	32,531	18,532	13,999
London City	4,820,292	80,854	80,643	211

Air taxi, positioning flights and local movements.
Test and training, other flights by Air Transport Operators, Aero Club (London Southend only), private, official, military, business aviation.

London Stansted

5.8.3 Stansted is the third busiest airport in the UK by passenger numbers, and the fourth largest in the UK. The airport serves more European destinations than any other airport, worldwide. The Manchester Airports Group, (MAG), which also owns Manchester, Bournemouth and East Midlands airports, bought Stansted in February 2013. The airport operates 24/7/365, with a single runway. Some 20 airlines fly to over 190 destinations in 31 countries. A new arrivals terminal is due to open in 2020. The existing terminal is being remodelled to create a modern and spacious departures terminal, with 134 check-in desks, a larger departure lounge with more seating, shops, bars and restaurants. There will be enhancement works on the airfield to create 24 aircraft parking stands so the airport can handle more flights each day.

[40] CAA UK Airports statistics 2018 Tables 3.1 and 9
http://www.caa.co.uk/Data-and-analysis/UK-aviation-market/Airports/Datasets/UK-Airport-data/Airport-data-2018/

5.8.4 Stansted is one of the UK airports that accommodate hijacked aircraft or aircraft that otherwise have a need for an emergency services/security response on landing.

London Southend

5.8.5 London Southend Airport is a 'home base' to a wide range of aviation support companies, airlines and operators. In particular, EasyJet is a primary user of London Southend with expectations to expand its service. Ryanair opened a new base in April 2019, with an expectation of increasing passenger numbers by circa 1.2m. Consequences will be an increase in road and rail passenger movements in order to get to the Airport. Flybe and Air Lingus also fly out of London Southend.

5.8.6 The Airport has a 129-room onsite hotel and its own rail station for passenger convenience.

Other Airports or Airfields

5.8.7 In addition to the two airports, there are a number of locations around in Essex from which Flying Clubs and/or private pilots fly, including a site used by Essex Police and Essex Air Ambulance. These include:

Andrewsfield, Great Saling (Grass strip)
Audley End (Grass strip)
Boones Farm, High Garrett (Private Strip)
Boreham (Essex Police A.S.U.)
Clacton (Grass strip)
Damyns Hall
Earls Colne (Grass strip / Essex Air Ambulance)
Great Oakley (New Farmhouse) (Private Strip)
High Easter (Airfield)
Laindon (Private Strip)
North Weald (Gliding/historic aircraft)
Rayne Hall Farm, Braintree (Private Strip)
Ridgewell (Gliding)
Stapleford (Light aircraft, landing/take off crosses M25)
Stow Maries (Flambirds) (Gliding/preservation project)
Thorpe-le-Soken (Private Strip)
Thurrock (Orsett) (Private Strip)
West Horndon (Private Strip)
Wethersfield (Gliding)
Wormingford (Gliding)

Air Activity

5.8.8 The Clacton Airshow, (Tendring District Council), is an annual event. The show took place over the period 23/24 August 2017. Reported attendance figures over the two days were in the region of 200,000. The next Airshow is 22/23 August 2019.

5.8.9 North Weald Airfield is an operational general aviation aerodrome, in North Weald Bassett, (Epping Forest District Council.). The airfield is home to several flying organisations offering flight training, flight experiences and regular trips. Fixed and rotary wing aircraft operate from this location. The airfield also hosts a large Saturday Market, vehicle shows and Track days for cars and bikes.

5.8.10 Stapleford Aerodrome is an operational general aviation aerodrome near Abridge, (Epping Forest District Council). It is about 3.4 nautical miles south of North Weald Airfield and 4.5 nautical miles north of Romford. This location offers flying training, business charter and London sightseeing flights, and aircraft engineering services

Military

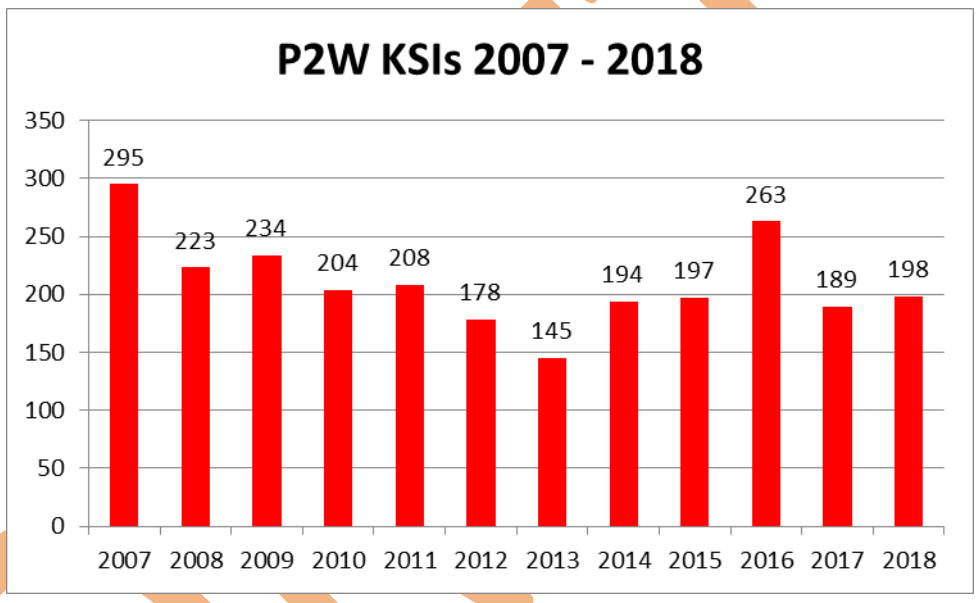
5.8.11 Essex has no military air assets based in it. However, Wattisham Airfield is just outside Essex and rotary wing aircraft frequently fly in the north Essex area, with exercises involving 16 Air Assault Brigade based at Colchester.

5.9 RISK SPECTRUM

5.9.1 Taking the above into account, the risk spectrum covers four primary areas, of which road traffic collisions form a significant part, and discussed first:

RTCs involving Powered Two Wheelers (P2Ws)[41]

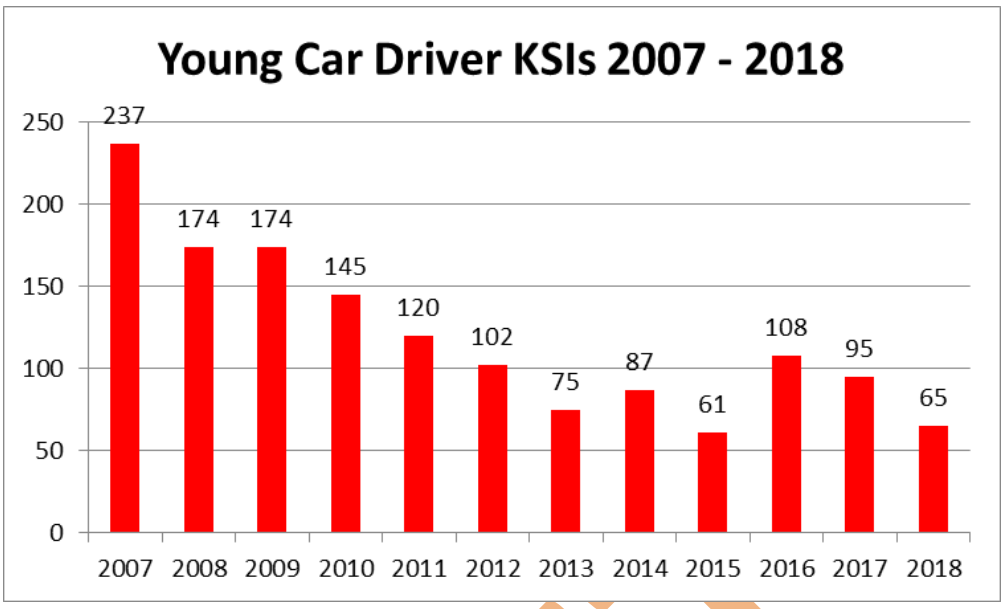
5.9.2 By the end of 2018, the number of killed or seriously injured in RTCs involving P2Ws was 198 people, and this has remained static since 2014. P2Ws remain the highest KSI risk group in Essex, and the most over represented in KSI statistics compared to all other road users. P2Ws account for just 0.8% of the traffic on Essex roads, yet they featured in 22% of all KSI RTCs in 2018. In P2W collisions involving no other vehicles, the riders were deemed to be at fault by the police officer reporting the collision. However, data analysis shows that other road users contribute to a significant proportion of P2W RTCs resulting in death or serious injury to the rider, particularly in urban areas at junctions and roundabouts. In P2W RTCs involving other vehicles, 61% are deemed the fault of the other vehicle and not the P2W rider.



RTCs Involving Young Car Drivers

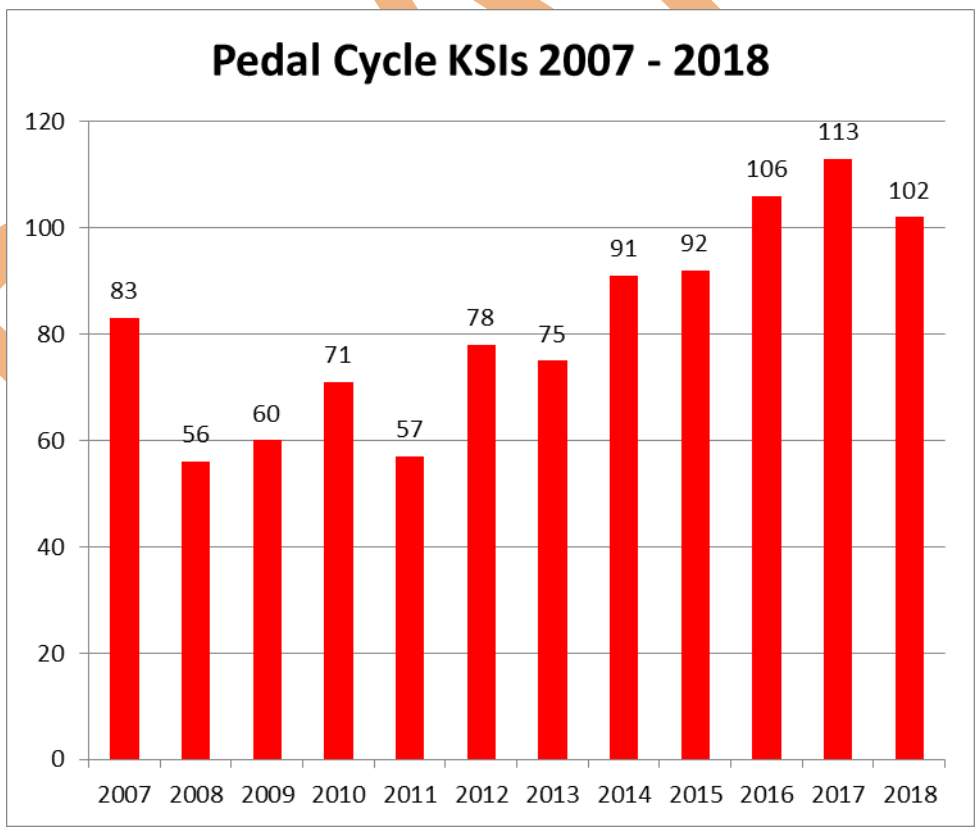
5.9.3 In 2018 young car drivers between the ages of 17 and 25 years of age were deemed to be at fault in 7% of all KSI RTCs. Young drivers are at five times greater risk of being the primary contributor to a road traffic collision than drivers of other ages. Much of this additional risk is down to deliberate risk taking behaviour (such as reckless driving and excess speed), with lack of driving experience making a smaller contribution to this risk. The KSI figures from 2012 to 2018 are as shown in the following chart.

[41] P2Ws includes motorcycles scooters and mopeds



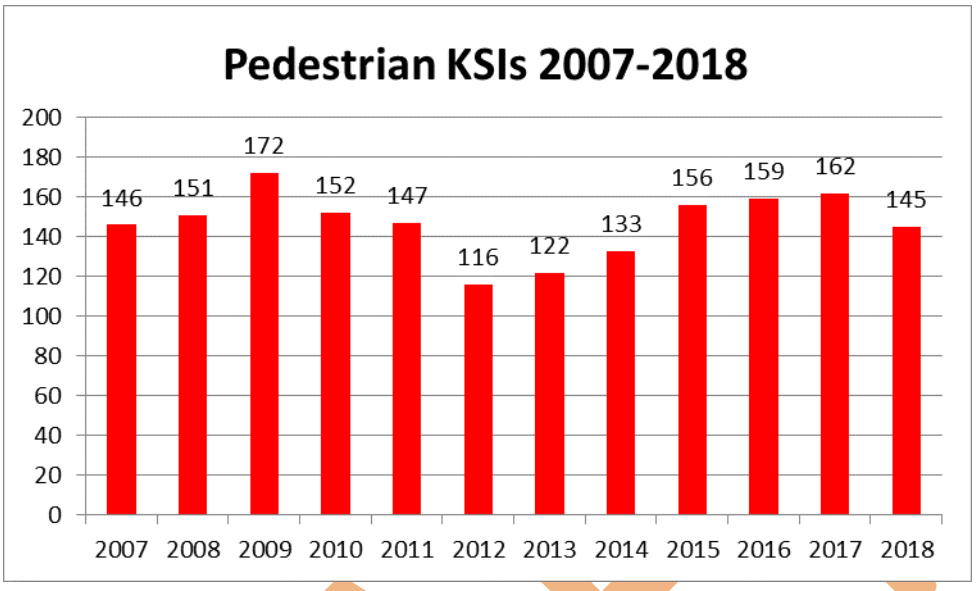
RTCs Involving Pedal Cyclists

5.9.4 The year 2018 saw 102 pedal cyclists involved in RTC KSIs. Increasing numbers of people are taking to cycling, which has seen an upturn following recent high-profile events, (such as the London 2012 Olympics and Tour of Britain races), also as a result of the promotion of cycling as part of healthy lifestyles . The number of pedal cycle KSI casualties is above local target and mirrors the well-established national upward trend in pedal cycle casualties. Under reporting by a significant percentage may affect KSI figures for pedal cyclists.



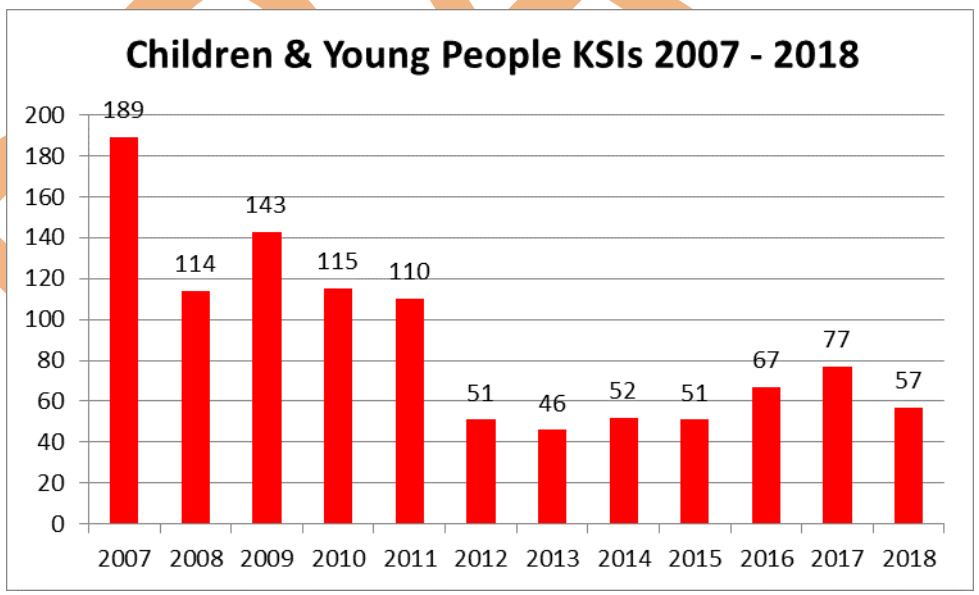
RTCs Involving Pedestrians

5.9.5 With regard to pedestrian KSI casualties these increased from 116 in 2012 to 145 in 2018 (an increase of 25%. Distractions such as the use of smartphones and listening to music on headphones are notable contributors, as is the consumption of alcohol, particularly in the evenings.



RTCs Involving Children and Young People aged between 0 and 17

5.9.6 The number of KSI casualties aged 17 or under has been reducing gradually over time although there were 57 KSIs involving this group in 2018, compared with 46 in 2013 (an increase of 23%).



5.9.7 Rail related incidents (Not Terrorism. **See Ch 9**).

5.9.8 Maritime related incidents (And see Chapter 6 Industrial, Utility & other Infrastructure). In addition to the Port facilities previously described, the River Thames has a number of locations on the Essex side that provide berths for petrochemical tankers. The Service has policies, procedures and Standard Operating Procedures for alongside fire-fighting etc. The responsibility for fighting fires on ships at sea rests with the ship operating company, (from April 2012). Neither the MCA nor any shore based Fire and Rescue Service are under a statutory duty to tackle such fires. Each ship operating company is obliged to have a safety

management system, commensurate with the Articles of the International Convention for the Safety of Life at Sea (SOLAS) and as accepted by the vessel's Flag State. Once the fire is contained, the ship operating company could make an application to coastal states for a Port or Place of Refuge, allowing the vessel to enter port so that shore FRS could tackle the fire. In accordance with International Maritime Organisation guidelines on Places of Refuge, when appropriate and if time allows, the Secretary of State's Representative will request that an inspection/assessment team board at sea for evaluating the condition of the ship.

5.9.9 Air related incidents:

- At or near an airport/airfield, i.e. around take-off and landing, involving the Airport Fire Service. (Not Terrorism – See separate Chapter).
- During an incident in the air, with collateral ground damage to people and/or property and disruption to other transport infrastructure. Unless this coincidentally involves an airport, an incident of this type will not involve an Airport Fire Service.

5.9.10 Refer to Transportation TOGs and SOPs at
http://servicenet/Operational_Information/Operational_Guidance/#Transportation|2315|2315

5.10 LIKELIHOOD

Road Traffic Collisions

5.10.1 In short, assessing the likelihood of RTCs is not possible other than to predict that a certain number will occur in any one 12-month period. No single underlying factor drives road casualties. Instead, there are a number of influences. These include:

- The distance people travel (which is partly affected by economic externalities)
- The mix of transport modes used
- Behaviour of drivers, riders and pedestrians
- The mix of groups of people using the road (e.g. changes in the number of newly qualified or older drivers)
- External effects such as the weather, which can influence behaviour (for instance, encouraging/discouraging travel, or closing roads) or change in the risk on roads (by making the road surface more slippery)

5.10.2 As stated in paragraph **5.4.1** RTC's remain a significant issue in Essex. Whilst the overall number of RTC KSIs fell steadily after 2007, since 2013 there has been an upward trend. The number of people killed and seriously injured on our roads remains too high.

5.10.3 P2Ws remain the highest risk KSI group in Essex and the collective risk to P2W riders is therefore clear and ongoing. The ECFRS FireBike product is an effective and respected means of engaging and training riders. Young car drivers between 17 and 25 years continue to be a high-risk group in Essex for which specific interventions and educational activity is appropriate, delivered via the ECFRS Community Wheels product, the Ford driving simulator at Waltham Abbey Fire Station the Fire Car product and our new 360º Virtual Reality road safety experience.

ROAD TRAFFIC COLLISIONS REPRESENT THE HIGHEST TRANSPORTATION RISK FOR AN ECFRS RESPONSE IN BOTH LIKELIHOOD AND IMPACT

Air Related Incidents

5.10.4 Essex has had air related accidents. There is evidence of 58 light aircraft incidents in Essex since 1960, and more previously. These incidents resulted in 19 fatalities to the pilot and/or passengers, with three seriously injured reported. No great property damage occurred, with airframes largely going down

onto open country. None appeared to require a major involvement of ECFRS. There was one major air incident, (December 1999), which involved a Korean Airline Boeing 747 cargo aircraft that crashed shortly after take-off from Stansted Airport. In that instance, the aircraft fell onto farmland.

5.10. 5 With Essex providing a pivot point for international flights in/out of the UK, together with flights to and from London Stansted and London Southend, and overflights from London City Airport, there is clearly potential for a major air related incident. Statistically one cannot be discounted. Nevertheless, subject to a terrorist event becoming significantly more likely, the likelihood of an air related incident is remote.

5.10.6 On 14 February 2019, a Virgin Atlantic flight VS301 from Delhi to London Heathrow (B787 – 9 Dreamliner with 264 passengers on board), had a near miss with **two drones**, one of which was judged to be around 90 feet from the jet. A UK Airprox report said it appeared the drones had been flown 'into conflict' with the aircraft and that 'providence had played a major part in the incident'. It was rated as Category A, the most serious incident category meaning there was a serious risk of a collision.

Rail Related Incidents

5.10.7 At 5 April 2019, the Rail Accident Investigation Branch published 341 investigation reports[42] on heavy rail, light rail, metro and Heritage railway incidents that took place across the UK between 2006 and 25 July 2018, and 43 incident bulletins. The following incidents occurred, to date, in Essex:

Date of Incident	Report #.	Date Published	Location & Nature of Incident
03/12/2005	23/2006	Dec 2006	At 1040hrs on 3 December 2005, a fast moving train on the station pedestrian crossing at Elsenham station struck two young girls, killing both. The two girls had purchased tickets from the booking office on the east side of the line (the Up platform) immediately prior to the accident and were in the process of walking to the opposite platform to catch the 10:41 hrs service to Cambridge. The station pedestrian crossing was fitted with miniature stoplights and an audible alarm to warn passengers of the approach of trains.
04/11/2007	11/2009	May 2009	At around 1012hrs on 4 November 2007 an operator and machine controller were putting a Basket 14 RRV (See photo on pg 73), on the track near Brentwood station (18 miles 16 chains) when it ran away westward to Romford and London. The operator and machine controller were unable to stop the Basket 14 RRV before it gathered speed. After travelling some four miles, the machine left the possession arranged for its protection and the operator, who was in the workbasket, jumped clear. The machine ran for a further three miles before Network Rail staff were able to stop it west of Romford station. The operator was injured and required hospital treatment.
26/04/2008	24/2009	Sep 2009	At about 0627hrs on 26 April 2008 a locomotive collided with the rear of a train between Leigh-On-Sea and Chalkwell, severely damaging two wagons. Both lines closed to normal traffic at the time of the collision.

[42] Extracts of the reports are Crown Copyright. https://www.gov.uk/raib-reports?keywords=&railway_type%5B%5D=heavy-rail&railway_type%5B%5D=light-rail&railway_type%5B%5D=metros&railway_type%5B%5D=heritage-railways&date_of_occurrence%5Bfrom%5D=&date_of_occurrence%5Bto%5D=

12/06/2008	01/2010	Jan 2010	At 1405hrs on 12 June 2008, a wheelset on a wagon forming part of the 08:05 hrs Daventry to Felixstowe service operated by Freightliner, derailed as it passed through Marks Tey junction. A second wheelset on the same bogie subsequently also derailed. Two persons received minor injuries because of the derailment, which also caused damage to the infrastructure and rolling stock involved. The line re-opened fully on the morning of 13 June 2008.
28/01/2011	19/2011	Nov 2011	At 2342hrs on 28 January 2011, a passenger alighting from the last coach of a train at Brentwood station fell, head first, between the side of the train and the platform. Another passenger who had alighted from the same train saw her begin to fall and was able to hold on to one of her legs. The driver of the train did not see this happen and the train departed from the station with the passenger still in the gap between the train and the platform. The passenger sustained injuries to her leg and head in the accident.
16/12/2012	07/2013	Jun 2013	At approximately 1343hrs on 16 July 2012, the 1304hrs service from Cambridge to London Liverpool Street was approaching a bridge just north of Roydon station, at a speed of 62 mph (100 km/h). As it did so, two track workers had to run from the bridge in order to avoid being struck by the train. The last of these track workers got clear of the railway line around two seconds before the train passed them.
24/01/2013	01/2014	Jan 2014	At 1737hrs on 24 January 2013, a cyclist using the footpath and bridleway level crossing at Motts Lane, near Witham, was struck and fatally injured by a passenger train travelling at almost 100 miles per hour (160 kilometres per hour).
28/08/2013	17/2014	Aug 2014	On 28 August 2013, a wheelchair user and her carer were waiting at Southend Central station for the arrival of a train when the wheelchair started to roll towards the edge of the platform, and then fell onto the track. Although the passenger and her wheelchair were recovered to the platform before the train arrived, the passenger was seriously injured in the fall.
21/04/2017	Safety Digest 12/2017	09/08/2017	At 11.33 hours on Friday 21 April 2017, a group of track workers narrowly avoided being struck by a train travelling at approximately 73 mph (117 km/h). The track workers and site lookout did not see or hear any warning provided by the distant lookout, and only became aware of the train because the train driver saw the track workers and continuously sounded the train's horn. The group moved to a position of safety with less than two seconds to spare, as the train approached and passed the site of work.(Great Chesterford)

Crown Copyright

http://www.raib.gov.uk/publications/investigation_reports.cfm

Maritime Related Incidents

5.10.7 Of note is an incident that began at sea in January 2018. A fire started in a refrigerator lorry and spread to several surrounding vehicles. The ship's crew put out the fire. ECFRS attended once the Stena Line ferry, with 400 people on board docked at Harwich International[43]. Other than that, there have not been any significant maritime related incidents involving shipping **off the Essex coast**, including the Essex part of the Thames estuary. This remains statistically possible, due to the number and types of shipping and passenger movements into Harwich, DP World London Gateway and Tilbury, although historical evidence would suggest this likelihood is remote.

5.10.8 Of particular note, however, is that on 22 June 2013, the ferry Sirena Seaways made heavy contact with berth 3 at Harwich International Port. The impact caused considerable damage to the vessel fore-end, including penetrations below the waterline. The linkspan at berth 3 collapsed into the water, severely damaging the supporting structures. **No one was injured and there was no pollution.** Passengers and vehicles disembarked following the vessel's move to another berth. The vessel's propulsion control records showed that the starboard propulsion system remained set at about 63% ahead throughout the accident.

5.11 IMPACT

5.11.1 The impact on the Service will clearly depend on the scale of an incident. Access to air or rail incident sites might be difficult, e.g. in a rural location requiring four-wheel drive/all-wheel drive vehicles. Weather may also play a part in this. (See the Grayrigg Rail incident below.)

Road Traffic Collisions

5.11.2 Consider the impact of RTCs on ECFRS in terms of prevention, operational response and aftermath.

5.11.3 The educational and preventative elements are fundamentally important in seeking to reduce RTCs generally and the number of people killed or seriously injured. Education and prevention activities tailored to car drivers, particularly high-risk new/young drivers, have resulted in steady reductions in the number of RTC KSIs over the years.

5.11.4 Targeting P2W RTC KSI incidents has been a particularly successful area of activity for ECFRS through the FireBike product, which has seen capacity increase in successive years. FireBike is making a difference to the reduction of P2W KSIs but there needs to be a continued focused effort to ensure that reductions are sustained into the future.

5.11.5 The RTC education and preventative activities also have a direct impact on ECFRS in terms of operational response. The fewer RTCs that occur, the less demand there is on ECFRS in attending and responding to RTC incidents, combined with reduced psychological impacts on ECFRS personnel.

5.11.6 The effectiveness of ECFRS in its RTC reduction activities is resource dependent, internally allocated from ECFRS revenue budgets, and from external partners, particularly private sector sponsors and the Safer Essex Roads Partnership.

5.11.7 What is certain is that the reductions in RTC KSIs are a result of long term dedicated actions and interventions on the part of ECFRS and its partners; there is a risk that the downward trend in KSI figures will start to reverse if resources are not available to support this area of work.

5.11.8 From a wider economic perspective, as well as a social and ethical one, the prevention of RTC KSIs offers a significant return on investment, as the following tables identify, revealing a strong and significant

[43] https://www.bbc.co.uk/news/uk-england-essex-42721060

economic motivation to continue RTC reduction work, as well as a social and ethical one. (Reported Road Casualties in Great Britain: 2014 Annual Report)

Reported RTC Statistics (Published in September each year for the year previous)

Department for Transport statistics
https://www.gov.uk/government/statistical-data-sets/ras30-reported-casualties-in-road-accidents#table-ras30008
Table RAS30008
Reported casualties by severity, by Local Authority area/Police force area, 2017

Local Authority Area	LA Code	Killed	Seriously Injured	Killed or Seriously Injured	Slightly Injured	All Casualties
Essex	E10000012	41	734	775	2,807	3,582
Southend-on-Sea	E06000033	2	79	81	272	353
Thurrock	E06000034	3	68	71	357	428

RAS60001: Average value of prevention[44] per reported road collision casualty and per reported road accident[45]: GB 2017

£ June 2017

Accident/casualty type	Cost per casualty	Cost per accident
Fatal	1,897,129	2,130,922
Serious	213,184	243,635
Slight	16,434	25,451
Average for all severities	64,726	90,424
Damage only		2,272

RAS60002: Average value of prevention of reported road accidents by road type: GB2017

£ 2017

	Road Type			
Accident type	Built-up roads[46]	Non-Built –up roads[47]	Motorways[48]	All Roads
Fatal	2,035,770	2,176,427	2,581,556	2,130,922
Serious	234,339	266,621	275,275	243,635
Slight	24,053	29,470	35,026	25,451
All injury accidents	73,694	152,456	107,491	90,424
Damage only	2,157	3,152	3,029	2,272
All accidents	**5,982**	**20,119**	**15,176**	**7,653**

[44] Costs based on 2017 prices & values. Costs based on estimated real costs for lost output, medical and ambulance, police, insurance and admin and damage to property. The human costs are based on the 'willingness to pay' principle.
https://www.gov.uk/government/statistical-data-sets/ras60-average-value-of-preventing-road-accidents#table-ras60001

[45] The number of reported road accidents were based on 2017 data

[46] Roads with speed limits of 40mph or less, excluding motorways and A(M) roads

[47] Roads with speed limits greater than 40mph, excluding motorways and A(M) roads

[48] Includes motorways and A(M) roads

RAS60003: Total value of prevention of reported accidents by severity and cost element: GB 2017
£million (2017 prices)

	Cost Elements						
	Casualty related costs		Accident related costs				
Accident severity	Lost output	Medical/ Ambulance	Human costs	Police costs	Insurance & admin	Damage to property	Total
Fatal	1,183	10	2,322	35	1	21	3,571
Serious	630	378	4,293	55	5	129	5,490
Slight	364	154	1,734	66	14	360	2,692
All injury accidents	2,177	543	8,349	156	19	510	11,753
Damage only accidents	0	0	0	82	125	4,335	4,542
Non-fatal accidents not reported to the police[49]	2,357	1,252	14,161	0	46	1,199	19,015
All accidents	**4,534**	**1,794**	**22,510**	**238**	**190**	**6,045**	**35,310**

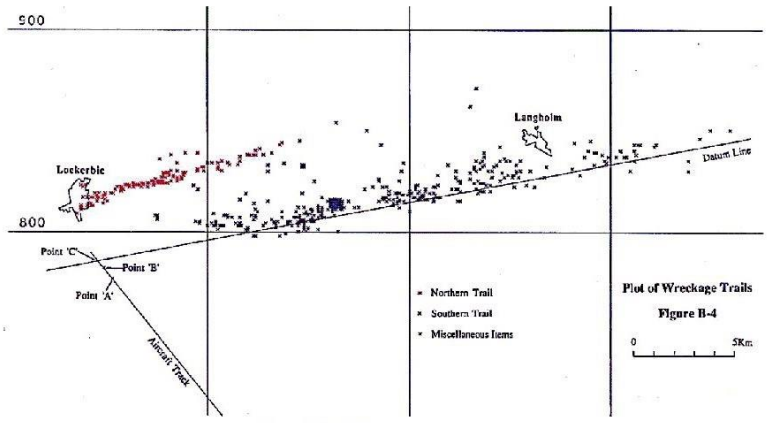
Air Related Incidents

5.11.9 The impact of an air related incident will depend on the size and type of the aircraft and location of the incident. Passenger numbers could range from a pilot in a light aircraft to an Airbus A380 that may hold 500 passengers in a three-class configuration, but in an all economy class configuration, could carry as many as 850 passengers.

5.11.10 Impacts could include high passenger deaths/casualties, (whole bodies and body parts), local deaths/casualties, collateral on-the-ground impacts to include wider societal impacts. Recovery, possibly over some time, should also be taken into account if a building or other infrastructure is directly affected.

5.11.11 The Lockerbie event, (21 December 1988), involving Pan Am 103, demonstrated that aircraft debris from an in-flight explosion will be distributed over an area that could be several kilometres long, and narrow, or more irregular. Passenger luggage and body parts will also feature as debris. This can have a psychological impact on responders.

5.11.12 The possibility of an increased risk of aviation fuel combusting, or the issue of dealing with a fire because of that risk materialising exists. In the event of a military aircraft being involved, there may be ordnance and weapons present. This is a particular hazard with the number of Apache attack helicopters based at Wattisham Airfield.



Map of PA103's massive debris field.

[49] Produced using the estimated number of non-fatal road casualties that were not reported to the police

Lockerbie December 1988

Rail Related Incidents

5.11.13 A train of eight coaches with 50 seats per coach will have circa 400 sitting passengers if full, e.g. as a commuter train. Each (commuter time) carriage may have 10 – 20 standing passengers for at least part of its journey. An Inter-City train may have 70 seats per coach and be eight coaches in length. Speeds can be up to 177km/h. A Class 90 locomotive, i.e. one that pulls the London – Norwich train, with eight coaches and a Driving Car Trailer at the rear can reach 96km/h in 1.63km, and 161km/h in 2.4km. The locomotive alone weighs 85 tonnes. Depending on type, a four-car trainset on the Liverpool Street to Clacton/Braintree/Harwich run will weigh between 138 - 170 tonnes. These trainsets can be doubled or tripled for peak time journeys, i.e. eight or 12 cars. Passenger numbers can be between the mid-tens to several hundred.

5.11.14 In addition to the impact on people, there will be a considerable impact on rail infrastructure, with a severe disruption to rail services. There are likely to be HSE investigations; possibly criminal enquiries.

Notable Rail Incidents

Ladbroke Grove

5.11.15 The Ladbroke Grove Rail Crash (also known as the Paddington train crash) was a rail accident that occurred on 5 October 1999 at Ladbroke Grove, London. The dead numbered 31 with 227 admitted to hospital. A further 296 people were treated at the site of the crash for minor injuries. A three-car Thames diesel multiple unit train collided with a High Speed Train (HST) that consisted of eight passenger carriages with a power car at each end at Ladbroke Grove Junction, about 4km/2miles west of the terminus at London Paddington. The trains collided almost head-on at the junction with a combined closing speed of approximately 210km/h. The first car of the Thames train was destroyed on impact, and the diesel fuel carried by this train at the start of its daily journey ignited, causing a series of separate fires in the wreckage, particularly in coach H at the front of the HST, which completely burnt out.

5.11.16 The restaurant coach, the eighth vehicle in the set, overturned onto its side and struck an overhead line gantry after derailing, resulting in severe damage to the vehicle.

Grayrigg, Cumbria

5.11.17 On 23 February 2007 at 20:12 hrs, an express passenger train derailed near Grayrigg in Cumbria. The train was travelling at 153km/h. All nine vehicles of the Class 390 *Pendolino* unit derailed. Eight of the vehicles subsequently fell down an embankment and five turned onto their sides.

5.11.18 One passenger died, 28 passengers suffered serious injury, with minor injuries to a further 58 passengers. The remaining 18 passengers and two crew were not physically injured in the derailment.

Up to 500 rescuers attended the scene, along with at least 12 ambulances, at least five fire engines, three RAF Sea King helicopters, three civilian mountain rescue teams plus the RAF Leeming Mountain Rescue

Team, and one Merseyside Police helicopter. Rain, darkness, and access problems caused by the narrow country lanes and muddy fields impeded the rescue operation. Emergency vehicles experienced difficult conditions, needing a tow by farm vehicles or tractors after bogging down in mud.

Maritime Related Incidents

5.11.19 The impact of a maritime shipping incident will vary according to:

- Vessel size, location, occupancy, configuration, age, loading, access, on-board facilities, services, and management.
- Type of cargo.
- Weather.
- Crew training and experience, for both responding to the cause of the incident and, where appropriate, passenger management.
- Passenger response.
- Quantity of Fuel Oil.
- Pollution control. In readiness for any pollution incident, the PLA-managed Thames Oil Spill Clearance Association (TOSCA) provides a 24-hour response to oil spills between Tower Bridge and Canvey Island. Funded in part by the terminals that handle oil and oil products, the service has two purpose-built craft, each designed to collect and/or contain oil in the first critical hours after a spillage.[50]

5.11.20 For example, a roll on – roll off super ferry, operating out of Harwich, is 240m in length, with a beam of 32m, has a speed of 22 knots, with a capacity for 230 cars, 1200 passengers, providing 538 passenger cabins with 1,376 passenger beds. There are 12 decks. The crew will be in the region of 85 strong. Such a ship will weigh 64,039grt.

5.11.21 By contrast, a cruise ship operating from Tilbury may carry some 800 passengers in 500 cabins, with a crew of 470. There could be nine decks in the ship's length of 205m.

5.11.22 A container vessel could weigh between 50,000 – 195,636grt, and carry as many as 14 – 19,000 mixed freight TEUs. (The Munkebo Maersk became the largest ship to sail up the River Thames berthing at DP World London Gateway. The 399m long, 60m wide, 195,000 ton Triple-E class vessel – equivalent in

[50] http://www.pla.co.uk/About-Us/TOSCA

length to almost four football pitches – and capable of carrying more than 18,300 TEU is one of the largest container vessels in the world.[51]

5.11.23 There are no known models of the impact of an explosion of the SS Richard Montgomery. Conjecture would indicate some impact on water movement, which could cause localised flooding to the generic and lower parts of Southend.

Commentary

Any incident to which ECFRS has to respond may require a high level of resource, either at once or over time (e.g. reliefs). Subject to the nature of the incident responded to, other longer-term impacts might require additional consideration and resources to manage these. In addition, consideration should cover having:

- A suitable and sufficient balance of resources to meet both reasonably foreseeable/ expected incidents involving land sea and air transport means, as well as, say, a mid-air collision involving two large passenger jets over an urban area of the County, or a "Grayrigg" event.
- Training and exercising to deal with such events at the correct level.

[51] http://shipmanagementinternational.com/maersk-triple-e-vessel-becomes-largest-ship-to-sail-on-river-thames-during-london-gateway-call/

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities
10. Essex has major transport infrastructure, covering land, air and sea. There are extensive strategic road routes crossing the County, including taking traffic from major container ports in Essex and Suffolk. There are two significant rail routes connecting with London Termini. The further development of the transport infrastructure with an increasing population in Essex could create the potential for a significant increase in the number of vehicles on the roads, leading to an increase in RTCs, congestion, number of accidental and deliberate vehicle fires, all leading to an increased life and fire risk. There are maritime and aviation risks associated with passenger and commercial traffic from London Stansted and London Southend Airports, and Harwich, Tilbury and Dubai London Gateway ports.	• Increase in the number of vehicles, driven by young and old persons. • Increase in the number of heavy goods vehicles on roadways. • Increase in the number of dangerous goods carried by road/rail. • Increase in the range and diversity of vehicle design and fuel systems. • Major residential and/or commercial premises development will create additional vehicle movements. • Increased life risk at transport facilities. • Increased population movements at transport hubs. • Large increase in industrial complexes at transport heads. • Increase in volume and density on road/rail/air/sea transport infrastructures. • Increase in 'unfamiliar' users of transport infrastructure.	• Greater demand on operational resources. • Delay in attendance times due to congestion. • Increase in the number of Hazardous Material incidents. • Increase in the number of blue light movements. • Greater demand on Community Safety officer time. • Rise in the number of serious or fatal incidents. • Increase in the number of calls to Control. • Greater demand for specialist skills, appliances and equipment. • Greater demand on Technical Fire Safety resources. • Insufficient level of resource to respond to all requirements. • On-call firefighters may not be able to provide fire cover required. • Lack of specialist and general skills available to deal with incident type. • Lack of specialist equipment available to deal safely with incident type. • Fire Safety Officers diverted from controlling existing risks. • The provision of an ECFRS stand-alone response. • Operational officer time used for incidents where currently other work undertaken. • Potential for larger numbers of 'multiple' accidents and 'protracted' incidents.	• Increase in budget for On-call fire fighters. • On-call firefighters may be away from their primary employers more frequently, who may withdraw support for releasing employees. • Increase in salary costs i.e. overtime. • Increased environmental damage. • Reduction in resources available to undertake community safety activities. • Economic loss to community. • Reduction in other activities i.e. Community Safety and training. • Reduced focus on medium to high-risk audits. • Potential for increase in training requirements in specialist roles and in the deployment of specialist equipment. • Increased funding requirement to resource an ECFRS response. • Lack of available funding.	• Opportunities for the development of new and innovative methods of transporting personnel and equipment to incidents. • Opportunities for more inter-agency GOLD command training for realistic events in Essex. • Opportunities for greater collaboration/co-responding with other Blue Light Services. • Greater On-Call recruitment if population increases. • Opportunity to relocate Fire Stations to match predicted demand. (IRMP).

CHAPTER 6: INDUSTRIAL, UTILITY AND OTHER INFRASTRUCTURE

6.1 OVERVIEW

The National Infrastructure[52]

6.1.1 The national infrastructure is comprised of the facilities, systems, sites and networks necessary for the delivery of the essential services upon which daily life in the UK depends.

6.1.2 There are nine national infrastructure sectors providing these essential services:

- Communications
- Emergency Services
- Energy
- Finance
- Food
- Government
- Health
- Transport
- Water

6.1.3 The UK's infrastructure protection effort is organised around these nine sectors. Work may also be driven forward on cross-cutting themes such as 'space' where there may be infrastructure which supports the delivery of essential services across a number of sectors, or 'personnel security' which will be important to improving security across all of the sectors – these are not recognised as national infrastructure sectors in their own right.

Critical National Infrastructure

6.1.4 Not everything within a national infrastructure sector is 'critical'. In the sectors, there are certain 'critical' elements of infrastructure, the loss or compromise of which would have a major, detrimental impact on the availability or integrity of essential services, leading to severe economic or social consequences or to loss of life. These 'critical' assets make up the nation's critical national infrastructure (CNI) referred to individually as 'infrastructure assets'. Infrastructure assets may be physical (e.g. sites, installations, pieces of equipment) or logical (e.g. information networks, systems).

Statute & Regulations

6.1.5 Two pieces of relevant legislation pre-date the Civil Contingencies Act 2004, (CCA):

- **Pipelines Safety Regulations 1996**: which relate to hazardous oil and gas pipelines and pipeline installations;
- **Radiation (Emergency Preparation and Public Information) Regulations 2001 (REPPIR):** which relate to radiation hazards at locations including nuclear power stations (including MoD nuclear installations subject to Defence Major Accident Control Regulations).

6.1.6 The **COMAH Regulations 2015** implement the majority of the Seveso III Directive (2012/18/EU).The land-use planning requirements from the Directive are implemented through planning legislation.

6.1.7 These sector-specific Regulations have established multi-agency emergency planning regimes in co-operation with the operators, which are specific, well defined and in some respects more prescriptive than the emergency planning requirements contained in the CCA.

6.1.8 The CCA and its supporting Regulations provide a framework defining what civil protection tasks should occur and how all parties should achieve co-operation involved in planning for and responding to

[52] http://www.cpni.gov.uk/about/cni/

emergencies. Although the CCA excludes COMAH Regulations, the arrangements for all emergency preparedness and response at establishments should fully integrate. CCA Category 1 responders[53] have specific responsibilities. The CCA places no requirement to prepare plans for COMAH/REPPIR events, because the essential relevant organisations already have this statutory responsibility under the HSE legislation. In practice, Category 1 responders will integrate planning arrangements.

Essex Sites

6.1.9 A number of locations in Essex require site-specific plans under the COMAH, REPPIR and Pipeline Regulations. Others form part of important infrastructure, both locally and nationally. Whilst responses to these sites are "business as usual", the size of an incident might cause a responding Authority to use nationally agreed arrangements.

6.1.10 In addition to locations subject to Regulation, Essex has the normal infrastructure that a modern built environment would expect.

6.1.11 This Chapter covers industrial accidents, not malicious attacks. It should, however, be read in connection with **Chapter 9** on **Terrorism**. Consequence management is likely to be similar, if not the same, for both.

Response

6.1.12 The Service has trained Hazardous Materials and Environmental Protection Officers, (HMEPO), and Petrochemical Officers, who would work alongside partner agencies during an incident.

6.2 THE CONTROL OF MAJOR ACCIDENT HAZARDS REGULATIONS 2015

6.2.1 The purpose of the COMAH Regulations is to prevent major accidents involving dangerous substances and limit the consequences to people and the environment of any accidents that do occur. A 'competent authority' enforces the Regulations. In England, the competent authority is one of the HSE, the Office for Nuclear Regulation (ONR) for nuclear establishments, and the Environment Agency (EA).

6.2.2 COMAH requires on-site and off-site emergency plans to deal with potential major accidents for those sites with the greatest hazards. Regulation 11 of the 2015 Regulations states:

(1) Every internal emergency plan and external emergency plan prepared for the purposes of these Regulations must have the following objectives –
(a) containing and controlling incidents so as to minimise the consequences, and to limit damage to human health, the environment and property;
(b) implementing the necessary measures to protect human health and the environment from the consequences of major accidents;
(c) communicating the necessary information to the public and to the services or authorities concerned in the area; and
(d) providing for the restoration and clean-up of the environment following a major accident

6.2.3 The **on-site** emergency plan details the roles that those who work at the establishment will have to play in the event of a major accident. It should include the arrangements established for assisting with emergency response offsite. This plan is the responsibility of the site operator and must be in writing. The local authority for the area where an upper-tier establishment is located deals with **off-site** emergency plans. The plan must be suitable for dealing with the consequences of major accidents beyond the

[53] Category 1 responders are Police, including the British Transport Police, Fire and Ambulance Services, HM Coastguard, Local authorities, Port health authorities, NHS primary care trusts, NHS hospital trusts, NHS foundation trusts, and the Environment Agency.

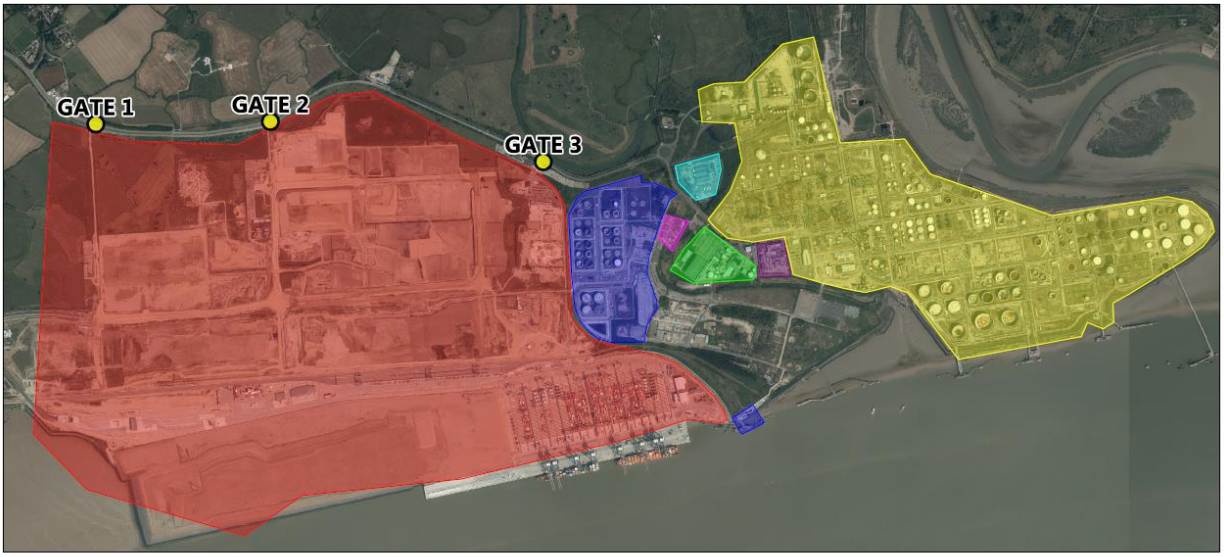
establishment. As with the on-site plan, it should be in writing. The off-site emergency plan details the roles carried out by emergency services, local authorities and other external organisations in the event of a major accident. This includes the arrangements established to help with the emergency response on site. The degree of planning should be proportionate to the probability and consequences of the accident occurring.

6.2.4 **On-and off-site plans must be tested at least once every three years.**

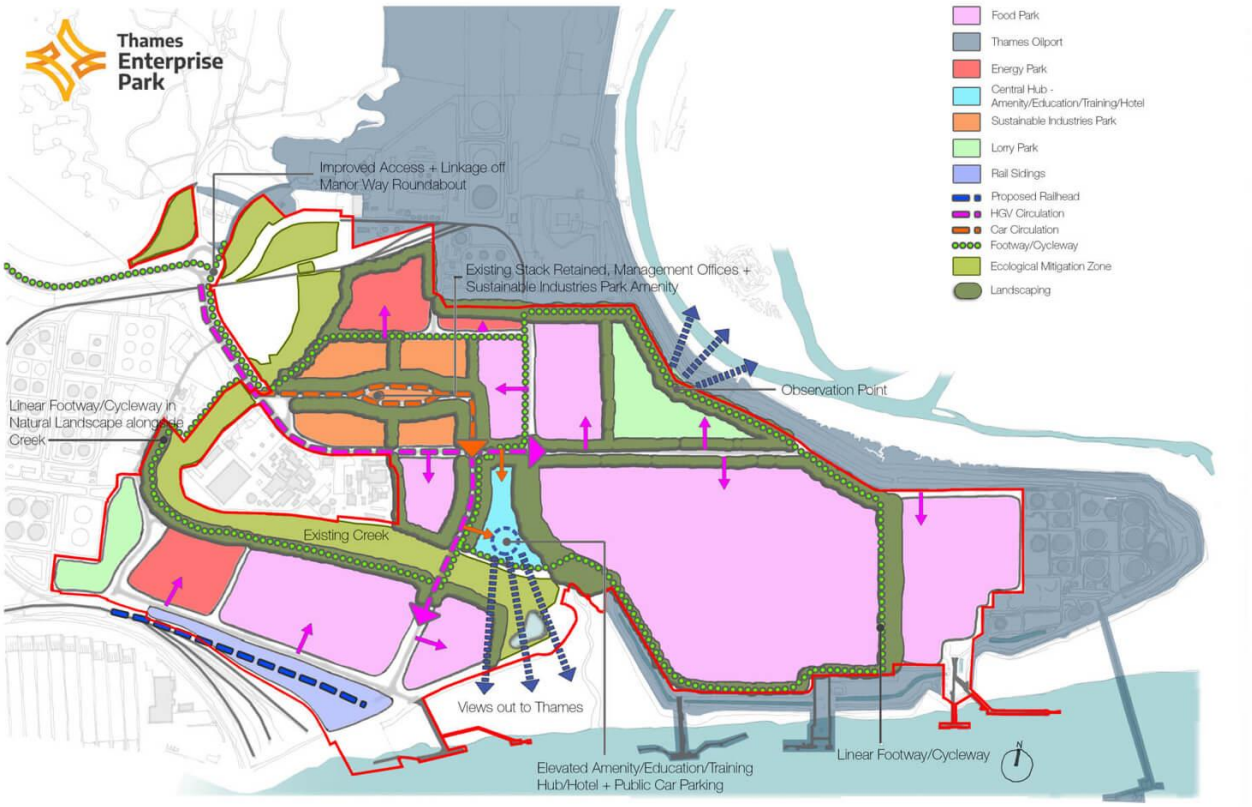
6.2.5 The Regulations operate at two levels, depending on the quantities of dangerous substances at an establishment. **It is important to note that the Regulations apply to establishments rather than individual activities**. An establishment having any substance specified in Schedule 1 to the Regulations present at or above the qualifying quantity is subject to the Regulations. There are two thresholds, known as **Upper-tier and Lower-tier**.

6.2.6 The tables below identify the Upper and Lower tier COMAH sites in Essex and in neighbouring Counties within or near to the 10km distance (13/16 arrangements) of Essex borders. The exception is Buncefield, included for historical reasons.

6.2.7 The former Coryton Refinery site, some 234 hectares, will come back into use over the next 2 – 5 years. **Thames Enterprise Park** will cover approximately 167 hectares. Shell and Greenergy now own the former Petroplus site, rebranded as **Thames Oilport**. The site has stored some 250 million litres of diesel. An Essex Mutual aid system, which shares foam stocks across all of the upper tier COMAH sites, supports sites. A Strategic Development Group has sat for approximately eight years and consists of the UTC Site operators and ECFRS Petrochemical Officers. All contribute to a mutual aid scheme for the provision of foam concentrate and equipment.



Thames Enterprise Park



UPPER TIER COMAH SITES IN ESSEX

Client Name	Location Name / Address	Comments
Calor Gas Limited	Canvey Island / Canvey Terminal Thames Road Canvey Island SS8 0HR. GR 578716 182478	35,000 tonnes of Refrigerated LPG storage comprising six 5,000 tonne capacity and two 2,500 tonne capacity storage tanks capable of storage down to -43C
Calor Gas Limited	Coryton The Manorway Stanford Le Hope SS17 9LW. GR 574026 182627	Commercial facility open to public trade selling bottled gas.
Morzine UK Branch Ltd. (Formally Coryton Asset Ltd)	Thames Oil Port The Manorway Stanford Le Hope SS17 9LL. GR 574431 182332	Bulk storage of petroleum substances. **See 6.2.7 above**.
Shell UK Oil Products Limited	Shell Haven Terminal The Manorway, Coryton, Stanford Le Hope, SS17 9GA. GR 573681 182315	Two tank farms with a total of 269,672m3/215,738 tonnes of Jet A1
EPC United Kingdom Plc (Formally Exchem Pl)c	Great Oakley Works / Bramble Island Great Oakley Works Harwich CO12 5JW. GR 621384 226635	Explosives & weapons storage. 470 Tonnes Type 1 explosive. 60 tonnes Sulphuric Acid (Oleum). 150 tonnes Concentrated Nitric Acid.
Esso Petroleum Company Ltd	Esso Terminal / Purfleet Fuels Terminal London Road Purfleet RM19 1RS. GR 556235 177871	108,000 tonne capacity. High and low flash petroleum products. Pipeline and marine fed facilities.
Industrial Chemicals Ltd	Old Power Station Site / Stoneness Road Grays RM18 8UJ.	Bio-fuel pellets.
Inter Terminals Ltd	Inter Terminal / Askews Farm Lane Grays RM17 5YZ. GR 560190 178537	311,000m3 capacity. 50 + storage tanks, 1600 – 20,800 cubic metres in size. Diesel, Gas oil, Kerosene, Gasoline and Ethanol.
Oikos Storage Ltd	Canvey Island / Holehaven Wharf Haven Road Canvey Island SS8 0NR. GR 577849 182101	Total bulk liquid storage capacity of over 300,000 cbm with individual tank capacities of between 500 cbm to 20,000 cbm. Vessels of up to 50,000 tonnes dwt and draft of up to 12.5 metres
Haltermann Carless UK Ltd (Formally Petrochem Carless Ltd)	Harwich Refinery, Refinery Road Parkeston CO12 4QG. GR623023 232217	Approximately 175 storage tanks on 27.5ha used primarily for storing hydrocarbon solvents. The site imports and exports flammable materials by ship via jetty, available at all states of the tide, by road tanker, and rail tanker from on-site loading racks. Potential for up to 50 employees and contract staff/drivers to be on site during daytime working hours and, typically, fewer than 8 outside this timeframe. (See TFP).
Procter & Gamble Product Supply (UK) Ltd	Grays / Procter and Gamble Headley Avenue Grays RM20 4AL. GR 559766 177365	Manufacture of household cleaning products - Storage of liquefied petroleum gas and substances dangerous for the environment. Chemical pesticides, Sulphur Trioxide/Dioxide
QinetiQ Limited	New Ranges Sector / Church End Foulness Island Southend on Sea SS3 9SR. GR 594420 185455	MoD testing facility

Navigator Thames Terminals BV Limited	West Thurrock / Oliver Road Grays RM20 3ED GR 557907 176822	78 operational storage tanks from 50cm3 to 9501cm3 (safe working volumes)/54.801cm3 to 10,300cm3 (tank shell capacity) plus 13 additive tanks across the 22ha site. An additional 12 empty tanks not used to store product. 47 of the tanks in service have internal floating roofs. The site has a capacity for storage of 330,000cm3 of bulk liquid products. Mild steel, coated. High and low flash petroleum products, chemicals, liquefied gas, vegetable oils, and bitumen.

LOWER TIER COMAH SITES IN ESSEX

Client Name	Location Name / Address	Comments
CLH Pipeline System (CLH-PS) Ltd (Formally Oil and Pipelines Agency (Serco Gulf Engineering))	Saffron Walden PSD / SERCO Gulf Engineering Ltd Ashdon Road Saffron Walden CB10 2NF GR 555271 238852	Storage and distribution of aviation fuel.
O-I Manufacturing UK Ltd	Harlow Factory, Edinburgh Way, Harlow CM20 2DB GR 546052 211747	Glass bottle manufacturing. Storage and use of oxygen.
Robert Stuart Plc	Robert Stuart Plc / 10 Edinburgh Way Harlow CM20 2DH GR 546025 212009	Largest range of metal finishing services on a single site in the UK. Electro-plating, chemical plating, anodising, conversion coatings, painting, material evaluation, process evaluation.
Synthomer (UK) Limited	Harlow / Templefields Central Road Harlow CM20 2BH GR 546275 211648	Polyvinyl acetate and polyvinyl alcohol plants. The plant has a variety of semi-automated stainless steel reactors, ranging from 25 litres to 12,000 litres, which are steam heated and equipped with reflux / stripping condensers. The majority are vacuum rated and capable of handling solids and solutions.
S & J D Robertson North Air Ltd known as North Air Stansted Fuelling	Stansted / Eleventh Avenue Stansted Airport CM24 1RY GR 552842 222997	Jet A1. 3 x 6300m3 and 2 x 150m3. P5C – Flammable liquids. Cats 2 & 3 not covered by P5A and P5B.
T W Logistics Ltd	Wrabness Storage Depot / Wheatsheaf Lane Manningtree CO11 2TE	The port handles a diverse range of cargoes including bulk products (grain, fertiliser and agri-products, aggregates, industrial minerals, and recyclables), forest products, granite, steel products, metals, and various bagged, palletised and unitised cargoes. Bagged ammonium nitrate fertilizer.
Coryton Advanced Fuels Ltd	The Manorway, Stanford-le-Hope, Essex SS17 9LN GR 574309 182306	The site stores Kerosenes and Jet Fuels on an intermittent basis. Petroleum products fuel blending operations. ~80 liquid hydrocarbon storage and blending tanks. Total storage volume of >2.5M litres. Bespoke drum storage capacity for 2000 x 200 litre drums. Two pressurised fuel storage vessels.

UPPER & LOWER TIER COMAH SITES IN NEIGHBOURING FRS AREAS

Upper Tier

HERTS FRS	BP Oil UK Ltd	Buncefield Oil Terminal Green Lane Hemel Hempstead Herts HP2 7JA	The Hertfordshire Oil Storage Terminal has a capacity of 60,000,000 gallons of fuel. The site is a major hub on the UK pipelines network and a source of aviation fuel to Heathrow, Gatwick and Luton. Oil, kerosene, petrol and diesel fuels are also present. TOTAL (60%) and Texaco (40%) own the site
	British Pipeline Agency Limited	Buncefield Oil Terminal Green Lane Hemel Hempstead Herts HP2 7HZ	
LFB	Flogas UK Limited	Rainham / Fairview Business Park Marsh Way Rainham RM13 8UH	Supplier of Liquefied Petroleum Gas (LPG)
	Stolthaven Dagenham Limited	Choats Road / Hindmans Way Choats Road Dagenham RM9 6PU	31 segregated jetty lines. 150 tanks, 50 heated. 133,000m³-storage capacity. Chemicals, Oil Products, Vegetable Oils, Biofuels, Alcohols, Pharmaceutical Oils, Liquid Fertilizer, Glycols, Acids, Bitumen.
Huntsman Advanced Materials (UK) Limited. **Cambs FRS**		Cambridge / Hinxton Road, Duxford, Cambridge, CB22 4XQ	Primary global manufacturing and distribution site for some of the adhesive products Huntsman deal in.
International Flavours & Fragrances **Suffolk FRS**		Haverhill / Duddery Hill, Haverhill, CB9 8LJ	Tertiary Amylene & Propylene Oxide

Lower Tier

Client Name		Location Name / Address	Comments
SUFFOLK FRS	Associated British Ports	Cliff Quay Ipswich IP3 0BD	Containers, Dry Bulks (aggregates, grain, animal feed, fertilisers and cement), Forest products, general cargo
	Deltech Europe Ltd	Piperell Way Haverhill CB9 8PH	Coating resins and unsaturated polyester resins produced in multiple reactor units including a developmental-scale reactor available for lower volume specialty resins.
	EDF Energy Nuclear Generation Limited	EDF Energy, Sizewell B Power Station, Nr Leiston, Suffolk IP16 4UR	Net electrical output: 1191MW. Sizewell B is capable of supplying roughly the equivalent of the daily domestic needs of Suffolk and Norfolk, or just under 3% of the UK's entire electricity needs.
	Origin Fertilisers (UK) Limited	Cliff Quay Ipswich IP3 0BG	Blended and straights fertilisers
LFB	Thames Water Utilities Limited	Beckton Sewage Treatment Works, Jenkins Lane, Barking IG11 0AD	

6.3 RADIATION (EMERGENCY PREPAREDNESS & PUBLIC INFORMATION) REGULATIONS 2001

6.3.1 The Radiation (Emergency Preparedness and Public Information) Regulations 2001, (REPPIR 2001), aim to protect members of the public from a radiation emergency that could arise from work with ionising radiation. A radiation emergency is an event that is likely to result in any member of the public receiving an effective dose of 5mSv during the year immediately following the emergency.

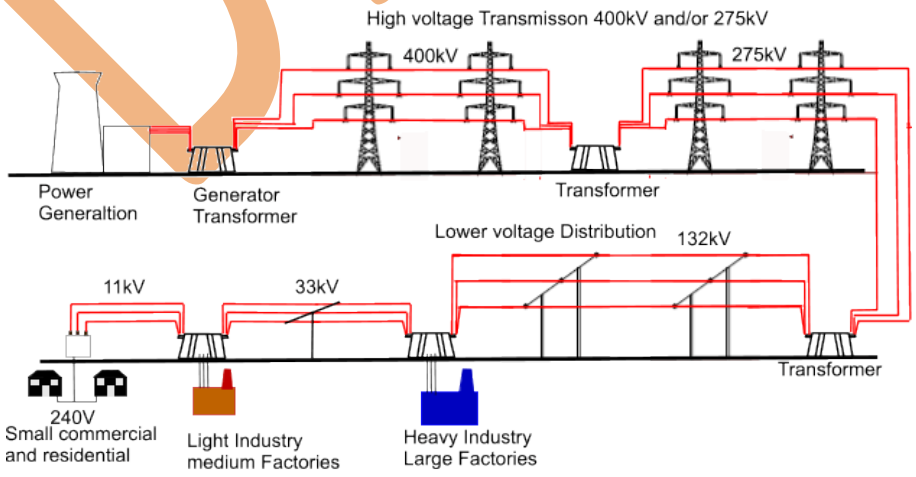
6.3.2 Bradwell Power Station is a location covered by REPPIR 2001 and the only site under these Regulations in Essex. The site followed an accelerated decommissioning programme and is now in "Care and Maintenance" (C&M). Long-term industrial partners CGN and EDF Energy intend to develop a new nuclear power station, Bradwell B. They are currently in the process of carrying out investigations in order to inform emerging proposals, (April 2019). Development is 5-7 years away.

6.4 UTILITIES [54]

6.4.1 The provision of water, gas and electricity is very important to any community. The loss of any utility infrastructure will have a negative effect, and generally, highly localised losses. The cold weather events in January 2010, and November/December 2010 demonstrated the overall resilience that investment in water infrastructure over the years has produced, compared to the disastrous impact on water loss in Northern Ireland in December 2010/January 2011.

Electricity

6.4.3 Generated electricity usually goes into the National Grid transmission system for transmission around the UK. Transmission substations take the electricity off the transmission system and inject into the distribution network. The distribution network then carries the electricity from the transmission substation to the customer. The distribution system in Essex operates at voltages from 132,000 Volts (Extra High Voltage) through 33,000 Volt and 11,000 Volt networks down to the low voltage distribution network which supplies the majority of customers at either 230 Volts (single phase) or 400 Volts (three phase). Substations transform voltage from one level to another. The design of the electricity network makes it robust with varying levels of resilience built into the various parts of the system to limit the impact of faults on the customer in accordance with national standards of security of supply. For example, on some parts of the network, usually the higher voltage networks, this means that in the event of a fault, protective equipment isolates the faulty piece of network and redirects the electricity along a different path to the customer to avoid interruption to the customer's supply.



Simplified UK Electical Power Transmission system

[54] For more on Water, see Chapter 7 – Environment

6.4.4 The safe interruption of power takes place on other parts of the network, usually the lower voltages, to minimise the damage to the network and because there are no alternative routes to the customer, until a repair team can be dispatched to carry out repairs and restore supplies.

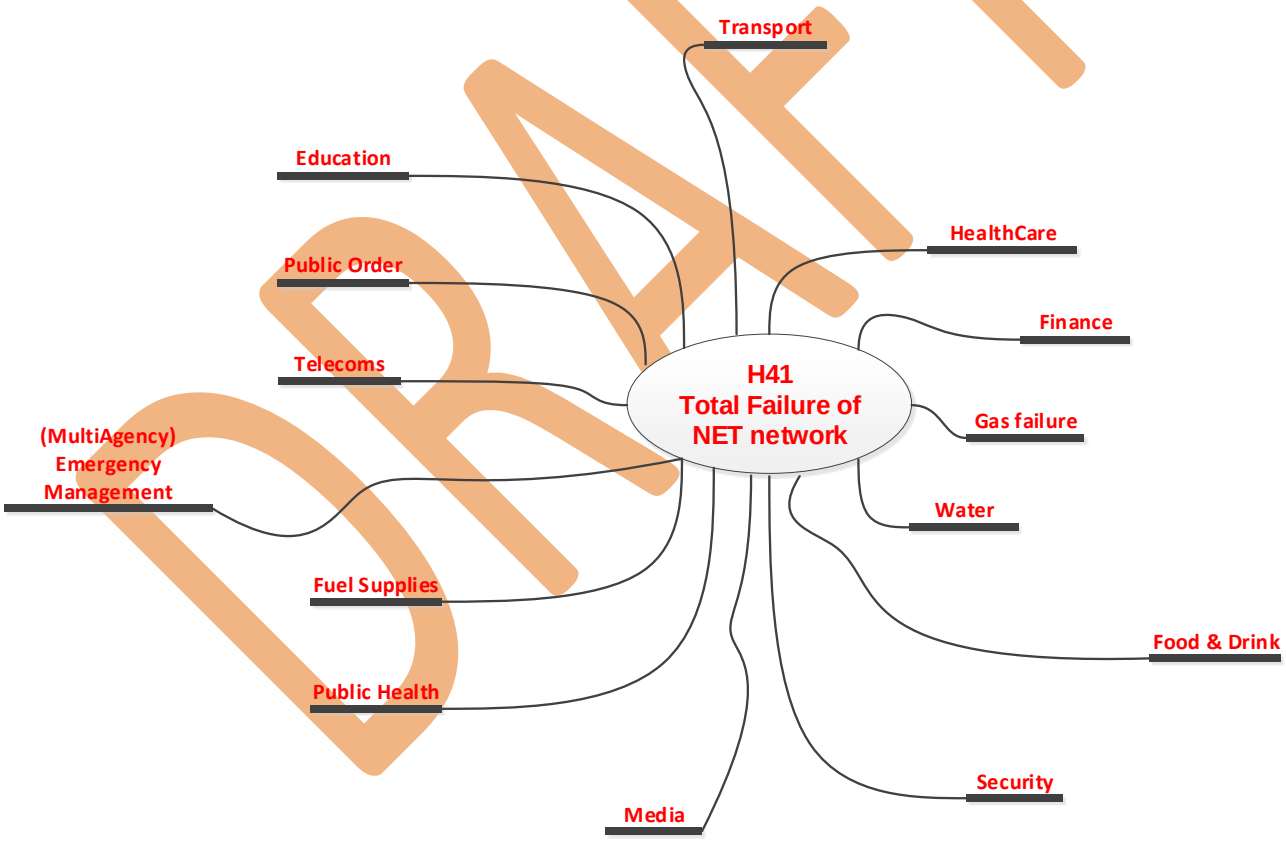
6.4.5 The following can affect electricity supplies:

- Third party damage such as from roadwork teams damaging cables, metal theft etc.
- Severe weather, e.g. strong winds causing trees and branches to fall into overhead lines bringing down overhead cables etc.

6.4.6 There is a link between thefts of copper wiring and the value of scrap metal, with recent prices being very high.

6.4.7 **The loss of electricity, recognised as a national risk (H41/H45), will have a severe impact on society and the economy, if the loss is over a prolonged period. See:**

Royal Academy of Engineering, Institution of Engineering and Technology, Lancaster University
https://www.raeng.org.uk/publications/reports/living-without-electricity



Tilbury Power Station

6.4.8 The Tilbury greenpower project comprises two separate phases of development: Phase 1 is a ca. 40 MW waste wood power plant; and Phase 2 is a ca. 20 MW Solid Recovered Fuel power plant. Phase 1 utilises around 270,000 tonnes of waste wood sourced from the region to produce up to 319,000 MWh of renewable electricity each year – enough to supply around 97,000 average homes.

1. **Waste Wood Storage Area:** Waste wood will go to the Plant by road and then stored within the Waste Wood Storage Area until transfer to the Waste Wood Processing Building. Around 270,000 tonnes of wood will go to the Plant each year.
2. **Waste Wood Processing Building:** The Waste Wood Processing Building will process waste wood to remove non-combustible material (such as metal) and produce woodchip. A conveyor transfers this woodchip to the Woodchip Storage Building.
3. **Woodchip Storage Building:** The Woodchip Storage Building will store the woodchip prior to transfer by conveyor to the Power Island. The Woodchip Storage Building can hold enough woodchip to fuel the Plant for around four days operation, although the actual quantity of fuel stored will fluctuate from day to day.
4. **Power Island:** Woodchip will transfer from the Woodchip Storage Building to the Power Island where it will be combusted within a single travelling grate boiler under tightly controlled conditions, to produce high-pressure steam. This steam will pass through a single steam turbine to generate electricity. Exhaust gases generated from the combustion process will pass to the Emissions Control Area.
5. **Emissions Control Area:** Emissions from the Plant will be rigorously controlled and monitored to ensure they meet the strict emission limits. Emissions control technology used at the Plant includes Selective Non-Catalytic Reduction (SNCR), fabric filters, and dry lime and activated carbon injection. Exhaust gases will discharge via a 100 m high stack, and will be subject to continuous monitoring.
6. **132 kV Electricity Substation:** Electricity generated by the Plant will be transferred by underground cable to the Plant's 132 kV Electricity Substation, and subsequently along a 4.5 km underground cable to the existing 132 kV substation at Tilbury. From here, the electricity enters the local electricity distribution network. UK Power Networks, the local electricity distribution network operator, is responsible for the construction of the 132 kV Electricity Substation and underground cable.
7. **Ecological Habitat Areas:** TGP will develop Ecological Habitat Areas to promote habitat creation and diversity. A range of habitat and landscaping features will develop including planting of native, ornamental and nectar-rich trees and shrubs, and the establishment of bird boxes, bat boxes, a bat shelter, and reptile shelters.
8. **Phase 2 Development Area:** The Phase 2 Development Area will accommodate a ca. 20 MW Solid Recovered Fuel power plant. No decision yet made on whether to proceed with Phase 2. The Phase 2

Development Area will be used as a laydown and car parking area during construction of the Phase 1 development.

Natural Gas facilities / pipelines

6.4.9 As already indicated in the Upper Tier COMAH site table, there are two Calor Gas facilities at Canvey Island, and Coryton. In addition, there are in excess of 750 km of high-pressure gas pipelines in Essex. They are:

- National and Transmission Systems (NTS) operated by Transco used to distribute natural gas to users throughout Essex.
- Horndon to Barking (power station) operated by Thames Power Services Ltd (18 km).
- Epping Green to Enfield pipeline operated by Enfield Energy Centre Ltd (12.8 km).

6.4.10 Noise from a high-pressure gas leak will be similar to that of a jet engine. An incident involving gas is likely to be dynamic in nature. The size of the main and its pressure will determine Emergency Planning Hazard Distances and thus the size and location of a cordon, or cordons.

6.4.11 Depending on its exact nature, any incident involving these pipelines may involve other agencies in addition to the police, either on site or in support, e.g. local authorities for temporary accommodation during an evacuation.

Oil Pipelines

6.4.12 Pipelines transport petroleum and its derivatives to and from refineries, shipping terminals and storage terminals. Typically, these products are:

- Petrol.
- Diesel Fuel.
- Dyed Diesel Fuel (red diesel).
- Aviation Fuel.
- Crude oil of varying viscosity.

6.4.13. Increasingly, Bio fuels, (e.g. ethanol), are being transported by pipelines, as well as slurries suspended in water and other liquids.

6.4.14. Multi-product pipelines transport two or more different products in sequence in the same pipeline. Usually there is no physical separation between the different products. Some mixing of adjacent products occurs, producing product interface.

6.4.15 Steel or plastic pipelines are buried at approximately 1-2 m deep. There are two oil pipelines flowing out of Essex and one that flows in to Essex. Three companies, the British Pipeline Agency, SERCO Gulf Engineering and Unipen, operate them. (**See indicative maps on pg 94**.)

British Pipeline Agency (BPA)

6.4.16 The British Pipeline Agency (BPA) is responsible for approximately 700 km of pipeline on behalf of oil, gas and chemical companies. This includes the United Kingdom Oil Pipeline (UKOP), part of which is in Essex.[55]

[55] http://www.bpa.co.uk/experience/what-we-operate/

6.4.17 The UKOP has been constructed and laid at a nominal depth of 1m underground for most of its length and has a diameter of 356mm. The system is operated and maintained by the BPA and is routed from Canvey Island to the River Mersey, with a spur to Heathrow/Gatwick Airports.

6.4.18. It passes through Essex from Canvey Island to Fishers Green, near Waltham Abbey, by way of Corringham, Great Warley and Stapleford Abbots.

6.4.19 The Thames Estuary Pumping Station is near the former Shell Haven site.

6.4.20. At any time, the pipeline can be transporting several petroleum products, including motor spirit, at pressures up to 80 bars, with a flow rate of approximately 300 tonnes per hour. Whilst the pipeline is operating, there will always be a controller in attendance at the Control Centre. All emergency contact and requests for BPA personnel should be through to the controller via Service Control.

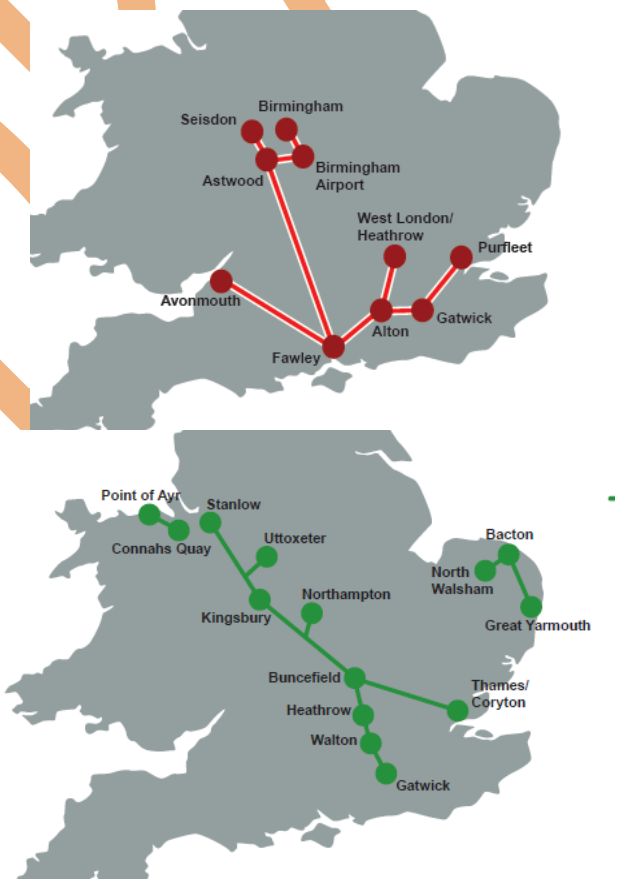
6.4.21 Pipelines from Canvey Island and oil installations at Coryton of 265mm and 305mm diameter supply the pumping station, known as the Thames Gathering System.

SERCO Gulf Engineering and Unipen

6.4.22 SERCO maintains a system on behalf of the Department of Energy. The route of this system is from Thames Haven to Saffron Walden then to Sandy (Bedfordshire) with branches elsewhere, including Stansted Airport. (Unipen operates this section).

6.4.23 The pipeline has a diameter of 254mm. Pumps with a capacity of 340tonnes per hour at up to 80 bar pressure are used and are remotely controlled from a Central Control whilst pumping is in progress. Pumps are fitted with an automatic cut-out that would come into operation immediately a rise in pressure occurred.

Pipeline routes



6.5 OTHER INFRASTRUCTURE

Low, Medium and High Rise Dwellings

6.5.1 All major urban conurbations in Essex have clusters of low, medium or high-rise dwellings. Medium rise new builds appear to be a popular choice by developers over most recent years. Medium rise can also include Sheltered Housing schemes, of which there have been a number in existence for many years. New "Retirement Living" such as the McCarthy & Stone Miami House in Chelmsford may typically be of three or four stories over a wide campus.

6.5.2 High rise residential blocks, qualified as being blocks over five stories, are located in the towns/city as identified below. Some may cluster with low-rise blocks.

Colchester	Orsett
Frinton	Grays
Weeley	Brentwood
Southend	Chelmsford
Basildon	Braintree
Leigh-on-Sea	Harlow

Properties requiring Tactical Fire Plans

6.5.3 Currently, there are 56 industrial or business premises that are the subject of Tactical Fire Plans, (TFPs). Plans are held by Operations and can be found at http://servicenet/Operational_Information/Operational_Risk_Information/Tactical_Fire_Plan_Allocation/#TFP|2273|2121

Automatic Fire Alarms (AFA)

6.5.4 AFA Guidance can be found in the document store on the Technical Fire Safety intranet page at http://servicenet/Department_Information/Technical_Fire_Safety/

Hospitals

6.5.5 Essex has five NHS acute hospitals, situated in major population centres. All have Accident and Emergency facilities. These are:

- Basildon & Thurrock University Hospitals NHS Foundation Trust General Hospital. (608 beds).
- Southend University Hospital NHS Foundation Trust General Hospital. (320 beds).

- Mid Essex Hospital Services NHS Trust, Broomfield, Chelmsford General Hospital and provides the Regional Burns & Plastic Centre. (396 beds).

These three planned to merge in April 2019, now pushed back to 2020.

- Princess Alexandra Hospital NHS Trust General Hospital, Harlow. (364 beds)

- Colchester University Hospital NHS Foundation Trust General Hospital. (560 beds) merged with Ipswich Hospital in July 2018

6.5.6 In addition to those beds stated above, there is provision for additional commissioned escalation beds during periods of significant surges, including crisis.

6.5.7 Other NHS hospital sites in Essex for day or otherwise limited admissions are:

- St. Peters Maldon – Maternity and outpatients.
- St Michael's Braintree – Birthing Centre.
- William Julien Courtauld Braintree – Maternity.
- St Margaret's Hospital Epping.
- Clacton Hospital – Cardiology, Diabetic medicine, Minor injuries, Podiatry, Physiotherapy, Urology.

6.5.8 Private hospital locations in Essex are:

- Nuffield Health, Brentwood.
- Spire Hartswood Hospital Brentwood.
- Spire Wellesley Hospital Southend on Sea.
- Ramsey Healthcare Springfield Private Hospital (Chelmsford).
- Ramsey Healthcare Oaks Private Hospital Colchester.
- BMI Southend Hospital.
- Chartwell Private Hospital Leigh on Sea.
- Holly House Hospital Buckhurst Hill.
- The Chelmsford (day surgery only).

Heritage and similar Properties

6.5.9 Essex has a number of Grade I and Grade II* Listed Buildings and Historic Houses, (which may or may not be listed), and thatched properties. Policies, procedures and processes inform the Operational Risk Information System, (PORIS). Whilst the Service does not respond to any automatic fire detector actuation other than for schools or sleeping risks without confirmation from an occupant or call centre that there is an incident, the Service does respond immediately to heritage sites.

Sites and Events attracting High Density Crowds

6.5.10 There are times when site-specific response plans may need consideration, whether the sites are permanent or temporary. For example, airports, sports grounds, hospitals, public events or areas where flooding is likely. Particular locations may also need specific plans, such as town or city centres, or coastal areas most vulnerable to pollution from major oil spills, or tidal flooding. **Basildon District Council** has a town-centre evacuation plan.

Major Retail Sites

6.5.11 All the major towns in Essex have a large retail footprint. In addition, there are a number of out-of-town retail parks, e.g. Tollgate (Stanway) near Colchester, and Freeport at Braintree.

6.5.12 Lakeside Basin, in Thurrock, covers some 365 hectares, forming one of the largest retail and leisure complexes in the UK. It includes 279,000m² of retail floorspace, 10,000m² of office floorspace and 797,000m² of industry and warehousing. There are a number of retail park areas, and of note is a large shopping mall.

Major Sporting Venues

6.5.13 Colchester United Football Club is in the Football League 2, situated at the Weston Homes Community Stadium. The ground has a crowd capacity of just over 10,000. The Stadium is accessible from the A12 (J28 Colchester bypass) via a purpose built on and off slip road system. This system feeds a Service area on the northbound carriageway. The Stadium and nearby residential and commercial developments are served off the southbound carriageway.

6.5.14 Southend United Football Club is in Football League 1. Its current ground is at Roots Hall, just outside Southend town centre. (There is a proposal to move to a new ground, Fossetts Farm). The ground has a crowd capacity of just over 12,000. Roots Hall is 7 – 10 minutes' walk from Southend Victoria railway station, and on the main road route out of Southend towards the A127.

Other Spectator Venues

6.5.15 Essex County Cricket Club, County Ground, Chelmsford (capacity approx. 6,000). Essex County Cricket Club also play a limited number of matches at Colchester and Southend.

6.5.16 Chelmsford City Football Club, Melbourne Stadium, Chelmsford (capacity approx. 3,000). A number of other Essex towns have local football clubs with small and enclosed grounds.

6.5.17 Chelmsford City Racecourse at Great Leighs, approximately five miles north of Chelmsford, provides day and night all-weather horseracing. The attendance license is for upto 30,000, (non-racing event). However, the Thursday night race meetings attract between 800-1200 racegoers, including those taking a meal in one of the two restaurants. Feature days throughout the year will attract a higher attendance, perhaps some 6-8,000 people. The highest attendance to date was for a concert after horse racing that attracted 12,000 people.

6.5.18 A Point-to-Point event take place at High Easter over the Easter period.

Colchester Zoo

6.5.20 Colchester Zoo is located off the Maldon Road at Stanway. The Zoo is in 60 acres of parkland, and has over 261 species of animals within. The 2016 Zoo report (published March 2017), quotes 1,017,671 general visits in 2016 and 42,064 students with staff/carers attended that year.

Music Festivals

6.5.21 Hylands Park just to the west of Chelmsford is home to the annual RiZE Festival in the August Bank Holiday weekend. The site license provides for upto 96,000 attending each day, with an expected attendance of 90 – 95,000 on site each day. Upto 20,000 people reside in the campsites within Hylands Park and adjacent to the park, utilising local fields. There is also an area for camper vans off the main site. The event requires a considerable amount of multi-agency planning to ensure crowd safety.

6.5.22 Priory Park in Southend is a venue for concerts since 2008, attracting an audience in the region of 30,000.

6.5.23 Audley End House, Saffron Walden, is host to a number of events during the late Spring and Summer months.

Sea Fronts and Promenades

6.5.24 Southend-on-Sea, Maldon, Clacton, Mersea Island and Walton-on-the-Naze all have sea fronts and/or promenades that, during good weather, can expect to have high visitor numbers. For example, the 7,000 population, (estimate), on Mersea could increase fivefold or more on a summer's day.

Penal Establishments

6.5.25 HMP-YOI, Chelmsford, is situated in Springfield Road, Chelmsford. It is a Category B Prison for males, including young offenders, convicted or on remand direct from courts within its local catchment area. The Prison currently has an operational capacity of 700 as at October 2018.

http://www.justice.gov.uk/contacts/prison-finder/chelmsford

6.5.26 Colchester Garrison has a Military Corrective Training Centre.

6.6 RISK SPECTRUM

Industrial Infrastructure

6.6.1 The risk spectrum ranges from a fire, or an explosion involving gas or petrochemical products, to a toxic chemical release, or a radioactive release accompanied by a fire/explosion. An incident may involve dealing with a tanker alongside or possibly "at sea" in the Essex half of the River Thames.

6.7 LIKELIHOOD

6.7.1 A major incident involving an industrial incident is rare in Essex. The likelihood remains low. Response, though scalable, is likely to remain quite localised, albeit that significant casualty numbers may invoke special plans (e.g. under COMAH or REPPIR) and/or the NHS Major Accident process.

6.7.2 The likelihood of a fire in residential accommodation of any description is always difficult to assess due to variables around time of day or night, whether the occupants smoke or not, and whether there are any other vulnerabilities around drug dependency, or age etc.

High Density Crowd Incidents

6.7.3 A non-terrorist incident at a high-density crowd event has a low to medium low likelihood, whether this is a fire at a sporting venue, music festival or in a large retail facility, etc. Response, though scalable, is likely to remain quite localised, albeit that significant casualty numbers may invoke the NHS Major Accident process.

6.8 IMPACT

6.8.1 Incidents could involve multiple deaths and injuries over a wide area, to a limited number of deaths and injuries in a more localised area. A large-scale long duration event, e.g. Buncefield, is likely to require resources beyond the capacity of ECFRS alone.

6.8.2 The Grenfell Tower fire on 14 June 2017 illustrated the issues of poor construction coupled with difficult access to both the hi-rise block and to the flats within. Post Grenfell, public property owners in Essex have taken steps, or are in the process of taking steps, to reduce/remove aluminium cladding due to the effect of fire. (April 2019).

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities
8. A major gas and/or petrochemical industrial accident/incident Up to 3km around site causing from 10 to 500 fatalities and from 150 to 1500 casualties. Gas terminal event likely to be of short duration, once feed lines are isolated; event at a storage site could last for days if the explosion damaged control equipment. Gas shortage not expected but some disconnections of intensive users. Disruption to transport services (road and rail) locally for up to a week and to provision of health services locally. Disruption to river traffic.	• Fire or explosion at a gas LPG terminal (or associated onshore feedstock pipeline) or flammable gas storage sites • Fire or explosion at a light end oil refinery or petroleum storage depots. • Industrial Toxic Chemical Releases • Radioactive substance release from an incident at Bradwell.	• Major incident declared • Probable invocation of national and local Mutual Aid arrangements • National coordination • Possible pollution due to necessary fire ground action • Death or (severe) injury to firefighter(s) in addition to scene casualties etc.	• Reputational risk if incident management is called into question • Criminal proceedings • Civil proceedings • Possible large fines • Public Inquiry • Political impact • Environmental impact • Post event Media management • Public scrutiny/perception • Reliefs over a protracted incident. • Invocation of Mutual Aid arrangements. • Invocation of SCG/SCC over a protracted period and the possible consequence on strategic managers and maintaining business as usual. • Liaison with COBR leading to national direction. • Potential postponement of Service business. • Business continuity plans invoked	• Positive PR. • Raises profile of ECFRS with politicians. • Improve relationships with partner agencies. • Training with partner agencies. • Planning with partner agencies. • Build strong relationships with site managers. • Identification of new equipment, tactics or training opportunities

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities
9. Incident at a sporting or music event etc. with a crowd of any size in an enclosed space of any size.	• Fire or explosion at a food vending location (e.g. due to petrol generator). • Fire in tented temporary accommodation. • Fire/explosion in a camper style vehicle. • Fire/collapse in/on a stage or stadium (area). • CBRN event • Arson/Fire as a weapon • VBIED. • IED • Lone Wolf/MTFA • Deliberate vehicle event, (e.g. vehicle driven in to pedestrians/industrial premises.)	• Multi-agency major incident declared • Likely invocation of Mutual Aid arrangements • National coordination. • Large numbers of fatalities and casualties. • Potential public order issues affecting response. • Recall to duty possibly required. • Mass decontamination. • Deceased Victim Identification (DVI) process. • Declaration of LOE/Zoning, Warm Zone only BPPE personnel able to be deployed	• Reputational risk if incident management is questioned. • Criminal proceedings. • Civil proceedings. • Public Inquiry. • Political impact. • During event “real time” and post event Media management. • Public scrutiny / perception. • Reliefs over a protracted incident. • Environmental impact • Post event Media management • Public scrutiny/perception • Reliefs over a protracted incident. • Invocation of Mutual Aid arrangements. • Invocation of SCG/SCC over a protracted period and the possible consequence on strategic managers and maintaining business as usual. • Liaison with COBR Leading to national direction. • Potential postponement of Service business. • Business continuity plans invoked	• Positive PR to the general public • Raises profile of ECFRS with politicians. • Improve relationships with partner agencies building on the relationships formed during previous major event preparation to include planning and training at Safety Advisors Group (SAG) meetings prior to event.

CHAPTER 7: OUR ENVIRONMENT

7.1 OVERVIEW

7.1.1 This Chapter looks at the environment we operate in and in particular our relationship with water. The Chapter references our coastline and river system; drinking water storage and distribution; flooding; water management and responsibilities; climate change; landfill and pollution.

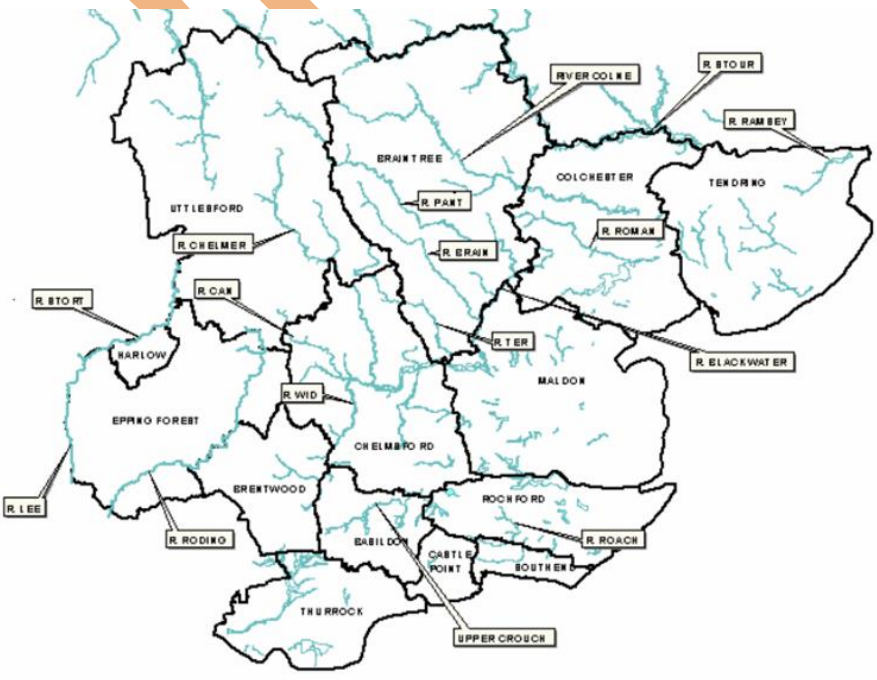
7.1.2 Essex has:

- An area of approximately 3,670 sq. km, with large areas of flat, low-lying land, about half of which are in agricultural use.
- Multiple internationally protected habitats and landscapes, including the Dedham Vale Area of Outstanding Natural Beauty.
- 10 Ramsar sites, three of which extend into other administrative areas.
- Seven Nature Reserves.
- 24 nationally important sites of geological conservation
- 86 Sites of Special Scientific Interest
- 49 Local Nature Reserves.
- 236 designated Conservation Areas.
- Over 14,200 Listed Buildings, including some 289 Grade I buildings, mostly Churches of antiquity.

7.1.3 The Chapter will also take account of National Operational Guidance on water rescue and flooding in order to lay the foundations for integrated risk management planning.

7.2 THE ESSEX COASTLINE AND RIVER SYSTEM

7.2.1 Essex has 515 km of coastline, one of the longest coastlines of any English county; the coastline includes a large number of estuaries and islands that are a distinctive feature of this stretch of the East Coast. The coast is low-lying and for the most part has sizeable flood defence structures, particularly the extensive lengths of sea wall, built following a calamitous flood in 1953. (**See 7.16.6**). The eastern side the coastline is characterised by saltmarshes, muddy estuaries and isolated islands, most notably Mersea Island, accessed by a causeway often submerged at high tide.



7.2.2 The River Stour to the North, the North Sea to the East and the Thames Estuary to the South provide Essex with three of its boundaries. The County is highest to the North and West with the major river systems draining eastwards into the North Sea (e.g. Rivers Stour, Colne, Blackwater, Chelmer, Crouch and Roach) or the Thames Estuary (Rivers Mardyke, Beam, Roding and Lee) although the area around Saffron Walden flows northwards via the River Cam to eventually reach the sea at Kings Lynn.

7.2.3 The Essex Estuaries European Marine Site, (EMS), is the second largest estuarine site on the east coast of England. It contributes to the range and variation of estuaries in the UK as the best example of a coastal plain estuary system on the British North Sea coast. Covering an area of 472 square kilometres, this estuary complex contains the major estuaries of the Rivers Colne, Blackwater, Crouch and Roach, as well as extensive open coast tidal flats at Foulness, Maplin and the Dengie. The intertidal mudflats and sandflats within the European marine site support a wide range of typical estuarine and marine communities. The Essex Estuaries Special Areas of Concern[56], (SAC), contains either fully and/or partially:

- Five distinct Special Project Areas.
- Seven SSSIs
- One Marine Conservation Zone.

One fifth of the total area of British saltmarshes occurs in East Anglia, with the Essex Estuaries EMS containing a significant proportion of the UK saltmarsh resource.

7.2.4 Essex is vulnerable to flooding from the sea, rivers, surface water or a combination of these. Coastal inundation becomes a concern when Low Pressure and a northwesterly wind combine to lift the prevailing sea height. This worsens when Spring Tides are due, particularly in the spring and autumn months, when significantly high Spring Tides are experienced

7.2.5 The creation of flood barriers and the increase in height of some sea defences around Essex has improved the resilience of areas vulnerable to tidal flooding. Even so, in recent years there have been a series of river and coastal flooding events within Essex, which resulted in a number of residential and commercial properties being flooded. Additionally, there has also been a rise in the number of flash flooding events. The map below shows the coastal and inland areas at risk from tidal flooding.

Essex Flood Risk. Copyright Environment Agency

[56] https://designatedsites.naturalengland.org.uk/Marine/MarineSiteDetail.aspx?SiteCode=UK0013690&SiteName=Essex%20Estuaries&countyCode=&responsiblePerson=

7.3 WATER MANAGEMENT IN ESSEX – WATER AUTHORITIES

7.3.1 Outcomes from the Pitt Review of the floods in 2007 brought about The Flood & Water Management Act 2010. In addition, the following Acts of Parliament apply:

- The Water Resources Act 1991.
- The Land Drainage Act 1991.
- The Environment Act 1995 (that created the Environment Agency).

7.3.2 The Environment Agency, (EA), is responsible for carrying out flood risk management activities in England and Wales as established by the Water Resources Act, the Land Drainage Act and the Environment Act. Essentially, this means the EA is responsible for dealing with coastal flooding and flooding from main rivers. Essex County Council also has powers under the Flood and Water Management Act 2010, the Land Drainage Act for the Regulation of ordinary watercourses, and the Highways Act 1980, (Sections 100 – 102), to alleviate flooding on roads.

7.3.3 The **Flood and Water Management Act 2010** ensured that, for the first time, one body is accountable for the delivery of coordinated local flood risk management to minimise the risk of a repeat of the flood events of summer 2007

7.3.4 Essex County, Southend and Thurrock Councils lead on and are accountable for ensuring effective management of the following local flood risks:

- **Groundwater flooding** - occurs when water levels in the ground rise above the ground surface. Flooding of this type tends to occur after long periods of sustained heavy rainfall and can last for weeks or even months.
- **Surface water flooding** - also known as pluvial flooding or flash flooding, occurs when high intensity rainfall generates runoff which flows over the surface of the ground and ponds in low lying areas.
- **Ordinary watercourses (streams and ditches)** - concerns flooding from any watercourse which is not designated by the EA as a main river. The classification “ordinary watercourses” includes all other smaller watercourses, ditches and streams. There is a vast and unmapped network of watercourses in Essex.

7.3.5 Local Authorities, (LAs), rely on information from other public and private bodies, such as water companies and emergency services, which have a duty to co-operate and share information. LAs have powers to carry out works for surface run-off and groundwater flood risk and also to maintain or restore natural processes and manage water levels in relation to these sources of flood risk. Locally agreed work programmes identify and managed these.

7.4 WATER MANAGEMENT IN ESSEX – STORAGE & DISTRIBUTION

7.4.1 The prediction is that water demand in Essex will rise by 6% by around 2035, almost entirely due to an increase in population, assuming that growth in housing development occurs as planned (**See page 30**).

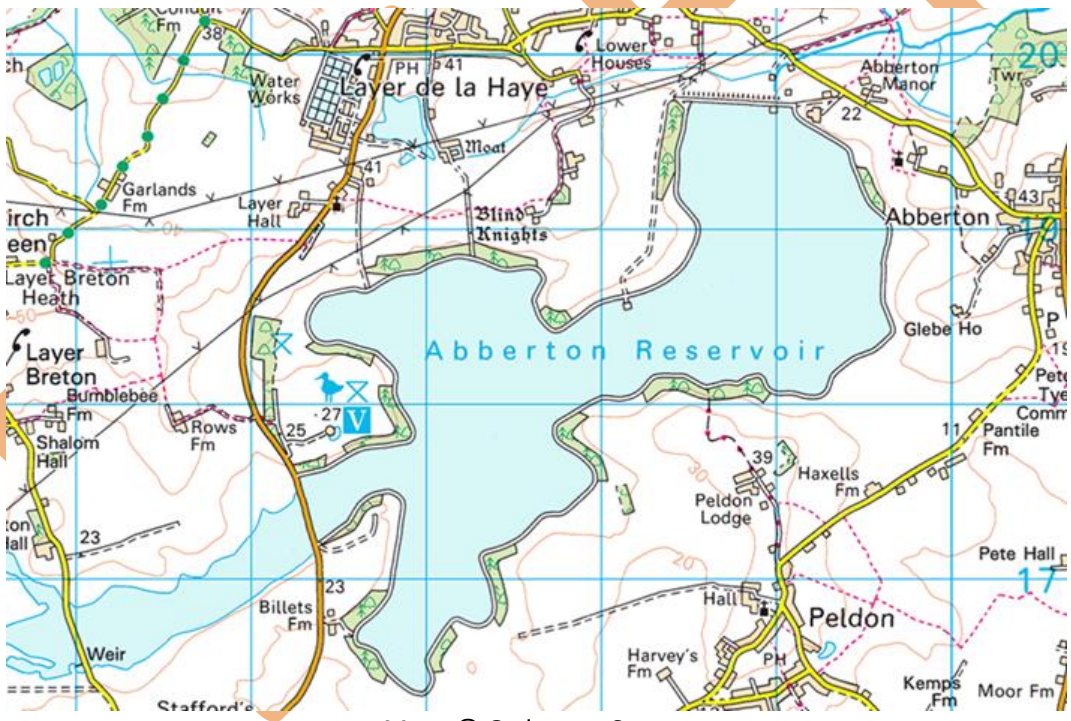
7.4.2 Essex is the driest county in the UK receiving on average less than 600 mm of rain a year, two thirds of the average for England and Wales. Only half the water supplied in the Essex area comes from within. In a dry year up to one third of the required water comes via the Ely Ouse to Essex Transfer Scheme (EOETS), which transfers water from Denver in Norfolk, through pipelines and pumping stations to the River Stour and River Blackwater to fill the reservoirs at Abberton and Hanningfield during dry periods. Under the scheme, the transfer of surplus water to Essex, otherwise lost to the Wash, occurs. In a wet year, no water is required; in an average year, the transfer provides 7% of the supply; in a dry year that can increase to between 15% and 35%. There appears to be an increasing supply deficit.

7.4.3 There are two main types of reservoir:

- Direct supply reservoirs – store water and supply it straight to a water treatment works.
- River regulating reservoirs – store water during rainy periods and release extra water into rivers when needed for extraction further downstream for treatment.

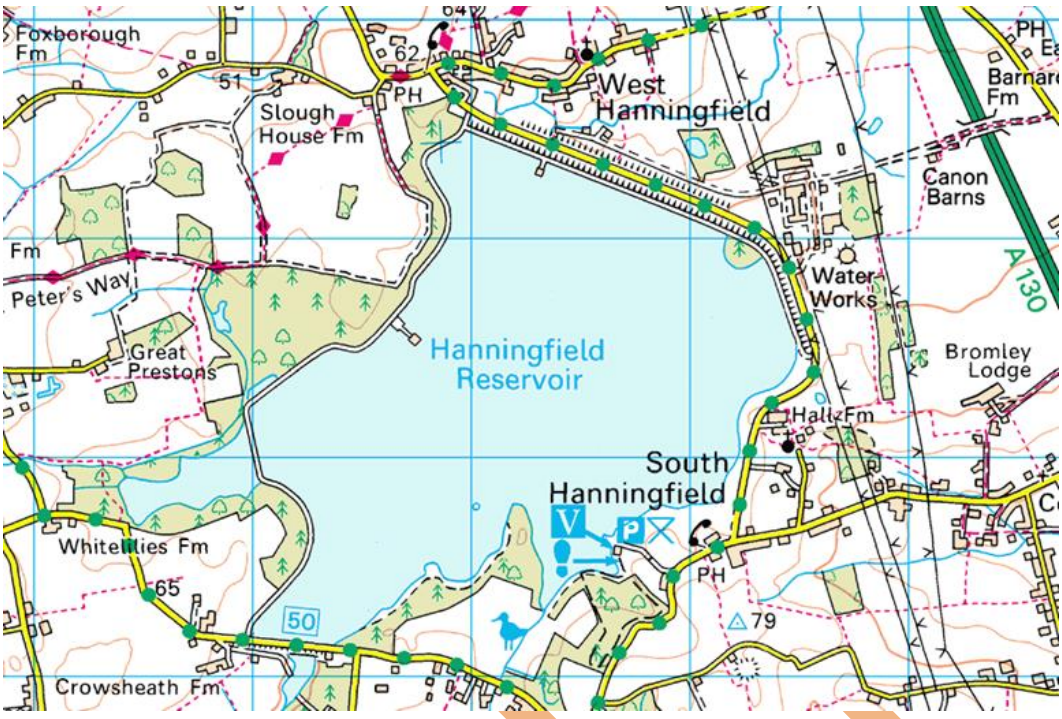
7.4.4 Hanningfield and Abberton Reservoirs, owned by Northumbrian Water Limited trading as Essex & Suffolk Water, are of the first type. Both contain about 25,000 megalitres. All reservoirs are risk assessed as either high or low risk. High-risk reservoirs will attract the controls referred to in paragraph **7.4.9**, based on an assessment of risk and not purely by cubic capacity. They are pumped storage Reservoirs, involving pumped water from the rivers Chelmer, Blackwater and Stour to fill them, rather than simply relying on rainfall from their limited catchment area. Damming shallow river valleys formed both; consequently, they are less deep compared to reservoirs in hilly districts. (The dam at Hanningfield is in the Guinness book of records, being the longest in the UK.)

7.4.5 Abberton Reservoir is about 6.5 km south of Colchester, and less than 8 km from the coast, and one of the most important in Britain for wildfowl. The Reservoir is the fourth largest in England, at 4.9 sq. km. It is a Ramsar Site (Wetland of International Importance for Birds), a Special Protection Area (SPA) designated under the EU Birds Directive, and a Site of Special Scientific Interest (SSSI) due to wildfowl. It is the largest freshwater body in Essex, with 485 hectares covered by water. An enlargement scheme increased the volume of water by 15bn litres/328m gallons or 58% of the former storage volume



Maps © Ordnance Survey

7.4.6 Hanningfield Reservoir is the second largest Reservoir in Essex, situated about 4.8 km south of Chelmsford. Its main scientific interest lies in its breeding and wintering wildfowl.



Maps © Ordnance Survey

7.4.7 The Service welcomed the enhancements to the Ely Ouse scheme (EOETS) and the associated increase in capacity at Abberton. It has no impact on the immediately available water supply for firefighting in the distribution network. However, it will reduce those occasions where potentially low reservoir levels result in the application of consumption reduction measures. A failure of this scheme in drought conditions could lead to excessively low reservoir levels, leading to the imposition of water restrictions.

7.4.8 The National Drought Risk, **H50**, is London-centric and refers specifically to ceasing routine transfers of water to Essex. In very dry times, upto 35% of the water used by Essex & Suffolk Water transfers via the EOETS, and a further 20% from Thames Water. There are Year 1, 2 and 3 conditions met in line with those encountered in 1976, which appear to provide the background to "unprecedented" drought risk. **Nevertheless, a drought for London will almost certainly mean a drought for Essex.**

7.4.9 The Flood & Water Management Act 2010, affecting Hanningfield and Abberton, updates the Reservoirs Act 1975. It reflects a more risk-based approach to reservoir regulation through:

- Reducing the regulated capacity for a reservoir from 25,000m³ to 10,000m³ and ensuring that only those reservoirs assessed as a higher risk are subject to regulation.
- All undertakers with reservoirs over 10,000m³ must register their reservoirs.
- Inspecting engineers must provide a report on their inspection within 6 months.
- All undertakers must prepare a reservoir flood plan.
- Mandatory reporting of all incidents at reservoirs.

7.4.10 During dry or drought conditions, reduction in pressure is likely to be a consequence of increased usage rather than a strategy employed by the Water Supply companies to reduce consumption, as most of the distribution network in Essex is gravity fed from elevated storage (water towers).

7.4.11 The following commercial Water Supply companies provide Essex with drinking water:

- Affinity Water (Central Region).
- Affinity Water (East Region).
- Thames Water.

- Anglia Water.
- Essex & Suffolk Water.

7.5 FLOOD TYPES

7.5.1 The National Security Strategy, "A Strong Britain in an Age of Uncertainty", identifies four Tier 1 Priority risks, one of which is, "A major accident or natural hazard, which requires a National response, **such as a severe coastal flooding affecting three or more regions in the UK**, or an influenza pandemic."

7.5.2 There are three types of flooding:

- Fluvial.
- Pluvial (otherwise known as surface water or "flash" flooding).
- Tidal.

7.5.3 **Fluvial** flooding occurs when rivers overflow and burst their banks, due to high or intense and prolonged rainfall. River flows may rise to flood levels at different rates, taking a few minutes to several weeks, depending on the type of river and the source of the increased flow. Slow rising floods most commonly occur in large rivers with large catchment areas. The increase in flow may be the result of sustained rainfall, or rapid snowmelt. Drainage obstructions such as landslides or vegetation debris may cause and exacerbate localised flooding. Rapid flooding events, including flash floods, more often occur on smaller rivers, rivers with steep valleys or rivers that flow for much of their length over impermeable terrain. The cause may be localised due to an intense thunderstorm.

7.5.4 **Pluvial** flooding occurs when intense and prolonged rainfall in the urban environment exceeds the capacity of drainage systems leaving water to flood streets and paths, creating flash flooding. The ground cannot absorb excess water. Surface water accumulates, sometimes referred to as ponding, a type of flooding in relatively flat locations. Puddles and ponds develop on the land in more rural areas; canals fill to the brim and spill over; gradually a layer of water covers the land. Rainwater falling in an area is normally stored in the ground, in canals or lakes, or is drained away, or pumped out. When more rainwater enters a water system than can be stored, or can leave the system, flooding occurs. In this case, rain is the source of the flood: not water coming from a river, but water on its way to the river, otherwise called "pluvial flood". Depending on the economic activity and size of the area that is covered, it may cause immense economic damage.

7.5.5 **Tidal**, or coastal, flood occurs by a combination of sea tidal surges caused by winds and low barometric pressure, possibly exacerbated by high upstream river flow in river estuaries. The sea level is higher beneath an area of low pressure, but the wind can have a larger effect. Tidal flooding may involve the overtopping or breach of coastal flood defences. (See **7.2.4** and **7.2.5**)

7.6 OPERATIONAL WATER MANAGEMENT – GENERAL

7.6.1 ECFRS has Water Bowsers located at Corringham and Halstead, each having an operational capacity of 12,500 litres. Other water management techniques include greater use of hose laying vehicles and High Volume Pumps, (HVP).

7.6.2 There are 34,830 fire hydrants and associated bypass valves in Essex, (July 2018), some capped, (a common situation in London.) Increasingly, the Water industry is finding it difficult to maintain these. In due course, working in a water-constrained environment might require measures that are more radical. For example, determining dedicated water plans for incidents at certain sites with a PDA relevant to the location; water re-use; or halving the numbers of hydrants and introducing strategically sited "super-hydrant" locations, with multiple take-off points fit for purpose in that area.

7.7 WATER RESCUE & FLOODING

7.7.1 Even though FRS in England do not have a statutory duty to respond to water rescue or flooding incidents, ECFRS has a water rescue and flooding capability. (In any event, there is a public expectation to meet and is covered under "other emergencies".)

7.7.2 ECFRS attends a variety of water-related incidents. The National Operational Guidance Programme[57] describes the possible hazards, the potential range of controls available and the likely actions to implement those controls.

7.7.3 The emergency services have been criticised for delaying action at incidents with apparently little risk of harm to personnel. It may not always be necessary to implement extensive control measures before taking action. Some situations may worsen in the absence of fast action, with a minimum of controls in place.

7.7.4 Water can be deceptive, hiding hazards not obvious, which may place firefighters at risk. Incident Commanders will need to be mindful of potential hazards using knowledge of the body of water to base their decisions on the balance of risk to personnel and members of the public.

7.7.5 The police are responsible for co-ordinating search and rescue (SAR) on land and on inland waters. The Maritime and Coastguard Agency (MCA) responds to rescues at sea, some inland waters, cliffs and the shoreline. However, when present at an incident, the FRS may be the best-equipped agency with the most expertise for performing SAR.

7.7.6 ECFRS should include risk profiling for water related incidents. For flooding this assessment should identify the areas of potential inundation and the most vulnerable people at risk. This process should use risk mapping from a variety of sources including the ERF and national community risk profiles for resilience and Environment Agency flood maps. For a ready-reference, see:

https://flood-warning-information.service.gov.uk/long-term-flood-risk/map

7.7.7 Assessment of flooding risk should include:

- Local flood maps including flash flood areas and specific risks such as fords and flooded roads, and specific hydrology.
- Geographic and demographic areas of highest need involving vulnerable members of the community and critical national infrastructure.
- Previous incident data.
- Links to weather patterns and historical flood data.

7.7.8 ECFRS will assess hazards and risks in Essex. Site-specific plans should be considered for locations where these are significant. They should include:

- Response levels. (The development of a Flood Rescue Emergency Plan should also prevent later criticism, which emerged in some areas following the flooding of the Somerset Levels.)
- Reference to relevant standard operating procedures.
- Tactical considerations, including rendezvous points, marshalling areas for appliances and access points.

[57] https://fireandrescue-public.sharepoint.com/Pages/Guidance-Catalogue.aspx?guidanceid=146

7.8 CLIMATE CHANGE

ECFRS cannot control Climate Change. Where resources are available, mitigating impacts and optimising capacity and capability should occur. This will involve adaptation to new environments, over time.

7.8.1 Climate change is the long-term change in average weather conditions, including temperature, precipitation and wind. A changing climate will have impacts and consequences for people, organisations and wildlife. (See Impact at **7.16**)

7.8.2 In July 2016, the Committee on Climate Change published the UK Climate Change Risk Assessment 2017 Synthesis of the Evidence Report's key findings.

https://www.theccc.org.uk/uk-climate-change-risk-assessment-2017/synthesis-report/

7.8.3 The risk assessment looks to the year 2100. Change is, however, gradual and incremental, and for a FRS, the potential problems will require some thought to keep on the front foot. (This should apply to all public authorities.) Figure SR1 from the report offers the following. (Note the references to relevant chapters.)

Figure SR.1: Top six areas of inter-related climate change risks for the United Kingdom

Source: ASC synthesis of the main areas of risk and opportunity within the chapters of the Evidence Report.
Notes: Future magnitude is based on a combination of climate change and other drivers of risk (e.g. demographic change), taking account of how current adaptation policies and plans across the UK are likely to reduce risks.

7.8.4 In July 2018, the Government published the latest National Adaptation Programme[58] to address the risks identified in 2017. Six priority areas of climate change risks for the UK were identified, three of which are particularly important to ECFRS.

- Flooding and coastal change risks to communities, businesses and infrastructure is a high risk now and is expected to remain a high risk in the future.
- Risks to health, well-being and productivity from high temperatures.
- Risks of shortages in the public water supply for agriculture, energy generation and industry.

[58] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/727252/national-adaptation-programme-2018.pdf

7.9 LANDFILL SITES

7.9.1 Landfill sites are the locations into which unrecyclable household and other waste goes. There are 15 licensed landfill sites in Essex, with a further three in the adjoining London Borough of Havering.

- Martells Quarry Slough Lane Ardleigh Colchester.
- Bellhouse Landfill Warren Lane Stanway Colchester.
- Wivenhoe, Alresford Road Wivenhoe Colchester.
- Wivenhoe Quarry Keelarsy Sunnymead Extension Wivenhoe Colchester.
- J McArdle Contracts Waltham Park Sewardstone Road Waltham Abbey.
- Linford, Buckingham Hill Road Stanford-Le-Hope.
- Mucking Landfill Crown House Mucking Wharf Road Stanford-Le-Hope.
- Barling Landfill Baldwins Farm Little Wakering Road Barling.
- Crumps Farm Landfill Site, Little Cranfield, Dunmow.
- Brittons Hall Farm Roxwell Chelmsford.
- Ongar Landfill Site Mill Lane High Ongar.
- Tilbury Power Station Fort Road Tilbury (Decommissioned and closed (2013)).
- Ockendon Landfill Site Medebridge Road Grays.
- Pitsea Landfill Site Little Mussels Pitsea Marshes Basildon.
- Aveley Landfill Site, Sandy Lane Aveley.
- Mardyke Farm Landfill Site Dagenham Road South Hornchurch Rainham.
- Fairlop Hainault Road Fairlop Romford.
- Rainham Landfill Site The Marshes Site 2 Ferry Lane Rainham.

7.9.2 Methane emissions through the cap of a landfill need to be monitored, through a Gas Management Plan, as an integral part of demonstrating compliance with the Landfill Directive, and in particular to:

- Prioritise the remediation required.
- Quantify the total emissions of this important greenhouse gas from the site as a whole.

Two Tree Island is a construct from man-made waste from Southend and Castle Point Boroughs. There is a potential for an environmental impact. Underground fires have occurred. The EA monitors methane emissions from the surface of permitted or licensed landfill sites.

7.9.3 The potential hazards that exist from landfill gas are:

- Toxicity (acute and chronic).
- Ecotoxicity.
- Fire and explosion.
- Asphyxiation.
- Odour.

7.9.4 The objectives of a Gas Management Plan are to:

- Prevent the migration of and control any release of landfill gas.
- Minimise the impact on local air quality.
- Minimise the contribution to climate change.
- Control the release of odorants.
- Minimise the risk of accidents.
- Prevent harm to human health.

7.10 TIMBER STORAGE

7.10.1 Timber storage yards, or sites that contain large piles of redundant wood offer additional risks. (E.g. Nazeing, Rio, Thurrock and Thoby Lane Mountnessing – **See 7.11.4**.)

7.11 ENVIRONMENTAL POLLUTION

7.11.1 The Service has Hazardous Materials and Environmental Protection Officers, (HMEPOs), who ensure environmental issues at large incidents, are considered.

7.11.2 The Fire Services Act 2004 provides for the "*Fire and Rescue Authority to take any action it considers appropriate – (if) the event or situation is one that causes or likely to cause harm to the environment (including the life and health of plants and animals)".*

7.11.3 Fire Service Circular 61/2006[59] directed FRS to work closely with the EA through the EA Working Together Protocol No.8. The Service has established relevant MoU with the EA. In addition, ECFRS attends Regional and Essex focussed liaison meetings with the EA to ensure that the Service meets the EA needs as much as possible.

Incidents that cause Pollution

7.11.4 The following incidents are examples of the wide range of incidents that the Service has dealt with in the recent past.

- A scrap wood yard fire at **Thoby Lane, Mountnessing**, (August 2014), required a significant initial attendance, with virtually every appliance in Essex after the initial attendance subsequently attending on relief over a period of nine weeks. By day eight, the cost was £286 k.
- In July 2011, ECFRS responded to a fire involving 40,000 tonnes of recycled wood at **Rio Recycling in Orsett**. Wood chips were in a former quarry 24m deep and 183m wide. This involved a controlled burn for a week.
- In October 2010 ECFRS responded to:
    - A chemical spill closed the **Port of Tilbury**. The Service dealt with a container of paraquat dichloride, damaged after a fall from a trailer. The material is a marine pollutant and spilled in a high-risk area that saw an attendance of seven appliances. There were no casualties, and a specialist contractor cleaned the area.
    - Two ammonia refrigerant gas leaks.
    - A chemical suicide involving two people in a car. The occupants had posted warning signs on the outside of the car. Nevertheless, appropriate action was required.
    - An attempted suicide by aluminium phosphide tablets liberating phosphine gas. This incident involved three casualties.
- In September 2010, ECFRS responded to a tanker carrying 20,000 litres of the chemical linear alkyl benzene (flammable but with a high flash point) which is an ingredient in detergents. The tanker was involved in an RTC at the **Brook Street roundabout**, Brentwood (A12). The entire contents of the tanker flooded onto the road, with much of it pouring into a nearby stream. Three appliances and the specialist foam appliance dealt with the spill.
- In May 2009, appliances dealt with a spill of 100 litres of Nitric Acid at **Parkestone Quay**.
- In January 2009, ECFRS undertook a controlled burn over a number of weeks at the timber stack fire in **Hoe Lane Nazeing**. This was a significant but straightforward decision. If, however, this stack had contained tyres or old refrigerators, balancing the environmental consequences of either

[59] A Fire Service Circular is a written statement of policy. It will often provide information, guidance, rules, and/or background information on legislative or procedural matters.

intervening or opting for a controlled burn would have been far more complex. It is arguable that, in this case, the decision minimised the overall impact on the environment.

7.11.5 The illustrations above are a demonstration of the type of activity with which ECFRS is involved, but do not illustrate frequency or likelihood.

7.12 RISK SPECTRUM

7.12.1 See the risk spectrum impacts at **7.16** for the Service.

7.13 LIKELIHOOD

Climate Change – Likelihood

7.13.1 There have always been natural fluctuations in climate. Observational records show that we are seeing rates of change far greater than previously experienced. Globally, each of the last three decades has been warmer than any preceding since 1850 and 17 of the 18 warmest years on record have all occurred since 2000. The oceans are warming at all depths and glaciers and ice sheets are melting which, together with thermal expansion of the oceans, is causing sea level to rise at an accelerating rate.

7.13.2. The UK is experiencing a warmer and wetter climate. All of the top ten warmest years on record have occurred since 1990 with eight of those since 2000. The UK's hottest year on record is 2018. Extremely warm summers, such as the European heat wave of 2003, which was responsible for 2000 excess deaths in the UK, are now expected to happen twice a decade compared to twice a century in the early 2000s. Seven out of the top ten wettest years in the UK have occurred since 1998 and the winters of 2014 and 2016 have been the two wettest on record. An extended period of extreme winter rainfall in the UK is now about seven times more likely than in a world without human emissions of greenhouse gases.

7.13.3 The current set of UK Climate Projections (UKCP18) tell us that the UK will continue to warm in the future and more so in summer than winter. The expectation is that UK winters will become wetter while summers could be slightly drier.

https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-fact-sheet-derived-projections.pdf

7.13.4. The UK may have the second most variable climate in the world, not based on extremes of temperature, or rainfall etc.

7.13.5 Accurate predictions around climate change and its impact/likelihood are difficult to provide, as they are dependent on variable factors. Nonetheless, there is an increased likelihood of severe, localised flooding in urban areas, (where storm drain capacity and capability to deal with heavy and sustained rainfall will be challenged – as experienced in Essex in August 2013), and rural areas surrounding waterways and coastal areas.

7.14 IMPACT

Flood Impact – General

7.14.1 The primary effects of inland flooding include loss of life and loss of infrastructure, damage to buildings, bridges, sewerage systems, roadways, and canals. Damage to roads and transport infrastructure may make it difficult to mobilise aid to those affected or to provide emergency health treatment. There will be an economic impact.

7.14.2 Floods also frequently damage power transmission and sometimes power generation, which then has knock-on effects. This includes loss of drinking water treatment and water supply, resulting in loss of drinking water or severe water contamination. It may also cause the loss of sewage disposal facilities. Lack of clean water, and human sewage in the floodwaters, raises the risk of waterborne diseases, which can include typhoid, giardia, cryptosporidium, cholera and many other diseases depending upon the location of the flood.

7.14.3 Floodwaters typically inundate farmland, making the land unworkable, preventing crops from being planted or harvested, which can lead to shortages of food for both humans and farm animals. Entire harvests for a country can be lost in extreme flood circumstances, leading to economic impacts. Some tree species may not survive prolonged flooding of their root systems.

Flood Impact – Specific

7.14.4 During Christmas 1927, heavy snow fell in the Cotswolds in central England, where the River Thames has its source. A sudden thaw occurred over the period 31st December 1927/1st January 1928 followed by unusually heavy rain, doubling the volume of water coming down the river. The sudden rise in water level coincided with a high Spring Tide and a storm surge caused by a major cyclone in the North Sea. The storm surge raised the water levels in the Thames Estuary, measured at Southend, to 1.5 metres (4ft) above normal.

7.14.5 Between January and March 1947, snow fell every day somewhere in the UK for 55 straight days. This was exceptional. Much of the snow settled because temperatures stayed very low, just above freezing most days. In the first half of March, there were strong gales and heavy snowstorms, creating blizzard conditions. On the 4th and 5th March, heavy snow fell over most of England and Wales, with severe snow drifts forming. Helicopters flew supplies to many villages, and the Armed Forces helped to clear roads and railways. By mid-March and with the cold front moving away, temperatures were rapidly rising up to about 10°C. The leftover snow began to thaw rapidly. The ground remained frozen solid due to the weeks of cold weather, leaving the melting snow with nowhere to go. Melt-water poured into rivers and caused many to burst their banks. Flooding problems increased as a new depression moved in from the Atlantic, bringing rain and severe gales. During the afternoon of 16th March, winds over southern England averaged about 50 knots, with gusts of 80-90 knots. This caused damage to buildings and caused even more problems as the strong winds created waves, which pounded and even broke some flood defences.

7.14.6 The most serious recorded flood in Essex was the 1953 **tidal** flood, which resulted in significant loss of life. Fifty-eight people died on Canvey Island and a further 38 at Jaywick. Significant fluvial flooding took place in 1968 with flooding right across the County, and in 2001, flood affected the Colne, Blackwater and Chelmer valleys. (**See 7.4** Flood Types.)

7.14.7 In September 1968, the Home Counties received a severe **inland** flood, the result of a prolonged downpour over the best part of two days. South Essex received more than 150 mm of rain, and two rainfall-recording sites in Essex - Tilbury and Stifford - received slightly more than 200 mm, more than either had during the whole of the summer quarter. On 14th September, there was an outbreak of thunderstorms, with torrential downpours and serious but localised flooding. It was particularly bad in South Essex and led to the construction of many of the defences we rely on today.

7.14.8 On October 2001, an area of heavy rain spread North across Central and Eastern England, with very heavy falls in some parts of East Anglia that led to widespread flooding. In Essex 200 roads were affected by floodwaters. At Sible Hedingham, 30.1 mm fell from midnight to 0645GMT, with 36 mm rain from 0645 to 1445GMT. Transport in East Anglia was severely disrupted.

7.14.9 Extensive surface water flooding occurred in Southend, Castle Point and elsewhere in Essex in August 2013.

Secondary and long-term effects

7.14.10 Economic hardship due to a temporary decline in tourism, rebuilding costs, or food shortages leading to price increases is a common after-effect of severe flooding. The impact on those affected may cause psychological damage, in particular where deaths, serious injuries and loss of property occur.

7.14.11 Urban flooding can lead to chronically wet houses, linked to an increase in respiratory problems and other illnesses. Urban flooding also has significant economic implications for affected neighbourhoods.

Climate Change – Impact

7.14.12 Climate change has, and will continue to have, an impact on the demands placed on ECFRS. In addition, all public authorities will have to take account of the crosscutting nature of climate change risks and opportunities to formulate successful adaptation strategies. Meanwhile, water, either the lack of it, or abundance of it suddenly in one place, will bear the largest impact.

7.14.13 HR Wallingford led the development of new projections of water availability for the UK Climate Change Risk Assessment report. The project evaluated the contributing factors for the current levels of risk in water resource planning, and then projected these according to a selection of plausible climate, population, adaptation and environmental protection scenarios to 2100.

7.14.14 The assessment is consistent with existing national and sub-national population projections, water company resource-management planning, demand projections and policy, such as the Water White Paper. The approach also followed assumptions on adaptation to take into account in estimating the level of future risk.

7.14.15 The top lines messages from the project[60] are:

- Deficits in the water balance either with respect to the environment or to public water supply, or both, depending on the scenario chosen may affect all areas of the UK.
- Population, adaptation decisions (including decisions on environmental flow calculations) and climate are the drivers of the availability of water for public water supplies.
- The freshwater environment is highly connected and its management for human uses and freshwater ecology is very complex. The assessment reiterates the important dichotomy with respect to how to maintain and improve the freshwater ecology whilst maintaining clean and sustainable water supplies for human uses.

Drought

7.14.16 The Environment Agency has four stages of drought incident management – normal – prolonged dry weather – drought – severe drought. East Anglia Area is currently, (March 2019), in a situation referred

[60] https://www.theccc.org.uk/wp-content/uploads/2015/09/CCRA-2-Updated-projections-of-water-availability-for-the-UK.pdf

to as Prolonged Dry Weather (PDW). This comes about when there has not been sufficient rainfall to recharge effectively the groundwater and rivers with sufficient winter reserves to allow such activities as abstraction for agriculture and business.

7.14.17 East Anglia as a whole received 28 mm of rainfall in February 2019, 77% of the Long Term Average (LTA) for the month. This rainfall fell in the first 10 days. The past 10 months have been the second driest for East Anglia as a whole since records began in 1910. Abberton and Hanningfield reservoirs levels slightly decreased during February due to maintenance works in the Ely-Ouse-Essex transfer.

7.14.18 Some impacts will happen gradually over time, for example sea level rise and the movement of ecosystems in response to increasing temperatures. Other impacts will be responses to extreme events, for example heavy rainfall causing flooding of communities, or infrastructure damage during a bad storm.

Flooding

- In 2004, the Foresight programme suggested that the risk of river flooding is likely to increase by four to six times over present levels by the 2080s, largely because of increases in rainfall. This equates to an increase in flood frequency from once in a hundred years to once in 15 to 25 years.
- In March 2013, the EA published figures showing that one in every five days saw flooding in 2012 and one in four days saw drought. New figures from the Met Office suggest that Britain could experience a severe short-term drought – such as the one in 1976 – every 10 years.

Coastal Erosion

- Sea level rise will increase coastal flooding and erosion. Current projections indicate that the coastal floodplains of the southeast and east coast are most likely to experience an increase in flooding. Other areas, such as North Norfolk, South Wales and along the outer Humber Estuary, also face significant increases.
- Higher tides and storm related flooding may affect coastal areas more frequently. Standing water depths may prevent standard Fire Service response vehicles from entering, leaving and moving around flooded areas. Flood management schemes may become compromised and less likely to mitigate or control the impact of flooding.
- If sea levels rise in line with expert predictions, the Essex coastline will face serious threat. Average sea levels off the Essex coast could rise by 26-86cm by 2080, with sea levels in extreme conditions potentially rising by 80-140cm.

SEVERE COASTAL FLOODING OFFERS THE HIGHEST RISK IN ESSEX OF A NATURAL HAZARD EVENT OCCURRING

Water Resources

- There is an expectation that the combination of increasing changes in seasonal rainfall (wetter winters and drier summers) and higher temperatures will to lead to changes in river flows. By the 2050's, changes in summer river flows are likely to range from a 20 per cent increase through to an 80 percent decrease. Groundwater levels show a general reduction, which will be greatest further away from river valleys. These impacts may affect the availability of water for use by industry, agriculture and public water supply, also affecting plants and animals that depend on river and groundwater to maintain their habitats.

Water Quality

- Reduced river flows during the summer months is likely to affect water quality. Increased water temperatures in rivers, estuaries and lakes could lead to higher concentrations of pollution and the growth of algal blooms.

Biodiversity

- Animals and plants that depend on cool conditions will decline in a warming environment. Invasive non-native species may increase, competing with native breeds and leading to significant changes in the character of our rivers and streams, with loss of some important groups. In agriculture,

plants and livestock species may become less suited to the local climate and therefore less productive. Domestic gardens and parkland will see a change in the mix of viable species of trees and plants.

Health and Wellbeing

- Warmer temperatures may bring benefits in terms of UK tourism and leisure. Cold weather related deaths might decrease as temperatures warm. More frequent summer heatwaves will have significant implications for people's health, particularly young children, the elderly and those with heart, respiratory and serious underlying health problems. Wildfire may increase.

Subsidence

- A hotter and drier climate will cause some soils, particularly clay, to shrink leading to increased subsidence affecting buildings, roads and other infrastructure.
- Summers will become hotter and drier. Nine of the 10 warmest years on record have occurred since 1990, with five of these being since the millennium. Summer rainfall will reduce on average with more very hot days experienced. There will be a general lack of water as reservoirs reduce in volume, the water table sinks, and watercourses dry up. Winters will become milder and wetter with shorter, intense downpours of rain. In both summer and winter, more individual 'extreme' weather events can be expected. Sea levels will continue to rise with more extreme surge tides more frequently. (A drought was declared in April 2012, and due to lack of rain, with several water companies in England initiating "hose pipe bans". So much rain fell shortly after the announcement of drought, causing the withdrawal of the bans in June 2012 with the final four companies lifting in early July 2012.)

Operational Impacts

7.14.19 In summer months, higher temperatures and reduced rainfall could lead to more drought conditions and longer periods of water shortage. Grassland secondary fires may increase in number with the potential for more large-scale incidents. In the event of more frequent and larger fires, proportionate attendances would be required or dramatic changes to firefighting response and attitudes. In rural areas, this will place greater demand on retained fire fighters. Insufficient water availability could seriously hamper fire-fighting operations. (Summer 2018 saw a number of wild-fires around the UK, including Wanstead Flats in London and at South Ockendon.)

7.14.20 In winter months, we have already experienced changes to rainfall patterns with shorter periods of more intense rainfall. The impacts of substantial increases in rainfall are wide-ranging, particularly if rain does not fall evenly. The frequency of flooding is less relevant than the severity of each flood incident; as one significant event affecting a relatively urbanised area would present consequences potentially well in excess of numerous less significant events. (Floods 2007 – Pitt Report – The possible impact is that of a major and prolonged incident that requires the deployment of other Fire Services into Essex, or Essex deploying out of County to support a major and prolonged incident.)

7.14.21 Wind speeds associated with extremes of weather are predicted to rise between 2% and 6% in winter periods and reduce between 2% and 10% in summer months. Wind speed modelling because of climate change is not widely available; however, it is realistic, based on events over the last three to five years, to identify that increases in the number of extreme weather events would almost certainly increase the incidence and experience of severe wind related incidents.

7.14.22 Attendance times to incidents might increase and prioritising of emergency calls in spate conditions become more common. (The Manchester wild-fire took three weeks to fully extinguish.)

Water Management

7.14.23 If longer, hotter and drier periods are expected, this will lead to reduced water availability from open water supplies such as watercourses, lakes and ponds. As most of the distribution network in Essex is gravity fed from elevated storage (water towers), reduction in pressure is likely to be a consequence of

increased usage rather than a strategy employed by the Water Supply Companies to reduce consumption. In areas where pressure is already managed as a means of both leakage and consumption control, it is at a point where further reduction would result in an inability to meet the existing statutory minimum.

Power Outages

7.14.24 The consequences of long-term power outages over a significant area and for a prolonged period could affect mobilisation and response at an incident site. In addition, it may not be possible to refuel appliances, as pumps will not work, either at a Fire Station, or at a Fuel Station on the appliance's ground. Fire Stations could experience a range of issues, e.g. working in the dark, lack of heating, ICT failure, no Mobile Data Terminal updates, etc. and water shortages as the pumps require electricity. This is a National Risk, (**H41**) that is receiving greater attention following a review.

Finance

7.14.25 Budgetary implications could be difficult to predict. It seems likely that an increase in the frequency of mobilising on-call fire fighters could emerge, taking them away from their primary employment. This could influence the goodwill of some employers to release them for firefighting duties, resulting in a decrease of retained appliance availability and a proportional increase on the operational use of whole-time fire fighters in retained areas.

7.14.26 Firefighting operations may require more resources to attend the same incident over a longer period. Increased incidents of flooding may require more operational attendances, including OC crews. Specialist equipment and training will be necessary to execute rescues and to mitigate the impact of flooding.

Other FRS activities

7.14.27 A predicted increase in operational activity will result in a decrease in the time available for other activities, such as training and community safety. With an emphasis on maintaining operational competencies, a reduction in the number of community-based activities undertaken by operational crews will affect the ability of the Service to support the prevention and protection workstreams.

7.14.28 Firefighting is an arduous activity, particularly during hot weather. Attending fires for long periods may have health and welfare implications for crews. This may reflect in the type of equipment provided and its use; also in the type of personal protective equipment provided and the welfare arrangements such as drinking water, food and toilet facilities.

Pollution

7.14.29 The Service has to deal, from time to time, with pollution arising from accidents involving hazardous materials in transit by road, rail, air and sea, or at sites where hazardous materials are stored

and/or used. ECFRS is also required to consider and mitigate pollution arising from an incident either because of the accident or because of ECFRS actions to deal with it. The scale of operation can vary enormously.

7.14.30 The Service has a duty to reduce pollution wherever it can. In addition to the impact of a pollutant on the environment, the additional risk is one of reputation if the Service fails to manage its business appropriately. In operational terms, there are three significant drivers for operational commanders, all of which must be in place to be effective:

- There is a life risk.
- The Service took all reasonable preventative measures.
- The Service informed the EA at the earliest possible opportunity.

7.14.31 In addition to incidents involving a pollutant, incidents where there is a high volume of water usage, (Five + appliances), involve HMEPOs to consider and monitor environmental impacts and in particular the impact on watercourses at or near the incident site and consider opportunities for water re-use.

7.14.32 A number of environmental risks are listed nationally. The highest risk identified is a Major Contamination Incident (Industrial Accident), which may involve fatalities, casualties and widespread implications for the food chain.

7.14.33 The National Operational Guidance Programme – Environmental Protection – provides strategic and tactical guidance

https://fireandrescue-public.sharepoint.com/Pages/Guidance-Catalogue.aspx?guidanceid=148

7.14.34 ECFRS has an EA funded Environmental Unit[61] based at Maldon Fire Station specifically to deal with environmental pollution. Under The Water Resources Act 1991, a FRS could be prosecuted and/or liable for clean-up costs if there is proof it caused or exacerbated pollution.

Societal Impacts

7.14.35 A large-scale incident caused by a natural hazard event, involving a number of fatalities and casualties, will inevitably place a strain on the Emergency Services and Local Authorities as they take the lead in the recovery process.

7.14.36 Local and regional economies could be affected.

[61] Each front line appliance carries an Environmental “grab pack”. The Environmental Unit provides a greater quantity of the same, plus additional environmental protection products. Can be called up by an HMEPO.

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities
1. Failure to respond appropriately to the effect of climate change on ***summers*** and prolonged periods of excessive heat(wave) leading to an increase in rural fires as well as wild fires covering larger rural areas. There may be insufficient water to extinguish fires due to drought or water restrictions (on water pressure). Longer time periods and/or increased resources may be required to extinguish fires	• Higher than average temperatures. • Longer dry periods between rainfalls. • Lower than average rainfall. • Reduction in available water. • Increased use of water in Essex by 6% in next 25 years • Extensive Fires in the Open	• Greater demand on resources. • Extensive wildfire • Resources deployed for longer periods. • Larger attendances required at incidents. • Increase in calls to Control. • Greater demand for specialist skills and equipment. • Inadequate levels of resource to respond to all requirements. • Inadequate welfare arrangements for firefighters. • Increase in relief crews and associated costs. • Increase in the number of blue light movements. • Longer response times to reach incidents. • Depletion in fire-cover for longer periods over larger areas. • Change in societal recreation (type, length, place etc). • Change in length of time spent in houses (increase in winter, decrease in summer). • Change in skills required by Service Delivery. • Dealing with flash flooding post heavy thunderstorms due to hard ground. • Potential for increased vehicle and equipment defects due to increased activity. • Potential for increased vehicle and equipment defects due to increased activity. • Increased consideration around off-road use of Type B appliances and pre-emptive use of current off-road capability.	• Financial requirement exceeds budget provision (use of reserves) • Increase in budget costs for On-call firefighters caused by spate conditions • On-call firefighters will be absent from primary employers more frequently and for longer periods. • Primary employers withdraw support for releasing employees for retained firefighting purposes. • Potential for reputation damage. • Loss of public confidence and support. • Increase in risks to the community and FRS personnel. • Increased environmental damage and wildfire. • Economic loss to community • Negative affect on Performance Indicators. • Change in % of time firefighting, leading to change of availability for other work • Reduction in other activities i.e. Community Safety and training due to operational commitments. • Less time for audits, other statutory duties and workplace fire safety activities.	• Opportunities for the development of the new and innovative techniques, equipment and response methods to meet the changing risk profile using existing resources. • Change in terms & conditions for employees for better fit Service Delivery need by providing more agile and flexible response options. • Up skill workforce to manage new risk. • Increase in partnership activity e.g. with the Environment Agency, Local Authority etc. • Opportunity for the Service to broaden its safer community work to remote communities to make them more resilient. • Take a longer-term view of off-road capability.

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities
2. Failure to respond to the effect of climate change on ***winters*** and prolonged periods of more extreme weather conditions, e.g. snow, ice, high winds, drifts leading to an increase in flooding from snow melt incidents, floods covering larger areas and more storm damage. Spate conditions may stretch available resources.	• Higher than average levels of rain. • Larger volumes of rain water falling over shorter periods. • Increase in frequency and intensity of storms. • Higher than average wind speeds. • Rapid, heavy, localised rainfall causing flooding. • Rapid rises in river levels leading to widespread and/or localised flooding. • Increase in snow / ice/fog	• Greater demand on Wholetime resources. • Resources deployed for longer periods. • Larger attendances required at incidents. • Increase in calls to Control. • Greater demand for specialist skills. • Greater demand for specialist appliances and equipment. • Inadequate levels of resource to respond to all requirements. • Inadequate welfare arrangements for fire fighters. • Increase in relief crews and associated costs. • Increase in the number of blue light movements. • Longer response times to reach incidents due to floodwater, snow, ice and other road conditions. • Depletion in fire-cover for longer periods over larger areas. • Change in societal recreation (type, length, place etc). • Change in length of time spent in houses (increase in winter, decrease in summer). • Change in skills required by Service Delivery. • Dealing with flash flooding post heavy thunderstorms, flood from snowmelt. • Potential for increased vehicle and equipment defects due to increased activity. • Potential for increased accidents involving appliances. • Extend scene of operations in large scale flooding.	• Financial requirement exceeds budget provision (use of reserves) • Increase in budget costs for On-call firefighters caused by spate conditions • On-call firefighters will be absent from primary employers more frequently and for longer periods. • Primary employers withdraw support for releasing employees for retained firefighting purposes. • Potential for reputational damage. • Loss of public confidence and support. • Increase in risks to the community and FRS personnel. • Increased environmental damage. • Economic loss to community • Lack of available funding. • Negative affect on Performance Indicators. • Change in % of time firefighting, leading to change of availability for other work • Reduction in other activities i.e. Community Safety and training due to operational commitments. • Less time for audits, other statutory duties and workplace fire safety activities.	• Opportunities for the development of new and innovative techniques, equipment and response methods to meet the changing risk profile using existing resources. • Change in terms & conditions for employees to improve Service Delivery need by providing more agile and flexible response options. • Up skill workforce to manage new risk. • Increase in partnership activity e.g. with the Environment Agency, Local Authority etc.

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities
3. Failure to provide the appropriate Environmental Management during Operational response	• Poor situational awareness (surrounding area/water courses and risks involved etc.) and failure to identify the nature and extent of the incident. • Failure to prevent pollutant flow on ground • Fire-fighting water run-off not effectively managed (e.g. into watercourses) • Water run-off from incidents using foam as the extinguishing media entering watercourses • Inappropriate use of controlled burn strategy • Incomplete or inadequate information leading to Control or IIC not requesting the attendance of an HMEPO and/or other relevant agency/authority at the appropriate time.	• Contamination of personnel and equipment • Illness through contamination (FF and third parties) • Contamination – ground, water courses (tidal, other) • Air pollution. • No (early) liaison with Environment Agency to speed decision-making and subsequent environmental mitigation. • Appropriate resources not available quickly enough • Potential impact on e.g. SSSIs, water abstraction etc. • Prolonged attendance at incident. • Investigation by Regulatory body.	• Slow response to wider incident management issues, e.g. evacuation • Legal action against ECFRS by EA, HSE, local businesses etc. • Financial penalty • Reputational risk through poor operational management • Strain placed on EA/ECFRS partnership. • Impact on local communities, business's and their continuity. • Prolonged recovery period leading to potential environmental legacy issues. • Increased operating costs	• Recovery of cost from polluter. • Development of new firefighting techniques that use less water and cause less damage. • New technology that helps extinguish fires with less water used.

CHAPTER 8: HUMAN & ANIMAL HEALTH

8.1 OVERVIEW

8.1.1 A UK wide epidemic or global pandemic, offer significant threats to ECFRS, (staff affected directly, or having to support their family), and operating in an infected environment. (Refer to the matrix on **Page 122**.)

8.1.2 ECFRS has tested its arrangements for a reduction in staff and is confident that those plans are appropriate. An epidemic or pandemic, however, is by its very nature an event that affects the whole of society over a prolonged period. This would directly affect all suppliers and partners. Under the circumstances, such plans remain untested. There is always a risk that these plans are not suitable or sufficient.

8.2 HUMAN DISEASES

8.2.1 Human diseases take a variety of forms and their impacts vary considerably in both scale and nature.

8.2.2. ECFRS experienced the consequences of the 2009 Swine Flu pandemic, following the World Health Organisation escalations and the subsequent arrival of the disease in the UK. Swine Flu had little impact on service delivery, but it could have if the nature of the virus was more virulent. The pattern of known infections also changes as the areas where disease is constantly present expand beyond traditional limits. Most newly recognised infections are Zoonotic, i.e. they are naturally transmissible, directly or indirectly, between vertebrate animals and humans and can be more challenging to monitor.

8.2.3. Rabies is a fatal viral disease of the nervous system that can affect **all mammals including humans**. The disease usually spreads by saliva from the bite of an infected animal. Classical Rabies is eradicated within the UK. Controls on the import of susceptible animals, including the pet travel scheme and quarantine, help protect against infected animals entering the UK.

8.3 ANIMAL DISEASES

8.3.1 A number of significant cases of animal disease have arisen in the UK with Foot and Mouth Disease and Avian Influenza (Bird Flu) being the most notable recent examples. When considering the impact of such outbreaks, take account of scale. There have been more frequent but smaller-scale examples in recent years but large national outbreaks are less common.

8.3.2 Non-zoonotic diseases cannot transmit to humans. Examples are Foot and Mouth Disease, Classical Swine Fever, Bluetongue and Newcastle Disease (of birds).

8.4 RISK SPECTRUM

8.4.1 The focus of the risk spectrum is on the impact on the workforce leading to a severe disruption in service delivery and support functions.

8.4.2 Although it is unlikely that a new infectious disease would originate in the UK, it is highly probable that one could emerge in another country. Given the ease and speed with which people travel around the world, it is possible that a new infection would spread before detection. New diseases pose a potential threat to the health of the UK population, and may present social and economic challenges.

8.4.3 There are several records of Highly Pathogenic Avian Influenza in poultry in the UK over the last few years. Migratory wild birds can spread and introduce it by direct and indirect contact. Mechanical transmission can introduce Avian Flu; that is, physically carried by infected material.

8.4.4 West Nile Virus is a viral infection mainly of birds, horses and humans, spread by the bite of infected mosquitoes which can cause encephalitis (inflammation of the brain) or meningitis (inflammation of the lining of the brain and spinal cord). The UK has no identified infection by West Nile Virus in horses or humans. The now endemic virus historically occurs in Africa, mainland Europe, the Middle East, West and Central Asia, and for the first time in the USA in 1999.

8.4.5 The ECFRS Infectious Disease Business Continuity Plan[62] takes account of the need to arrange to continue to perform the core functions of ECFRS and ability to respond to emergency incidents.

8.4.6 Operational response (to animal emergencies in particular), must take account of the environment, if there is a known outbreak of, e.g. Foot and Mouth and appropriate precautions would be required by attending crews.

8.5 LIKELIHOOD

8.5.1 In the absence of any announcements of an epidemic, there is a low likelihood of one occurring. (May 2019). IF an event occurs, as a "Rising Tide" event initially, it could escalate swiftly and significantly if the disease strain is particularly virulent.

8.5.2 Experts agree that there is a high probability of another general influenza pandemic occurring, and this probability is unchanged, regardless of the timing of the recent Swine Flu pandemic. It is impossible to forecast its exact timing or the precise nature of its impact. Based on historical information, scientific evidence and modelling, the impacts described in the next paragraph are possible.

8.6 IMPACT GENERAL

8.6.1 The most notable influenza pandemic of the last century occurred in 1918–19 and is often referred to as 'Spanish flu'. It caused serious illness, with an estimated 20 – 50 million deaths worldwide in excess of the numbers usually expected (with peak mortality rates in people aged 20–45) as well as major disruption. In the UK alone, there were an estimated 228,000 additional deaths. While the pandemics in 1957 and 1968, (often referred to as 'Asian' and 'Hong Kong' flu respectively), were much less severe, they also caused significant illness levels – mainly in the young and the elderly – and an estimated 1–4 million deaths worldwide between them. The H1N1 virus has generally caused mild disease but has caused more severe responses in some people.

8.6.2 The potential remains for **a very high impact on humans** if there is a resurgence of the H1N1 Influenza virus, or a more virulent strain to epidemic/pandemic proportions.

8.6.3 Many millions of people around the world will infect, causing global disruption and a potential humanitarian crisis. The World Health Organization estimates that between 2 million and 7.4 million deaths may occur globally.

8.6.4 National planning assumptions are:

- Up to 50% of the population could experience symptoms of pandemic influenza during one or more waves lasting 15 weeks (though more would be expected to be infected);

[62] The Service Infectious Disease Business Continuity Plan supports business critical functions in order to prioritise against reducing human resources.

- A case fatality ratio of up to 2.5% is expected in the reasonable worst case scenario, meaning up to 2.5% of those with symptoms could die as a result of the pandemic;
- Up to 4% of symptomatic patients could require hospital care if the virus results in severe illness, 25% of whom are expected to require level 3 critical care;
- Peak illness rates of around 10-12% (measured in new clinical cases per week as a proportion of the population) are expected in each of the weeks in the peak fortnight; and
- Absence rates for illness will be reaching 15-20% in the peak weeks.

8.6.5 Normal life is likely to face wide social and economic disruption; significant threats to the continuity of essential services, lower production levels, shortages, and distribution difficulties. The potential effects are likely to be profound. The impact of an influenza pandemic is unlikely to be confined to a building, or a highly defined geographical area. Consequently, the potential for a considerable to severe disruption to our Service, as well as to Society, is plain in a worst-case scenario.

8.7 IMPACT – OPERATIONS AND STAFF ABSENCE

8.7.1 Service planning assumptions, based on national modelling, suggest that:

- Up to **50%** of the workforce may require time off at some stage over the entire period of the pandemic, with individuals absent for a period of seven to ten working days.
- In a widespread and severe pandemic, affecting **35-50%** of the population, this could be even higher as some with caring responsibilities will need additional time off.
- Staff absence should follow the pandemic profile. In a widespread and severe pandemic, affecting **50%** of the population, between 15 - 20 % of staff may be absent on any given day. These levels are likely to remain similar for one to three weeks and then decline.
- Additional staff absences are likely to result from other illnesses, taking time off to provide care for dependants, to look after children in the event of schools and nurseries closing, family bereavement, and practical difficulties in getting to work and/or other psychosocial impacts

8.7.4 ECFRS experienced the consequences of the 2009 Swine Flu pandemic, which caused the implementation of a Service Critical Incident Team. This had little overall impact on service delivery, but it could have if the nature of the virus mutated and/or was more virulent. The ECFRS Infectious Disease Business Continuity Plan makes provision for arrangements to continue the core functions, i.e., firefighting, road traffic collisions, and other emergencies.

8.7.5 Movement restriction regimes and on-farm controls will also limit the spread of disease where necessary. These restrictions may also affect our attendances if routes are blocked, or detours required. If an infected farm is the site of an emergency, it will require actions such as disinfecting wheels and tyres.

Effect on Essex as a whole (Based on Mid-Year Population Estimates June 2019 (1,832,752)). The tables show an arithmetical result only. For example, it does not mean that Control will not have casualties.

Overall case fatality rate	Clinical attack rate		
	25%	**35%**	**50%**
0.4%	1,832	2,566	3,664
1.0%	4,582	6,415	9,164
1.5%	6,873	9,622	13,747
2.5%	11,455	16,037	22,910

Indicative Impact on Staffing * (Staff figures as at 30 April 2019) Indicative figures pay no account of worried well absenting themselves from the workplace.

Effect on all Service Staff (1325)

Overall case fatality rate	Clinical attack rate		
	25%	35%	50%
0.4%	1	2	3
1.0%	3	5	7
1.5%	5	7	10
2.5%	7	12	17

Effect on Whole Time staff (620):

Overall case fatality rate	Clinical attack rate		
	25%	35%	50%
0.4%		1	1
1.0%	1	2	3
1.5%	2	3	5
2.5%	4	5	8

Effect on On-Call staff (398):

Overall case fatality rate	Clinical attack rate		
	25%	35%	50%
0.4%			1
1.0%	1	1	2
1.5%	1	2	3
2.5%	2	3	5

Effect on Control (31)

Overall case fatality rate	Clinical attack rate		
	25%	35%	50%
0.4%			
1.0%			
1.5%			
2.5%			

Effect on All Support Staff (276)

Overall case fatality rate	Clinical attack rate		
	25%	35%	50%
0.4%			
1.0%	1	1	1
1.5%	1	1	2
2.5%	2	2	3

* % figures rounded up or down to a whole number.

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities
6. Reduction in service delivery due to Human Health issues, E.g. pandemic.	Highly virulent and harmful infectious disease leading to epidemic and/or pandemic, e.g. 'flu'. SARS outbreak Accidental Biological Release Pollution of controlled waters (e.g. through flood, chemical spillage, or release of untreated sewage) Zoonotic notifiable animal disease (e.g. highly pathogenic Avian Influenza, Rabies, West Nile Virus)	• Invocation of business continuity arrangements due to reduced workforce (subject to nature of outbreak) over a prolonged period of time, and possible high numbers of loss of life (not job related). • Worried well including Operational personnel staying away from work to look after family. • Operational activity slowed by mitigation actions. • Recovery may take longer than life of cause (to allow firefighters to return to work). • Potential for requests to be involved in covert 'out of scope' activities (e.g. body recovery).	• Large Scale Recruiting and training. • Reputation risk – increase / development of FRS remit. • Potential increase in budget costs for On-call FF caused by the provision of fire cover at Wholetime stations. • Stations going off the run • Reduced support services in addition to operational staff. • Reduction to incident attendances (Exposure of personnel to disease / reduced availability) (13/16 and MoU arrangements) • Pressure to attend incidents not normally associated with FRS. • Possible cessation of non-incident related activity.	• Review of operational policies • New Partnerships • Funding • Tighter ERF working arrangements Communications Strategy – **External** for Public Safety messages. **Internal** – for staff welfare and workforce management.
7. Animal Health issues	Non-zoonotic notifiable animal diseases (Foot & Mouth, Classic Swine Fever, Blue Tongue & Newcastle's Disease) Zoonotic notifiable animal disease (e.g. highly pathogenic Avian Influenza, Rabies, West Nile Virus)	• Increased training requirement. • Decontamination regimes for FF and appliances. • Implementing biosecurity controls. • Potential for reputational risk. Perception by Press/Public that FF are spreaders of disease. • Raised awareness • USAR search dog quarantine. • Potential for requests to be involved in covert 'out of scope' activities (e.g. body recovery). • Movement regimes and 'on farm' controls could affect ECFRS vehicle movements, mobilising and deployment. • Non-availability of On-call firefighters working in livestock environments.	• Consideration of attending all incidents • Full review of working practices involving animals	

CHAPTER 9: TERRORISM & SECURITY

9.1 OVERVIEW

9.1.1 As identified in Chapter 1, the Government published its National Security Strategy and Strategic Defence and Security Review, 2015, “A Secure and Prosperous United Kingdom”, in November 2015.

9.1.2 Terrorism, defined as attacks on and radicalisation of UK residents and nationals at home and abroad, features as a Tier 1 risk. (As is evident, there are risks in each tier that will apply to ECFRS in one way or another.) Terrorism can be categorised into three distinct groups:

- **International terrorism** from groups such as the so-called Islamic State that often have the desire and capability to direct terrorist attacks against the West, and to inspire those already living there to carry out attacks of their own.
- **Northern Ireland-related terrorism** involving some dissident republican groups who continue to mount terrorist attacks, primarily against the security forces.
- **Domestic extremism**. This mainly refers to individuals or groups that carry out criminal acts in pursuit of a larger agenda, such as "right-wing extremists". They may seek to change legislation or influence domestic policy and try to achieve this outside normal democratic processes. For the most part, they pose a threat to public order but not to national security.

9.1.3 Cyber-crime is also a Tier 1 risk. Wide ranges of hostile actors use cyber to target the UK. They include foreign states, criminals, "hacktivist" individuals and groups, and terrorists. The resources and capabilities of these actors vary. Foreign states are generally equipped to conduct the most damaging cyber espionage and computer network attacks. Cyber espionage is an extension of traditional espionage. It allows a hostile actor to steal information remotely, cheaply and on an industrial scale.

9.1.4 The Service has an every-day dependence on the availability of the network. For Web transactions in July 2018, the Service blocked 17,500 outbound connections because they contained threats, mostly associated with phishing sites but also cross-site-scripting and malicious content. However, that is only 0.05% of connections, with every web image being a connection.

9.2 UK THREAT LEVELS

9.2.1 The design of threat levels is to give a broad indication of the likelihood of a terrorist attack.

9.2.2 Assessments are based on a range of factors including current intelligence, recent events and any known terrorist intentions and capabilities. Information may be incomplete. Decisions about the appropriate security response will consider those.

9.2.3 Analysis informs the Police, and security practitioners in key sectors, of the potential threat of a terrorist attack. If necessary, threat assessments are produced for individuals and/or events. The five threat levels that inform decisions to protect the Critical National Infrastructure (CNI) are:

- **Low** - an attack is unlikely
- **Moderate** - an attack is possible, but not likely
- **Substantial** - an attack is a strong possibility
- **Severe** - an attack is highly likely
- **Critical** - an attack is expected imminently

Current Threat Level		
International terrorism in the UK (1 March 2018)	Northern Ireland-related terrorism in Northern Ireland (1 March 2018)	Northern Ireland-related terrorism for Great Britain (1 March 2018)
Severe	Severe	Moderate

9.2.4 For the history of the UK threat level, go to:

https://www.mi5.gov.uk/threat-levels

9.3 CONTEST – COUNTER TERRORISM STRATEGY

9.3.1 It is the Government's policy to issue warnings or advice to protect public safety in the event of a specific and credible terrorist threat. The Government provides a counter terrorism strategy, CONTEST. This is an integrated approach based on four main work streams, each with a clear objective to reduce the risk to the UK from international terrorism:

- Pursue: stopping terrorist attacks
- Prevent: stopping people becoming terrorists or supporting violent extremism
- Protect: strengthening our protection against terrorist attack
- Prepare: where an attack cannot be stopped, mitigating its impact

9.3.2 The updated CONTEST strategy, published in June 2018, reflected a change in approach within the framework to increase the UK ability to counter the shift in threat. This will include a step-change in domestic investigative capabilities through implementing the recommendations of MI5 and CT Policing's Operational Improvement Review.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716907/140618_CCS207_CCS0218929798-1_CONTEST_3.0_WEB.pdf

9.3.3 The National Risk Register (NRR) focuses on preparing for emergencies and mitigating the impact of terrorists attacks (the Prepare work stream of CONTEST). There are links with all CONTEST work streams, under which, comprehensive plans were developed to protect sites critical to our national infrastructure; crowded places such as sports venues, shopping centres, and the UK borders. Trained and equipped ECFRS personnel deal with rescue at a terrorist incident. This includes incidents involving chemical, biological and radiological weapons. This ensures the response to an attack is as effective, co-ordinated and as swift as possible, so that the primary aim of saving life can be achieved, as well as effectively managing the impact of such an attack to ensure a quicker return to normality. The NRR is a cross-government document incorporating expertise from a wide range of departments and agencies. It underpins the ERF CRR. (See **Chapter 11** – Interoperability - JESIP)

9.3.4 The NRR includes the threat of terrorist attacks, and the current risk register identifies the following risk areas:

- Attacks on crowded places
- Attacks on infrastructure
- Attacks on Transport Systems
- Small scale (Chemical, Biological, Radiological) attacks,
- Cyber security (infrastructure and data confidentiality)
- Catastrophic attacks

9.3.5 The Government published a new and on-line Security Policy Framework in May 2018.

https://www.gov.uk/government/publications/security-policy-framework/hmg-security-policy-framework

9.4 CBRNe RESILIENCE

9.4.1 The resilience planning assumptions estimate that the expected consequences from a CBRNe event will be beyond those that any single FRS can manage. OFFICIAL or OFFICIAL – SENSITIVE documents detail assumptions and all national, regional and local plans are built around these assumptions.

9.4.2 The Service has immediate actions to follow with risk-assessed control measures to enhance CBRNe response.

9.5 SERVICE RESOURCES

NATIONAL INTER AGENCY LIAISON OFFICERS

9.5.1 ECFRS has invested in a group of specially trained National Inter-Agency Liaison Officers (NILOs') who have been qualified to a National standard to advise Incident and Strategic Commanders at multi-agency terrorist incidents.

9.5.2 There are two declarations that can and will be made in the event of certain types of incident. Operation RED DISCUS identifies the move to CRITICAL. Operation PLATO will occur when a Police Force identifies a major incident involving an actual or suspected terrorist incident. In either case, Service NILOs' will become involved at some level of incident management. Whilst this is most likely in Essex, cross-border support may be called for, e.g. an event in London. (**See paragraphs 9.6.3 and 9.8.1**.)

DETECTION, IDENTIFICATION, MONITORING

9.5.2 Part of the New Dimension programme is the provision of an advanced Detection, Identification and Monitoring (DIM) capability. A team of 12 DIM Advisors, utilising a bespoke vehicle equipped with a range of advanced scientific equipment, deliver the capability.

9.5.3 It enables the gathering of information on the CBRNe material involved, the development of a tactical plan regarding protective equipment and tactics for first responders, decontamination methods for the public involved, and longer-term recovery.

9.5.4 The DIM vehicle is part of a national capability, covering the Eastern Region with support of four DIM Advisors from Cambridgeshire FRS, available for accidental hazardous materials incidents in Essex and neighbouring counties.

SUBJECT MATTER ADVISORS

9.5.6 The Service has officers trained as CBRNe Subject Matter Advisors.

9.5.7 The intention is to deploy this specialist capability outside Essex to assist other FRSs with tactical and operational incident management. SMAs from another FRS would support ECFRS if a CBRNe incident occurred in Essex.

9.6 RISK SPECTRUM

9.6.1 Whilst there have been attacks against well-protected targets around the world, crowded places remain an attractive target for a terrorist attack. Daesh/IS/Al Qaida and related terrorist groups have shown a level of ambition and willingness to carry out indiscriminate terrorist attacks. They do not give warnings, they have shown a readiness to use suicide tactics and the majority of their attacks have, as a primary intent, the deaths of large numbers of people. Most recently refer to events in Manchester and

London in March/May/June 2017, and the failed bombing at Parsons Green Underground Station in September 2017.

9.6.2 The range and style of attack is more varied. A vehicle carrying a bomb may deliver marauding attackers. The vehicle itself may be the weapon. Ceramic knives featured recently, presumably to avoid metal detection. Returnees from Syria, who may be radicalised, represent a threat. Events in Europe and the UK have increased in number since, to put a date on it, January 2015 (Paris – Charlie Hebdo).

9.6.3 The National Operational Guidance Programme provides MTFA guidance. Access requires an email request the link below.

https://fireandrescue-public.sharepoint.com/guidance/published-guidance

9.7 LIKELIHOOD

9.7.1 **See 9.2.3.**

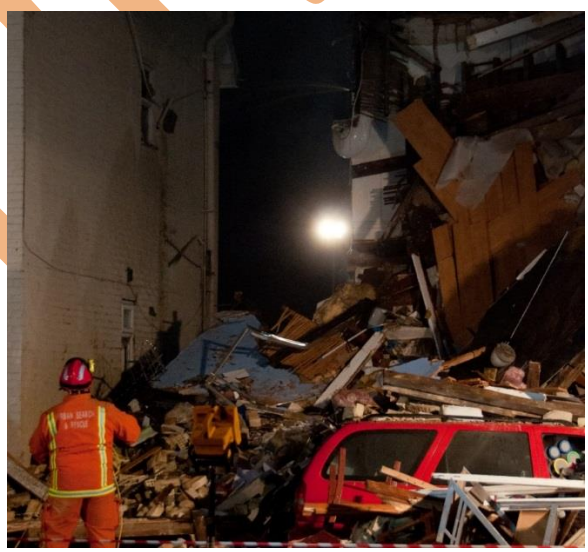
9.8 IMPACT

9.8.1 The impacts on ECFRS of a worst-case terrorist event may require:

- Supporting LFB (London target) with resources.
- Responding to an Essex based event on land.
- Responding to a marine based incident.
- Supporting regional partners (event outside Essex).
- Responding to an Essex based event on land following an air incident, (e.g. Similar to Lockerbie).

9.8.2 The people impact is initially on the victims directly involved, and subsequently their families, and incident responders. The secondary impact involves the multi-agency recovery process in the immediate aftermath and over the days and weeks that follow.

9.8.3 Whilst this will be similar to a large-scale natural hazard event, by its nature, a terrorist incident is likely to invoke different feelings in a community.



Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities
11. The security of Personnel, Premises, Appliances, Equipment and PPE is put at risk due to a high terrorist threat level. There is also the threat of fire service resources being used by terrorist organisations. (Trojan Horse). A terrorist attack could include multiple incidents and secondary devices The UK National Risk Register 2017 places attacks on crowded places and transport at high plausibility over the next five years, with smaller – scale CB or R attacks, Cyber-attacks and attacks on infrastructure at medium and medium – low plausibility. Larger – scale CBR or N attacks are placed at medium – low plausibility. CB ingredients may become more readily available	• Political unrest leading to action from militant organisations and/or fundamentalists. • Out-of-the-blue lone wolf event. • Terrorist attack on ECFRS infrastructure • Terrorist activity includes Essex (infrastructure and/or high risk targets). • London event affecting ECFRS/Essex. • MTA • Op PLATO declared • Terrorist use of chemical attack	• Possible public order issues • High loss of life. • Service New Dimensions resources not adequately resourced. • Ability to maintain suitable fire cover. • Arson attacks on specific communities. • Greater demand on resources. • Detrimental effect on fire cover, during and post CBRNe incident. • Resources deployed for longer periods. • Greater demand for specialist skills appliances and equipment. • Greater demand for rapid transportation of specialist personnel and equipment (DIM). • Infiltration of secure high-risk premises. • Breach of security cordons at incidents. • Subject to scale of event(s), insufficient resources to respond effectively to multiple incidents. • Longer response times to non-CBRNe incidents. • Secondary hazards and potential for RVPs to be compromised. • Contamination, and delay in completing mass decontamination. • Large scale and possibly long-duration London event requiring considerable support over the border /mutual aid.	• Long-term resource management of limited specialist Service resources. • Ensure control of confidential shared information between responders. • Theft of confidential information on local risks. • Theft of fire service vehicles, equipment and uniforms leading to a Trojan Horse event. • Lack of available funding. • Increase in Service delivery costs. • Personnel security checks. • Conflicting advice leading to increased risk to life. • Public and firefighters at risk from terrorist actions (overt/covert) • Potential increase in long-term welfare issues. • Breakdown in community relations/law and order. • Reputational risk. • Personnel refusing to undertake tasks as MTA is currently voluntary.	• Opportunities to develop search and rescue response capability to any incident. • Develop interdepartmental liaison. • Greater use of JESIP and multi-agency collaboration generally. • Opportunity to share specialist skills and equipment across agencies • Greater organisational awareness of other agencies special procedures. • Opportunity to make MTA contractual.

CHAPTER 10: THE LOCAL ECONOMY, HEALTH & WELLBEING AND "FUTURE ESSEX"

10.1 INTRODUCTION

10.1.1 This Chapter describes some economic details, and provides a sketch of, and signpost to, relevant and various reports, each of which will play a part in the development of Greater Essex.

10.2 ESSEX ECONOMIC COMMISSION

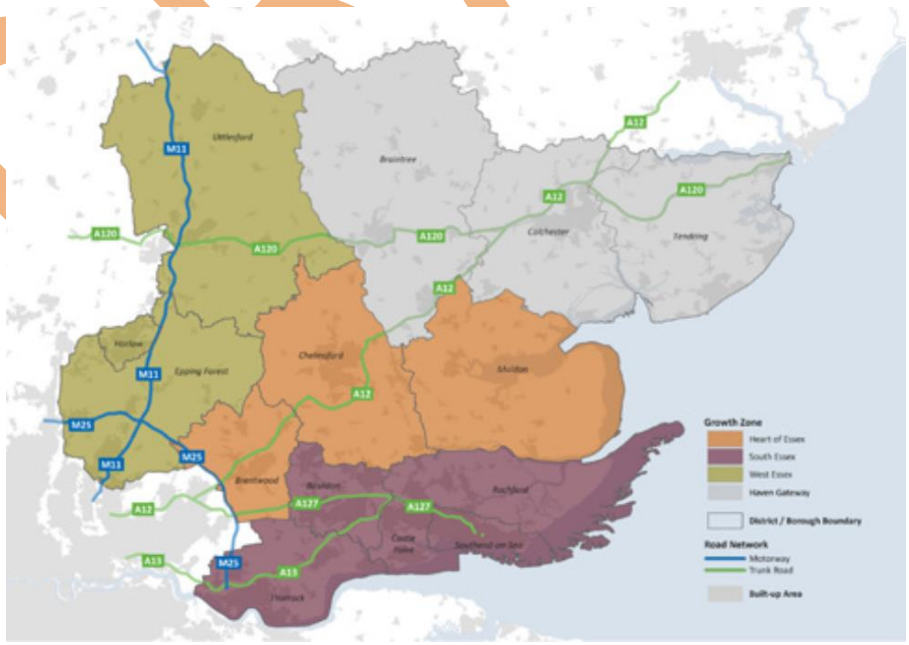
10.2.1 The **Essex Economic Commission** is an advisory body set up to help shape the economy of Greater Essex. A report published in early 2017[63] intended to establish a context in which the current position and trends in the Greater Essex economy could be understood compared to other counties in the southeast and metropolitan areas. From the report, a number of key challenges facing the Greater Essex economy emerged:

- Raising skills and qualifications.
- Developing opportunity sectors and technologies.
- Improving transport infrastructure.
- Expanding availability of suitable workspace and commercial premises.
- Supporting coastal districts.

10.3 GROWTH CORRIDORS

10.3.1 Essex has four well-established growth corridors:

- Thames Gateway South Essex
- Heart of Essex
- West Essex
- Haven Gateway



[63] Enterprising Essex: Opportunities and Challenges. Report on the Greater Essex Economy http://www.essexgrowth.co.uk/media/1020/enterprising-essex.pdf

10.4 GENERAL

10.4.1 Outside London, Greater Essex is the eighth largest economy in the UK and the fourth largest out of 13 Counties in the South East and East Anglia.

10.4.2 Greater Essex growth rate of 0.6% a year between 2004 and 2014 was slower than UK average of 1.3% and the slowest amongst counties in South East and East Anglia.

10.4.3 Heart of Essex was the fastest growing growth corridor at 1.0% a year over the decade, and South Essex the slowest at 0.2% a year. Heart of Essex was the fastest growing area in the East of England over this period. Of the four corridors – Essex Haven Gateway, Heart of Essex, South Essex and West Essex – South Essex is the largest with 36% of Greater Essex GVA. Total working hours remaining static by unduly slow productivity growth that hindered growth in Greater Essex over the decade.

10.4.4 Authorities immediately surrounding Greater London have between 20% and 44% of people commuting into London. The evidence is that the extent of commuting from Greater Essex into London does not appear to have been significantly different to that of other authorities around the capital.

10.4.5 While commuting into London is a major feature of travel to work patterns in Greater Essex, there is also a considerable movement of people within and around the County. For some major centres, this means that the inflow of people to work in the local authority boundaries is almost as great as the outflow. No single area has a net outflow of commuters, although Basildon comes closest with inflows and outflows being close to balancing out. In Colchester, Chelmsford, Brentwood, Uttlesford and Harlow, inflows were between 88% and 97% of outflows By contrast, some authorities had a much larger net outflow: in Castle Point and Tendring inflows of commuters were only 32% and 39% of outflows, respectively. The key conclusion drawn from commuter flows in the South East is that Greater Essex is not disadvantaged any more than other Counties surrounding central London in the scale of the outflow of commuters into London. This factor therefore does not appear to be a significant contributor to lower growth in Greater Essex.

10.4.7 The Essex coastline offers a wide variety of water based recreation activities including nature and landscape appreciation as well as sports and leisure activities.

10.4.8 The following business sectors are prevalent in Essex:

- Construction
- Education
- Supporting transport activities
- Sale, maintenance and repair of vehicles
- Wholesale and commissioning trade
- Health and social work
- Hotels and restaurants

10.5 DISTRICT PROFILES

10.5.1 The Essex Insight website is the information hub for Essex. The homepage is at:

http://www.essexinsight.org.uk/mainmenu.aspx

10.5.2 The Local Authority Portrait Series, containing profiles of the people living in the Boroughs, District and City within Essex is at:

http://www.essexinsight.org.uk/Resource.aspx?ResourceID=386

10.6 SOUTH EAST LOCAL ENTERPRISE PARTNERSHIP

10.6.1 The South East Local Enterprise Partnership[64], (SELEP), is the largest partnership between private and public sector bodies outside London working to develop and deliver sustainable economic growth across all parts of the SELEP area.

10.6.2 The SELEP brings together business, local government and education partners from the counties of Kent, Essex and East Sussex and the unitary authorities of Medway, Thurrock and Southend-on-Sea. The South East Growth Deal aims to contribute to the Local Enterprise Partnership's Strategic Economic Plan.

10.6.3 The Growth Deal will focus on four key priority areas as identified in the Local Enterprise Partnership's Strategic Economic Plan:

- Enhancing Transport Connectivity
- Increasing Business Support and Productivity
- Raising Local Skill Levels
- Supporting Housing and Development

10.7 THAMES ESTUARY GROWTH COMMISSION

10.7.1 In 2016, The Thames Estuary Growth Commission was formed, its task to develop an ambitious vision and delivery plan for north Kent, south Essex and east London. The Commission published their 2050 Vision report in June 2018. The report focuses on the diversity of places across the Thames Estuary area, recognising that it will be most successful when viewed as a series of functional economic areas, places (for both people and wildlife), and communities. It stresses that those places need to take concerted and coordinated action together to create positive change in the Thames Estuary.

[64] Source – Essex County Council http://www.essex.gov.uk/business-partners/Partners/Local-Enterprise-Partnership/Pages/Default.aspx

10.7.2 In March 2019, the Government published its response to that report, addressing four key themes: governance and delivery; sector growth and skills; placemaking and the environment; and housing and transport. This will be through support and delivery of growth in the Estuary by working in partnership with local partners, including local government, South East Local Enterprise Partnership and London Economic Action Partnership, businesses and civil society.

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/789048/Thames_Estuary_Commission_Response.pdf

10.8 HEALTH & WELLBEING

10.8.1 The latest Essex Health & Wellbeing report from the Joint Strategic Needs Assessment can be found by logging in at:

http://www.essexinsight.org.uk/Resource.aspx?ResourceID=1335

10.9 "FUTURE ESSEX"

10.9.1 The Essex Grand Challenges Summit took place on 26 April 2016 to explore the future of Essex. This was the final part of a project conducted by the RSA, (otherwise the Royal Society for the encouragement of Arts, Manufactures and Commerce), on behalf of the **Essex Partnership Board.** Research identified 20 top trends, signifying major social, technological and economic changes that could affect Essex (and the wider region).

10.9.2 The project examined significant trends that could affect public services and the community. The study drew on insight from research carried out by the RSA, combined with input from a broad range of stakeholders working across a variety sectors (public, private, higher education, voluntary and community) and disciplines (e.g. local government, health services, law enforcement, central government and environmental protection).

10.9.3 These trends could shape how public services might operate over the next 15-20 years. The central objective of the event was to reflect on these trends, with a view to gaining a better collective understanding of what the region needs in order to thrive in the face of major change and to begin to think about how Essex leaders might respond to these challenges going forward.

10.9.4 The final project report, published in August 2016, identified the top 20 trends as:

- Aging population. Twice as many over 85s by 2031.
- Diversity. BAME proportion double for 0-19 year olds than for total population.
- Flexible work practices. The home office.
- Changing demands for skills. Tech, creativity, empathy, and problem solving.
- Changing structure of work. The self-employed to overtake public sector workforce.
- Housing tenure shift. Private rentals to overtake mortgage holders in the 2020s.
- Gridlock. Increasing demand on the transport infrastructure.
- Shifts in energy production and usage. Replacement energy systems needed.
- London Overspill. Essex likely to continue as destination for capitals overspill.
- Childhood obesity. 1 in 5 school aged children obese by 2030.
- Transformation of social care. Quadrupling of need by 2030?
- Health demand management in the community. Risk of hospital overload.
- Individual led commissioning. Reconfiguration of services around patient led demand?
- Increasing temperatures. Impact on agriculture, wildlife, communities and migration.
- Sustainable locations for development (flooding). Impacts of agriculture, wildlife, communities and migration.

- New crime and public safety challenges. Crime increasingly distant and personal.
- Hyper-connectivity and automation. An economic opportunity or a threat to existing economic structures?
- Big data, AI, and analytics. Will Essex harness the power of Big Data to meet needs?
- Digital Public Services. Digital as the norm.
- Public Sector Finance. More localised systems of finance.

10.9 5 The report went on to assert that the trends point to abundant opportunity for Essex to capitalise on economic and technological change to meet the needs of its citizens, but they also appear to signal significant social, institutional, and political challenge.

10.9.6 . The key challenges were summarised as:

- An economy that is re-structuring with new industries, jobs and opportunity but uncertain foundations and likely transitional stresses.
- Technology changing our relationships with people, work and services.
- Public services facing new possibilities but new demands and expectations with still limited resources.
- Governance with new powers at the local level but uncertainty about how powers can be best deployed, with a search for new models of systemic leadership.
- A changing population that exhibits dynamism and enjoys longevity, but creates new demands such as those resulting from isolation or social and cultural change.
- A society that is plural but divided in many ways creating stresses and some conflict.

10.9.7 The potential consequences of the identified trends are not determined. The degree to which Essex can exploit the opportunities that these trends offer and minimize the risks, rests on a series of choices that Essex's public, private and voluntary sector leaders make.

10.10 RISK SPECTRUM

10.10.1 There is a reliance on the London economy. Any population growth, which seems likely, will put pressure on the transport infrastructure. In addition, the housing market could see property prices increase, leading to an inability to provide affordable housing. The proposed increase in housing will certainly lead to other infrastructure and environment impacts, such as the provision of roads, drinking water, sewage, and power. Key sector growth should lead to an internal improvement to the Essex economy, if Essex Local Authorities provide or facilitate suitable infrastructure improvement to meet demand. The alternative is an absence of jobs against a rising number of (young) people available for the job market, leading to high(er) numbers of unemployed and a decline in living standards, in turn leading to a greater burden on Local Authorities and/or the State. As identified in Chapter 3, the Essex population is at one level aging. At another, by the 2030's, and based on the projected housing figures, Greater Essex will see a population increase of some 300,000 to 400,000 people, in addition to "normal" population growth.

10.10.2 An inability to attract good jobs will continue a trend towards an unskilled and low value economy. Without a skilled, qualified workforce, the area will not attract 'good' jobs.

10.11 LIKELIHOOD

10.11.1 A weaker economy in certain areas, with less money and higher poverty, may result in less spent on home safety. This may lead to higher risks in some (already hard-to-reach and/or vulnerable) areas of our communities. A declining economy can have a number of other effects. There is a widely held perception

and some objective correlation from studies across wide areas that fire activity has identifiable links with reported crime, unemployment, low income, ill health and other educational and social deprivations.[65].

10.11.2 Fuel and metal theft increases in hard economic times (late 2011 and early 2012). Metal theft includes electrical cabling for railways, as well as lead from Church roofs. These activities tend to involve ECFRS as they often result in an accident. Anecdotal evidence suggests that arson may increase during periods of financial difficulty as well. Metal theft appears less prevalent in most recent years.

10.11.3 Fire Stations have experienced theft of high-value equipment in the past. In times of economic difficulties, attempts to steal equipment like RTC cutting gear, may increase. This requires careful management of Fire Station security.

10.11.4 Changes in building design and materials, and in society construction and networks will have an impact on the number of fire deaths in the home. How much these factors have and will influence this is currently unknown.

10.11.5 The Comprehensive Spending Review, (CSR), will see a year-on-year reduction in Public Service funding for the near future. The Service is working towards nil central government support by 2020.

10.12 IMPACT

10.12.1 An increase in population, dwellings, workplaces, leisure activity and travel also means an increase in the likelihood of things "going wrong". The increased 'incidents or emergencies' has the potential to increase demand for Prevention, Protection and Response activities.

10.12.2 The direction and position of the economy can change the type of prevention, protection or response required from us. The amount of risk determines the quality of action requested.

10.12.3 An increasing population means an increase in commuting, into and out of Greater Essex. We have a very busy road infrastructure, which will only get busier as other populations and work areas increase. Any change in fire safety and building legislation, say because of the Grenfell Inquiry, may see an increase in Technical Fire Safety work. It would appear likely that more businesses will open up in Greater Essex, affecting staff movements, delivery movements and building safety. More schools, or a significant increase in current school communities, will mean more school visits.

10.12.4 An increase in housing will lead to an increased income from Council Tax.

[65] Fire & Rescue Service partnership working toolkit for Local Area Assessment (Feb 2008) CLG, TSO.

CHAPTER 11: GOVERNANCE, COLLABORATION AND OPERATIONS

11.1 BACKGROUND

11.1.1 This Chapter looks at governance, collaboration and interoperability. Resources are:

- The Policing and Crime Act 2017, (PCA 2017).
- Joint Emergency Services Interoperability Programme (JESIP) doctrine[66].
- The National Framework for fire and rescue services (July 2018)(National Framework)[67]
- The Data Protection Act 2018
- EU General Date Protection Regulation (GDPR 2016)
- ECFRS IRMP 2016-2020

11.1.2 This chapter also looks at other influences on service delivery.

11.2 EXTERNAL GOVERNANCE

11.2.1 Responsibility for Fire and Rescue Policy for England transferred from the Department for Communities and Local Government to the Home Office, from 5 January 2016. This included Ministerial responsibility for Fire.

11.2.2 Fire and rescue services are the subject of a new inspection regime. Her Majesty's Inspectorate of Constabulary was renamed Her Majesty's Inspectorate of Constabulary and Fire & Rescue Services, (HMICFRS). HMICFRS has run pilots with a small number of fire and rescue services in early 2018, and has moved to a full programme of inspections. ECFRSs first inspection will take place around July 2019. The inspection will focus on three areas; effectiveness, efficiency and people. All 45 FRSs will be inspected and reports will be publicly available. This will culminate in a national summary of the overall performance of the FRS. Inspections will be risk-based and proportionate, with rounded inspections and graded judgments. FRSs will be graded outstanding, good, requires improvement or inadequate in the 11 key diagnostic areas. This is similar to the approach taken with PEEL inspections of police forces in England and Wales.

11.3 INTERNAL GOVERNANCE

11.3.1 – Police Fire & Crime Commissioner

The Police Fire and Crime Commissioner has now had responsibility for governance of ECFRS for two years. March 2019 saw publication of the first Fire and Rescue plan in ECFRS also in England. The Fire and Rescue plan sets out the priorities for the Fire and Rescue Service in Essex and a series of strong, tangible commitments to how we will help keep our communities safe. The plan brings together the Service, partners and the public to build safe and secure communities and offer efficient and effective prevention, protection and response activity.

Following publication of the Fire and Rescue Plan the Service has produced a strategic planning timeline that details how internal business planning and financial planning will now fit with the Fire and Rescue plan timelines. Business planning has been aligned to the new 4 directorates to compliment the new Service Leadership Team structure which came into effect on 1 April 2019.

ECFRS continuous improvement plan details how the business planning process will be used to enable continuous improvement to be achieved and how assurance relating to delivery of the Fire and Rescue plan will be provided to the PFCC.

[66] http://www.jesip.org.uk/joint-doctrine
[67] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/5904/nationalframework.pdf

ECFRS has begun work to formulate a new IRMP which will detail how ECFRS will deliver against the priorities set by the Fire and Rescue Plan. Public consultation on the proposed IRMP is due to commence in June 2019.

11.3.2 – Information Management

ECFRS has continued on the journey towards Data Protection Act 2018 and GDPR 2016 compliance. Following an audit opinion of 'no assurance' in 2017, improved governance relating to information was implemented including allocation of roles such as Senior Information Risk Officer, Information Asset Owners and a Data Protection Officer recruited. Initial work focused on having essential processes defined and implemented such as data breach reporting and management process and subject access request process. ECFRS has captured details of all of the information assets in an Information Assets Register and begun data flow mapping to understand where data comes from, what is it used for, who is it shared with and retention periods.

Increased training and awareness has also been a focus. The Service implemented an eLearning platform for all staff to undertake their bi-annual Information Governance training. We have also provided more in depth training for our network of Information Asset Owners on various topics such as surveillance. We have ensured those staff that manage all of the statutory requests the Service received are appropriately trained to undertake their roles.

Work will continue in 19/20 to embed data protection and information security into business as usual ensuring necessary approaches are designed into our processes.

11.4 COLLABORATION

11.4.1 Paragraph 5.13 of the National Framework states:

The Policing and Crime Act 2017 created a statutory duty on fire and rescue authorities, police forces to:

- *keep collaboration opportunities under review;*
- *notify other emergency services of proposed collaborations that could be in the interests of their mutual efficiency or effectiveness; and*
- *give effect to a proposed collaboration where the proposed parties agree that it would be in the interests of their efficiency or effectiveness and that it does not have an adverse effect on public safety.*

11.4.2 Under a duty to collaborate, ECFRS already has a number of arrangements in place. This is dynamic and following the PCA 2017 and the change of governance arrangements, is likely to increase.

11.4.3 The National Framework further states:

*5.17 Fire and rescue authorities must collaborate with other fire and rescue authorities to deliver **intra**operability (between fire and rescue authorities) and **inter**operability (with other responders such as other emergency services, wider Category 1 and 2 responders and Local Resilience Forums) in line with the Joint Emergency Services Interoperability Principles (JESIP). Fire and rescue authorities must collaborate with the National Resilience Lead Authority to ensure interoperability is maintained for National Resilience assets.*

5.18 Intraoperability includes, but is not limited to:

- *compatible communications systems, control rooms and equipment;*
- *common command and compatible control and co-ordination arrangements;*

- *effective information, intelligence and data sharing;*
- *compatible operational procedures, and guidance with common terminology;*
- *compatible training and exercising (both individually and collectively); and*
- *cross border working with other English fire and rescue authorities and those in the devolved administrations*.

5.19 Interoperability includes, but is not limited to:

- *compatible communications systems, control rooms and equipment, as appropriate;*
- *compatible command, control and co-ordination arrangements;*
- *effective inter-agency working and liaison and, where appropriate, information, intelligence and data sharing;*
- *shared understanding of respective roles and responsibilities, operational procedures, guidance and terminology;*
- *robust multi-agency plans for managing risks identified in the National Risk Assessment and community risk registers;*
- *multi-agency training and exercising; and*
- *cross border working with other responders in England and the devolved administrations.*

11.4.4 Following the change in governance for ECFRS, the Essex Emergency Services Collaboration Programme was formalised and includes the East of England Ambulance Trust. Projects within the programme are both tactical and strategic. Prince2 and MSP Project documentation has been adapted to use JESIP principles to aid Project Management and provide common terminology across sectors.

11.4.5 Tactical Projects include:

- Expansion and roll-out of Parish Safety Volunteers model into the Safe & Well and Secure Visits, includes falls assessment
- Control Room Portal – reduce calls between control rooms.
- Development of a Joint Rural Engagement programme with Essex Police.
- Development of web-based portal for the public to request a Safe, Well and Secure visit.
- Collapsed Behind Closed Doors / Gaining Entry.
- ECFRS to take over the Development of Community Speed Watch.
- Arson Prevention.
- Expansion of ECFRS Education Team with officers funded by Essex Police.
- Duke of Edinburgh Provision for Essex Police Cadets.
- Restorative Justice Firebreaks.

11.4.6 Strategic Projects include:

- Joint Fleet – workshops/operational and management.
- Joint Provision of Specialist Capabilities – USAR, OPC and HART (Hazardous Area Response Team).
- Joint use of classrooms and Joint Training (management / leadership).
- Shared use of Estate – Drop-Ins, Co-use, ES response to housing developments.
- Joint Incident Command Unit.
- IT Convergence incl. IT Procurement – joint IT strategy, integrated teams.
- Joint Procurement – long term as need contracts to align.
- Shared Control room facility – P1 shared software, P2 integrated/co-located.
- Increased resources in Dengie – tri-service officer.
- Joint Community Safety function – integrated team, joint management.

11.5 OPERATIONS – JOINT EMERGENCY SERVICES INTEROPERABILITY PROGRAMME (JESIP)

11.5.1 The aim of the JESIP is that:

"Blue light services are trained and exercised to work together as effectively as possible at all levels of command in response to major or complex incidents (including fast moving terrorist scenarios) so that as many lives as possible can be saved."

11.5.2 There are many drivers for JESIP, including the London Bombings in 2005, (7/7), flooding in 2007, followed by the Pitt Report, shootings in Cumbria, and the successful planning and preparation around the Queens Diamond Jubilee and the London Olympics.

11.5.3 Interoperability already exists. This piece of works intends to build on those existing arrangements. The programme intends to produce:

- Common planning assumptions.
- Joint emergency services guidance.
- A common approach to information sharing and communication.
- Common operating principles for assessing and managing risk at the scene.
- A joint training and exercising strategy for all levels of command across the services.
- Tri-service mobilisation coordination.

11.5.4 The JESIP workstreams cover:

- Doctrine & Organisation.
- Operational Communications (Airwave).
- Shared Situational Awareness.
- Training & Exercising.

11.5.5 Significant activity within the JESIP Forum includes:

- Six, half day multi agency JESIP courses planned for both 2019 and 2020 and are being advertised and recruited to between three blue light agencies at this time. This is an arrangement for the first time in c18 months.
- Essex Police created a new JESIP tactical group, comprising of members of the Training Team, Operational Planning, a NILO rep and a member of the Force Control Room.
- Over 120 new recruits and Sergeants (on development courses) have had a JESIP input in the last quarter. More probationer courses are planned for 2019 and a JESIP input is a mandatory part of initial intake courses, both at EPC and KP.
- A new five day command course for Force Duty Officers (to replace Silver Command role) from April 2019 has been arranged with a JESIP input planned for day two, delivered by staff from all three blue light agencies.
- Marked Essex Police vehicles are to be equipped with a blue/white Police tactical commander tabard as at April 2019 there are very few of these in existence. They are not issued to police officers as part of PPE and some recent incident de-briefs highlighted a lack of identification being an operational issue.
- Following a suggestion by the Essex Police Roads Policing Lead, work in progress, (at April 2019), is to create a JESIP themed HYDRA exercise between Police, Fire, Ambulance and Highways England to help improve collaborative working around RTCs and road related incidents. This was facilitated through the Collaboration team through the ECFRS Learning & Development department. In addition, some practical JESIP styled/themed RTC training (requested by Fire to aid learning) will be discussed as part of this HYDRA related conversation.

11.6 OPERATIONS – NATIONAL & REGIONAL RESPONSE

11.6 1 In April 2013, the Government published the revised **"Responding to Emergencies. The UK Central Government Response Concept of Operations".**

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/192425/CONOPs_incl_revised_chapter_24_Apr-13.pdf

11.6.2 This document sets out arrangements for responding to, and recovering from, emergencies, irrespective of cause or location, requiring co-ordinated central government action, which could include direction, co-ordination, expertise, or specialised equipment and financial support. It focuses primarily on the response to no-notice or short notice emergencies requiring UK central government engagement – although the principles, definitions and roles outlined here also underpin the more tailored approach that should be adopted to manage slower, rising tide, emergencies. It sets out the relationship between the central, regional and local tiers within England, as well as covering the relationship between UK central government and the devolved administrations. (See also Joint Doctrine Publication 02. UK Operations: the Defence Contribution to Resilience & Security.
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/591639/20170207_JDP02_Resilience_web.pdf)

11.6.3 Directly relevant to the Concept of Operations is the Statutory Guidance under the CCA 2004, and in particular Chapter 6 – Business Continuity Management. The Act requires Category 1 responders to maintain plans to ensure that they can continue to exercise their functions in the event of an emergency so far as is reasonably practicable. The duty relates to **all functions**, not just their emergency response functions. ECFRS has a suite of business continuity plans.

11.6.4 In 2015, the Chief Fire Officers' Association and the Chief Fire & Rescue Advisor published, the "National Coordination and Advisory Framework" [68], (NCAF), as an adjunct to the National framework and as a mechanism to support and coordinate deployment arrangements for fire and rescue assets in the event of a situation demanding regional or national involvement.

The NCAF supports:

- everyday assistance and collaboration between fire and rescue services;
- the provision of specialist assistance to fire and rescue services where an incident warrants it and it is available from elsewhere, or additional resources where an unforeseeable incident demands it because it is likely to overwhelm or is overwhelming a service's own resources;
- coordination of the combined fire and rescue services response to high impact or wide area incidents, and when required, the integration of that coordination with that of other first responders, for example police, ambulance and the military, at any geographical scale;
- the Chief Fire and Rescue Adviser to provide the Secretary of State with expert advice, to support the coordination of an incident(s) that is being coordinated by Government; and
- the provision of information between the affected services, the Chief Fire Officers Association, other agencies, and government, where that is necessary for the framework to operate effectively.

11.6.5 This framework details the functions, roles and responsibilities associated with the various components of the framework, highlighting the direct lines of communication involved. This is to ensure the provision of the appropriate level of advice, guidance and assurance at the point of need.

[68] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/464024/150918_NCAF.pdf

11.6.6 The structure and operation of the framework is designed to be flexible to adapt and develop against the nature, scale and operational requirements of an incident and support those involved in resolving it. The framework is a supporting function. It does not imply that all of the components will be required on each occasion nor automatically activated for every incident that requires a national response

11.6.7 The Fire & Rescue Service National Coordination Centre, based in London (Merton – London Fire Brigade) provides 24/7/365 overview of the availability and distribution of national capability assets, some of which are held by ECFRS.

11.6.8 ECFRS responded to calls for assets to deploy to Buncefield, (petro-chem storage), Gloucester (floods), Cumbria (floods), and Didcot in early 2016, (Coal Fired Power Station explosion). In addition to national and regional responses, the Service will respond to international calls for assistance through nationally coordinated arrangements. Instances of this are international search and rescue calls from Haiti (2010), Christchurch New Zealand (2011), Nepal (2015) and China (2016).

11.7 OPERATIONS – CROSS BORDER ARRANGEMENTS

11.7.1 The Service has arrangements with neighbouring FRS for cross-border cooperation and mutual aid. In 2018, the Service also provided an SMA to Cambs FRS for a long-duration timber fire. ECFRS has National Tac Ads for waste fires and our approach with Extreme Rescue for dealing with waste fires is now replicated around the UK. Structured meetings are now in place between ECFRS and LFB Group and Station managers to discuss cross border interoperability.

11.8 OPERATIONS – LEVELS OF COMMAND

11.8.1 There are three levels of command and control that may operate at a multi-agency incident, known as Bronze, (Operational), Silver, (Tactical), and Gold, (Strategic). The terms are used to describe tiers of **joint, multi-agency emergency management** and will normally only be utilised where a combined multi-agency response is necessary. The adoption of this nationally agreed management framework will assist to integrate plans and procedures between agencies ensuring understanding of roles and responsibilities.

11.8.2 During a major incident, and prior to that if a significant “rising tide” event is on the horizon, the Strategic Coordinating Group, (SCG), represents the GOLD level of command. This group will consist of managers senior enough to be able to commit resources, namely staff, equipment and money, to delivering a resolution to the incident. This is typically at the Chief Officer of Police/Chief Fire Officer/Chief Executive level, or officers with sufficient seniority to speak on behalf of their Chief Officer. When not involved in incident management, this group will meet as the Essex Resilience Forum.

11.9 ESSEX RESILIENCE FORUM

11.9.1 The ERF is a multi-agency group of Category 1 responders that oversees the resilience of Essex should a significant event (natural hazard, industrial accident or threat) materialise. Currently, the Chief Constable is the Chair of the Executive Programme Board of the ERF. This provides strategic direction. The Planning Assurance Group, (PAG), sits directly under the Programme Board. This group deals with capability and capacity and provides the plans and exercises required in order to ensure Essex responds appropriately to a significant event identified through analysis by the Risk Intelligence Group (RIG) of the ERF. The RIG compiles the CRR, which localises national risks from the national risk assessment guidance to Essex.

11.9.2 The SAOR includes the IRMP risk register that provides a golden thread to the CRR by aligning identified risks to a specific individual national risk, or a group of risks.

11.9.3 An important document produced by the ERF is the Combined Operating Procedures for Essex, (COPE), which provides a multi-agency response and recovery framework. The document checklist sequence covers:

- Notification of an Incident (METHANE Report)
- Activation
- Coordination
- Recovery

11.9.4 The main contents then cover:

- Introduction and background
- Major Incident
- Command and Control
    - Tactical Coordination
    - Strategic Coordination
    - Recovery Coordination
- Agency Roles & Responsibilities
- SCG Agenda
- Situation Reports
- SCG/RCG Participation in Ministerial Meetings

11.10 SHARED ARRANGEMENTS & THIRD PARTY SERVICES

11.10.1 The Service has entered into a number of collaborative arrangements with other Emergency Services. At October 2017, the Emergency Services Collaboration Programme has a number of projects working to it with Essex Police. Two On-Call stations, Coggeshall and Newport, provide first responder activity with the East of England Ambulance Service Trust.

11.10.2 ECFRS has arrangements with a private sector contractor for heavy lift and recovery at RTCs, and swift water rescue. The Service is also looking at various opportunities to enter into other partnership arrangements.

11.11 OPERATIONS – NEW DIMENSIONS

11.11.1 The New Dimension programme provided the Fire and Rescue Service with the specialist equipment and training needed to respond to terrorist and other large-scale major and catastrophic incidents. The programme provided a number of specialist transport vehicles, Prime Movers, equipment to deal with mass decontamination, modules for Urban Search & Rescue, and high volume pumps and larger diameter hoses together with hose boxes for extra length hose laying.

11.12 PROCUREMENT

11.12.1 ECFRS is actively involved with Regional and National procurement programmes.

- PPE – ECFRS is currently (March 2019) in contract with Ballyclare for the provision of their firefighting PPE using the South Eastern Regional PPE framework until 3rd October 2019. From this date, ECFRS will commence a new seven-year PPE contract with Bristol Uniforms using the National PPE framework, again led by Kent FRS. PPE sizing for all Essex uniformed staff is currently underway.
- The provision of new Incident Ground digital/analogue radios for 2-way communications is complete along with a number of software update installations by our in house engineer. (March

2019). The replacement of the ATEX (intrinsically safe) versions is underway by means of an ongoing replacement programme.

- Whilst the majority of radio difficulties have reduced, ECFRS still experiences a few isolated cases. These are generally due to digital and analogue channels used in close proximity to each other. Both analogue and digital work on the same frequency but different bandwidths. If, for example, channel 11 is used on digital and channel 11 analogue is used at the same incident, the analogue signal will block out the digital signal.

APPENDIX A: THE RISK MATRIX

A.1 The matrix used by the Service is based on the methodology below, which includes illustrations of how scores are arrived at. It provides a "heat picture" of where risk lies within the Service.

Likelihood and Consequence

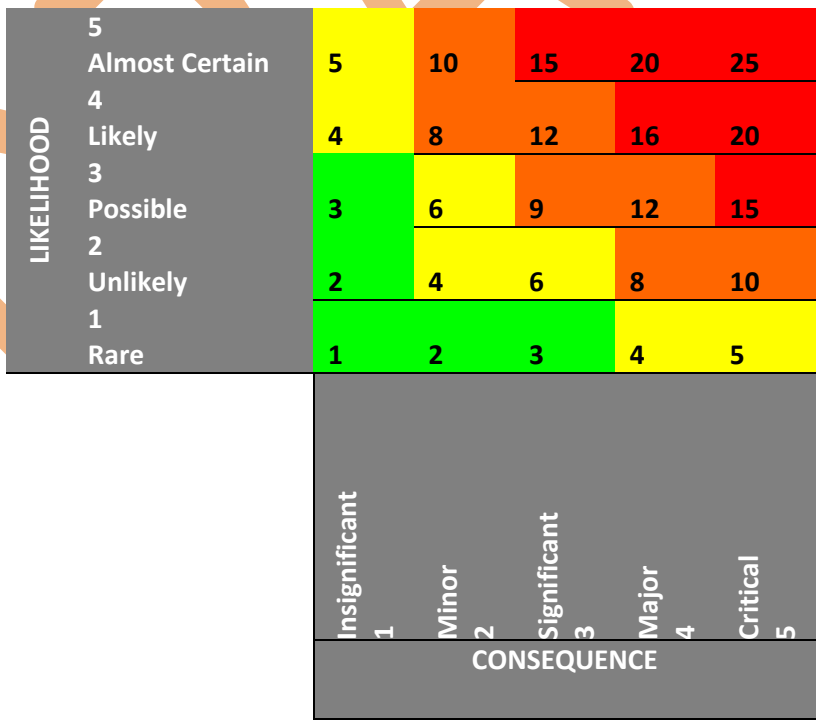
A.2 Values are required for likelihood and impact in order to make more sense of the words and numbers used. These provide those involved in creating risk registers, with the ability to apply a rating of their risks in a more meaningful way. Use of the traffic light (RAG) system enhances the significance of the scores. Management will focus attention on 'red risks' and be concerned with risks in the dark amber areas for threats, and the medium blue to dark blue areas for opportunities.

Likelihood Scoring Scale

Level	Descriptor	Likelihood
1	Rare	< 10% May occur only in exceptional circumstances.
2	Unlikely	10 - 35%. The event could occur infrequently.
3	Possible	35 - 65%. The event could occur at some time.
4	Likely	65 - 90%. The event is expected to occur in most circumstances
5	Almost Certain	>90%. The event will occur in most circumstances

Consequence

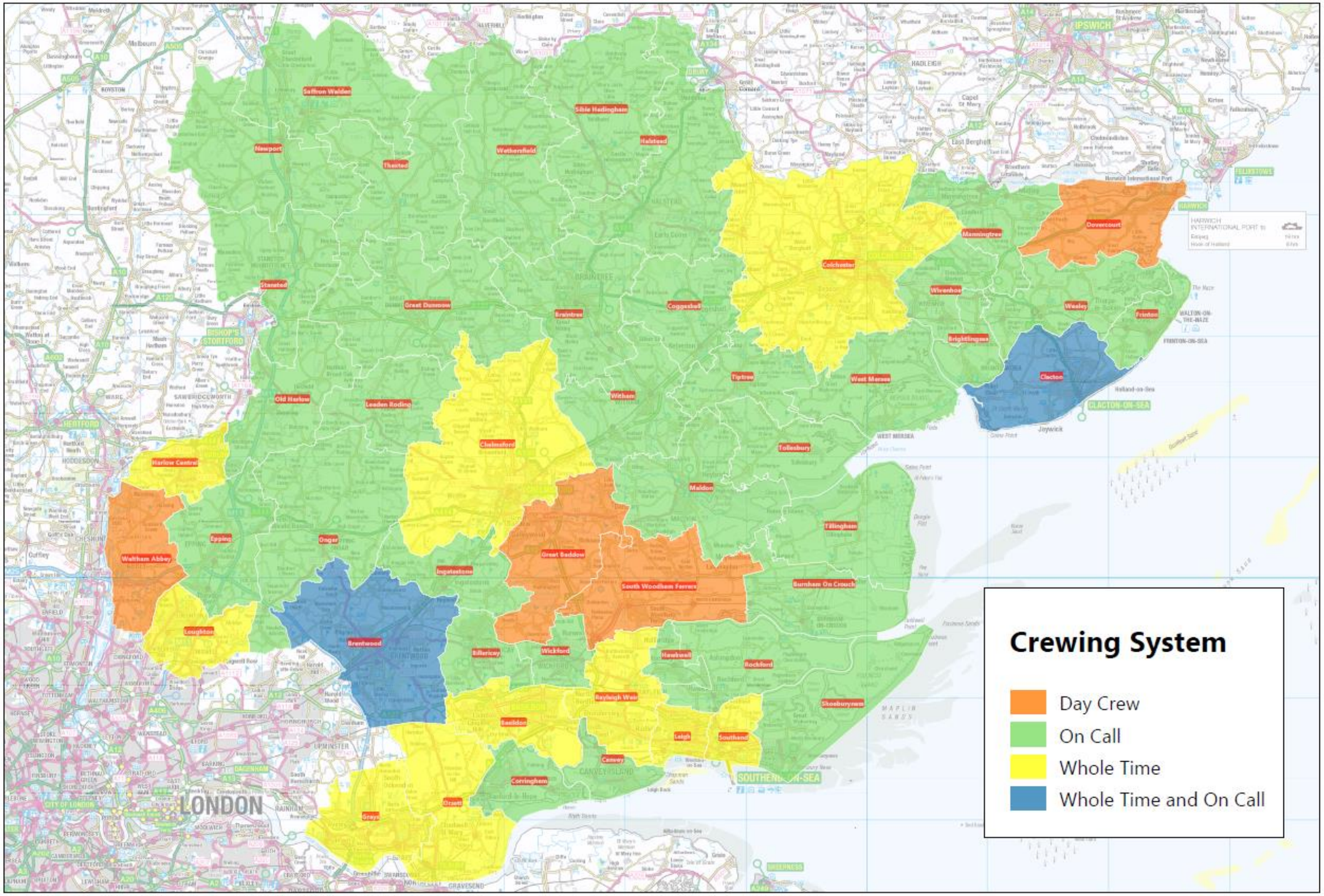
A.3 Consequence, (impact), has hitherto been a single category value that deserves to be the subject of greater scrutiny, as consequences can occur in a number of areas. Accordingly, the consequence may need moderation across those areas to understand the true value. The table on the following page will assist in providing context and texture. Having identified likelihood and consequence, the resultant risk matrix provides a "heat map".



Rating	Rating Scale	Staff / Safety	Service Disruption	Service Objectives	Direct Loss /Finance	Media Attitude /Reputation	Legal/Regulatory Action	Environment
Insignificant	1	No injuries or threat of injuries. H & S compliant	Very little disruption to normal services.	Some problems delivering departmental objectives	Financial loss <£25k	No media coverage. External parties not impacted or aware of problem	Unsupported threat of legal action. High compliance standards recognised.	No damage to local environment.
Minor	2	Minor injuries (first aid required).H & S Policy review required	Minor disruption to delivery of services.	Inability to deliver a departmental objective.	Financial loss >£26k <£100k	Some local media coverage. Some external parties aware of the problem, but impacts on external parties are minimal.	Legal action with limited potential for decision against. / Oral comments received	Minimal damage to local environment
Significant	3	Serious injury. Short-term hospitalisation. H&S standards insufficient / poor training.	Significant disruption to important services.	Inability to deliver departmental objectives	Financial loss >£101k <£250k	Extensive local front-page press & local TV coverage. Significant number of external parties aware of problems	Probable settlement out of court. / Findings in written examination report	Moderate damage to local environment.
Major	4	Severe/multiple injuries possibly leading to loss of life. Long-term hospitalisation. H&S investigation.	Major disruption to important services	Inability to deliver one of the corporate objectives	Financial loss >£251k <£500k	Some national broadsheet & TV coverage. Cost to third parties.	Civil action against for significant violation with limited opportunity for quick settlement. Possible criminal action. / Multiple or repeat violations.	Significant damage to local environment.
Critical	5	Loss of life. Severe/Multiple injuries & long-term hospitalisation. H&S breach causing serious fine, investigation, legal fees and possible stop notice.	Major disruption to a number of critical services.	Inability to deliver all or a number of corporate objectives.	Financial loss >£501k	Extended national media coverage, inc broadsheet editorial & TV./ Third parties suffer major loss and/or cost.	Action brought against for major violation. / Action brought against for significant violation. Very large penalty/fine.	Major local and significant national environmental damage

APPENDIX B – ECFRS CREWING SYSTEMS

Essex County Fire and Rescue Service



Dovercourt, Great Baddow, Waltham Abbey and South Woodham Ferrers will convert to on-call stations by April 2021

APPENDIX C: INTEGRATED RISK MANAGEMENT PLANNING RISK REGISTER

ENVIRONMENT

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities	Current Controls	Con	Lhd	Level	Proposed Mitigation	CRR Ref
1. Failure to respond appropriately to the effect of climate change on ***summers*** and prolonged periods of excessive heat(wave) leading to an increase in rural fires as well as wild fires covering larger rural areas. There may be insufficient water to extinguish fires due to drought or water restrictions (on water pressure). Longer periods and/or increased resources may be required to extinguish fires.	• Higher than average temperatures. • Longer dry periods between rainfalls. • Lower than average rainfall. • Reduction in available water. • Increased use of water in Essex by 6% in next 25yrs • Extensive Fires in the Open	• Greater demand on resources. • Extensive wildfire • Resources deployed for longer periods. • Larger attendances required at incidents. • Increase in calls to Control. • Greater demand for specialist skills and equipment. • Inadequate levels of resource to respond to all requirements. • Inadequate welfare arrangements for firefighters. • Increase in relief crews and associated costs. • Increase in the number of blue light movements. • Longer response times to reach incidents. • Depletion in fire-cover for longer periods over larger areas. • Change in societal recreation (type, length, place etc). • Change in length of time spent in houses (increase in winter, decrease in summer). • Change in skills required by Service Delivery. • Dealing with flash flooding post heavy thunderstorms due to hard ground. • Potential for increased vehicle and equipment defects due to increased activity. • Increased consideration around off-road use of Type B appliances and pre-emptive use of current off-road capability.	• Financial requirement exceeds budget provision (use of reserves) • Increase in budget costs for On-call firefighters caused by spate conditions • On-call firefighters will be absent from primary employers more frequently and for longer periods. • Primary employers withdraw support for releasing employees for retained firefighting purposes. • Potential for reputation damage. • Loss of public confidence and support. • Increase in risks to the community and FRS personnel. • Increased environmental damage and wildfire. • Economic loss to community • Negative affect on Performance Indicators. • Change in % of time firefighting, leading to change of availability for other work • Reduction in other activities i.e. Community Safety and training due to operational commitments. • Less time for audits, other statutory duties and workplace fire safety activities.	• Opportunities for the development of the new and innovative techniques, equipment and response methods to meet the changing risk profile using existing resources. • Change in terms & conditions for employees for better fit Service Delivery need by providing more agile and flexible response options. • Up skill workforce to manage new risk. • Increase in partnership activity e.g. with the Environment Agency, Local Authority etc. • Opportunity for the Service to broaden its safer community work to remote communities to make them more resilient. • Take a longer-term view of off-road capability.	**Policy** – SIS notes including severe weather contingency plan; FITECH; Service Critical Incident Team; Mobilisation Policy; contractual obligation of 3 yearly medical; OTB - Section 13/16 arrangements (FSA2004). EA/ECFRS MOU. Fire in the Open TOG. **Organisation** – SAOR, Control (Standing Orders); Service arrangements for reliefs; Incident Command System; Inter-agency Liaison; Emergency DERV SOP. The appropriate identification of existing and changing risks allows appropriate decision making regarding the allocation of resource to mitigation. Currently demographic profiling delivered in house with licence for updating of data in place; provision of CIT to assist with management of "spate" conditions. **Planning** – SOPs, ERF risk management, Strategic and Community Risk Registers, National Risk Register; PDA's; Business Continuity Plans; TFS involved in plan applications. Budget Planning /Reserves. Command & Station Planning. Close liaison with Water Companies supplying Essex (Water Section and regular Regional meetings). Close liaison with EA via local and regional working groups. Liaison with the DEFRA Co-ordination Team; contingency plans. **Implementation** – SIS notes; Specialist Appliances (Off-Road, Rangers, Water Bowsers, Welfare Unit, ICUs, High Volume Pumps), USAR, New PPE including BA; provision of water on appliances, Duty Water Officer, 2 x 12,500 litre (working capacity), Recall to duty system, duty media & comms officer; enhanced water rescue capability; managing crews' intake of water & electrolytes; tactical use of branches to minimise water use. **Monitoring, Audit and Review** Station Audits; Incident Support and Monitoring Policy; Documents; H&S inspections, Debrief. Training and verification across core competencies and, as applicable, recorded in TASK Books.	3	4	12	• Develop media campaigns to address heat waves and associated risks to be used "off the shelf" as required. • Operations – Review the Service off-road capability	**R90 - MO, R84 - Defra R85 - Defra**

ENVIRONMENT

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities	Current Controls	Con	Lhd	Level	Proposed Mitigation	CRR Ref
2. Failure to respond to the effect of climate change on ***winters*** and prolonged periods of more extreme weather conditions, e.g. snow, ice, high winds, drifts leading to an increase in flooding from snow melt incidents, floods covering larger areas and more storm damage. Spate conditions may stretch available resources. An associated risk is the loss of electricity for hours or possibly days because of significantly bad weather conditions. (H41 [National] and H45 [Regional] on the CRR.)	• Higher than average levels of rain. • Larger volumes of rain water falling over shorter periods. • Increase in frequency and intensity of storms. • Higher than average wind speeds. • Rapid, heavy, localised rainfall causing flooding. • Rapid rises in river levels leading to widespread and/or localised flooding. • Increase in snow / ice/fog	• Greater demand on Wholetime resources. • Resources deployed for longer periods. • Larger attendances required at incidents. • Increase in calls to Control. • Greater demand for specialist skills. • Greater demand for specialist appliances and equipment. • Inadequate levels of resource to respond to all requirements. • Inadequate welfare arrangements for fire fighters. • Increase in relief crews and associated costs. • Increase in the number of blue light movements. • Longer response times to reach incidents due to floodwater, snow, ice and other road conditions. • Depletion in fire-cover for longer periods over larger areas. • Change in societal recreation (type, length, place etc). • Change in length of time spent in houses (increase in winter, decrease in summer). • Change in skills required by Service Delivery. • Dealing with flash flooding post heavy thunderstorms, flood from snowmelt. • Potential for increased vehicle and equipment defects due to increased activity. • Potential for increased accidents involving appliances. • Extend scene of operations in large scale flooding.	• Financial requirement exceeds budget provision (use of reserves) • Increase in budget costs for On-call firefighters caused by spate conditions • On-call firefighters will be absent from primary employers more frequently and for longer periods. • Primary employers withdraw support for releasing employees for retained firefighting purposes. • Potential for reputation damage. • Loss of public confidence and support. • Increase in risks to the community and FRS personnel. • Increased environmental damage. • Economic loss to community • Lack of available funding. • Negative affect on Performance Indicators. • Change in % of time firefighting, leading to change of availability for other work • Reduction in other activities i.e. Community Safety and training due to operational commitments. • Less time for audits, other statutory duties and workplace fire safety activities.	• Opportunities for the development of the new and innovative techniques, equipment and response methods to meet the changing risk profile using existing resources. • Change in terms & conditions for employees to improve Service Delivery need by providing more agile and flexible response options. • Up skill workforce to manage new risk. • Increase in partnership activity e.g. with the Environment Agency, Local Authority etc.	**Policy** – Incidents on or near water; Flood Warnings; Search & Rescue on Water; Stability Procedures; SIS notes - Severe weather contingency plan; FITECH; Service Critical Incident Team; Mobilisation Policy; contractual obligation of 3 yearly medical; OTB Section 13/16 arrangements (FSA 2004). EA/ECFRS MOU. **Organisation** –SAOR, Control (Standing Orders); Service arrangements for reliefs; Incident Command System; Inter-agency Liaison; Emergency DERV SOP. The appropriate identification of existing and changing risks allows appropriate decision making regarding the allocation of resource to mitigation. Currently demographic profiling is delivered in house with licence for updating of data in place. **Planning** – Work through ERF and relevant working groups, Strategic and Community Risk Registers, National Risk Register; PDA's; Business Continuity Plans; TFS involved in plan applications. Budget Planning and reserves. Command & Station Planning. Close liaison with Water Companies supplying Essex (Water Section and regular Regional meetings). Close liaison with EA via local and regional working groups. Liaison with the DEFRA Co-ordination Team, Met Office Hazard Manager, Contingency Plans. **Implementation** – Service Boats; Appropriate rescue equipment, e.g. Life jackets and floating lines; HVP; SIS note safety at incidents; Specialist Appliances (Off-Road, Rangers, Welfare Unit, ICUs, High Volume Pumps), USAR, PPE including BA; Recall to duty system; enhanced water rescue capability; availability of specialised capability, National resilience mutual aid support arrangements – declared water/flood assets. **Monitoring, Audit and Review** Station Audits; Incident Support and Monitoring. Policy Documents; H&S inspections, Debrief. Training and verification across all Core competencies and, where applicable, recorded in individual TASK books.	3	3	9	• Develop media campaigns to address snow, ice and flood and associated risks to be used "off the shelf" as required. • Review off-road capability (P2020) • Flood Prevention work with Essex CC in place.	**R81, R83, R83-Defra R91, R93 MO R97 BEIS**

ENVIRONMENT

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities	Current Controls	Con	Lhd	Level	Proposed Mitigation	CRR Ref
3. Failure to provide the appropriate Environmental Management during Operational response	• Poor situational awareness (surrounding area/water courses and risks involved etc.) and failure to identify the nature and extent of the incident. • Failure to prevent pollutant flow on ground • Fire-fighting water run-off not effectively managed (e.g. into watercourses) • Water run-off from incidents using foam as the extinguishing media entering watercourses • Inappropriate use of controlled burn strategy • Incomplete or inadequate information leading to Control or IC not requesting the attendance of an HMEPO and/or other relevant agency/authority at the appropriate time.	• Contamination of personnel and equipment • Illness through contamination (FF and third parties) • Contamination – ground, water courses (tidal, other) • Air pollution. • No (early) liaison with Environment Agency to speed decision-making and subsequent environmental mitigation. • Appropriate resources not available quickly enough • Potential impact on e.g. SSSIs, water abstraction etc. • Prolonged attendance at incident. • Investigation by Regulatory body.	• Slow response to wider incident management issues, e.g. evacuation • Legal action against ECFRS by EA, HSE, local businesses etc. • Financial penalty • Reputational risk through poor operational management • Strain placed on EA/ECFRS partnership. • Impact on local communities, business's and their continuity. • Prolonged recovery period leading to potential environmental legacy issues. • Increased operating costs	• Recovery of cost from polluter. • Development of new firefighting techniques that use less water and cause less damage. • New technology that helps extinguish fires with less water used.	**Policy** – Update to NOGS and TOGS. Relevant SIS / SOPs relating to water pollution control; Major Foam Attack Policy; Environmental Policy. SSRIs. EA/ECFRS MoU. **Organisation** – SAOR, Hazmat and Environmental Protection Officers; Petrochemical Officers. Joint EA / FRS premises inspections. Duty Water Officer, Incident Command System. Training. PPE. **Planning** – SOPs, ERF risk management; Strategic Risk Register, Community Risk Register, National Risk Register. Close liaison with EA via local and regional working groups. Continue to develop closer working with the EA; contingency plans. **Implementation** – Environmental Module, Environmental packs on Frontline appliances. High Volume Pump, USAR. **Monitoring, Audit and Review** – TASK books; Station Audits; Incident Support and Monitoring. Policy Documents; H&S inspections, Debrief. Training and verification across all Core competencies and, where applicable, recorded in individual TASK Books.	3	2	6	• Examine Service water management (Run-off, bunding, optimising use). • Improve the management of water runoff. • Continual assessment of use of foam and foam products to limit negative environmental impact. • Research into the use of ultra-high pressure lances. • Review & refinement of Tactical Fire Plans and SSRIs – water run- off incorporated into site specific planning. • TACAD Info • Water additives instead of foam. * No CRR reference as such, as this risk is about ECFRS response to 1 and 2 above.	*

DEMOGRAPHICS

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities	Controls	Con	Lhd	Level	Proposed Mitigation	CRR Ref
4. Changing demographics in Essex in the short and medium terms leading to a shift in age and potentially vulnerable population groupings.	• An aging population with a significant increase in older persons who will be entering the over 65s and the 80+ age groups in the next 5 and 10 years and considered to be potentially at higher risk from fire. • Increase in the number of immigrants/migrants living and working in Essex including BAME increasing the diversity of persons living in Essex. • Change in Local Authority provision for the elderly and wider vulnerable sections of our community.	• Unrepresentative workforce. • Increase in the number of un-wanted fire signals. • Increase in the number of fire deaths and injuries. • Greater demand for Community Safety services. • Increase in primary fires. • Greater demand for specialist skills (translators, community workers). • Greater demand on firefighting resources. • Difficulty in reaching high-risk groups. • Increase in the number of blue light movements. • Increased audit volumes for Technical Fire Safety. If staffing levels are not increased, a smaller percentage of high-risk premises will be inspected. • Potential increase in dwelling fires. • Difficulties in communication with an increasingly diverse community. • Increase in the number of vehicles driven by young and old persons leading to a potential increase in the numbers and frequency of RTCs/journeys/travel, notably in young people generally and P2W in particular. • Ongoing issues with On Call recruitment.	• Increase in economic loss. • Increase in Service costs. • Lack of available funding. • Lack of awareness amongst migrant community of services available. • Services not informed by local need. • Increase in enforcement action due to poor understanding of UK Regulations. • Lack of Service uptake. • Reduction in other activities i.e. training. • Negative impact on PIs. • Change in FRS 'Standing' or 'Brand' as a result of 'cultural' change in community. • Change in allocation of CS resources. • Increased use of natural resources, e.g. water • Increased care for sick and elderly in own homes NOT care facilities or hospices. • Need for more joined up thinking. • Wider use of inappropriate land for housing development. • Increase in HMOs. • More house building. • More business premises. • Increase in certain types of criminal activity. • Modern day slavery. • Human trafficking. • Additional training around human issues. • Greater need for data analysis to provide information to ensure activities are intelligence led. • Effect on On-Call appliance availability.	• Health and Welfare. (Safe & Well Strategy). • Opportunities to improve the care of the elderly and the education of the young through the promotion of passive and proactive fire suppression/detection systems in domestic premises and the delivery of more intelligent and focussed road traffic safety education. • Opportunities for more diverse workforce. • Partnership working with other agencies to support mechanisms to manage a significantly larger older population, e.g. work with Planning Control/Building Control to design inherently safe environments. (Longer term proposition) • Data sharing between partners and stakeholders. • increased Inter- and Multi-Agency Collaboration	**Policy** – Community Safety Policy; Workplace Fire Safety Policy, SIS notes including – Motorway and Dual Carriageway procedures; RTC procedures; Commercial Vehicle Hazards; Automatic Fire Detection and Alarm System. NOGs. Further development and implementation of Arson Strategy. **Organisation** – RTC reduction strategy. Introduce road safety awareness as part of schools' education work stream. Equality & Diversity Section/ outreach workers; Performance and Review Department; Restructure of the service into two areas using a functional management approach. Functional command exercised to integrate, Safer Communities. The appropriate identification of the existing and changing risks allows appropriate decision making regarding the allocation of resource to mitigation. E.g. USAR. Demographic analysis. Enhance the volunteer scheme to support safety initiatives and deliver better capacity. **Planning** –Collaboration with partners e.g. ECRB, Station Risk Profiles, Mosaic Software, Directorate/ Command /Station/ Watch Plans, ERF Planning, Application of performance monitoring and advanced risk profiling tools to identify risk patterns. Closer working with Trading Standards (ECC); use of telephone translation service providing interpreters and multi-lingual Q&A books; contingency plans. **Implementation** – HSV's, the HSC centralisation project outcomes; RTC Cutting Equipment on frontline appliances; Revised procedures for use of cutting equipment as a consequence of new technologies in vehicle construction; Heavy Rescue Pumps, Enhanced FireBike capacity/capability, Community Wheels. Partnerships with agencies who deal with 'At Risk' groups; Elderly Persons Strategy. Duke of Edinburgh Award Scheme and Firebreak. Road Safety Initiatives. RTC resource centre at Waltham Abbey **Monitoring, Audit and Review**. Station Audits; Incident Support and Monitoring Policy Documents; H&S inspections, Debriefs; training and verification across all Core competencies and, where applicable, recorded in individual TASK Books.	3	5	15	• Enhance Station based prevention and protection activity. • Continued development of vulnerable children, adults & elderly persons' strategies and with a view to longer-term situations. • Develop improved data sharing arrangements with partners and stakeholders. • Enhancing the RTC response. • Revised recruitment strategy to encourage and reflect the diverse Essex community. * The Essex Resilience Forum Community Risk Register does not cover Demographics as a Risk	*

TECHNOLOGY

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities	Controls	Con	Lhd	Level	Proposed Mitigation	CRR Ref
5. Failure to understand, and where appropriate take advantage of, advances in technology that would deliver improved or new solutions for the FRS. Technological improvements and changes could reduce risk or present ECFRS with new or changing risks. The changes are likely to impact on every part of the management, delivery and working of the ECFRS. It is impossible to predict with any certainty the change or impact of change.	• New uses of existing technologies • New interchange of data across technologies • Development of new technology. • Technology failure. • New technology brought into the workplace. • Present working practices do not allow efficient use of technology. • Technology advances change risks to be managed.	• Technical Fire Safety department unable to operate efficiently. • Change in Service needs for Service Delivery. • Downstream impacts on all Departments	• Additional training needed. • Increased costs. • Lack of funding available. • Present technology becomes obsolete. • Staff not properly trained. • Technology not used to fullest potential. • Failure to communicate effectively with the public through new media. • Poor use of funding. • Unable to respond in statutory period. • Reduced amount of fire safety audits carried out. • Potential for technological advances occurring within the normal appliance replacement cycle.	• Opportunities for technological improvements to passive and proactive fire protection systems and the reduction of RTC casualties due to improved vehicular design and collision avoidance systems. • Improvement in Support Services (back office functions). • Improvement in Service Delivery (equipment, training etc) • Reduction of costs, more efficient use of existing resources. • 4i Mobilisation system installed 2016 • Review of mobilisation systems towards the end of the 4i contract.	**Policy -** **Organisation** – Fire Authority, Governance Boards, **Planning** – NFCC, IRMP, ECFRS Governance Arrangements, Emerging Risk Register; ICT Master Risk Register Membership with Regional and National groups delivering performance data and reporting. Continual professional development of existing specialist staff (including skills maintenance, updating and development) Contingency Plans **Implementation** – ECFRS Business Plans. MDTs. TFS, CS, Ops; CRM. **Monitoring, Audit and Review** – Peer review. ICT structure and management. Technical Dept and R & D process. Horizon scanning for new technologies to ensure the Service is aware of potential change as early as possible and is agile enough to react in time. Training and verification across all Core competencies and, where applicable, recorded in individual TASK Books.	3	2	6	• ICT asset tracking system for Station / operational equipment under trial to provide tracking, logging and inventory for management. • MDT2 risk information project • ESMCP Project. Airwave replacement and upgrade (2018 >) • COSMOS programme incorporating ESMCP (Airwave replacement), Tablets on Appliances, MDT and SatNav. • Better exploitation of the CRM system.	*

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The Essex Resilience Forum Community Risk Register does not specifically cover Technology as a Risk

DISEASE

Risk No. & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities	Current Controls	Con	Lhd	Level	Proposed Mitigation	CRR Ref
6. Reduction in service delivery due to Human Health issues, e.g. pandemic.	Highly virulent and harmful infectious disease leading to epidemic and/or pandemic, e.g. 'flu'. SARS outbreak Accidental Biological Release Pollution of controlled waters (e.g. through flood, chemical spillage, or release of untreated sewage) Zoonotic notifiable animal disease (e.g. highly pathogenic Avian Influenza, Rabies, West Nile Virus)	• Invocation of business continuity arrangements due to reduced workforce (subject to nature of outbreak) over a prolonged period of time, and possible high numbers of loss of life (not job related). • Worried well including Operational personnel staying away from work to look after family. • Operational activity slowed by mitigation actions. • Recovery may take longer than life of cause (to allow firefighters to return to work). • Potential for requests to be involved in covert 'out of scope' activities (e.g. body recovery).	• Large Scale Recruiting and training. • Reputation risk – increase / development of FRS remit. • Potential increase in budget costs for On-call FF caused by the provision of fire cover at Wholetime stations. • Stations going off the run • Reduced support services in addition to operational staff. • Reduction to incident attendances (Exposure of personnel to disease / reduced availability) (13/16 and MoU arrangements) • Pressure to attend incidents not normally associated with FRS. • Possible cessation of non-incident related activity.	• Review of operational policies • New Partnerships • Funding • Tighter ERF working arrangements Communications Strategy – **External** for Public Safety messages. **Internal** – for staff welfare and workforce management.	**Policy** – NOGs. SIS notes, Service Leave Policies; Service Critical Incident Team; Key Station Policy. **Organisation** – Business continuity arrangements, HR Business Partners; Interagency Liaison Officers; Occupational Health. Reporting procedures. CRT. **Planning** – Liaison with Health Protection Agency; ERF and working groups; daily availability; recall to duty; Business Continuity and other contingency plans at strategic and department levels, Occupational Health advice. Contingency Plans. Additional shift working. **Implementation** – Exercising Business Continuity arrangements. Pre-arranged out-duties. Mixed Crewing. Integration of Electronic Rota Book to assist with workforce management and planning **Monitoring, Audit and Review -** Station Audits; Incident Support and Monitoring Policy Documents; H&S inspections, debriefs; Training and verification across all Core competencies and, where applicable, recorded in individual TASK Books.	4	1	4	• Degradation planning to support BC arrangements • Investigate shared services with other Emergency Services for a greater strategic overview of Key Locations (not just Key Stations) and consider a tiered approach. • All Grey Book staff to maintain operational skill levels and qualifications, etc. Skills maintenance arrangements in place. • Introduction to Operational Availability Management. •	**R95, 97 DHSC**
7. Animal Health issues	Non-zoonotic notifiable animal diseases (Foot & Mouth, Classic Swine Fever, Blue Tongue & Newcastle's Disease) Zoonotic notifiable animal disease (e.g. highly pathogenic Avian Influenza, Rabies, West Nile Virus)	• Increased training requirement. • Decontamination regimes for FF and appliances. • Implementing biosecurity controls. • Potential for reputational risk. Perception by Press/Public that FF are spreaders of disease. • Raised awareness • USAR search dog quarantine. • Potential for requests to be involved in covert 'out of scope' activities (e.g. body recovery). • Movement regimes and 'on farm' controls could affect ECFRS vehicle movements, mobilising and deployment. • Non-availability of On-call firefighters working in livestock environments.	• Consideration of attending all incidents • Full review of working practices involving animals		**Policy** – SIS notes, Foot and Mouth Precautions, Incidents involving Animals, Decontamination Procedures, Biological Hazards; Key Stations Policy; Service Critical Incident Team **Organisation** – Gold Command, HR Business Partners, Inter-agency Liaison Officers, Occupational Health, reporting procedures; Liaison with the DEFRA Co-ordination Team. **Planning** – Liaison with Health Protection Agency; ERF and working groups; daily availability; recall to duty; Business Continuity and other contingency plans at strategic and department level, Scientific advice; Contingency Plans. **Implementation** – Decon equipment, Environmental Packs, Pre-arranged out-duties, Mixed Crewing. HMEPOs to support safe working practices. Integration of Electronic Rota Book to assist with workforce management and planning **Monitoring, Audit and Review** Station Audits, Operational Assurance, H&S inspections, Debriefs. Training and assessment across all Core competencies and, where applicable, recorded in individual TASK Books.	4	1	4	• Degradation planning to support BC arrangements • Consider enhanced business continuity arrangements by investigating shared services with other agencies to have a strategic overview of Key Locations (not just Key Stations) and consider a tiered approach. • All Grey Book staff to maintain operational skill levels and qualifications, etc. Skills maintenance arrangements in place. • Additional shift working	**R98 - Defra**

INDUSTRIAL AND OTHER INFRASTRUCTURE

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities	Current Controls	Con	Lhd	Level	Proposed Mitigation	CRR Ref
8. A major gas and/or petrochemical industrial accident/incident Up to 3km around site causing from 10 to 500 fatalities and from 150 to 1500 casualties. Gas terminal event likely to be of short duration, once feed lines are isolated; event at a storage site could last for days if the explosion damaged control equipment. Gas shortage not expected but some disconnections of intensive users. Disruption to transport services (road and rail) locally for up to a week and to provision of health services locally. Disruption to river traffic.	• Fire or explosion at a gas LPG terminal (or associated onshore feedstock pipeline) or flammable gas storage sites • Fire or explosion at a light end oil refinery or petroleum storage depots. • Industrial Toxic Chemical Releases • Radioactive substance release from an incident at Bradwell.	• Major incident declared • Probable invocation of national and local Mutual Aid arrangements • National coordination • Possible pollution due to necessary fire ground action • Death or (severe) injury to firefighter(s) in addition to scene casualties etc.	• Reputational risk if incident management is called into question • Criminal proceedings • Civil proceedings • Possible large fines • Public Inquiry • Political impact • Environmental impact • Post event Media management • Public scrutiny/perception • Reliefs over a protracted incident. • Invocation of Mutual Aid arrangements. • Invocation of SCG/SCC over a protracted period and the possible consequence on strategic managers and maintaining business as usual. • Liaison with COBR leading to national direction. • Potential postponement of Service business. • Business continuity plans invoked.	• Positive PR. • Raises profile of ECFRS with politicians. • Improve relationships with partner agencies. • Training with partner agencies. • Planning with partner agencies. • Build strong relationships with site managers. • Identification of new equipment, tactics or training opportunities.	**Policy** – NOGs and TOGs, SIS notes – Service Critical Incident Team; Mobilisation Policy; Water Section liaison with Water Companies. **Organisation** – Control (Standing Orders); Service arrangements for reliefs; Incident Command System; Petrochemical Officers, a cadre of highly trained specialist officers who will attend PetroChem incidents. Inter-agency Liaison Officers; Hazardous Materials and Environmental Protection Officers. National Resilience Fire Control (NRFC) arrangements. The appropriate identification of the existing risk and the changing risks allows appropriate decision making regarding the allocation of resource to mitigation **Planning** – Work through ERF and the Strategic Development Group and the COMAH Forum, Community Risk Register, National Risk Register; Business Continuity Plans; TFS involved in planning applications. Command Group and Station Planning. On-going series of multi-pump & multi-agency COMAH Site exercises; COMAH/REPPIR arrangements including TFS inspections as Regulations require, including Jetty Inspections. Specialist support via Bureau Veritas. S13/16 and other MoU arrangements. Contingency Plans. **Implementation** – SIS note safety at incidents; Combined Group Station planning (PORIS), Petrochem officers; Specialist Appliances (Foam, Off-Road, Water Bowsers, Welfare Unit, ICU's, High Volume Pumps), USAR, Mass Decon capability, PPE including BA; provision of water on appliances, Duty water Officer, Recall to duty system, duty media & comms officer; DIM vehicle; SMAs. MoU with private sector to increase our response capacity in more specialised equipment (i.e. foam.) by Large flow monitor (Ambassador) and Large flow/high pressure mobile pump (Dependapower.) **Monitoring, Audit and Review.** Station Audits; Incident Support and Monitoring Policy; H&S inspections, Debrief. Training and verification across all Core competencies and, where applicable, recorded in individual TASK Books.	4	2	8	• JESIP Programme implementation on all mitigations.	**R55, 56, 57, 58,61, 64 HSE R2, 3,70 BEIS**

INDUSTRIAL AND OTHER INFRASTRUCTURE

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities	Current Controls	Con	Lhd	Level	Proposed Mitigation	CRR Ref
9. Incident at a sporting or music event etc. with a crowd of any size in an enclosed space of any size.	• Fire or explosion at a food vending location (e.g. due to petrol generator). • Fire in tented temporary accommodation. • Fire/explosion in a camper style vehicle. • Fire/collapse in/on a stage or stadium (area). • CBRNe event • Arson/Fire as a weapon • VBIED. • IED • Lone Wolf/MTA • Deliberate vehicle event, (e.g. vehicle driven in to pedestrians/industrial premises.)	• Multi-agency major incident declared • Likely invocation of Mutual Aid arrangements • National coordination. • Large numbers of fatalities and casualties. • Potential public order issues affecting response. • Recall to duty possibly required. • Mass decontamination. • Deceased Victim Identification (DVI) process. • Declaration of LOE/Zoning, Warm Zone only BPPE personnel able to be deployed	• Reputational risk if incident management questioned. • Criminal proceedings. • Civil proceedings. • Public Inquiry. • Political impact. • During event "real time" and post event Media management. • Public scrutiny / perception. • Reliefs over a protracted incident. • Environmental impact • Post event Media management • Public scrutiny/perception • Reliefs over a protracted incident. • Invocation of Mutual Aid arrangements. • Invocation of SCG/SCC over a protracted period and the possible consequence on strategic managers and maintaining business as usual. • Liaison with COBR Leading to national direction. • Potential postponement of Service business. • Business continuity plans invoked	• Positive PR to the general public • Raises profile of ECFRS with politicians. • Improve relationships with partner agencies building on the relationships formed during previous major event preparation to include planning and training at Safety Advisors Group (SAG) meetings prior to event.	**Policy** – SIS notes – Service Critical Incident Team; Mobilisation Policy; Water Section liaison with Water Companies. The Delivery of Risk Critical Information to the Incident Ground **Organisation** –Control (Standing Orders); Service arrangements for reliefs; Incident Command System; national Inter-agency Liaison Officers; Hazardous Materials and Environmental Protection, Fire Investigation Officers. The appropriate identification of existing and changing risks allows appropriate decision making regarding the allocation of resource to mitigation. **Planning** – Work through ERF and relevant working groups, Community Risk Register, National Risk Register; PDA's; Business Continuity Plans; TFS involved in planning applications and technical support for Local Authorities. Specialist support via Bureau Veritas. S13/16 and other MoU arrangements **Implementation** – SIS note safety at incidents; Combined Group and Station Planning (PORIS). Petrochem officers. Specialist Appliances (Off-Road, Rangers, Water Bowsers, Welfare Unit, ICU's, High Volume Pumps), USAR, Mass Decon capability from MDU, Suffolk FRS and LFB. PPE including BA; provision of water on appliances, Recall to duty system, duty media & comms officer, Airwave Tac-Ad. DIM vehicle; CBRNe SMAs. **Monitoring, Audit and Review**. Station Audits; Incident Support and Monitoring Policy; H&S inspections, Debrief. Training and verification across all Core competencies and, where applicable, recorded in individual TASK Books. Threat level rise to CRITICAL • Op RED DISCUS • Threat Level Policy Doc • Stay Safe Policy Doc	5	1	5	• JESIP Programme implementation on all mitigations.	**R14, 16, 17, 19, 21, 22 HO**

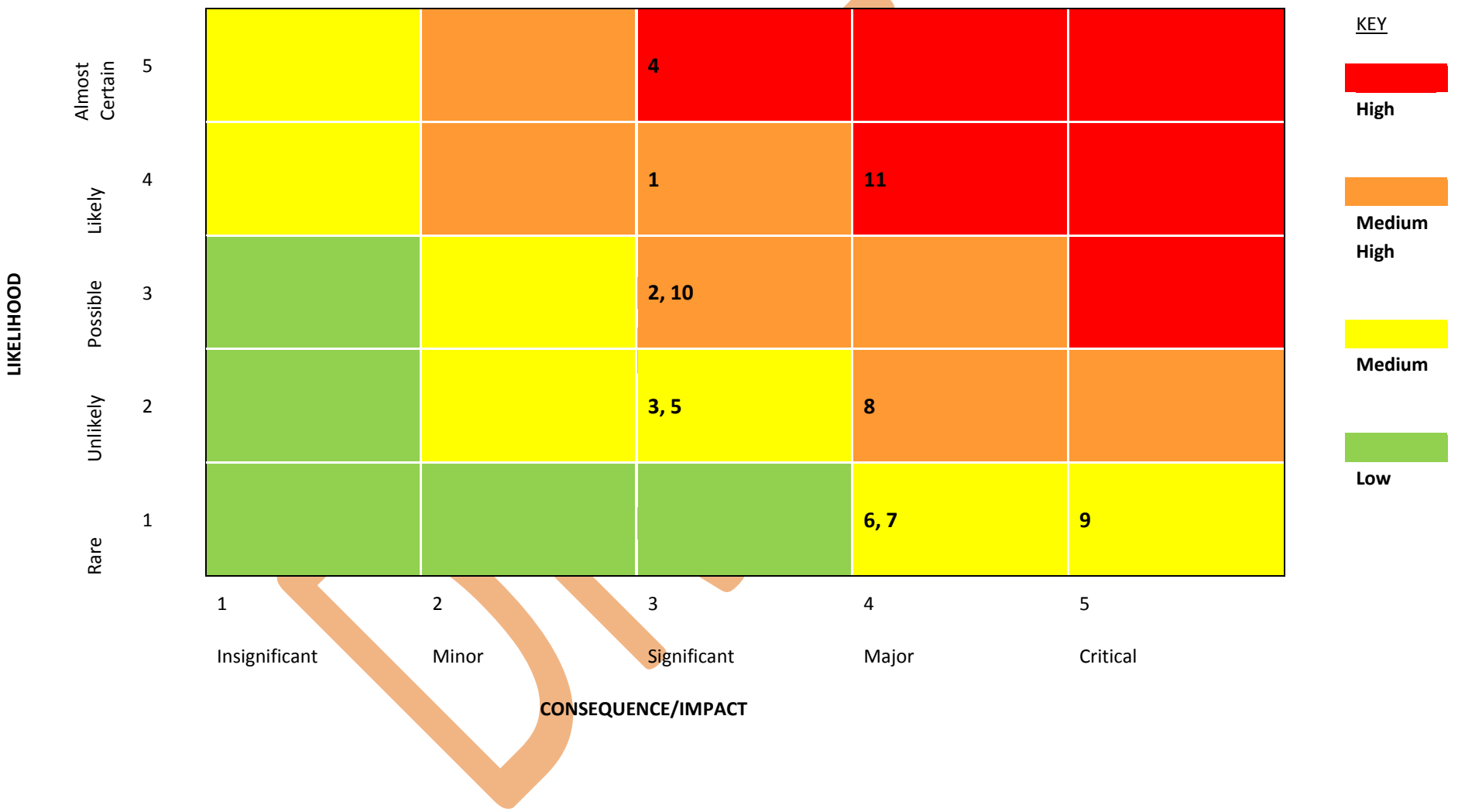
TRANSPORT

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities	Controls	Con	Lhd	Level	Proposed Mitigation	CRR Ref
10. Essex has major transport infrastructure, covering land, air and sea. There are extensive strategic road routes crossing the County, including taking traffic from major container ports in Essex and Suffolk. There are two significant rail routes connecting with London Termini. The further development of the transport infrastructure with an increasing population in Essex could create the potential for a significant increase in the number of vehicles on the roads, leading to an increase in RTCs, congestion, number of accidental and deliberate vehicle fires, all leading to an increased life and fire risk. There are maritime and aviation risks associated with passenger and commercial traffic from London Stansted and London Southend Airports, and Harwich Tilbury and Dubai London Gateway ports.	• Increase in the number of vehicles, driven by young and old persons. • Increase in the number of heavy goods vehicles on roadways. • Increase in the number of dangerous goods carried by road/rail. • Increase in the range and diversity of vehicle design and fuel systems. • Major residential and/or commercial premises development will create additional vehicle movements. • Increased life risk at transport facilities. • Increased population movements at transport facilities. • Large increase in industrial complexes at transport heads. • Increase in volume and density on road/rail/air/sea transport infrastructures. • Increase in 'unfamiliar' users of transport infrastructure.	• Greater demand on operational resources. • Delay in attendance times due to congestion. • Increase in the number of Hazardous Material incidents. • Increase in the number of blue light movements. • Greater demand on Community Safety officer time. • Rise in the number of serious or fatal incidents. • Increase in the number of calls to Control. • Greater demand for specialist skills, appliances and equipment. • Greater demand on Technical Fire Safety resources. • Insufficient level of resource to respond to all requirements. • On-call firefighters may not be able to provide fire cover required. • Lack of specialist and general skills available to deal with incident type. • Lack of specialist equipment available to deal safely with incident type. • Fire Safety Officers diverted from controlling existing risks. • The provision of an ECFRS stand-alone response. • Operational officer time used for incidents where currently other work undertaken. • Potential for larger numbers of 'multiple' accidents and 'protracted' incidents.	• Increase in budget for On-call firefighters. • On-call firefighters may be away from their primary employers more frequently and could withdraw support for releasing employees. • Increase in salary costs i.e. overtime. • Increased environmental damage. • Reduction in resources available to undertake community safety activities. • Economic loss to community. • Reduction in other activities i.e. Community Safety and training. • Reduced focus on medium to high-risk audits. • Potential for increase in training requirements in specialist roles and in the deployment of specialist equipment. • Increased funding requirement to resource an ECFRS response. • Lack of available funding.	• Opportunities for the development of new and innovative methods of transporting personnel and equipment to incidents. • Opportunities for more inter-agency GOLD command training for realistic events in Essex. • Opportunities for greater collaboration/co-responding with other Blue Light Services. • Greater On-Call recruitment if population increases. • Opportunity to relocate Fire Stations to match predicted demand. (IRMP).	**Policy** – Community Safety Policy; Technical Fire Safety Policy, SIS notes – Motorway and Dual Carriageway procedures; Aviation and Maritime TOGS and SOPs; Rescue from Crashed Aircraft; Major Incident Procedure. The Delivery of Risk Critical Information to the Incident Ground **Organisation** – Multi-agency RTC reduction strategy; Equality and Diversity Section/ outreach workers; Performance and Review Department; Technical Fire Safety, Community Safety Strategy. Safer Essex Road Partnership **Planning** – Site Specific Plans, Strategic Assessment of Risk, NRR, CRR, SRR, Mosaic Software, Directorate/ Command/Station/Watch Plans, ERF Planning. **Implementation** – Multi-agency response procedures. JESIP. Essex Fire Car. Car Seat safety advice. Community Wheels. Site Specific liaison and training, RTC Cutting Equipment on frontline appliances. Revised procedures for use of cutting equipment with new technologies in vehicle construction. Heavy Rescue Pumps; Requirements. Petrochem officers; HMEPOs, ILOs, IRU, HVP, USAR, Environmental Support unit. Area Command & Station Planning (PORIS). **Monitoring, Audit and Review.** Review of cutting equipment & new technologies. Incident Support and Monitoring Policy Documents; H&S inspections, Debriefs. Training and verification across all Core competencies and, where applicable, recorded in individual TASK Books.	3	3	9	• Continue to develop data sharing arrangements with partners and stakeholders. • Increased multi-agency collaboration and prevention arrangements (in place) • Targeted interventions (16-25s). • Review of attendance standards. • New response strategy.	**R10, 11, 12, 71 DfT R16 HO**

TERRORISM

Risk Number & Description	Triggers	Operational Consequences	Strategic Consequences	Opportunities	Controls	Con	Lhd	Level	Proposed Mitigation	CRR Ref
11. The security of Personnel, Premises, Appliances, Equipment and PPE is at risk due to a high terrorist threat level. There is also the threat of fire service resources used by terrorist organisations. (Trojan Horse). A terrorist attack could include multiple incidents and secondary devices The UK National Risk Register 2017 places attacks on crowded places and transport at high plausibility over the next five years, with smaller – scale CB or R attacks, Cyber-attacks and attacks on infrastructure at medium and medium – low plausibility. Larger – scale CBR or N attacks are placed at medium – low plausibility. CB ingredients may become more readily available	• Political unrest leading to action from militant organisations and/or fundamentalists. • Out-of-the-blue lone wolf event. • Terrorist attack on ECFRS infrastructure • Terrorist activity includes Essex (infrastructure and/or high risk targets). • London event affecting ECFRS/Essex. • MTA • Op PLATO declared • Terrorist use of chemical attack	• Possible public order issues • High loss of life. • Service New Dimensions resources not adequately resourced. • Ability to maintain suitable fire cover. • Arson attacks on specific communities. • Greater demand on resources. • Detrimental effect on fire cover, during and post CBRNe incident. • Resources deployed for longer periods. • Greater demand for specialist skills appliances and equipment. • Greater demand for rapid transportation of specialist personnel and equipment (DIM). • Infiltration of secure high-risk premises. • Breach of security cordons at incidents. • Subject to scale of event(s), insufficient resources to respond effectively to multiple incidents. • Longer response times to non-CBRNe incidents. • Secondary hazards and potential for RVP's to be compromised. • Contamination, and delay in completing mass decontamination. • Large scale and possibly long-duration London event requiring considerable support over the border /mutual aid.	• Long-term resource management of limited specialist Service resources. • Ensure control of confidential shared information between responders. • Theft of confidential information on local risks. • Theft of fire service vehicles, equipment and uniforms leading to a Trojan Horse event. • Lack of available funding. • Increase in Service delivery costs. • Personnel security checks. • Conflicting advice leading to increased risk to life. • Public and firefighters at risk from terrorist actions (overt/covert) • Potential increase in long-term welfare issues. • Breakdown in community relations/law and order. • Reputational risk. • Personnel refusing to undertake tasks as MTA is currently voluntary.	• Opportunities to develop search and rescue response capability to any incident. • Develop interdepartmental liaison. • Greater use of JESIP and multi-agency collaboration generally. • Opportunity to share specialist skills and equipment across agencies • Greater organisational awareness of other agencies special procedures. • Opportunity to make MTA contractual.	**Policy** – SIS notes – Service Critical Incident Team; Mobilisation Policy; **Organisation** – Control (Standing Orders); Service arrangements for reliefs; Incident Command System; Inter-agency Liaison Officers; Hazardous Materials and Environmental Protection Officers. Use of Threat Level Boards; clear desk policy at all locations; screen locking when away from desks; MDT security screen; ICT Master Risk Register. **Planning** – Work through ERF and relevant working groups, Community Risk Register, National Risk Register; PDA's; Business Continuity Plans;. Command & Station Planning. Specialist support via Bureau Veritas. NILO and national liaison. **Implementation** – SIS note safety at incidents; Specialist Appliances, (e.g. ICU's, High Volume Pumps), USAR, Recall to duty system, duty media & comms officer. Petrochem Officers. Flexi officer structure to contribute to level of resource and specialism is appropriate for scale of risk. DIM vehicle; CBRNe SMAs. Post incident welfare arrangements. Asset tracking devices. Vehicle alarms. Building alarms. Vehicles disposed of via vetted routes. CCTV where appropriate on sites and Service vehicles. Terrorist threat level up-to-date on sites. ID Badges ICT Security Fobs **Monitoring, Audit and Review -** Station Audits; Incident Support and Monitoring Policy; H&S inspections, Debrief. Training and verification across all Core competencies and, where applicable, recorded in individual TASK Books.	4	4	16	• Raised awareness of incident types at all levels. • "Clear desk "policy at times at all locations. • Screen locking when away from desks. • Improve station security; develop service wide security policy to address access to premises, information and personnel. • Ongoing training and development of NILO and MTA. • Take account of the Kerslake Report and lessons identified to incorporate into ECFRS SOPs. • Review of USAR. • Identify options around Police/Fire collaboration for special services. • JESIP. • Potential to include MTA as part of contracts. • Greater security at ECFRS sites	**R14, 16, 17, 19, 21, 22 HO**

Heat Map


LIKELIHOOD
Almost Certain
Likely
Possible
Unlikely
Rare
5
4
3
2
1
4
1
11
2, 10
3, 5
8
6, 7
9
1
2
3
4
5
Insignificant
Minor
Significant
Major
Critical
CONSEQUENCE/IMPACT
KEY
High
Medium High
Medium
Low

APPENDIX D: ADDITIONAL SOURCES AND BIBLIOGRAPHY

Chapter 1 – Risk – General

Fire & Rescue National Framework for England
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/705060/National_Framework_-_final_for_web.pdf

National Risk Register of Civil Emergencies 2017 Edition
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/644968/UK_National_Risk_Register_2017.pdf

Essex Resilience Forum – Community Risk Register Overview
http://www.essexprepared.co.uk/know-the-risks/community-risk-register

IRMP Steering Group Integrated Risk Management Planning: Policy Guidance – Business Continuity Management
http://www.communities.gov.uk/documents/fire/pdf/938067.pdf

IRMP Steering Group Integrated Risk Management Planning: Policy Guidance – Community Safety
http://www.communities.gov.uk/documents/fire/pdf/940448.pdf

IRMP Steering Group Integrated Risk Management Planning: Policy Guidance – Environmental Protection
http://www.communities.gov.uk/documents/fire/pdf/938074.pdf

IRMP Steering Group Integrated Risk Management Planning: Policy Guidance – Equality and Diversity
http://www.communities.gov.uk/documents/fire/pdf/940445.pdf

IRMP Steering Group Integrated Risk Management Planning: Policy Guidance – IRMP Steering Group Integrated Risk Management Planning: Policy Guidance – Protection of Heritage Buildings and Structures
http://www.communities.gov.uk/documents/fire/pdf/940468.pdf

IRMP Steering Group Integrated Risk Management Planning: Policy Guidance – Road Traffic Collision Reduction
http://www.communities.gov.uk/documents/fire/pdf/940479.pdf

IRMP Steering Group Integrated Risk Management Planning: Policy Guidance – Wildfire
http://www.communities.gov.uk/documents/fire/pdf/938088.pdf

Chapter 3 – People – Demography

Fire and Rescue Service Equality and Diversity Strategy 2008 - 2018
http://www.communities.gov.uk/documents/fire/pdf/equalitydiversitystrategy.pdf

Chapter 5 – Road, Sea & Air Transport Infrastructure

Roads

Safer Essex Roads Partnership
https://saferessexroads.org/

Safer Essex Roads Partnership collision data

https://saferessexroads.org/collision-data/

Department of Transport Reported Road Casualties in Great Britain 2016
https://www.gov.uk/government/statistics/reported-road-casualties-great-britain-annual-report-2016

Stansted Airport
http://www.stanstedairport.com/

Southend Airport
http://www.southendairport.com/

Chapter 6 – Industrial, Utility & Other Infrastructure

Reserved

Chapter 7 – Our Environment

The United Kingdom Climate Impacts Programme, (UKCIP).
http://www.ukcip.org.uk/index.php

DEFRA – Future World Images
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/192061/future-worlds.pdf

HM Government
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/584281/uk-climate-change-risk-assess-2017.pdf

1928 River Thames flood
https://en.wikipedia.org/wiki/1928_Thames_flood

Strategic National Guidance – The decontamination of buildings, infrastructure and open environment exposed to CBRN materials.
https://www.gov.uk/government/publications/strategic-national-guidance-the-decontamination-of-buildings-infrastructure-and-open-environment-exposed-to-chemical-biological-radiological-or-nuclear-materials

Planning Practice Guidance
http://planningguidance.communities.gov.uk/

Chapter 8 – Human & Animal Health

Department of Health
www.dh.gov.uk/en/index.htm

Public Health England
https://www.gov.uk/government/organisations/public-health-england

World Health Organisation
www.who.int/en/

European Centre for Disease Prevention & Control
www.ecdc.europa.eu/en/Pages/home.aspx

Chapter 9 – Terrorism

MI5
www.mi5.gov.uk/

Home Office – Counter – Terrorism
https://www.gov.uk/government/policies/counter-terrorism

Centre for the Protection of National Infrastructure
www.cpni.gov.uk/

CLG – Circular 1/2009
Tactical Guidance Document - Fire and Rescue Service Response to CBRN Events
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/15020/GRA_Hazmatt_Manual_COMBINED.pdf

National Audit Office – Enhancing the FRS capacity to respond to terrorist and other large scale incidents
https://www.nao.org.uk/report/new-dimension-enhancing-the-fire-and-rescue-services-capacity-to-respond-to-terrorist-and-other-large-scale-incidents/

Chapter 10 – Economy & "Future Essex"

Essex County Council Integrated County Strategy (Full)
http://www.essex.gov.uk/Your-Council/Strategies-Policies/Integrated-County-Strategy/Documents/Integrated%20County%20Strategy%20-%20Final.pdf

Essex County Council Integrated County Strategy (Summary)
http://www.essex.gov.uk/Your-Council/Strategies-Policies/Integrated-County-Strategy/Documents/ICS%20summary_final.pdf

Essex County Council Integrated County Strategy Priorities
http://www.essex.gov.uk/Your-Council/Strategies-Policies/Integrated-County-Strategy/Documents/ICS%20Priorities.pdf

Chapter 11 – Interoperability

National Framework
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/705060/National_Framework_-_final_for_web.pdf

JESIP
http://www.jesip.org.uk/home

APPENDIX E: ACRONYMS

ACFO	Assistant Chief Fire Officer/Brigade Manager
ADO	Assistant Divisional Officer/Station Manager B
AFA	Automatic fire alarm
AFD	Automatic fire detection
ALP	Aerial Ladder Platform
ARA	Analytical Risk Assessment
BEM / BME	Black and ethnic minority
BFV	Bulk foam vehicle
BPA	British Pipeline Agency
CAA	Civil Aviation Authority
CAFS	Compressed Air Foam Systems
CAST	Critical Attendance Standard
CBRNE	Chemical, Biological, Radiological, Nuclear and Explosives
CCA	Civil Contingencies Act (2004)
CFO	Chief Fire Officer
CFOA	Chief Fire Officers' Association
CFRA	Chief Fire and Rescue Adviser
CNI	Critical National Infrastructure
COBRA	Cabinet Office Briefing Room (A) (co-ordinates national response to emergencies such as flood)
COMAH	Control of Major Accident Hazards
CRR	Community Risk Register
CFO	Chief Fire Officer
CS	Community Safety
CSR	Comprehensive Spending Review
CSV/U	Control support vehicle/unit
CTRL	Channel Tunnel Rail Link (HS1)
DCLG	Department for Communities and Local Government
DEFRA	Department for Environmental, Food & Rural Affairs
DfT	Department for Transport
DO	Divisional Officer/Group Manager
DRA	Dynamic Risk Assessment
EA	Environment Agency
ECC	Essex County Council
ECFRS	Essex County Fire & Rescue Service
EFA	Essex Fire Authority
EOETS	Ely Ouse to Essex Transfer Scheme
ESS	Emergency Special Service
F&RSA	Fire and Rescue Service Act 2004
FADA	False Alarms due to apparatus
FAGI	False Alarms 'Good Intent'
FBU	Fire Brigades Union
FCO	Fire Control Officer
FCOp or FConOp	Fire Control Operator
FDS	Flexi Duty System
FF	Firefighter
FP	Fire Prevention
FRS	Fire and Rescue Service
GIC	Geomagnetically-Induced Currents

GRT	Gross Register Tonnage
GVA	Gross Value Added
H&S	Health and Safety
HFRA	Home Fire Risk Assessment (same as HFSCI)
HFSC	Home Fire Safety Check
HFSCI	Home Fire Safety Check Initiative
HFSV	Home Fire Safety Visit (same as HFSC)
HHA	Harwich Haven Authority
HL	Hose layer (lorry)
HMEPO	Hazardous Materials & Environmental Protection Officer
HMG	Her Majesty's Government
HMO	Houses in Multiple Occupancy
HO	Home Office
HR	Human Resources
HRP	Heavy Rescue Pump
HSE	Health and Safety Executive
HS1	High Speed 1 (See CTRL)
HST	High Speed Train
ICS	Incident Command System
NILO	National Inter-agency Liaison Officer
IPCC	Intergovernmental Panel on Climate Change
IRMP	Integrated Risk Management Plan(ning)
IRS	Incident Recording System
JESIP	Joint Emergency Services Interoperability Programme
KSI	Killed or Seriously Injured
LEP	Local Enterprise Partnership
LRT	London Regional Transport
MAG	Manchester Airports Group
MCA	Maritime and Coastguard Agency
MDT	Mobile Data Terminal (A ruggedized laptop computer containing operational information)
MoU	Memorandum of Understanding
NeSS	Neighbourhood Statistics Service (http://neighbourhood.statistics.gov.uk/)
NFCC	National Fire Chiefs Council
NRAT	National Resilience Assurance Team
NRR	National Risk Register
OAC	Output Area Classification
OHLE	Overhead Line Equipment
OSHENS	Occupational Safety and Health Environmental Notification System
OTB	Over the Border
P2Ws	Powered two wheelers
PDA	Pre-determined attendance *(operational)*
PESTLE	Political, Economic, Social, Technological, Legal and Environmental
PFCC	Police Fire & Crime Commissioner
PI's	Performance Indicators
PPG	Pollution Prevention Guidelines
RA	Risk assessment
RDS	Retained duty system (On call)
REPPIR	Radiation Emergency Preparedness & Public Information Regulations 2001
Ret	Retained (On-Call)

RFF	Retained firefighter (On call)
RFU	Retained Firefighters Union
RIDDOR	Reporting of Injuries, Diseases & Dangerous Occurrences Regulation
RP	Rescue Pump
RRO	Regulatory Reform Order
RTC	Road traffic collision
RVP	Rendezvous Point
SAOR	Strategic Assessment of Risk
SCG	Strategic Co-ordination Group
SDO	Senior Divisional Officer/Area Manager B
SIS	Service Information System
SLT	Service Leadership Team
SMA	Station Manager A
SOLAS	Safety Of Life At Sea
SOP	Standard Operating Procedure
SOSREP	Secretary Of State's Representative
SRR	Strategic Risk Register
SSRI	Site Specific Risk Information (for use with MDTs)
SSSI	Site of Special Scientific Interest
TEN	Trans-European Network
TEU	Twenty Foot Equivalent Unit
TfL	Transport for London
TFP	Tactical Fire Plan
TFS	Technical Fire Safety (Was Workplace Fire Safety)
TOCs	Train Operating Companies
UKOP	United Kingdom Oil Pipeline
WT	Water Tender
YCD	Young Car Drivers
YTD	Year to Date