LONDON RESILIENCE PARTNERSHIP

# London Risk Register

Version 7.0 Not protectively marked February 2018

**London Resilience Partnership Risk Register**

Version 7.0 (Feb 2018) The London Risk Register is collectively owned by the Category 1 Responders (as defined by Schedule 1 to the Civil Contingencies Act 2004) within the London Resilience Forum area.

**For information, please contact:**

**LONDON** RESILIENCE GROUP

London Fire Brigade Headquarters

169 Union Street

London

SE1 0LL

LondonResilience@london-fire.gov.uk

www.london.gov.uk

**LONDON** RESILIENCE GROUP

The London Resilience Group is jointly funded and governed by the Greater London Authority, London Local Authorities and the London Fire and Emergency Planning Authority. We are hosted by the London Fire Brigade. Our work, and that of the London Resilience Partnership, is overseen by the London Resilience Forum.

## Contents

# 1. Introduction and Background

Risk assessment underpins the work of the London Resilience Forum. Assessments within the London Risk Register drive the development of multi-agency capabilities to prevent, mitigate, respond to and recover from incidents.

Publication of the London Risk Register is designed to assist communities and businesses develop their own emergency and business continuity arrangements.

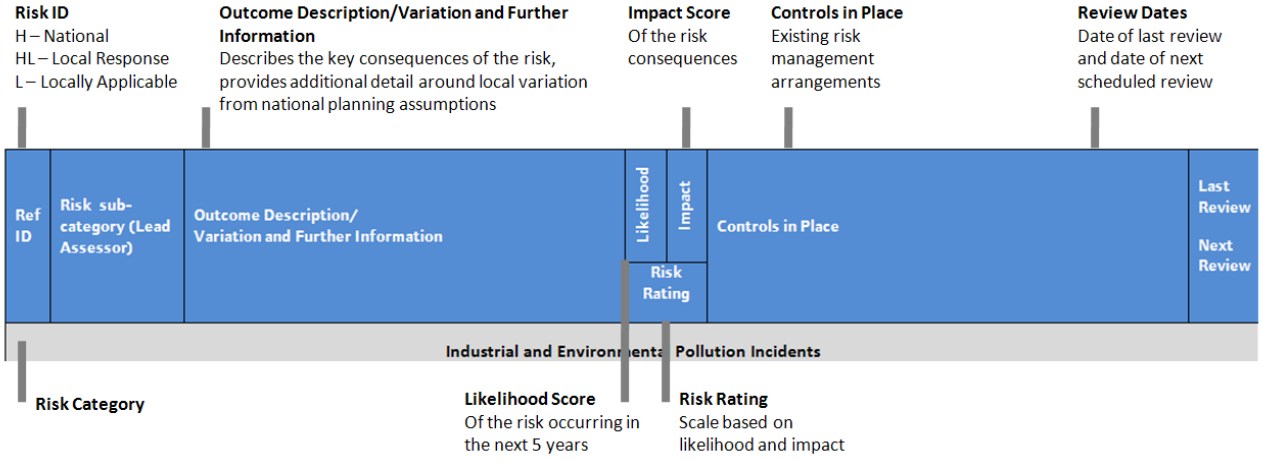
Planning is based on 'reasonable worst case scenarios' informed by historical and scientific data, modelling and professional expert judgement of both the likelihood and impact of a risk. The inclusion of a risk does not mean that we think it will happen nor that the impact would be as serious as the description provided.

Each risk is scored for impact and likelihood. Impact is ranked from Limited (1) to Catastrophic (5) and likelihood by how likely a risk is to happen over the next 5 years. These scores are combined to give an overall risk rating.

The London Risk Register is designed to provide a summary of the main risks affecting Greater London. The UK National Risk Register of Civil Emergencies provides a similar outline of risk for the UK as a whole. Further risk assessments may be conducted within each London Borough, providing additional information on locally specific risks and response arrangements.

**Understanding the Risk Register**

Each risk is assigned a Risk ID which is nationally consistent and relates to a more detailed, and protectively marked, Individual Risk Assessment.



# 2. London Risk Register: High-Level Summary

| Impact | | | | | |
|---|---|---|---|---|---|
| | | **Coastal Flooding**<br>**Unconventional Attack** | **National Electricity Failure**<br>**Toxic Chemical Release** | **Pandemic Disease** | |
| | Reservoir/Dam Failure | Oil/Gas Upstream Failure<br>Hazardous Goods Accident | **Fluvial Flooding**<br>**Regional Electricity Failure** | **Severe Space Weather** | |
| | Pipeline Fire or Explosion<br>Maritime transport incident<br>Bridge Collapse | Aviation Incident<br>Road explosives accident<br>Fire at fuel distribution site<br>Cyber Security<br>Disruption to Water Supply<br>Drought | Surface Water Flooding<br>Storms and Gales<br>Low Temperatures and Snow<br>Attacks on Infrastructure<br>Industrial Accident<br>Effusive Volcanic Eruption<br>Land Movement | Attack on Crowded Places<br>Heatwave<br>Railway Accident<br>Flooding from other sources<br>Emerging Infectious Diseases | Attack on Transport System<br>Essential Service Strike |
| | Maritime Pollution<br>Bio Release | Industrial Explosions and Fires<br>Light Aircraft<br>Wildfire<br>Radioactive material release | Animal Disease<br>Fuel Supply Constraint<br>Transport Industrial Action | Volcanic Ash<br>Inland Water Pollution<br>Food Chain Contamination<br>Influx of British Nationals | Building Collapse |
| | | | Public Disorder | Large road accident | Cyber (Data Confidentiality) |
| | **Likelihood** | | | | |

# 3. London Risk Register: High-Level Summary

| Ref ID | Risk sub-category (Lead Assessor) | Outcome Description/ Variation and Further Information | Likelihood | Impact | Risk Rating | Controls in Place | Last Review / Next Review |
|---|---|---|---|---|---|---|---|
| **3.1** | **Human Diseases / Human Health Incidents** | | | | | | |
| **H 23** | Influenza Type Disease (Pandemic)<br><br>(Public Health England) | A worldwide outbreak of influenza occurs when a novel flu virus emerges with sustained human to human transmission. Up to 50% of the population may experience symptoms, which could lead to up to 750,000 fatalities in total in the UK. Absenteeism would be significant and could reach 20% for 2-3 weeks at the height of the pandemic, either because people are personally ill or caring for someone who is ill, causing significant impact on business continuity. Each pandemic is different and the nature of the virus and its impacts cannot be known in detail in advance. Based on understanding of previous pandemics, a pandemic is likely to occur in one or more waves, possibly weeks and months apart. Each wave may last between 12-15 weeks.<br><br>All ages may be affected, but we cannot know until the virus emerges which groups will be most at risk. There is no known evidence of association between the rate of transmissibility and severity of infection, meaning it is possible that a new influenza virus could be both highly transmissible and cause severe symptoms. Pandemics significantly more serious than the RWCS are therefore possible.<br><br>The impact of the countermeasures in any given pandemic is difficult to predict as it will depend on the | 4 | 5 | | NHS Vaccination Programme (Seasonal and provision for pandemic specific)<br><br>Specific NHS capacity and response planning<br><br>Comprehensive surveillance systems<br><br>London Resilience Partnership Plans | Dec 2017<br><br>Dec 2019 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | nature of the virus and the RWCS assumes countermeasures are not effective.<br><br>Whilst not explicitly stated in every case, H23 would likely compound the effects of the vast majority of risks in the NRA as all sectors would experience staffing pressures. | Very High | | | |
| **H 24** | Emerging infectious diseases<br><br>(Public Health England) | Over the past 30 years, more than 30 new or newly recognised diseases have been identified. Most of these have been zoonoses, i.e. diseases that are naturally transmissible, directly or indirectly, from animals to humans. It is highly probable that such an infection will arise in another country and possible that it could arrive in the UK before it is identified, but it is also possible that one may arise in the UK.<br><br>Severe Acute Respiratory Syndrome (SARS), a newly emerging severe respiratory infection, spread to infect over 8,000 people worldwide within an eight month period before it was contained in early 2004. An emerging or re-emerging infection would not necessarily be spread by the respiratory route (as are influenza and SARS/MERS), but could instead be transmitted directly between people through the gastro-intestinal (e.g. E. coli) or blood routes (e.g. Ebola), or indirectly via vectors such as insects (Zika virus).<br><br>Based upon the experience of the outbreak of SARS and more recently, MERS and Ebola, the worst case likely impact of such an outbreak originating outside the UK would be cases occurring amongst returning travellers and their families and close contacts, with spread to health care workers within a hospital setting. However, it is unlikely to present a wider threat to the UK through sustained spread. | 4 | 3 | NHS Vaccination Programme<br><br>Specialist capability and capacity planning in NHS trusts<br><br>Comprehensive surveillance systems and response arrangements<br><br>London Resilience Partnership Plans | Dec 2017<br><br>Dec 2019 |
| | | | High | | | |

| 3.2 | Flooding | | | | | |
|---|---|---|---|---|---|---|
| **H 21** | Fluvial flooding<br>(Environment Agency) | A massive river flood event or series of concurrent events across multiple geographic regions following a sustained period of heavy rainfall extending over two weeks, possibly combined with snow melt and surface water flooding.<br>The event would include major river flooding predominantly affecting large urban areas. This may also be combined with additional impacts from surface water flooding and sediment movement, resulting in the closure of primary transport routes and other infrastructure issues, with significant regional economic damage. We would expect loss of essential services (gas, electricity & telecoms) affecting up to 250,000 homes and businesses for up to 14 days as well as disruption to water supplies.<br>Up to 328,000 properties (homes and businesses) across urban and rural areas (with a greater proportion situated in urban areas) may be flooded for up to 10 days affecting 363,000 residents. Between 200 to 450 fatalities, over 10,000 casualties and 20 missing persons ("missing" means not accounted for during the first 48 hours, before Police can reunite with family or friends) with up to 68,000 people needing assistance with evacuation (vulnerable communities), 8,000 of these being priority evacuees. | 3 | 4<br>Very High | Flood and Water Management Act 2010<br>Land Drainage Act 1991<br>Water Resources Act 1991<br>EA Flood Warning Direct service<br>Met Office National Severe Weather Warning Service<br>Existing and planned Flood Defences<br>London Resilience Partnership Plans | Feb 2017<br>Feb 2018 |
| **H 19** | Coastal/tidal flooding<br>(Environment Agency) | A combination of high natural tides and a major storm surge and significant onshore waves caused by a severe low pressure system leads to severe coastal flooding, predominantly on the east coast from Aberdeen to Dover. The flooding is accompanied by gale force winds and heavy rainfall.<br>Inundation from breaches in defences would be rapid and dynamic with minimal warning and little time to evacuate. There would be widespread structural damage including disruption to transport, power and water treatment infrastructure, for example. | 2 | 5 | Thames Barrier and Flood Prevention Act 1972.<br>Flood and Water Management Act 2010<br>Metropolis Management (Thames River Prevention of Floods) Amendment Act 1879<br>EA Flood Warning Direct service<br>Met Office National Severe Weather Warning Service<br>Existing and planned Flood Defences (TE2100)<br>London Resilience Partnership Plans | Feb 2017<br>Feb 2018 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | On the east coast, where impacts are expected to be worst, there could be flooding of approximately 180,000 properties (homes and businesses), with evacuation and housing required for up to approximately 170,000 people, for up to 14 days . Of these, up to 46,000 may require assistance with evacuation (vulnerable communities) with around 5,000 of these being priority evacuees. Up to 26,000 people in holiday accommodation including caravan and camping sites could be affected during high season. Over 80% of those at risk on the East Coast are situated between the Humber and North Norfolk. People may be stranded over a large area, with up to 2,000 'missing' persons. There may be up to c.400 fatalities and between 1,000 and 10,000 casualties, including those whose death, illness, or injury is an indirect consequence of flooding (e.g. as a result of hospital evacuation). | Very High | | | |
| **H 22** | Surface water flooding<br>(local authorities) | Surface water flooding in a large metropolitan area caused by a warm unstable atmosphere, most likely to occur in summer due to the warmer atmosphere having a greater water holding capacity, causes a pattern of convective rainfall events. These events result in a pocket of exceptionally high rainfall in the south east. The event includes rain gauges in London and just outside of London recording exceptional levels of rainfall over a short duration.<br>The most severe impacts occur in the London Local Resilience Forum (LRF) area, although further impacts also occur in Hertfordshire and the Thames Valley (over £100 million property damages in each). Over 314,000 people are located in residential areas, of which 25,000 are identified as more vulnerable and potentially requiring assistance. Total damage to property amounts to £1.6 billion affecting a total 108,000 properties. In addition, there may be over 200,000 people in the flooded area during the day due to the high working population: 184,000 weekday workers are located in 10,000 | 3 | 3 | Flood and Water Management Act 2010<br>Metropolis Management (Thames River Prevention of Floods) Amendment Act 1879<br>EA Flood Warning Direct service<br>Met Office National Severe Weather Warning Service<br>Existing and planned Flood Defences (TE2100)<br>London Resilience Partnership Plans | Feb 2017<br>Feb 2018 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | businesses modelled to flood in the London LRF. Severe disruption to critical infrastructure and transport, including the closure of around 17 underground stations and 73 railway stations is expected. 427km of road and 218km of railway are estimated to be impacted. | High | | | |
| **L 19** | Flooding from other sources<br><br>(EA) | A rapid increase in volume of water in a localised area due to either; heavy rainfall, groundwater emergence or a burst water main which overwhelms the local drainage or river system, collects in low lying areas resulting in flooding of property or infrastructure. | 4 | 3 | Flood and Water Management Act 2010<br>Land Drainage Act 1991<br>Water Resources Act 1991<br>Environment Agency Floodline and public warnings<br>Met Office, National Severe Weather Warning Service<br>Flood Guidance Statements | Feb 2017<br><br>Feb 2018 |
| | | | High | | | |
| **H 44** | Major reservoir dam failure/collapse<br>(Environment Agency) | Collapse without warning resulting in almost instantaneous flooding. Significant movement of debris and sediment. Complete destruction of some residential and commercial properties and serious damage of up to 500 properties. Several thousand other properties could be flooded. Up to 200 fatalities, up to 1000 casualties. Up to 50 missing persons and people stranded. Hazardous recovery amongst collapsed infrastructure and debris. Up to 200 people need temporary accommodation for 2 – 18 months. Extent of downstream effect could reach 50-60km. Significant damage to gas, electricity supplies, telecommunications, road and rail links. | 1 | 4 | Reservoirs Act, 1975<br>Water Act, 2003<br>Regular statutory inspections<br>Met Office National Severe Weather Warning Service<br>London Resilience Partnership Plans | Sept 2017<br><br>Sept 2019 |
| | | | Medium | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **3.3** | **Volcanic hazards** | | | | | |
| **H 55** | Severe effusive (gas rich) volcanic eruption overseas | A severe volcanic eruption, generating large amounts of gas, aerosol and ash over a 5 month period affecting the UK and Northern Europe. | 3 | 3 | Met Office forecasting<br>Category 1 and 2 responder Business Continuity Plans<br>Excess Deaths Framework<br>Health Sector surge and escalation plans | Dec 2016<br><br>Dec 2018 |
| | | | High | | | |
| **H 54** | Disruption to aviation as a consequence of volcanic ash | Volcanic ash incursions for up to 25 days resulting in sporadic and temporary closures of significant parts of UK airspace for up to a total of 15 days during a 3 month eruption period. The entire UK mainland and potentially other parts of Europe could be affected for up to 10 of these days. A single period of closure within the 3 month eruptive episode may last for up to 12 consecutive days, depending on meteorological conditions. | 4 | 2 | Met Office Volcanic Ash Advisory Centre forecasting<br>CAA Volcanic Ash Safety Regime<br>Airline response plans | Dec 2016<br><br>Dec 2018 |
| | | | Medium | | | |
| **3.4** | **Severe weather** | | | | | |
| **H 50** | Drought<br>(Environment Agency) | Periodic water supply interruptions affecting 385 000 businesses in London for up to 12 months. Emergency Drought Orders in place authorising rota cuts in supply according to needs of priority users as directed by Secretary of State. | 3 | 3 | Water Resources Act 1991<br>Floods & Water Management Act 2010<br>Progressive restraints on consumption to preserve supply for critical services<br>Storage reservoirs | <br>Dec 2016<br><br>Dec 2018 |
| | | | Medium | | | |
| **H 17** | Storms & Gales<br>(Local Authorities) | Storm force winds affect multiple regions for at least 6 hours during a working day. Most inland and lowland areas experience mean speeds in excess of 55mph and gusts in excess of 85mph.<br>Although the storm will be over in less than a day, disruption to infrastructure including power, communications, transport networks, homes and businesses could last for 1-4 days and for up to 5 days in | 3 | 3 | Regular inspections of trees and highways for maintenance.<br>Met Office National Severe Weather Warning Service<br>Met Office Hazard Manager service<br>Responder specialist resources | <br>Dec 2016<br><br>Dec 2018 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | remote rural locations.<br><br>There may be a number of casualties and fatalities, mainly due to falling trees, structures or other debris.<br><br>Some social disruption and economic impacts are likely, due to disruption to transport networks, power supplies, telecommunications links and water supplies, predominantly from fallen branches, trees and other debris. Storms may also have an effect on agriculture as crops could be destroyed. | High | | | |
| **H 18** | Low temperatures and heavy snow<br><br>(Local Authorities) | For at least one week, multiple regions of the UK (London being one), are subject to low temperatures and snow (falling and lying) over substantial areas of low-lying land, (below 300m). After an initial fall of snow, there is further snowfall on and off for at least 7 days. Most lowland areas experience some falls in excess of 10cm at a time, with overall snow depth in excess of 30cm. This would coincide with a period of at least 7 consecutive days with a daily mean temperature below -3°C.<br><br>This would affect vulnerable communities, particularly older people and those with pre-existing conditions, such as cardiovascular and respiratory disease. An increase in falls, injuries (e.g. fractures) and hypothermia would be expected due to the prolonged period of cold, snow and ice.<br><br>There will be a large number of excess morbidity/mortality deaths with potentially thousands of casualties and fatalities. This will place significant pressure on health and social care services.<br><br>Considerable social disruption, along with economic impacts, may affect transport networks, power supplies, telecommunications links and water supplies. Schools & businesses would be hampered by the disruption. School closures would have consequential effects on staffing levels in other sectors, thereby exacerbating the economic impact. The agricultural sector may suffer loss of livestock. | 3 | 3 | Highways Act 1980, Railways and Transport Act 2003<br><br>Government's 'Snow Code'<br><br>Specific plans for traffic management and transport resilience<br><br>Coordination of gritting and salt stocks<br><br>Met Office National Severe Weather Warning Service<br><br>Responder specialist resources<br><br>RE:NEW retrofitting programme | Dec 2016<br><br>Dec 2018 |
| | | | High | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **H 48** | Heatwave<br>(Health) | Daily maximum temperatures in excess of 32°C and minimum temperatures in excess of 15°C over most of a region for around 2 weeks at least with 5 consecutive days where maximum temperatures exceed 32°C. Up to 1,000 fatalities and 5,000 casualties, mainly amongst the elderly. There could be disruption to power supply, telecommunications links and transport infrastructure within the 2 weeks. | 4 | 3 | Health & Safety at Work Act 1974<br>Public Health Act<br>Heatwave Plan for England<br>London Resilience Partnership Plans<br>Climate Change Adaption Strategy for London<br>Heat-Health Watch – annually June to September<br>Air quality forecasts | Dec 2016<br>Dec 2018 |
| | | | High | | | |
| **3.5** | **Structural Incidents** | | | | | |
| **HL 21** | Land movement<br>(London Fire Brigade) | Caused by Landslides or tremors. Roads and access routes impassable for a time. Emergency access into/out of large populated areas difficult or impossible; severe congestion over wide geographical area. Loss of power and other essential services over wide geographical area. Potential for a number of persons to be trapped or missing either in landslides itself and/or in collapsed structures. Up to 5 fatalities depending on the size and location of land movement.<br>Such incidents are rare within the UK with some areas being more prone to landslides than others. | 3 | 3 | Land use planning restrictions<br>Building Control regulations enforced by Local Authorities.<br>Construction, renovation, maintenance and demolition standards | Feb 2017<br>Feb 2019 |
| | | | High | | | |

| 3.6 | Severe space weather | | | | | |
|---|---|---|---|---|---|---|
| **H 56** | Severe space weather<br><br>(GLA) | Disruption to the electricity grid, resulting in two rural/coastal sub-station disconnections each effecting communities of approx. 100,000 people, with loss of power for 1 month or more and rotadisconnections for a further 1 month or more. Voltage instability may also result in local blackouts, most likely in urban areas lasting a few hours.<br><br>Up to 10% of the current operational satellite fleet may have temporary outages lasting hours to several days, including disruption to the Global Navigation Satellite Systems (GNSS, e.g. GPS). This could result in a small increase in casualties and fatalities as the emergency services use automated dispatch systems based upon GNSS.<br><br>Aviation disruption could last several days as a result of:<br><br>• Increased error rate in electronic control systems;<br><br>• Temporary loss of high frequency radio and satellite communication;<br><br>• Increased aircraft separation due to degradation of GPS augmentation services; and<br><br>• Increased exposure of passengers and crew to elevated levels of radiation.<br><br>Increase in error rate in ground-based unprotected digital control systems e.g. computers, internet, mobile phones etc.<br><br>Interruptions lasting up to three days to L-band communications including civilian mobile satellite communication and satellite Broadcasting. Terrestrial broadcasting could be indirectly affected due to a dependency on GPS timing. | 4<br><br>Very High | 4 | Electricity Industry monitoring and analysis of GIC<br><br>Space Weather is assessed as part of the Daily Hazards Assessment<br><br>National Grid design standards and response arrangements<br><br>Alternative positioning, navigation and timing signal systems<br><br>Forecasting through Met Office Space Weather Operations Centre | Dec 2016<br><br>Dec 2018 |

| 3.7 | Severe wildfires | | | | | | |
|---|---|---|---|---|---|---|---|
| H58 and HL33 | Severe wildfire and forest or moorland fire<br><br>(London Fire Brigade) | Severe wildfire spreading over an area of 1500 hectares at an urban-rural interface and lasting for 7-10 days.<br><br>At any one time during the incident period, a fire front covering 20 hectares will burn with significant potential to put firefighters at risk, with a further 100 hectares of vegetation smoldering and/or creeping and carrying the risk of a secondary burn-back.<br><br>Fatality numbers low (under 10) and casualty numbers between 50 and 100, as a result of respiratory complaints and burns.<br><br>Dense smoke would spread for a distance of 3-5 miles (minimum) resulting in short to medium term closures of motorways (2x12 hours) and major arterial roads and railway lines.<br><br>Smoke rising to a higher altitude could also cause disruption to incoming flight paths if the fire is close to a major airport.<br><br>Disruption to electricity, fuel and telecommunications is possible and a possibility of water contamination as a result of dissolution of ash and burn particulates into ground and reservoir supplies.<br><br>There may also be significant natural environmental impacts as a result of damage to Special Protection Areas (SPA), Special Areas of Conservation (SAC) and Sites of Special Scientific Interest (SSSI) and a large release of carbon and greenhouse gases)<br><br>Evacuation of 3,000 people from an affected area.<br><br>Firefighting may require mutual aid, including use of National assets such as High Volume Pumps and specialist officers. | 2 | 2 | London Fire Brigade borough specific rural strategies<br><br>Specialist fire fighting equipment and resources | Feb 2017<br><br>Feb 2019 |
| | | | Medium | | | | |

| 3.8 | Animal Diseases / Animal Health Incidents | | | | | |
|---|---|---|---|---|---|---|
| **HL 26 a** | Non-zoonotic Notifiable animal diseases<br><br>(Local Authorities) | Disease introduced into a predominantly sheep area and infected animals sold at market or moved to other premises before disease is detected resulting in widely dispersed multiple outbreaks. Assessment based on the need to cull and dispose up to 4 million animals with up to 900 infected premises across UK.<br><br>Movement of all susceptible livestock prohibited unless licensed. Economic and reputational losses to the agriculture and food chain industry. Loss of disease free status resulting in EU and third country import bans on livestock and livestock products from susceptible animals. | 3 | 2<br><br>Medium | Animal Health Act 1981<br><br>Animal Health Act 2002<br><br>Other secondary legislation and EU directives<br><br>National disease control strategies | May 2017<br><br>May 2019 |
| **HL 26 b** | Zoonotic Notifiable animal diseases<br><br>(Local Authorities) | The most significant disease in this category is Highly Pathogenic Avian Influenza. The major outbreak scenario is of much greater scale than that experienced in any of the recent outbreaks of avian influenza in the UK, where the disease has been contained and has been limited to one or two infected premises plus associated contact premises.<br><br>Need to cull and dispose of up to 30 million poultry across UK. Loss of disease free status resulting in EU and third country import bans on poultry, captive birds and poultry products. Disruption to communities, local economies, tourism and the environment. Economic impacts for a major outbreak assessed at £60 million. | 3 | 2<br><br>Medium | Animal Health Act 1981<br><br>Animal Health Act 2002<br><br>Other secondary legislation and EU directives<br><br>National disease control strategies | May 2017<br><br>May 2019 |

# 4. London Risk Register – Major accidents / incidents

| 4.1 Major industrial accidents / Industrial and Environmental Pollution Incidents | | | | | | |
|---|---|---|---|---|---|---|
| HL 3 | Localised industrial accident involving small toxic release<br>(London Fire Brigade) | Up to 1km from site causing up to 10 fatalities and up to 100 casualties. | 3 | 3 | Control of Major Accident Hazards Regulations 2005 (COMAH)<br>Regulatory Reform (Fire Safety) Order 2005<br>London Resilience Partnership Plans | May 2017<br>Feb 2019 |
| | | | High | | | |
| HL 12 | Local accident involving transport of hazardous chemicals<br>(London Fire Brigade) | Up to 50 fatalities and up to 500 casualties (direct injuries from the accident would be similar to road or rail accidents; indirect casualties are possible, if substance covers wide area). The extent of the impact would depend on substance involved, quantity, nature and location of accident. The assumption is based on phosgene / chlorine. | 2 | 4 | Carriage of Dangerous Goods by Rail Regulations 1996<br>Packaging, Labelling and Carriage of Radioactive Material by Rail Regulations 2002<br>Radioactive Material (Road Transport) Regulations 2002<br>Air Navigation (Dangerous Goods) Regulations 1994<br>Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1990<br>Specialist Emergency Services and other responder equipment and resources | June 2016<br>June 2018 |
| | | | High | | | |
| H 4 | Fire/explosion at a fuel distribution or storage site toxic liquids in atmospheric pressure storage tanks<br>(London Fire Brigade) | Up to 3km around sire causing (from 10) up to 150 fatalities and (100 to) 2000 casualties. Might be disruption to air transport in the short-term until fuel supply re-directed. Short-term regional excessive demands on health core services. Closure of roads in locality for a short period of time. | 2 | 5 | Control of Major Accident Hazard 1999 (COMAH) Regulations.<br>The Dangerous Substances and Explosive Atmosphere Regulations 2002<br>Petroleum Regulations<br>Regulatory Reform (Fire Safety ) Order 2005<br>Site Operators on-site contingency plans<br>Emergency Services specialist resources | Feb 2017<br>Feb 2019 |
| | | | High | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| H 9 | Large toxic chemical release<br><br>(London Fire Brigade) | Up to 3km from site of toxic chemical release causing up to 50 fatalities and up to 2000 casualties from a large industrial complex or bulk storage of chemicals near to a populated (i.e. urban) area. There are some sites of this nature within the M25. Depending on the nature and extent of the contamination there could be impacts on air, land water, animal welfare, agriculture and waste management. This risk might require decontamination. Excessive demands on health care services locally both short and long term. Risk to water supplies and contamination of farm land could lead to avoidance of foodstuffs. | 3 | 5 | Control of Major Accident Hazards Regulations 2005 (COMAH)<br><br>Regulatory Reform (Fire Safety) Order 2005<br><br>Emergency Services and other responder specialist resources<br><br>London Resilience Partnership Plans | May 2017<br><br>Feb 2019 |
| | | | Very High | | | |
| HL 4 | Major pollution of inland waters<br><br>(Environment Agency) | Pollution incident impacting upon inland waters (for example, could be caused by chemical spillage or release of untreated sewage) leading to persistent and/or extensive effect on water quality, major damage to aquatic ecosystems, closure of potable abstraction, major impact on amenity (i.e. tourism) value, serious impact on human health.<br><br>Major sewage pollution could occur as the result of a failure of electric supply. | 4 | 3 | Environment Act 1995<br><br>Water Resources Act 1991<br><br>Environmental Protection Act 1990<br><br>Pollution Prevention and Control Act 1999<br><br>Control of Major Accident Hazards Regulations 1999<br><br>The Environmental Permitting Regulations (England and Wales) 2010<br><br>Groundwater Regulations 1998<br><br>Anti-Pollution Works Regulations 1999<br><br>Environmental Permitting Regulations 2010<br><br>Inspections and compliance monitoring undertaken by appropriate regulatory body<br><br>24 hour incident hotline and response system<br><br>Pollution control equipment and resources | March 2017<br><br>March 2019 |
| | | | Medium | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| HL 28 | Localised fire or explosion at a fuel distribution site or tank storage of flammable and/or toxic liquids.<br><br>(London Fire Brigade) | Up to 1km around the site, causing up to 15 fatalities and 200 casualties.<br><br>Impact on environment, including widespread impact on air quality. | 2 | 3 | Control of Major Accident Hazard 1999 (COMAH) Regulations.<br><br>The Dangerous Substances and Explosive Atmosphere Regulations 2002<br><br>Petroleum Regulations<br><br>Regulatory Reform (Fire Safety ) Order 2005<br><br>Site Operators on-site contingency plans<br><br>Emergency Services specialist resources | March 2017<br><br>March 2019 |
| | | | Medium | | | |
| H 12 | Biological substance release from facility where pathogens are handled deliberately<br><br>(Health) | A pathogen is inadvertently released from a containment laboratory in an urban area that causes up to 5 fatalities, up to 500 hospital admissions and a further 1,500 non-hospital cases.<br><br>The agent released is a genetically modified version of a highly pathogenic strain of avian H5N1 influenza resulting in an agent that is slightly less virulent but more transmissible to humans. Prior to modification, the parental virus would be classified as a Hazard Group (HG) 3 pathogen. It is released in an urban area as a result of a failure of containment measures, possibly by a lab worker not following correct procedures.<br><br>Full symptoms take several days to emerge and the virus is passed on through close contact and through the strain's limited airborne transmission route. The RWCS assumes that the infected worker stays home, self-medicates and is perhaps cared for by a family member as they become more ill, but does not notify their workplace that they may have been infected with H5N1, further delaying identification of the containment loss. | 1 | 2 | Animal Health Act 1981<br><br>Specified Animal Pathogens Order 1998<br><br>Health & Safety at Work etc Act 1974<br><br>Control of Substances Hazardous to Health Regulations 2000<br><br>Management of Health & Safety at Work Regulations 1999<br><br>Reporting of Injuries Diseases and Dangerous Occurrences Regulations<br><br>Carriage of Dangerous Goods (Classification, Packaging and Labelling Regulations<br><br>Genetically Modified Organisms (Contained Use) Regulations 2000<br><br>Regulation, audit and enforcement of legislation by HSE<br><br>London Resilience Partnership Plans | March 2017<br><br>March 2019 |
| | | | Low | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **H46** | Biological substance release during an unrelated work activity/industrial process<br><br>(Public Health England) | Inadvertent release of a biological agent caused by an unrelated work activity (e.g. Legionella release due to improperly maintained building environmental control systems) that causes up to 7 fatalities and up to 500 people requiring hospital admissions. | 4<br><br>Medium | 2 | Health & Safety at Work etc Act 1974<br><br>Control of Substances Hazardous to Health Regulations 2002<br><br>The Notification of Cooling Towers and Evaporative Condenser Regulations 1992 require the notification of wet cooling towers and evaporative condensers to local authorities<br><br>Management of Health & Safety at Work Regulations 1999<br><br>Reporting of Injuries Diseases and Dangerous Occurrences Regulations<br><br>HSC Approved Code of Practice and Guidance 2001 (not fully complied with)<br><br>HSC The control of legionella bacteria in water systems, Approved Code of Practice and Guidance" November 2013<br><br>HSE and Local Authority inspections of cooling towers; (not uniform)<br><br>Notifiable disease. Local HPT follows national guidance for the management of single cases and clusters.<br><br>NEW HSE Guidance for Spa Pools.<br><br>Reporting of incident to HSE with subsequent investigation and enforcement if relevant.<br><br>NHS and PHE response to patients and to investigate and protect Public Health.<br><br>Local Authority and other partners as relevant. | |
| **HL 14** | Local (road) accident involving transport of fuel/explosives<br><br>(London Fire Brigade) | Up to 30 fatalities and up to 20 casualties within vicinity of accident/explosion. Area would require evacuating up to 1 km radius depending on substances involved. Potential release of up to 30 tonnes of liquid fuel into local environment, watercourses etc. Large quantities of fire fighting media (foam) could impact on environment. Roads and access routes impassable for a time. Emergency access into/out of large populated areas becomes difficult or impossible. | 2 | 3 | Carriage of Dangerous Goods by Rail Regulations 1996<br><br>Packaging, Labelling and Carriage of Radioactive Material by Rail Regulations 2002<br><br>Radioactive Material (Road Transport) Regulations 2002<br><br>Air Navigation (Dangerous Goods) Regulations 1994<br><br>Merchant Shipping (Dangerous Goods and Marine Pollutants) | June 2016<br><br>June 2018 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | Medium | | Regulations 1990<br>Specialist Emergency Services and other responder equipment and resources | |
| HL 25 | Fire or explosion at a flammable gas terminal including LPG/LNG storage sites<br>(London Fire Brigade) | Up to 1km around site, causing up to 50 fatalities and 150 casualties.<br>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 equipments. Impact on environment, including widespread impact on air quality. | 1 | 3 | Control of Major Accident Hazard 1999 (COMAH) Regulations<br>Pipeline Safety Regulations 1996 cover the pipelines feeding the gas holders.<br>Site Operators on-site contingency plans<br>Multi Agency off-site COMAH Plans<br>Major Accident Hazard Pipeline (MAHP) Plan<br>Emergency Services specialist resources | June 2016<br>June 2018 |
| | | | Medium | | | |
| HL 7 | Industrial explosions and major fires<br>(London Fire Brigade) | Up to 1km around site, causing up to 20 casualties, some of a serious nature. Explosions would cause primarily crush / cuts and bruise-type injuries, as well as burns. | 2 | 2 | Legislation: Control of Major Accident Hazards (COMAH) Regulations 1999<br>Regulatory Reform (Fire Safety) Order 2005<br>Building design and fire protection systems to prevent or limit the spread of fire<br>Emergency Services and other responder specialist resources | March 2017<br>March 2019 |
| | | | Medium | | | |
| H 5 | Fire or explosion at an onshore fuel pipeline<br>(London Fire Brigade) | Fire or explosion at an onshore fuel pipeline following ignition of flammable fuel under high pressure. This could result in a crater, destruction of buildings and evacuation from homes as well as a cloud of gas/vapour. The fire may continue to burn until the pipeline is isolated.<br>The RWCS assumes a release point close to a populated (i.e. urban) area. The fire or explosion would affect up to 1km around site, causing between 10-100 fatalities and between 50-500 casualties. The release of certain fuels | 1 | 3 | Requisitioned Land and War Works Act 1948<br>The Land Powers (Defence) Act1958<br>Shell-Mex and BP (London Airport Pipeline) Act 1959<br>Esso Petroleum Company Act 1961<br>Pipelines Act 1962<br>Pipeline Safety Regulations 1996 | March 2017<br>March 2019 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | may also lead to toxicity issues and/or environmental damage that could take some time to recover from, depending on the fuel in question, nature of the contamination and<br>sensitivity of the affected area. This risk is likely to result in substantial short term demands on emergency responders; however, the impact at site level is unlikely to continue over a prolonged period of time because of the relative ease with which onshore pipelines can be isolated.<br>Natural gas (H7) is considered separately because of the specific potential toxicity and/or environmental damage that the liquid fuel scenarios covered by this risk assessment could generate. | Medium | | Control of Major Accident Hazards (COMAH) Regulations 1999<br>Emergency Services specialist resources | |
| H 7 | Explosion at a high pressure natural gas pipeline<br>(London Fire Brigade) | Fire or explosion at a gas pipeline following ignition of flammable gas under high pressure. This could result in a crater, destruction of buildings and evacuation from homes as well as a cloud of gas/vapour – the fire may continue to burn until the pipeline is isolated. The explosion would be local to the site and could occur anywhere along the length of one of the high pressure gas transmission pipelines, causing between 10-100 fatalities and hospitalising between 20-200 people.<br>This risk is likely to result in substantial short term demands on emergency responders; however the impact at site level should not continue over a prolonged period of time because of the relative ease with which gas pipelines can be isolated.<br>Supplies could be rerouted via alternative pipelines, but (depending on location) the RWCS could lead to domestic disruption. | 1 | 3 | Pipeline Safety Regulations 1996<br>Regulatory and industry measures including provision of maps for excavation<br>Emergency Services and other responder specialist resources | March 2017<br>March 2019 |
| | | | Medium | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **HL 30** | Localised explosion at a natural gas main<br><br>(London Fire Brigade) | Causing up to 100 fatalities and up to 100 casualties. | 1 | 3 | Pipeline Safety Regulations 1996<br><br>Regulatory and industry measures including provision of maps for excavation<br><br>Emergency Services and other responder specialist resources | March 2017<br><br>March 2019 |
| | | | Medium | | | |
| **H 11** | Radiation exposure from stolen goods<br><br>(Environment Agency) | Incorrect handling of a stolen radioactive source leads to accidental exposure to radioactive material. Three deaths after a month and eight people requiring long term medical supervision. Up to 500 worried well in the vicinity of where the source was removed from its shielding may seek medical reassurance at doctor' surgeries and hospitals.<br><br>Limited environmental contamination but possibly a difficult recovery operation because of high dose rates around the radiation source and restricted access. | 2 | 2 | Radioactive Substances Act 1993<br><br>High Activity Sealed Source Regulations 2005<br><br>Arrangements for safe handling and disposal of radioactive sources<br><br>Radiation detectors at high risk sites<br><br>Environment Agency inspections of all major sources<br><br>Emergency Services specialist resources<br><br>London Resilience Partnership Plans | March 2017<br><br>March 2019 |
| | | | Medium | | | |
| **H 14** | Major contamination incident with widespread implications for the food chain<br><br>(Local Authorities) | There may be direct animal and consumer health effects arising from this incident. Assume a small number of fatalities (5) and casualties (50), although the public health implications of food incidents vary widely. Additionally, there may be food production/marketing implications, depending on the scale and area affected. Consumer confidence may also be affected leading to lost markets and, where staple products (e.g. bread or milk) are affected, potential panic buying.<br><br>Could arise from:<br>1. Industrial accident (chemical, microbiological, nuclear) affecting food production areas e.g. Chernobyl, Sea Empress oil spill, animal disease.<br>2. Contamination of animal feed e.g. dioxins, BSE.<br>3. Incidents arising from production processes, e.g. adulteration of chilli powder with Sudan I dye or melamine contamination of milk. | 4 | 2 | EC Directives and Regulations:<br><br>Regulation (EC) 852/2004<br><br>Regulation (EC) 853/2004<br><br>Regulation (EC) 854/2004<br><br>Food Safety Act 1990<br><br>Imports monitored<br><br>Local Authority Environmental Health Sampling<br><br>Public Health England monitoring and surveillance<br><br>Food Standards Agency plans<br><br>**Note – risk requires review – Outcome Description varies from National Risk Register* | March 2017<br><br>March 2019 |
| | | | Medium | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **H 15** | Maritime pollution<br>(Maritime and Coastguard Agency) | Spillage of 100,000 tonnes of crude oil into the Thames estuary polluting up to 200 km of coastline. Release of sufficient pollutant into the river, with contamination of embankments and river structures, to result in a Tier 2 or Tier 3 pollution response within the port. Pollution may arise from an incident within the London Resilience area, or from an incident further east with pollution being spread upriver on a series of tidal cycles. | 1 | 2 | Dangerous Substances in Harbour Areas Regulations 1987.<br>Merchant Shipping (Oil Pollution Preparedness, Response and Cooperation Convention) Regulations 1998.<br>Port State Control checks coordinated in European waters<br>All vessels navigating on the tidal Thames required PLA licence<br>PLA Vessel Traffic Service<br>National Contingency Plan for Marine Pollution from Shipping and Offshore Installations (2000)<br>Oil Spill Contingency Plan Guidelines for Ports, Harbours & Oil Handling Facilities<br>Specialist equipment for response | March 2017<br>March 2019 |
| | | | Low | | | |
| **HL 37** | Release of significant quantities of hazardous materials as a result of major shipping accident<br>(Maritime and Coastguard Agency) | Fatalities and casualties unlikely. Significant environmental damage would depend on substance involved, quantity, nature and location of accident. | 1 | 2 | Port of London River Byelaws 1978<br>Dangerous Substances in Harbour Areas Regulations 1987<br>Dangerous Substances in Bulk Byelaws 1991<br>Merchant Shipping (Oil Pollution Prevention, Response and Cooperation Convention) Regulations 1998<br>Navigation safety monitored by Vessel Traffic System at the Thames Barrier Navigation Centre<br>PLA Dangerous Substances in Bulk Byelaws 1991<br>Specialist response equipment and resources | June 2017<br>June 2019 |
| | | | Low | | | |

| 4.2 Major industrial accidents / Major structural accidents | | | | | | |
|---|---|---|---|---|---|---|
| HL 22a | Large Building Collapse<br>(Local Authorities) | Collapse of a large building (high-rise block, shopping mall etc). Up to 100 fatalities depending on the size and construction of building, and occupation rates, and 350 casualties. Potential for a number of persons to be trapped or missing. Localised loss of power and other essential services. Local access routes affected due to road closures. | 1 3<br>Medium | Building Control regulations enforced by Local Authorities<br>Construction, renovation, maintenance and demolition standards and enforcement<br>Emergency Services and other responders specialist resources<br>London Resilience Partnership Plans | May 2017<br>May 2019 |
| HL 105 | Complex Built Environments<br>(Local Authority) | A consequence of a major incident affecting large buildings / complex built environments. Incidents in these facilities have the potential to trigger a complex chain of events that lead to serious consequences for public. | 2 3<br>Medium | Health and Safety at Work Act 1974.<br>Management of Health & Safety at Work Regulations 1999.<br>Fire and Rescue Services Act 2004 & guidance pursuant to the Regulatory Reform (Fire Safety) Order 2005.<br>Safety at Sports Grounds Act 1975 and Fire Safety and Safety of Places of Sport Act 1987<br>Local building safety systems and practices<br>Safety Advisory Groups in place at major sports grounds<br>London Resilience Partnership Plans | May 2017<br>May 2019 |
| HL 22 | Building Collapse<br>(Local Authorities) | Collapse of low rise building, or part thereof. Potential for a number of persons to be trapped or missing. Localised loss of power and other essential services. Local access routes affected due to road closures. Up to 5 fatalities and 20 casualties depending on the size and construction of building, and occupation rates. A number of such incidents annually within London. | 5 2<br>Medium | Building Control regulations enforced by Local Authorities<br>Construction, renovation, maintenance and demolition standards and enforcement<br>Emergency Services and other responders specialist resources<br>London Resilience Partnership Plans | May 2017<br>May 2019 |
| HL 23 | Bridge Collapse<br>(Local Authorities) | Roads, access roads and transport infrastructure impassable for considerable length of time. Severe congestion over wide geographical area. Emergency access into / out of large populated areas severely restricted. Potential for a number of persons to be trapped or missing. | 1 3<br>Medium | Building Control regulations enforced by Local Authorities<br>Highways Act Regular inspections<br>Height and weight restrictions and signs reduce the likelihood of an incident<br>London Resilience Partnership Plans | May 2017<br>May 2019 |

| 4.3 | **Major industrial accidents / Technical failures** | | | | | |
|---|---|---|---|---|---|---|
| **H 41** | Technical failure of national electricity network - Blackstart<br>(London Fire Brigade) | Total blackout for up to 5 days with prolonged disruption for up to 14 days due to loss of the National Grid.<br>Possible loss of life support machines, civil unrest, no alarms, street lighting, gas heating, rail transport, water supplies and mobile telecommunications etc. Back up generators available for limited time for individual businesses and emergency services in some instances.<br>Most of the country reconnected within three days, London late on in the process. Peak demand not able to be met after three days. | 3 | 5<br>Very High | Testing and maintenance regime<br>National Emergency Plans<br>London Resilience Partnership Plans | Sept 2016<br>Sept 2018 |
| **H 45** | Technical failure of electricity network due to operational error or bad weather causing damage to the system<br>(London Fire Brigade) | Total shutdown of the electricity supply in Greater London occurring during working week and lasting for 24hours. Damage to distribution overhead lines meant that many customers remained without a supply for several days before repairs could be completed.<br>An event of this kind occurred in October 1987 when severe storms led to the electricity transmission network in the south east being shut down. | 3 | 4<br>Very High | Testing and maintenance regime<br>National Emergency Plans<br>Mutual aid resources available<br>London Resilience Partnership Plans | Sept 2016<br>Sept 2018 |
| **H 38** | Disruption in upstream oil and gas production<br>(London Fire Brigade) | Catastrophic accident destroying all parts of a critical upstream facility and, in the worst case, taking months or more to restore to normal levels of service. This could potentially result in <11% loss of gas supply to the UK which could impact on power generation if demand were high. As 40% of power is generated by gas fired stations then a reduction in generation might be felt. Downstream oil would not be immediately so adversely affected given alternative means of supply. | 2 | 4<br>High | National Emergency Plan for Fuel<br>National Blackstart Plan<br>London Resilience Partnership Plans | Sept 2016<br>Sept 2018 |

| | | | | | | |
|---|---|---|---|---|---|---|
| H 39 | Non-availability of piped water supply<br>(London Fire Brigade) | Non-availability of piped water supply to domestic, industrial, commercial and agricultural premises, for a population of up to 350,000 for more than 24 hours and up to 2 weeks. Fire tenders can not be refilled from fire hydrants within the affected area. Severe logistical difficulties in resupply of bottled water/bowsers even using mutual aid from other water companies. Suspension of hospital and school services. Food industries within the impacted zone may close.<br>Human population given priority over animals and livestock. | 2 | 3<br>Medium | Water Industry Act 1991<br>Security and Emergency Measures Direction 1998<br>Water companies mutual aid arrangements in place<br>London Resilience Partnership Plans | Sept 2016<br>Sept 2018 |
| H 40 | No notice loss of significant telecommunications infrastructure in a localised fire, flood or gas incident<br>(Metropolitan Police Service) | Loss of fixed and mobile telecommunications (both voice service and internet access) for up to 100,000 people for up to 72 hours. Mainly household customers would be affected; the impact on businesses would depend on the extent of resilience purchased. Service impacts would vary – for both mobile and landline the geographical area affected should be restricted to that served by the exchange. An outage to landline voice is likely also to affect landline data (and vice versa). A mobile data outage would not necessarily affect voice traffic (and vice versa). | 2 | 2<br>Medium | Civil Contingencies Act 2004<br>Telephone provider demand and network capacity management strategies<br>National Emergency Alert for Telecoms<br>London Resilience Partnership Plans | Sept 2016<br>Sept 2018 |
| **4.4 Major Transport accidents / Incidents** | | | | | | |
| HL 11 | Railway Accident<br>(British Transport Police) | Up to 30 fatalities and up to 100 casualties (fractures, internal injuries – burns less likely). Possible loss of freight. Major disruption to rail line including possible closure of rail tunnel. | 4 | 3 | Railway and Transport Safety Act 2003<br>Railways (Access and Management) Regulations 2005<br>Railways (Accident Investigation and Reporting) Regulations 2005<br>Railways (Licensing of Railway Undertakings) Regulations 2005<br>Railways Act 2005 and 1993<br>The Railway Safety Levy Regulations 2006<br>Transport Act 2000 | June 2016<br>June 2018 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | High | | Heath and Safety at Work (etc) Act 1974<br>The Railway (Safety Case) Regulations 2000<br>Improved inspection regimes to detect track defects<br>Train Protection Warning Systems<br>ATOC Guidance and Directives<br>Specialist Emergency Services and other responder resources | |
| **HL 9** | Aviation accident<br>(London Fire Brigade) | Aviation accident causing up to 50 fatalities and up to 250 casualties. Accident involving one commercial aircraft, probably on take off or landing. | 2 | 3 | Stringent controls on aircraft entering UK Airspace including the mandatory use of Aircraft Collision Avoidance systems on heavy aircraft<br>UK flight separation rules<br>CAA Maintenance and Flight safety standards<br>Airline maintenance regimes<br>London Resilience Partnership Plans | June 2016<br>June 2018 |
| | | | Medium | | | |
| **H 16** | Aviation accident over a semi-urban area<br>(London Fire Brigade) | Collision of two commercial airliners - death of all passengers and crew on aircraft (600 fatalities), up to 50 fatalities and 300 casualties on the ground. Significant debris field but no significant damage to key infrastructure. | 1 | 4 | Stringent controls on aircraft entering UK Airspace including the mandatory use of Aircraft Collision Avoidance systems on heavy aircraft<br>UK flight separation rules<br>CAA Maintenance and Flight safety standards<br>Airline maintenance regimes<br>London Resilience Partnership Plans | June 2016<br>June 2018 |
| | | | Medium | | | |
| **HL 9b** | Small Aircraft Incident | A light aircraft is an aircraft that has a maximum gross take off weight of 12,500 lb (5,670 kg) or less. Many light aircraft are used commercially for passenger and freight transport, sightseeing, photography, and other similar roles as well as personal use. This covers an accident involving one commercial aircraft, probably on take off or landing. | 2 | 2 | Stringent controls on aircraft entering UK Airspace including the mandatory use of Aircraft Collision Avoidance systems on heavy aircraft<br>UK flight separation rules<br>CAA Maintenance and Flight safety standards<br>Airline maintenance regimes<br>London Resilience Partnership Plans | June 2016<br>June 2018 |
| | | | Medium | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **HL 34 and HL 8** | Incident involving a passenger vessel in or close to UK waters leading to the ship's evacuation or partial evacuation<br><br>(Maritime and Coastguard Agency) | Up to 50 fatalities and up to 100 casualties.<br><br>The risk is based on an accident to a typical passenger vessel visiting London, or a large Class V vessel (<600 passengers) operating in central London. | 1 | 3 | Port of London Act 1968 (as amended).<br><br>General Directions for Navigating in the Port of London 2009.<br><br>Port of London River Byelaws 1978.<br><br>Port State Control checks coordinated in European waters<br><br>Compulsory PLA pilotage for visiting cruise ships<br><br>PLA Vessel Traffic Management System and coordination with Thames Barrier Navigation Centre<br><br>Provision of life saving equipment on river banks and specialist response resources | Sept 2016<br><br>June 2018 |
| | | | Medium | | | |
| **HL 10** | Local accident on motorways and major trunk roads<br><br>(Metropolitan Police Service) | Multiple vehicle incident causing up to 10 fatalities and up to 20 casualties; closure of lanes or carriageways causing major disruption and delays. | 4 | 1 | Road Traffic Act 1988<br><br>Road Vehicle (Construction and Use) Regulations 1986<br><br>Traffic Management Act 2004<br><br>VOSA patrols to enforce legislation<br><br>London Resilience Partnership Plans | Sept 2016<br><br>June 2018 |
| | | | Low | | | |

## 4.5 Disruptive industrial action

| | | | | | | |
|---|---|---|---|---|---|---|
| **HL 42** | Loss of cover due to industrial action by workers providing a service critical to the preservation of life<br><br>(LRG) | A number of three day strikes with significant support over a two month period affecting a single emergency service. | 5 | 3 | Police Act (1996)<br><br>RCN Code on Industrial Action<br><br>Standards of conduct, performance and ethics for nurses and midwives<br><br>Alternative emergency cover protocols for the Fire Brigade<br><br>Organisational Business Continuity Arrangements | Dec 2017<br><br>Dec 2019 |
| | | | High | | | |
| **H** | Significant or | Actual or threatened significant disruption to the | 3 | 2 | Legal requirements re: conduct of industrial disputes. | |

| | | | | | |
|---|---|---|---|---|---|
| 31 | perceived significant constraint on fuel supply at filling stations<br>(Metropolitan Police Service) | distribution of fuel by road, including as a result of industrial action by fuel tanker drivers.<br>Retail filling stations, depending on the extent of the disruption and their locations and assuming no panic-buying, would likely run out of fuel within 4-5 days. High throughput sites such as supermarket filling stations and motorway sites would likely run out of fuel within 24 hours. Oil depots, for example those supplying the emergency services and critical supply chains, would also face reduced deliveries and it is likely that they would progressively begin to run short of fuel. Food haulage companies would run out of fuel within approximately 10 days.<br>In the event of panic-buying the impact on forecourts would be significantly more severe. During a ballot for a national strike of tanker drivers, for example, buying peaked just above double usual volumes for a short period in spring 2012. This level of panic-buying would lead to more rapid forecourt stock-outs which might be more severe if increased buying behaviour were to last for 2 days or more. Replenishment of sites following a disruption could take up to 2 weeks. | Medium | Stocks of contingency fuel to varying degrees<br>National Emergency Plan for Fuel<br>London Resilience Partnership Plans | Dec 2017<br>Dec 2019 |
| H 35 | Industrial action by key rail or London Underground workers.<br>(British Transport Police) | Strike action resulting in the shut down of 3/4 of the London Underground or near total shut down of the or the national rail network (e.g. action by key rail workers) for greater than 3 days. Greater impact if action occurs in a co-ordinated manner. | 3 2<br>Medium | Heath and Safety at Work Act 1974.<br>Employment Act 1980.<br>Employment Act 1988.<br>Public Order Act 1986.<br>Trade Union and Labour Relations (Consolidation) Act 1992.<br>Anti-Social Behaviour Act 2003.<br>Organisational Business Continuity Arrangements | Dec 2017<br>Dec 2019 |
| H 33 | National strike by prison officers | Unofficial strike lasting more than 24 hours and resulting in a shortfall in personnel available to operate prisons, resulting in likely indiscipline and disruption to the Criminal Justice System. | | This risk is yet to be specifically assessed by London Risk Advisory Group.<br>Nationally this is considered a LOW risk. | **TBC** |

| 4.6 Public and Crowd Events | | | | | | |
|---|---|---|---|---|---|---|
| London is host to a wide number and variety of public events which attract people from all over the world. These events are subject to specific risk management measures through Safety Advisory Groups coordin2ated by relevant Local Authorities. Whilst events do not constitute an emergency in their own right, they provide the potential for one or more of the risks in the London Risk Register to occur. The London Risk Advisory Group therefore encourages all event organisers to consult the available guidance to help ensure safe events in London<br>Further guidance: Green Guide to Safety at Sports Grounds and Purple Guide to Health Safety and Welfare at Music and Other Events | | | | | | |
| H 37 | Influx of British Nationals not normally resident in the UK<br>(Local Authority) | Up to 10,000 British nationals not normally resident in the UK, returning to UK within a 3– 4 week period following conventional war, widespread civil unrest or sustained terrorism campaign against British and other Western nationals. | 4 | 2<br>Medium | Local Authority emergency housing arrangements however response to this risk coordinated through FCO at a national level.<br>Heathrow TravelCare access to specialist services<br>Voluntary sector support to FCO response | June 2016<br>June 2018 |
| H 57 | Public Disorder | Large scale public disorder in multiple sites in a single city occurring concurrently over several days. | 3 | 1<br>Medium | Riot Damages Act 1886<br>Public Order Act 1986<br>Central command for large scale public events<br>Dedicated police training and response capability | Sept 2017<br>Sept 2019 |

# 5. London Risk Register – Malicious Attacks

| 5.1 Attacks on crowded places | | | | | | |
|---|---|---|---|---|---|---|
| X 1 | Attacks on crowded places | Crowded places remain an attractive target for a terrorist attack. Crowded places by their nature are easily accessible and offer the prospect for an impact beyond the loss of life alone. Attacks are often (but not always) carried out without prior warning. | 4 | 3<br>High | • Work of counter terrorism security advisors to raise awareness and provide training<br>• Physical security measures where appropriate<br>• Emergency services response plans<br>• Emergency services specialist resources | Dec 2017<br>Dec 2019 |

| | | | | | |
|---|---|---|---|---|---|
| **5.2** | **Attacks on infrastructure** | | | | |
| X 2 | Attacks on infrastructure | Many of the impacts which could result from industrial accidents, technical failure or severe weather could also result from a terrorist attack on infrastructure. The risk and impact vary according to the criticality of the infrastructure assets affected. Cyber attacks are not incorporated in this risk assessment (see subsequent section). | 3 3 High | • Business continuity plans for loss of essential services helps minimise disruption<br>• Well established programme of work to protect infrastructure from terrorism including protective security advice from Centre for the Protection of National Infrastructure and local Police services. | Dec 2017<br>Dec 2019 |
| **5.3** | **Attacks on transport system** | | | | |
| X 3 | Attacks on transport system | Conventional attacks on transport systems are judged to be the more likely (however the likelihood of them affecting any one individual is still extremely low). This is supported by evidence from around the world. Attacks on transport can take different forms and result in different levels of impact.<br>Stringent security measures are in place at airports. Most rail and underground systems are more open and therefore attractive potential targets. To date no attack against maritime interests in the UK has been mounted by terrorists. | 5 3 High | • Regulation and security processes of individual public transport sectors<br>• Contingency plans developed by operators in conjunction with responders | Dec 2017<br>Dec 2019 |
| **5.4** | **Unconventional Attacks (small scale and catastrophic)** | | | | |
| X 4 | Small Scale Unconventional Attacks | Mass impact terrorist attacks, whilst unlikely, cannot be ruled out. The likelihood of terrorists successfully undertaking an attack against a nuclear or chemical facility or obtaining chemical, biological, radiological (CBR) or nuclear materials remains low, but not negligible. If such attacks were successful, their potential impact on the UK would be severe and significantly greater than a conventional attack. The potential impacts of an incident involving CBR agents will depend on a range of factors including type and quantity of CBRN materials used. This could range from small-scale (assassination or poisoning) to mass-impact (widespread dispersion and contamination) which is reflected in the scores. | 3 3 High | • Well developed specialist response capability<br>• Access to medical-countermeasures | Dec 2017 |
| X 5 | Catastrophic Unconventional Attack | | 2 5 Very High | | Dec 2019 |

| 5.5 Cyber security | | | | | | |
|---|---|---|---|---|---|---|
| X 6 | Cyber security (Infrastructure) | Increasing reliance on cyber space brings new opportunities and new threats. The very openness of the networks presents a vulnerability of compromise or damage to networks from the actions of hackers, criminals or foreign intelligence services.<br><br>The two assessments cover risks of cyber attack against infrastructure and cyber attacks resulting in a loss of data confidentiality. Impacts of both types of cyber attack could include economic and societal disruption.<br><br>While terrorists can be expected to continue to favour high-profile physical attacks, the possibility that they might also use cyber space to facilitate or mount an attack is growing. | 2 3<br>Medium<br>5 1<br>Low | • National Cyber Security Programme<br>• Additional outreach to businesses and public regarding cyber threats and security<br>• National Cyber Crime Unit<br>• Centre for Protection of National Infrastructure providing security advice | Dec 2017<br><br>Dec 2019 |
| X 7 | Cyber security (Data Confidentiality) | | | | | |

# 6. Risks Not Applicable and Removed

| ID | Risk sub-category | Rationale for Not Applicable Status |
|---|---|---|
| H1 | Fire or explosion at a gas LPG or LNG terminal or flammable gas storage site. | Deemed not applicable to London as no sites meeting this description. Flammable gas storage covered in HL25 assessment |
| HL1 | Fire or explosion at a gas terminal or involving a gas pipeline. | Covered by H7 and HL30 assessment. |
| H2 | Fire or explosion at an onshore ethylene gas pipeline. | Deemed not applicable to London due to no ethylene gas pipelines |
| HL26 | Localised fire or explosion at an onshore ethylene gas pipeline | Deemed not applicable to London due to no ethylene gas pipelines |
| H3 | Fire or explosion at an oil refinery | Deemed not applicable to London due to no oil refineries |
| HL27 | Localised fire or explosion at an oil refinery | Deemed not applicable to London due to no oil refineries |
| H6 | Fire or explosion at an offshore oil/gas platform | Deemed not applicable to London due to no offshore Oil or gas platforms |
| H 103 | Fire or explosion at a gas LPG or LNG terminal (or associated onshore feedstock pipeline) | The nearest gas terminal to a London LRF is Bacton, Norfolk, Therefore this risk is not applicable to London. |
| H8 | Very large toxic chemical release | No such facilities with London area. |
| HL 104 | Fire or explosion at a gas LPG or LNG terminal (or associated onshore feedstock pipeline) | The nearest gas terminal to a London LRF is Bacton, Norfolk, Therefore this risk is not applicable to London. |
| HL2 | Localised industrial accident involving large toxic release (e.g. from a site storing large quantities of chlorine). | Not Applicable as incorporated in H4, H9 and HL3 |
| H 10 | Radioactive substance release from a nuclear reactor. | Deemed not applicable to London due to no nuclear reactors |
| HL31 | Limited radioactive substance release from a nuclear accident. | Deemed not applicable to London due to no nuclear reactors |
| H 42 | Rapid accidental sinking of a passenger vessel in or close to UK waters. | This outcome covered in Risk Assessment for HL34 and HL8. |
| HL13 | Maritime accident or deliberate blockage resulting in blockage of access to key port, estuary, maritime route for more than one month | This risk deemed not applicable to London by London Risk Advisory Group. |
| H 22 | Influenza Epidemic | Removed 2013: Advice from Public Health England is that this would not be considered a 'bad seasonal flu outbreak' and would be dealt with using normal arrangements. |
| H 24a | Legionnaires Disease | Removed 2013: Advice from Public Health England is that this would be dealt with using normal outbreak arrangements. |

| ID | Risk sub-category | Rationale for Not Applicable Status |
|---|---|---|
| H 24b | Meningococcal Disease | Removed 2013: Advice from Public Health England is that this would be dealt with using normal outbreak arrangements. |
| HL 102 | Oak Processionary Moth | Removed 2013: Advice from Public Health England is that there is minimal human health risk and this can therefore be removed from the London Risk Register. |
| HL 20 | Flash Flooding | Removed 2014: Advice from Environment Agency that London doesn't have the geography for this risk. |
| H 49 | Loss of drinking water supplies due a major accident affecting infrastructure | Removed from National Risk Assessment – combined into H39. |
| HL 19 | Local fluvial flooding | Covered by updated H21 Fluvial flooding risk (which reflects the NRA) |
| HL 18 | Local / Urban flooding fluvial or surface run-off | Covered by updated H21 Fluvial flooding risk (which reflects the NRA) |
| HL 17 | Local coastal / tidal flooding (in one Region) | Covered by updated H19 Coastal/tidal flooding risk (which reflects the NRA) |
| HL 16 | Local coastal / tidal flooding (affecting more than one Region) | Covered by updated H19 Coastal/tidal flooding risk (which reflects the NRA) |
| H 30 | Loss of fire cover due to industrial action | Removed from the NRA as the impact was reduced to 0. Merged into HL42 assessment. |
| H 25 | Non-zoonotic Notifiable animal diseases | NRA merged H 25 and H26, animal diseases, but LRAG decided to retain the split of zoonotic and Non-zoonotic, now captured in HL 26a and b. |
| H 26 | Zoonotic Notifiable animal diseases | |

# Appendix 1 - The 6 Stage Risk Assessment Process

## 1. Contextualisation

A range of factors influence the assessment of both likelihood and impact of risks. Demographics, transportation and environmental factors all exert an influence on how a risk would manifest in a particular area. Each of the 33 Borough Resilience Forums in London uses this local context to develop their own risk assessments..

## 2. Hazard Identification and allocation for assessment

London Risk Advisory Group identifies the threats and hazards that, in their view, could give rise to an emergency within London in the next 5 years.

Identified lead assessors then undertake Individual Risk Assessments for each risk prior to multi-agency discussion. Risks included in the London Risk Register are subject to a scheduled review programme to ensure that each risk is revisited and updated periodically.

## 3. Risk analysis

Drawing on guidance from Government, other research and local knowledge, lead assessors consider the likelihood of the risk over the next five-year period. Individual Risk Assessments are then provided to the London Risk Advisory Group for discussion and approval.

## 4. Risk evaluation

Individual Risk Assessments are confirmed and summary information collated into the London Risk Register.

## 5. Risk treatment

Gaps in capability against the Reasonable Worst Case Scenario is assessed periodically by the London Resilience Forum, where additional risk management options are agreed as necessary.

## 6. Monitoring and Review

Risk assessment is not a static process and is subject to constant review.  At a minimum, each Individual Risk Assessment is formally reviewed on a 2 year cycle. An annual update of the London Risk Register is published in the spring.

# Appendix 2 – Likelihood and Impact Scoring Scales

Further detail on the scoring measures is provided in Annex 4D of "Emergency Preparedness" (HM Government, 2005) or Local Risk Management Guidance (available via Resilience Direct).

| Score | Impact Descriptor | Likelihood Descriptor | % Likelihood over 5 years | Likelihood Over 5 Years |
|---|---|---|---|---|
| 1 | Limited | Low | > 0.005% | > 1 in 20,000 chance |
| 2 | Minor | Medium Low | > 0.05% | > 1 in 2,000 chance |
| 3 | Moderate | Medium | > 0.5% | > 1 in 200 chance |
| 4 | Significant | Medium High | > 5% | > 1 in 20 chance |
| 5 | Catastrophic | High | > 50% | > 1 in 2 chance |

### Impact Categories

| Category | Explanation |
|---|---|
| Health | Direct health impacts (numbers of people affected, fatalities, injuries, human illness or injury, health damage). |
| Social | Encompassing the social consequences of an event, including availability of social welfare provision and indirect health impacts that arise because of strain on the health service; disruption of facilities for transport; damage to property; disruption of a supply of money, food, water, energy or fuel; disruption of an electronic or other system of communication; homelessness, evacuation and avoidance behaviour; and public disorder due to anger, fear, and/or lack of trust in the authorities. |
| Economic | An approximate net economic cost, including both direct (*eg* loss of goods, buildings, infrastructure) and indirect (*eg* loss of business, increased demand for public services) costs. |
| Environment | Encompassing long-term impact of contamination or pollution of land, water or air with harmful biological / chemical / radioactive matter or oil, flooding, or disruption or destruction of plant or animal life. |

# Appendix 3 – Risk Rating Definitions

| Definitions of Nationally Approved Risk Ratings | |
|---|---|
| Very high (VH) | These are classed as primary or critical risks requiring immediate attention. They may have a high or low likelihood of occurrence, but their potential consequences are such that they must be treated as a high priority. This may mean that strategies should be developed to reduce or eliminate the risks, but also that mitigation in the form of (multi-agency) planning, exercising and training for these hazards should be put in place and the risk monitored on a regular frequency. Consideration should be given to planning being specific to the risk rather than generic. |
| High (H) | These risks are classed as significant. They may have a high or low likelihood of occurrence, but their potential consequences are sufficiently serious to warrant appropriate consideration after those risks classed as 'very high'. Consideration should be given to the development of strategies to reduce or eliminate the risks, but also that mitigation in the form of at least (multi-agency) generic planning, exercising and training should be put in place and monitored on a regular frequency. |
| Medium (M) | These risks are less significant, but may cause upset and inconvenience in the short term. These risks should be monitored to ensure that they are being appropriately managed and consideration given to their being managed under generic emergency planning arrangements. |
| Low (L) | These risks are both unlikely to occur and not significant in their impact. They should be managed using normal or generic planning arrangements and require minimal monitoring and control unless subsequent risk assessments show a substantial change, prompting a move to another risk category. |
| *Based on the model risk rating matrix published in Annex 4F of "Emergency Preparedness" (HM Government, 2005)* | |

# Appendix 4 – Full Risk Matrix

| Impact | | | | | | |
|---|---|---|---|---|---|---|
| | **5** | | H4, H19, X5, H44 | H9, H41 | | |
| | **4** | H16 | HL12, H38, H39 | H21, H45, H50 | H23, H56 | |
| | **3** | HL25, H5, H7, HL30, HL34, HL8 | HL28, H12, HL14, HL22a, HL105, HL23, X6 | HL3, HL9, H17, H18, HL21, H22, H56, X2, X4, H55 | H24, H48, HL4, X1, L19, HL11 | H30, X3, HL42, HL22 |
| | **2** | HL33, H15, HL37 | HL7, H11, H40, H58, HL9b | HL26a, HL26b, H31, H35 | HL4, H14, H37, H46, H54 | |
| | **1** | | | H57 | HL10 | X7 |
| | | **Low** | **Medium/Low** | **Medium** | **Medium/High** | **High** |
| | | **Likelihood** | | | | |

BLANK

LONDON RESILIENCE

PREPARING FOR EMERGENCIES

# **LONDON** RESILIENCE PARTNERSHIP


For information, please contact:

**LONDON** RESILIENCE GROUP

London Fire Brigade Headquarters

169 Union Street

London

SE1 0LL

LondonResilience@london-fire.gov.uk

www.londonprepared.gov.uk


**LONDON** RESILIENCE GROUP

The London Resilience Group is jointly funded and governed by the Greater London Authority, London Local Authorities and the London Fire and Emergency Planning Authority. We are hosted by the London Fire Brigade. Our work, and that of the London Resilience Partnership, is overseen by the London Resilience Forum.