London Risk Register

Version 8.1 Not protectively marked January 2019

London Resilience Partnership Risk Register

Version 8.1 (Jan 2019) of 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.

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LONDON RESILIENCE GROUP

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

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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. An explanation of this follows;

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review

Ref ID; H= National and London Risk, HL = London Risk, L = Locally applicable London Risk, T= Threat. The number assigned to each risk/threat is for reference

Rating; The overall rating based on likelihood and impact.

Risk Sub Category; The group that risk or threat has been assigned to e.g. Storms and Gales is within the Natural Hazard Sub Category.

Outcome Description; Describes the key consequences or the high level summary of the risk.

Likelihood score; From 1-5. 1 being the lowest Likelihood score and 5 being the highest likelihood the risk will occur in the next 5 years.

Impact score; From 1-5. 1 being the lowest Impact score and 5 being the highest.

Controls in place; Plans and procedures that are in place to mitigate this risk or threat.

Last Review/Next Review; When this risk was last reviewed and when it will next be reviewed.

2. London Risk Register: High-Level Summary Risk Matrix

Impact	5	**H4** Hazardous Liquids Supply Infrastructure, **H5** Fuel Supply Infrastructure (Pipelines), **H9** Toxic Chemical Release, **H44** Reservoir/Dam Failure	**X5** Catastrophic Unconventional Attacks	**H41** National Electricity Transmission		
	4	**H16** Aviation Crash, **HL30** Localised Explosion at a Natural Gas Main	**H38** Gas Supply Infrastructure, **HL12** Local Accident Involving The Transport of Fuel/Explosives **HL19** Coastal/Tidal Flooding	**H22** Surface Water Flooding, **H23** Pandemic Influenza, **H45** Regional Electricity Transmission, **H54** Volcanic Eruption, **H56** Space Weather, **L21** Fluvial Flooding, **HL50** Severe Drought		
	3	**H7** Gas Supply Infrastructure (High Pressure Pipelines) , **HL23** Bridge Collapse, **HL25** Fire or Explosion at a Flammable Gas Terminal, **HL34** Evacuation of passenger ship	**H39** Water Supply Infrastructure, **HL28** Fuel Distribution Site Fire or Explosion, **HL105** Complex Built Environments, **X6** Cyber Security	**H17** Storms and Gales, **H18** Cold and Snow, **H24** Emerging Infectious Diseases, **HL11** Railway Accident , **HL21** Land Movement, **HL48** Heatwave, **X2** Attacks on Infrastructure, **X4** Small Scale Unconventional Attacks	**HL4** Major Pollution of Inland Waters, **L19** Groundwater Flooding, **X1** Attacks on Crowded Places	**X3** Attacks on Transport System
	2	**HL37** Maritime Pollution Incident	**H15** Maritime Pollution , **H14** Food Supply Contamination, **H40** Telecommunications, **H58** Wildfires, **H60** High Consequence Dangerous Goods, **HL7** Industrial Explosion and Major Fires, **HL33** Forest or Moorland Fire	**H11** Radiation Exposure from Stolen Goods, **H31** Fuel Tanker Driver (Industrial Action), **H35** Public Mass Transportation (Industrial Action), **HL9** Aviation Crash, **HL14** Local Road Accident Involving the transport of Fuel/Explosives	**H37** Influx of British Nationals, **H46** Biological Substance Release	**HL22a** Large Building Collapse
	1		**H57** Public Disorder		**HL10** Local Accident on Motorways/ Major Trunk Roads	
		1	**2**	**3**	**4**	**5**
		Low	**Medium/Low**	**Medium**	**Medium/High**	**High**
		Likelihood				

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review

3. London Risk Register

3.1 Accident Hazards

H4 HIGH	Accident	**Hazardous liquids supply infrastructure** Fire or explosion at a fuel distribution site, or at a site storing flammable and/or toxic liquids.	1	5	Control of Major Accident Hazard 1999 (COMAH) Regulations. The Dangerous Substances and Explosive Atmosphere Regulations 2002 Petroleum Regulations Regulatory Reform (Fire Safety) Order 2005 Site Operators on-site contingency plans Emergency Services specialist resources	Feb 2017 Feb 2019
H5 HIGH	Accident	**Fuel Supply Infrastructure (Pipelines)** Fire or explosion affecting up to 1km round the site, causing between 10 to 100 fatalities and 50 to 500 casualties. The release of certain fuels may lead to toxicity issues and / or environmental damage.	1	5	Requisitioned Land and War Works Act 1948 The Land Powers (Defence) Act1958 Shell-Mex and BP (London Airport Pipeline) Act 1959 Esso Petroleum Company Act 1961 Pipelines Act 1962 Pipeline Safety Regulations 1996 Control of Major Accident Hazards (COMAH) Regulations 1999 Emergency Services specialist resources	Feb 2017 Feb 2019

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
H7 MED	Accident	**Gas Supply Infrastructure (High Pressure Pipelines)** Fire or explosion at a gas pipeline following ignition of gas under high pressure. This could result in a crater, destruction of buildings and evacuation of homes, as well as a cloud of gas/vapour.	1	3	Pipeline Safety Regulations 1996 Regulatory and industry measures including provision of maps for excavation Emergency Services and other responder specialist resources	Feb 2017 Feb 2019
H16 MED	Accident	**Aviation crash** The worst case scenario involves the collision of two commercial aircrafts.	1	4	Stringent controls on aircraft entering UK Airspace including the mandatory use of Aircraft Collision Avoidance systems on heavy aircraft. Number of Airlines detailed in above history are regulated not to enter UK airspace. CAA Maintenance and Flight safety standards exceed ICAO recommendations Airline maintenance regimes subject to CAA scrutiny and regulation. Strict controls over London Approach.	May 2018 May 2020
HL3 HIGH	Accident	**Localised industrial accident involving small toxic release** Localised industrial accident involving small toxic release impacting 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) Regulatory Reform (Fire Safety) Order 2005 London Resilience Partnership Plans	Feb 2017 Feb 2019
HL7 MED	Accident	**Industrial explosions and major fires** A fire or explosion at a flammable gas terminal (including LPG/LNG storage sites) reaching 1km around site, causing up to 50 fatalities and 150 casualties.	2	2	Legislation: Control of Major Accident Hazards (COMAH) Regulations 1999 Regulatory Reform (Fire Safety) Order 2005 Building design and fire protection systems to prevent or limit the spread of fire Emergency Services and other responder specialist resources	Feb 2017 Feb 2019

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
HL9 MED	Accident	**Aviation Crash** Accident involving one commercial aircraft on take off or landing. Aviation accident causing up to 50 fatalities and up to 250 casualties.	2	3	Stringent controls on aircraft entering UK Airspace including the mandatory use of Aircraft Collision Avoidance systems on heavy aircraft UK flight separation rules CAA Maintenance and Flight safety standards Airline maintenance regimes London Resilience Partnership Plans	May 2018 May 2020
HL10 MED	Accident	**Local accident on motorways and major trunk roads** Multiple vehicle incident causing up to 10 fatalities and up to 20 casualties (internal injuries, fractures, possible burns); closure of lanes or carriageway causing major disruption and delay.	4	1	The Road Traffic Act 1988 The Road Vehicle (Construction and Use) Regulations 1986 The Traffic Management Act 2004	May 2018 May 2020
HL11 HIGH	Accident	**Railway Accident** 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.	3	3	Railway and Transport Safety Act 2003 Railways (Access and Management) Regulations 2005 Railways (Accident Investigation and Reporting) Regulations 2005 Railways (Licensing of Railway Undertakings) Regulations 2005 Railways Act 2005 The Health and Safety (Enforcing Authority for Railways and Other Guided Transport Systems) Regulations 2006 The Railway Safety Levy Regulations 2006 The Railways Act 1993 Transport Act 2000 Health and Safety at Work etc. Act 1974 The Railway (Safety Case) Regulations 2000	May 2018 May 2020

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
HL12 HIGH	Accident	**Local accident involving transport of hazardous chemicals** The extent of the impact would depend on substance involved, quantity, nature and location of accident. The reasonable worst case scenario involves up to 50 fatalities and up to 500 causalities, (direct injuries from the accident would be similar to road or rail accidents; indirect causalities are possible, if substance covers wide area).	2	4	Compliance with: (a) the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2004; (b) the Carriage of Dangerous Goods by Rail Regulations 1996; (c) the Packaging, Labelling and Carriage of Radioactive Material by Rail Regulations 2002; (d) the Radioactive Material (Road Transport) Regulations 2002; (e) IAEA Regulations for the Safe Transport of Radioactive Materials 1996 (Revised) TS-R-1; (f) Air Navigation (Dangerous Goods) Regulations 1994; (g) Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1990.	May 2018 May 2020
HL14 MED	Accident	**Local road accident involving the transport of fuel/explosives** Up to 30 fatalities and up to 20 casualties within vicinity of accident/explosion. Area could 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 difficult or impossible.	2	3	Compliance with: (a) the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2004; (b) the Carriage of Dangerous Goods by Rail Regulations 1996; (c) the Packaging, Labelling and Carriage of Radioactive Material by Rail Regulations 2002; (d) the Radioactive Material (Road Transport) Regulations 2002; (e) IAEA Regulations for the Safe Transport of Radioactive Materials 1996 (Revised) TS-R-1; (f) Air Navigation (Dangerous Goods) Regulations 1994; (g) Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1990.	May 2018 May 2020
HL22a	Accident	**Large Building Collapse** 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	Building Control regulations enforced by Local Authorities Construction, renovation, maintenance and demolition standards and enforcement Emergency Services and other responders specialist resources London Resilience Partnership Plans	May 2017 May 2019

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
HL23 MED	Accident	**Bridge Collapse** Roads, access routes 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	Building Control regulations enforced by Local Authorities Highways Act Regular inspections Height and weight restrictions and signs reduce the likelihood of an incident London Resilience Partnership Plans	May 2017 May 2019
HL25 MED	Accident	**Fire or explosion at a flammable gas terminal** A fire or explosion at a flammable gas terminal (including LPG/LNG storage sites) reaching 1km around site, causing up to 50 fatalities and 150 casualties.	1	3	Control of Major Accident Hazard 1999 (COMAH) Regulations Pipeline Safety Regulations 1996 cover the pipelines feeding the gas holders. Site Operators on-site contingency plans Multi Agency off-site COMAH Plans Major Accident Hazard Pipeline (MAHP) Plan Emergency Services specialist resources	Feb 2017 Feb 2019
HL28 **MED**	Accident	**Fuel distribution site fire or explosion** Localised fire or explosion at a fuel distribution site or tank storage of flammable and/or toxic liquids impacting up to 1km around the site, causing up to 15 fatalities and 200 casualties.	2	3	Control of Major Accident Hazard 1999 (COMAH) Regulations. The Dangerous Substances and Explosive Atmosphere Regulations 2002 Petroleum Regulations Regulatory Reform (Fire Safety) Order 2005 Site Operators on-site contingency plans Emergency Services specialist resources	Feb 2017 Feb 2019
HL30 MED	Accident	**Localised explosion at a natural gas main** Localised explosion at a natural gas (low and medium pressure) main causing up to 100 fatalities and up to 100 casualties.	1	4	Pipeline Safety Regulations 1996 Regulatory and industry measures including provision of maps for excavation Emergency Services and other responder specialist resources	Feb 2017 Feb 2019

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
HL34 MED	Accident	**Evacuation of passenger ship** Incident involving a passenger vessel in or close to UK waters leading to the ship's evacuation (or partial evacuation). A major incident involving a passenger vessel operating on the tidal Thames within the London Resilience area may result in a major loss of life by drowning.	1	3	Port of London Act 1968 (as amended), General Directions for Navigating in the Port of London, Port of London Thames Byelaws 2012, International and national regulation of shipping aimed at preventing accidents by the safe construction, equipment and operation of ships by competent crews and shipping operators, Regulations enforced by Flag States and subject to rigorous Port State Control checks, co-ordinated in European waters MCA (Class V legislation and High Speed Craft Code), Port Marine Safety Code	May 2018 May 2020
HL37 LOW	Accident	**Maritime pollution incident** The release of significant quantities of hazardous chemicals/materials as a result of a major shipping incident. Fatalities and casualties unlikely. Significant environmental/ecological damage expected.	1	2	Port of London Thames Byelaws 2012 Dangerous Substances in Harbour Areas Regulations 1987 Dangerous Substances in Bulk Byelaws 1991 Merchant Shipping (Oil Pollution Prevention, Response and Cooperation Convention) Regulations 1998 On-site & off-site COMAH plans for TDG European Chemicals, Dagenham. IMO HNS Convention – has not been ratified in the UK.	May 2018 May 2020
HL105 LOW	Accident	**Complex built environments** The following outcomes are possible as 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 safety.	2	3	Health and Safety at Work Act 1974. Management of Health & Safety at Work Regulations 1999. Fire and Rescue Services Act 2004 & guidance pursuant to the Regulatory Reform (Fire Safety) Order 2005. Safety at Sports Grounds Act 1975 and Fire Safety and Safety of Places of Sport Act 1987 Local building safety systems and practices Safety Advisory Groups in place at major sports grounds London Resilience Partnership Plans	May 2017 May 2019

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review

3.2 Disease Hazards

H23 VERY HIGH	Disease	**Pandemic Influenza** 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.	4	5	NHS Vaccination Programme (Seasonal and provision for pandemic specific) Specific NHS capacity and response planning Comprehensive surveillance systems London Resilience Partnership Plans	Dec 2017 Dec 2019
H24 HIGH	Disease	**Emerging infectious diseases** 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 Specialist capability and capacity planning in NHS trusts Comprehensive surveillance systems and response arrangements London Resilience Partnership Plans	Dec 2017 Dec 2019

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
HL26a MED	Disease	**Non-zoonotic Notifiable animal diseases** 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. 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	Animal Health Act 1981 Animal Health Act 2002 Other secondary legislation and EU directives National disease control strategies	May 2017 May 2019
HL26b MED	Disease	**Zoonotic Notifiable animal diseases** 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. 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	Animal Health Act 1981 Animal Health Act 2002 Other secondary legislation and EU directives National disease control strategies	May 2017 May 2019

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review

3.3 Hazardous Materials (HAZMAT)

H9 HIGH	HAZMAT	**Toxic Chemical Release** Large toxic chemical release caused by release of chlorine or a number of other chemicals. This incident arises from possible mechanical equipment/process failure or corrosion, and not necessarily involving fire or explosion.	1	5	Control of Major Accident Hazards Regulations 2005 (COMAH) Regulatory Reform (Fire Safety) Order 2005 Emergency Services and other responder specialist resources London Resilience Partnership Plans	 Feb 2017 Feb 2019
H11 MED	HAZMAT	**Radiation exposure from stolen goods** 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'.	3	2	Radioactive Substances Act 1993 High Activity Sealed Source Regulations 2005 Arrangements for safe handling and disposal of radioactive sources Radiation detectors at high risk sites Environment Agency inspections of all major sources Emergency Services specialist resources London Resilience Partnership Plans	 Feb 2017 Feb 2019

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
H12 LOW	HAZMAT	**Biological Pathogen Release** Biological substance release from a facility where pathogens are handled deliberately (e.g. Hazard Group 3 or 4 pathogen release from containment laboratory). 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 1500 non hospital cases.	2	2	Animal Health Act 1981 Specified Animal Pathogens Order 1998 Health & Safety at Work etc Act 1974 Control of Substances Hazardous to Health Regulations 2000 Management of Health & Safety at Work Regulations 1999 Reporting of Injuries Diseases and Dangerous Occurrences Regulations Carriage of Dangerous Goods (Classification, Packaging and Labelling Regulations Genetically Modified Organisms (Contained Use) Regulations 2000 Regulation, audit and enforcement of legislation by HSE London Resilience Partnership Plans	Feb 2017 Feb 2019
H14 MED	HAZMAT	**Food Supply Contamination** A major contamination incident involving a microbiological pathogen in the food chain causing illness, hospitalisation and possible fatalities in a moderate to large number of people over a period of a few days to weeks to identify the contaminate and months for the response.	2	2	Food Safety Act 1990 Imports monitored Local Authority Environmental Health Sampling Public Health England monitoring and surveillance Food Standards Agency plans	Feb 2017 Feb 2019

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
H15 MED	HAZMAT	**Maritime Pollution** A large fully laden oil super tanker sinks in the approach to a port leading to the spillage of 100,000 tonnes of crude oil into the sea polluting up to 200km of coastline. The scenario assumes no loss of access to Liquefied Natural Gas (LNG) terminals or other major port infrastructure.	2	2	Dangerous Substances in Harbour Areas Regulations 1987. Merchant Shipping (Oil Pollution Preparedness, Response and Cooperation Convention) Regulations 1998. Port State Control checks coordinated in European waters All vessels navigating on the tidal Thames required PLA licence PLA Vessel Traffic Service National Contingency Plan for Marine Pollution from Shipping and Offshore Installations (2000) Oil Spill Contingency Plan Guidelines for Ports, Harbours & Oil Handling Facilities	Feb 2017 Feb 2019
H46 MED	HAZMAT	**Biological Substance Release** 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	2	Health & Safety at Work etc Act 1974 Control of Substances Hazardous to Health Regulations 2002 The Notification of Cooling Towers and Evaporative Condenser Regulations 1992 require the notification of wet cooling towers and evaporative condensers to local authorities Management of Health & Safety at Work Regulations 1999 Reporting of Injuries Diseases and Dangerous Occurrences Regulations	Feb 2017 Feb 2019
H60 MED	HAZMAT	**High consequence dangerous goods** A road or rail tanker containing dangerous goods and/or “high consequence” dangerous goods is involved in an accident leading to fire and an explosion. Up to 200 fatalities and up to 500 people requiring medical treatment. The explosion will cause varying degrees of damage to property and infrastructure depending on their distance from the incident. This risk would result in a toxic plume/gas cloud which would be harmful to the population, resulting in evacuation of the immediate area.	2	2	Health & Safety at Work etc Act 1974 Control of Substances Hazardous to Health Regulations 2002 Management of Health & Safety at Work Regulations 1999 Reporting of Injuries Diseases and Dangerous Occurrences Regulations	Feb 2017 Feb 2019

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
HL4 HIGH	HAZMAT	**Major pollution of inland waters** Pollution incident impacting upon controlled waters such as 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 points, major impact on amenity (e.g. tourism) value, serious impact on human health and involving extensive multi-agency liaison.	4	3	Environment Act 1995 Water Resources Act 1991 Environmental Protection Act 1990 Pollution Prevention and Control Act 1999 Control of Major Accident Hazards Regulations 1999 The Environmental Permitting Regulations (England and Wales) 2010 Groundwater Regulations 1998 Anti-Pollution Works Regulations 1999 Environmental Permitting Regulations 2010 Inspections and compliance monitoring undertaken by appropriate regulatory body 24 hour incident hotline and response system Pollution control equipment and resources	Feb 2017 Feb 2019

3.4 Humanitarian Hazards

H37 MED	Humanitarian	**Influx of British Nationals** Influx of destitute/vulnerable British Nationals who are not normally resident in the UK and cannot be accommodated by family/friends. Up to 10,000 BNs not normally resident in the UK returning to the UK within a 3-4 week period following conventional war, widespread civil unrest or sustained terrorism campaign against British and other Western nationals. Around 2% of returnees require statutory support including housing, health services and access to welfare.	4	2	Local authority: Standard social care and emergency housing arrangements. Existing mutual aid agreements in place across London. Other organisations: Full time officer located at Heathrow (alongside Heathrow TravelCare) to consider the issue of repatriation at ports. Position funded by the Foreign & Commonwealth Office. Heathrow Travel Care – a team of social workers. Red Cross and FCO agreement on repatriation; Meet & greet returning passengers at airport, arrange onward transport, supported by the FCO	May 2018 May 2020

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
H57 LOW	Humanitarian	**Public Disorder** Large scale public disorder at site(s) in a single city, or in multiple cities, occurring concurrently over several days.	2	1	Specific riot and public order legislation Riot Compensation Act 2016 Public Order Act 1986 Police community tension monitoring processes Police community engagement teams Advice and guidance from police regarding legitimate protest from event planners	Dec 2018 Dec 2020

3.5 Industrial Action

H31 MED	Industrial Action	**Fuel Tanker Strike** Actual or threatened significant disruption to the distribution of fuel by road, including as a result of industrial action by fuel tanker drivers. 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.	3	2	Legal requirements re: conduct of industrial disputes. Stocks of contingency fuel to varying degrees National Emergency Plan for Fuel London Resilience Partnership Plans	Dec 2017 Dec 2019
H35 MED	Industrial Action	**Public Mass Transport** Strike action by key rail or London Underground staff (e.g. signallers) resulting in the total shutdown of very significant amounts of the national rail network or about ¾ of the London Underground network. In both cases severe disruption could last for a week as part of a three month campaign.	3	2	Heath and Safety at Work Act 1974. Employment Act 1980. Employment Act 1988. Public Order Act 1986. Trade Union and Labour Relations (Consolidation) Act 1992. Anti-Social Behaviour Act 2003. Organisational Business Continuity Arrangements	Dec 2017 Dec 2019

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
HL42 MED	Industrial Action	**Critical Service Industrial Action** Loss of cover due to industrial action by workers providing a service critical to the preservation of life. A number of three day strikes with significant support over a two month period affecting a single critical service; or, a series of strikes takes place, spread over a period of two months, perhaps lasting up to 48 hours each.	2	3	Police Act (1996) RCN Code on Industrial Action Standards of conduct, performance and ethics for nurses and midwives Alternative emergency cover protocols for the Fire Brigade Organisational Business Continuity Arrangements	Dec 2017 Dec 2019

3.6 Infrastructure and Systems Failure

H38 HIGH	Systems Failure	**Gas Supply Infrastructure** A technical failure or accident in an upstream oil/gas facility, gas import pipeline terminal, or Liquefied Natural Gas (LNG) import reception facility leading to disruption in UK gas supplies.	2	3	National Emergency Plan for Fuel London Resilience Partnership Plans	Dec 2017 Dec 2019
H39 MED	Systems Failure	**Water Supply Infrastructure** Failure of water infrastructure or loss of drinking water caused by the complete and relatively sudden loss of piped water supply or the degradation of the piped supply such that it is unfit for human consumption even after boiling. The RWCS assumes up to 350,000 people affected for between 24 hours and two weeks.	2	3	Water Industry Act 1991 Security and Emergency Measures Direction 1998 Water companies mutual aid arrangements in place London Resilience Partnership Plans	Sept 2018 Sept 2020
H40 **MED**	Systems Failure	**Telecommunications** Loss of fixed and mobile telecommunications (both voice service and internet access) for up to 100,000 people for up to 72 hours.	2	2	Civil Contingencies Act 2004 Telephone provider demand and network capacity management strategies National Emergency Alert for Telecoms London Resilience Partnership Plans	Sept 2018 Sept 2020

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
H41 VERY HIGH	Systems Failure	**National Electricity Transmission** A total national blackout due to the loss of the GB National Electricity Transmission System caused by damage to or technical failure of the transmission network. The technical recovery process (Black Start) could take up to 5 days; however, there is the potential for wide area power disruptions for up to 14 days, potentially affecting millions of consumers.	3	5	Testing and maintenance regime. London Power Supply Disruption Plan EDF Energy System Emergency Plan. - EDF Energy Emergency Communication Plan. - EDF Energy Black Start Plan. - Business Continuity Plans for Category 1 and 2 Responders, businesses and other key organisations - London Power Supply Disruption Plan - Major Incident/Emergency Plans for Category 1 and 2 Responders.	Sept 2018 Sept 2020
H44 HIGH	Systems Failure	**Reservoir/Dam Failure** A reservoir or dam collapses without warning resulting in almost instantaneous flooding. Significant movement of debris (including vehicles) 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.	1	5	Reservoirs Act, 1975 Water Act, 2003 Regular statutory inspections Met Office National Severe Weather Warning Service London Resilience Partnership Plans	Feb 2017 Feb 2019
H45 VERY HIGH	Systems Failure	**Regional Electricity Transmission** A significant failure of the electricity network across one or more regions of Great Britain affecting large numbers of customers (approximately 1 million) for up 24 hours or up to 72 hours for some people.	3	4	Testing and maintenance regime. EDF Energy System Emergency Plan. EDF Energy Emergency Communication Plan. EDF Energy Black Start Plan. London Power Supply Disruption Framework	Sept 2018 Sept 2020

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review

3.7 Natural Hazards

H17 HIGH	Natural Hazards	**Storms and Gales** 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.	3	3	Met Office Hazard Manager service Warning & Informing Category 1 & 2 responders emergency response plans Highways Agency response plans. TfL adverse weather plans LFB USAR and Water Rescue capabilities. LAS HART	Feb 2018 Feb 2020
H18 HIGH	Natural Hazards	**Cold and Snow** Low temperatures and snow (falling and lying) over substantial areas of low-lying land, (below 300m) for at least one week . 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.	3	3	Met Office Hazard Manager service Warning & Informing Category 1 & 2 responders emergency response and BCM plans. Category 1 & 2 responders severe weather plans. Highways Agency, TFL and local authorities' winter road maintenance plans. Met Office forecasts & National Severe Weather Warning Service TfL snow desk Op GRIDLOCK to support motorists stranded on M25.	Feb 2018 Feb 2020

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
H22 VERY HIGH	Natural Hazards	**Surface Water Flooding** 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.	3	4	Flood and Water Management Act 2010 The Flood Risk Regulations 2009 Land Drainage Act 1991 Water Resources Act 1991 FFC – Flood Guidance Statements New building developments controlled through planning guidelines Multi Agency Flood Plans London Strategic Flood Framework National Flood Emergency Plan	Feb 2018 Feb 2020
H54 VERY HIGH	Natural Hazards	**Volcanic Eruption** Volcanic ash incursions for up to 25 days (assumed not to be sulphur-rich) resulting in sporadic and temporary closures of significant parts of UK airspace for up to a total of 15 days (possibly non-consecutive) during a three month eruption period.	3	4	Met Office Volcanic Ash Advisory Centre forecasting CAA Volcanic Ash Safety Regime Airline response plans	Feb 2017 Feb 2019
H56 VERY HIGH	Natural Hazards	**Space Weather** 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 rota-disconnections for a further 1 month or more. Voltage instability may also result in local blackouts, most likely in urban areas lasting a few hours.	3	4	Electricity Industry monitoring and analysis of GIC Space Weather is assessed as part of the Daily Hazards Assessment National Grid design standards and response arrangements Alternative positioning, navigation and timing signal systems Forecasting through Met Office Space Weather Operations Centre	Dec 2016 Feb 2019

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
H58 MED	Natural Hazards	**Wildfires** A severe wildfire spreading over an area of 1,500 hectares at an urban-rural interface and lasting for 7 to 10 days. 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 smouldering and/or creeping and carrying the risk of a secondary burn-back.	2	2	London Fire Brigade borough specific rural strategies Specialist fire fighting equipment and resources	Feb 2017 Feb 2019
L19 HIGH	Natural Hazards	**Groundwater Flooding** Following unprecedented amounts of extended above average rainfall throughout 3 winter months groundwater levels are exceptionally high throughout London. The main areas of concern are in the South East of London where the geology is predominately chalk.	4	3	Flood and Water Management Act 2010 The Flood Risk Regulations 2009 Land Drainage Act 1991 Water Resources Act 1991 The London Plan Civil Contingencies Act 2004 Environment Agency Floodline FFC – Flood Guidance Statements Multi Agency Flood Plans London Strategic Flood Framework National flood emergency plan	Feb 2018 Feb 2020
HL19 HIGH	Natural Hazards	**Coastal/Tidal Flooding** Localised tidal flooding resulting from sudden breach of a section of the Thames tidal wall or embankment caused by a vehicle collision or construction incident or a failure of a tidal flood gate coinciding with high tides on the river Thames.	2	4	*See L19*	Feb 2018 Feb 2020

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
L21 VERY HIGH	Natural Hazards	**Fluvial Flooding** Successive bands of frontal rainfall saturate river catchments (soil moisture deficit is at zero) and fill river channels to full capacity. High intensity heavy rainfall causes fluvial rivers in London (tributaries to the Thames) to exceed channel capacity. Flooding happens very quickly with little warning and time for evacuations.	3	4	*See L19*	Feb 2018 Feb 2020
HL21 HIGH	Natural Hazards	**Land Movement** 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.	3	3	Land use planning restrictions Building Control regulations enforced by Local Authorities. Construction, renovation, maintenance and demolition standards	May 2017 May 2019
HL48 HIGH	Natural Hazards	**Heatwave** 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 Public Health Act Heatwave Plan for England Long term planning for local authorities, CCG's and NHS Climate Change Adaption Strategy for London Heat Health Watch Department of Health Heatwave Plan for England	Feb 2018 Feb 2020

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
HL50 VERY HIGH	Natural Hazards	**Severe Drought** Following three consecutive and unprecedented dry winters London is in a severe drought (level 4) situation. Emergency drought orders are in place with millions of properties with severe water supply restrictions and low water pressure (impacting supply to properties at high levels and tower blocks). Increase of illnesses due to reduced use of water impacting on hygiene levels, increased casualties and potentially fatalities. Mental wellbeing impacts communities and public outrage leads to some disorder issues.	3	4	Water Resources Act 1991 DEFRA: Planning for Major Water and Wastewater Incidents in England and Wales Drought Plan direction document	Feb 2018 Feb 2020

3.8 Threats

X1 HIGH	Threats	**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	Work of counter terrorism security advisors to raise awareness and provide training Physical security measures where appropriate Emergency services response plans Emergency services specialist resources	Dec 2017 Dec 2019
X2 HIGH	Threats	**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.	3	3	Business continuity plans for loss of essential services helps minimise disruption 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 Dec 2019

Ref ID Rating	Risk sub-category	Outcome Description	Likelihood	Impact	Controls in Place	Last Review Next Review
X3 **HIGH**	Threats	**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).	5	3	Regulation and security processes of individual public transport sectors Contingency plans developed by operators in conjunction with responders	Dec 2017 Dec 2019
X4 HIGH	Threats	**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	Well developed specialist response capability Access to medical-countermeasures	Dec 2017 Dec 2019
X5 VERY HIGH	Threats	**Catastrophic Unconventional Attack** *See X4 Outcome Description*	2	5	*See X4*	Dec 2017 Dec 2019
X6 MED	Threats	**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. 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	National Cyber Security Programme Additional outreach to businesses and public regarding cyber threats and security National Cyber Crime Unit Centre for Protection of National Infrastructure providing security advice	Dec 2017 Dec 2019

4. Risks Not Applicable and Removed

H1 – Gas Supply Infrastructure - Deemed not applicable to London as no sites meeting this description. Flammable gas storage covered in HL25 assessment.

H2 – Chemical Gas Supply Infrastructure (Pipelines) - Deemed not applicable to London due to no ethylene gas pipelines.

H3 – Fuel Supply Infrastructure (installations) - Deemed not applicable to London due to no oil refineries.

H6 – Offshore Oil/Gas Platform - Deemed not applicable to London due to no offshore Oil or gas platforms.

H19 – Coastal Flooding – London Coastal Flooding risk see HL19.

H21 – Fluvial Flooding – London Fluvial Flooding risk see L21.

H25 – Animal Diseases – London separate Zoonotic and Non-Zoonotic . See HL26a and HL26b.

H33 – Prison Officers Strike – Risk not realised as prison officers are not permitted to strike.

H50 – Drought – London specific risk; Severe Drought. See HL50.

H61 – Civil Nuclear – Risk not realised in London – Covered under Radiation (Emergency Preparedness and Public Information) Regulations (REPPIR).

5. Risks to be Reviewed in 2019-2020

H13 – Radiation Release from a Foreign Nuclear

H32 – Fuel Supply (insolvency)

H59 – Finance / Banking

H62 – Poor Air Quality

H63 – Earthquake

HL51 – Burst Water Main

HL9b – Small Aircraft Incident

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
Causalities	Direct health impacts – Casualties
Fatalities	Direct health impacts – Fatalities
Social Disruption	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.
Psychological Impact	Public outrage and public perception of the hazard or threat.
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)	

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LONDON RESILIENCE GROUP

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