

Reference number	N.O.G. CC 028
Date	May 2021



National Operational Guidance topic	
National Operational Guidance: <i>Geophysical hazards (First edition version one)</i>	
Change originator	
NFCC Fire Central Programme Office – National Operational Guidance content team	
Change requested	
<p>Publication of context guidance, which contains some new topics plus some context topics previously contained in the <i>Water rescue and flooding</i> guidance.</p> <p>For ease of understanding, current content is displayed as black text, with tracked changes, while new hazards and control measures are displayed as purple text.</p>	
Consultation process	
Open consultation for six weeks	
Changes proposed	Rationale for change
<p>Site-Specific Risk Information (SSRI) related to geophysical hazards to be added to the <i>Corporate guidance for operational activity</i>, including:</p> <ul style="list-style-type: none"> • Areas prone to landslides • Areas at risk of coastal cliff collapse • Sinkholes • Naturally occurring radon • Volcanic hazards • Severe weather • Amend existing text of “Ground conditions” to “Ground conditions, including unstable ground” 	<p>The aim is for all information relating to the gathering of SSRI to be in a central location to assist with the process</p>
<p>Creation of new hazards and control measures for:</p> <ul style="list-style-type: none"> • Coastal cliff collapse (to be combined with Landslides) 	<p>These topics had either been only briefly referred to in existing guidance or had not been previously considered for inclusion. A pre-review survey suggesting their inclusion, and discussions with the NFCC Operational</p>

<ul style="list-style-type: none"> • Sinkholes • Naturally occurring radon • Volcanic hazards • Severe weather 	Guidance Forum, indicated consensus with this action.
<p>Relocation of hazards and control measures for:</p> <ul style="list-style-type: none"> • Flooding • Landslides • Unstable surfaces 	<p>The guidance for these topics is currently combined with the water rescue guidance, but are types of geophysical hazards.</p> <p>The water rescue content has been redrafted as a standalone piece of activity guidance, to provide a better focus on the topic.</p>
<p>Restructure of the hazard for Flooding, being split into two new hazards:</p> <ul style="list-style-type: none"> • Working near, on or in floodwater • People at risk: flooding 	To provide differentiation between the hazards presented to personnel attending a flood , and the hazards for people involved in a flood.
Updated hyperlinks and links to other sections of guidance	To ensure hyperlinks are still functioning and relevant, and to link to sections of guidance where there have been review changes.
<p>Updates to strategic actions:</p> <ul style="list-style-type: none"> • Amendments • Additions • Archiving 	The strategic actions that support the control measures will be updated as required, as indicated in the draft guidance.
Governance and approval	
<p>NFCC Operational Guidance Forum</p> <p>NFCC Operations Committee</p> <p>NFCC Steering Group</p>	
Impacts on other National Operational Guidance and other products	
<p>Impacts to other pieces of guidance have been identified:</p> <ul style="list-style-type: none"> • All guidance – check hyperlinks that currently point to content that has been relocated into Geophysical hazards • One of the National Resilience control measures, <i>Request National Resilience resources for high volume pumps</i>, covers both water delivery and flood response; it is currently published in Fires and firefighting as well as in this guidance. To make the content more relevant to both pieces of guidance: <ul style="list-style-type: none"> ○ The current version of the control measure in the Fires and firefighting guidance will be left in place until the review for that guidance is undertaken ○ During the Fires and firefighting review, the control measure will have any flood- 	

specific content removed and be retitled *Request National Resilience resources for high volume pumps: Water delivery*

- A new control measure *Request National Resilience resources for high volume pumps: Floodwater* has been created in this guidance
- Generic content will remain in both versions of the control measure
- Incident command -control measure *Specialist resources* requires an additional strategic action regarding the establishment of memoranda of understanding
- Operations – control measure *Emergency response plans* requires a paragraph about the health and safety considerations for voluntary and uncategorised organisations attending an incident, with a link to GOV.UK <https://www.gov.uk/guidance/how-volunteers-can-help-in-emergencies>

Updates to related:

- Training specification
- Scenarios



National
Operational
Guidance

Geophysical hazards

Initial draft 2021

Contents

Introduction (NEW)	5
Risk management plan	5
Risk management planning for flooding	5
Responsibility of fire and rescue services	6
Roles and responsibilities for flooding	6
Hazard – Insufficient preparation for a flood	98
Control measure – Fire and rescue service planning for flood response	1240
Control measure – Emergency response plans: Flooding.....	1714
Control measure – Fire and rescue service flood recovery strategy.....	2147
Control measure – Business continuity plans for the fire and rescue service: Flooding.....	2349
Hazard – Working near, on or in floodwater (NEW)	2524
Control measure – Gain and maintain safe access and egress: Floodwater.....	2622
Control measure – Safe system of work: Working near, on or in floodwater (NEW)	2824
Hazard – People at risk: Flooding (NEW)	3026
Control measure – Protecting people at risk from floodwater (NEW).....	3127
Control measure – Search of the flooded built environment.....	3329
Control measure – Evacuation and shelter: Flooding.....	3631
Hazard – Insufficient resources:Flooding	3833
Control measure – Specialist resources: Flood response	3833
Control measure – Request National Resilience resources for flood rescue.....	4236
Control measure – National Resilience: Mobilise appropriate assets for flooding.....	4438
Control measure – National Resilience: Accepting flood rescue assets	4539
Control measure – National Resilience: Tasking flood rescue resources	4640
Hazard – Flood damage to the built environment	4842
Control measure – Divert the flow or improve the drainage of floodwater	4942
Control measure – Pumping out floodwater	5044
Control measure – Request National Resilience resources for high volume pumps: Floodwater.....	5245
Control measure – National Resilience: Deployment of high volume pump resources.....	5447
Control measure – National Resilience: High volume pump hose deployment	5649
Control measure – National Resilience: Deploy high volume pumps to remove floodwater	5750
Hazard – Utilities: Flooding.....	5952
Control measure – Isolate or make safe utilities: Flooding	6053
Hazard – Unstable ground or surfaces	6556

Control measure – Safe system of work: Unstable ground or surfaces	6858
Control measure – Specialist resources: Unstable ground or surfaces	7060
Hazard – Landslides and coastal cliff collapse	7362
Control measure – Safe system of work: Landslides and coastal cliff collapse	7564
Control measure – Specialist resources: Landslides and coastal cliff collapse [NEW]	7867
Hazard – Sinkholes [NEW]	8169
Control measure – Safe system of work: Sinkholes [NEW]	8270
Hazard – Severe weather [NEW].....	8573
Control measure – Safe system of work: Severe weather [NEW].....	8674
Hazard – Naturally occurring radon [NEW]	8876
Control measure – Safe system of work: Naturally occurring radon [NEW]	8876
Hazard – Volcanic hazards [NEW]	9078
Control measure – Responding to volcanic hazards [NEW].....	9078
Removed content	9280
Control measure – Plan reception centres [PUBLISHED IN OTHER GUIDANCE]	9280
Control measure – Cordon controls [PUBLISHED IN OTHER GUIDANCE]	9380
Control measure – Evacuation and shelter [PUBLISHED IN OTHER GUIDANCE].....	9680
Control measure – Identify areas that have been searched [PUBLISHED IN OTHER GUIDANCE]	10180
Control measure – Specialist resource: Helicopter [PUBLISHED IN OTHER GUIDANCE]	10280
Control measure – Liaise with local emergency planning groups [PUBLISHED IN OTHER GUIDANCE]	10480
Control measure – Communication strategy: Water rescue and flooding [PUBLISHED IN OTHER GUIDANCE].....	10580
Control measure – Warn, inform and advise people: Flooding [CONTENTS MERGED]	10680
Control measure – Reduce exposure to hazards [PUBLISHED IN OTHER GUIDANCE]	10680
Control measure – Specialist advice [PUBLISHED IN OTHER GUIDANCE].....	10780
Control measure - Remove blockages [CONTENTS MERGED]	10880
Control measure – Personal protective equipment (PPE): Water rescue and flooding (PUBLISHED IN OTHER GUIDANCE).....	10980
Control measure – Safety officers: Water rescue and flooding (PUBLISHED IN OTHER GUIDANCE)	11180
Control measure – Cordons: Water rescue and flooding (PUBLISHED IN OTHER GUIDANCE) ..	11281
Control measure – Appropriate techniques for removal of casualties from unstable surfaces [PUBLISHED IN OTHER GUIDANCE]	11581

Control measure – Spread the load [PUBLISHED IN OTHER GUIDANCE].....	11581
Control measure – Have an effective recovery system [PUBLISHED IN OTHER GUIDANCE]	11681
Unstable surfaces and landslides [CONTENTS MERGED]	11781
Control measure – Specialist advice: Unstable surfaces [CONTENT RELOCATED].....	11781
Control measure – Monitor ground conditions [CONTENT RELOCATED].....	11781
Control measure – Use geological monitoring equipment [CONTENT RELOCATED]	11881

Introduction (NEW)

This context guidance is for incidents involving geophysical hazards, including flooding. There are many other sections of National Operational Guidance that may need to be incorporated when responding to these incident types.

Many geophysical hazard events will occur suddenly and require a multi-agency response. The [JESIP principles for joint working](#) should be applied whenever there is a multi-agency response, regardless of the type, size or complexity of the incident.

Local arrangements, such as memoranda of understanding (MoUs) and mutual aid arrangements with neighbouring fire and rescue services and other organisations, should consider the benefits of co-operation and communication between emergency responders involved.

Due to the potential widespread or long-term nature of some geophysical hazard events, National Resilience assets may be beneficial or required to achieve a successful outcome, including a return to normality.

Impacts of geophysical hazards on operational response

Some geophysical hazards may have an impact on the operational response of fire and rescue services and other emergency responders. For example, sinkholes may affect the roadway system for an extensive period while repairs are made and therefore have an impact on attendance times.

Fire and rescue services should consider the potential impact of geophysical hazards on their operational response and develop business continuity plans to mitigate the impact.

Fire and rescue services should also be mindful of the potential impact of geophysical hazards on other emergency responders and organisations that may provide advice or assistance at incidents. The demands on all organisations may be overwhelming during a large-scale or long-term geophysical hazard event.

Risk management plan

Each fire and rescue authority must develop their strategic direction through their risk management plan. To determine the extent of their services, strategic managers will consider their statutory duties and the foreseeable risk within their area.

Work to identify risk and prepare operational plans should consider all stakeholders, including local emergency planning groups and the fire and rescue service risk management plan.

Risk management planning for ~~water rescue and flooding~~

Risk management plans should consider the foreseeable hazards associated with flooding ~~and water rescue~~. This assessment should identify the most vulnerable people and infrastructure in their area. Fire and rescue services should use community risk profiles and flood maps provided by responsible bodies to develop risk management plans.

[A common approach to flood planning by fire and rescue services normally consists of three phases:](#)

- [Preparation \(preplanning\) – refer to Fire and rescue service planning for flood response](#)
- [Response \(mitigating an immediate risk or stopping things getting worse\) – refer to Working near, on or in floodwater, People at risk: Flooding and Flood damage to property and infrastructure](#)
- [Recovery \(a longer-term activity of rebuilding, restoring and rehabilitating the community\) – refer to Fire and rescue service flood recovery strategy](#)

Responsibility of fire and rescue services

Fire and rescue services are responsible, under legislation and regulations, for developing policies and procedures and to provide information, instruction, training and supervision to their personnel about foreseeable hazards and the control measures used to reduce the risks arising from those hazards.

This guidance sets out to provide fire and rescue services with sufficient knowledge about the potential hazards their personnel could encounter when attending incidents. Fire and rescue services should ensure their policies, procedures and training cover all of the hazards and control measures contained within this guidance.

Roles and responsibilities [for flooding](#)

~~For legal responsibilities of fire and rescue services relating to flooding see National Operational Guidance: Legal register.~~ The Department for Environment, Food and Rural Affairs ([Defra](#)) is the lead government department for major flooding in England and Wales; [their guidance, Developing a multi-agency flood plan \(MAFP\), contains details about the roles and responsibilities of Category 1 and Category 2 responders.](#)

~~The [Scottish Environment Protection Agency \(SEPA\)](#) is Scotland's national flood forecasting, flood warning and strategic flood risk management authority, in Scotland and the [Department for Infrastructure in Northern Ireland](#) provides equivalent guidance for flooding. However, responding agencies report to a range of government departments, requiring co-ordination in the event of flooding over a wide area.~~

Environmental agencies in England, Wales and Scotland and the Department for Infrastructure in Northern Ireland are responsible for ~~providing~~ [the provision of](#) flood mapping and defences. Lead local flood authorities should co-ordinate and manage flood planning for areas within their jurisdiction. In addition to their responsibility for flood mapping, environmental agencies have an incident response capability providing flood barriers, mobile water pumps and incident command vehicles. Agencies may request [the assistance of the fire and rescue service](#) in filling or constructing temporary barriers.

A national mutual aid scheme has been developed by the Department for Environment, Food and Rural Affairs (Defra) to provide a framework for co-ordinating a rescue response to major flood events. This includes [their Flood rescue concept of operations \(FRCO\), which](#) ~~that~~ provides a model for flood incident management for all flood events, from a local deluge to catastrophic wide-area inundation. [It includes topics such as:](#)

- [How organisations involved should respond to a flood](#)
- [Operational instructions for the management and engagement of flood rescue assets](#)
- [Standards relating to response, training and equipment for flood rescue assets](#)
- [The type and quantities of equipment required according to a team type](#)
- [How and to whom that equipment is allocated and located according to a team type](#)
- [Training required to operate the equipment in each organisation](#)

[This publication should be considered by all responders to establish a standard approach to a flood.](#)

[The management and engagement of national flood rescue assets in England and details of how agencies will respond to flooding are detailed in Defra's Flood Rescue Concept of Operations.](#)

The Ministry of Defence may be requested to provide assistance during [a flood events](#). A guide to military assistance during emergencies is set out in Military aid to the civil authorities ([MACA](#)). [Further information is provided in the Joint Doctrine Publication 02: UK operations: the defence contribution to resilience and security.](#)

[The police are responsible for co-ordinating search and rescue on land and on inland waters. The Maritime and Coastguard Agency \(MCA\), through HM Coastguard \(HMCG\) will respond to rescues at sea, on the coastline, within tidal waters and in certain delegated inland waters. HMCG are responsible for co-ordinating search and rescue at sea. Local arrangements may exist for governing responsibility between HMCG and the police in certain areas.](#)

[HMCG's search and rescue teams have the following capabilities:](#)

- [Search](#)
- [Water rescue](#)
- [Mud rescue](#)
- [Rope rescue](#)

[HMCG and the police can call on various search and rescue assets, for example, fire and rescue services, lifeboats, helicopters, ambulance, cave rescue, mountain rescue and lowland search and rescue. Fire and rescue services will often provide an initial response or offer support in HMCG's statutory area of responsibility.](#)

[The ambulance service is responsible for the clinical care of casualties in the pre-hospital environment. It has a unique legal duty of care towards individual casualties from search and rescue activities that is not shared by other responding agencies. Hazardous Area Response Teams \(HART\) and the Special Operations Rescue Team \(SORT\) have skills and equipment that enable them to work with rescue agencies and gain access to patients within the hazard zone. However, sometimes ensuring the safety of the ambulance personnel, including HART and SORT, mean it would be safer for the patient to be brought to the ambulance service. In these circumstances communication between personnel and the medical specialists should be maintained.](#)

[Legislation, regulations and guidance for flooding](#)

The following [publications and websites](#) ~~legislation and guidance are~~ applicable to [a flood incidents](#); ~~some are~~ and relevant to emergency planners and responders:

- [The Civil Contingencies Act, for England and Wales](#)
- ~~2017 amends Article 2 of the Order to include a duty to prepare for and respond to flooding and rescues from inland waters. 2011, sets out a duty for the Scottish Fire and Rescue Service and Northern Ireland Fire and Rescue Service to prepare for and respond to serious flooding. This includes any flooding that causes or is likely to cause a person to die, be seriously injured or become seriously ill.~~ [Flood and Water Management Act \(England and Wales\)](#)
- [National Strategy for Flood and Coastal Erosion Risk Management in Wales](#)
- [Flood Risk Management Act \(Scotland\)](#)
- ~~The European Floods Directive 2007/60/EC~~
- [National Planning Policy Framework](#)
- [Technical Guidance to the National Planning Policy Framework](#)
- [Department for Environment, Food & Rural Affairs \(Defra\) Guidance for Developing a multi-agency flood plan](#)
- ~~The Pitt flooding review~~
- ~~National strategies Future Water~~
- ~~Localism Act~~
- ~~The Building regulations 2010~~
- ~~Water Framework Directive~~
- [Department for Environment, Food & Rural Affairs \(Defra\) Flood rescue concept of operations](#)

[Although there is no specific legislative duty for fire and rescue services in England to respond to a flood or water rescue, the Fire and Rescue Services Act does make provision for rescuing and protecting people in the event of emergencies, other than fires and road traffic accidents.](#)

[The Fire and Rescue Services \(Emergencies\) \(Wales\) \(Amendment\) Order contains an amendment to include a duty to prepare for and respond to floods and rescues from inland waters.](#)

[The Fire \(Additional Function\) \(Scotland\) Order 2005 and The Fire and Rescue Services \(Emergencies\) Order \(Northern Ireland\), set out a duty for the Scottish Fire and Rescue Service and the Northern Ireland Fire and Rescue Service to prepare for and respond to serious floods. This includes any floods that cause or are likely to cause a person to die, be seriously injured or become seriously ill.](#)

Hazard – Insufficient preparation for a flood ~~events~~ing

HAZARD KNOWLEDGE

Floods and flood-waters can present significant hazards to responders and communities. ~~Some flood events~~Most floods are often predictable, ~~through the and fire and rescue services should use of~~ weather and tide forecasting ~~to inform their response to incidents.~~ However, ~~This may not always be possible as some other~~ types of floods ~~s events~~ may occur with little or no warning. ~~To be able to provide an effective response,~~ Fire and rescue services ~~need to should~~ identify the potential ~~locations and~~ causes of a flood ~~events~~ing in their area and ~~prepare appropriately~~plan accordingly.

Insufficient preparation for a flood may result in:

- Inadequately trained or resourced personnel being mobilised
- Poor situational awareness and tactical planning
- Injury or loss of life to:
 - Public
 - Personnel
 - Other responders
 - Animals
- Disruption to or closure of critical infrastructure
- Failure of utilities and telecommunications
- Impact on fire and rescue services, resulting in reduced resources
- Impact on the activities of Category 1 and Category 2 responders

Floods are moving incidents that follow physical rather than administrative boundaries such as areas represented by resilience forums. They are often long duration, multi-agency events- with societal, economic and environmental impacts that can take months or years to recover from.

An inland flood occurs when the drainage is compromised or overwhelmed. Physical processes which contribute to inland flooding include:

- Damage or disruption of pipes carrying water, sewage or other liquids
- Extreme weather
- Breaches in flood defences of rivers or dams
- Blockages in drainage

These processes can occur in combination; their impact may be worse if the ground is already saturated. A lengthy period of severe weather may lead to a similarly prolonged period of very elevated flood risk and worsening ground conditions.

Coastal flooding can occur if ~~S~~storms or tsunamis increase the ~~sea~~ tidal range beyond ~~its~~their normal levels. Low pressure and high winds increase the size of waves and the water level of bodies of

water. If wind direction, atmospheric conditions and high tides align it can result in major flooding across a significant area and cause river flooding upstream. The damage caused by storm surges can be extreme. They may affect several areas and possibly countries at once and have a long-lasting impact, stretching resources and requiring a longer-term response.

Short term flooding

Short term flooding can be sudden and often unpredictable, causes may include damage or disruption of pipes carrying water, sewage or other liquids. While the flooding could have an impact on life, structures and infrastructure, once the cause has been controlled or isolated the floodwater will often disperse relatively quickly and is unlikely to require support from fire and rescue services for recovery.



Figure: Image of a building damaged by a water mains failure, courtesy of West Midlands Fire Service

Although the incident may require the services of other agencies, the initial response may be the sole responsibility of the fire and rescue service. Personnel may arrive on-scene without the appropriate equipment to deal with the flood, and may not have the required skills, especially as they may need to enter the water to assist with evacuation.

Medium and long-term flooding

This can be deemed as a period over several days or weeks, with causes including severe weather,

high tides or breaches in flood defence.

With the continuing advancement in weather and flooding forecasting, timeframes and the areas likely to be affected can be predicted. Response to such flooding may require local personnel trained in entering floodwater with specialist equipment.

Weather conditions

Sustained heavy rainfall, melting snow or ice can cause heavy run-off, causing water to rise above or break the banks of a river. Fast flows and increased hydrostatic pressure can overcome flood defences causing flooding in areas where it had not been anticipated by forecasting agencies.

Ground conditions in catchment areas can affect the likelihood of flooding. For example, areas with clay soil or developed areas with paved or hard surfaces will not absorb water, increasing the risk of flooding regardless of conditions prior to rainfall.

Rural catchment areas or those with more permeable soil will allow a certain portion of water run-off to be absorbed, decreasing peak flow into channels and absorbing water from flooded channels. This reduces the likelihood of flooding, but sustained periods of rainfall will cause the ground to become saturated and increase the likelihood of flooding.

Flood plains are generally low-lying sections of land that can be flooded deliberately to prevent flooding in other areas. This may be achieved naturally or by reversing locks and activating water management systems. However, even unpopulated flood plains may be used as grazing land or contain informally established temporary dwellings such as tents or caravans.

Obstructions and breaches

Blockages in channels or drainage systems may result in flooding. This can include major flooding caused by landslides or a build-up of debris in channels. Blockages in channels are often linked to narrowing of channels around man-made structures such as bridges or water management systems. More localised events where blockage of drainage systems can cause flooding of properties in the immediate vicinity.

Breaches in flood defences can result in the creation of fast moving and destructive flows of water. As the size of the breach increases the pressure and speed of flow will reduce. Depending on the size of the affected channel or body of water resulting flooding may be severe. Although regular inspections and reports on the condition of flood defences are completed the location, size and number of breaches are difficult to predict.

Breaches or failures of dams can result in significant and unexpected flooding.

Storm surge

Leakages

Burst water mains, failures of water management systems and breaches in flood defences can cause unexpected flooding. The severity and scale will be dictated by the size of the leak and how much water is contained. Most leakages will be localised but the effects on residents of affected properties

may be severe. Leakages of foul water systems may require responders to consider the risk of contamination.

Flood types

Floods can create fast moving waters, static or semi-static conditions. Because of the additional risks presented by floods, all flood water should be treated as moving water.

Ground water flooding will often be localised, occur quickly and may recede quickly after weather conditions change.

Flash floods rise quickly and often recede relatively rapidly, but can create dangerous conditions for responders as flow rates are likely to be higher and conditions will alter rapidly.

Slow moving or semi-static flooding will provide a greater lead time to response.

The rate at which flood water recedes will vary and depend on ground conditions, drainage and weather conditions in the local area. Upstream and downstream conditions will also affect the duration and effects of a flood. Pooling may occur in dips or low areas and in some cases these areas may require pumping out.

Most flood types can be modelled and forecasters should be able to provide accurate scenarios for likely development of conditions.

Control measure – Fire and rescue service planning for flood response

CONTROL MEASURE KNOWLEDGE

Due to legislative requirements, fire and rescue services need to consider flooding as part of their risk management plans and establish the activities they are required or willing to undertake to respond to a flood.

If their emergency planning group has identified their area as being at risk of flooding, it would be good practice for a fire and rescue service to:

- Establish and maintain a relationship with the emergency planning group, to provide input and be consulted on the flood risk plan
- Prepare their own plans for delivering an operational flood response for the community
- Prepare their own flood recovery strategy for the community
- Develop business continuity plans to protect fire and rescue service assets and employees

Preparation and planning can reduce the impact, and response and recovery can be more effective and efficient. For medium or long-term flooding, the following should be considered throughout the planning process:

- Floods are multi-jurisdictional and multi-agency incidents that should follow the JESIP principles
- Effective risk assessment based on geographical, hydrological and historical incident data

and including analysis of population risk and critical infrastructure

- Effective liaison with weather and environmental agencies to aid the development of operational and strategic intelligence leading up to and during an incident
- Adequately trained and equipped response personnel, including specialist rescuers and tactical advisers
- Effective inter-agency liaison at all levels
- Agreed standards and competences
- A mechanism for co-ordinating response
- Having pre-determined attendance based on accurate and timely warnings

Flood risk planning Assessments of flooding hazard should include:

- Specific hazards, such as fords and flooded roads
- Hydrology and potential hydrology
- ~~Critical Local~~ infrastructure
- Previous incident data
- Links to weather patterns and data on previous floods ~~events~~
- Climate change impact assessments
- Historical information and markers
- Pre-planning documents, such as the flood inundation-risk plans established by emergency planning groups

~~Assessments of water rescue hazards should include the identification of existing bodies of water, particularly those used by the public for recreation.~~

~~Agencies should assess the hazards and develop appropriate control measures in their area. Fire and rescue services should consider gathering Site-Specific Risk Information (SSRI) should be considered for locations where there is a significant risk of flooding. Their plans should consider inclusion of:~~

- Response levels that are flexible and scalable to allow for a variety of flood scenarios
- ~~Reference to relevant standard operating procedures, tactical actions, and preplanning for response, including rendezvous points, appliance marshalling areas and access points~~
- ~~Protocols for dealing with sites subject to Environmental Permitting Regulations (EPR), Control of Major Accident Hazard (COMAH) and Critical National Infrastructure (CNI)~~
- ~~On-site control measures and hazards, including pertinent upstream or downstream hazards~~

~~Personnel Local responders should acquire and maintain have knowledge of local sites that are at risk of flooding, including their associated hazards, and perform risk visits, joint on-site training and exercises should be carried out as appropriate to reinforce that knowledge.~~

Planning for the flood response that may be required should consider the community risk profile, operational standards and the safety of personnel. Response levels should be established and based on the safe systems of work required for each response level. The response levels should consider a range of scenarios, such as:

- Localised flooding to a housing estate, with members of public being trapped by floodwater, without a threat to life; this could be attended by a local frontline pumping appliance with personnel trained to enter the water
- A major flood event, predicted to last for several days, that requires a large-scale deployment of National Resilience assets and specialist personnel

The outcome of all risk assessments associated to flooding should be considered to inform decisions on the flood activities that personnel will be undertake and those that should not be carried out. This will help define the scope of the work activities, the safe systems of work required and any management arrangements.

Flood planning should consider that lead times for a flooding events may vary, depending on the cause. A phased approach model, for when the preparedness phase should be deployed, needs to take into account that the levels of certainty about a flood and its extent will vary, but where possible this model should be followed and the preparedness phase should begin as soon as practicable. Due to low levels of confidence in forecasting, services may be required to make important decisions based on imperfect information with low levels of certainty.

Phase	Considerations
1. Early warning	<ul style="list-style-type: none"> • Over five days out • Early alert from the Flood Forecasting service Centre (or equivalent). • Low confidence of exact path and impact. Early warning may be up to eight days out for certain events but confidence intervals in these circumstances are very
2. Assessment	<ul style="list-style-type: none"> • Three to five days out • Stronger confidence in path • First official statements and warnings may be issued • Resource considerations begin • Confidence of forecasting may remain as low as 50% at the three days out marker. Any Critical National Infrastructure that may be affected should be identified and assessed, with. Where possible, mitigation activities should be considered
3. Preparedness	<ul style="list-style-type: none"> • Three days to hours out • Key decision-making phase for mitigation and prioritisation • It is during this phase fire and rescue services should consider and enact business continuity plans, prioritisation and request for national resources • Including establishment of strategic holding areas and command groups. At one day out, confidence should be high when identifying areas affected and impact for inundation. However, damage,

	vandalism or failure of flood defences can cause unexpected impacts.
4. Impact	<ul style="list-style-type: none"> • A few hours to receding of flood-waters • The response phase may last for an extended period, depending on weather conditions and consequences of flooding-
5. Recovery	<ul style="list-style-type: none"> • Post-flood rebuilding and recovery • For extreme events, such as an East coastal inundation this may last several years-

Figure: Table showing an example model for preparedness phases

Prepare

When preparing for a flood, fire and rescue services need to consider the impacts on current response strategies and manage the development of any operational policies, procedures and safe systems of work. Joint policies and procedures should be developed with other emergency responders to ensure any safety-related messages can be effectively communicated to the incident ground. Building a common understanding of the procedures among emergency responders is essential.

It is important that the right level of equipment and training is provided to relevant personnel, in accordance with current legislation, and that ongoing resourcing is taken into account when preparing and responding. The National Coordination and Advisory Framework (NCAF) should be considered when preparing for major flood.

Fire and rescue services should consider embedding management arrangements to ensure that preparation for delivering a flood response is effectively maintained.

For further information on preparing for flooding refer to:

- The National Flood Emergency Framework for England
- Environment Agency - England
- Welsh Government
- Natural Resources Wales
- nidirect government services – Northern Ireland
- Rivers Agency in Northern Ireland
- Ready Scotland
- Scottish Environment Protection Agency

Response

The Met Office issues three types of warnings when flooding is forecast; flood alerts, flood warnings and severe flood warnings. Fire and rescue services should be aware of which level of warning will trigger action by their organisation and pre-emptive deployment should be considered at the earliest opportunity.

Appropriate command structures, including those for specialist functions, need to be established when responding to a flood. These need to take into account the actions of other emergency

[responders, to ensure the correct safe systems of work are employed, especially for the management of the inner cordon. Supervisory officers need to be appropriately trained and competent to take command of a flood.](#)

[JESIP and the Department for Environment, Food & Rural Affairs \(Defra\) Flood rescue concept of operations \(FRCO\) provide guidance for a multi-agency response. This includes ~~E~~effective multi-agency management of a flood incident, which requires joint planning and preparation ~~recognising Joint Emergency Service Interoperability Principles \(JESIP\).~~](#)

[Establishing operational strategies, including procedures for working in, on or near floodwater. Most flooding and water related incidents are multi-disciplinary and multi-jurisdictional. Procedures should be developed in conjunction with emergency responders and voluntary rescue agencies, establishing protocols for requesting mutual aid, including air support.](#)

Voluntary or uncategorised organisations

[There may be concerns about voluntary or uncategorised organisations and how they will work together with the fire and rescue service from a health and safety aspect. Although health and safety law may not apply to a voluntary or uncategorised organisation, there are many aspects that are considered as good practice and all participants have a mutual duty of care.](#)

[Effective preplanning will help develop a mutual understanding of how health and safety considerations are applied. The general principle of reducing risks to as low as is reasonably practical should be followed by all responding organisations. This can usually be achieved by:](#)

- [Identifying hazards and risks](#)
- [Putting in place control measures and safe systems of work to manage the risks](#)
- [Reviewing the impact of the controls on the risks](#)

[It may be beneficial for fire and rescue services to establish memoranda of understanding \(MOUs\) or other arrangements for flood response, and to participate in joint training and exercises. This will help to improve interoperability by gaining an understanding of the capabilities of external organisations when dealing with incidents.](#)

Communication and reporting

[Strategic and tactical situational awareness should be developed through the use of effective communications systems. Such systems should be comprehensive, including the ability to communicate with other emergency responders. Reporting mechanisms, especially from the incident ground, should feed into an intelligence development system that is specific to the specialist nature of flood and floodwater activities. This includes developing a commonly recognised incident picture and appropriately sharing information.](#)

[A media strategy should be developed that is aligned with the other emergency responders; this is particularly important during a major flood. The importance of communicating pre-flood warnings through the media, as part of a joined-up local emergency planning groups strategy, should be recognised.](#)

STRATEGIC ACTIONS

Fire and rescue services should:

<u>Revised, new, archive or no change</u>	<u>Strategic action</u>	<u>Reference No. if applicable</u>
<u>No change</u>	Identify areas vulnerable to flooding and develop risk management plans and processes	15663
<u>New</u>	<u>Determine the activities personnel will undertake for a flood</u>	
<u>New</u>	<u>Establish flood risk plans with emergency planning groups if their area has a-risk of flooding</u>	
<u>New</u>	<u>Establish memoranda of understanding (MoUs) with voluntary groups and any uncategorised organisations that may attend and support a flood</u>	
<u>New</u>	<u>Plan how to work with voluntary or uncategorised organisations that may attend and support a flood for their area</u>	
<u>Revised</u>	<u>Consider site-specific flood plans for sites that are risk to significant flooding and liaise with site owners or controllers (particularly specific risks including the Environmental Permitting Regulations (EPR) and Control of Major Accident Hazard (COMAH) sites) to develop tactical guidance and support arrangements</u>	15665

TACTICAL ACTIONS

Incident commanders should:

<u>Revised, new, archive or no change</u>	<u>Tactical action</u>
<u>New</u>	<u>Ensure personnel adhere to their service’s policy and procedures when responding to a flood</u>

All personnel should:

<u>Revised, new, archive or no change</u>	<u>Tactical action</u>
<u>New</u>	<u>Adhere to their service’s policy and procedures when responding to a flood</u>

Control measure – Emergency response plans: Flooding~~Prepare for flooding~~

This control measure should be read in conjunction with Operations - Emergency response plans

CONTROL MEASURE KNOWLEDGE

Given the highly-developed status of weather and flood forecasting in the UK, most flooding can be predicted. ~~Preparation is vital to reduce the effects of flooding~~ and incidents should be managed as ~~an~~ intelligence-led planned events.

[Preparation and planning for flooding can reduce the impact, and response and recovery can be more effective and efficient. Emergency response plans for flooding should be developed with all Category 1 and Category 2 responders to ensure activities are carried out safely and effectively.](#)

The expected impact of a flood ~~event~~ may dictate the level of multi-agency involvement. [However, the key to success is a clear agreement that is tested through regular training, exercises and management systems. In particular there should be robust arrangements for resolving conflict and this is best achieved through a positive working relationship at operational and strategic level.](#)

Voluntary or uncategorised organisations

Voluntary ~~organisations~~ and any [uncategorised](#) organisations that may assist or provide information ~~but are not considered to be Category 1 or 2 responders~~ should be considered during planning phases, in addition to ~~Nationally Resilience~~ registered assets. [This could include Ccommunity flood action groups, that may provide assistance to communities during floods.](#)

[Local emergency planning groups can assist with developing a suitable response with a wide range of voluntary or uncategorised organisations that are likely to attend flooding incidents. It is at this level that working arrangements are established and responders can develop an understanding of capabilities and how to engage effectively. Some Category 1 responders will already have well-established links with voluntary organisations, such as:](#)

- [Maritime and Coastguard Agency \(MCA\)](#)
- [Royal National Lifeboat Institution \(RNLI\)](#)
- [Mountain Rescue](#)
- [Voluntary and charity ambulance services](#)

[For these partnerships, effective capability is well proven at local level. In some cases, the voluntary or uncategorised organisation may play a very significant role in other emergency response work and have specific capability that can enhance flood response.](#)

Emergency planning groups

[The Flood Risk Regulations, Flood Risk Management \(Scotland\) Act and The Water Environment \(Floods Directive\) Regulations \(Northern Ireland\) require the assessment and management of flood risks to be carried out by a lead local flood authority in England, Wales and Scotland, and the department for infrastructure for Northern Ireland.](#)

[Emergency planning groups establish emergency plans for flooding, which can be referred to by many titles, including 'flood risk plan'. A flood risk plan is a sub-plan of a local authority major emergency plan.](#)

[Emergency planning groups comprise:](#)

- [Local resilience forums \(LRFs\) in England and Wales](#)
- [Regional resilience partnerships \(RRPs\) in Scotland](#)
- [Emergency preparedness groups \(EPGs\) in Northern Ireland](#)

Flood risk plans

Flood risk plans should include an assessment of the flood risk, based on the combination of the probability of an event happening and the consequences if it occurs. The risk of flooding is dependent on there being:

- A source of flooding, such as a river
- A route for the floodwater to take, known as a pathway
- Something that is affected by the flood, also known as a receptor, such as a housing estate

A flood risk plan typically includes:

- Aim and objectives
- Overview of flooding and specific risks
- Information sources
- Roles and responsibilities
- Response and implementation, covering:
 - Locations at risk
 - Triggers
 - Timescales
 - Resources and equipment
 - Places for safe evacuation
- Recovery
- Communication process
- Contact lists of organisations, contractors and others

Flood risk planners should also consider the lead time needed to mobilise and deploy responder teams into anthe affected area before access routes, including roads and bridges, may become are rendered impassable or damaged by the floodwater washed away.

Forecasting and flood mapping can indicate the areas likely to be affected, although the creation of flood defences and changes in the built environment will may affect the outcome flooding. Historical information, such as markers of water height and distributions, are useful indicators when establishing considering preparation for a flood risk plan event.

A flood risk plan should be established using the input of all organisations that may need to provide response or support in the event of a flood. The plan should benefit all emergency responders and help to ensure that activities are carried out safely and effectively. As flooding is often complex in nature, with many consequences, it may require a comprehensive and often sustained response from a wide range of organisations.

Flood warnings

Planners need to decide in advance what they will do when they receive a flood warning. [The Environment Agency publication, Flood warnings – What they are and what they do, explains the levels and advice for public and operational organisations.](#)

~~These Flood warnings are provided by the Flood Forecasting Centre (FFC) in for England and Wales and the Scottish Flood Forecasting Service (SFFS) in for Scotland. The Met Office and Rivers Agency have co-operative arrangements to provide similar services to Northern Ireland. In Northern Ireland, the Met Office works with the Department for Infrastructure to raise awareness of weather events that may result in flooding impacts for people and property. Flood guidance statements are provided by the FFC in England and Wales, and the SFFS in Scotland. They detail general flood risk by county as opposed to the more specific detail covered by responsible agencies' flood warnings over a five-day period. Flood guidance statements allow for a broader risk assessment. Similar information is provided by appropriate government bodies in devolved administrations, these include the Rivers Agency in Northern Ireland and Scottish Environment Protection Agency (SEPA).~~

[The Met Office's Flood warnings guide explains how they work with the Environment Agency \(EA\), Natural Resources Wales \(NRW\) and Scottish Environment Protection Agency \(SEPA\) to constantly monitor rainfall, river levels and sea conditions to forecast the possibility of flooding. There are three types of warning issued by them when flooding is forecast; flood alerts, flood warnings and severe flood warnings.](#)

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
New	Consider joint training, exercising and management systems with all responders for a flood	
Revised	Work with emergency planning groups, emergency responders services and other agencies-organisations to co-ordinate a flooding responses	15666
Revised	Establish mechanisms methods to receive and communicate flood warnings	21749
Revised	Develop procedures methods to support action on receipt of a severe weather warning	21750
Archive	Develop information sharing policies to allow identification of vulnerable groups or individuals	21751

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
Revised	Consider implement flood risk plans when deploying personnel and resources based on available intelligence

<u>Revised</u>	Be familiar with the <u>roles and responsibilities of other Category 1 and 2 responders-organisations and the roles of their representatives that may respond to a floodattend operational incidents</u>
<u>Archive</u>	<u>Use common terminology contained in the Cabinet Office Lexicon</u>

Control measure – Fire and rescue service flood recovery strategy

CONTROL MEASURE KNOWLEDGE

Dealing with response phase of a flood can be relatively short in comparison to the recovery phase. Short-term recovery includes actions taken to assess damage and return normal support systems to minimum operating standards. Long-term recovery can take months, or even years, to complete; it will need to address the human, physical, environmental, social and economic consequences of flooding.

As with response, recovery is not just dealt with by emergency responders and organisations; the private sector, voluntary sector and the community itself may all have an important role. Response and recovery are not discrete phases and they do not occur sequentially. Response and recovery should be integrated and co-ordinated from the outset of the incident.

The recovery process is an integral part of the objectives of the combined response. It extends from the early stages of the response phase, and decisions and actions taken during this period can influence the longer-term recovery outcomes. The lead agency should incorporate the strategic assessment of both the response and recovery needs in parallel wherever possible.

Local authority roles and responsibilities

The local authority has the primary role in restoring normality after a flood. This can include the convening a dedicated recovery management team if appropriate, to support the recovery process. The fire and rescue service should consider liaising with and supporting this team.

Essential utilities, such as power, drinking water and fuel supplies, should be restored as a priority. The recovery management team can undertake an assessment of recovery needs, establish priorities for action and formulate a recovery plan. This plan may include:

- Clean-up operations, removal and disposal of debris and floodwater
- Procedures for clean-up to facilitate insurance claim investigations where necessary
- Providing advice, support and assistance to the community
- Continued provision of short-term facilities for evacuees and people displaced by the event
- Moving people displaced by the flood event from short-term rest centres to more permanent accommodation
- Actions to facilitate the return of displaced people to their homes
- Accounting for costs incurred by the responding agencies and organisations
- Facilitating the provision of humanitarian assistance

Fire and rescue service activities

Fire and rescue services should consider establishing a recovery strategy that supports that of their local authority. Doing so should:

- Ensure efficient use of resources
- Co-ordinate recovery for fire and rescue service sites

As part of their overall strategic assessment of a flood incident, fire and rescue services should give early consideration to the recovery strategy for their personnel, resources and sites affected. This should include:

- Establishing health monitoring and post-incident support for their employees
- Identifying suitable short-term accommodation for displaced fire and rescue service resources to operate from
- Recovery or replacement of equipment lost or damaged in the flood; preplanning for this eventuality will help in this process, which can be resource and cost intensive
- Capturing good practice and lessons learned; for more information refer to Operations - Operational learning

Transition and handover

There needs to be a clear line of handover established to support the transition from response to recovery. The chair of the emergency planning group should agree a date and time for the transition from response phase to recovery phase with representatives of the Category 1 and Category 2 responders, including the fire and rescue service.

STRATEGIC ACTIONS

Fire and rescue services should:

<u>Revised, new, archive or no change</u>	<u>Strategic action</u>	<u>Reference No. if applicable</u>
<u>Revised</u>	<u>Liaise with local authorities and emergency planning groups to develop contingency recovery plans</u>	<u>15664</u>

TACTICAL ACTIONS

Incident commanders should:

<u>Revised, new, archive or no change</u>	<u>Tactical action</u>
<u>New</u>	<u>Consider the flood recovery strategy for personnel, resources and sites affected</u>
<u>New</u>	<u>Assist with the transition from flood response to recovery</u>

Control measure – Business continuity plans for the fire and rescue service: Flooding

CONTROL MEASURE KNOWLEDGE

If the flood risk plans established by the emergency planning group indicate that a fire and rescue service site may be affected, a flood risk assessment should be carried out.

The flood risk assessment should be used to develop business continuity plans for the fire and rescue service. It is important that fire control rooms are fully involved in the business continuity planning process, as they will need to understand the potential impacts on resourcing and mobilisation. In a flood, it is likely that fire control rooms will be receiving a high number of calls, including those from people at risk, who may need water survival guidance.

The business continuity plans should extend from the response to the recovery phase, and include:

- Details of any actions required by personnel for that site if a flood warning is issued
- How the health and safety of fire and rescue service employees will be monitored and maintained, especially if essential utilities may be compromised during flooding
- Whether fire and rescue service assets and resources need to be relocated, in order to protect them and maintain an adequate response
- Business continuity plans should consider potential interdependencies, such as loss of electricity and resulting effect on mobilisation systems ~~when assessing hazards and risks.~~
- The potential impact of floodwater on communications, including mobilisation systems and the contingency arrangements required to establish and maintain an operational response
- Consideration as to whether ~~B~~ack-up power systems may ~~also~~ be affected by floodwater, such as ~~electrical-standby generators in basements or uninterruptible power supplies~~

The inability to access resources, provision of food and clean water, delays in responding and the effects on the lives of responders outside of their employment should be considered during planning for floods, particularly for an extended out-of-area response.

Assessment of the response required during the preparation phase should consider ~~not only the direct movement of flood water but~~ the potential effects on access and egress to fire and rescue sites ~~and the impact on critical infrastructure.~~ It may also be necessary to mobilise or repositioning resources to areas identified as not being susceptible to flooding, to maintain or based on flood warnings and mapping may improve the response to all types of incidents. This action should also aim to and protect the assets of ~~the~~ fire and rescue service and those of its employees.

While the Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO) provides details for operational personnel, non-operational personnel should also be considered as part of the training and response plans for a flooding. For example, they may be required to assist with logistical roles, such as transporting equipment, fuel or welfare facilities.

Ad hoc local arrangements for support may leave fire and rescue service areas exposed if the incident develops. Any requests ~~made~~ outside of formal National Resilience arrangements should consider the potential development of the flood and any potential regional or

national requests for assistance.

STRATEGIC ACTIONS

Fire and rescue services should:

<u>Revised, new, archive or no change</u>	<u>Strategic action</u>	<u>Reference No. if applicable</u>
<u>No change</u>	Develop business continuity plans for flooding in their area	21748
<u>New</u>	<u>Consider training non-operational personnel who may be required to attend and support a flood</u>	

TACTICAL ACTIONS

Incident commanders should:

<u>Revised, new, archive or no change</u>	<u>Tactical action</u>
<u>New</u>	<u>Consider following flood business continuity plans for response and recovery</u>

Hazard – Working near, on or in floodwater (NEW)

HAZARD KNOWLEDGE

There are many reasons why fire and rescue service personnel, equipment and vehicles may need to go near, on or in floodwater. This includes:

- The need to go through a flooded area to attend an incident, which may or may not relate to a flood
- To assist people at risk to evacuate the flooded area
- To protect structures and infrastructure, for example by placing sandbags
- To carry out activities to reduce the impact of a flood, such as:
 - Pumping floodwater away from the area
 - Removing blockages to allow the floodwater to drain away

Assessing the quality of floodwater requires specialist assistance. ~~Unless otherwise~~~~Without~~ confirm~~edation from~~ ~~by~~ a responsible ~~agency~~~~body~~, flood-water should be treated as contaminated; ~~as~~ it may contain biological hazards ~~or~~~~and~~ hazardous materials. Flood-water may also affect biosecurity, as non-native species ~~may be able to~~~~can~~ move freely. ~~For more information refer~~ ~~to~~~~See~~~~National-Operational-Guidance:~~ Environmental protection – Biosecurity.

~~Suitable and sufficient decontamination arrangements need to be considered, due to the potential health risks associated with floodwater. The Department for Environment, Food & Rural Affairs (Defra) Flood rescue concept of operations (FRCO) provides examples of decontamination capability (page 55).~~

Hazards related to flooding

Hazards in flooded areas can include:

- ~~F~~Fast flowing water
- ~~E~~Entrapment hazards
- ~~D~~isplaced or submerged street furniture
- ~~L~~ifted ~~D~~rain covers
- Waterborne objects
- Railings ~~or perforated~~ objects ~~may act as~~~~become~~ strainers when submerged
- Large objects, ~~such as~~~~like~~ rocks, trees or vehicles, ~~being lifted by the movement and pressure of floodwater~~
- ~~C~~ontaminated water
- ~~Impact on~~~~flood waters affecting~~ electrical facilities or water treatment plants
- ~~L~~imited access ~~and egress, which may be affected by~~~~and~~ rising waters ~~affecting egress.~~

Working durations during a flood events may be extended and risks to personnel include fatigue and physiological stress.

See National Operational Guidance: [Operations – Physiological stress](#)

Displaced street furniture and waterborne objects can present a range of hazards to responders, creating trip hazards and the risk of falling into an obscured hole. Waterborne objects may affect responders; hydrostatic pressure may lift, presenting a risk of limb entrapment.

The hazards to personnel from working near, on or in floodwater are detailed in other sections of National Operational Guidance, including:

- [Operations – Driving to incidents](#)
- [Operations - Working near water or other liquids](#)
- [Operations – Physiological stress](#)
- [Water rescue – Hydrological hazards](#)
- [Water rescue – Entering the water](#)
- [Water rescue – Entrapment or entanglement in water](#)

Hazard – Restricted access and egress: ~~Water rescue and flooding~~

Hazard Knowledge

Transport routes/networks may become impassable as flood-waters rise or if bridges and/or other transport infrastructure is/are damaged. Floodwaters affecting access routes that had been usable previously may become deeper and prevent their continued use.

Planned routes may be blocked by other activity and other routes may be in flood-affected areas. Some areas have local authorities may have designated and provided signage to indicate safe evacuation routes for the public; these routes may become congested during the immediate response to flooding. If also used their use by emergency services, this may affect the speed of slow the evacuation and also delay response times.

Undercutting of river-banks, or erosion of softer surfaces, caused by flood-water may make surfaces prone to collapse. Saturation of natural surfaces may increase the likelihood of vehicles or personnel becoming stuck or falling into the body of water.

Control measure – [Gain and maintain safe Access and egress: Floodwatering](#)

CONTROL MEASURE KNOWLEDGE

Identifying, Establishing and identifying-maintaining safe access and egress routes that are unlikely to be affected by floodwater or the development of the incident, will reduce the risk of response times being affected or personnel becoming isolated or stranded.

Personnel should consider the effect of floodwater on vehicles or vessels used to gain access and their continued appropriateness for the task. The position of air intakes or propulsion style of

watercraft may preclude their use in certain [flood](#)water depths.

~~Responders~~[Personnel](#) should ~~also~~ be aware of the risk that they [may](#) become isolated by changes in conditions:-

~~Personnel should be aware that~~[floodwater](#) depth can change rapidly or unexpectedly, and pathfinders may be required to establish safe routes.

Marking out hazardous areas and establishing exclusion routes ~~will~~[should](#) reduce the risk of entrapment but will require regular reassessment as the [flood](#)water levels change. Access and egress to the site of operations should be monitored constantly.

~~Loss of power, isolation by flood-waters and loss of communications~~ ~~will~~[may](#) affect the emergency response. The ~~primary and secondary~~ effects of flooding should be considered when ~~establishing areas and locations such as:~~[deciding where to establish:](#)

- [Rendezvous points \(RVPs\)](#)
- [Forward command points \(FCPs\)](#)
- [Tactical co-ordinating groups \(TCGs\)](#)
- ~~→~~[Strategic co-ordinating groups \(SCGs\)](#)
- [Strategic holding areas \(SHAs\)](#)
- [Multi-agency holding areas \(MASHAs\)](#)

Evacuation and access routes should be assessed ~~for the response during a flood event~~[during the assessment phase](#). Consideration should be given to the ~~potential conflict~~[impact](#) of ~~the~~ public ~~evacuation~~ using identified evacuation routes on ~~the~~ fire and rescue service response to incidents ~~and vice versa~~. ~~In this event, fire and rescue services~~[so other routes](#) should ~~be~~[identify and use](#) ~~ied~~[alternative routes if](#) ~~where~~ possible.

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
Revised	Provide access to appropriate information, mapping and forecasting systems to allow the identification of potential impact to access and egress hazardous areas and development during a flood events	21756
Revised	Provide or have access to appropriate vehicles for the use in a flooded areas	21757
New	Consider providing equipment to identify, establish and indicate safe access and egress routes for a flood	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
<u>Revised</u>	Identify, <u>establish, maintain and indicate</u> safe access and egress to the scene of operations and communicate avoidance routes <u>for a flood</u>
<u>Revised</u>	Consider <u>the effects of flooding when establishing</u> predesignated strategic holding areas and <u>locations for resources</u> forward control points
<u>Revised</u>	<u>Consider using pathfinders to identify and update</u> safe routes and holding areas as the <u>flooding incident</u> develops
<u>New</u>	<u>Establish and regularly assess</u> exclusion routes for a flood
<u>New</u>	<u>Consider avoiding evacuation routes to prevent potential conflict between response and public use during a flood</u>

Control measure – Safe system of work: Working near, on or in floodwater (NEW)

CONTROL MEASURE KNOWLEDGE

Many of the hazards, and therefore many of the control measures, for working near, on or in water apply to floodwater as well.

Cordons

In floods the cordons may need to extend to and protect a large area, making them difficult to establish and maintain. The cordons may also need to be adjusted as the floodwater rises and falls. For more information refer to Water rescue – Cordon controls: Water rescue.

Communication

When working in floodwater, communication between emergency responders may be more difficult, due to the sound of water and potentially extensive distances. For more information refer to Water rescue – Effective communications: Water rescue.

Personal protective equipment

Personnel working near, on or in floodwater must wear appropriate personal protective equipment. This may be challenging, given the environment they will be working in, potentially for protracted periods and when carrying out a variety of tasks. For more information refer to Water rescue – Personal protective equipment: Water rescue.

Safe entry into the water

Due to the potential hazards of working in floodwater, incident commanders should only deploy the minimum personnel and those who know how to safely enter the water. For more information refer to Water rescue – Safe entry into the water.

Safety officers

As personnel may need to work at some distance from the incident commander, consideration should be given to appointing safety officers who are briefed to, for example, monitor the changes in the floodwater or monitor the activity of personnel when working near, on or in floodwater. For

more information refer to Water rescue – Safety officers: Water rescue.

Control measure – Clearly defined area of operations: Flooding

CONTROL MEASURE KNOWLEDGE

The area of operations during a flood may be vast. To help manage wide area flooding, it can be subdivided. Intelligence reports will contribute to defining the area of operations and the development of a common operating picture (COP). The defined area may be dynamic and require updating regularly.

Sectors identified for search-related tasks should be searchable within an operational period for the assigned [asset resources](#) and have clearly identifiable boundaries.

-There should be a clear plan of action to deal with flood casualties and survivors, [including how to establish a search box for casualties in floodwater](#). [For more information refer to Water rescue – Clearly defined area of operations: Water rescue.](#)

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
New	Consider providing suitable PPE and equipment for working near, on or in floodwater	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
New	Where possible, establish, maintain and regularly monitor inner and outer cordons for a flood
New	Consider appropriate methods of communication between personnel for a flood
New	Ensure that personnel wear suitable PPE and personal flotation devices when working near, on or in floodwater
New	Only deploy the minimum personnel required into floodwater
New	Consider appointing a safety officer to monitor the hazard presented by floodwater
New	Consider subdividing areas of operations for a flood
New	Consider sectors for search-related tasks with clearly identifiable boundaries for a flood

Hazard – People at risk: Flooding (NEW)

HAZARD KNOWLEDGE

If flooding has been forecast, actions to prevent people from becoming at risk may have taken place. These could include:

- Evacuating people from buildings or locations that may be directly or indirectly affected
- Cordoning off the area that may flood to prevent people or modes of transport from entering
- Closing or rerouting transport networks

However, once an area has flooded, or if the flooding is sudden, there may be people at risk who require the assistance of emergency responders. People may be:

- Trapped in a building affected by floodwater; the water may be inside the building, outside the building or both
- Trapped in a mode of transport in floodwater
- Stranded in transport networks due to power supply interruption
- Stranded on high ground surrounded by floodwater

There may also be reports received about missing people during or following a flood.

If people are not provided with appropriate assistance, they may put themselves at greater risk by entering the floodwater.

The hazards of a casualty actually being in the floodwater, and the control measures for the search and rescue of them, are contained in the Water rescue guidance.

People trapped in a building due to floodwater

Flooding can often lead to people becoming trapped due to water surrounding or entering buildings. Flooding is likely to affect a wide area, leading to multiple people being trapped in buildings and potential widespread interruption to power supplies.

People who have become trapped in a building may not appear to be in immediate danger. However, due to the risks associated with water and the additional risk of water in a building there is still a significant risk of injury or death.

Water can enter buildings through apertures such as doors and windows, air bricks on exposed walls and gaps in the floor. Pressure created by flooding can reverse the flow of drainage systems and pipes, causing water to back-up and enter a building through sinks, toilets, and other drainage systems.

Differences in pressure may cause water to move through semi-permeable materials, such as bricks. If water levels are over a certain height, even a building with property level protection, such as door barriers or sandbags, will start to experience some water ingress.

Water in buildings can compromise the safety of gas and electric supplies to both the building and appliances in the building, causing an increase in fire risk. Water is an excellent conductor of electricity, therefore there is a significant risk of electrocution if water has entered buildings. This may be caused by:

- Touching or operating electrical installations or appliances while standing in water
- Electrical installations or appliances being submerged in water, causing electrification of the water
- Damaged electrical installations or appliances, causing electrification of the water

People trapped in modes of transport in floodwater

People at risk may become trapped in a mode of transport if it is surrounded by floodwater. In low levels of water, modes of transport may be stable; but if water levels rise, they may become buoyant.

Water entering a mode of transport may affect its electrical systems and powered windows, although they may still work for a time, even if it is full of water. Modes of transport are not airtight, and it is unlikely for there to be an air bubble inside if it submerges.

Control measure – Protecting people at risk from floodwater (NEW)

CONTROL MEASURE KNOWLEDGE

People at risk from floodwater may need to be:

- Provided with advice about whether to evacuate or shelter in place
- Helped to evacuate or reach shelter – for more information refer to [Operations – Evacuation and shelter](#)
- Rescued from their location – for more information refer to [Search, rescue and casualty care](#)

Pre-mobilisation of resources

Fire and rescue services should consider pre-mobilising resources when a flood warning is issued. This can ensure resources are within the areas like to be affected and provide immediate response. Fire control rooms should be updated on a regular basis on the current situation in relation to people identified as being at risk and current actions being taken.

Fire control rooms should inform other organisations about the fire and rescue service resources deployed, their location and any actions currently being taken. Information should also be requested from other organisations.

Effective communication during a flood

Consideration should be given about the communication methods that can be used during a flood, taking into account the potential impact of floodwaters on utilities such as electricity and aerals.

The multi-agency response to a flood will make it necessary for all organisations involved to regularly

communicate with each other.

If the incident requires local authorities to establish reception centres, or other facilities to deal with evacuated or displaced people, the fire and rescue service should provide them with regular updates. The local authority should detail their requirements, which may include information such as:

- How many people may require assistance
- How many companion animals may be involved
- An estimated time for when facilities will be required, and for how long
- Special needs or requirements

Warn, inform and advise people

Any messages related to flooding should be co-ordinated by the appropriate agency and services should not deviate from publicly issued advice. However, if the advice or water survival guidance needs to be changed, the fire control room and appropriate agencies should be advised as soon as possible.

People may not respond to warnings and instructions. This could be due to many reasons, including:

- Language barriers
- Fear or distrust of authority
- Lack of communication technology, which could be due to the interruption of power supplies

It may be possible to use alternative means of communication to provide flood warnings and instructions, such as pictorial warning systems, translation sheets or community champions. If a flooded area is difficult to gain access to, it may be feasible to request that a police helicopter uses its loudspeaker to deliver the flood warnings and instructions.

If people are in contact with a fire control room, or another emergency service control room, they may be receiving water survival guidance if they are at risk due to flooding. The incident ground and the relevant control room should liaise to ensure the people at risk are being given appropriate advice. The people at risk may need to be provided with instructions to assist with the tactical plan.

Fire control and on-scene personnel should liaise to:

- Establish what survival guidance should be provided to people at risk of flooding or floodwater
- Ensure the survival guidance being given to people at risk reflects and supports the current tactical plan

For more information refer to [Operations – Warn, inform and advise people](#). There will also be a need to raise public awareness, potentially via media channels. For more information refer to [Major incidents – Public awareness](#).

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
<u>Revised</u>	Consider <u>developing pre-mobilisation plans for</u> resources that may be affected by flooding when a flood warning is issued	21752
<u>New</u>	<u>Develop arrangements with partner agencies for the delivery of warnings, information and advice during a flood</u>	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
<u>New</u>	<u>Establish and maintain multi-agency communication during a flood</u>
<u>New</u>	<u>Regularly provide the lead agency and the fire control room about people evacuated or displaced and any further information that may be required for a flood</u>
<u>New</u>	<u>Liaise with the appropriate agency and the fire control room to ensure people at risk in flooding are being provided with the most appropriate message and water survival guidance</u>
<u>New</u>	<u>Liaise with the fire control room if the current message or water survival guidance may be inappropriate</u>

Fire control personnel should:

Revised, new, archive or no change	Tactical action
<u>New</u>	<u>Implement available pre-mobilisation plans when a flood warning is issued</u>
<u>Revised</u>	Consider requesting information that may be held by other e Category 1 and 2 responders s agencies and other organisations
<u>New</u>	<u>Provide regular updates to local authorities of evacuated or displaced people and any further information that may be required for a flood</u>
<u>New</u>	<u>Provide water survival guidance in line with publicly issued advice unless on the instruction of the incident commander</u>

Control measure – Search of the flooded built environment
~~Co-ordinated search plan:~~
Flooding

This control measure should be read in conjunction with Search, rescue and casualty care – Effective search management

CONTROL MEASURE KNOWLEDGE

The search for a missing person inland, including during a flood, is the responsibility of the police.

[However, the fire and rescue service have a duty to protect life and could be the first to arrive at a flood that involves a missing person. The fire and rescue service may be asked to take the lead for the co-ordination of the search for people at a flood.](#)

There is an established hierarchy of search activities for wide area disasters, which is also applicable to floods. Initial reconnaissance is about developing intelligence to inform where to search, creating a common operating picture (COP) and directing mobile, uninjured survivors to reception centres. [The initial search phase does not usually include complex rescue activity is normally conducted during the initial reconnaissance phase.](#)

Hasty search:

An initial search to identify the location of easily found casualties and perform very simple rescues or extrications. [The focus is on establishing](#) the search and request resources to provide the rescue response.

Primary search:

House to house type activities, typically using shout and listen techniques as well as quick visual sweeps to look for casualties. [The focus is on](#) the collection of intelligence, such as the number of people in a building and survivor needs assessment.

Secondary search – Low coverage:

A more detailed search, including the movement of debris in buildings, clearing street debris to find casualties and a detailed search of debris in areas away from human habitation to find missing people.

Secondary search – High coverage:

Full entry into all parts of buildings with the removal of debris, [with](#)— no further search activity to be conducted on completion. Removal of all debris from areas with human habitation. Extensive search of other debris to ensure a high coverage search, [moving](#) debris from one place to another to ensure it is searched. This would usually be conducted during the later stages of the response phase or as part of the recovery phase. The nature of these searches would usually be to locate flood casualties; [and](#) the protection and recovery of evidence should be a considered to support the relevant authorities.

[People](#) ~~Transient populations~~ may be living [off-grid or](#) in [places](#) ~~areas~~ that are not registered [as](#) [accommodation](#) and may need to be [located](#) ~~identified~~ using [other means such as](#) aerial [resources](#) ~~assessment~~ or thermal imaging.

[Some communities may not respond to traditional methods of communication such as megaphones, flood alerts, TV or radio. This may be because the community does not have access to the required technology or does not understand the language that is being used. Where necessary, alternative means of communication such as pictorial warning systems, translation sheets or community champions may assist in providing flood warnings.](#)

Aerial search:

Aerial ~~resources/assets, including helicopters, fixed-wing aircraft and unmanned aerial systems (drones)~~, may be ~~requested/used~~ to search larger flood affected areas. For more information refer to:

- ~~See Control measure – Specialist resource: Helicopter~~ Search, rescue and casualty care – Aerial resources: Drones for search
- Search, rescue and casualty care - Aerial resources: Helicopters for search and rescue

Some aerial assets may be suitable for transferring search teams or equipment to hot spots or lily pads. Lily pads may also be used as a temporary area of relative safety for ~~evacuees/survivors~~. For more information refer to Transport - Joint working with helicopter services.

Search in or rescue from floodwaters

If a casualty is known or suspected to be in the floodwater, the Water rescue guidance should be applied.

Casualty care

If a casualty requires first aid or other medical care, the Search, rescue and casualty care guidance should be applied. The ~~Water rescue~~ guidance contains casualty care specific to that context.

Commented [AG1]: Add link when available

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
<u>New</u>	Liaise with local authorities/other organisations or emergency planning groups to develop multi-agency arrangements for searching procedures at a flood events	
<u>Archive</u>	Ensure incident commanders understand the principles of search co-ordination	21709

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
<u>Revised</u>	Work with emergency services and multi-agency responders/other organisations to co-ordinate <u>a search of the flooded built environment</u> response
	Identify the casualty's level of consciousness and offer reassurance where possible
	Establish casualty details (name, age, sex, size, clothing, state of mind, swimmer, floating, sub-surface)

Commented [KK2]: Water rescue

Commented [KK3]: Water rescue

Control measure – Evacuation and shelter: Flooding

This control measure should be read in conjunction with Operations – Evacuation and shelter

CONTROL MEASURE KNOWLEDGE

~~It may be feasible to carry out Flood evacuation prior to a flooding event, if there is a high degree of certainty in the forecasting of its impact warrant pre-emptive action. This may include a requirement to establish reception centres and other care facilities and should be carried out in conjunction with local and national responses.~~

In some circumstances, vertical evacuation, which is (the movement of people to a higher floor in a building their own property), may be considered. This strategy may be unsuitable for certain some property types buildings or people, including and vulnerable groups, and it may not be suitable effectiveness is limited for longer term flooding as the effect on utility supplies, including the availability of clean drinking water, and the the health risks associated with flooding may force longer term full evacuation.

~~Properties affected by flooding may no longer be habitable and the relevant agencies should consider the need for long-term rehousing following evacuation.~~

~~During evacuation, it may be necessary services should consider the need to evacuate and accommodate provide shelter for communities those living in vulnerable properties accommodation, including:~~

- ~~• such as Holiday homes~~
- ~~• and Caravan parks~~
- ~~• Campsites~~
- ~~• Houseboats~~
- ~~• Buildings that are unoccupied, derelict or awaiting demolition~~

~~Large scale evacuations rely on effective management. Failure to manage evacuations can result in members of public taking actions that are not compatible with the overall evacuation strategy and may affect the success of future evacuations. Messages should be clear and reception centres should be established and ready to accept people prior to the need to evacuate.~~

Assisted evacuation

There may be people who are not at harm but are physically unable to evacuate due to floodwater. For example, people may be unable to leave their properties as the road for egress has flooded.

Personnel may be required to assist with evacuation if the order for people to evacuate has been issued. Personnel may need to use:

- Fire and rescue service vehicles that are capable of entering water
- Non-powered watercraft, such as a rescue sled

- Wading techniques

While not a rescue, the term assisted evacuation only applies to people who are not in any immediate life-threatening situation.

Fire control and on-scene personnel should liaise to provide information and updates about people who need assistance to evacuate from the effects of flooding or floodwater, and those who have been evacuated.

Animals

Results of search activities may indicate that companion animals or livestock need to be evacuated or taken to shelter as part of the flood response. For more information refer to:

- Incidents involving animals: Animals requiring evacuation
- Incidents involving animals: Animal in water, on ice, or on unstable ground

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
<u>Revised</u>	<u>Establish appropriate evacuation plans for foreseeable floods, working with partner agencies and lead local authorities to develop evacuation emergency plans for a flood events</u>	21471

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
<u>Revised</u>	<u>Implement evacuation arrangements for people at risk from the effects of flooding and rising flood-waters</u>
<u>New</u>	<u>Identify the number and location of people who need assistance to evacuate from the effects of flooding or floodwater</u>
<u>New</u>	<u>Regularly provide details to the fire control room of people assisted to evacuate from a flood</u>

Fire control personnel should:

Revised, new, archive or no change	Tactical action
<u>New</u>	<u>Liaise with on-scene personnel to provide information and updates about the number and location of people who need assistance to evacuate from the effects of flooding or floodwater</u>

New	Provide regular updates to local authorities of people assisted to evacuate from a flood
---------------------	--

Hazard – Insufficient resources: Flooding

[This hazard should be read in conjunction with Incident command – Insufficient resources](#)

HAZARD KNOWLEDGE

Depending on the scale and durations of flooding, local [emergency service](#) resources may be overwhelmed [by requests for assistance](#) or [be insufficient in either numbers or capability](#). It may be necessary to mobilise National Resilience resources or request military aid [under Military Aid to the Civil Authorities \(MACA\) principles](#). [If a flood is determined to be of sufficient extent in impact or duration, it may be necessary to declare it as a major incident](#). For [more further information refer to see National Operational Guidance: Major Incidents](#).

~~When National Resilience resources are requested, the response is co-ordinated considering the current and potential development of an incident. The impact of deploying~~ When local resources or [invoking mutual aid arrangements for a flood, which may be protracted, are used during a response the potential escalation, duration or movement of an incident](#) should be considered. [The demand for Rresources across a region may be challenging](#) ~~committed in other areas may subsequently be required to respond locally especially~~ if the flooding spreads.

[Working with voluntary or uncategoryed organisations that may attend a flood, may result in discrepancies or lack of understanding. This may especially occur if responders are trained to different levels of response such as those detailed in the Department for Environment, Food & Rural Affairs \(Defra\) Flood rescue concept of operations \(FRCO\).](#)

[Incident commanders need to be mindful that when using locally sourced volunteer or uncategoryed teams, may be made up of individuals that do not all meet the requirements set out in recognised guidance such as the FRCO.](#)

Control measure – Specialist resources: [Flood responseing](#)

[This control measure should be read in conjunction with Incident command – Specialist resources](#)

CONTROL MEASURE KNOWLEDGE

~~A national mutual aid scheme has been developed by the Department for Environment, Food and Rural Affairs (Defra) to provide a framework for co-ordinating a rescue response to major flood events. This includes Defra's [Flood Rescue Concept of Operations](#) that provides a model for flood incident management for all flood events from a local deluge to catastrophic wide area inundation.~~

~~Co-ordination of wide area flood response will be managed under the National Coordination and Advisory Framework (NCAF), the established formal governance structure for managing National Resilience assets such as urban search and rescue and mass decontamination. Flood response sits alongside these capabilities and mobilisation of flood resources will be in line with existing arrangements for those functions. For more information see [Request National Resilience resources](#)~~

[for flood rescue.](#)

Water incident managers or equivalent, subject matter advisers (SMA) and subject matter experts (SME) will provide additional support and guidance during a response to a flood and should be considered as part of a response to water incidents. High volume pumps (HVP), water rescue teams and boat teams are also available to assist with incidents when required. A national asset register of available resources to assist services and provide mutual aid, grouped into designated team types, is maintained and updated. This provides a simplified means of identifying and requesting resources for different levels of flooding. Resources can be requested from National Resilience Fire Control (NRFC). Refer to Defra's [Flood Rescue Concept of Operations](#) for further information regarding team typing and available resources. See National Operational Guidance: Major incidents for details of military assistance.

In addition to National Resilience resources, including flood response and high volume pump (HVP) capabilities, ~~Some other~~ organisations, such as the Royal National Lifeboat Institution (RNLI), have inland flood rescue teams that may [be able to provide a flood assist during response to flooding](#). During response to wide area flooding, resources should be mobilised using established National Resilience protocols.

For ~~smaller~~ flooding incidents [that do not require a national response](#), resources ~~may be~~ [available through requested using](#) local arrangements [or memoranda of understanding \(MoUs\)](#). Any local arrangements for mutual aid should consider the impact on neighbouring areas of a flood or its potential development.

[Watercraft](#)

Watercraft, such as boats or sleds, may be available locally or through mutual aid agreements, and [provide functions such as:](#)

- ~~offer additional support such as~~ [casualty transfer capabilities](#). They may assist during
- ~~Evacuation~~
- ~~and may provide the best means of~~ [conducting a search](#)
- ~~or performing a rescue in large bodies of water or water that may otherwise be too difficult to access or work in.~~

Any watercraft used should be suitable [for the environment](#), considering:

- Depth [of water](#)
- Strength [and speed](#) of flow [of water](#)
- [Hazards, including](#) ~~Debris in water~~ that may affect propellers
- [Equipment required for the tasks](#)
- [Duration of deployment](#)
- [Limitations of their use](#)
- ~~Any other hazards present~~

Watercraft should be ~~erewed operated~~ by personnel ~~or other emergency responders who are~~ trained ~~and equipped~~ for the environment and ~~the tasks required for which they are deployed~~.

~~When using watercraft, safe suitable launching and bail-out sites should be identified prior to deployment of watercraft into floodwater, and any limitations of the craft considered. All watercraft should be suitably equipped for the environment, task and duration. Certain powered watercraft may not be suitable for deployment in the flood environment due to the depth and presence of debris and road furniture.~~

Aerial resources

~~Air support assets~~ Aerial resources may be requested are available to assist in surveillance, search and rescue, casualty transfer and deployment of equipment and personnel. For more information refer to:

- Search, rescue and casualty care – Aerial resources: Drones for search
- Search, rescue and casualty care - Aerial resources: Helicopters for search and rescue
- Transport - Joint working with helicopter services

Voluntary or uncategorised organisations

Voluntary or uncategorised organisations may play a very significant role for an emergency response and have specific capability that can enhance flood response.

They may have a broad area of expertise in a specific area, with proven skill levels and a capability that is different to or above Category 1 and Category 2 responders. It is essential to establish their capabilities to ensure operating practices are understood prior their deployment.

Individuals who meet a recognised standard, such as those defined in the Department for Environment, Food & Rural Affairs (Defra) [Flood rescue concept of operations \(FRCO\)](#), should have an understanding of hazard and risk identification, control measures and safe systems of work at a flood. Those registered as assets should understand that they will be operating within a risk-managed environment and be prepared for the constraints that this might bring.

To support health and safety management of those from voluntary or uncategorised organisations, there is a need to communicate the overarching plan. This should provide them with an understanding about the incident command structure within which they will be expected to operate. If any issues arise, these should be discussed at the earliest opportunity.

Military aid

It may be necessary to request support of the armed forces for a flooding if resources are overwhelmed or to provide a specialist capability. The support of the armed forces to civil authorities in the UK is officially termed Military Aid to the Civil Authorities (MACA). Armed forces can assist with:

- Building flood defences
- Evacuating people

- [Providing helicopter support](#)

[For further information about MACA refer to the JESIP Joint Doctrine.](#)

[Joint training and exercises](#)

[If fire and rescue services establish mutual aid, memoranda of understanding \(MoUs\) or other arrangements for flood response, it may be beneficial to participate in joint training and exercises. This will help to improve interoperability by gaining an understanding of the capabilities of external agencies when dealing with incidents.](#)

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
	Establish methods of mobilising and accepting National Resilience and mutual aid resources	21439
New	Maintain a directory of emergency contact details for specialist resources that can assist with a flood response	
New	Consider establishing local arrangements or memoranda of understanding (MoUs) with organisations that may support for a flood response	
New	Participate in joint training and exercises with other agencies and organisations to improve interoperability at flood sing incidents	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
Revised	Request appropriate Consider the need for specialist resources for a flood response during flooding and request them through appropriate channels
New	Ensure watercraft are operated by personnel or other emergency responders who are trained and equipped for the flood environment and the tasks required
New	Establish safe launching and bail-out sites before deploying watercraft in floodwater
New	Establish capabilities of individuals from voluntary or uncategorised organisations prior to their deployment during a flood
New	Communicate hazards and risks identified, the overarching plan and the incident command structure to voluntary or uncategorised organisations that are responding to a flood
New	Co-ordinate the flooding response with voluntary or uncategorised organisations in attendance

Control measure – Request National Resilience resources for flood rescue

CONTROL MEASURE KNOWLEDGE

Much of the information regarding flood rescue can be found in the [Department for Environment, Food & Rural Affairs \(Defra\) Flood rescue concept of operations \(FRCO\)](#), ~~published by Defra~~. The information provided in this section of National Operational Guidance seeks to provide high-level detail that specifically involves the fire and rescue service.

Interoperability is critical for routine cross border mutual aid operations and for larger scale incidents involving deployment of national assets. The duty to co-ordinate inland flood rescue lies with the police; they will have primacy during a major flood ~~events~~. During a major flood ~~event~~, flood rescue assets will be deployed from a wide range of organisations, including emergency services and volunteers.

The common objectives for a flood rescue response are:

- Saving and protecting human life
- Relieving suffering
- Protecting property
- Providing the public with information
- Containing the emergency – limiting its escalation or spread
- Maintaining critical services
- Maintaining normal services at an appropriate level
- Protecting the health and safety of personnel
- Safeguarding the environment
- Facilitating investigations and inquiries
- Promoting self-help and recovery
- Restoring normality as soon as possible
- Evaluating the response and identifying lessons to be learned

Therefore, the response of the fire and rescue service may include the provision of additional assets, for example, high volume pumps (HVPs), water rescue and other related activities.

Once a full picture of the potential flood is established, a strategy for dealing with the incident must be developed. This should set the priorities for the management of the event and allow an accurate assessment of operational requirements. To provide a safe and efficient response, it is essential that these resources are capable of operating at an incident and do so under a single unified command system.

Requesting a national response

Assets and skills hosted by individual fire and rescue services, and other agencies, can respond if

Commented [AG4]: Needs to be a new control measure on the website as it has slight variances to its counterpart in the Water rescue guidance

specifically requested to do so as a national capability and where incident timescales allow. If the fire and rescue service incident commander believes that national flood rescue resources are required, they should [use agreed protocols to](#) provide the following information to ~~the~~ National Resilience Fire Control (NRFC):

- Location of incident or the expected time and location of impact
- Nature of the incident and any specific hazards
- Prevailing weather and, if known, water conditions
- Estimated number of persons requiring rescue
- Local resources already in attendance ~~and/or~~ available
- Requirement for urban search and rescue (USAR) teams; they may be able to construct landing platforms, etc.
- Estimate of mutual aid resources required, ~~(as detailed in the Flood Rescue of Concept of Operations)~~ – this may be flood rescue teams ~~and/or~~ flood rescue tactical advisers
- Host fire and rescue service point of contact name and contact details
- Initial location for a rendezvous point (RVP), strategic holding area (SHA) or multi-agency strategic holding area (MASHA)
- Safe approach route to the incident, including any access issues caused by the flooding

Hosting a national response

The requesting fire and rescue service may need to provide support to the National Resilience resources, including the following activities:

- Establish the number of resources being provided and identify suitable locations for them such as RVPs, SHAs or MASHAs
- Collate team data sheets on the arrival of flood rescue resources
- Record all flood rescue assets being deployed
- Establish communications protocols with flood rescue resources, including the issue of radios if not already held
- Establish and record agreed call signs for all flood rescue resources
- Nominate a site for each team at the RVPs, SHAs or MASHAs
- Request welfare facilities for flood rescue teams
- Request decontamination facilities for flood rescue teams

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
Revised	Have systems in place to request National Resilience flood rescue resources	22756
No change	Consider pre-determining locations for rendezvous point, strategic holding area or multi- agency strategic holding area	22757

Commented [KK5]: Same as WR

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
Revised	Request flood rescue resources from the National Resilience Fire Control if required, using agreed NCAF National Resilience protocols
Revised	Establish appropriate the quantity of resources being provided and identify suitable locations for them such as a rendezvous points (RVPs), strategic holding area (SHAs) or multi-agency strategic holding areas (MASHAs) for flood rescue resources
New	Provide support to the National Resilience flood resources as required
	Collate team data sheets on arrival of flood rescue resources
	Record all flood rescue assets being deployed
	Establish communications protocols with flood rescue resources, including the issue of radios if not already held
	Establish and record agreed call signs for all flood rescue resources
	Nominate a site for each team within the rendezvous point, strategic holding area or multi-agency strategic holding areas
	Provide welfare facilities for flood rescue teams
	Provide decontamination facilities for flood rescue teams

Commented [KK6]: Same as WR

Commented [KK7]: Moved to CMK

Commented [KK8]: Moved to CMK

Commented [KK9]: Moved to CMK

Commented [KK10]: Moved to CMK

Commented [KK11]: Moved to CMK

Commented [KK12]: Moved to CMK

Commented [KK13]: Moved to CMK

Control measure – [National Resilience](#): Mobilise appropriate [National Resilience](#) assets for flooding

CONTROL MEASURE KNOWLEDGE

When assessing mutual aid requirements consideration must be given to the time of day, distance to be travelled, logistical arrangements including rest and accommodation centres etc. ~~The~~ National Resilience Fire Control (NRFC), usually assisted by a National Resilience Officer or a flood rescue tactical adviser (TacAd), will co-ordinate the mobilisation of mutual aid for flood rescue, in partnership with the receiving [authority service](#).

A system of team typing has been developed for flood rescue teams. This system provides assurance regarding the capabilities of each element deployed and that each operates to a common standard and specification irrespective of the organisation to which it belongs.

The [Department for Environment, Food & Rural Affairs \(Defra\) Flood rescue concept of operations \(FRCO\)](#) provides further details on the specification for each team type.

If assets that are on the national asset register are deployed through local agreements, it is imperative that the NRFC is informed, so that these assets are flagged as not available for deployment elsewhere.

STRATEGIC ACTIONS

National Resilience should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
No change	Maintain a register of flood rescue assets by gathering updates from the holders of those registered assets, including their current availability	22767
No change	Request flood rescue assets by contacting responder organisations using agreed NCAF protocols for mobilisation; this will either be individual fire and rescue services or a control room or nominated contact(s) for an external organisation	22768
No change	Maintain a register of qualified flood rescue TacAds, including their current availability	22770
No change	Mobilise flood rescue TacAds as required	22771

TACTICAL ACTIONS

Specialist responders should:

Revised, new, archive or no change	Tactical action
No change	Assist the National Resilience Fire Control with the mobilisation of flood rescue assets

Control measure – [National Resilience: Accepting flood rescue assets](#)

CONTROL MEASURE KNOWLEDGE

All Flood rescue assets, irrespective of their organisation, will be required to comply with the incident command structure. Upon arrival, all flood rescue assets should produce a pre-prepared team data sheet in accordance with the concept of operations. This should be presented at the RVP, SHA or MASHA, so that each asset can be checked in and directed as appropriate to the incident. Usually a Flood Rescue Tac Adviser performs a ‘credentialing’ process to assess the capability of responding assets.

Details of incident arrangements, (as detailed in the concept of operations,) should be provided to the team leaders of the flood rescue assets on arrival at the RVP, SHA or MASHA, including:

- Communications detail
- Logistics, using enhanced logistics support (ELS) protocols
- Mapping or on-scene detail

- Location of casualty landing sites and/or reception centres
- Location of fuel provision for vehicles and powered craft

STRATEGIC ACTIONS

National Resilience should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
<u>No change</u>	Provide flood rescue supporting documentation for completion by specialist responders	22773

TACTICAL ACTIONS

Specialist responders should:

Revised, new, archive or no change	Tactical action
<u>No change</u>	Ensure that all flood rescue assets are checked in and provided with incident arrangements on arrival, prior to tasking

Control measure – [National Resilience](#): Tasking flood rescue resources

CONTROL MEASURE KNOWLEDGE

The resources to deal with the incident should be matched effectively against the incident need. The flood rescue tactical advisers (TacAds) will provide detailed tactical capability-relevant advice to the incident commander. This will inform the allocation of a specific site for each team within the holding area, with an established means of communication prior to tasking. Different team types should be clearly identified and located accordingly for immediate deployment.

The incident requirements should be recorded and communicated to the flood rescue response that will carry out the tasks required. Teams should be given a comprehensive operational and task specific brief. To ensure flood rescue activity is effectively managed, briefings and records should include elements such as:

- A record of the task to be carried out
- Which flood asset the task has been assigned to
- Start and finish times
- How progress will be monitored
- Search audit
- Decision logs, narratives and action logs
- Handover briefings

A full debrief should be undertaken to capture lessons learned; this should assist with planning for future

STRATEGIC ACTIONS

National Resilience should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
<u>No change</u>	Gather and assess information from debriefs, including any lessons learned that are relevant for specialist responders	22776

TACTICAL ACTIONS

Specialist responders should:

Revised, new, archive or no change	Tactical action
<u>No change</u>	Provide briefings to flood rescue teams
<u>No change</u>	Keep records and logs of flood rescue teams briefs and debriefs
<u>No change</u>	Provide regular updates to the National Resilience Fire Control via the enhanced logistical support (ELS)

Hazard – Flood damage to the built environment ~~property and infrastructure~~

HAZARD KNOWLEDGE

Property damage caused by flooding can be significant. Short-term cleaning up costs can be high, and water can ~~also~~ cause longer term cosmetic damage, warp timbers, cause degradation of structural elements and lead to mould and damp. Scouring by fast-moving water may affect the stability of foundations or cause subsidence.

In addition to the damage caused by flowing water, lateral pressure can create significant forces. The greater the difference between the height of water on either side of an impermeable surface, the greater the pressure created. This pressure can cause structural damage to properties and potentially result in the collapse of temporary or unstable structures.

Structures may be built of partially permeable materials, such as brick. The differences in pressure will cause water to move through semipermeable surfaces, even if all apertures are closed. Over a certain height even a home-building with property-level protection, such as door barriers or sand bags, will suffer from ~~start to see some~~ water ingress.

Secondary effects of flooding include disruption to infrastructure, such as the supply of clean water, electricity and transport and can include damage to Critical National Infrastructure (CNI). Other effects of flooding may include ~~failure of automatic telling machines,~~ disruption to food and water supplies and health care facilities, potentially resulting in long-lasting damage to the community ~~economy of an area. The inability to access resources, provision of food and clean water, delays in responding and the effects on the lives of responders outside of their employment should be considered during planning for floods, particularly for extended out-of-area response.~~

Water treatment works

Water treatment works can be affected by flooding, preventing the production of clean water for drinking and bathing. Prolonged loss can increase the risk of ill health and lead to dehydration amongst vulnerable communities. Although the provision of clean water during an emergency will be considered as part of a response to flood, ~~this suppliesy~~ will be limited and costly. Where possible, water treatment facilities should be protected rather than relying on temporary provision.

Transport networks

Flooding, or resultant landslides, can make transport routes impassable and prevent access and egress to incidents. Roads ~~Safe routes~~ may become congested as the public attempt to evacuate or find passable routes.

~~Landslides linked to flooding may cause routes to become blocked and areas of r~~ Road or rail networks may ~~become so~~ damaged by water or debris, ~~and that they can~~ may not be ~~used-usable~~ after flood-waters recede. People may become stranded either on transport ~~the road~~ networks or ~~at~~ transport hubs and may require evacuation.

Control measure – Divert the flow or improve the drainage of floodwater

CONTROL MEASURE KNOWLEDGE

Even during smaller incidents, any diversion of flood water should be done in consultation ~~and~~ with, and the consent of the relevant responsible agency, such as an environmental ~~agencies or~~ land agency ~~ies, or other responsible groups~~, as there may be unintended consequences. The diversion of water may:

- ~~–~~ Affect biosecurity
- ~~Result in the~~ cause flooding ~~of~~ in unaffected areas
- ~~–~~ Cause ~~translocation of~~ damage to other areas
- ~~or otherwise~~ negatively impact affect the holistic flood management plan-

Commented [AG14]: Add link to EP

It may be beneficial to establish memoranda of understanding (MoUs) with responsible agencies to determine roles and responsibilities for diverting the flow, or improving the drainage, of floodwater.

Divert the flow of floodwater

It may be possible to divert the flow of water to either prevent flooding or protect assets. This can be achieved by:

- Using pumps to redirect water
- Making use of existing water management systems
- Excavating channels to direct the flow
- Erecting barriers

During larger floods, diverting the flow may allow areas to be protected. Areas of importance should be identified, such as those containing Critical National Infrastructure (CNI), important transport ~~routes~~ networks or built-up areas. It may also prevent additional hazards, ~~from being generated~~ such as contamination of water supplies; once contamination has occurred the implications may be significant.

Improve the drainage of floodwater

Removing blockages in drainage systems and water-ways is not the responsibility of the fire and rescue service. However, if ~~where~~ it is appropriate and safe to do so, removing objects that are preventing flood water from draining away may prevent or reduce damage ~~caused by flooding and may be considered where appropriate.~~ Such action should not be taken until the consent of the relevant responsible agency has been obtained.

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
Revised	Consider establishing memoranda of understanding (MoUs) Have policies to support the sharing of information during a flood between with responsible agencies for dealing with floodwater to identify and remove blockages as part of a multi-agency plan	21482
Archive	Identify and prioritise risks in their area that may be at risk from flooding	21483
Archive	Develop a holistic flood water management plan	21478

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
Revised	Identify and consider protecting eCritical National i nfrastucture and receptorspotential sources of contamination
Revised	Consider diverting flood-water with the consent of the relevant responsible agencyin consultation with lead agencies to protect properties, important areas and infrastructure
Revised	Consider improving theremoving blockages from drains and water channels to allow drainage of floodwater with the consent of the relevantin consultation with responsible agencies

Control measure – Pumping out [floodwater](#)

CONTROL MEASURE KNOWLEDGE

Fire and rescue services may be required to pump out flood-water to prevent or reduce damage to properties and infrastructure. Pumping water may be achieved using mobile pumps, vehicle mounted pumps or high volume pumps (HVP). Any decision to pump water from a structure should consider:

- Why pumping out is being considered and whether [any](#) damage will be prevented
- Where water will be moved to and what impact it will have, including whether it will affect any undamaged or unaffected areas
- Whether conditions are likely to worsen or re-flood a structure, and whether any reasonable action can be taken to prevent this from occurring
- The duration that pumping activities will be required to continue for [to prevent or reduce damage](#)
- The effect of lateral [hydrostatic pressure on should be considered when making a decision to pump out](#) a structure, [as](#) the combination of scouring, water damage and the pressure differential created by lowering the internal water level by pumping, may cause unnecessary

structural damage.

- The effect removal of water from temporary or unstable structures will have on stability, ~~if~~ [where](#) water pressures have stabilised
- Whether the movement of water to unaffected areas will affect biosecurity or harm the environment

When making the decision to move large volumes of water, downstream conditions and development of a flood event should be considered. This assessment should include the time lag for water to arrive and probable duration of pumping activities.

During flooding, it may be ~~prudent~~ [appropriate](#) to wait for water to subside, rather than pumping ~~out~~ [properties out](#) during flooding. Once waters begin to recede, pumping water from flooded properties may speed the recovery process but should take place as part of a structured recovery plan.

~~When pumping out for extended time periods the welfare of personnel should be considered. Contaminated equipment and pumps will require decontamination. Effective decontamination of HVPs requires large volumes of water and space which should be considered prior to redeployment of assets.~~

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
Revised	Establish what Provide appropriate resources can be requested to provide pumping out of floodwater to support responders when responding to flooding	21487

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
Revised	Consider the effects of pumping out structures, including temporary or unstable structures
New	Request appropriate resources if pumping out of structures is required
New	Consider the impact of pumping out structures on biosecurity and the environment, including to undamaged or unaffected areas
New	Consider delaying pumping out structures until the floodwater has subsided

Control measure – Request National Resilience resources for high volume pumps: Floodwater

CONTROL MEASURE KNOWLEDGE

High volume pumps (HVPs) can be used for incidents including:

Natural flooding – Flooding is becoming an increasing problem; it may cause widespread damage and disruption to areas and can often affect a large number of locations at the same time. HVPs can enhance the ability of the fire and rescue service to mitigate the effects of flooding. This assistance may involve working in partnership with the lead government agency for flooding or the environmental agency.

Deliberate flooding – There are incidents where an individual or an organisation deliberately cause flooding. HVPs can enhance the capability of the fire and rescue service, to mitigate the effects of these incidents. This assistance may involve working alongside water or wastewater service suppliers and the environmental agency.

~~Firefighting activities – HVPs can enhance and provide resilience for fire and rescue services, by pumping high volumes of water for firefighting and bulk media provision at the incident ground. If incidents occur on a larger scale, or if several incidents occur at the same time, it may affect the volume or pressure of the local water supply. If HVPs use pressure fed water supplies, it is essential to liaise with the local water authority in order to maximise the effectiveness of available water mains and not cause further disruption to the water network.~~

Operations to save life, prevent incident escalation or to render humanitarian services should not be delayed awaiting the attendance of HVP resources, subject to a risk assessment.

Requesting National Resilience response

If the fire and rescue service incident commander believes the National Resilience HVP capability is required, they should provide the following information to National Resilience Fire Control (NRFC) via the affected fire and rescue service control room:

- Intended use of the HVP – water provision or water removal
- Incident details, including size, type and scale
- Current pumping resources and capabilities in use
- Resource requirements
- Initial location for a rendezvous point (RVP), strategic holding area (SHA) or multi-agency strategic holding area (MASHA)
- Host fire and rescue service point of contact name and contact details
- Safe approach route to the incident
- Potential length of deployment

Early consideration should be given to ~~the requesting of a T~~tactical ~~A~~adviser for information and

Commented [AG15]: Set up as a new control measure on the website.

The original CM is also in the Fires and firefighting guidance. It is being split into two:

- 1.Request NR resources for HVP: Floodwater (in Geophysical hazards)
- 2.Request NR resources for HVP: Water delivery (in Fires and firefighting)

Generic content will remain in both versions of the CM.

support regarding the capabilities and deployment of HVPs. This can be sought through the National HVP Tactical Advisers (TacAds) cadre, either remotely via telephone or by requesting them to attend the incident.

Any request for a Tac-Ad should be made to NRFC via the affected fire and rescue service control room.

HVP assets are mounted on prime movers and are classed as large goods vehicles. They weigh approximately 26 tonnes fully laden. This should be taken into account when determining suitable access and egress routes, and hard standing areas to demount units. Demounted units may be left in situ for several days; therefore the security of the assets should be considered.

If the deployment of a HVP will be into open water consideration should be given to the distance from a suitable hard-standing area for the HydroSub to the open water. HVPs have a submersible pump with hydraulic power hoses and winch cable of 60m, with the submersible pump capable of being deployed up to a distance of 55m from the HydroSub. A small number of HVPs have been modified with 80m of hydraulic power hoses and winch cable to enable the deployment of the submersible pump up to a distance of 75m from the HydroSub.

HVP delivery hose lines are 150mm in diameter when laid and charged and can cause obstructions to transport networks and premise access. Hose line routes should be carefully considered, in conjunction with the use of hose ramps. Three hose ramp sets are provided with each full HVP set.

[Hosting a national response](#)

[The requesting fire and rescue service may need to provide support to the National Resilience resources, including the following activities:](#)

- [Establish the number of resources being provided and identify suitable locations for them, including pre-deployment and post-deployment locations, such as RVPs, SHAs or MASHAs](#)
- [Identify suitable routes for HVP vehicular access and demounting locations](#)
- [Consider routes for HVP hose deployment, the potential impact and mitigation options](#)
- [Identify suitable locations to clean, decontaminate and repatriate pumps and equipment if necessary](#)
- [Collate team data sheets on the arrival of HVP resources](#)
- [Record all HVP assets being deployed](#)
- [Establish communications protocols with HVP resources, including the issue of radios if not already held](#)
- [Establish and record agreed call signs for all HVP resources](#)
- [Nominate a site for each team at the RVPs, SHAs or MASHAs](#)
- [Request welfare facilities for HVP teams](#)

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
<u>Revised</u>	Have systems in place to request HVP resources, or specialist HVP capability advice, from National Resilience Fire Control	22782

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
<u>Revised</u>	Request HVP resources, or specialist HVP capability advice, from NRFC if required , using agreed National Resilience CAF protocols
<u>New</u>	Establish appropriate rendezvous points (RVPs), strategic holding areas (SHAs) or multi-agency strategic holding areas (MASHAs)
<u>New</u>	Provide support to the National Resilience resources as required
	Establish the quantity and type of resources being provided and identify suitable deployment locations for them (including pre and post deployment locations) such as a rendezvous point, strategic holding area of multi-agency strategic holding area
	Identify suitable routes for HVP vehicular access and demounting locations
	Consider routes for HVP hose deployment, the potential impact and mitigation options
	Consider water capacities available and their sustainability
	Contact local water authorities if using pressure fed supply for water delivery
	Consider the environmental impact of using HVP to deliver water from an open water supply
<u>No change</u>	Consider the environmental impact of using HVP to remove flood-water
	Identify suitable locations to clean, decontaminate and repatriate pumps and equipment if necessary
	Consider the environmental impact of water run-off at all incidents

Commented [AG16]: F&FF only

Commented [AG17]: F&FF only

Commented [AG18]: F&FF only

Control measure – [National Resilience](#): Deployment of high volume pump(s) resources

CONTROL MEASURE KNOWLEDGE

Due to the nature of use, a high volume pump(s) (HVPs) sector at an operational incident often provides a series of operational challenges for the capability. These include:

- An incident sector footprint which may span over several kilometres due to the distance that hose can be deployed, and water pumped
- The need for an adequate incident ground communications strategy, due to the potential distance between HVP crews and the limitations of some fire and rescue service radio equipment

- A need to retain a focus on HVP crew welfare management; crews can often be operating a significant distance from the main scene of operations for protracted periods
- The need to effectively manage the demands of HVP sector logistics, including:
 - Fuel supplies
 - Reliefs and welfare
 - Equipment breakdown or maintenance support
 - Security
 - Lighting
 - Recovery planning, including decontamination and cleaning

For complex or protracted incidents and those requiring multiple assets further assistance may be provided through the request and mobilisation of enhanced logistical support (ELS).

HVP equipment should only be installed, set up or operated by personnel, trained and deemed competent in its use. When deploying HVP resources, there will be a minimum of five competent HVP operators. HVP operators should only be tasked for the deployment, use and recovery of HVP equipment and not for any other purpose during the incident. The following roles are usually included in the response:

Driver/hook arm operator – trained to drive the prime mover and operate the hook lift system to deploy the main HVP module, the HydroSub and hose box modules. They can operate elements of the HVP hose recovery system within the cab to retrieve hose, and are also able to operate as a driver’s assistant.

HVP operator – trained in all aspects of HVP operation, including procedures for deploying and recovering the HydroSub, deployment and retrieval of hose, operation of the HydroSub, winch cable, and the use of all ancillary equipment

Traffic marshal ~~(also known as a banksman)~~ – trained to assist the driver with loading or unloading the HVP main module, and the loading process for the HydroSub or hose box modules. If trained to do so, they can also assist with hose deployment, hose retrieval and the operation of ancillary equipment.

Service specific support crew – trained in specific aspects of the operator’s role to suit individual fire and rescue service requirements, such as hose recovery.

STRATEGIC ACTIONS

National Resilience should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
<u>No change</u>	Provide appropriate advice and/or resources, including equipment and personnel as requested, for the incident type and size	22794

No change	Carry out specialist HVP roles appropriate to the incident type and size	22795
---------------------------	--	-------

TACTICAL ACTIONS

Specialist responders should:

Revised, new, archive or no change	Tactical action
No change	Establish adequate incident ground communications for HVP operators
No change	Manage high volume pump personnel welfare
No change	Manage the demands of HVP sector logistics

Control measure – [National Resilience](#): High volume pump hose deployment

CONTROL MEASURE KNOWLEDGE

Consultation should take place between all relevant agencies over the proposed route of the hose deployment, with consideration given to traffic management and the impact on the surrounding community.

The hose route should take into account:

- Topography
- Terrain
- Infrastructure that may be affected
- Distance
- Position of hose lines (left, right or centre lay)
- Single, ~~T~~win or multiple hose lines
- Weight of charged hose lines
- Traffic management requirements
- Drainage points
- Hose ramp points
- Discharge point
- Recovery of hose

Hose ramps should be used to protect hose lines if they are routed across vehicular access, including roads. Consideration should be given to the limited number of hose ramp sets on each HVP; there are three sets on each full HVP set. Additional hose ramps can be requested through National Resilience Fire Control (NRFC) via the affected FRS control room. Traffic calming measures and marshalling should be put in place to reduce the risk of damage to the hose lines and the vehicles crossing them; early consideration should be given requesting the assistance of the [p](#)Police, [L](#)ocal [A](#)uthority or [h](#)ighways [A](#)gency to provide traffic management solutions. Hose ramp points will be

suitably signed, coned and illuminated.

STRATEGIC ACTIONS

National Resilience should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
No change	Provide appropriate advice and HVP resources, including equipment and personnel as requested, for the incident type and size	22799

TACTICAL ACTIONS

Specialist responders should:

Revised, new, archive or no change	Tactical action
No change	Provide technical information and advice to inform the decision for hose deployment
No change	Deploy HVP hose lines following agreed routes
No change	Ensure that hose lines are obvious to traffic and are protected by hose ramps, traffic calming measures and marshalling where required

Control measure – [National Resilience Water extraction: Deploy high volume pumps to remove flood-water](#)

CONTROL MEASURE KNOWLEDGE

If there is large-scale flooding, pumping operations may need to be provided for extended durations which may extend to multiple weeks.

The suitability of the receiving area for the extracted flood-water will need to be assessed prior to operations. Considerations should include the environmental impact and the surrounding communities. For example, the receiving area should not be:

- Environmentally sensitive
- A Site of Special Scientific Interest (SSSI)
- Susceptible to further flooding

Flood-water may be contaminated with chemicals or sewage; advice should be sought from the environmental agency or hazardous materials advisor. A suitable location should be identified to carry out decontamination of equipment. A HVP Tac Ad will be able to assist with the consideration and identification of an appropriate site. Consideration should also be given to biosecurity.

Further information about the use of an HVP submersible pump can be found in the control measure for [Fires and firefighting - National Resilience water delivery: Deploy high volume pumps into open](#)

[water](#). Additional consideration should be given to the likelihood of the presence of contaminants and debris.

STRATEGIC ACTIONS

National Resilience should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
No change	Provide appropriate advice and resources for water extraction, including equipment and personnel as requested, for the incident type and size	22814

TACTICAL ACTIONS

Specialist responders should:

Revised, new, archive or no change	Tactical action
No change	Consider appropriate locations to deploy HVPs
No change	Consider the environmental impact of delivering flood-water to another area
No change	Ensure the flood-water is of a minimum depth to ensure safe submersible pump operation
No change	Place HVP equipment in a safe area that has been made as safe as practicable
No change	Adopt appropriate protocols for working on or near water when deploying or retrieving the submersible pump
No change	Monitor the function of the submersible pump during operations
No change	Carry out appropriate decontamination of equipment

Hazard – ~~Electricity~~Utilities: Flooding ~~incidents~~

HAZARD KNOWLEDGE

Water in buildings can compromise the safety of gas and electric supplies to both the building and appliances in the building, causing an increase in fire risk.

Electricity in buildings

Water is an excellent conductor of electricity, therefore there is a significant risk of electrocution if water has entered buildings. This may be caused by:

- Touching or operating electrical installations or appliances while standing in water
- Electrical installations or appliances being submerged in water, causing electrification of the water
- Damaged electrical installations or appliances, causing electrification of the water
 - ~~can have a significant effect on the immediate tactical options for incident commanders and can pose significant hazards to personnel and public. A property's electricity supply may be affected by flood water or an element of the electrical transmission or distribution network may be affected.~~
 - ~~Water can conduct electricity presenting a direct hazard to personnel and the public. Damage to electrical infrastructure could leave communities without electricity and have additional consequences that will affect the public and responding agencies.~~
- Damage to electrical installations

High-voltage electricity systems

Transmission system substations or overhead lines operate at significantly higher voltages (400kV or 275kV) than local distribution networks. Emergency services should keep away from transmission and distribution system substations and downed overhead line conductors that are affected by flooding until they receive notification from the owner or operator of the transmission system. Even ~~in~~ in flood conditions it should be assumed that all high voltage equipment remains live.

For more information refer to Utilities and fuel – Electricity.

Most equipment in substations is designed to be unaffected by a degree of flooding, although there will be a safe operating flood-level limit. If water reaches this level, the network operator may have to switch off electricity supplies for safety reasons and to prevent damage to the equipment.

Personnel should assume that all equipment in substations presents a hazard, unless the distribution network operator or transmission operator confirms that it has been isolated. ~~In most cases the primary conductors or equipment within substations are not affected by flooding. Secondary and ancillary services, such as the protection or control systems may be affected and pose a hazard. The environment around a flooded substation may contain hazards, such as Hidden trenches also pose a significant risk of injury to staff and the emergency services when working in flooded substations.~~

Battery storage facilities

The presence of any renewable energy systems, such as turbines or photovoltaic (PV) systems, may indicate that the building or facility also has battery storage facilities.

For a building, battery storage could be located anywhere inside or outside; for a residential building, the garage is a common location. Although the installer should site the battery storage so that it cannot be affected by flooding, it should not be assumed that this advice has been followed or, if it has, that the flood has remained within predicted levels.

For a larger site, such as a solar farm, the location of the battery storage should have undergone a flood risk assessment at the planning stage. In an area that is subject to flooding, the battery storage may be housed in a structure that is raised from the ground. Similarly, it should not be assumed that a flood risk assessment was carried out, that advice from the assessment was followed or that the flood has remained within predicted levels.

Flooding of lithium-ion battery storage facilities may result in the risk of thermal runaway, which could result in fire and the release of flammable and toxic gases and vapours. If this were to occur in an enclosed space, such as a garage, there would be an increased risk of an explosive atmosphere rapidly developing.

Generators

Most infrastructure has some dependence on electrical supply and although back-up systems may be available, this may also be affected by floodwaters. For example, many hospital back-up generators are in basements that can be affected by flooding.

Gas and fuel oil

Gas appliances, such as boilers, may be unsafe to use if they or their vents or flues have been affected by floodwater. Floodwaters can cause liquefied petroleum gas (LPG) or fuel oil bulk storage vessels and gas cylinders to move or detach from installation pipework.

Utility pipelines

Pipelines carrying gas, oil, water or sewage may be damaged by floodwaters. For more information refer to Utilities and fuel – Pipeline failure.

Control measure – Isolate ~~and or~~ make safe utilities: Flooding ~~electricity supplies~~

CONTROL MEASURE KNOWLEDGE

Isolating or making safe utilities during a flood will potentially be more hazardous or difficult to achieve. There should be emphasis placed on liaising with the utility provider to obtain advice or assistance if required. It may be beneficial to establish memoranda of understanding (MoUs) with utility or fuel supply companies to improve joint working at a flood.

If the hazards from the presence of utilities in a flood cannot be controlled, fire and rescue services should:

- [Establish and maintain appropriate cordons to protect members of the public, personnel and other emergency responders from the utilities that may be affected by floodwater](#)
- [Consider adopting defensive tactics](#)

[Electric and gas supplies](#)

[Control measures for dealing with electric and gas supplies are provided in the Utilities and fuel guidance, including:](#)

- [Situational awareness: Utilities and fuel](#)
- [Seek specialist advice or assistance for dealing with utilities or fuel](#)
- [Apply cordons and control for utilities or fuel](#)
- [Isolate utility or fuel supply to the premises](#)
- [Isolate utility or fuel supply within the national grid](#)

[Renewable energy](#)

[Control measures for dealing with renewable energy are provided in the Utilities and fuel guidance, including:](#)

- [Isolate photovoltaic \(PV\) systems](#)
- [Identify presence and type of rechargeable batteries](#)
- [Isolate rechargeable batteries](#)
- [Safe system of work: Rechargeable batteries](#)
- [Isolate the turbine](#)

[Pumping out of any commercial renewable energy site that has battery storage facilities should be co-ordinated and controlled by the responsible person.](#)

[Electricity](#)

[Control measures for dealing with electricity are provided in the Utilities and fuel guidance, including:](#)

- [Safe system of work: Low-voltage electricity](#)
- [Personal protective equipment: Electrical gloves](#)
- [Safe system of work: High-voltage electricity](#)
- [Contact distribution network operator or transmission operator](#)
- [Adopt defensive tactics until the utility system is isolated](#)

[Water pumping out of any electrical substations or high-voltage power equipment should be co-ordinated and controlled by the responsible person.](#)

[Utility pipelines](#)

Isolating pipelines will require specialist assistance and may take some time to achieve. For more information refer to Utilities and fuel – Isolate pipelines.

Some utility pipelines, such as sewers, contain hazardous materials. In the event of such pipelines failing, appropriate hazardous materials protocols should be applied.

Electrical isolation to small premises can be achieved by isolating electricity at the consumer unit (or fuse board) or by removing the supplier's main fuse, found on the supply side of the meter.

Removal of this fuse could be carried out by fire and rescue service personnel in extreme circumstances. Due to the possibility of small quantities of asbestos being present in older fuses, appropriate personal protective equipment (PPE) and respiratory protective equipment (RPE) should be worn.

All commercial premises will have electricity isolation points at the electrical intake. At larger sites, there may be isolation points that control areas of the site or separate pieces of machinery or equipment.

Fire and rescue service personnel will benefit from having access to risk information about equipment and its location such as:

- Substations
- Transformers
- Switchgear
- Emergency stops
- Consumer units (fuse boards)

If fire and rescue service personnel need to deal with three phase power supplies, they may need to request assistance from the electricity supplier, unless there are on site engineers competent in dealing with, and controlling, this hazard.

Health and Safety Executive – electrical definitions

It is critically important that fire and rescue service personnel understand electrical terminology when discussing isolation of electricity supplies with electricity distributors or any attending electrical engineers. Failing to understand this terminology may increase the risks encountered.

The definitions in the table below provide the explanation for words and terms used in this guidance, unless otherwise stated. Note that some of these terms are definitions from the Electricity at Work Regulations (1989):

Charged	Means that the item has acquired a charge either because it is live or because it has become charged by other means such as by static or induction charging, or has retained or regained a charge due to capacitance effects even though it may be disconnected from the rest of the system.
---------	--

Dead	Not electrically 'live' or 'charged'
Designated competent person (also known in some industries as 'authorised person' or 'senior authorised person')	A competent person appointed by the employer, preferably in writing, to undertake certain specific responsibilities and duties, which may include issuing and receiving safety documents such as permits to work. The person must be competent by way of training, qualifications and/or experience and knowledge of the system to be worked on.
Disconnected	Equipment (or a part of an electrical system) that is not connected to any source of electrical energy
Electrical equipment	Includes anything used, intended to be used or installed for use, to generate, provide, transmit, transform, rectify, convert, conduct, distribute, control, store, measure or use electrical energy
High voltage	Voltages greater than 1000V AC or 1500V DC. Voltages below these values are low voltage.
Isolated	Equipment (or part of an electrical system) that is disconnected and separated by a safe distance (the isolating gap) from all sources of electrical energy in such a way that the disconnection is secure, i.e. it cannot be re-energised accidentally or inadvertently
Live	Equipment that is at a voltage by being connected to a source of electricity. Live parts that are insulated and exposed so they can be touched either directly or indirectly by a conducting object are hazardous if the voltage exceeds 50V AC or 120V DC in dry conditions.
Live work	Work on or near conductors that are accessible and live or charged. Live work includes live testing, such as using a test instrument to measure voltage on a live power distribution or control system.
Low voltage	Voltages up to 1000V AC or 1500V DC. Voltages above these values are high voltage.

Note: on a nuclear site, the designated competent person would be referred to as the duly authorised person.

The Energy Networks Association has produced [Safety Information for the Fire Service](#). This contains information on emergency situations involving electricity, along with important contact numbers for electricity companies. It contains a rescue flow chart that may assist with risk assessments.

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
Revised	Maintain a directory of raise with emergency contact details for local utility and fuel supply companies and maintain up to date emergency contact details in their fire control rooms	13592
New	Consider establishing memoranda of understanding (MoUs) with local utility and fuel supply companies to improve joint working at a flood	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
New	Establish and maintain appropriate cordons to protect people from the utilities that may be affected by floodwater
New	Consider adopting defensive tactics if utilities cannot be isolated or made safe at a flood
New	Consider using appropriate techniques to isolate or make safe utilities at a flood
New	Seek specialist advice or assistance from the appropriate organisations for dealing with utilities at a flood

Hazard – Unstable [ground or surfaces](#)

HAZARD KNOWLEDGE

Unstable [ground or surfaces](#) can be hazardous ~~as they; an unstable or soft surface~~ may give way when downward pressure is applied. The [ground or surface](#) may be ~~so soft~~ [enough to allow people that humans or animals can to](#) sink, until movement becomes impossible. [The ground or surfaces can might](#) have a layer of relatively firm ground covering ~~a softer material surface beneath, but this.~~ [A thin layer of firm ground](#) may break through ~~if when~~ [sufficient](#) pressure is applied ~~causing personnel to sink into softer ground below.~~

Attempting ~~to work on a rescue from~~ unstable ground or ~~surfaces working at a landslide~~ without the appropriate [training, skills and equipment](#) ~~or sufficient specialist personnel~~ may result in serious injury to [personnel responders](#).

Fire and rescue service vehicles may become trapped or stranded on unstable, ~~soft or uneven~~ ground [or surfaces](#). On sites that do not have designated hard standing or purpose-made vehicle routes, ground conditions can quickly deteriorate. [For more information refer to Operations – Driving to incidents.](#)

[This hazard covers](#) ~~For the purposes of this guidance~~ unstable [ground or surfaces](#), ~~that could includes any surface that may~~ give way, break, collapse or allow people, equipment or vehicles to sink [into](#) or become stuck [in](#). This includes ~~but is not limited to:~~

- Ice
- [Mud](#)
- [Steep slopes](#)
- [Embankments](#)
- Gravel
- Sand
- [Slurry](#)
- Rubble [or debris, for example following a structural collapse](#)
- [Free-flowing solids, Bulk storage of materials that do not provide a firm footing](#) such as ~~rubble, soil, sugar, grain or rice;~~ [if these are present in a confined space, also refer to Height, structures and confined space – Confined space environment](#)

~~The hazards and associated control measures for unstable surfaces also apply to steep slopes, embankments, trench walls, cliff tops and roofs. Incidents may combine working at height, confined space and unstable surfaces.~~

[Other related guidance includes:](#)

- [Height, structures and confined spaces – Fragile surfaces, such as roofs and structural elements](#)

- [Height, structures and confined spaces – Unstable or collapsed natural or built environments, such as trenches, excavations and pits](#)
- [Height, structures and confined spaces – Unstable or collapsed structures, such as the geological causes of instability or collapse](#)
- [Industry – Stacked materials, such as manufactured or waste materials, including landfill sites](#)

If the incident on unstable ground or surfaces involves a casualty, refer to [Search, rescue and casualty care – Casualty on unstable ground](#). If the incident on unstable ground involves an animal, refer to [Incidents involving animals - Animal in water, on ice, or on unstable ground](#).

[Ground or surfaces may become unstable due to:](#)

- [A surface may appear to be stable, but the effects of the incident, for example peat or waste burning away under the surface](#)
- [The introduction of water to the ground; this could be from:](#)
 - [Operational activity may cause it to become unstable, for example include or the application of large volumes of water to a soluble or semi-soluble substance, such as when carrying out a mud rescue](#)
 - [Flooding](#)
 - [Adverse weather](#)
- [Thawing of an area where the ground or surface has been frozen](#)
- [Geological activity, for example erosion that has undermined the integrity of the ground](#)
- [Vibration from nearby on-site machinery or on-site vehicles](#)
- [Severe impact](#)
- [and heavy loads close to an edge can also affect the stability of the ground](#)
- [Partial or full building structural collapse may be caused by or cause unstable surfaces](#)

There is frequently little or no indication of the transition between [firm stable](#) and unstable [ground or surfaces](#). [If there is evidence of structural collapse, this and](#) may indicate that the [area surrounding ground the collapsed structure](#) is unstable.

[Sudden collapse or the failure of unstable ground or surfaces may be caused by conditions or naturally occurring's integrity and it can fail without warning.](#)

[The natural environment including pits, cliffs, steep ground, or free flowing solids may be subject to instability.](#)

[Trenches and excavations are present in building works and utilities maintenance. Pits can be found in a variety of locations such as old mines or quarries, agricultural and industrial sites. An incident involving a trench or excavation may require shoring or the removal of soil, along with having to move heavy machinery or plant. See National Operational Guidance: Sub surface, height, structures and confined spaces – Unstable natural or built environment.](#)

Geological weakness such as earthquakes and subsidence may cause buildings to collapse through movement of the strata on which the foundations are laid. This movement can place excessive stress on a structure, overloading it and causing collapse. Alternatively, the ground on which the building is constructed may weaken to the extent that it is unable to support the weight of the building. Liquefaction, where the water content in the soil increases to such an extent that the soil loses all cohesiveness and strength and the building sinks into the ground, is one of the most common forms of failure.

A serious risk of injury exists at incidents involving an unstable surface; soil, for example, can weigh more than 1.25 tonnes per cubic metre square. Even small collapses may be fatal. The risks to people include:

- [Becoming trapped or buried](#)
- [Being crushed by the movement of soil and any subsequent loading](#)
- [Falling from height](#)
- [Falling into a trench, pit or opening](#)
- [Drowning and asphyxiation](#)

Depending on the site involved, ground conditions can become unstable for many reasons. Certain sites present increased risks of ground becoming unstable:

- [Landfill sites: deep-seated fires burning waste deep under the crust can create underground voids with little or no warning. These voids present a significant hazard to onsite vehicles as well as to responding fire and rescue service personnel.](#)
- [Poorly maintained or illegal industrial sites and byways: these sites are less likely to have designated hard-standing or purpose-built vehicle routes. Ground conditions can quickly deteriorate as a result of firefighting and vehicle movement.](#)
- [Farmland: tracks and fields may not be suitable for fire service vehicles. Slurry pits may appear to be hard-waste ground, or covered in grass or weed growth.](#)
- [Naturally occurring hazards such as sink holes and liquefaction can make a surface that appears solid to collapse or become unstable.](#)

The [following](#) hazards and [their](#) associated control measures [for bodies of water and unguarded edges](#) may also apply when working near unstable [ground or](#) surfaces:

- [Operations – Working near water or other liquids](#)
- [Height, structures and confined spaces – Unguarded edges](#)

Ice

Ice should never be considered safe to walk on. The thickness may vary depending on water depth, temperature and microclimates. It can be difficult to determine the depth and flow of water underneath the ice. [Personnel/People](#) can fall through ice and travel a significant distance below the surface or become trapped beneath it, [thereby requiring rescue from water](#).

Mud

It may be difficult to access ~~casualties-the scene of operations~~ through deep mud, as walking ~~may~~ becomes impossible without specialist equipment, such as mud shoes. The distance to the ~~scene of operation~~ ~~casualty~~ can make the situation more difficult, ~~as can working in reduced-~~ ~~incidents can be particularly hazardous at night or during periods of poor~~ visibility ~~such as dense fog.~~ ~~The mud may also be subject to tidal changes and quickly become submerged.~~

Geological movement

~~There may be occasions when u~~Unstable ~~ground or~~ surfaces ~~may be due to~~ ~~are affected by some~~ form of geological movement. The ~~cause~~ ~~reasons for this movement~~ may not be known and ~~could be~~ ~~minor~~ ~~might not be noticeable~~, but the history of the ~~area~~ ~~initial cause of the structure's instability or~~ ~~collapse~~ may indicate a need to be aware of potential ~~or further~~ ground movement. For example, in areas of known mining, the ~~geological movement may be~~ ~~caused~~ ~~may be assigned to by~~ the collapse of old workings ~~and therefore the possibility of further movement will need to be considered.~~

Working on unstable surfaces

~~Weather conditions, firefighting operations and vehicle movements can cause ground conditions to deteriorate.~~

Control measure – ~~Specialist equipment~~Safe system of work: Unstable ~~ground or~~ surfaces

CONTROL MEASURE KNOWLEDGE

Accessing unstable ground or surfaces

~~If accessing unstable ground or surfaces, including mud flats, the provision of rescue paths for access and egress need to be carefully planned and implemented. A safe system of work that is capable of recovering emergency responders, and casualties if present, should be put in place. An example of this is a recoverable system using rope equipment, but that may not be appropriate in all circumstances.~~

~~Personnel should~~ ~~it is important to~~ avoid walking on unstable ~~ground or~~ surfaces ~~wherever possible.~~ ~~if~~ ~~when~~ this is not possible, specialist equipment should be used to mitigate the risk of collapse. The use of inflatable rescue paths and other types of platform may spread the weight and provide a stable platform to work from. Inflatable rescue paths and sleds are buoyant and may reduce the risk of immersion when working on an unstable surface, such as ice ~~above on~~ a body of water.

Buoyancy aids should be used ~~where~~ ~~if~~ there is a risk of submersion in water. ~~However, the rescue of people wearing automatically inflated buoyancy aids. Consider the hazards related to removing casualties from restricted areas such as via a~~ holes in the ice ~~will be difficult and hazardous~~ ~~when using automatically inflated buoyancy aids.~~

When ~~operating~~ ~~working~~ on ~~or near~~ mud in tidal areas, the use of suitable rescue craft should be considered. ~~Incident commanders should have access to~~ ~~tide~~ ~~charts or~~ ~~timetables~~ ~~should form part of the~~ ~~to assist~~ decision making, ~~especially if the area is subject to rapid submersion.~~ ~~For more information refer to~~ ~~Water rescue - Check water and tidal conditions.~~

When transporting equipment consider towing or using backpacks or bags to allow the use of hands whilst moving and reduce the risk of losing dropped equipment.

~~Suitable methods for removing casualties may also be required and the additional weight of the casualty considered during recovery.~~

Working on unstable ground or surfaces

Personnel should be aware of the physical condition of the ground or surfaces they are working on. ~~Roofs may be weak, embankments and cliff tops~~ They may be steep, slippery or have loose surface materials and ~~be moresome built environments may be~~ unstable ~~and weaker~~ than they ~~first~~ appear to be.

~~Fire and rescue personnel should remember that while the equipment they use is regularly inspected, tested and maintained, the areas they traverse and attach to are not. These areas should be stringently examined and suitable precautions taken.~~

When working on unstable ground or surfaces, the area surface should be ~~observed-monitored~~ continually to spot any movement or dipping; this may indicate subsidence and possible collapse into unidentified voids. If the ground or surface is frozen, the area should be monitored continually for signs of thawing that could impact on stability.

If a flow of water could worsen ground conditions, incident commanders should consideration should be given to:

- C-channelling water ~~run-off~~ to sacrificial areas
- ~~, moving vehicles to avoid entrapment and e~~ Containing, diverting or controlling the use of fire ~~fighting media-water~~ to reduce the impact on ground conditions; for more information refer to-
- See National Operational Guidance: Environmental protection – Fire water run-off.

Working on or moving vehicles on unstable ground or surfaces should be avoided ~~and -C~~ care should be taken whenever vehicles are driven off ~~road-purpose-built vehicle routes~~. An assessment should be made to ensure that the surface can take the weight of the vehicle, avoiding the possibility of it becoming stranded. For more information refer to Operations - Position fire and rescue service vehicles safely.

At some locations there may be on-site machinery or vehicles that are suitable for use on unstable ground or surfaces. For more information refer to:

- Industry - Use competent people to operate on-site machinery
- Industry - Use competent people to operate on-site vehicles

Careful siting of equipment or vehicles, including aerial appliances, will be required ~~for working near unstable surfaces~~ and ground conditions should be constantly monitored. The equipment or vehicles may have to be relocated if the ground they are on becomes unstable ~~reviewed regularly.~~

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
Revised	Have access to equipment and vehicles appropriate for working on unstable ground or surface terrain in their area	21501
Archive	Identify areas where unstable ground may be present and make this information available to personnel	21490

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
Revised	Establish rescue paths for access and egress to unstable ground or surfaces; this may require the use of inflatable rescue paths
	Consider the use of specialist equipment for rescues from mud, ice and unstable surfaces
	Identify safe access and egress routes and areas for the site and any specific working areas
	Monitor ground and surface conditions for any changes in their stability and the impact of firefighting media on ground conditions
	Consider controlling the flow of water, including fire water, that may worsen the stability of the ground or surface. Implement appropriate methods to reduce the effects of firefighting media on ground conditions
	Consider the use of on-site equipment, machinery and vehicles to access sites with unstable ground or surfaces
	Consider the impact of past, present and future weather conditions on the ground conditions
New	Monitor the ground conditions around equipment or vehicles in use at incidents involving unstable ground or surfaces
New	Be prepared to relocate equipment or vehicles in use at incidents involving unstable ground or surfaces if the ground they are on becomes unstable

Commented [AG19]: Originally published as SA 21495

Control measure – Specialist resources: Unstable [ground or surfaces](#) ~~and landslides~~

[This control measure should be read in conjunction with Incident command – Specialist resources](#)

CONTROL MEASURE KNOWLEDGE

Unstable [ground or surfaces](#) ~~and landslides~~ can present [unique](#) challenges to [responding](#) personnel and may require specialist [resources or equipment](#) ~~or personnel~~ to effectively resolve the incident.

Incidents involving unstable [ground or surfaces](#) may require actions that are beyond the capabilities of the initial response. [Personnel](#) ~~Incident commanders~~ should be aware of the restrictions that

available equipment and training place on their ability to take action. If it is not possible to put sufficient control measures in place to safely and effectively deal with the incident, in such circumstances, specialist resources, such as technical rescue teams, should be requested to attend the incident.

Technical rescue teams may be able to provide:

- additional Support to in creating safe working platforms
- A provide assistance with shoring
- provide Specialist equipment
- of a Alternative means of access

Tactical and If the ground or surface instability could be due to geological movement, specialist resources advisers may be able to provide advice and monitoring equipment and advice. For more information refer to Height, structures and confined spaces – Use of structural monitoring.

Watercraft such as rescue sleds, boats and rescue platforms may be appropriate to can, in some circumstances, provide a safe means of access. This specialist equipment will need to be operated by personnel with the appropriate training and skills, or by specialist resources.

The Maritime and HM Coastguard Agency (HMCA) and voluntary organisations can provide details of specialist mud rescue services in coastal areas. MCA/MCG rescue teams and some local voluntary rescue associations, including the Royal National Lifeboat Institution (RNLI), may have considerable knowledge of the area and the capability to operate on local mud flats.

Aerial appliances can may be able to provide a safe working platform to access unstable ground or surfaces and perform tasks, although their use may cause additional hazards due to their weight, movement or from vibration.

If there are locations in the fire and rescue service area that are subject to having unstable ground or surfaces, it may be beneficial to participate in on-site joint training and exercises. This will help to improve interoperability by gaining an understanding of the capabilities of external agencies when dealing with incidents at such locations.

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
<u>Revised</u>	<u>Maintain a directory of emergency contact details for Provide access to agencies specialist resources that can assist at incidents involving unstable ground or surfaces where appropriate</u>	21491
<u>New</u>	<u>Participate in joint training and exercises with other agencies to improve interoperability at incidents involving unstable ground or surfaces</u>	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
<u>Revised</u>	Request appropriate specialist resources for incidents involving rescues from unstable ground or surfaces and landslides
<u>Revised</u>	Consider the use of specialist equipment at incidents involving unstable ground or surfaces landslides

Hazard – Landslides and coastal cliff collapse and debris flow

HAZARD KNOWLEDGE

Landslides and coastal cliff collapse can present challenges to personnel and may require specialist equipment or personnel to effectively resolve the incident. Attempting a rescue from or working at a landslide or coastal cliff collapse without appropriate or specialist resources and equipment may result in serious injury to emergency responders.

Landslides and coast cliff collapse can result in:

- Damage to or loss of land
- Damage to or loss of buildings, vehicles or infrastructure
- Injury to people or animals

If buildings or infrastructure are affected by a landslide or cliff collapse, it may result in environmental hazards such as:

- Damage to utilities or utility pipelines
- Ruptured oil or septic tanks

For more information refer to:

- Environmental protection – Polluting materials
- Utilities and fuel
- Hazardous materials – Environmental harm

If there is a landslide or coastal cliff collapse, the suddenness of the event and potential outcomes may result in fire and rescue services attending to assist with:

- Establishing cordons
- Rescuing casualties
- Stabilising buildings, structures or modes of transport
- Isolating utilities

As landslides can occur on coastlines as well as inland, it may not be possible to determine, without specialist advice, whether a coastal event is a landslide or a coastal cliff collapse. However, the primary and secondary hazards, and the control measures to mitigate them, are also very similar.

Landslides

Landslides can happen suddenly or more slowly over long periods of time. Heavy rainfall, flooding, weathering of the ground, traffic vibration or earthquakes are some of the causes of landslides. Landslides are classified by their type of movement, with the four main types being:

- Falls

- [Topples](#)
- [Slides](#)
- [Flows](#)

[There may be one or more types of movement in a single event.](#)

[Flows are landslides that involve the movement of material down a slope in the form of a fluid. They often result in an upside-down funnel shaped deposit when the material has stopped moving. There are different types of flows including:](#)

- [Mud flows, which are often associated with larger complex landslides](#)
- [Debris flows, which can be very rapid and usually occur on steep slopes](#)
- [Rock flows, which are also known as avalanches](#)

[Deforestation, heavy rainfall, undercutting of slopes, inappropriate construction and buildings with weak foundations can lead to the sudden failing of the integrity of slopes causing a landslide or debris flow.](#)

[Steeper slopes forming a V-shaped valley with large boulders, 1 to 6 metres in diameter, or those exposed to excessive water flows are more prone to landslides.](#)

[Landslides can be categorised into three types:](#)

- [Falls: large pieces of debris falling through the air or bouncing down steep slopes](#)
- [Slides: materials moving in contact with a slope. Slow moving slides on shallow slopes are possible.](#)
- [Flows: liquid or semi fluid movement of materials down a slope, typically fast moving](#)

[Landslides have a high casualty rate and also damage property, infrastructure and utilities can be Temporary mortuary arrangements may be required.](#)

[Debris flows and landslides are powerful enough to move \[vehicles\]\(#\)\[cars\]\(#\), \[large\]\(#\) trees and buildings within their flow. They can be over 20 metres wide and can move at \[up to\]\(#\) 35mph, making them difficult to outrun or outmanoeuvre.](#)

[Secondary hazards of landslides include:](#)

- [Damage to utilities or utility pipelines, which can result in \[cause such as\]\(#\) fire \[and or\]\(#\) gas leaks](#)
- [The impacts on \[Damage or blockage of roads, which infrastructure\]\(#\) may affect the response to an incident](#)
- [Debris flows and landslides can result in \[b\]\(#\)Building collapse](#)
- [trappings or cause \[b\]\(#\)Blockages to bodies of water, which could \[that\]\(#\) result in flooding-](#)
- [Unstable ground or surfaces](#)

[The disturbance caused by a landslide may result in secondary movements and collapses. See Hazard \[Unstable surfaces\]\(#\)](#)

Coastal cliff collapse

A Coastal Change Management Area is an area identified in local plans as likely to be affected by physical changes to the shoreline through erosion, landslip, permanent inundation or accumulation of sediment. Information on Coastal Change Management Areas is available in GOV.UK guidance on [Flood risk and coastal change](#).

Fire and rescue services should consider seeking advice from coastal engineers and environmental agencies to maintain an understanding of the current situation and risks in their area.

The coastline, especially areas of soft rock, are at risk of coastal erosion, cliff instability and cliff collapse. Any interaction with an unstable cliff may cause a partial or total collapse. The hazards are very similar to those relating to landslides, as this may result in falling and sliding rocks that present a hazard to emergency responders or other people, including casualties. The falling and sliding rocks may create a further collapse and more damage or loss to buildings or infrastructure.

There are factors that may activate an initial or secondary cliff collapse, such as:

- Heavy rainfall
- Heavy snowfall, resulting in high amounts of run-off
- Landslides
- Storms or high sea swell

Control measure – [Safe system of work](#) ~~Make a safe and controlled approach~~: Landslides and coastal cliff collapse

CONTROL MEASURE KNOWLEDGE

~~Areas with a history of landslides are also more prone; many at risk sites have been identified and precautions put in place.~~

Cordons and access

Cordons around the hazard area should be immediately established, to keep members of the public and emergency responders at a safe distance from the landslide or coastal cliff collapse. For more information refer to Incident command – Cordon controls.

The police may need to carry out road closures and prevent members of the public entering the hazard area; these types of incident often draw onlookers.

If possible and safe to do so, it may be beneficial to move vehicles or other property away from the hazard area, especially if this may prevent them from falling into the area affected by the landslide or coastal cliff collapse.

Approaching a landslide or coastal cliff collapse

During approach and deployment at an incident involving a landslide or coast cliff collapse, the effects of vibration and ~~vehicle or personnel~~ movements should be considered and monitored. ~~All~~

~~personnel and vehicle movements of vehicles, personnel and other emergency responders, and the use of machinery or equipment, should be minimised and the effects of movement on ground conditions should be monitored.~~

Exclusion zones should be set up and avoidance routes identified. [Personnel and other emergency responders should be briefed about avoidance routes and exclusion zones and provided with updates if they need to be changed.](#)

[Safe access and egress routes should be established and monitored; if there are any safety concerns with these routes, alternative routes should be identified or tactical plans revised.](#)

[Direction of approach to a landslide](#)

Landslides will usually travel in the direction of a slope, but this can include lateral movement and initial movement may be slow or difficult to perceive. Approach should be from an uphill position and areas deemed as unsafe should be identified and marked. [This type of incident may benefit from the deployment of safety officers, who can visually monitor the landslide area for further flows of material or other ground movement.](#)

Direction of approach to a coastal cliff collapse

When approaching incidents from a clifftop or base of a cliff, consideration should be given to its stability before personnel are deployed to the hazard area. This type of incident may benefit from the deployment of safety officers, potentially located at the top and base of the cliff, who can visually monitor the area for signs of further collapse.

Situational awareness

Personnel should consider the stability of the landslide or cliff collapse area when operating on or near it. When attending an initial collapse, personnel should be aware of the possibility of a secondary collapse occurring; this may be as a result of the disturbance from the initial collapse or other factors. The extent of a secondary collapse will be unknown and may include large areas of land that emergency responders and members of the public may believe to be safe.

Situational awareness can be gained from:

- Above the landslide or at the clifftop; signs of instability include:
 - Cracks in the ground
 - Appearance of sinkholes
- The base of the landslide or cliff, if assessed to be safe and feasible; signs of instability include:
 - Activity of recent landslide or movement of material
 - Cracking
 - Seeping water from a cliff face

The risk of secondary ~~movement hazards~~ or further [movement or](#) collapse should be considered. Buildings, [structures and infrastructure](#) in the area ~~affected~~ should be assessed for the risk of

collapse.

Situational awareness may also benefit from the deployment of drones (classified as a type of [unmanned aircraft](#) by the Civil Aviation Authority); they may be able to provide a downlink to assist with an assessment of the stability of the landslide area or cliff.

Evacuation

If there are people in buildings, structures or other areas that may be affected by a landslide or coastal cliff collapse, their evacuation should be a priority. The police should be requested to assist and lead with this activity if time permits. For more information refer to [Operations – Evacuation and shelter](#).

Evacuation and access routes should consider the effects of secondary [collapse hazards](#) and affected areas should be avoided [by members of the public, personnel and other emergency responders if where possible](#). [Fire control room and on-scene personnel should exchange information about evacuation needs and the evacuation routes that should be used if required](#).

Rescue from a landslide or coastal cliff collapse

There could be casualties involved in the landslide or coastal cliff collapse, who for example:

- Are trapped in a building – for more information refer to [Search, rescue and casualty care – Accessing a casualty](#)
- Are trapped in an unstable mode of transport – for more information refer to [Search, rescue and casualty care - Accessing a casualty involved with an unstable mode of transport](#)

If a landslide or coastal cliff collapse results in needing to rescue a casualty, consideration should be given to:

- Secondary hazards and further flows or collapse of materials
- Impacts from operational activity on ground stability

The rescue should include appropriate distribution of weight to unstable ground and the use of ground anchors for the safety of personnel and the casualty.

If there are people trapped in a partially or fully collapsed building following a landslide or coastal cliff collapse, an appropriate risk assessment should be carried out before any attempt to perform a rescue. Specialist advice from a geophysical engineer should inform the tactical plan. For more information refer to [Search, rescue and casualty care - Primary search: Unstable or collapsed structure](#).

For more information about rescuing a casualty who has fallen with or into materials, such as mud, debris or rocks, refer to [Search, rescue and casualty care – Rescue a casualty at height](#). If a risk assessment determines that the ground is too unstable to lower and raise an emergency responder, other options should be considered. This could include:

- Lowering an emergency responder to the casualty, then lowering both people to the ground below

- Requesting specialist resources

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
<u>Archive</u>	Establish multi agency working protocols for geological hazards	21509
<u>New</u>	<u>Consider providing local equipment or access to specialist resources to enable personnel to work safely in the area around landslides and coastal cliff collapse</u>	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
<u>Revised</u>	<u>Establish and monitor safe approaches to and cordons for a landslide or coastal cliff collapse</u> Consider direction of approach in relation to the hazard area at landslides
<u>Revised</u>	<u>Consider minimising the movement and use of isolating equipment and vehicles when not in use near the area affected by a landslide or coastal cliff collapse</u> unstable surfaces
<u>Revised</u>	<u>Consider appointing safety officers to establish aerial visually monitoring the area for material or ground movement following a landslide or coastal cliff collapse</u> of geological hazards
<u>New</u>	<u>Consider evacuating buildings, structures or other areas that may be affected by a landslide or coastal cliff collapse</u>
<u>New</u>	<u>Consider requesting drones to provide a downlink to assess the stability of the landslide or coastal cliff collapse or to locate casualties involved in the event</u>
<u>New</u>	<u>Exchange information with the fire control room about evacuation needs and the evacuation routes that should be used if required following a landslide or coastal cliff collapse</u>

Fire control personnel should:

Revised, new, archive or no change	Tactical action
<u>New</u>	<u>Liaise with on-scene personnel about evacuation needs and the evacuation routes that should be used if required following a landslide or coastal cliff collapse</u>

Control measure – Specialist resources: Landslides and coastal cliff collapse [NEW]

This control measure should be read in conjunction with Incident command - Specialist resources

CONTROL MEASURE KNOWLEDGE

An early request for a civil, geotechnical or coastal engineer to provide advice and assistance should be considered. These specialist resources are able to investigate the strength and integrity of the area affected by the landslide or cliff collapse, as well as determine the likelihood of further movement or collapse. This information will help fire and rescue services, and other involved agencies, to jointly form a tactical plan, which should include appropriate cordons and the need for further evacuations.

If the landslide or cliff collapse has affected the built environment, isolation of utilities may be required. When requesting support from utility companies, they should be informed about the extent of damage; as they may need to carry out isolation remotely or further away from the scene of the incident.

It may be beneficial to request specialist resources to provide advice and assistance through the use of monitoring equipment. For more information refer to [Height, structures and confined spaces – Use of structural monitoring equipment](#).

The appropriate environmental agency should be notified about the landslide or cliff collapse, because of the potential for environmental contamination. If required, an appropriate environmental risk assessment should be completed. For more information refer to [Environmental protection – Environmental risk assessment](#).

If casualties have been buried by debris from a landslide or coastal cliff collapse, specialist resources, such as urban search and rescue (USAR) may be required. The equipment and resources that are available from USAR may benefit the incident outcome, especially if an early request is made. For more information refer to [Search, rescue and casualty care - Request National Resilience resources: Urban search and rescue](#).

Searches for casualties may benefit from the deployment of drones (classified as a type of [unmanned aircraft](#) by the Civil Aviation Authority). For more information refer to [Search, rescue and casualty care - Aerial resources: Drones for search](#).

If a rescue is required following a landslide or coastal cliff collapse, resources that mitigate the deployment of personnel or disturbing unstable material should be considered. This could include the use of a helicopter with winch capability, or if it is a coastal event, a vessel to gain access from the sea. For more information refer to [Search, rescue and casualty care - Aerial resources: Helicopters for search and rescue](#).

Joint training and exercises should help to improve interoperability by gaining an understanding of the capabilities of external agencies when dealing with a landslide or coastal cliff collapse.

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
------------------------------------	------------------	-----------------------------

New	Maintain a register of engineers who can provide advice or assistance for landslide or coastal cliff collapse incidents	
<u>New</u>	Participate in joint training and exercises with other agencies to improve interoperability at landslide or coastal cliff collapse incidents	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
New	Request the attendance of USAR if a casualty is buried under debris from a landslide or coastal cliff collapse
New	Consider requesting the attendance of a civil, geotechnical or coastal engineer following a landslide or coastal cliff collapse
New	Request the attendance of utility companies if required following a landslide or coastal cliff collapse
New	Ensure the stability and integrity of the area affected by a landslide or coastal cliff collapse informs the tactical plan
New	Notify the environmental agency about the landslide or coastal cliff collapse so that they can consider the environmental impact
New	Consider requesting helicopters or vessels with rescue capability following a landslide or coastal cliff collapse
<u>Revised</u>	Consider requesting geological monitoring equipment in consultation with urban search and rescue (USAR) tactical advisers or other specialists

Hazard – Sinkholes [NEW]

HAZARD KNOWLEDGE

There are several different types of sinkhole, which are sometimes called dolines:

- **Solution sinkholes**

These are formed by local chemical weathering of the limestone where water accumulates around a fissure or joint in the rock. This may be underneath the soil or on the ground surface. The hollow that is formed is drained of water through the fissure or joint, but not before it has dissolved some of the limestone. The depression gradually gets enlarged.
- **Collapse sinkholes**

These occur where the gradual collapse of a cave passage occurs and eventually causes subsidence at the surface level.
- **Suffosion sinkholes**

These form where solution of the limestone has created a depression on the surface of the limestone, but under a covering of soil. The unsupported soil subsides into the cavity and leaves a depression in the landscape. These are sometimes referred to as subsidence sinkholes.
- **Drop out sinkholes**

These can be more suddenly created if the surface material is more solid, like clay, as a large cavity could have been created below the surface and can suddenly collapse without warning.

A sinkhole may be tens or more of meters deep, and it will eventually lead into a cavity which may extend downwards for hundreds of meters below the ground. These can collapse downwards due to gravity, leading to great surface depressions and subsidence damage and even the complete loss of houses.

Sometimes sinkholes are a purely natural phenomenon, but they may also be associated with previous industrial activities, most commonly mining. Historic mine workings in coal, salt, potash, tin and copper often leave voids in the ground. These voids may eventually come to the surface over time as the roof progressively collapses. These collapses can be gradual, or can happen suddenly, with surface depressions appearing without warning. Such rapid events are often associated with changes in groundwater or during excessive rainfall events.

Fire and rescue services should include this risk when carrying out risk management planning. If required, they should seek advice from environmental engineers and environmental agencies to understand the current situation and risks in their area.

The [British Geological Society](#) provides information about sinkholes, their appearance, type and location in the UK.

Sinkholes can result in:

- Damage and loss of land
- Damage to and loss of property and infrastructure
- Physical injury to people or animals

Control measure – Safe system of work: Sinkholes [NEW]

This control measure should be read in conjunction with [Height, structures and confined spaces - Safe system of work: Unstable or collapsed natural or built environments](#)

CONTROL MEASURE KNOWLEDGE

The suddenness of sinkhole events and potential outcomes may result in the attendance of fire and rescue services to assist with:

- Establishing cordons
- Rescue of casualties
- Stabilising buildings and infrastructure
- Isolating utilities
- Controlling transport networks

Establishing cordons

Cordons around the hazard area should be immediately established, to keep members of the public and emergency responders at a safe distance from the sinkhole. For more information refer to [Incident command – Cordon controls](#).

It may be beneficial to appoint safety officers to visually monitor the area for changes in the sinkhole.

The police may need to carry out road closures and prevent members of the public entering the hazard area; this type of incident often draws onlookers.

If possible and safe to do so, it may be beneficial to move vehicles or other property away from the hazard area, especially if this may prevent them from falling down the sinkhole.

Evacuation

If there are people in buildings, structures or other areas that may be affected by a sinkhole are occupied, their evacuation should be a priority. The police should be requested to assist and lead with this activity if time permits. For more information refer to [Operations – Evacuation and shelter](#).

Rescue of casualties

There could be casualties involved in the sinkhole event, who for example:

- Have fallen into the sinkhole or are stranded on land near to the sinkhole – for more information refer to [Search, rescue and casualty care – Rescue a casualty at height](#)

- Are trapped in a building – for more information refer to [Search, rescue and casualty care – Accessing a casualty](#)
- Are trapped in an unstable mode of transport – for more information refer to [Search, rescue and casualty care - Accessing a casualty involved with an unstable mode of transport](#)

Stabilising buildings and infrastructure

The local council should be contacted as they should be able to provide details of structural engineers who can provide advice and assistance. The council may also be able to provide information about any previous sinkhole events in the area, which will help to inform situational awareness.

Isolating utilities

The appropriate utility or fuel supplier should be asked to isolate the supply if it may be impacted by the sinkhole. This may need to be an emergency request if pipes are visibly affected. For more information refer to [Utilities and fuel - Isolate utility or fuel supply within the national grid.](#)

Controlling transport networks

If the communications or transport infrastructure may be impacted by the sinkhole, the appropriate organisation should be contacted, such as the highways agency, rail operator or communications network. For more information refer to [Transport – Effective communication at transport incidents.](#)

Joint training and exercises

Joint training and exercises should help to:

- Gain an understanding of the capabilities of external agencies when dealing with a sinkhole
- Establish roles and responsibilities when rescuing people from a sinkhole or from impacted buildings or modes of transport

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
New	Consider providing local equipment or access to specialist resources to enable personnel to work safely in the area around sinkholes	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action

New	Establish and monitor safe approaches to and cordons for a sinkhole
New	Consider moving vehicles or other property away from the hazard area to prevent them falling into the sinkhole
New	Consider appointing safety officers to visually monitor the area for changes in the sinkhole
New	Consider evacuating buildings, structures or other areas that may be affected by a sinkhole
New	Contact the local council to request advice or assistance of structural engineers regarding sinkholes

Hazard – Severe weather [NEW]

This should be read in conjunction with [Operations - Weather conditions](#)

HAZARD KNOWLEDGE

The UK weather system is mainly dictated by westerly winds that bring low pressure weather systems that often lead to unsettled weather conditions, particularly in winter.

Climate change has already altered the risk of certain types of extreme weather and further changes are expected in the future. Extreme heat has become more likely, while the risk of extreme cold has decreased. There is a trend toward wetter winters and drier summers, leading to an increasingly complex and challenging picture.

The [National Risk Register](#) assesses the risk from four main types of severe weather:

- Storms, gales, including hurricanes and tornados with damaging wind speeds and possible [lightning](#)
- Low (sub-zero) temperatures and heavy snow for prolonged periods
- Heatwaves with high temperatures lasting several weeks, harming peoples' health
- Drought as a result of a lack of rainfall over several years, leading to water shortages

Consequences of severe weather may include:

- Fatalities and casualties, affected physically or psychologically, particularly among vulnerable groups, such as older adults
- Evacuation and shelter of residents or employees of homes and businesses
- Widespread damage to property and infrastructure
- Disruption to essential services, particularly transport, utilities and communications
- Additional pressure on healthcare services
- Environmental damage

Fire and rescue service operational response can be hampered by severe weather, such as:

- Employees being unable to get to work
- Fire and rescue service vehicles being unable to negotiate road conditions
- Fire and rescue service premises being inaccessible or damaged
- Firefighting water supplies hampered, for example as a result of:
 - Insufficient hydrant pressure due to the supplier reducing flow in low temperatures
 - Bodies of water being extremely low due to drought
- Fire and rescue service equipment and vehicle malfunctions, due to exposure to extreme temperatures, for example:

- Equipment failing to charge
- Defibrillator pads losing adhesion
- Effects on vehicle components or fluids

Control measure – Safe system of work: Severe weather [NEW]

This control measure should be read in conjunction with [Operations - Assess current and forecast weather conditions](#)

CONTROL MEASURE KNOWLEDGE

Fire and rescue services should monitor forecasts for severe weather conditions that may affect their community and their operational response to that community. The impacts of severe weather can range from short-term to longer-term, which will affect the mitigation a service may need to apply.

Mitigation for impacts on the community

A fire and rescue service may need to support the community during severe weather. This could include assistance with:

- Operations -[Evacuation and shelter](#)
- Major incidents - [Planning reception centres](#)
- Operations -[Emergency response plans](#)
- Operations -[Warning, informing and advising people](#)

Business continuity for the fire and rescue service

Although written with a focus on flood events, the control measure [Business continuity plans for the fire and rescue service: Flooding](#) incorporates many of the issues that are presented in severe weather. This includes:

- How the health and safety of fire and rescue service employees will be monitored and maintained, especially if essential utilities may be compromised
- Whether fire and rescue service assets and resources need to be relocated, in order to protect them and maintain an adequate response
- Potential interdependencies, such as loss of electricity and resulting effect on mobilisation systems
- The potential impact on communications, including mobilisation systems and the contingency arrangements required to establish and maintain an operational response
- Consideration as to whether back-up power systems may be affected, such as standby generators or uninterruptible power supplies

The inability to access resources, provision of food and clean water, delays in responding and the effects on the lives of responders outside of their employment should be considered during planning

for severe weather, particularly for an extended out-of-area response.

Mitigation for impacts on water supplies for firefighting

Mitigation should be put in place if water supplies for firefighting may be impacted by severe weather, such as extreme cold or drought. For more information refer to [Fires and firefighting – Water and extinguishing media management and planning](#).

Mitigation for impacts on fire and rescue service equipment and vehicles

Mitigation should be put in place to protect fire and rescue service equipment and vehicles from the impacts of extreme temperatures. This may be achieved by ensuring equipment and vehicles are stored under cover where possible.

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
New	Identify if they are likely to be affected by severe weather and if so, establish business continuity plans	
New	Consider providing storage areas to protect equipment and vehicles from extreme temperatures	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
New	Consider following business continuity plans for response and recovery in severe weather
New	Ensure equipment and vehicles are stored appropriately to protect them from extreme temperatures

Hazard – Naturally occurring radon [NEW]

HAZARD KNOWLEDGE

Radon is a natural radioactive gas, which has no taste, smell or colour. It is produced by the radioactive decay of uranium and thorium, found in small quantities in all soils and rocks.

Radon can reach high levels in buildings due to them often being insulated and with modern central heating causes warm air to rise, creating an air flow which draws in soil air carrying radon.

The radioactive elements formed by the decay of radon can be inhaled and enter the lungs. Inside the lungs, these elements continue to decay and emit radiation, most importantly alpha particles. These are absorbed by the nearby lung tissues and cause localised damage. This damage can lead to lung cancer.

Public Health England (PHE) produce an [interactive map](#) with current radon data which can be used as a guide to identify if locations are in a radon 'Affected Area'.

Buildings with basements are also more susceptible to high levels of radon accumulating, as there is a larger surface area in contact with the soil through which the gas can permeate. PHE advise that any property with a basement, whether or not it is located in an Affected Area, will have an increased probability of containing high radon concentrations.

Control measure – Safe system of work: Naturally occurring radon [NEW]

CONTROL MEASURE KNOWLEDGE

Under their health and safety duties as employers, fire and rescue services should consider radon as a hazard when completing workplace risk assessments.

If a workplace is identified as a potential radon Affected Area, fire and rescue services should consider carrying out further investigation, to obtain a more precise measurement and determine what action should be taken.

For more information on radon and how to reduce radon levels refer to:

- Health and Safety Executive - [Radon in the workplace](#)
- [The UK Radon Association](#)
- [UKradon](#)

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
------------------------------------	------------------	-----------------------------

New	Identify if any of their sites are susceptible to high levels of radon	
New	Take appropriate action if the radon levels are above the permitted annual average	

TACTICAL ACTIONS

All personnel should:

Revised, new, archive or no change	Tactical action
	Be aware of the hazards associated with radon exposure

Hazard – Volcanic hazards [NEW]

This hazard should be read in conjunction with Major incidents – Major resource requirements

HAZARD KNOWLEDGE

There is potential for the UK to be affected by volcanic eruptions from other countries. The main volcanic hazards to affect the UK are:

- Gases and aerosols
- Airborne ash
- Deposition of ash
- Tsunami

Air traffic could be immediately disrupted, as volcanic ash and aerosols can cause damage, maintenance issues or, in high concentrations, potentially cause engine failure in aircraft. High concentrations of volcanic gas may be a health hazard inside aircraft.

If volcanic ash, gas and aerosols are present at ground level in sufficient quantities and for prolonged periods, they can affect human and livestock health, damage crops, contaminate water supplies and affect electricity infrastructure. Fire and rescue service response and communications could be affected due to the present of ashfall.

The risk to the UK from a volcanically-generated tsunami is extremely low and experts suggest that even a very large tsunami would be unlikely to register more than 1cm on a UK tide gauge.

Control measure – Responding to volcanic hazards [NEW]

CONTROL MEASURE KNOWLEDGE

Although the risk of the UK being affected by volcanic ash fall from other countries is low, current data shows that Scotland and northern England could be affected by ash fall resulting from volcanic activity in Iceland.

Fire and rescue services that could be affected should consider business continuity plans and liaise with local emergency planning groups and local authorities to establish a point of contact, and their roles and responsibilities should an event occur.

A nominated team, which is usually the fire control room, should be given the responsibility to liaise with the local authority point of contact. They should gather information from the point of contact and relay it to relevant operational personnel.

Fire and rescue services could support their local communities affected by:

- Establishing exclusion zones
- Assisting with evacuations
- Transporting essentials, such as food and water

Any support arrangements that fire and rescue services may carry out should not be to the detriment of providing an emergency response. Fire control rooms should be notified if any community support arrangements could impact mobilising to incidents.

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
New	Identify if they are likely to be affected by volcanic ashfall and if so, establish business continuity plans	
New	Liaise with local emergency planning groups and local authorities to establish their roles and responsibilities if their area could be affected by volcanic ashfall	
New	Establish a point of contact with local authorities if their area could be affected by volcanic ashfall	
New	Nominate a team that is responsible for liaising with the local authority point of contact to gather information about volcanic hazards and relay to relevant operational personnel	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
New	Implement local business continuity plans for volcanic ashfall
New	Consult with local authorities on support arrangements required to be carried out by fire and rescue service personnel in the event of volcanic ashfall

Fire control personnel should:

Revised, new, archive or no change	Tactical action
New	Liaise with the local authority to gather information about volcanic ashfall and relay to relevant operational personnel

Removed content

Control measure – Plan reception centres [PUBLISHED IN OTHER GUIDANCE]

Commented [AG20]: Published in Major incidents guidance

CONTROL MEASURE KNOWLEDGE

Depending on the scale and nature of the incident, suitable locations and logistics for the safe reception of large numbers of people may need to be identified and arranged. Reception centres in the form of survivor reception centres, emergency rest centres and humanitarian assistance centres are designed to cater for the needs of all casualties and others involved.

Experience has shown that in the immediate aftermath of an incident many people will travel to the scene or to meeting points, such as travel terminals, if they believe their family or friends may have been involved in an emergency. Friends and relatives who may be feeling intense anxiety, shock or grief, need a sympathetic and understanding approach. Appropriate and effective liaison and control must be in place to ensure that information is accurate, consistent and non-contradictory.

Local authorities work with statutory and specialist agencies and the voluntary sector who can provide additional specialist assistance at a large scale incident or one which requires additional logistical and public support. Such agencies include:

Voluntary Sector Civil Protection Forum

Red Cross — emergency response

Disaster Action

Salvation Army Trust

Samaritans

St. John Ambulance / St. Andrews Ambulance (Scotland)

Royal Voluntary Service — formerly Women's Royal Voluntary Service

For further information, see: [Emergency Response and Recovery Non-statutory guidance accompanying the Civil Contingencies Act 2004](#)

Strategic actions

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
	Make appropriate arrangements with local authorities and partner agencies for pre-planned public reception centres as part of the community risk assessment	12496
	Develop local guidance and appropriate arrangements on the available support services for people affected by emergency incidents	12497

	Ensure that incident commanders have an understanding of the processes and arrangements for local emergency public support services	12498
--	---	-------

Tactical actions

Incident commanders should:

Carry out timely liaison with partner agencies on the establishment of reception centres

Instigate local arrangements for emergency public support services

Control measure – Cordon controls [PUBLISHED IN OTHER GUIDANCE]

Commented [AG21]: Published in Incident command guidance

CONTROL MEASURE KNOWLEDGE

Fire and rescue services have the power to restrict the access of people to premises or a place in an emergency. Commanders must consider the safety of personnel, members of other agencies and the public. Cordons are an effective way of controlling resources and maintaining safety.

Where practical, the police will establish and maintain cordons at appropriate distances to allow the emergency services and other responding agencies to save life, protect the public and property, and care for casualties.

In some areas the police will have agreements enabling the fire and rescue services to manage gateways into the inner cordon, establish who should be granted access and keep a record of people entering and exiting.

Personnel from other agencies may need to work within cordons that are under the safety management of the fire and rescue service. Briefing arrangements for responders from other agencies should be jointly established, preferably in advance of an incident.

Pre-planning and exercising with partner agencies should aim to establish the roles and responsibilities for implementing and maintaining cordon control for multi-agency incidents.

Further information on cordons can be found in the Cabinet Office publication, [Emergency Response and Recovery](#).

After the initial cordon has been established to secure the scene the incident is usually divided into two distinct areas:

- Inner cordon
- Outer cordon

Inner cordon

The inner cordon denotes the hazard area and controls access to the immediate scene of operations. This provides an increased measure of protection for personnel working in that area. Incident commanders should restrict access to the lowest numbers needed for safe and effective operational

activity. At small incidents this could be an existing physical barrier or a safety officer briefed to restrict access.

At incidents where a higher degree of control is required, those entering the inner cordon should report to a designated scene access control point and register their arrival. This ensures that they can be safely accounted for should there be any escalation of the incident, and affords an opportunity for briefing about the hazards, control measures, emergency arrangements and other issues. Nobody should be permitted to enter the inner cordon without an appropriate level of personal protective equipment (PPE). It is necessary to ensure that those leaving the inner cordon register their departure.

Incident commanders must account for people's safety and location. If an incident is using sectors they can delegate this responsibility to the sector commander, who should be aware of the people and personnel who are active in their sector. An inner cordon gateway control system should be established and may include:

- Means of recording all people entering and exiting the inner cordon area
- Provision of safety briefing and agreed evacuation signals
- Checklists for personal protective equipment (PPE)
- Personnel to escort non fire and rescue responders
- Details of working locations
- Tasks of other agencies

The fire and rescue service will be responsible for safety management within the inner cordon until responsibility for the scene is transferred to another body. Overall responsibility for the health and safety of personnel working within the inner cordon remains with individual agencies. Such agencies should ensure that personnel arrive at the scene with appropriate PPE and are adequately trained and briefed for the work they are to undertake within the cordon.

Information about the control of the inner cordon is detailed in the Cabinet Office publication, [Emergency Response and Recovery](#).



Figure: Where practical the inner cordon should be identified with the use of red and white barrier tape

Outer cordon

An outer cordon may be established around the vicinity of the incident to control access to a wide area. This will allow the emergency services and other agencies to work unhindered and in privacy. Access through the outer cordon for essential non-emergency service personnel should be by way of an access control point.

This cordon limits access to an area being used by the emergency services and other relevant agencies. The police will usually control outer cordons, and may also establish traffic cordons to prevent unauthorised vehicular access. The police will identify safe routes in and out of the cordon for emergency vehicles and other agencies. Rendezvous points and marshalling areas will usually be located within the outer cordon.



Figure: Where practical the outer cordon should be identified by using blue and white barrier tape

Hot, warm and cold zones

At certain incident types, there may be a need to divide cordons into hot, warm and cold zones. This will depend on the level of risk faced by emergency responders and the range of corresponding control measures identified and implemented. The use of these zones should be agreed by all emergency responders. As example, for a CBRN(e) incident, JESIP provides the following definitions:

- Hot zone—The area where the initial release occurs or disperses to. It will be the area which may pose an immediate threat to the health and safety of all those located within it and is the area of greatest risk.
- Warm zone—An area uncontaminated by the initial release of a substance, which becomes contaminated by the movement of people or vehicles. The warm zone will be extended to include the area of decontamination activity. These areas cannot be guaranteed as free from contamination.
- Cold zone—The uncontaminated area between the inner cordon and the outer cordon where it has been assessed that there is no immediate threat to life.

Exclusion zone

Some hazards may present such a significant danger to the safety of personnel, other agencies and the public that no control measures will adequately reduce the risk. Incident commanders should consider establishing an exclusion zone within the inner cordon to which precludes access for all personnel and responders from other agencies.



Figure: Where practical exclusion zones should be identified with the use of black and yellow barrier tape

Air exclusion zones

It is important that fire and rescue services notify air traffic control as soon as possible if there is a possibility that an incident may represent a hazard to aircraft in the area. Air traffic control can then issue warnings and instructions to aircraft in the vicinity of the fire. If required, the police can request that air traffic control create an air exclusion zone around a fire, to prevent unauthorised aircraft or drones (classified as a type of unmanned aircraft system by the Civil Aviation Authority) from flying over, or near, the incident.

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
	Provide appropriate equipment and other resources to safely implement cordon control	
	Establish the roles and responsibilities for implementing and maintaining cordon control with partner agencies for multi-agency incidents	
	Jointly establish the briefing arrangements for when other agencies are working within inner cordons under the safety management of the fire and rescue service	
	Consider pre-planning and exercising with partner agencies for cordon control arrangements	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
	Ensure that appropriate inner and outer cordons are established and communicated following an assessment of risk to all people present
	Control access to the inner cordon using methods proportionate to the type, size and complexity of the incident
	Establish a scene access control point to log all people operating within the inner cordon when appropriate
	Implement exclusion zones if intolerable risks to safety are identified
	Request police assistance to establish a traffic cordon or air exclusion zone if necessary

Control measure – Evacuation and shelter [PUBLISHED IN OTHER GUIDANCE]

Commented [AG22]: Published in Operations guidance

CONTROL MEASURE KNOWLEDGE

‘Evacuation’ is the immediate and urgent movement of people away from a threatened or existing hazard. The response of people to emergencies can vary from inaction to panic; a key factor in maintaining control and order when conducting evacuation is communication.

The need to evacuate or shelter people could be due to:

- An act of terrorism
- The actual or threatened release of hazardous substances
- Fire
- An unstable or collapsed structure
- The risk of explosion
- Severe weather, including widespread flooding
- Environmental contamination
- Transport incidents

When producing Site Specific Risk Information (SSRI) and developing incident plans, the evacuation or shelter of large numbers of people should be considered. Planning should be carried out with statutory resilience forums who may be able to mobilise resources to assist during the emergency phase of an incident.

Personnel at the incident and in the fire control room should develop a joint understanding of risk when determining if there is a need for evacuation, shelter in place or 'stay put'. To achieve this effectively, robust communications should be established and maintained throughout the incident. For further information see: [Have a communications strategy](#).

The decision to evacuate, and the size of the area to be evacuated, should be based on a joint understanding of risk which is agreed by the Strategic Co-ordinating Group (SCG). As a decision to evacuate is likely to affect multiple agencies, they should all be consulted if possible. If this is not possible, all agencies involved should be informed as quickly as possible.

The police are normally the lead agency for evacuation, and are likely to make a decision to evacuate in consultation with the local authorities. However, the police can only recommend evacuation and have no power to force responsible adults to leave their homes, with the exception of evacuation of the inner cordon for a terrorist incident.

In any decision about whether or not to evacuate, the overriding priority should be the safety of the public and emergency responders. It is possible that evacuating people to the open may put them at greater risk; buildings may provide protection against some types of risks and the public may be safer seeking shelter in a suitable building.

Unless they are provided with specific instructions, people are likely to follow the most obvious or familiar egress route; this could result in a stampede, evacuating towards the hazard, or result in people being trampled.

Evacuation time comprises the time taken for individuals to move towards an exit, plus the time taken before movement is initiated—the time taken to recognise there is a danger and to decide on the most appropriate course of action. Communication and sharing of information should aim to enhance the effectiveness of evacuation. For further information see Warn, inform and advise

people.

For further information, see the Cabinet Office publication, [Understanding Crowd Behaviours: Supporting Evidence](#)

Once implemented the evacuation plan should be regularly reviewed, to take into account:

- The development of the incident
- Changes in weather conditions
- Information gathered from emergency responders and the public
- The effectiveness or impact of the evacuation

Fires in buildings

Taller or larger buildings are likely to have scalable evacuation plans, with some occupants remaining in relatively safe areas of the building during firefighting operations.

To prevent access, egress and escape routes becoming compromised, compartmentation and suitable routes for firefighting teams should be identified and secured at the earliest opportunity. Building signage should not be relied on for suitable access and egress routes.

Access and egress routes should be suitably and sufficiently protected by:

- Using personnel with appropriate firefighting media
- Making use of the building's fixed installations
- Maintaining the structure and integrity of fire protected areas

The primary objective of an evacuation strategy is to ensure that in the event of a fire, the occupants of a building can reach a place of ultimate safety outside the building. The evacuation procedures are an essential part of the overall fire strategy. There are two basic categories of evacuation procedure:

Total evacuation

Total evacuation of the occupants to a place of ultimate safety, by either simultaneous or phased procedures:

Simultaneous evacuation

- The default approach, where it is unreasonable to expect the occupants to remain in the building for a prolonged time when there is a fire

Phased evacuation

- A common approach adopted in high rise premises where the storeys are separated by fire resisting construction, or in certain atrium buildings
- The first people to be evacuated are all those on the storey most immediately affected by the fire, and those on other storeys with impaired ability to evacuate, unless their personal emergency evacuation plan (PEEP) has determined otherwise

- The remaining storeys are then evacuated, usually two storeys at a time, at phased intervals

Progressive evacuation

Progressive evacuation of the occupants, initially to a place of relative safety within the building where they can remain or, if necessary, complete the evacuation to ultimate safety as part of a managed system. There are two categories of progressive evacuation:

Progressive horizontal evacuation

- The process of evacuating people into an adjoining fire compartment on the same level, from which they can later evacuate to a place of ultimate safety

Zoned evacuation

- A common approach adopted in large retail developments, where an operational loss could be created by evacuating a large building for a relatively small fire
- A zoned evacuation is achieved by moving the occupants away from the affected zone to an adjacent zone; for example, in a shopping centre where the occupants would be moved to the adjacent smoke control zone while the fire affected zone was brought under control

Occupant evacuation or escape strategies

Occupant evacuation or escape strategies will vary; the responsible person should be able to provide information about them. Some buildings have a policy to simultaneously evacuate when hearing an alarm, others maintain a 'stay put' or 'defend in place' policy and some adopt a vertical phased approach.

The 'stay put' policy, as detailed in the Local Government Association's [Fire safety in purpose built blocks of flats](#) may be considered appropriate, based on the levels of fire resistance for compartment walls and floors. The use of occupant evacuation or escape strategies that are based on 'stay put' or 'defend in place' policies should be kept under review throughout the incident.

When determining the evacuation strategy the following factors should be considered and reviewed to maintain the safety of occupants:

- That there is a clear passageway to all evacuation routes
- The risks to the occupants exiting along firefighting access routes
- Exposure to potential hazards
- Whether any occupants require assistance to evacuate
- If the evacuation routes are clearly marked, and are as short and direct as possible
- Whether there are enough exits and routes available for all people to evacuate
- If emergency doors open easily in the direction of evacuation
- Whether there is emergency lighting provided where needed
- If training has taken place about using the evacuation routes
- Whether a safe assembly point has been designated and communicated

Evacuation of medical facilities

Medical facilities are likely to contain patients, visitors and staff. These people will have varying levels of familiarity with their surroundings and the evacuation procedures. It is also likely that some people will be impaired by physical or mental disabilities.

Fire and rescue service personnel may be able to provide assistance to evacuate non-ambulant patients.

Medical facilities may have more than one evacuation strategy. This may include simultaneous evacuation, where people immediately go to a designated assembly point, 'horizontal phased' or 'vertical phased' evacuation.

Methods of horizontal phased evacuation are particularly useful when dealing with seriously ill or infirm people, who may require life support equipment, medical gases or strict environmental conditions for their wellbeing.

Hazardous materials

The aim should be to reduce the impact of a hazardous material on members of the public not originally involved in the incident, but who could potentially become involved as the material moves from the incident. This may be achieved by implementing an evacuation or shelter in place plan.

An assessment about which course of action is correct for protecting the public should be made by a hazardous materials adviser (HMA), and provided to the incident commander. For further information about the information that will influence this assessment see:

- Hazardous materials—Assess impact of release or spill
- Hazardous materials—Safe and controlled approach: Hazardous materials

For information regarding contaminated casualties, see [Hazardous materials—Controlled evacuation of contaminated casualties](#).

STRATEGIC ACTIONS

Fire and rescue services should:

- Liaise and consult with developers, owners, occupiers and responsible persons of buildings, to provide expert safety advice and to develop tactical guidance and support arrangements for the associated hazards and actions to take to confirm the occupier's evacuation policy or strategy
- Ensure that personnel have access to pre-determined evacuation plans for buildings or locations that have them
- Develop and test emergency plans and support arrangements for evacuating large numbers of affected people, in conjunction with statutory resilience forums and partner agencies
- Participate in pre-planning and exercises for evacuating medical facilities
- Provide on-scene mapping facilities to enable risk areas to be identified and actions to be

planned and documented

- Consider liaising with partner agencies who have air monitoring capabilities, public communication responsibilities and specialist knowledge on issues relating to public health

TACTICAL ACTIONS

Incident commanders should:

- Determine whether people should be advised to evacuate, shelter in place or 'stay put'
- Establish communication arrangements to allow information to be gathered from and passed to fire control rooms
- Identify the most appropriate evacuation plan and record rationale for decision
- Ascertain the availability of pre-arranged evacuation strategies and policies
- When evacuation is necessary, identify the number of people affected and develop a plan
- Consider occupants that need assistance to evacuate (e.g. disabilities, medical needs, refuge areas)
- Establish a safe evacuation point and consider safe egress routes and refuge points. Assess the suitability of the location for people to shelter in place
- Review the use and effectiveness of evacuation, shelter in place or 'stay put' plans throughout the incident, to ensure they remain valid
- Consider the impact of the incident on the local community and consider a shelter in place strategy
- Ascertain the likely impact of people on emergency responders
- Make contact with the relevant authorities for advice on evacuation arrangements and progress

Control measure – Identify areas that have been searched [PUBLISHED IN OTHER GUIDANCE]

CONTROL MEASURE KNOWLEDGE

To prevent duplication of effort and potential delays in covering unsearched areas, there should be effective search co-ordination as the incident progresses. Detailed debriefing of teams on their progress against objectives and the extent of the areas covered should be carried out and the results recorded. Any areas that have not yet been searched should be prioritised and identified to subsequent search teams as part of their brief.

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
	Liaise with local authorities or emergency planning groups to develop multi-agency arrangements for search procedures	

- Have procedures for co-ordinating the areas to be searched
- Have procedures for debriefing teams following search and recording of outcomes in a way that can be shared with subsequent search teams

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
	Consider appointing a search coordinator to ensure all areas have been systematically searched
	Consider establishing a search sector to co-ordinate fire survival guidance and prioritise response

Control measure – Specialist resource: Helicopter [PUBLISHED IN OTHER GUIDANCE]

Commented [AG23]: Published in Search, rescue and casualty care

CONTROL MEASURE KNOWLEDGE

Helicopters can be mobilised to assist in search and rescue activities, providing support, accessing stranded individuals, transferring casualties and offering additional surveillance capabilities. When considering their use incident commanders should consider the variation of capabilities and limitations of helicopter assets.

Search and rescue helicopter capabilities:

- Winch capable
- Operate in a wide range of weather conditions
- Additional surveillance capabilities including night vision

Police air support capabilities:

- Surveillance capabilities
- No winch capability

Emergency medical helicopter services capabilities:

- Equipped for treatment and transfer of casualties
- No surveillance capabilities
- Require landing site for loading of casualties
- No winch capability

Mobilising and support

Prior to requesting air support assets, the weather, access and any potential effect on the incident ground should be considered. Helicopters may create large amounts of noise and cause considerable rotor wash, blowing water, dust and other materials. Rotor wash may also cause boats to move or flip.

Any decision regarding access or landing arrangements will be made by the aircraft’s captain.

The Aeronautical Rescue Coordination Centre (ARCC) will respond to all requests from the emergency services for helicopter assistance where lives are at risk. Assets are mobilised from the ARCC, but available from a number of sites around the UK. Additional support of a Search and Rescue Liaison Officer (SARLO). The ARCC manage the deployment and support of search and rescue helicopter assets, including identification of refuelling sites and arranging reliefs.

When requesting resources from the ARCC to support fire and rescue service activities, ensure the following information is provided:

- Location of incident (grid reference)
- Description of incident
- Nature of tasking; for example, rescue, reconnaissance, transport
- Number and position of casualties
- Hazards (overhead power lines etc.)
- Weather and environmental conditions
- Other resources on scene

The potential contribution offered by air assets to a flooding event is considerable. The ARCC provides a common tasking procedure for all UK Search and Rescue (UKSAR) helicopters. No costs are charged to the emergency service in situations where life is at risk. For other purposes costs may be charged.

Police air support units, such as National Police Air Support (NPAS), Police Service of Northern Ireland Air Support Unit and Police Scotland Air Support Unit provide additional support, advice and communication links.

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
	Provide appropriate means of requesting assets from the Aeronautical Rescue Coordination Centre and other available air support assets	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
	Consider the use of air support

Control measure – Liaise with local emergency planning groups [PUBLISHED IN OTHER GUIDANCE]

Commented [AG24]: Published in Operations Guidance as Emergency response plans

CONTROL MEASURE KNOWLEDGE

Information is critical to emergency response and recovery, yet maintaining the flow of information between agencies, with partners, and to the wider public, is extremely challenging under emergency conditions. The importance of information for emergency responders and those affected by events must not be underestimated.

Effective information management depends on the appropriate preparatory measures being in place to build situational awareness and on developing a Common Recognised Information Picture (CRIP) at the local, sub-national and national levels (if appropriate). Such measures will need to support:

- Transmitting and collating potentially high volumes of information from multiple sources
- Assessing collated information to ensure its relevance, accuracy, timeliness, accessibility, interpretability and transparency
- Translating available information into appropriate information products; for example, briefing the Strategic Co-ordinating Group or national groups, or releasing it to the media for public information

Particular challenges that may need to be addressed in collating, assessing, validating and disseminating information under emergency conditions may include:

- Information management procedures varying between agencies
- Perspectives on the event or situation differing
- Mistakes and misunderstandings occurring under pressure
- Overloaded communications

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
------------------------------------	------------------	-----------------------------

	Work with others to establish systematic information management systems and embed them in multi-agency emergency management arrangements to enable the right balance to be struck – in particular, sharing information in a way that is responsive to the needs of emergency responders, and is compliant with data protection and other legislation, needs to be thoroughly understood and tested	12306
	Establish compatible terminology, abbreviations, communication systems and risk information for joint working with neighbouring fire and rescue services	12307
	Ensure that incident commanders are familiar with the responsibilities of other agencies, Category 1 and Category 2 responders and the roles of their representatives that may attend operational incidents – refer to the JESIP publication, <u>Joint Doctrine: the interoperability framework</u>	12308

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action

Control measure – Communication strategy: Water rescue and flooding [PUBLISHED IN OTHER GUIDANCE]

CONTROL MEASURE KNOWLEDGE

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
	Provide appropriate equipment for communication in the water environment	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action

	Consider establishing appropriate methods of communication for the water environment
	Brief responders on signals used to communicate prior to committing to water

Control measure – Warn, inform and advise people: Flooding [CONTENTS MERGED]

Commented [AG26]: Now contained in control measure Protecting people at risk from floodwater

CONTROL MEASURE KNOWLEDGE

The appropriate government bodies will be responsible for warning the public. Any messages related to flooding should be co-ordinated by the appropriate agency and services should not deviate from publicly issued advice.

STRATEGIC ACTIONS

Revised, new, archive or no change	Strategic action	Reference No. if applicable
	Refer to the responsibilities of fire and rescue services.	

TACTICAL ACTIONS

Revised, new, archive or no change	Tactical action
	There are no tactical actions associated with this control measure.

Control measure – Reduce exposure to hazards [PUBLISHED IN OTHER GUIDANCE]

Commented [AG27]: Published in Operations guidance

CONTROL MEASURE KNOWLEDGE

If it is not possible to fully eliminate the hazard, then exposure should be reduced to limit the risk as far as reasonably practicable. Examples of ways in which this can be achieved include:

- Reducing the amount of time spent in the risk area and avoid repeated exposure
- Increasing the distance from the hazard

STRATEGIC ACTIONS

Fire and rescue services should:

- Identify from pre-planning any risks that can be reduced by reduced exposure and communicate to personnel

TACTICAL ACTIONS

Incident commanders should:

- Consider implementing control measures that reduce the exposure of responders to a hazard

- Keep the number of people exposed to the hazard at a minimum and reduce time of exposure through crew rotation

Control measure – Specialist advice [PUBLISHED IN OTHER GUIDANCE]

Commented [AG28]: Published in Incident command guidance

CONTROL MEASURE KNOWLEDGE

It is unlikely fire and rescue service personnel will have in-depth knowledge of all types of incidents they could encounter. To deal with an incident safely and effectively, it may therefore be necessary to request specialist advice from the responsible (competent) person, subject matter expert (SME) or a tactical adviser (Tac Ad).

The extent and urgency in requesting specialist advice will be dictated by the size, complexity and type of the incident. The amount, quantity and quality of information will be directed by the nature of the incident and it is crucial that the on-scene commander or fire control room can access the most current information possible.

Competent person

A competent person is someone who has sufficient training and experience or knowledge and other qualities that allow them to assist you properly. The level of competence required will depend on the complexity of the situation and the particular help required.

A competent person should be able to provide accurate and relevant information in their specific area of work. They should also be able to interpret and translate such understanding into information that would be useful to support operational priorities.

Subject matter expert (SME)

A subject matter expert is a person who is an authority in a particular area or topic. Incident commanders should ensure, so far as practicable, that the individual is an expert in the relevant field.

Subject matter adviser (SMA)

Subject matter advisers are members of the fire and rescue service who work with national resilience capabilities on a day-to-day basis. The SMA will provide detailed tactical capability advice to the incident commander. SMAs will only be mobilised by the National Resilience Fire Control (NRFC).

Tactical adviser

Tactical advisers are trained and recognised specialists with specific references within local capabilities and/or national resilience. They are available to provide advice and support to any incident irrespective of location. However, their usual role is within their host fire and rescue service.

A tactical adviser has in-depth knowledge from both a business and organisational perspective that can significantly enhance performance when shared with others.

Tactical advisers are currently available from the following fields:

- National Inter-agency Liaison Officer (NILO)
- Urban search and rescue (USAR)
- High volume pumps (HVP)
- Water rescue
- Marine
- Wildfire incidents

STRATEGIC ACTIONS

Fire and rescue services should:

- Develop arrangements and protocols with identified competent persons and other sources to request specialist advice
- Maintain the details of any tactical adviser or subject matter expert for specific industries and know how to request their attendance
- Understand the available specialist advice that may be able to assist and how to contact the appropriate person to provide advice.
- Ensure personnel are aware of the tactical adviser role which may be used as a resource at operational incidents

TACTICAL ACTIONS

Incident commanders should:

- Consider requesting the attendance of a competent person, subject matter expert or tactical adviser

Control measure - Remove blockages [CONTENTS MERGED]

CONTROL MEASURE KNOWLEDGE

STRATEGIC ACTIONS

Fire and rescue services should: Revised, new, archive or no change	Strategic action	Reference No. if applicable
	Have policies to support the sharing of information during a flood between responsible agencies to identify and remove blockages as part of a multi-agency plan	21482
	Identify and prioritise risks in their area that may be at risk from flooding	21483

TACTICAL ACTIONS

Incident commanders should: Revised, new, archive or no change	Tactical action
	Consider removing blockages from drains and water channels to allow drainage in consultation with responsible agencies

Control measure – Personal protective equipment (PPE): Water rescue and flooding (PUBLISHED IN OTHER GUIDANCE)

Commented [AG29]: Published in Water rescue guidance

CONTROL MEASURE KNOWLEDGE

Protecting rescuers when dealing with flooding and water rescue requires different clothing and accessories than protecting them during land-based rescues. When working in, on or near water personal protective equipment (PPE) suitable for the task and environment should be used.

A personal flotation device (PFD) should be compatible with any other PPE in use. There are two main categories of PFD, buoyancy aids and life jackets. Buoyancy aids are designed to allow wearers to swim and allow for other postural movements; they are suitable for use by trained responders during rescue but are not compatible for use with fire kit. Once saturated, the additional weight of fire kit will negate any buoyancy offered by buoyancy aids; they will also not assist in maintaining a clear airway. Life jackets, which offer a greater level of buoyancy and hold the wearer face up when immersed regardless of levels of consciousness, are more appropriate for working near water. Any life jackets used should provide enough buoyancy to keep an adult wearing structural fire kit afloat, considering the weight when saturated.

The risk of thermal injury during response to an incident involving water, including hyperthermia and hypothermia, should be considered when selecting appropriate PPE for responders. The choice of PPE and thermal layer should reflect the expected activities and environmental conditions. See National Operational Guidance: Operations – [Physiological stress](#).

Working near a body of water

Firefighting helmets are not designed for submersion and may pose a risk of neck injury if accidental entry into water occurs. When working near water responders should consider the need to wear a helmet that is suitable for use near water, consider relaxing helmets or wearing them without fastening the chin strap. Any decision to change the standards of PPE in use should reflect the levels of risk presented by other hazards personnel may be exposed to.

Working in or on water

Responders committing to water should have PPE specifically designed for expected activities considering the nature of deployment and the conditions present. For example, immersion in offshore waters may require greater thermal protection and the effects of salt water on equipment seals may need to be considered.

PPE selection for use in water should include footwear suitable for use on slippery surfaces. Snag hazards should be removed from all PPE used in moving water.

Rescue buoyancy aids are designed to allow freedom of movement. They should include a quick release/securing system designed for responder retrieval and provide suitable buoyancy for the conditions they will be used in. Information on buoyancy aid requirements can be found [here](#).

Any suit or buoyancy aid should be appropriate for the individual's height, weight and size to ensure the appropriate level of buoyancy. The use of dry suits or other watertight clothing may affect the performance of PFDs.

Working at night or with poor visibility

If accidental entry into water occurs, it may be difficult to see or track personnel that are partially submerged. Fire and rescue services should consider some means of illuminating individuals who are working near, on or in water. Waterproof beacons, lights or other personal illumination devices should be attached to personnel so that they can be identified if accidental entry into water occurs. Lights attached to PFDs should be activated. Where possible they should correspond to colours used to identify levels of competence:

- Water rescue technicians and rescue boat operators: Red light
- Water rescue first responders: Yellow light
- Lines and throw line bags: Green light

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
	Ensure PPE provided is fit for purpose and complies with current legislation	
	Provide appropriate maintenance and care of water PPE	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
	Ensure all personnel wear PPE according to service risk assessment and procedures for incidents near, on or in water
	Consider adequate means of identifying personnel during night operations or in poorly illuminated areas

Control measure – Safety officers: Water rescue and flooding (PUBLISHED IN OTHER GUIDANCE)

Commented [AG30]: Published in Water rescue guidance

CONTROL MEASURE KNOWLEDGE

Safety officers should be appointed and positioned as soon as practicable. The nature of the incident and the environment will dictate the required safety officers at water incidents. The following safety officers are suitable for most water incidents.

Upstream spotters

Upstream spotters should be appointed to identify hazardous debris and communicate it to rescuers at the earliest opportunity. Upstream spotters should also communicate any changes in conditions or sudden releases of water.

Swimmers, divers and watercourse users in boats and other watercraft may be unaware of operational activity. They may affect rescue activities or endanger rescuers, casualties and themselves. Moving craft can also cause water movement, making rescue more difficult.

Spotters should be positioned a suitable distance upstream to inform responders of hazards and to stop oncoming watercourse users. When positioning spotters, consider the speed of flow and physical restrictions of the site to allow the best opportunity for early identification and communication of hazards.

Downstream safety

Downstream safety officers are positioned to retrieve rescuers and provide assistance to casualties.

Incident commanders will need to quickly assess the scene to decide if downstream safety teams will be required depending on the urgency of the rescue and the available resources.

Personnel should be positioned at a suitable point downstream to perform rescues. When using safety systems such as downstream safety lines, consider the time required to establish systems. It may be necessary to adopt alternative downstream safety until systems have been established.

The environment will dictate what form of downstream safety is appropriate. It may require the deployment of watercraft, a fixed downstream safety line or teams positioned on the bank side to perform in water or bank based rescues.

Downstream safety officers should be positioned with safe entry and egress points in mind. Entry and egress may not necessarily be the same point; water and bank conditions may make a point further downstream more suitable for egress.

Downstream safety teams should be comprised of a suitable number of personnel and equipment to rescue all people committed to the water, including personnel in watercraft and casualties.

Where downstream safety officers are not appropriate, another means of recovering casualties or responders should be considered. Safety systems should be appropriate for the environment; for example, when working near large static bodies of water, watercraft may be used to recover

responders who accidentally enter the water.

Incident commanders will need to prioritise the effective use of personnel and equipment, particularly when waiting for additional resources to arrive. It may be necessary to implement either downstream safety teams or upstream spotters according to the outcomes of their dynamic risk assessment.

Safety officers for management of tethers or lines

When watercraft or rescuers are tethered, trained personnel should manage any lines or tethers in use. They should be positioned at a point of relative safety considering the requirements of the rescue.

Appointed safety officers should perform checks of equipment and personal protective equipment (PPE), confirm communication signals, hazards, control measures and any expected tasks. Safety officers should ensure that the clean line principle is maintained throughout the rescue.

Any member of personnel managing a line should have a clear line of sight to the rescuer or watercraft at all times and maintain verbal or visual communication with responders.

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
	Provide equipment suitable for establishing safety systems at water incidents	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
	Consider deploying appropriate safety officers at incidents involving water and unstable surfaces
	Consider using safety systems such as downstream safety lines
	Consider implementing appropriate method of controlling boat traffic and water users

Control measure – Cordons: Water rescue and flooding (PUBLISHED IN OTHER GUIDANCE)

Commented [AG31]: Published in Water rescue guidance

CONTROL MEASURE KNOWLEDGE

When working near, on or in water, it may be appropriate to establish hazard zones to restrict

movement of personnel depending on levels of training and available equipment. Where possible, areas should be indicated using physical barriers and access should be controlled but due to the large geographical area covered by some flooding and water incidents this may not be feasible.

Where cordons or hazard zones are required it may be necessary to control access using comprehensive briefings and physical landmarks.

Hazard zones are separated into hot, warm and cold zones. It may not always be appropriate to establish any zones, or access to the hot zone may be prevented depending on the risk assessment. Known bodies of water, with limited risk may not require any hazard zones to be established.

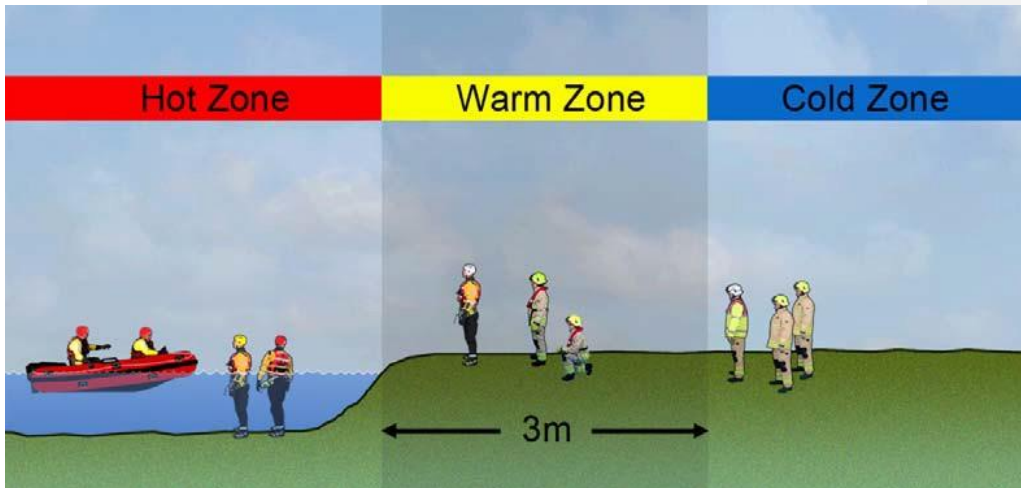
The hot zone is usually defined as the area of water or unstable surface. This area may be expanded based on the risk assessment of the incident commander. The hot zone is the area of greatest risk where rescues will be carried out and should only be entered by rescuers with the appropriate training and personal protective equipment (PPE).

The warm zone is the working area adjacent to the hazard, usually within three metres but this distance may be extended or reduced following a risk assessment. There may be a significant risk of uncontrolled entry into the water in this area. A warm zone may not be required when accidental entry into water can be prevented, or the hazard from entry is minimal such as still bodies of water with known depths. Personnel working in the area should be suitably trained, equipped and briefed to carry out specific tasks.

The cold zone is the safe area located outside the hazard zones. Equipment dumps, holding areas, casualty reception centres and marshalling areas should all be located in this area.

The cold zone is usually established 3 metres from the water's edge, but this distance will depend on the ground conditions, slope and presence of barriers around the edge of the water and may be extended or reduced depending on the hazard and risk of uncontrolled entry.

It is important that control zones are established, effectively implemented and communicated to all emergency responders as early as possible to maintain safe working areas and to assist in defining role responsibilities and objectives.



Hazard zones for water related incidents

The geographic scale of operations during responses to wide area flooding can make management of personnel difficult. To establish greater levels of command and control incident commanders should consider logging the number of personnel committed to the risk area. This should include the times of entry of personnel, assigned tasks and equipment. If necessary, consider placing appropriate limits on durations committed to the risk area. The duration of commitment will depend on the required tasks and environmental conditions. Regular radio contact should be maintained and where possible a dedicated officer appointed to manage the safety of personnel.

STRATEGIC ACTIONS

Fire and rescue services should:

- Provide appropriate means of implementing control zones and cordons at incidents involving water
- Provide all operational firefighters with water awareness training

TACTICAL ACTIONS

Incident commanders should:

- Consider establishing control zones at incidents involving water and communicate to all responders
- Consider using cordon control gateways at incidents involving flooding
- Ensure that personnel operate on the safe side of existing guarding near water or unstable surfaces
- Consider establishing an exclusion zone around any body of water or unstable surface where no guarding exists

- Manage hazards in the working environment that could lead to slips, trips and falls into bodies of water or unstable surfaces

Control measure – Appropriate techniques for removal of casualties from unstable surfaces [PUBLISHED IN OTHER GUIDANCE]

CONTROL MEASURE KNOWLEDGE

Mud and other unstable surfaces create suction on an entrapped person; as they attempt to move a vacuum can be created. Pulling a casualty trapped in mud without having taken prior action to reduce the effects of this vacuum such as digging out, lubricating or diluting the substance may cause additional harm. Excessive mechanical force should not be used to extricate casualties from entrapment in unstable surfaces.

When digging close to casualties, considerable care should be taken. The casualty may be numbed by the temperature of the mud and may not feel any contact with the spade or tool being used.

Injury to the casualty caused by digging may not be immediately obvious.

In all but the most minor cases the casualty should not be allowed to walk out. Advice can be provided by ambulance personnel. Sudden release and attempts to stand may induce post-rescue collapse. The casualty should be evacuated in as near a horizontal position as possible and passed to medical practitioners for treatment.

Casualties being removed from unstable surfaces may be suffering from physiological stress such as the effects of heat illness. See National Operational Guidance: Operations – [Physiological stress](#).

STRATEGIC ACTIONS

TACTICAL ACTIONS

Incident commanders should:

- Take care when digging around casualties partially submerged in unstable ground
- Consider the use of specialist equipment for rescues from unstable surfaces

Control measure – Spread the load [PUBLISHED IN OTHER GUIDANCE]

CONTROL MEASURE KNOWLEDGE

Applying pressure to an unstable surface will increase the likelihood of collapse. It may also result in a responder, appliance or casualty sinking or becoming engulfed. The greater the pressure the higher the likelihood.

Where movement on an unstable surface cannot be avoided, consider spreading the load, reducing weight and pressure. This can be achieved using specialist equipment or by taking simple actions

Commented [AG32]: Published in Search, rescue and casualty care guidance

Commented [AG33]: Published in Search, rescue and casualty care guidance

such as removing unnecessary equipment or sitting down.

Spreading the load may prevent or slow movement of unstable ground and can be used to stabilise a casualty's position prior to rescue or aid responders.

STRATEGIC ACTIONS

Revised, new, archive or no change	Strategic action	Reference No. if applicable
	Refer to the responsibilities of fire and rescue services.	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
	Consider spreading a load to reduce the risk from an unstable surface

Control measure – Have an effective recovery system [PUBLISHED IN OTHER GUIDANCE]

Commented [AG34]: This relates to working in confined spaces. Similar more relevant content added to the section about unstable ground or surfaces.

CONTROL MEASURE KNOWLEDGE

The regulations state that no person at work shall enter or carry out work in a confined space unless there are suitable and sufficient arrangements for their rescue in an emergency, whether or not that arises from a specified risk. As a result, a recovery system should be in place for all personnel entering the area of risk.

Fire and rescue service personnel will encounter organisations working in confined spaces with recovery systems that range from simple and immediate systems to more extensive recovery and rescue provision. The water industry, for example, has simple two person working systems through to full rescue teams on standby at main construction centres.

Depending on the level of access, recovery systems may involve using rope rescue equipment or dedicated confined space winching systems. An emergency team wearing appropriate respiratory protective equipment and associated equipment should also be available at all incidents except those with good access, adequate ventilation and low risks of a hazardous atmosphere.

STRATEGIC ACTIONS

TACTICAL ACTIONS

Incident commanders should:

- Establish what recovery systems have been employed before the fire and rescue service arrived

- Establish a recovery system for personnel deployed into confined space environments and ensure it is in place at all times
- Ensure that emergency arrangements are maintained and resourced for the duration of the incident

Unstable surfaces and landslides [CONTENTS MERGED]

Hazard — Insufficient resources: Unstable ground and landslides

HAZARD KNOWLEDGE

Working near or on unstable surfaces or performing a rescue from landslides is likely to involve arduous work over a significant duration.

Control measure – Specialist advice: Unstable surfaces [CONTENT RELOCATED]

CONTROL MEASURE KNOWLEDGE

Mud rescues may take place in tidal areas.

STRATEGIC ACTIONS

Revised, new, archive or no change	Strategic action	Reference No. if applicable
	Refer to the responsibilities of fire and rescue services.	

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
	Consider requesting specialist advice to assist with rescues from unstable surfaces

Control measure – Monitor ground conditions [CONTENT RELOCATED]

CONTROL MEASURE KNOWLEDGE

STRATEGIC ACTIONS

Fire and rescue services should:

Revised, new, archive or no change	Strategic action	Reference No. if applicable
------------------------------------	------------------	-----------------------------

	Monitor ground conditions and the impact of firefighting media on ground conditions	21495
--	---	-------

TACTICAL ACTIONS

Incident commanders should:

Revised, new, archive or no change	Tactical action
	Implement appropriate methods to reduce the effects of firefighting media on ground conditions
	Consider the use of on-site equipment and vehicles to access sites with unstable ground
	Identify safe access and egress routes and areas for the site and any specific working areas
	Consider the impact of past, present and future weather conditions on the ground conditions

Control measure – Use geological monitoring equipment [CONTENT RELOCATED]

CONTROL MEASURE KNOWLEDGE

There may be occasions when the unstable or collapsed structure may be affected by some form of geological movement. This is rare in the UK but similar types of ground movement within the substrata in and around the area of an unstable structure could occur.

The reasons for this movement may not be known and may not be noticeable, but the history of the initial cause of the structure's instability or collapse may indicate a need to be aware of potential ground movement. For example, in areas of known mining, the cause may be assigned to the collapse of old workings and therefore the possibility of further movement will need to be considered.

Urban search and rescue (USAR) tactical advisors will have some knowledge of the equipment available for monitoring ground movement, i.e. geological monitoring, but access to this type of highly specialist equipment will be limited. Some external specialists, such as Mines Rescue, will have access to or knowledge of geological monitoring equipment. It may be appropriate to consider using this type of equipment and service, especially in the case of protracted incidents, but it will take time to source and implement.

STRATEGIC ACTIONS

Fire and rescue services should:

TACTICAL ACTIONS

Incident commanders should: