Tactical Guidance 007

Flooding/ Incidents Involving Floodwater

Networked Fire Services Partnership

Document Overview

*Guidance to support assertive, effective and safe incident command at incidents involving **flooding** where water levels have risen to cover land that is normally dry. While the guidance is focused mostly on widespread flooding, the principles can be scaled down to apply to localised flooding.*

Quick Links

Checklist | Incident Info | Resource Info

Hazard/ Risks | Planning | Incident Closure

Supporting Guidance References

Tactical Guidance	**TG001** All Incident Actions **TG013** Environmental Protection **TG023** Co-ordinated search and rescue operations	**TG009** Hazardous Materials **TG008** Rescues from water
Operational Prompt	**OP1069** Flooding/ Incidents Involving Floodwater **OP1072** Rescues from water	**OP1073** Rescues from vehicles in water

INCIDENT SPECIFIC CHECKLIST

INCIDENT INFORMATION	✓	USER NOTES
Consider flood risk plans when deploying personnel and resources		
Be familiar with the roles and responsibilities of other organisations that may respond to a flood		
Consider the flood recovery strategy for employees, resources and sites affected		
Consider the impact of floodwater on vehicles or vessels being used		
Consider the effects of loss of power, isolation by floodwater or loss of communications on the emergency response		
Identify the number and location of people who need assistance to evacuate from the effects of flooding or floodwater		
RESOURCE INFORMATION	**✓**	**USER NOTES**
Consider the effects of flooding when establishing areas and locations for resources		
Consider requesting police assistance to close roads and prevent members of the public entering the hazard area		
Support the advance mobilisation of resources as required when a flood warning is issued		
Request appropriate specialist resources for a flood response including national resilience resources e.g. flood rescue and high volume pumps. Establish the capabilities of voluntary sector individuals before deployment		
Establish safe launching and bail-out sites for watercraft before deploying them in floodwater		

Establish capabilities of individuals from voluntary sector organisations prior to their deployment during a flood		
Establish appropriate rendezvous points (RVPs), strategic holding areas (SHAs) or multi-agency strategic holding areas (MASHAs) for flood rescue resources		
Seek specialist advice or assistance from the appropriate organisations for dealing with utilities at a flood		
HAZARD/ RISK INFORMATION	✓	**USER NOTES**
Refer to section 3 Hazard/ Risk table		
TACTICAL PRIORITIES	✓	**USER NOTES**
Consider subdividing areas of operations (AOO) for a flood		
Facilitate and assist evacuation or shelter arrangements for people at risk or vulnerable people from the effects of flooding or floodwater		
Identify and consider protecting Critical National Infrastructure, receptors of contamination, transport networks and built-up areas		
Assist with the transition from flood response to recovery		
OPERATIONAL TACTICS	✓	**USER NOTES**
Consider using pathfinders to indicate safe routes as the flood develops		
Have a plan of action to search for and deal with flood casualties and survivors- co-ordinate with other organisations		
Consider diverting/ improving or maintaining drainage of floodwater preferably with the consent of the relevant responsible agency unless it is a rapidly developing incident		

Consider the effects of pumping out structures, including temporary or unstable structures and the impact on biosecurity and the environment		
Consider adopting defensive tactics if utilities cannot be isolated or made safe at a flood		
Consider using appropriate techniques/ utility companies to isolate or make safe utilities at a flood		
COMMUNICATIONS	✓	**USER NOTES**
Consider appropriate methods of communication between emergency responders for a flood		
Regularly provide fire control information about people evacuated or displaced and any further information that may be required for a flood e.g. if the flood advice/water survival guidance is appropriate		
Liaise with the appropriate agency and the fire control room to ensure people at risk and vulnerable people are being provided with the most appropriate flood advice and water survival guidance		
Co-ordinate the flood response with other organisations in attendance, applying the JESIP principles; establish and maintain multi-agency communication during a flood		
Communicate hazards and risks identified, the overarching plan and the incident command structure to voluntary sector organisations that are responding to a flood		
CONTROL	✓	**USER NOTES**
Adhere to service's policies and procedures when responding to a flood- consider following contingency plans		
Consider avoiding evacuation routes to prevent potential conflict between response and public use during a flood		

Establish safe access, egress, cordons, hazard areas and avoidance routes for the incident, including around affected utilities		
Ensure personnel wear suitable PPE and personal flotation device / life jacket (type dependant on role) when working near, on or in floodwater		
Only deploy the minimum trained personnel required to work in flood water		
Appoint a safety officer to monitor the hazard presented by floodwater		
Ensure watercraft are operated by personnel or other emergency responders who are trained and equipped for the flood environment and the tasks required		
Consider delaying pumping out structures until the floodwater is receding		
Consider the environmental impact of using HVP to remove flood water in liaison with a tactical advisor and other agencies e.g. EA		
INCIDENT CLOSURE & HANDOVER	✓	**USER NOTES**
INVESTIGATIONS & INCIDENT REPORTING		
Investigate and co-operate with post incident investigation		
DEBRIEFING & WELFARE ARRANGEMENTS		
Conduct a structured debrief		
Report concerns about mental or physical wellbeing of responders		
Consider decontamination		
HANDOVER & SITE SECURITY		
Have all residual hazards, potential hazards and control measures remaining been identified?		
ADDITIONAL INFORMATION		

INCIDENT INFORMATION

1. SITUATIONAL AWARENESS/ SCENE SURVEY

Consider flood risk plans when deploying personnel and resources

- ☐ Flood risk plans will be created by emergency planning groups in the area e.g. Local Resilience Forums (LRFs).
- ☐ Flood risk plans should include an assessment of the flood risk based on the probability and consequences of a flood happening. It typically includes:
  - Aims and objectives
  - An overview of flooding and specific risks
  - Roles and responsibilities
  - Response and implantation covering locations at risk, triggers, timescales, resources, places for safe evacuation
  - Recovery
  - Communication process
  - Contact lists of organisations, contractors and others
- ☐ Flood risk plans should also include:
  - Specific hazards e.g. fords
  - Local infrastructure
  - Links to weather patterns
  - Data on previous floods
  - Water depth markers
  - Hydrology/potential hydrology
  - Previous incident data
  - Tide charts/timetables
  - Climate change impact assessments
  - Preplanning documents

Consider the flood recovery strategy for employees, resources and sites affected

- ☐ The recovery phase is likely to be protracted when compared to the response phase
- ☐ The recovery phase will be dealt with in collaboration with other agencies, the private sector and the volunteer sector; the local authority has the primary role
- ☐ The recovery strategy may include:
  - Clean up e.g. disposal of debris
  - Facilitating insurance claims
  - Providing advice
  - Continued provision of short-term facilities for evacuees
  - Moving displaced people from short-term accommodation to permanent accommodation or back to their homes
  - Accounting for costs

- While the fire service will not necessarily be involved in all of these activities, the response phase and recovery phase should be co-ordinated from the outset

Consider the impact of floodwater on vehicles or vessels being used

- Personnel should consider the effect of floodwater on vehicles or vessels used and their continued appropriateness for the task
- When considering if vehicles or vessels are appropriate consider:
  - The position of air intakes
  - Propulsion style of watercraft
- Consider where is likely to be flooded next and the effect that will have on vehicles and crews being able to access, rescue or withdraw

RESOURCE INFORMATION

2. RESOURCES

Consider the effects of flooding when establishing areas and locations for resources

- ☐ Access and egress to the site of operations should be monitored constantly
- ☐ Establish and an emergency evacuation area at the outset of incident
- ☐ Personnel should consider the effect of floodwater on vehicles and equipment
- ☐ Personnel should be aware of the risk that they may become isolated by changes in conditions- floodwater depth can change rapidly and unexpectedly
  - Establishing hazard areas, exclusion zones, and avoidance routes should reduce the risk but will require regular reassessment

Request appropriate specialist resources for a flood response including national resilience resources e.g. flood rescue and high volume pumps. Establish the capabilities of voluntary sector individuals before deployment

- ☐ National resilience resources should be requested via the national resilience control room and include:
  - High volume pumps
  - Flood rescue teams
- ☐ 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
- ☐ The voluntary sector can provide assistance at an incident e.g. RNLI inland flood rescue teams, mountain rescue, voluntary and charity ambulance services
  - When working with volunteer organisations it is essential to establish their capabilities to ensure operating practices are understood prior to deployment

- To support health and safety management with volunteers, the overarching plan and hazards and risks identified should be communicated to them. They should also be provided with an understanding about the incident command structure

- Aerial resources e.g.. drones, helicopters can assist in surveillance, search and rescue and deployment of equipment and personnel.
- Military aid may be necessary if resources are overwhelmed. Armed forces can assist with:
  - Building flood defences
  - Evacuating people
  - Providing helicopter support

Establish Seek specialist advice or assistance from the appropriate organisations for dealing with utilities at a flood

- Specialist advice or assistance for gas can come from:
  - Gas distributor for the area
  - Gas supplier to the premises
  - Gas industry helpline
  - On-site personnel and management team
  - Responsible person
- Specialist advice or assistance for electricity can come from:
  - Distribution network operator
  - Electricity suppliers to the premises
  - Relevant high-voltage electricity network
  - Onsite personnel and management team
  - Responsible person
- Specialist advice or assistance for water can come from:
  - Water distributor for the area
  - Water supplier for the premises
  - Sewerage company
  - On-site personnel and management team
  - Responsible person

HAZARD/ RISK INFORMATION

Consider and review significant hazards and appropriate control measures. The table below identifies hazards that are likely to be present at an incident and suggests appropriate control measures that could be implemented to reduce risk to fire service personnel, other responders and the public. These are not tactical actions that prompt incident commanders to resolve the incident.

Utilise this information where relevant and the risk information gathered at the incident to develop risk assessments appropriate to the dynamics of the situation.

Hazards/ Risks	Control Measures
Insufficient preparation for a flood ☐ Isolation/ trapped by changing conditions ☐ Unaware of sub-surface conditions	☐ Adhere to service procedures and contingency plans ☐ Consider flood risk plans ☐ Don appropriate PPE ☐ Liaise with other agencies on scene ☐ Establish cordons/access and egress/ exclusion zones ☐ Use suitable equipment e.g. wading poles ☐ Implement a safety officer ☐ Request specialist advice e.g. tech rescue, National resilience
Working on or near water ☐ Unintended entry into water ☐ hypothermia	☐ Don appropriate PPE ☐ Only trained personnel to enter the water ☐ Establish welfare facilities ☐ *See TG: Rescues from water*
Biohazard ☐ Flood water contaminated e.g. sewage	☐ Avoid contact ☐ Follow hazmat procedures ☐ Follow hygiene procedures ☐ Decontaminate as soon as possible ☐ Monitor health post incident
People needing rescue from floods	☐ Liaise with other agencies ☐ Consider flood risk plans ☐ Warn and inform residents that are likely to be affected ☐ Co-ordinate a search. *See TG: Co-ordinated search and rescue*

Damage to the built environment ☐ Structural collapse	☐ Divert the flow of water or improve drainage ☐ Pump out floodwater ☐ Establish cordons/access and egress/ exclusion zones ☐ Don appropriate PPE
Utilities ☐ Electrocution ☐ Gas – Flammable atmospheres e.g. appliances extinguished	☐ Isolate utilities - either locally or via utility companies ○ Consider removing suppliers' main fuse with caution ☐ Seek specialist advice ☐ Confirm utilities are isolated before entering water ☐ Establish cordons ☐ If unable to establish isolation, consider adopting defensive tactics ☐ Assume supply is live until confirmed by supplier or competent person ☐ Use gas monitoring if suspected gas leak ☐ Ventilate as appropriate

4. TACTICAL PRIORITIES

Consider subdividing areas of operations for a flood

- To help manage wide area flooding, the area of operations can be subdivided.
  - Intelligence reports will contribute to defining the areas of operations; it is likely to be dynamic
- Sectors identified for search-related tasks should be searchable with an operational period for the assigned resources and have clear boundaries

Implement evacuation or shelter arrangements for people at risk or vulnerable people from the effects of flooding or floodwater

- If an area has flooded suddenly, there may be people at risk who require the assistance of emergency responders. People may be:
  - Trapped in a building affected by floodwater, either internally or externally
  - Trapped in a mode of transport in floodwater
  - Stranded in transport networks due to power supply interruption
  - Stranded on high ground
- There may also be reports received about missing people
- If people are not provided with appropriate assistance, they may put themselves at greater risk by entering the floodwater
- It may be feasible to carry out evacuation prior to a flood if there is a high degree of certainty in the forecasting of its impact
- In some circumstances, vertically evacuating people to a higher floor in a building may be considered. This may be unsuitable if:
  - The building isn't appropriate
  - If the residents are vulnerable
  - The flooding is long term due to impacts on utilities and health
- There may be people who are not at risk but are physically unable to evacuate due to flood water e.g. if their road has flooded. Personnel may be required to assist with evacuation using:
  - Fire and rescue service vehicles capable of entering water
  - Non-powered watercraft
  - Wading techniques
- On scene personnel should liaise with fire control to provide information and updates about people who need assistance and those who've been evacuated

Identify and consider protecting Critical National Infrastructure (CNI), receptors of contamination, transport networks and built-up areas

- CNI is infrastructure that has been identified by the government as being of strategic national importance to essential service delivery and which the loss of would have a severe, widespread effect, impacting on a national scale e.g. transport, energy production, water treatment

4.1. OPERATIONAL TACTICS

Have a plan of action to search for and deal with flood casualties and survivors- co-ordinate with other organisations

- Searches for missing persons inland is the responsibility of the police, however fire and rescue resources may be involved or the first emergency responders on scene. The fire and rescue service may be asked to take the lead.
- Searching at wide area disasters including floods will start with initial reconnaissance to inform where to search and directing mobile, uninjured survivors to reception centres. It does not usually include complex rescue
- The DEFRA flood rescue concept of operations lists three types of search to be carried out:
  - Initial visual search
  - Systematic search- low assurance
  - Systematic search- high assurance
- Aerial resources should be requested to assist searching larger affected areas
  - Some aerial assets may be able to assist by transferring teams and equipment to areas completely cut off by floodwater (known as 'lily pads'). Lily pads can also be used as temporary areas of safety for survivors.
- If a casualty is known or suspected to be in flood water, follow water rescue guidance *OP: Rescues from water, TG: Rescues from water)*
- Communication between responders may be difficult due to the presence of water. Consider:
  - Establishing common terminology
  - Establishing hand or whistle signals
  - Requesting and sharing appropriate communications equipment

Consider diverting or improving drainage floodwater preferably with the consent of the relevant responsible agency unless it is a rapidly developing incident

- Even during smaller incidents, any diversion of flood water should be done in consultation with and with the consent of the relevant responsible agency such as:

- The environment agency
- The local authority responsible for surface water drainage
- The local sewerage undertaker
- The landowner

- If the incident develops rapidly or there is threat to life, and it's not been possible to obtain consent, the relevant agency should be informed as soon as possible
- Diverting the flow of flood water can be achieved by:
  - Using pumps to redirect water
  - Making use of existing water management systems
  - Excavating channels to direct the flow
  - Erecting barriers
- Unintended consequences of diverting floodwater can include:
  - Surface water drainage systems being overwhelmed
  - Sewage works being impacted
  - Biosecurity being affected
  - Damage to other areas
  - A negative effect on the flood management plan
- At larger floods, diverting the flow may allow areas to be protected. Areas of importance include Critical National Infrastructure, receptors of contamination, transport networks and built-up areas
- Removing blockages in drainage systems and waterways is not the responsibility of the fire and rescue service, however if appropriate and safe, removing blockages preventing draining can reduce damage
  - Such action should not be undertaken without the consent of the relevant responsible agency

Consider the effects of pumping out structures, including temporary or unstable structures and the impact on biosecurity and the environment

- Floodwater may need to be pumped out to prevent or reduce damage to properties and infrastructure. This can be achieved with:
  - Mobile pumps
  - Vehicle mounted pumps
  - High Volume Pumps (HVP)
- Environmental agencies also have a range of pumps that can be used and, with an adapter, can connect with HVP delivery hose.
- Any decision to pump water should consider:
  - Why it's being considered and if damage will be prevented

- Where the water will be moved to and the impact it will have, including its effect on water treatment plants or settlement tanks
- Whether conditions are likely to worsen and reflood a structure and if this can be prevented
- The duration pumping will be required for
- The effect of lateral pressure on a structure- the combination of scouring, water damage and the pressure differential created by lowering the internal water level may cause structural damage
- The effect removal of water from temporary or unstable structures will have on stability if water pressures have stabilised
- Whether the movement of water will affect biosecurity or harm the environment

- ☐ When making the decision to move large volumes of water, downstream conditions and flood development should be considered; this may require specialist advice
- ☐ Consider the effect of exhaust fumes if running pumps in or near an enclosed space. Use gas monitors as required

Consider using appropriate techniques to isolate or make safe utilities at a flood

- ☐ Isolating or making safe of utilities may be more hazardous or difficult during a flood
- ☐ Where possible, the utility provider should be contacted for advice or assistance
- ☐ Use gas monitoring equipment if there is a suspected gas leak

5. COMMUNICATION

Consider appropriate methods of communication between emergency responders for a flood

- ☐ Communication between responders may be difficult due to the presence of water. Consider:
  - Establishing common terminology
  - Establishing hand or whistle signals
  - Requesting and sharing appropriate communications equipment

Co-ordinate the flood response with other organisations in attendance, applying the JESIP principles; establish and maintain multi-agency 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 floodwater on utilities, such as electricity and aerials.
  - As floodwater can affect fixed infrastructure for mobile telephony, fire and rescue services should not solely rely on it for communications.
- ☐ If the local authority has established reception centres for displaced people, the fire and rescue service should provide them with regular updates

5.1. CONTROL

Consider avoiding evacuation routes to prevent potential conflict between response and public use during a flood

- ☐ Consideration should be given to the potential conflict of the public using identified evacuation routes on the fire and rescue service response and vice versa
  - In this event, fire and rescue services should identify and use alternative routes if possible

Establish safe access, egress, cordons, hazard areas and avoidance routes for the incident, including around affected utilities:

- ☐ Establishing 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
- ☐ Due to the potential large scale of floods, establishing and maintaining cordons may be difficult
  - Consider requesting police for assistance in keeping members of the public away

- Consider zoning the hazard areas into hot, warm, and cold zones as appropriate
  - At large scale incidents where management of these zones is difficult, consider cordon control gateways where personnel entering the zones are logged
- Establish and monitor hazard areas and avoidance routes for significant hazards e.g. live utilities

Ensure personnel wear suitable PPE and personal flotation devices when working near, on or in floodwater

- Depending on activities and level of training, personnel should don appropriate PPE including:
  - Personal flotation devices or life jackets
  - Protection against thermal injury
  - Helmets suitable for working near water
  - Dry suits
  - lighting

Consider appointing a safety officer to monitor the hazard presented by floodwater

- As personnel may need to work some distance from the incident commander, safety officers briefed to monitor changes in flood water or activity of personnel may be required
- Other activities that could be undertaken by safety officers include:
  - Upstream or downstream spotters
  - Tether/safety line monitor
  - Control of entering the hazard area
  - Cordon control

Consider delaying pumping out structures until the floodwater is receding

- It may be appropriate to wait for water to subside rather than pumping during a flood
- When floodwaters begin to recede, pumping out may speed the process but should be done as part of the recovery plan

6. INVESTIGATIONS & INCIDENT REPORTING

Investigate and co-operate with post incident investigation

- Investigations may be carried out by:
  - Fire and rescue service
  - Police
  - Local authority
  - HSE
  - As part of legal proceedings
- Personnel should co-operate with all investigations

6.1. DEBRIEFING & WELFARE ARRANGEMENTS

Report concerns about mental or physical wellbeing of responders

- Personnel should report any concerns of ill health caused by:
  - Noise
  - Vibrations
  - Fumes
  - Dusts
  - Biological agents
  - Other hazardous substances
- The risk of mental trauma is high at this type of incident. Personnel should be monitored and service procedures followed if there are concerns

6.2. HANDOVER & SITE SECURITY

Ensure that hazards, potential hazards and control measures are identified when handing over responsibility for health and safety:

- Handover to include:
  - Responsible person's details
  - Time and date of handover
  - Identification of hazards and measures to ensure health and safety is maintained
  - Security issues

- Logging decisions made by the IC
- Formal acceptance of responsibility by the responsible person

- ☐ Site security to include:
  - Inform those affected by the incident
  - Inform relevant people of any remaining hazards – including environmental hazards caused by fire and rescue operations
  - Any security issues
  - The need to leave in place any cordons or signage to provide warnings of residual hazards, e.g. unguarded edges
  - The need to seek specialist advice regarding impact, or potential impact, e.g. Health & Safety Executive
- ☐ Ensure Fire Control are advised that the incident is being closed and update status

Glossary of Abbreviations

AOO	Area of Operation	RVP	Rendezvous Point
ARA	Analytical Risk Assessment	SSRI	Site-Specific Risk Information
CNI	Critical National Infrastructure	USAR	Urban Search and Rescue
DEFRA	Department for Environment, Food and Rural Affairs		
DRA	Dynamic Risk Assessment		
ETA	Estimated Time of Arrival		
FRCO	Flood Rescue Concept of Operations		
FireMet	Met Office FRS weather information		
HazMat	Hazardous Materials		
HSE	The Health & Safety Executive		
HVP	High Volume Pump		
JESIP	Joint Emergency Services Interoperability Principles		
NR	National Resilience		
MASHA	Multi-Agency Strategic Holding Area		
PLS	Place Last Scene		
RP	Response Plan		
PPE	Personal Protective Equipment		
RNLI	Royal National Lifeboat Institute		

National Operational Guidance References

	National Operation Guidance Context: Geophysical hazards

Partnership Relevant References

	NFSP S6.0.0 Flooding in buildings NFSP S7.0.0 Flooding in the open

Other Related Guidance

	DEFRA Flood Rescue Concept of Operations

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