INDIVIDUAL RISK ASSESSMENT

Hazard/threat category	**Sub-category**
Severe weather	Flooding (major fluvial, urban)
Hazard and threat description, plus scale	**Risk reference number**
Localised, extremely hazardous flash flooding.	HL20
Author	Environment Agency
Version	2
Date of revision	**Next review**
December 2007	December 2008

1. Overview of hazard or threat

Heavy localised rainfall in steep valley catchments leading to extremely hazardous flash flooding (e.g. high velocities and depths). Likely that no flood defences or warnings in place or suddenness of event means timely flood warnings are not possible. Flooding of up to 200 properties (The outcome is essentially the same as H44 - dam or reservoir failure).

Assumes:

- Very little time to evacuate (as little as 15 minutes).
- Flooding lasts less than 24 hours.
- Emergency Services not pre-warned.
- Extent of downstream effect could reach 30 to 50km.
- Significant local infrastructure damage – gas, electricity supplies, telecommunications, road and rail links.

Most commonly caused by intense bursts of rain possibly in association with thunderstorms, which results in rivers or other watercourses overflowing their banks.

2. Key historical evidence

National

- August 2004 – Boscastle, North Cornwall – Intense heavy rainfall over a short period of time resulted in flash flooding on a massive scale. Homes and businesses were completely destroyed and over 150 people rescued by a team of 7 helicopters and 34 by the Fire Brigade. Boscastle is situated in a steep sided valley and has three rivers the Valency, Jordan and Paradise - which flow out into the harbour**.** 185 millimetres of rain was recorded in 5 hours at Otterham Station by a Met Office recorder. That was about twice the monthly long term average rainfall for August in North Cornwall of 95mm. The rain came down with such intensity it turned the village into a ferocious flood taking down whole trees, greenhouses, fuel tanks, cars, trucks and sweeping anything in its path down through the valley towards the harbour. 60 properties were flooded, some completely destroyed. 30 vehicles were washed right into the harbour and a major emergency rescue operation swung into action.

- June 2005 - North Yorkshire - thunderstorms caused one month of rain to fall in two hours. This led to dramatic and extensive surface water flooding with water surging down hills and along roads. The flash floods damaged 121 properties; some of them partially or completely washed away, destroyed or damaged bridges and roads and swept hundreds of animals to their death. Miles of dry stone walls and fencing were washed away and hundreds of tonnes of trees, vegetation and silt were washed into roads, streams and rivers. Over 120 properties were flooded by either surface water running off the land, overflowing drains or sewers, or from flood swollen streams or rivers. Flash flooding affected properties in the villages of Hawnby, Thirlby, Boltby and Sutton-under-Whitestonecliffe and the towns of Thirsk and Helmsley. While no deaths occurred a number of people were evacuated with some needing to be airlifted to safety. Electricity supplies were lost for 2,500 homes in the immediate area and 38,000 homes in the Region during the storms.

- March 1999 – North Yorkshire – River Derwent burst its banks and inundated Malton and Norton forcing 200 families to abandon their homes (recurred in November 2000)
- Easter 1998 floods - extensive flooding killed 5 in the Midlands and damaged 4,500 homes in Northamptonshire, Warwickshire and Oxfordshire.
- August 1952 – Lynmouth, North Cormwall – Severe flash flooding event which occurred at night and durning which 34 people died

Local

- No historic flood events of this type in TVLRF area. There are flashy rivers in the area but the topography of this area does not meet the criteria for this hazard (there are no steep sided valleys or topography which would result in a Boscastle type flood event).

Flood Mapping

The Environment Agency provides flood mapping on its website at: http://www.environment-agency.gov.uk/subjects/flood/826674/829803/858477/?version=1&lang=_e.

The Flood Map is a multi-layered map which provides information on:

- Flooding from rivers or sea without defences: the natural flood plain area that could be affected in the event of flooding from rivers and the sea
  - For flooding from rivers the map indicates the extent of a flood with a 1% (1 in 100) chance of happening each year*

- Extent of extreme flood: a flood with a 0.1% (1 in 1000) chance of happening each year

- Flood defences: such as embankments, walls and flood storage areas (which are areas of land designed and operated to store flood water)

- Areas benefiting from flood defences: where possible the EA map out the areas that benefit from flood defences in the event of flooding from rivers or the sea (as described above*). If the defences were not there, these areas would flood. Note that the EA do not show all areas that benefit from flood defences.

The Flood Map does not provide information on flood depth, speed or volume of flow. It does not show flooding from other sources, such as groundwater, direct runoff from fields, or overflowing sewers.

Where possible, the Environment Agency will assist professional partners' by producing customised maps to assist their flood planning eg showing sites of Emergency Services, schools, COMAH sites etc.

3. Likelihood

Hazard	Outcome description	Likelihood
Severe weather	Heavy localised rainfall in steep valley catchments leading to extremely hazardous flash flooding (e.g. high velocities and depths). Likely that no flood defences or warnings in place or suddenness of event means timely flood warnings are not possible. Flooding of up to 200 properties	**Negligible (1)**

4. Impact

Summary

Hazard	Outcome description	Impact				
		Health	Social	Env	Econ	Overall
Severe weather	Heavy localised rainfall in steep valley catchments leading to extremely hazardous flash flooding (e.g. high velocities and depths). Likely that no flood defences or warnings in place or suddenness of event means timely flood warnings are not possible. Flooding of up to 200 properties.	2	3	2	3	2

Details

Impacts
Primary
Drowning of people, pets and livestock
Pollution/health risks from sewerage systems, chemical stores, fuel storage tanks
Evacuation and temporary/long-term accommodation needs
Major damage to property and surrounding land
Closure, or washing away, of roads, bridges, railway lines.
Disruption to infrastructure – road and rail travel, community and key services
Loss of (and possible damage to) telephone, electricity, gas and water supplies
Secondary
Need for recovery strategy in aftermath of major flood. Clean up and recovery costs
Disruption of economic life and major costs of rebuilding infrastructure
Public need for information, advice, benefits/emergency payments
Insurance implications, including help for the uninsured
Safety assessments/possible demolition of damaged buildings and structures
Shortage/overstretch of key resources (equipment and personnel) and agencies
Overstretch of normal communication links, including mobile phones
Displacement of people post flooding, accommodation problems

5. Vulnerability and resilience

Major urban areas along the Thames corridor are most at risk from flash flooding and the possibility of large numbers of properties flooding as a result.

The resilience of a community is improved when there is an awareness of the risk of flooding and the actions that can be taken to reduce damage. In many communities this awareness of the risk of flooding from rivers is low. Flooding may also occur at times when people are at work or asleep; or with flash flooding as a result of heavy rain that they are not aware is forecast therefore their ability to take effective action is delayed.

Within flood risk areas there are some groups of people that are particularly vulnerable. These groups included:

- Those that do not receive a warning;
- The elderly;
- Disabled;
- Non-English speakers;
- Single parent families, and those with young children;
- People new to the area;
- Visitor and tourists.

For details of the locations of Flood Risk Areas in the TVLRF Area, please refer to the Local Flood Warning Plan for the Berkshire, Buckinghamshire, Oxfordshire and Wiltshire Areas.

6. Overall assessment

Category	**Sub-category**		
Severe weather	Flooding (major fluvial, urban)		
Outcome description	**Impact**	**Likelihood**	**Risk**
Heavy localised rainfall in steep valley catchments leading to extremely hazardous flash flooding (e.g. high velocities and depths). Likely that no flood defences or warnings in place or suddenness of event means timely flood warnings are not possible. Flooding of up to 200 properties.	Minor (2)	Negligible (1)	Low

Controls in place

- Environment Agency Incident Management Plans
- Environment Agency 24/7 incident response
- Environment Agency Issued Flood Warnings primarily using Floodline Warnings Direct
- Environment Agency Memorandum of Understanding with Fire Brigades, Police, Local Authorities, Highways Agency, Health Protection Agency and Health Authority.
- Environment Agency Local Flood Warning Plans for Oxfordshire, Buckingham and Berkshire
- Oxfordshire County Council Emergency Plan Part 3 Section E
- Buckinghamshire County Flood Plan
- Milton Keynes Council Flood Plan
- Buckinghamshire County Council Emergency Plan
- Aylesbury Vale District Council Emergency Plan
- Chiltern District Council Emergency Plan
- South Bucks District Council Emergency Plan
- Wycombe District Council Emergency Plan
- Oxfordshire, Royal Berkshire and Two Shires Ambulance NHS Trusts Major Incident Plan
- West Berkshire Council – Major Incident Plan
- Royal Berkshire Hospital NHS Trust Major Incident Plan
- Heatherwood and Wexham Park Hospitals NHS Trust Major Incident Plan
- Berkshire Primary Care Organisations Major Incident Plan and Operational Response Manuals
- Berkshire Healthcare Trust Major Incident Plan
- Buckinghamshire Hospitals NHS Trust Major Incident Plan
- Milton Keynes Hospital NHS Trust Major Incident Plan
- Buckinghamshire Mental Health Trust Major Incident Plan
- Buckinghamshire Primary Care Organisations Major Incident Plan
- Oxford Radcliffe Hospitals NHS Trust Major Incident Plan
- Oxford Mental Health Trust Major Incident Plan
- Nuffield Orthopaedic Clinic Major Incident Plan
- Oxfordshire Primary Care Organisations Major Incident Plan
- Thames Valley Strategic Health Authority Major Incident Plan
- Berkshire Integrated Emergency Planning Structure
- Wokingham District Council Emergency Plan
- Reading Borough Council Emergency Plan
- West Berkshire Council Emergency Plan
- Bracknell Forest Borough Council Emergency Plan
- Royal Borough Council of Windsor and Maidenhead Emergency Plan
  Slough Borough Council Emergency Plan

Additional risk treatment required

- Regular exercising of emergency plans.
- Regular training of duty officers and staff involved in flooding events.