

The UK's Evolving Physical Landscape: Sheffield Floods

The Sheffield Floods of 2007

Sheffield is a city in **South Yorkshire** that experienced devastating floods in **June 2007**.

Heavy and prolonged rainfall overwhelmed the city's **drainage systems**, and the River Don - which flows through Sheffield - **burst its banks**. This caused widespread flooding and many issues in Sheffield: **2 people died**, over **1,200 homes** were flooded, **1,000 businesses** were affected and **13,000 people had no power** for two days.

Several areas of Sheffield were severely affected, including **Lower Don Valley, Brightside and Hillsborough**. Hillsborough is shown in the map below, located at the **confluence of the rivers Don, Loxley and Rivelin**. This area was hit hard by the River Don overflowing, and areas such as the **Hillsborough Football Stadium** and the **Cadbury Trebor Bassett Headquarters** were in floodwaters up to **6 feet high**.



Location of Sheffield. (Source: Google Maps)

The causes of flooding can be attributed to a combination of **human and physical processes**.



Hillsborough, Sheffield. (Source: adapted from Google Maps)
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Physical Processes

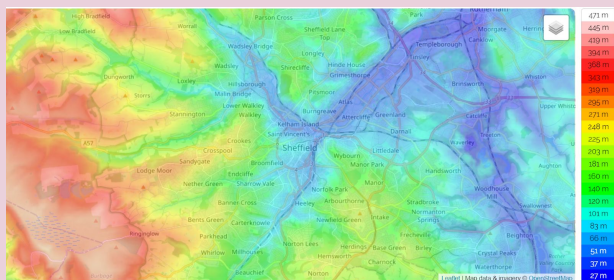
Heavy and prolonged rain fell on South Yorkshire during England's wettest May-July since 1766. Sheffield's rainfall levels were much **higher than average** for the season.

- 15th June: Over **90mm of rain** fell over Sheffield in **48 hours**.
- 25th June: Nearly **100mm** fell in Sheffield in **24 hours**, the highest daily rainfall on record for Sheffield.
- June was the **wettest month recorded in Yorkshire** since 1882.
- 286mm of rain fell in Sheffield in June 2007. Sheffield's **average rainfall in June** is 76mm.



The Wicker, Sheffield. (Source: www.thestar.co.uk)

Several hills surround Sheffield, in fact it is known as the "**city of seven hills**" due to its **topography**. It also sits at the foot of the **Pennines**. Rainfall flows rapidly down the surrounding hills as **runoff** and drains into Sheffield's river systems, filling them quickly.



Elevation of Sheffield. Red = high. Blue = low. (Source: bw.topographic-map.com/maps/7yb5/Sheffield/)

Human Processes

Sheffield is a **heavily urbanised area**, with concrete and tarmac surrounding the rivers. These **impermeable surfaces** stop water from infiltrating into the ground; and instead water is directed into **urban drainage systems**.

On the 15th June, **drains began to be overwhelmed** with rainwater in some parts of the city and **surface water flooded areas** even when rivers were still not at full capacity.

This problem was only made worse when rainfall continued to fall heavily for weeks. When the rivers burst their banks, **drainage systems could not take any more water**, leading to widespread flooding. However, **Sheffield council** claimed the drainage systems were not at fault.



(Source: AXA insurance)

The worst damage caused by the flooding was seen in the **natural floodplains** of the River Don, which have been used for **industry**.

Many important businesses built in low-lying areas were flooded, including:

- Clarkson Osborn
- Sheffield Forgemasters International
- Cadbury Trebor Bassett

These businesses suffered around **£15 million each** in damages, and had to undertake huge clean-up operations.

Many **homes and businesses** that were flooded were located on the natural floodplains of rivers.

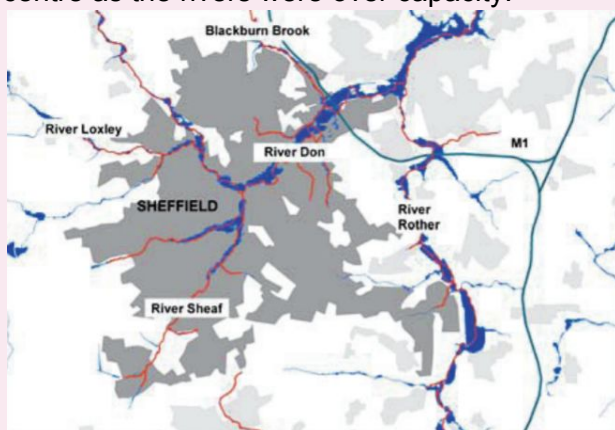


Three **fast-flowing rivers**, the **River Don**, the **River Loxley**, and the **River Sheaf**, join in Sheffield, and many other tributaries also contribute to the rivers' flows.

High rainfall levels caused all of the rivers of Sheffield to rise in June 2007, but the **River Don** particularly was a major cause of flooding.

Several rivers flow directly into the **River Don** (seen in the image below). These rivers continued to contribute to the Don's discharge as heavy rainfall continued, and eventually the channel became overwhelmed with water and **burst its banks**.

Water continued to flow into the river, and flooding worsened. Fast flowing torrents of water began **flowing down roads** in the city centre as the rivers were over capacity.



Areas of Sheffield that Flooded in June 2007 (flood area in blue). (Source: [Environment Agency](#))

During stormy and windy weather, **trees fell** and **blocked river channels**, backing up water and causing even more flooding in areas.

Poor **river management** and weak **building regulations** have limited the ability for rivers to **naturally overflow and drain into floodplains**, which has increased flooding risk.

Urbanisation in Sheffield has left the River Don and its tributaries with **no space to naturally expand and flood**, which is important for flood risk reduction.

These rivers are squeezed into **man-made channels (called culverts)** which **direct and manage water**. This means when the rivers do swell, they have no space to flow onto floodplains, and instead **flood homes and businesses**.



Buildings directly next to the River Don.
(Source: [Environment Agency](#))

Some **flood defences** were simply not strong enough and were breached, such as at Meadowhall Shopping Centre. Officials say they were **not designed for flooding events as severe as the one in 2007**.

