

Enabling fire brigades to fight fires faster

Stantec

Challenges

- Real-time information needed about the water flow available to fight fires, on a building-by-building basis

Benefits

- Effective responses to fires in London
- Focused measures to create a safer city
- Informed decision making in planning process
- Less water wastage during hydrant testing

The professional services company Stantec has used ArcGIS in the creation of a ground-breaking new solution that gives water utilities and fire services real-time insight into fire hydrant performance. Called the Fire Flow System, the app is currently being used across Greater London to help firefighters extinguish fires more quickly.

The Challenge

A vast amount of water can be required to put out major fires. Indeed, a blaze at a multi-story residence, school or commercial premises can require 35 to 75 litres of water per second to bring it under control. Water utilities are, however, often not aware if there is sufficient water capacity and pressure for firefighting at every property in their region. Equally, when fire crews are called out to emergencies, they generally don't know in advance what water pressure to expect at the nearest hydrants or whether there will be sufficient water capacity to enable them to implement their preferred firefighting strategy.

The Solution

Recognising these challenges, Stantec set out to develop a solution that would calculate the water capacity and pressure at each hydrant across a water supply network and also assess whether there was sufficient fire flow available to tackle fires at individual buildings. Its prototype application, called the Fire Flow System, attracted the interest of Thames Water and led to the delivery of a fully operational solution covering all of Greater London.

Built using ArcGIS Pro, ArcGIS Online and ArcGIS Experience Builder, the Fire Flow System for Thames Water:

- Estimates how much water would be required to fight a fire at 1.7 million individual properties in Greater London, based on the types of buildings, number of floors and whether they are residential
- Calculates whether sufficient water flow is available in the water supply network to fight fires, at each individual property
- Displays which hydrants are available and most suitable to use for firefighting at each building
- Presents a 3D digital twin of all buildings in the capital, on ArcGIS Online, categorised and colour-coded by the ability to meet firefighting requirements
- Highlights in red all buildings where there is insufficient water supply to extinguish a serious fire, should one occur at this location.

The solution for Thames Water was developed in collaboration with the London Fire Brigade and takes into account standard procedures for how fire crews fight fires. For instance, the system knows the typical length of hoses used by the London Fire Brigade and rules about how and where hoses can be laid near waterways, roads and rail infrastructure. Now both organisations use the Fire Flow System daily, in offices and in the field. "The ArcGIS Online environment is key to collaboration," says Sunil Terkar, Principal GIS Technician. "Thames Water can update the Fire Flow System and share new information instantly with the London Fire Brigade."

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Sunil Terkar, Principal GIS Technician, Stantec



ArcGIS highlights buildings in London that have limited access to water hydrants with the required water flow

The Benefits

Effective responses to fires in London

When 999 calls are received by the London Fire Brigade, staff at dispatch centres and firefighters travelling in fire engines can view the Fire Flow System online to see exactly which hydrants are closest to the fire, within reach of hoses and able to deliver the required water pressure and water volume. If firefighters know there is a potential problem with water flow in advance, they can order tankers to site earlier and plan different attack methods. “Our innovative use of ArcGIS gives firefighters immediate access to up-to-date information about water flows and hydrants, enabling them to make the right decisions and implement the most effective strategies to put out fires quickly,” says Michael Morrisroe, Technical Director at Stantec.

Focused measures to create a safer city

For the first time, Thames Water and the London Fire Brigade now have accurate, shared, up-to-date information about water flow in Greater London. ArcGIS clearly identifies, on 2D and 3D maps, specific buildings that would be hard to reach with the required water flow in the event of a fire. Consequently, Thames Water and the London Fire Brigade can now plan ahead and put focused measures in place to mitigate the risk of inadequate water flow, to help make London a safer place to live and work.

Informed decision making in planning process

The clarity of the information displayed via ArcGIS Online enables the London Fire Brigade to take water flow into account, for the first time, when approving or rejecting planning permissions. It is easy for personnel to use the interactive mapping interface to zoom into a specific building and see if it has sufficient water flow to permit a change of use or new development. “The solution was recently consulted when the Excel Centre was transformed into a Nightingale Hospital,” Morrisroe explains.

Less water wastage during hydrant testing

Through this innovative use of ArcGIS, Stantec has delivered a solution that enables Thames Water to quantify likely fire flows for the first time and therefore better understand hydrant performance across the city. As ArcGIS highlights clearly which hydrants have the required pressure and capacity and which do not, Thames Water can better plan its routine testing of fire hydrants and only carry out full flow tests where absolutely necessary. This not only saves time for Thames Water, but could also potentially save millions of litres of water a year, while maintaining the operational readiness of the hydrant network.

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