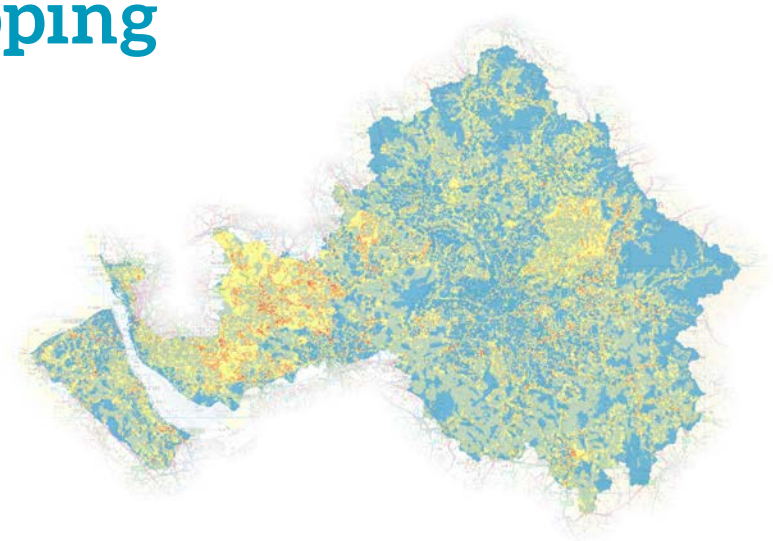
Green Infrastructure for Water Opportunity Mapping

City of Trees



Date carried out

2017

Location

Irwell, Upper Mersey and Lower Mersey Catchments

Background

Maintaining water quality and managing water quantity in the urban environment presents a number of challenges for government agencies, utility companies and policymakers. The UK has in recent years, faced increased incidences of flooding, imposing enormous economic, social and environmental costs on householders, businesses and the public sector. Such devastating events are only expected to increase as a result of climate change.

Meanwhile, keeping our rivers, lakes and seas clean is another challenge. Our commitments under the Water Framework Directive requires all water bodies to achieve 'Good' ecological and chemical status by 2027 unless it is technically infeasible or disproportionally expensive. Green Infrastructure (GI) has the potential to modify rates of surface water flow, promote infiltration into the ground, remove excess water through transpiration, and provide areas for water storage during high rainfall and flood events, thus helping to reduce flood risk. GI also helps to reduce pollutants running off roads and buildings and entering rivers and other water bodies by acting as a natural buffer. The Green

Partners

City of Trees, Greater Manchester Combined Authority, Environment Agency

Themes

Urban | Healthy Rivers | Water Quality | Evidence & Tools

Infrastructure for Water (GIFW) Opportunity Mapping method was developed by City of Trees in order to respond to the question "where, in a predominantly urban catchment, is there the greatest opportunity to install GI that will have beneficial impacts on water quality and surface water flooding.

Project

The GIFW opportunity mapping method used

readily available data in a GIS to identify a range of elements in the physical environment of the study area that represented potential pathways for urban diffuse pollution (UDP). These included major roads, large car parks, wide footpaths which could potentially be interrupted using GI interventions such as street trees, swales and other SuDs schemes to manage water in the urban environment more sustainably.

The model incorporates proximity of multiple opportunities, to map those locations, or 'hot spots', where the greatest opportunity to reduce UDP and flooding are presented.

Fifteen opportunity 'layers' make up that model:

- Historic landfill adjacent to watercourses
- Large areas of greenspace within built-up areas
- Urban pavements wider than 2.5m
- Large areas of hard surfacing in built-up areas
- Large roofed areas in built-up areas
- Roadside woodlands
- Highways and motorways within close (300m) proximity to river network
- Zones contributing runoff to areas of severe surface water flood risk
- Large Industrial yards within 300m of a watercourse
- Large impermeable surfaces close to watercourses
- Large roofs close to water courses
- Surface water discharges to watercourses in residential areas (inferred)
- Watercourses on agricultural land
- Cloughs
- Steep ground

In order to further prioritise locations and reduce the pool of candidate sites it was necessary to bring in additional data on environmental issues and priorities, and overlay those within the GIS.

Overlaying the main 'hot spot' map with other data allows for useful narrowing of the search field. The additional GI 'needs' datasets considered in this project were:

- EA reasons for not achieving WFD 'Good' status
- EA Risk of flooding from Surface Water
- Defra air quality management areas
- United Utilities hydraulic incidents register

The final mapping product comprises a report, the opportunity 'hot spot' map, and the GIS data layers.

Outcomes

This project used GIS data in a systematic way to identify potential 'hot spots' for the development of multi-beneficial GI projects in Greater Manchester. Whilst it still doesn't replace the need for ground truthing it does provide a means of rapidly assessing large areas of a catchment. The methodology should be easy to repeat for other geographical areas providing the base data is readily available.

Next Steps

Extant urban greenspaces are highlighted frequently by the model as ideal opportunities for temporary storage of storm water, or filtration/ bioremediation of contaminated surface water. Many areas of substantial urban greenspace are either earmarked for development, and so it is important that their potential to alleviate water-related issues is acknowledged so that this function may be planned in to their future development.

Overlaying additional data, such as priority outfalls, or surface water flood risk, can help to further focus attention on particular locations, and facilitate selection of GI-based solutions to those problems.

Hosting the model online would greatly facilitate examination of potential project locations by partners.

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