

018530 - SWITCH

Sustainable Water Management in the City of the Future

Integrated Project
Global Change and Ecosystems

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Contents

1	Executive Summary	1
2	City Overview and Context	2
3	Description of Stakeholders, Role & Responsibilities	4
3.1	Background	4
3.2	Stakeholders.....	5
3.3	Water Management in Birmingham.....	9
4	Prime-movers within Stakeholders	10
5	Relationships between Stakeholders.....	10
6	Social and gender aspects of city water management.	14
7	Conclusions and Recommendations	14

1 Executive Summary

Stakeholder analysis has been undertaken in the city of Birmingham, England, although due in part to national legislation and structures very similar results would be found for other major cities and towns within the United Kingdom.

Stakeholders are generally easily identifiable as the water industry in the UK is both historic and highly structured. The dominant stakeholders tend to be the water company (former authority) - in Birmingham's case Severn Trent Water is the main provider of services, the city council - Birmingham City Council and the various regulators (including the Environment Agency and OFWAT). The linkages between the stakeholders have also been addressed and also the relative influence of each.

However there are many other stakeholders operation either at the national, regional or local level and some of whom even operate on the neighbourhood level in the case of Flood Action Groups for example.

Increasingly insurance companies, who take on flood/property insurance, environmental groups, local societies and even individuals are taking a role in the debate about water, water management and or cities in general.

Some initial stakeholder analysis was carried out in the City Story work concluded in 2006 and this report builds and expands upon these earlier findings.

2 City Overview and Context

Anglo-Saxon tribes started to settle in the area around 700 A.D. The town of Birmingham was a hamlet up until the early 1500's when the population of the town of Birmingham reached 1000 inhabitants. Eventually Birmingham became the largest town in Warwickshire and by 1700 the population rose to some 15,000. Birmingham became one of the first industrialised towns in the world Birmingham continued to grow over the 18th-19th centuries and by the early 1900's it was a world renowned industrial city. Earlier, driven by rapid industrialisation, canals were constructed which connected Birmingham to the sea and enabled the city to export manufactured goods throughout the world. Birmingham has today more kilometres of canal than Venice and these, having fallen into decay by the mid 1900's are now forming the nucleus of some major regeneration projects that we are seeing today.

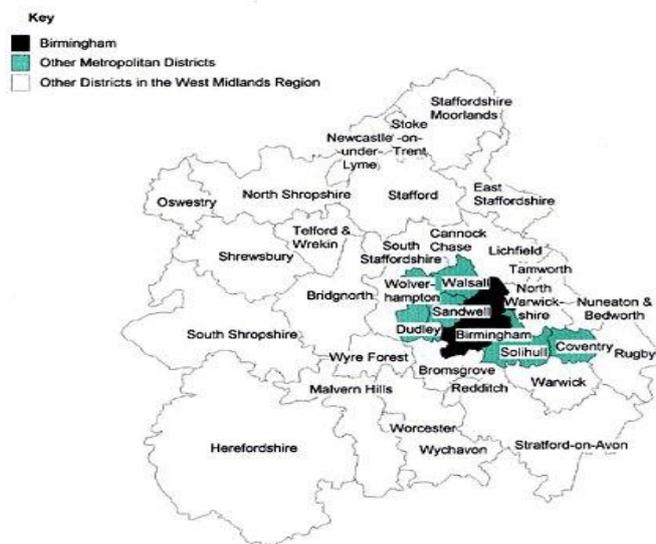
During the 19th century, at the time of the Industrial Revolution, Birmingham's population grew rapidly. Clean water was in short supply and there were major epidemics of water-borne diseases including typhoid, cholera and diarrhoea.

Birmingham City Council set about finding a clean water supply for the City and an Act of Parliament was passed for the compulsory purchase of the total water catchment area of the Elan and Claerwen Valleys (some 180 square kilometres).

This very much catered for the provision of water to the city for the next 100 years. However through various Acts and Directive coming from London and Europe saw the water and sewerage provision of the Municipal Authorities passing into Regional Water Authorities based upon river catchment areas. By the Water Act of 1991 these Water Authorities were turned into Privatised, Regulated Companies along with the complete transfer of all assets. In the Birmingham area this was to the Severn Trent Water Company and this led on to an integration of water supply systems across the rivers Severn and Trent catchment region currently having some 9 million inhabitants.

The population of Birmingham is c 1 million but it sits in the administrative region of the West Midlands and with the other adjoining municipal areas of Sandwell & Dudley, Wolverhampton, Walsall and Solihull accounts for almost 5 million inhabitants all told.

Birmingham's Location Within The West Midlands Region



Currently the Regional Spatial Strategy is looking at development options to meet the governments housing targets and in Birmingham there are currently some 400,000 dwellings (2001 Census).

However the Sustainability Appraisal carried out by the planners to date has indicated that Severn Trent, the water company responsible for providing water and wastewater services to the region, has water some significant resource limitations. The SA also shows that Environment Agency data demonstrates that much of the Region has no additional surface water available and in some areas groundwater abstraction is unsustainable.

It is proposed that in the future, most new developments will be built at densities higher than have occurred in the past. Draft Government guidance indicates that there should be a presumption that no new development should be built at a net density of less than 30 dwellings per hectare and recommends a range of densities, depending on the nature of the area, from 30 – 40 dwellings per hectare in rural areas to over 70 dwellings per hectare in City Centres.

This will imply a greater concentration on terraced properties and flats. This could help to ease affordability problems but could limit the extent to which new housing development could meet the full range of identified needs. There will inevitably be a “hardening” of the urban landscape, potentially 70 dwellings per hectare, and hence a greater need to control run-off from rainfall events and the attendant increasing localised risk of flooding. Particularly as there is a requirement under the Planning Policy Statement 25 (PPS25) which dictates that a climate change factor of 20% be added to all Flood Risk Assessments and new development designed to accommodate this.

New housing will have Sustainability Targets of water supply demand reduction/efficiency of 20% savings on current a demand which in effect means a reduction of 25 l/h/day/household (Severn Trent estimated average household consumption 2004-05 was given as 132 l/h/d).

Currently less than 26% of households in the UK have metered supplies and Birmingham follows a very similar pattern.

Geographically Birmingham and more properly the West Midlands Conurbation sits on relatively high ground at the head of the catchment to a major river (river Trent) and immediately to the east of the longest river in Britain (river Severn) it is nevertheless exposed to local flooding from the rivers Rea and Tame (Cole) as show below. As the city landscape progressively becomes more “hardened” and land use at the urban/rural interfaces change then there has been an increase in localised flooding of properties.



Localised urban and peri-urban flooding is becoming more prevalent.

The numbers of “flash-flooding” within the city has increased quite significantly over the past 20 years and it is generally accepted that the peri-urban parts of the city has become more prone to such flooding particularly at the urban/rural interface.

3 Description of Stakeholders, Role & Responsibilities

3.1 Background

The privatised water company Severn Trent supplies all of the water services to the city and are responsible both for drinking water supply, drainage and sewage treatment. The Environment Agency are nationally (England & Wales) responsible for water resources and natural water quality. Water for the city is supplied primarily from external surface water sources and is imported into the city (much of it from mid Wales). Since the decline of the industry, groundwater has been rapidly replenished and rising groundwater tables are now a threat to the subsurface infrastructure of the city. Groundwater quality near surface is poor and groundwater effluents to the river Tame and its tributaries that pass through the city contain significant organic and metals contents. Leakage of the water supply pipe network has been significantly reduced in recent years and the reduction in industrial demand has helped the city to cope with increasing household demand. Measures to save water at the household level including metering and education in the adoption of good practices for water conservation are having some impact on water demand but presently these actions do not have high priority. Changing land use both within the city and in the region surrounding the

city has resulted in more “flash” flooding of the urban areas and this appears to be exacerbated by climate change.

The manner in which responsibility for UWM has been split with the Water Company, Environment Agency, City Corporation and a number of other organisations including private owners has led to difficulties in adopting strong policies, Best Practice and an Integrated approach to UWM.

3.2 Stakeholders

Stakeholder	Role and Responsibility
Birmingham City Council	Management and Control of the Municipal Functions and Governance for the City of Birmingham including Health, Education, Housing, Employment Creation and Environment (transport, planning), They are also leading in the planning and implementation of Urban Regeneration one of which is Eastside. They also have a responsibility for land drainage and highway drainage in the City.
Severn Trent Water Limited	STWL are the Regulated Water Company responsible under the Water Industries Act for the provision of water and drainage services for the Severn and Trent catchments (approximately) and in the current context for the City of Birmingham. They are a former public utility and are now a stock market listed plc and subject to regulation by OFWAT, the Environment Agency and Drinking Water Inspectorate. Their Head Quarters are in the city.
South Staffordshire Water Company	Is a private Water only company who provide drinking water to parts of the South Staffordshire are of the West Midlands Region. They were established under the Water Act and are responsible to Ofwat for price regulation, the Environment Agency for abstractions and to the Drinking Water Inspectorate for the quality of their water supplies.
Environment Agency	The Environment Agency was formed from the previous National Rivers Authorities who where responsible for the control of water resources and water quality. The EA now has the full remit to control air, land and water pollution. They issue and control IPPC licences and are responsible for flood management and coastal protection/management. They have recently become statutory consultees to the Planning Process.
British Waterways	British Water are a government statutory body responsible for the management of inland navigations. These are a collection of former private waterways and canals and they now form part of a national network. They are also holders of abstraction and discharge licences and answerable to the EA for water quality. They are funded through licences and predominantly government grants.
Solihull Metropolitan Borough Council	SMBC are the Municipal Authority for the Solihull area of the West Midlands conurbation. They have the same areas of responsibility as Birmingham City Corporation for their area.
Walsall Metropolitan Borough Council	WMBC are the Municipal Authority for the Solihull area of the West Midlands conurbation. They have the same areas of responsibility as Birmingham City Corporation for their area.
Sandwell District Council	SDC are the Municipal Authority for the Solihull area of the West Midlands conurbation. They have the same areas of responsibility as Birmingham City Corporation for their area.

Dudley Borough Council	DBC are the Municipal Authority for the Solihull area of the West Midlands conurbation. They have the same areas of responsibility as Birmingham City Corporation for their area.
West Midlands Regional Observatory	The government body responsible for reviewing the state of the West Midlands, and providing access to information and intelligence. This community of data and intelligence users represent both the key suppliers of data and the key users of information services. They work with partners to identify and map key information resources, and signpost these resources using an online catalogue.
Consumer Council for Water – West Midlands	Consumer Council for Water is the industry watchdog, set up to represent customers of water and sewerage companies in England and Wales and provide a strong national voice for customers. It represents the consumers interests in water and wastewater, particularly with respect to price and quality issues.
West Midlands Regional Assembly	Currently the West Midlands Regional Assembly is responsible for developing and co-ordinating a strategic vision for improving the quality of life in the region. The Assembly is responsible for setting priorities and delivering regional strategies, including the West Midlands Spatial Strategy. The areas where the Assembly has specific responsibilities range from business and economic development through to social inclusion, and regional planning through to the environment. These responsibilities are outlined through their regional priorities, and it is the Assembly's job to communicate and deliver regional strategies for each of these areas, and to ensure they are tailored to meet the needs of the West Midlands.
Groundworks – West Midlands Groundworks has recently been wound up and it's role has been absorbed into other organisations such as AWM, etc.	Groundwork's was a partnership who's vision was for a society made up of sustainable communities which are vibrant, healthy and safe, which value the local and global environment and where individuals and enterprise prosper. Groundwork's purpose was to build sustainable communities through joint environmental action. They did this by developing and delivering partnership projects that enable an integrated and community-led approach to local regeneration. By the use of environmental improvements as a means of achieving social and economic change and help individuals and organisations contribute to sustainable development They are heavily involved in the eastside Regeneration project in Birmingham.
Advantage West Midlands – Regional Development Agency	Advantage West Midlands is the Regional Development Agency (RDA) for the West Midlands, the region at the heart of the UK which includes the seven metropolitan districts of Birmingham, Coventry, Dudley, Sandwell, Solihull, Walsall and Wolverhampton. Advantage West Midlands was established by the Government in 1999 along with seven other RDAs, to transform England's regions through sustainable economic development. All RDAs are non-departmental public bodies that are accountable to the Department of Trade and Industry.
UKWIR – UK Water	UKWIR was set up by the UK water industry in 1993 to provide a

Industries Research	framework for the procurement of a common research programme for UK water operators on 'one voice' issues. UKWIR's members comprise 24 water and sewerage undertakers in England and Wales, Scotland and Northern Ireland.
British Water	An organisation dedicated to the promotion of the interests of British Water Industries including water companies, manufacturing operations, etc. They organise international trade missions and provide a platform for contacts through the various British Embassies Commercial Attaché's. British Water is a trade association for the water industry supply chain, representing the industry collectively to government, regulators, other institutions, customers and the media.
CIWEM – Chartered Institution of Water and Environmental Managers.	CIWEM is a professional body governed under Charter looking after the interests of Water Engineers and Environmental Managers in the UK (and increasingly internationally)
OFWAT – The Office of the Water Regulator – England & Wales	OFWAT is the Water Industries Regulator for England and Wales established by government to set and regulate the pricing levels of the Water Companies (in England & Wales). OFWAT reports annually to Government on the performance of each water company and advise government on the need for further legislation of the operator licences.
Department for the Environment, Food and Rural Affairs	Defra is the UK custodian of the marine and aquatic environment, which is a shared and valuable asset. We deal with all aspects of water policy in England, including water supply and resources, and the regulatory systems for the water environment and the water industry. These include drinking water quality; the quality of water in rivers, lakes and estuaries, coastal and marine waters; sewage treatment; and reservoir safety.
Flood action groups	Rea Valley Resident Association (Flood action group sub-committee) Witton Flood action group
The University of Birmingham	The University of Birmingham is one of the main research partners of SWITCH. They are currently undertaking research in green/brown roofs, virus transfer in aquifers, aquifer recharging and integrated catchment modelling on behalf of SWITCH, not to mention all of the other research carried out in urban water management.
CIRIA	CIRIA's research is member-driven, and spans the separate market sectors of buildings and facilities, water and utilities and transportation infrastructure. Working both within and across these market sectors, the themes of work cover wide remits topical to construction, such as technical issues, legislation and regulation, training, management and economics.
Birmingham Canal Navigations Society	The Society's original aims continue:- to conserve, improve and encourage a wide range of interests in the 100 mile network of the Birmingham and Black Country Waterways know as the BCN.
Drinking Water Inspectorate (DWI)	DWI is responsible for assessing the quality of drinking water in England and Wales, taking enforcement action if standards are not being met, and appropriate action when water is unfit for human consumption.
Birmingham Anglers Association	The society is responsible for informing members of good fishing locations in and around Birmingham.
Housing corporation	The Housing Corporation is the national Government agency that

	funds new affordable housing and regulates housing associations in England.
Natural England	Natural England are responsible for Sites of Special Scientific Interest (SSSI) in addition to national nature reserves. They advise the government on nature conservation as well as being involved in biodiversity action plans.
English Heritage	English Heritage are responsible for the conservation of buildings and areas of heritage and archaeological interest.
English Partnerships	Is a central government agency which is responsible for regeneration and the disposal of land owned by central government.
Pension Funds	Pension funds invest vast sums of money in both land and development. There is now encouragement to invest in sustainable developments.
Council of Mortgage Lenders	Virtually all banks, building societies and other mortgage lenders are members of the CML. A significant question is whether sustainable water management will increase or decrease the value of a property.
Birmingham Chamber of Commerce and Industry	The BCI represents the views of local, independent businesses within the Birmingham area. They lobby government on a number of issues including the environment and energy.
Department of Communities and Local Government	Works towards the creation of communities, sustainable housing, improving local services, regenerating areas and combating anti-social behaviour.
Parish Councils	Parish Councils have wide ranging responsibilities, but these include; drainage, water supply, recreation facilities, planning, land acquisition and disposal.
Met Office and Hadley Centre	Together the Met office and the Hadley Centre provide weather information and climate change prediction which are then used in conjunction with other information to analyse flood risk, future water availability, design sewers etc.
Institution of Civil Engineers	The ICE is a professional body governed under Charter looking after the interests of Civil Engineers in the UK (and internationally).
Association of British Insurers	The ABI is a trade organisation which represents the majority of companies who offer insurance within the UK. The ABI has become very active with regards to climate change as the ability to get a mortgage depends on insurance being available. As a result the ABI has been lobbying the government for increased investment in flood alleviation measures, resilient construction methods in flood prone areas and the exclusion of new developments on floodplains.
National Audit Office	Carries out performance evaluations and financial audits of government departments including the Environment Agency and OFWAT.
Audit Commission	Carries out performance evaluations of local government, including their performance in engagement of stakeholders.
Making Space for Water	Making Space for Water is the cross Government programme taking forward the developing strategy for flood and coastal erosion risk management in England.
Water UK	Water UK represents all UK water and wastewater service suppliers at national and European level. They provide a positive framework for the water industry to engage with government, regulators, stakeholder organisations and the public.
West Midlands	The Club is a subscription network, promoting the values of

Environmental Business Club	sustainable development to the business community and providing a cross flow of information, knowledge and experience.
Royal Society for the Protection of Birds (RSPB)	One of the most active environmental NGOs. They have strong interests in river abstraction, pollution reduction and wetland restoration.
West Midlands Centre for Constructing Excellence	The West Midlands Centre for Constructing Excellence (WMCCE) provides specialist business improvement assistance specifically to help local businesses in the construction and building technologies sectors.
Water Framework Directive (WFD)	The Water Framework Directive introduced the principle of integrated water resource management. It has also resulted in river basin management plans being produced for each river district.
<i>Note the above list is not exhaustive or arranged in any specific order nor does it imply any hierarchy of structure or level of importance within the overall framework of stakeholders in Birmingham.</i>	

3.3 Water Management in Birmingham

Severn Trent Water Limited provides approximately 2 billion litres of drinking water to their customers and treats about 2.5 billion litres of waste water and sewage per day across their region which includes the City of Birmingham. Currently, approximately 28% of drinking water comes from impounding reservoirs, 40% from river abstraction and 32% from groundwater supply. There are currently 20 water treatment works and 1018 sewage treatment works. Currently, a significant percentage of the total sewer length (53,325km) is made up of combined sewers, where surface water and foul water are within the same sewer resulting in surface water being contaminated and therefore having to be treated. There has also been limited uptake of sustainable draining solutions, but with an increasing housing density there will have to be more integrated water solutions including water reuse, green and brown roofs, sustainable draining and widespread metering if the needs of the city are to be met.

The Environment Agency is responsible for managing environmental standards, water resources management, flood risk (to the extent that these include “main river” designation) and surface bodies of water as well as ground water sources. The EA acts in the role of a Regulator in respect of water quality and resources.

Birmingham Corporation takes on the role of the Municipal body responsible for drainage (Non-main River), highway drainage and maintaining parks and public open space which often has open water bodies and lakes, etc. They also manage municipal housing stocks and act in the way of a landlord responsible for the housing assets.

British Waterways are the government body responsible for canals and navigations. Birmingham has a large number of canals, some in use and others still derelict. They also hold a large number of water assets such as reservoirs and feeders and have statutory powers to abstract water to feed their networks. Many of these canals are forming the basis of new regeneration projects and are becoming seen as valuable future assets and even expansion plans are being put in place.

There is a widespread recognition in Urban Planning that in the future, there also needs to be increased usage of SUDS (source control) in new developments, this will need to be enforced by national agencies (such as the Environment Agency), local councils and the water companies and taken up by developers and the public at large.

4 Prime-movers within Stakeholders

Severn Trent Water Limited is a main stakeholder within the Birmingham conurbation. They are responsible for the provision of water and the removal of sewerage from the majority of the residences and businesses within the area. Currently, they are replacing water mains at a rate of 0.7% per year, but have been slow on the adoption of SUDS as a method of water collection and treatment. Severn Trent Water must also satisfy other stakeholders such as the DWI, OFWAT and the Consumer Council for Water.

The Environment Agency is responsible for quality of fresh, marine, surface and groundwater in England and Wales. They are therefore responsible for the two major rivers in the region; the River Severn and the River Trent.

Birmingham City Council, followed by the other district councils also take a lead role in water management in the Birmingham (and wider conurbation) area. They are responsible for new development, regeneration, and planning policy as well as the local environment.

The UK Government and EU agencies individually have little power directly within the region, however, due to UK and European legislation, their powers and duties with regards to water management and the environment filter through to local agencies (such as the Environment Agency) and the local councils.

British Waterways as they hold many water assets within the city and much of this is now acting as a catalyst for urban regeneration and will play an increasing role in the management of water within the city.

Developers, business and industry also have some influence as they bring money into the region and therefore lobby for increased development and regeneration. The environmental NGOs and the redevelopment organisations in turn lobby the developers to carry this out in a sustainable manner.

Consumers Council for Water as they represent the voice of the consumer in current and future debates on water services provisions by the Water Companies.

5 Relationships between Stakeholders

The relationships between the stakeholders has been explored and assessed in terms of functionality by dividing “water” into four components; clean water and waste water (**Figure 1**) and storm water and water sources/bodies (**Figure 2**). The stakeholders which influence each of these areas have been identified. Generally, the further away from the water component, the less direct influence the stakeholder has, but they may strongly influence another stakeholder which is closer to the problem identified. The key stakeholders (water companies and local authorities) are shown in red, with secondary stakeholders shown in blue and green. The stakeholders shown in blue are national bodies where as those shown in green tend to be local agencies or local branches of a national group. The stakeholders shown in **bold**, are the key stakeholders identified above.

These diagrams are not an exhaustive list of all the agencies and groups involved in water management in Birmingham, but do show those with the most influence. From **Figures 1** and **2**, it is clear that water management in the UK is highly regulated and complex. Most of the stakeholders are national bodies or local representatives from national organisations.

From these diagrams it is also clear that clean and waste water treatment, although heavily regulated, has fewer stakeholders and is therefore a relatively straightforward model. The management of storm water and water sources is far more complex and there are many more regional influences.

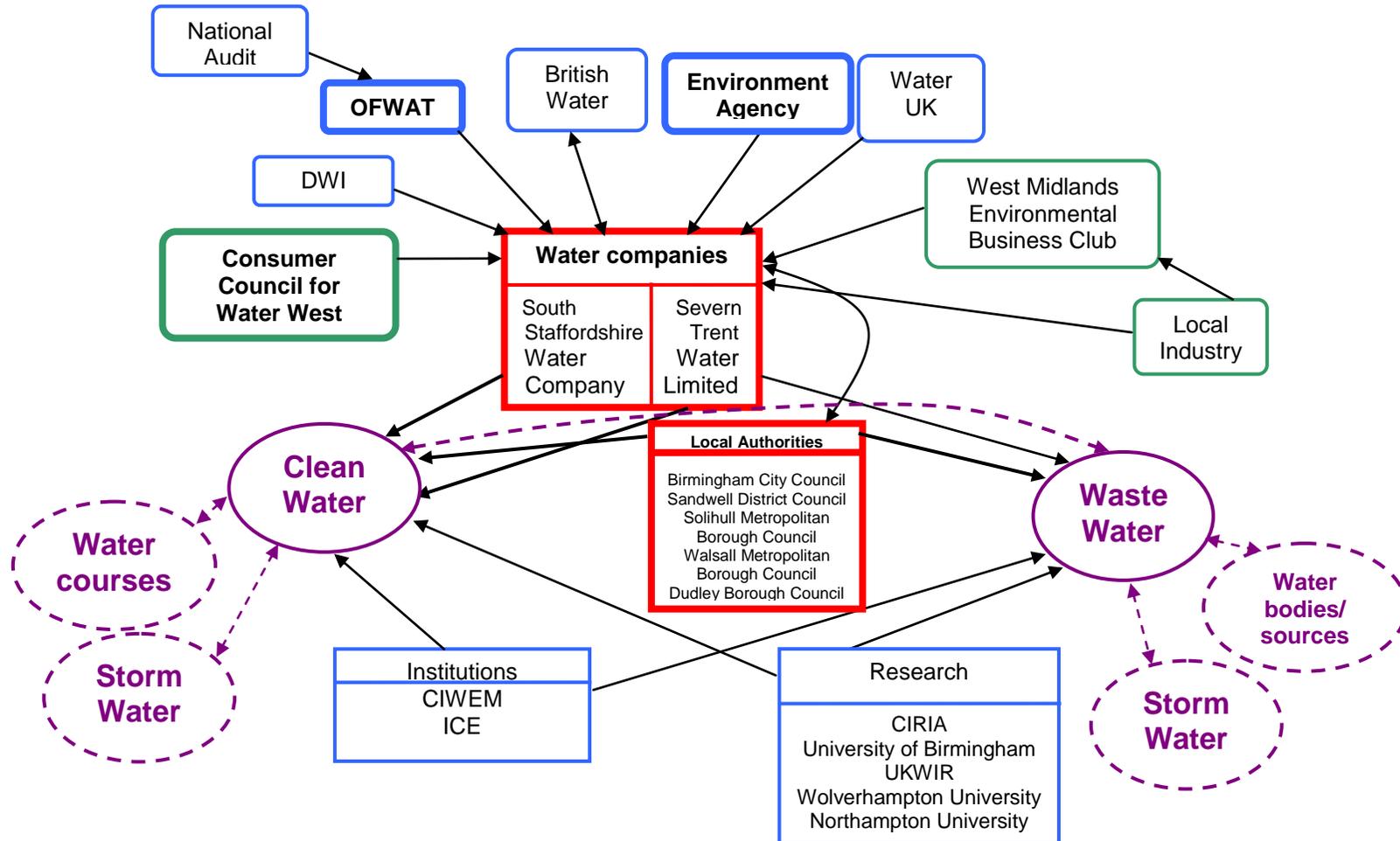
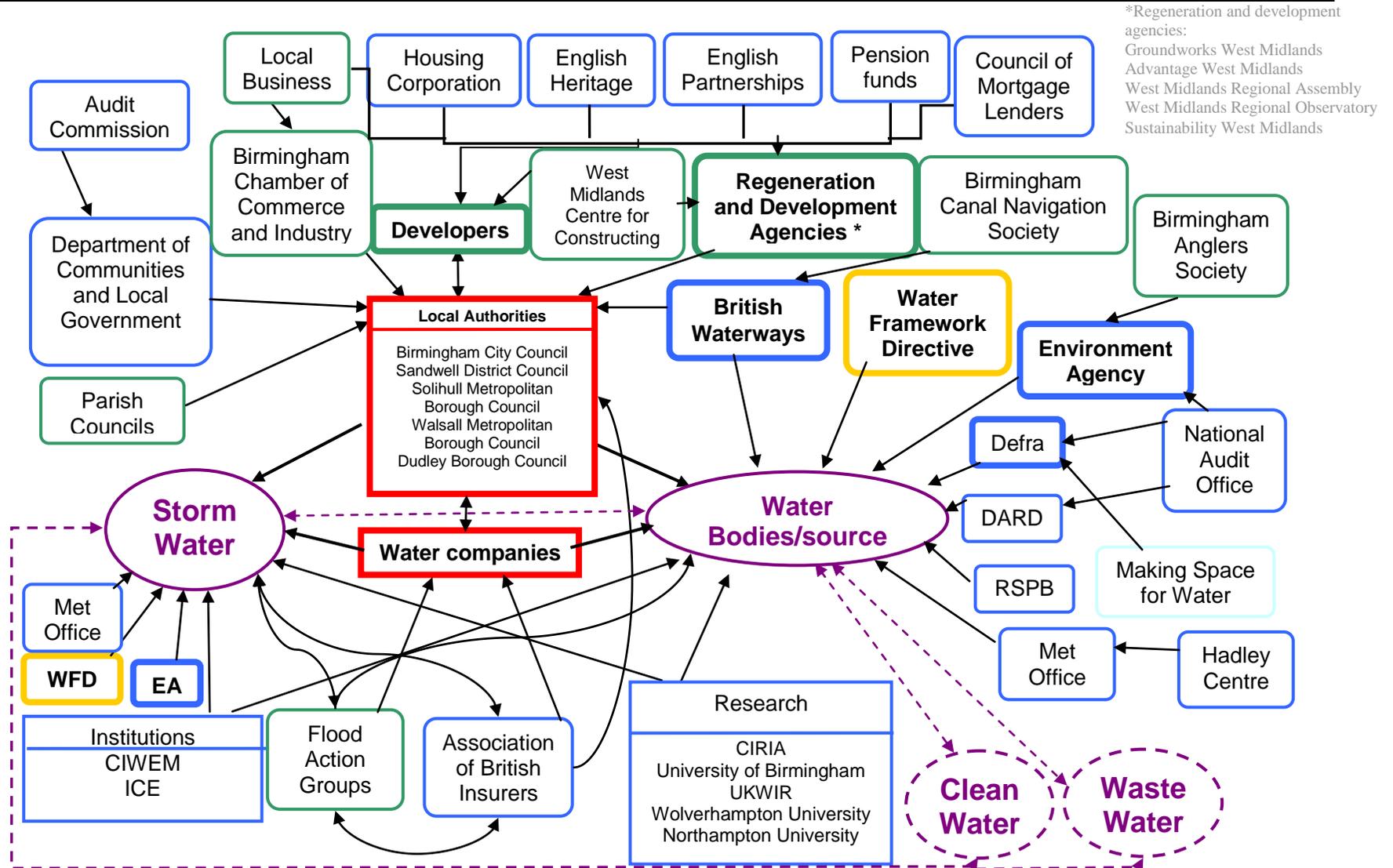


Figure 1: Stakeholders involved in clean and waste water management



*Regeneration and development agencies:
Groundworks West Midlands
Advantage West Midlands
West Midlands Regional Assembly
West Midlands Regional Observatory
Sustainability West Midlands

Figure 2: Stakeholders involved in stormwater management and water sources

6 Social and gender aspects of city water management.

The UK has only a very few of the social issues of affordability or equal access to water that is sometime the case in other countries. Organisations such as OFWAT, Consumers' Council for Water and Social Services provide support to water consumer customers when this is called for. Nevertheless it would be far from the truth to say that there are no social issues in the way that water is managed in the city and country as a whole.

There is, throughout the country a low level of domestic water metering (less than 35%) and therefore water is paid for (including sewerage and surface water drainage charges) based upon a municipal property rate. This is often combined in the property rental charge for rented accommodation along with a number of other community charges. However water is manifestly different from Gas or Electricity for example which are more or less 100% metered domestic supplies. Water therefore is seen to have some sort of special status in our communities which elevates this to an essential requirement rather than a commodity.

Customs who experience difficulties in meeting the water charges (and energy charges for that matter) are in general supported by Social Services and having one's water supplies cut-off is seldom used except in extreme circumstances even though there is a legal right to do so by the Water Supply Companies/Authorities.

Gender Laws effectively prevent discrimination in terms of access to water or sanitation on grounds of gender.

Access to public parks, bath houses/swimming pools and water in a recreational sense are non-discriminatory although charges can be made for this.

Often and certainly in the case of Birmingham, fluoride is injected into the public water supplies and the cost of this is met by the Department of Health as an aid to improving dental health in children.

There is currently a wide ranging discussion on the impacts of the larger families and lower waged communities if plans for increasing the penetration of domestic water metering were to go ahead (as it surely must). This debate also includes tariff setting and step-pricing. This debate is set to run over the next few years.

7 Conclusions and Recommendations

Birmingham, as with many large towns and cities in the UK generally has a well defined approach to drinking and wastewater management with most of the stakeholders being relatively easily identified. The city falls within the Severn Trent Water Company Region of operation for both drinking water and wastewater services provision and is therefore required to perform to a highly regulated framework in terms of cost, quality and quantity of water.

However when we examine overall water management there are more stakeholders associated with drainage and storm water management, although they are all intrinsically linked.

At present, the major stakeholders are the water companies (such as Severn Trent Water and South Staffordshire Water), the local authorities (such as Birmingham City Council and Solihull Metropolitan Borough Council) and the regulators (including OFWAT, the Environment Agency and the Drinking Water Inspectorate). There are others such as environmental NGOs that have a say in the governance of water in Birmingham (and the wider area) as their views can have a significant impact on planning decisions. Such bodies are often consulted by developers and others in the building industry as part of the pre-planning process. The linkages between stakeholders and the relative influence each has is shown in **Figures 1 and 2**.

Due to a developing recognition that climate change driven effects will lead to increasing uncertainty with flooding and water resources and given that in the recent past building on flood plains was a widespread practice it can be concluded that in the future the Environment Agency, Planners, developers and insurers will have an increasing influence over our urban water environment.

Wastewater is very much based upon the “polluter pays” principle and it is likely that in terms of water supply the UK and Birmingham will move towards the “consumer pays” principle as intelligent water metering becomes more widespread.

Following increasing incidents and costs of urban flooding a national report The Pitt Report and Making Space for Water, along with a number of other similar reports are starting to point to a revision in the way that the current surface water drainage, pluvial and fluvial aspects are dealt with. It is anticipated that with a short period from now either a new or substantially reorganised authority will take on a dominate role in urban drainage/flooding.

For the purposes of SWITCH in the City of Birmingham most of the key stakeholders have been identified and belong, to a greater or lesser degree of commitment, in the Birmingham Learning Alliance. The challenge now is to expand the representation in the City Learning Alliance to attract both the national and neighbourhood/smaller stakeholders to LA functions and interactions.

As the water scene changes perhaps in the light of new legislation or organisation then these movements will need to be re-mapped.