

A MID-TERM REVIEW OF SWITCH IN BIRMINGHAM, ITS LEARNING ALLIANCE AND ENGAGING RESEARCH TO ADDRESS THE CHALLENGES OF INTEGRATED WATER MANAGEMENT¹

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1. INTRODUCTION

1.1 Urban Water Management (UWM) issues in Birmingham

SWITCH, which stands for Sustainable Water Management Improves Tomorrow's Cities' Health is a major research partnership funded by the EC, with a budget exceeding €20 million, undertaking innovation in the area of integrated urban water management (IUWM). Rather than solely focusing on new research, the project is encouraging the forging of learning alliances² to help set the research agenda and to put research across different aspects of the urban water cycle into use in cities to help improve integration and scaling-up impacts. One of the objectives of SWITCH is to develop research interventions that are more integrated; research is put to use and sustained after the project; and learning and sharing of lessons takes place so that innovations can be scaled up. Birmingham is one of 10 demonstration cities around the world that are part of the SWITCH project.

Birmingham is fairly typical of many large post-industrial cities in Northern Europe, relying on a centrally managed water supply and wastewater/sewage collection service. It has a privately operated and effective water supply system and a network of sewerage and drainage infrastructure, both managed by Severn Trent Water (www.stwater.co.uk). Much of this infrastructure dates back to Birmingham's industrial development during the 19th century, yet remains largely functional for managing waste water and rain water run-off. The significant water management issues currently recognised relate mainly to future risk (including climate change), and to increased policy and statutory attention to environment management and water quality.

During the SWITCH project implementation, the issues and opportunities forming the main drivers for the planned research and pilot demonstration activities were identified for Birmingham as:-

Rising groundwater table: since the decline of industry when many boreholes were used to extract water for industrial use, groundwater has been rapidly replenished and rising groundwater tables are now a threat to the subsurface infrastructure of the city. Groundwater

¹ This paper was prepared in 2008 for the SWITCH project and is available at www.switchurbanwater.eu

² A Learning Alliance is a group of individuals or organizations with a shared interest in innovation and scaling up of innovation in a topic of mutual interest. Learning Alliances are designed to break down barriers to both horizontal and vertical information and sharing in order to speed up the process of identification, adaptation and uptake of new innovation.

quality near the surface is poor and groundwater effluents to the river Tame and its tributaries that pass through the city contain significant organic and metals contents.

Flash-flood risks: Changing land use, both within the city and in its surrounding region, has resulted in more “flash” flooding of the urban areas, and this appears to be exacerbated by climate change.

Limited coordination between key institutions: 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.

A large regeneration programme affecting a significant part of the city centre (“Eastside”) provided a further opportunity for SWITCH to engage with UWM management issues through engagement with planning processes and through the application of modelling.

Box 1: Eastside Development, Beyond a “business as usual” approach to planning for sustainable development.

Eastside is a significant part of the city centre that was identified as in need of “re-generation”, following earlier successes with other parts of Birmingham city centre. The growing awareness of the importance of truly sustainable development, integrating concerns and opportunities relating to the economy, the environment and society, led to the aspiration that Eastside would “become an exemplar of sustainable development”. This included the effective and responsible use of energy, water and waste reduction, and engagement with community and social issues.

In 2002 a visioning study identified a range of regeneration opportunities, including the redevelopment of large plots and the creation of a high quality public realm, centred on a new, green, sustainable park.

During dialogue between SWITCH Learning Alliance members, it was recognised that it will be difficult to achieve the desired exemplar status for Eastside without a master plan or an adopted local development policy. The plan needed to detail the approach and qualitative and quantitative standards necessary to support delivery of development that significantly exceeds (in terms of sustainability) that required by regulation and a ‘business as usual’ approach.

Members of the Learning Alliance joined forces to undertake a study of issues constraining delivery of sustainable developments that are largely outside the control of individual developers, including transportation and the co-ordination of the planning and management of services and utilities infrastructure. They produced a report making recommendations about the possible next steps and priority actions in seizing opportunities currently available for intervening in the ‘business as usual approach’ to utilities infrastructure for Eastside in order to facilitate a more sustainable solution. The report can be found at <http://switchbirmingham.wordpress.com/reports/>

1. 2 SWITCH, a project framework for trying out an innovative approach to urban water science

Many of the challenges faced in getting research into use, and replicated at scale, are not only technical, but also related to issues of governance, financing and administration. SWITCH has aimed to engage the relevant stakeholders and to establish linkages between research providers, knowledge managers and research users through the adoption of learning alliances in nine cities, including Birmingham.

The SWITCH approach explicitly addresses the limited uptake of much previous technical research in the water sector, largely as a result of the neglect of the political context and developmental processes, which has been linked to the disappointing impact of many water management research projects (Gyawali et al., 2006). The approach to much water science has been largely focussed on long-term knowledge acquisition with assumed long timescales for uptake. However, present needs for early problem solving in the water sector mean that this approach is no longer applicable. Thus, a common shortcoming of conventional water management science has been a focus on the interests of the researchers rather than the direct concerns of potential research users (who are only recently being involved by research funders in prioritization, or fully engaged by the researchers in the design of the research). This is compounded by the tendency to shy away from integrated and inter-disciplinary approaches in favour of the division of problems into discrete issues, often defined by a single discipline approach (e.g. not involving economists at an early stage to analyse the cost of technologies in relation to their use and not involving political scientists in the development of decision support processes). Moreover, research results published in scientific papers often don't attract the attention of the potential users of this information.

As the concept of learning alliances is relatively new, and not widely tested, they are not only at the centre of the SWITCH approach, but are also a subject of the action-research being undertaken by SWITCH.

In reviewing progress with the more innovative aspects of SWITCH, in particularly its city learning alliances, the integration of various disciplines, and the aim of “demand-driven research”, it is important to briefly map out key features of the project design and development which shaped its mode of implementation.

Firstly, the EU format required structuring of the project into discrete “work packages”, each of which tended to attract particular sub-grouping of specialisms, fostered more of a multi-disciplinary approach than interdisciplinarity.

Secondly, while the concept of “demand-led research” (arising from city learning alliances) fronted the project, the reality was that the main areas of research were largely decided upon at project design stage, while stakeholder analysis and the establishment of city learning alliances followed on. This, gave the city stakeholders limited real influence on the main research being undertaken in the cities (unless they had been in consultation on this through previous collaboration); in most cities putting them in a position of “waiting” for the results of research into which they had limited input into at the design stage.

Thirdly, in the allocation of budgets and responsibilities, the need to earmark significant levels of project resources for developing the city learning alliances, and for processes of internal monitoring and learning within the project, was overlooked during project preparation and submission. The result was that the project management team, made up largely of disciplinary researchers, were faced with the difficult task of re-allocating resources from research activities to the learning alliance activities. They did make a specific allocation to learning alliances at the start of the project, on the understanding that once the learning alliances were established by year 3, funding to sustain these would be identified from other sources outside of the project.

Fourthly, the EU matching funds rule imposed limitations on the capacity of project partners to respond to demands from cities, particularly to provide specialist inputs apart from training. This was because the researchers had targeted their research inputs into cities where they already had other activities, and shifting research to a different city would incur a

financial loss – in short the matching funds rule implied that demand had to be identified at project design stage.

Fifthly, it has become apparent that different actors within SWITCH have somewhat different understandings of what Learning Alliances might look like, and their main purpose. One view (mainly coming from the social scientists) is that learning alliances are a platform through which other stakeholders within a city can engage in identifying research priorities and is a platform and process for bringing new knowledge to bear on problems relating to IUWM. Another view (mainly coming from professionals with a strong belief in the virtue of a holistic, sustainable and futuristic water management model) see learning alliances as a vehicle through which to promote awareness and understanding of IUWM, and to galvanise commitment by key stakeholders to it. A third perspective (mainly coming from researchers with clear ideas about what particular water related technologies or models might be up-scaled in cities) is that learning alliances are a potential vehicle for promoting and up-scaling promising technologies, knowledge and planning models. A fourth perspective comes mainly from the non-researchers in the city learning alliances, which might include city service operators and planners. This view is that the Learning Alliance is at the centre of SWITCH, providing an opportunity for cities to interact with local and international researchers and also providing a neutral forum for them to meet with other stakeholders within the city and safely air views and explore a longer term vision of what IUWM in the city of the future might look like.

It is important to highlight these differences in understanding, because they have a bearing on how the performance of learning alliances in the different SWITCH cities might be evaluated and also on future emphasis on areas of focus for the learning alliances. In this context the management team commissioned a review of the performance of the city learning alliances, along with research in the cities, in the eight SWITCH cities where there was some evidence that a learning alliance had been established. The various SWITCH cities are not directly represented on the project management team, which (as noted by the recent EU project mid-term review) is composed of project researchers. This review was designed therefore to expose the management team to the wider perceptions of the various non-research stakeholders within the Birmingham Learning Alliance that are not routinely provided through the reporting of the Chair of the Demonstration City committee.

1.3 This Review

Midway through SWITCH's five year research programme, Birmingham figures among the more successful "SWITCH cities" in its progress with operationalising the learning alliance approach. Based on an emerging understanding of how Birmingham, as a city of the future, might improve its water management and address future challenges, research is being undertaken and pilot demonstrations are being initiated with the involvement of research users. Through the city learning alliance, linkages have been strengthened between scientists, decision makers and other key stakeholders in the city. Regular meetings and a number of visioning exercises have created a shared commitment to addressing the water management issues of the future, as well as an opportunity for engaging with the ongoing opportunity to demonstrate sustainable systems presented by Eastside. The Birmingham Vision drew upon a number of contemporary working groups looking at Climate Change Adaptation, Water Strategy for England, The "Be Birmingham 2026" and the Severn Trent Water Company Strategic Direction Statement – 25 year look-ahead. This review, along with others being undertaken at a similar time in other SWITCH cities, aims to draw preliminary lessons and make recommendations from the Birmingham experience that might help inform the implementation of the remainder of the project in the city, and also offer insights for other SWITCH cities and similar initiatives aiming to put 'research into use' in the water sector.

The review is based upon three sources of evidence: a) the authors' own experience within SWITCH and other action-research projects, b) interviews with members of the Birmingham learning alliance, and c) a review of project documents. The authors' involvement with SWITCH, including two of them with the role of learning alliance facilitator and one a city research coordinator, makes this account partial. However, following the best practice principles of process documentation (Schouten *et al.*, 2007) the review aims to be self-critical and reflective. The review remains a working paper for discussion and aims to support learning in Birmingham through further discussion of its contents. After outlining key elements of the SWITCH project methodology in Birmingham including the project's "theory of change" and the approach used to develop the learning alliance, the paper highlights results achieved and emerging lessons, before making recommendations intended to help SWITCH in Birmingham be a more effective project.

2.0 OVERVIEW OF THE PROJECT METHODOLOGY

2.1 Urban water management research activities in Birmingham

SWITCH in Birmingham aims to explore, through research, some key technical challenges and to demonstrate some promising measures under the heading of *integrated urban water management*. It is intended that the package of research and demonstration measures will work together over the longer term in addressing rising and polluted ground water, reduce run-off and associated local flooding risks, improve the sustainability of the cities drainage and waste water systems, improve the quality and sustainability of the urban environment, and agree a clear long-term vision for more integrated and sustainable water resource management in Birmingham. As the project implementation unfolds, and as new opportunities and challenges emerge, this package of measures includes the introduction of new technologies and planning tools and processes. While longer term "sustainability" is an aim which permeates much of what SWITCH is doing in Birmingham, and is a recurrent theme in meetings of the learning alliance, the project research activities fall under the following more specific headings.

2.1.1. Rising Polluted Ground Water – Risks & Future Uses

Groundwater-surface interactions: Over the past decade, the UK has been improving its river and stream water quality and has been opening up previously disused watercourses. It has now been found that groundwater contaminated by pollutants is entering into streams and other water bodies and that possibly beneficial remediation is taking place at the stream-aquifer interface. However, the extent of natural remediation, the conditions under which this happens and under which additional attenuation could be provided through surface water course modifications is uncertain and requires research. Field based experimental research on the River Tame that runs through north Birmingham and crosses the major aquifer beneath Birmingham is being undertaken with the Environment Agency for England and Wales and aims to address these issues.

Reuse of groundwater: Groundwater levels are rising following the declining use of boreholes and reliance on piped water supplies by nearly all users in the city. This poses a risk to buried structures (such as basements and service tunnels) from groundwater flooding, and rising groundwater also needs to be managed to reduce storm water runoff. Urban groundwater has the potential to be a valuable source of water, and therefore, how to use urban aquifers effectively to reduce flood risks and increase water security is an issue that is being addressed by SWITCH research. Urban ground water is often polluted due to the effects of the city's

heavy industry in the past and present pollution from sewer leaks and this forms a major potential risk that must be dealt with as part of any aquifer exploitation strategy. This research is being carried out in association with the UK Environment Agency, its main user, and is exploring the occurrence and mobility of viruses in groundwater and their potential risks to human and animal health. It is important to qualify and quantify the risks before future exploitation of underground reservoirs can be carried out. Long term monitoring of viral populations and their relationship to pollution from sewers is being carried out in addition to experiments which are looking at the mobility of the pollutants and the risk they pose to groundwater abstraction schemes.

Related to both the above research activities is the use of groundwater, by British Waterways, to re-charge the city's network of canals. The canals are used for various leisure and commercial activities, including angling, boating and transport. Owing to the topographical location of Birmingham and its major role in fostering the Industrial Revolution, canals were developed as the national means of transporting goods to the sea ports and Birmingham became the centre of the national navigation network and consequently now has "more kilometres of canal than Venice" The summit of this canal navigation network is in what is known as the Birmingham Box and it is necessary to feed water into the networks summit to maintain the flows within the network. The canals have now largely ceased to act as transportation routes for goods and these have now become the places of leisure, national heritage sites and act as environmental corridors connecting the city to the surrounding rural areas. With increased leisure boating use, water supplies have become an issue and alternative sources of water have been investigated including mine water and the rising ground water within the city area. This started off as a pilot study to assess the impacts of such a proposal and it now has been developed to relieve water shortages in the Oxford Canal section of the network. Further studies are being carried out in order to exploit more of this alternative water supply and to achieve the benefits of reducing the city's rising ground water.

2.1.2. Sustainable Urban Drainage Systems (SUDS)

Green roof research and demonstration: Green roof is a general term for any roof covered with a growth substrate with plants growing on it, and as such, green roofs vary enormously in their type and function. The potential benefits for sustainable drainage are reduced run-off during heavy rainfall, with enhanced biodiversity as a general environmental benefit. The term brown roof has been used in a variety of contexts, but is used in SWITCH to describe a type of extensive green roof that is designed to mimic brownfield sites at an early stage of succession. When choosing a type of green roof it is very important to realise that the way a roof is designed will influence the environmental benefits associated with that roof. Research and demonstration of various types of green and brown roofs (including those commercially available) is being undertaken at the University of Birmingham. An experimental array for exploration of different brown roof materials and their impact on biodiversity and urban hydrology has been erected on the University campus. Commercial organisations are also supporting the implementation of a presentation array to allow visitors to see first hand different green roof types. There are also two brown roof demonstration projects, supported by Birmingham City Council, in Birmingham's city centre, the **BVSC** (Birmingham Volunteer Service Council) brown roof, and the **ICC** (International Convention Centre) brown roof with a third still to be constructed. Monitoring of biodiversity at all the sites is part of the research and demonstration effort. Discussions with development companies are underway to expand action research to resolve outstanding questions on the implementation and design of these roofs.

Assessing flash-flood risks

The University of Middlesex Flood Hazard Research Centre is combining GIS technology with exercises to engage with stakeholders in Eastside to develop a storm water management vision for 2030. The Eastside Regeneration Area lies within some of the oldest parts of the city and is looking to add significantly to the regeneration of the city. Eastside is crossed by the river Rea which is the most significant water feature of the city and at the same time is bounded by two of the city's main canals. The River Rea is heavily culverted and constrained within the central part of the city and there is a desire to "liberate" this to some extent. In addition a number of principal surface water and combined sewer overflows discharge into the river channel. Whereas fluvial flooding of the central part of the city is quite rare the water quality of the river is poor and the risks of pluvial flooding from the main drains connecting to this is reasonably high. Stormwater management best practice is being encouraged by the City Council for the Eastside regeneration area and SWITCH is assisting in defining the risks and uncertainties and helping to create a "Vision for Surface Water Management for 2030" in Eastside. This study will help to inform the City Planning Department and the Drainage Department, British Waterways, the Environment Agency and Severn Trent Water Company in planning, reviewing and implementing this vision as developments are brought-forward through the planning process.

2.1.3. Eastside: Planning Models and Processes for sustainability

The development in Eastside, and engagement of City Planners and other Authorities and stakeholders, provides SWITCH with an opportunity for action-research into models and processes for planning more sustainable urban water management systems.

Integrated urban water management models: Conventionally water supply, wastewater and storm water are viewed as three distinct areas in the urban water system, but they are related. Proper assessment of options for reducing waste, minimising costs and decreasing energy demand is dependant on a quantified overview of the whole urban water cycle. The research aims to produce a scoping model capable of assessing the interaction between all three areas. Although it will be benchmarked against data from Birmingham, it will be general enough to be applied to other towns and cities. It is intended to give a general picture of the water balance as a whole, and to aid the urban water planning process.

Eastside Utilities Study: At the invitation of the city council, SWITCH undertook a Scoping Study of the issues arising from Utilities/Services Infrastructure capacity and predicted demand for Eastside. The study provided recommendations on where opportunities might lie to increase the sustainability in environmental and economic terms of the development in Eastside through co-ordinated planning for services infrastructure, including water related services. The study also looked at methodologies for undertaking this type of scoping and the challenges involved, including working with private developers and the types of technical issues typically faced with surface re-generation over an existing sub-service drainage infrastructure.

2.1.4. Addressing Water Governance Challenges

The split responsibility for urban water management in the UK, as typified in Birmingham, has led to difficulties in adopting strong policies, best practice and an integrated approach. SWITCH has therefore implemented two related initiatives to address the institutional challenges of water governance.

Mapping of Stakeholders & Institutions: The outline mapping of stakeholders was undertaken early in the implementation to ensure that SWITCH identified and engaged with them in the planning, monitoring and communication of the research and demonstration

activities. Mapping of the institutions responsible for aspects of water management, known as “Institutional Mapping” involved a detailed analysis of the complex set of laws, policies, rules and behaviour relating to various aspects of the urban water management sub-systems. The aim was to identify potential barriers to change and innovation, as well as opportunities for change and identification of drivers of change.

Establishing a City Learning Alliance: The city learning alliance was formed to provide a more or less neutral platform at which the main stakeholders could meet to share information and views on issues relating to water management in the city, including a discussion of research priorities, results and the development of a vision for IUWM in Birmingham, 30-50 years from now. The Birmingham city learning alliance was formally launched in early 2007.

2.2 SWITCH Intervention Logic for Birmingham

The intervention logic of the SWITCH project in Birmingham is implied in the project methodology outline above. The hypotheses outlined in this section form a theory of how SWITCH aims to make a difference in Birmingham, and beyond.

A. Improved understanding of the groundwater biophysical and hydrological processes at critical interfaces will contribute to measures which reduce risks from pollution of surface streams by ground water and assist the identification of opportunities for safe future use of ground water resources.

The data from the long term experiments being carried out on the River Tame and the University campus will provide critical information that will underpin the knowledge required to design appropriate risk mitigation measures for aquifer and river exploitation and will enable extrapolation of the use of these measures from the experimental sites to comparable geo-morphological conditions in other parts of the city and other areas.

B. Climate change, changes to the built urban environment and the rising (energy) costs of processing waste water will increase the need/demand for urban drainage technologies, and waste-water systems that are more sustainable and reduce risks arising from flash flooding, and also for better models for assessing sustainability and risk.

A major focus on modified roofing systems, green and brown roofs, in order to reduce run-off during heavy rainfall events and also enhance biodiversity. The data from the green/brown roof research and demonstration sites in the city will enable interested users to make informed decisions about the direct benefits to the supporting building and also provide useful evidence on the broader environmental benefits of green/brown roofs.

Research is also looking at an improved integrated model for assessing sustainability of the urban water system, which has the potential to contribute to the planning and decision-making process at various levels by the main stakeholders (notably the City Council) in the water sector in Birmingham and other comparable towns and cities.

With regard to managing risks from flash flooding, emphasis in combining GIS analysis with extensive stakeholder consultation has the potential to influence and inform future planning frameworks and processes, by-law formulation and implementation, technology and product development relating to surface water drainage, and collaborative frameworks for managing aspects of the urban water cycle.

C. Engaging with an ongoing re-generation programme provides an irresistible opportunity to apply the principles of integrated water management and available research to demonstrate the potential of an integrated approach.

As the Eastside Regeneration project is the largest redevelopment of the city central area for many years SWITCH has actively engaged with the opportunity presented by the regeneration. This has been linked to the activities listed under hypothesis B above, and also through ongoing dialogue with the planning agencies involved and the scoping study referred to earlier. In addition, many of the Learning Alliance members and other stakeholders are actively involved in the Eastside Project and it is seen as an excellent opportunity for SWITCH to provide stimulus for intervention in what may otherwise have been a “business as usual” approach to this very important regeneration project. It provides a forum to meet with developers and designers and to keep them informed/appraised about developing sustainable water management practices.

D. Involving city stakeholders in discussions of the research, demonstrations and visions of IUWM for the future will lead to more effective research implementation and results that are more widely used within management agencies and provide a foundation for more integrated planning and management around urban water into the future.

The city learning alliance aims to create the conditions for a productive stakeholder dialogue on goals, problems and solutions and to jointly plan activities, share results more widely and quickly than would be normal practice, and to utilize as much local and outside expertise as possible in putting research into use. While the manner by which the SWITCH project was initiated has meant that the primary research topics were quite well defined before the learning alliance was fully established, the research and development team can be somewhat flexible in responding to the needs expressed by stakeholders in the learning alliance and to support the follow up of opportunities for application of research and best practice. The visioning exercises have aimed to bring stakeholders around the table and encourage longer-term sustainability planning around water management.

E. Public awareness activities and networking will lead a wider sense of the need for a shared vision for integrated and sustainable water management by key city stakeholders.

To widen the learning alliance – beyond representatives of key operators, authorities, and consumer groups, the SWITCH team in Birmingham has engaged in strategic networking, presentations at key meetings and forums, and setting up a website also provides a central source of information on the project in Birmingham

(<http://switchBirmingham.wordpress.com/>).

2.3 Birmingham’s learning alliance

Birmingham became involved with the SWITCH project through the researchers in the University of Birmingham, who were part of the team that put the project proposal together.

The Birmingham Learning Alliance started to take shape in 2006 before the project officially took off. The start up work for the LA was done by its coordinator and the research team from the University of Birmingham. ARUP coordinates, steers and facilitates the Birmingham Learning Alliance and the University of Birmingham is involved in the various research projects in SWITCH. The LA coordinator (Phil Sharp) also acted as its facilitator up to December, 2007 when a facilitator (Jennifer Chlebek) was appointed. Phil and Jennifer work on this project part time, supported by ARUP who match fund the SWITCH budget by 50%.

Prior to the establishment of the Birmingham LA, there were other projects that required the coordination of various stakeholders. Researchers used these contacts with the different stakeholders to come together, sending out initial invitations for the stakeholders to join the learning alliance. The process initially engaged the stakeholders who had been working with the researchers and over time, more actors have been identified and involved. Some of the

main stakeholders engaged in the Birmingham SWITCH learning alliance, and their roles, are included in Box 2. The SWITCH Learning Alliance platform has worked to strengthen the connections among the stakeholders over the past 2 years.

Box 2. Some stakeholders in urban water management involved in the Birmingham SWITCH learning alliance

Birmingham City Council (BCC): this is the municipal development agency responsible for the management of various municipal functions including housing, education, social services, health, biodiversity and governance for the City of Birmingham. It is also the main planning authority for the city and has responsibilities for highways, critical and small water courses as well as certain drains. The BCC members role in the Birmingham alliance has been strongly linked to work on planning and implementation of urban regeneration including the Eastside development, which the learning alliance has done some organisational research on as well as addressing issues of flooding. They have also been heavily involved in the demonstration of Green roofs.

The *Environment Agency (EA)* England and Wales in Birmingham is one of the key stakeholders. The EA is responsible for the control of air, land and water pollution. Some of their specific tasks include checking of surface water (quality and quantity), abstraction and discharge into these bodies, flood management, maintenance of groundwater quality, coastal water etc. They give licenses to water companies for abstraction and discharge and are also responsible for the management of flood risk and for that developers have to get their approval if the development could impact surface flows or groundwater. They are statutory Consultees in the planning process. They are active members of the LA and are involved in the research on stream-aquifer interactions and also on viral transmission in aquifers.

Severn Trent (Water Company) is the world's fourth largest privately-owned water company serving over 8 million customers across the heart of the UK. Since its establishment in 1974 *Severn Trent* has moved from a local Water Authority to a privatized, specialised operation which owns treatment plants and networks for water supply and sewage. It has the responsibility for the provision of water and drainage services for the Severn and Trent Catchments – from Bristol to the Humber (including Birmingham) and from mid-Wales to the East Midlands. Their activities are regulated by the Office of Water Services (OFWAT), the Drinking Water Inspectorate (DWI) and the EA. As a company, they are always keen to ensure that there is an open dialogue for communicating on all matters. The company has been engaging with various stakeholders including the regulators and consumers. They have been active members of the LA since its inception and see the LA as an opportunity to engage a wider stakeholder group. They are currently working on their Strategic Direction Statement which sets out their direction of travel for the next 25 years and this is an area that the results of SWITCH research could contribute to.

The *Consumer Council for Water (CCW)*: this group is the industry “watchdog”, set up to represent customers of water and sewerage companies in England and Wales. They have been involved in research on policies and issues that affect customers such as tariffs, quality of water, security of supply and protection from flooding. They also provide consumers with information and education on using water wisely and responsibly. They are strongly represented on the LA and have taken part in all LA activities. At the recent LA meeting, they made a presentation on their position regarding the Pitt Review Report³. They provide an avenue for the Learning Alliance to engage with water users.

³ Sir Michael Pitt was asked by Ministers to conduct an independent review of the flooding emergency that took place in June and July 2007. The Government asked that the process should be both thorough and independent; a fair assessment of what happened and what might be done differently. The interim conclusions of the Review were published in a report in December 2007, and views were sought during a consultation exercise lasting three months. The Review had in-depth discussions with key organisations (one of which is the CCW) at a national level throughout the consultation exercise as well as receiving hundreds of written submissions. The final report; ‘The Pitt Review: Lessons learning from the 2007 floods’ has been launched.

Advantage West Midlands (AWM) is the Regional Development Agency (RDA) for the West Midlands. They are a government type organisation who receives funding to support projects in the West Midlands. They usually use their resources as match funds to stimulate employment in the area. They are used to working with various stakeholders; public, private, voluntary and community based to develop their policies. Their interest in the LA is centred on planning for sustainability.

British Waterways (BW). British Waterways 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.

Chartered Institute of Water Engineers and Environmental Managers (CIWEM) is a professional body with the aim to advance the science and practice of water and environmental management. They also promote education, study, training and research to establish standards of competence and conduct on the part of member of the institution. Currently they are very supportive of the LA and are interested in dissemination and training. The group provides a core of professionals who will be both “users” and “providers” of information for the Learning Alliance. They are helping with the formation of “Young SWITCH” network which is currently made up of mostly “Young CIWEM” members and from the EA.

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. Eligible businesses in the West Midlands can benefit from subsidised, or in some cases fully-funded, business improvement services.

The Centre supports the region's industry-led Constructing Excellence clubs and delivers the regional demonstration programme to showcase innovation and best practice.

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. OFWAT are kept informed on the progress on SWITCH in the city and the LA Meetings however they have not, as yet, elected to send a member to sit on the LA.

Learning alliance activities

The Birmingham Learning Alliance has been meeting regularly since its inception in 2006. The following gives a summary of some of the Learning Alliance activities:

Visioning Exercise

A number of visioning workshops and consultations have been held by the LA to look at Birmingham in the future. The workshops reviewed responses from questionnaires that had been sent around and also looked at other visioning documents for various organisations. The result of these workshops is a document which outlines the draft vision for the city of Birmingham (<http://switchbirmingham.wordpress.com/la/birmingham-planned-activities/>)

Stakeholder Analysis

One of the SWITCH LA process requirements is a stakeholder analysis exercise. The objective is to develop a good understanding of the stakeholders involved in the LA process: their interests and roles and the constraints they face. A stakeholder analysis was undertaken that not only looked at the stakeholders within the city, but the linkages to other stakeholders and the contribution they make.

(<http://switchbirmingham.wordpress.com/la/birmingham-planned-activities/>)

Eastside Utility Study

A study was conducted to look into the utilities services and infra-structure capacity (particularly energy requirements) of the Eastside development in Birmingham. This was at the expressed request of the Learning Alliance members (Birmingham City Corporation, Eastside Development Group and Advantage West Midlands). The study had major inputs from the researchers from the University of Birmingham. The result of the study is a Scoping Report for critical infrastructure for the Eastside Regeneration. Although wider than the “urban water” remit of SWITCH, it showed that water management is intrinsically linked to energy issues. This was well received by Learning Alliance members. A copy of the final report is on the city website: (<http://switchbirmingham.wordpress.com/reports/>).

Monitoring the learning alliance

The Birmingham SWITCH learning alliance aims to achieve an improved research process. Along with other learning alliances in other cities, it acknowledges the need for ways to track and evaluate whether its approach is effective. Learning alliances place emphasis on changes in perceptions, behaviours, and increased collaboration for scaling up. Two innovative methods of assessing effectiveness of the learning alliance being used in Birmingham that can capture these type of changes are scoring ladders (see Box 3) to assess mainly qualitative change (Sijbesma and Postma, 2008; Butterworth and Da Silva, 2008) and process documentation (Schouten *et al.*, 2007).

Process documentation is important for projects with social or political objectives such as empowerment, stakeholder cooperation, integration etc. SWITCH and similar projects have the ambition to change traditional patterns, attitudes, relationships, approaches and ways of thinking. They should therefore try to understand the context and background of these attitudes, relationships and approaches. Process documentation is a tool that helps project staff and stakeholders to carefully track meaningful events in their project, ‘in order to discern more accurately what is happening, how it is happening and why it may be happening.’ (Annie E. Casey Foundation, 2003; Schouten *et al.*, 2007). A training course in July 2007 made the approach available to the SWITCH LA coordinator in Birmingham. This review is an example of process documentation.

3.0 RESULTS TO DATE

This section draws on interviews with Learning Alliance members, records of the learning alliance meetings and reports from researchers. It aims to sketch out emerging results from the SWITCH research and development process in Birmingham. While areas of progress with technical research are outlined, the main focus is on:-

- How research has progressed and how researchers have engaged with other stakeholders,
- How city stakeholders have engaged with the ongoing research and demonstration activities, and
- The role of the learning alliance and its facilitator in the IUWM research and development process.

3.1 Research Progress and engagement with other stakeholders,

Research and Demonstration Progress

As noted earlier, the focus of the research activities was agreed during project formulation, in order to secure funding. Hence a challenge that researchers in Birmingham share with researchers in other SWITCH cities is engaging with other stakeholders in undertaking their research, and also incorporating elements of demonstration into their research where possible. The research and demonstration activities identified in the initial stages of the project were

re-affirmed by the LA members on award and start-up of the project and are regularly reported upon at LA Meetings. LA members encourage feedback and progress reporting on the research and demonstrations and at the Birmingham Scientific Meeting in February 2007 and site visits were arranged to view some of these activities. Research and demonstration activities have been ongoing under the main thematic or “Work Package” areas of SWITCH. It is proposed to hold 2 workshops in October 2008 and January 2009 specifically on Sustainable Drainage Systems including Green & Brown Roofs and one looking at City Water software development and application.

Sustainable IUWM WPI.1 & 1.2

Scenario Planning & indicator selection. This has involved:- gathering and collating all applicable spatial data for the development and testing of the IUWM and sustainability assessment models; initial production of a prototype systems analysis model using part of Birmingham for the initial trial; integration of concepts derived from the evaluation of Birmingham with the overarching programme of modelling under 1.1 and 1.2. Members of the learning alliance have been involved in the discussion of indicators and possible future scenarios for the city.

The Perspective of a Water Modeller

Ewan Last is a researcher who has been involved in the Birmingham LA since its inception. For the past two and half years he has been working on modelling Urban Water Sustainability. This falls under Work package 1.2 and has the objective of developing a model of an urban water system that will have the capability of addressing different scenarios (e.g. climate change, population increase) with a variety of sustainable technologies, outputting a suite of sustainability indicators. Fundamental indicators include mains water saved, wastewater emitted, runoff quantity, various contaminant emissions, life cycle energy and life cycle economic cost. The tool is being demonstrated in the Eastside development area. Even though development plans for the Eastside area are far advanced and the model will not be finished in time to have an impact on the planning, the pilot study is expected to come out with a framework for testing and refining the model and the underpinning concepts. At the end of the day, the model is expected to be applicable to all other cities providing a global dimension to the research.

Some preliminary results have been obtained; A limited number of alternative water management options have been simulated for Eastside using the water balance model using the best available data in early 2007. Results for a model run with a mixture of unit block rainwater and wastewater recycling options with the addition of a cluster scale stormwater and wastewater system (Cluster scale alternative water management options can collect water or waste from user specified upstream clusters including the one in which they are situated - they can then supply any cluster with recycled water) showed that all recycling systems use at least 20% less mains water than the conventional system. Reduction in stormwater runoff and wastewater runoff varies from 12-35% but there is some trade-off between the two. The systems with a mixture of wastewater and rainwater recycling yield the best results. Consequently the effect of the alternative strategies is not seen as increased evaporation as a result of greater irrigation supplied but rather as a further reduction in the mains water used. Exfiltration from wastewater/stormwater pipes is not currently modelled (it is intended to investigate the inclusion of these in the ongoing model development) and so a reduction in flows has no effect on subsurface moisture levels and as a result no effect on the evaporation volume. (Last and Mackay, 2007)

The model is further being refined to take into account other conditions such as energy requirements of the system. Ewan sees the LA as a group of people, companies, organizations that have an interest in water working together and drawing on all their expertise to come up with an innovative direction for water in the city of the future. For him it has been important to listen to their opinions and have them guide the research to produce something they would use rather than have researchers prescribe what they need. In doing this, he says he has picked up some ideas for his research through the various interactions with stakeholders. He has shared his results with the LA and some of the ideas from his study helped to put together the Eastside Utilities Scoping Report.

Based on interview and paper written by Ewan Last and Rae Mackay

Storm-water Management WP2.3

This has involved:- collection and analysis of ecological and hydrological experimental data from the extensive green roofs; evaluation of options for storm water storage and use below ground (ASR); updating of the Birmingham Groundwater Model to permit testing of the impacts of modified recharge patterns on groundwater levels; construction of the initial storm water GIS mapping and analysis; application for assessing alternative storm water management strategies; develop a training package to be adopted for Extensive Green Roof implementation. The learning alliance members, and particularly the City Council, have actively engaged with this research and provided co-funding for the demonstrations.

Currently there are two demonstration green (brown) roofs in the Birmingham City Centre; the Birmingham Volunteer Service Council (BVSC), and the International Convention Centre (ICC). The Birmingham Learning Alliance been able to organise tours to create a wider awareness of green and brown roofs both for stakeholders and the general public. The University of Birmingham brown roof research facility is currently used as a teaching resource for the third year Geography course GGM312 - Landscape and Urban Ecology that includes Geography, Environmental Science and Environmental Management students.

Green Roofs Research and Demonstration

The Green roof demonstration examples collaboration between SWITCH and stakeholders (in this case the Birmingham City council) to undertake demand led research and demonstration.

The most important environmental benefits associated with green roofs are: the thermal insulation of buildings, increased roof longevity, urban cooling, improved urban aesthetics, reduced roof run-off, and habitat creation. Under SWITCH the demonstration of green roofs mainly aims to develop a strong scientific understanding of the ability of green roofs to act as a substitute brownfield habitat and reduce roof run-off, although there is excellent potential to use the significant data sets that are being accumulated to explore the other benefits perceived for these systems. SWITCH is sharing this understanding with practitioners and the general public through workshops and demonstration projects. :

One stakeholder said the following about green roofs “*SWITCH provided resources to carry on research on green roofs; design of roofs, match funds to expand physical sites. We have synergy with research at university*”. Rosemary Coyne (formerly sustainability advisor for Eastside development projects).

Safe Water Reuse WP3.2

Viral transmission: This research falls under work package 3.2 in the SWITCH research, and looks at the potential of groundwater reuse. This research is important because groundwater levels are rising, and may cause buried structures (such as basements and service tunnels) to flood in addition to the need to be managed in terms of stormwater runoff. On the other hand, groundwater has the potential to be a valuable source of water, and therefore, the safe and effective use of groundwater and aquifers must be defined.

The research is to gain the knowledge necessary to develop rules for operation of AR schemes and uses the following approach:

- (i) field experimentation on a borehole array using bacteriophage as surrogates for human viruses;
- (ii) laboratory experimentation on intact cores;
- (iii) monitoring of virus concentrations at multi-level piezometers and pumping wells;
and
- (iv) modelling.

The initial work on the basic design of the field experiments, hydraulic testing and checking for virus presence in the groundwaters of the test site was done in 2007. Currently experiments on boreholes using bacteriophage are far advanced, despite some initial setbacks, and preliminary results are available. These were shared with members of the LA at the last LA meeting in August, 2008. LA members found the results stimulating and there was extensive discussion and interest in how these were going to be used in future in relation to guidelines for the abstraction of groundwater. While this research is of interest to many of the city stakeholders, the main customer/user is regarded as the Environmental Agency which holds responsibility for environmental monitoring.

Use of Natural Systems WP5.3

Groundwater-surface water interactions. This groundwater related study is being done in close conjunction with the Environment Agency. The study looks at the flows in the Hyporheic zone and the natural attenuation (NA) potential of the urban hyporheic zone in the River Tame. This research is important because over the past decade, the UK has been improving its water quality and has been opening up previously disused watercourses. It has now been found that groundwater contaminated by pollutants is entering into streams and other water bodies. What is not known is the extent of natural remediation, the conditions under which this happens and which additional attenuation could be provided through surface water course modifications. The preliminary design simulations show that the pumping rate must not exceed 150 m³/d, to achieve applicable design test conditions for the control of mixing of flows from the aquifer to the river (Durand et al, 2007).

Development of a training package for the assessment and quantification of NA processes in urban rivers for risk assessment calculations is an intended output of this research to be applied to monitoring practice. . This research holds interest for many of the city stakeholders, but the main customer/user is the Environmental Agency. Preliminary results were shared with the members of the LA during August 2008, invoking interested responses and discussions. Unfortunately the main researcher involved was out of the city and thus not available for interview during the review visit.

Non Work Package Specific Actions: The Eastside Utility Study

The result of the study is a Scoping Report for critical infrastructure for the Eastside Regeneration. Although wider than the “urban water” remit of SWITCH, it showed that water management is intrinsically linked to energy issues. In this context, approaches for separating stormwater and sewerage flows have emerged as a key issue for the future, as it currently is in another SWITCH city, Lodz. Separation of the stormwater and its retention in the landscape and rivers could reduce flooding and improve water quality. Part of this Scoping Study was looking at proposed demands for power, water and other services and involved some estimation of future demands going forward in order to demonstrate the need for demand reduction, as well as making future provisions to meet the needs of the future inhabitants.

An immediate benefit from this Scoping Report was the direct intervention of Advantage West Midlands (AWM), the Regional Development Agency, in taking on a co-ordination role, initially for power supplies, that has enabled the key developers to combine their efforts in terms of supply applications. By working together, through AWM, significant cost savings have been achieved and an approach developed that will enable the use of Combined Heat & Power (CHP) to be incorporated in the utilities Plans and potential for renewable energy sources (Biomass and Waste to Energy).

AWM are now looking at a combined, co-ordinated approach for the provision of water, drainage and other utility services and for the planning of services diversions and the incorporation of Sustainable Drainage Systems into the planned developments including Green and Brown Roofs. A series of Eastside Developer Forums have now been established in an effort to deliver this SWITCH led intervention.

Perspective from a Senior Researcher

The research described above is mostly being undertaken by Ph D students and by young Postpost-doctoral researchers under the lead guidance of Rae Mackay, who has developed relationships with many of the stakeholders in the city. Additional senior researchers are also involved in the individual activities (John Bridgeman, City Water balance (WP1.2); Jon Sadler, Extensive Green roofs (WP2.3), John Tellam/Michael Riley, Viral Fate and Transport (WP3.2); Michael Rivett, HZ Natural Attenuationn(WP5.3)) This is what Rae Mackay said about SWITCH as a research project:-

“The difference between SWITCH and other research projects is that we are being more proactive in providing outcomes and information to users in a totally different way than we are used to”

(Rae Mackay)

Historically, the primary goal for the research community has been to provide new high quality knowledge and to publish this new knowledge in a form that is accessible (i.e. documented) to practitioners, but to leave the practitioners to decide the most effective application of the results and to draw conclusions from the results based on their own needs and perspective. Whilst practitioners have frequently called for more directed results to be forthcoming the publishing/dissemination framework for research has not been geared to this need. Steerage of research by one or a few stakeholders has inevitably led to over-focussed outcomes. The adoption of a learning alliance environment for open and early dissemination of the results permits a very wide base of practitioner’s perspectives to be fed back to the research team at each stage of research development such that the knowledge can directly influence the formation of a wide spectrum of policy and practice and that this interaction

leads to iterative cycles of knowledge transfer and influence among the stakeholder/researcher partnership.

Lesson:

The broad framework for interactions provided by SWITCH has provided a good opportunity for younger researchers to raise the quality of their links with the stakeholder community and has created pressure for them to improve the applicability of their research. Interaction with an ongoing urban regeneration programme and with important planning and regulatory agencies, as well as with a wider group of international researchers and experienced local practitioners through the city Learning Alliance, has enabled each young researcher to shape their research in a direction that is not only informed by good professional practice, but responds to emerging challenges of urban water resource management that are relevant far beyond Birmingham and for cities of the future.

3.2 City stakeholder engagement with the ongoing research, demonstration and learning activities,

Engagement of city stakeholders with the SWITCH research and demonstration process was reviewed through interviews with some of the stakeholders, and records of the meetings of the Learning Alliance. Even though the results for these research works are now coming in there is already excitement in the learning alliance and there is great potential for use among the wider LA members and also at the national level for the EA.

Environment Agency - Making Use of Research Results

David Lowe from the EA is a Regional Manager; he has been in the EA since it started within the Water Authorities in 1974. He has expertise in contaminated land and effects on water resources and bodies of water. He sits on the River Basin group and is currently working on the EU Water Framework Directive. He has been involved in discussions on the management plan and discussions about what goes on in 25 years. Even though he is very busy, he gladly identifies himself as an LA member and has attended more than 50% of all LA meetings. He has also given a talk at one of the meetings.

David Lowe is very much abreast with the current research that is being undertaken in the SWITCH project. He said there are a whole range of things that the research will tell us and these will have an impact on decisions that we make on how to use water. He indicated that people who work under him are directly involved in the research and said there will be useful outputs. Regarding the research on viral transmissions, he said it will be important when it came to licensing or preparing future groundwater abstraction guidelines; whether drought flows can be supported by abstracting groundwater, how much groundwater will be available and its “flexibility”. He also said that the research on interaction between surface and groundwater could support monitoring of rebound in Birmingham aquifers.

At the end of the day, there have been challenges with the initial start up and constraints with time but the process has been rewarding for those who have been part of it.

The Water Engineers Fraternity: Making the SWITCH with Learning Alliances

Alastair Mosley is a technical director (Water) in a private consultancy company (WSP). He has over twenty years of experience as a Water Engineer and has mostly been involved in the design and operation of sewer networks and wastewater treatment plants. His participation

in SWITCH started at an early stage through his involvement in the Birmingham pilot on urban Flooding and integrated urban drainage (Making Space for Water) which he was instrumental in initiating. Starting in September, he will be the national President for CIWEM- before now he was the secretary. He has been to all the LA meetings- clearly demonstrated by his extensive knowledge of the project- and is enthusiastic in using his outfit to promote the LA and SWITCH as a whole

“At first I wondered why and was a little disappointed that it appeared that we were starting again on a subject that has been well understood but now I see the (intervention) logic and I appreciate it.....seeds have been planted and the shoots are beginning to grow”.

For him, SWITCH is an example of what can be achieved if people work together. It has been about sharing knowledge. He has been happy with the sort of people that “Phil” helps to bring together and has found members to be very open, even where they could have said no. He noted “it’s the people that are the experts. We have got to allow more walls to be broken down. If we can only harness all the mottos of the organizations, we could move forward and achieve much more”.

There had been a lot of key moments for him and the LA meeting in August 2008 was one of them. There was a presentation on the vision for stormwater trying to link all the pieces; such as how do we store and use rainwater, so we reduce the burden of water supply?

What he would like to see in future is to have further collaboration between CIWEM and the LA and will like to see CIWEM giving SWITCH more of a platform. We could use the findings and incorporate them into local planning.

The difference between SWITCH and other projects is that the LA provides a round-the-table forum, making water central. Another difference is the involvement of academic institutions – this breaks down barriers and it credibility. People value being invited to meetings – getting to have an influence in the research and discussions; “putting my thoughts across and know that they are being taken seriously. SWITCH looks at the bigger picture, water as a living medium, water as a resource, as a life threat, making space to solve a particular problem. A “SWITCH” on how should we structure our future direction. What is the shortest route to sustainable water management?

Also the global dimensions make companies interested. If you are doing an LA across the whole world then you could learn from each other, you can get a cross fertilization of ideas from around the world in where things work and where they don’t. It will be in our interest to help the developing world get there without as much resources and efforts.

On the future this is what he had to say – (after two and half years) SWITCH is now in a better position to say this is the right way to go forward at this point; a good point to raise the game. We know our strengths. .

Even though the process of engaging with SWITCH through the learning alliance has been rewarding for many stakeholders interviewed, one question is whether it will make the impact it is looking for.

Creating the Paradigm Shift- Views from a Water Company Engineer

John Martin works as a Water Quality Manager at Severn Trent Water. He has experience in the water sector spanning more than 30 years. His current responsibilities are mainly related to water resources and water quality issues. He has worked on a number of projects and is working on the Water Framework Directive and Urban Waste Water Directive and how it will affect Severn Trent; and that requires liaising with the Environment Agency. He also plays key roles in stakeholder engagement activities for the company and is involved with the regular discussions with OFWAT and other organizations. He has interests in professional and institutional issues and is on the CIWEM local committee. He has been an active member of the Birmingham Learning Alliance since its inception.

John's connection to SWITCH was forged at the inception of SWITCH. Rae Mackay involved Severn Trent in the SWITCH Project and the creation of the initial membership of the LA. Researchers at the University had worked together with John on an earlier project; SMURF⁴.

He has been very much interested in the Learning Alliance. Even though work constraints do not allow enough time for him to participate in all meetings, he indicated that Severn Trent very much recognizes the need to get involved with other stakeholders since they have to deal with both the regulatory agencies and consumers and have taken a big interest in the stakeholder engagement process especially in the Consumer Council for Water (CCW). Also meetings at the LA have stimulated open discussions and more links with the Local authority climate change office. There have been follow ups on this. Through his involvement in the LA he has been able to tell people about the strategic directions for his company especially when people talk about the lack of long term planning. He also mentioned that even though their job is to get things going now, it is important for them to get together to look at water in the future. For example how issues of water will be dealt with when planning new areas. Government is looking at having local authorities to have more housing, support for Eco Towns Sustainable development, some common elements. The company had to produce a strategic direction statement which is an outline 25 yr plan of where the company will like to be going including areas such as climate change. This is one of the areas in which SWITCH research and the LA could make contributions.

So definitely he thinks the learning alliance has made a difference but on whether the paradigm shift will be achieved, he thought the timetable for SWITCH is short; if you talk of a paradigm shift he was not sure how long it will take. But for him this is a seed that has been sown- "if you sow a seed in five years, you may not see massive changes but after a long time, some changes could be made. At the end of day, SWITCH is one of many projects tending to lead in the same direction e.g. general issues about flooding, climate change etc and this might be a slow process and there will be a cumulative weight of evidence and pressure that gets things to change and if one looks too quickly we may not see anything".

John encouraged the project to make its contribution. He gave the example of when Severn Trent was set up. "There wasn't as much on Water Demand Management as there is now because of a fundamental change of attitude. To improve on the LA one thing is how to move from where we are now to do things differently where that is necessary".

⁴SMURF (Sustainable Management of Urban Rivers and Floodplains) was a three year partnership project that started in August 2002. The project was based on the River Tame in the West Midlands - specifically the urban area of the river catchment that includes Birmingham. The River Tame is a typical example of an urban river - polluted, heavily modified by culverting, straightening, re-routing and with concrete banks and few natural features. SMURF was based on integrated planning and management of land-use, water quality, ecology and flooding and river flows .

John hopes that the Demonstrations in the city will help stimulate this process.

An aspect of SWITCH valued by a number of city stakeholders was the opportunity presented by the project to engage with international experts and situations in other parts of the world.

The Global Dimension of SWITCH

Comments from various partners pointed to the value and potential they see in SWITCH's global dimension.

David Lowe sees the international dimension of SWITCH as being something that will encourage the take up of new concepts in water management. "I would like to know more about what is going on in Belo Horizonte. I would like to talk to someone from the Hamburg equivalent of the Environmental Agency to see how they were managing the WFD and how they found that SWITCH was fitting into that. With benefits of modern understanding and philosophy about Climate change and sustainability – the island engineering to compare what they are doing with the work we are doing here- the diversity of that. That would have been very interesting (David Lowe, Environmental agency)

"If you can get to visit the Emscher region in Germany that would be very nice. It is an amazing thing; what they are doing with stormwater management (Clive Wright, Birmingham City Council).

"There is a huge opportunity for knowledge transfer but there is no mechanism (Rae Mackay) It will be essential in the final phase of the SWITCH project to expand the role of the training/education programme to ensure that international knowledge sharing is central to much of the dissemination activity of the research teams and that a long-term arrangement is made to generate long-term continuation of SWITCH education. Initial links between Emscher and UK researchers to present on green roof technologies through a self financing workshop in the UK provide a Birmingham LA illustration of the type of contribution that could be developed globally

Stakeholders in Birmingham valued the opportunity that SWITCH has provided for engaging with the planning process. However, some of them felt that even more could be achieved in this respect.

Further Opportunities for Engaging with the Planning Process

"What will go forward will be a function of planning. In the case of planning, we have not fully engaged the sort of planning system required. We need to have acceptance from the people who make the law, government, the planners, the local authorities to drive it. The engagement and acceptance by Birmingham planners is not fully engaged. The Learning Alliance has created a platform where you bring together a network of people from water companies, consultants, universities, the Environment Agency, and that network has got to be a good thing even if it just creates that alliance of exchange of learning. It plants a seed. That is not money being wasted. You won't see the major shift within the period of the project, but

it makes a network within which we can ask questions that will influence change, (David Lowe)

Making the change we need

Rosemary Coyne has a new role related to sustainable design and planning at Advantage West Midlands and her tasks include working with policy. Prior to this, she was the Advisor on sustainability with regards to the Eastside Development and was involved in the green roofs research. For her the opportunity to join with the research by SWITCH was a transformation. Rosemary is very enthusiastic about the LA process. She sees great opportunities to influence planning and was part of the team that prepared the Eastside Regeneration scoping report. She has found participation in the LA useful. She has taken part in the tours for the green roofs and was a “tour guide” in one of the sessions. She thinks more field visits could help to improve the LA process.

When an invitation was extended to her to be part of the LA, she saw “an opportunity to work with SWITCH to influence the real world. It gave a chance to say you have to work in a way that sometimes people working on planning did not think it is possible. There is a real need to support vision in the strategic planning documents. This is a good time get building blocks centred on sustainability in water management in place especially at a time when local authorities are preparing suites of planning documents.”

Rosemary added “Currently work is ongoing on a regional spatial strategy focused on sustainable development, climate change and a project like this helps in understanding how to develop the vision and strategies from a strong technical point of view. Sustainability has been talked about, but we don’t know what it means on the ground. Now we are talking about measuring sustainably; what it means and how to measure it.

Rosemary believed taking part in the LA has definitely improved on her network and given her access to stakeholders who otherwise have been very difficult to get in touch with; “it is usually difficult to get to talk to anyone in their professional capacity when you call their main line but over here you get easy access to someone who is at a higher level, the people you need to talk to”. She admits that getting people to participate regularly in meetings is sometimes difficult because their performance at work will be measured by what they do at their day to day jobs. “To get them to be interested and make time from their jobs, an understanding should be created that there is research available that they can tap into and get a lot of benefit which won’t cost anything, just their time. The LA can also latch onto dissemination and more side visits adds value to give stakeholders a chance to do what they usually won’t do in their normal work.”

A related observation is that SWITCH is currently driven by the older generation of professionals, and will need to bring on board the newer generation.

SWITCHING on to the Next Generation

“At some point in the 2nd half of the SWITCH project, we need to inject some younger people into the LA and planting a seed that will develop further. I will fully support that”.

For David Lowe, SWITCH presents a different dimension and goes a little further in looking at sustainability and political issues than he is used to in other projects that require stakeholder engagement. His involvement in the LA meetings has been to get an understanding of the research that is going on and to get a deeper engagement with some of the key stakeholders. He finds this very useful and has been able to enhance his network but thinks the LA should begin to focus on people who can take the ideas being generated “into the city of the future”. He thinks this is one of the improvements that can be made to the LA; to energize it and bring a “younger” SWITCH. For him, the older people would get some outcomes from the research but younger people have the energies to move on. This is something that all stakeholders currently in the LA (government sector, public bodies, private organizations etc) should be interested in supporting and that is where he thinks training and dissemination should be targeted. He already has in mind people from his organization who could be interested: a group that will build on what has been started and add value to it.

Another reason why he is also very interested in this young group is the fact that most of the current stakeholders are also tied down with various responsibilities and may not find the needed time to always be at meetings or to undertake LA activities. He feels that having young people will go a long way to help and keep the group active/dynamic.

“Deliver Practical Tools from research results”.

Clive Wright works for the Birmingham City Council. He is a team leader in the drainage section. He has been involved in the Birmingham LA from a distance and is enthusiastic about getting on board, now that he will be the council’s new representative. For him the most useful contributions that the research in SWITCH can make for the members is to come up with practical tools. Clive has been involved in a number of projects such as SMURF and “Making Space for Water”.

“SWITCH is intellectually stimulating but as a practitioner at the end of the day I will want to know (for example) whether the Environment Agency has got a tool for practice.....I will direct researchers towards producing something that we can actually use” (Clive Wright)

Clive sees the research as a potentially useful piece of work and finds the research interesting. For him, most research reports come out at the end and then stops. Do the next step; if SWITCH is a vehicle to do that then it is useful. He thinks that SWITCH can deliver tools that will assist practitioners in striving for change; tools that are simple and easy to use, where people can easily understand the terms and relation to their roles and most importantly easy to replicate. Clive gave an example of SMURF and said one of the good things they produced were “planning guidance, good general guidelines for river management; but no detailed technical advice. Results I would have liked were if we could have produced good technical guidance and it will be good if SWITCH can do something like that.”

He thinks stakeholder engagement is important. His main constraint is time; but sees opportunity with taking part in the LA. “I was intellectually stimulated”. Advancing our intellectual knowledge – we’ve got a wealth of information. He gave an example of a project with stakeholder engagement in which Customers’ views, some were unexpected, were taken. The stakeholder engagement gives a structured approach to getting down what already know. There was a lot of information we have learnt from that. How to bring people together, how to facilitate them; but think there needs to be a longer period for longer engagement with

stakeholders to achieve a paradigm shift. The only way you get a paradigm shift to get legislation to back it and at the moment we do not have so much legislative support.

He believes SWITCH spent its first year finding its way and that was quite difficult. He thinks having clearer directions could improve the process and that we should begin to think about leaving a legacy that will go beyond the programme. To have defined reviewed periods to keep the lights on and making sure the baton is passed on to someone (could be the same group of stakeholders); maybe a Birmingham Water Group. How to get it in people's minds to set it up is the challenge. If there is the need, then you could set it up. Lot's of hooks that you can hang a lot of people's coats on. I will get involved more once we have finished our project.

3.3 The role of the learning alliance and its facilitators in the IUWM research and development process.

This section looks more specifically at the results from the Learning Alliance Process. It is based mainly on discussions with those involved with organisation LA activities, and the reports from its meetings.

View from Philip Sharp, the LA Coordinator

Phil reflected at length on his experience with setting up and managing the learning alliance process.

Challenges with start up

“Training and support for the establishment of the Learning Alliance inevitably came quite late in the initiation of the LA. The LA was to some extent already assembled before we got enough ideas (and a budget) about how the LA processes in SWITCH were expected to work and what it was trying to achieve - to some extent.”

Getting peripheral stakeholders involved.

“We should have tried to get the key city authorities as actual SWITCH partners as this would have been quite an incentive for them to take a strategic role in delivering the SWITCH project in the city in rather a similar way as in Hamburg. SWITCH is a fantastic project looking into water in the future, climate change, adaptation and looking into Water Management as this is a very serious topic and is constantly in the news so it has a high profile right now. Jennifer is trying to link up with the young CIWEM. Members Interest Group right now to get a ‘Young SWITCH LA Group’ established and so far there have been some strong interest expressed, but mainly from Environment Agency young members. We now need to try and reach young people from our other LA Member organizations.

Keeping interest

“When the researchers were organising themselves the LA was trying to set up. At the time, when the LA was ready, it was early in the process of the research, so we had not got too many results to give to feed back to them (LA Members), hence we got involved in the Eastside scoping study research. Research results are now coming in and now it's beginning to keep their interest. Initially the plan was for two meetings in a year but we do more than

that. To keep stakeholder interest the LA started to rotate the venue for meetings. For example, Severn Trent has had 2 meetings held in their office. But now with research results coming in, it is expected that there will be some stronger interest from stakeholders, with lots of training opportunities presenting themselves.

Took 1st few meetings to really establish ourselves and our identity. A lot of the training came late- i.e. training for development and support of LA and pressure was on to get LAs up and working. We in fact got initial key stakeholder commitment to a Birmingham LA moving before the bid was submitted, but a long time went by in between formation of the proper LA and the bid award so in many respects we were starting again

The Impact of the LA so far

Phil noted “A big difference that the LA has made is in bringing stakeholders together in a way they don’t usually get to meet. Stakeholders don’t usually get an opportunity like this to meet together; to talk of the future of things in a more diverse group. They may meet, but on more specific official and current issues. Getting them together in an LA type format is useful, because they develop contacts where they can pick up the phone, call and discuss future issues on in a more personal manner.

“Another important outcome that SWITCH in Birmingham made was the impact from the Scoping Study document for Eastside. It was an opportunity for intervention even though it is quite late in the planning process for getting more sustainable development in the Eastside region and encouraging collaboration among the parties – government and the private sector.

“SWITCH would be a good reference for a point in time where people start to change. The project came at a time when it and other projects were giving major consideration to issues of climate change, urbanisation, population, energy etc. These issues are on the agenda and there is the need for a distinct change in our approach to these matters.

Phil noted further the challenge of moving from awareness among professionals to achieving more widespread change in attitudes. “How do you introduce change? That’s why we are keen in Birmingham on having a teacher’s training pack. We believe that change will come from the new generation, the children of today, even though the LA is trying to influence the old members of our society. it is the children that will inherit the benefit of a more integrated, sustainable way of managing water in our Cities of the Future”.

Regarding the hoped impact from SWITCH Learning Alliance Phil noted “at the end of the day I hope that the LA process will result in:-

1. Something of SWITCH (LA) that carries on after the programme itself has finished. SWITCH will still have a lot of learning to offer the City Stakeholders.
2. Maybe it will be adopted by a “son of SWITCH” programme. Another programme further refining research, adding on. Developing theories of active learning for example.
3. SWITCH Legacy that it was seen to have been at the very least the start of the paradigm shift. The point in time we made a change of course, towards the paradigm shift.

Documenting the learning and change process

For Phil, this is what the “learning” in the LA is about; “how people accept, adapt to, join and commit to behavioural changes. From notes kept we will find out why/what we think influenced an increase or decrease in the Monitoring & Evaluation scores. We need to know what has brought about changes; not just the reporting of the facts that this or that has happened.

Phil noted some of the documentation that has been done includes:-

- Workshop reports, all of which have been put on the city website
- Contribution to SWITCH newsletter
- City posters
- Stakeholder Analysis (which is a bit factual).
- Institutional Mapping (work that has been done in Birmingham)
- The work that Middlesex University are doing in Eastside (relates to the process of change and adaptation and is starting to be a good reference document).

View from a Water Engineer recently turned LA Facilitator

Jennifer Chlebek is an Engineer who has been working with ARUP for the past year. Jennifer’s involvement in SWITCH is a good example of how dissemination could bring about interest in SWITCH and in the LA process. It all started with attending one of the various lectures in different subject areas that are given in ARUP. The LA coordinator (Phil) gave a talk on SWITCH and that caught her interest. Jennifer spoke to Phil at the end and asked for a bit more information. Coincidentally the coordinator said they were looking for a facilitator and that was it.

She started by visiting the main SWITCH page to find out more about the project, a task she found quite challenging. Her first major assignment was working on the city page for the Learning assignment. This was done from December 2007 to January 2008. The webpage is updated as and when things come up. Researchers are very much involved in the webpage and have access to it, so they could also fill in some of the pages or upload information on them.

Jennifer got involved after the LA had been set up; at a time when most of the training for the setting up and development of learning alliances had been done. She thinks it would have been more useful if she had got some of that initial training. “At least with the training I will know the areas I needs to cover and knowing that will help a lot with my role as a facilitator. At the same time Jennifer noted has been ably supported by the LA coordinator to fit into the role. Recently she has also begun to make use of some of the briefing notes.

Jennifer finds SWITCH assignments time consuming. Even though she is allocated 1.5 days a week, realistically she spends more time. For example the week spent in Hamburg and the week spent in working on the assessment in Birmingham already equates to approximately two months of her SWITCH time. The difficulty with this is that she is not able to do as much as she would have liked to.

On the whole Jennifer feels she has benefited a lot from her involvement in SWITCH. She has gained a lot of information. She sees a lot of success when it comes to the dissemination

of information within her organisation of which she says: “SWITCH has filtered its way into ARUP; people have become aware and as a result they can see linkages between their projects and SWITCH knowledge. People now come to you to ask for information and how it can help”. Within her organisation there is already a strong linkage between SWITCH and other research projects related to water such as one on the development of a water strategy document.

For Jennifer one of the highlights was a Theme 2 meeting and to a sharing event in Delft in March 2008. She hopes such events will be done regularly and will involve a more facilitators and coordinators from the various cities. In all it has been an interesting process which has got her thinking of a lot of things that she would like SWITCH to do. Jennifer hopes to do some more work on water strategy.

Challenges in Developing A Vision for IUWM in Birmingham in 2050:

Developing the vision for the city of Birmingham, Phil notes “has been an interesting and highly interactive process involving key stakeholders in the city. It involved a series of stakeholder meetings in October, 2007 and March, 2008 as well as consultations of other vision documents”. The visioning process also considered responses to questionnaires that were distributed to the various stakeholders on their ideas of what Birmingham/ West Midlands Conurbation may look like in 2030 – 2050.

The workshops also served as meetings for the learning alliance members, with inputs from other researchers in SWITCH. Stakeholders were divided into 3 groups: the “old world group”, the “new world group” and the “sustainability world group”. Each of these groups was tasked with the job of identifying the way forward for a vision for the city of Birmingham. The groups also considered various scenarios using them as a basis for identifying economically and environmentally sustainable potential strategies and plans to achieve the vision for the city of Birmingham.

The old world group was tasked with discussing the issues relating the ideas of urban water management; how it is structured and why it is not sustainable. The New World Group discussed issues around re-generation (projects) in Eastside and North Solihull (both in Birmingham) and processes in place for “Green infrastructure” to be taken up in practice. The Sustainable World Group addressed future scenarios that will support a new paradigm including indicators of sustainability.

Some of the key issues raised by the stakeholders relating to the vision of the city of the future were the availability of clean water, removal and appropriate treatment of wastewater, wise use of water, energy use, carbon footprints and sustainability, regulatory issues and the assurance of a constant supply of water.

At the end of the meetings and discussions and based on the considerations of the three world views, the LA members agreed “the future should see Birmingham as a trailblazer for water resources, a model for other cities in the UK and abroad”. The LA meeting agreed on the following as a vision for the city of Birmingham:



A vision of Birmingham in 2050: Birmingham is a green, clean and vibrant, multi-cultural city: among the world leaders in terms of water resources, sustainability, environment, economy and development and see as an exemplar of Sustainable Integrated Urban Water Management.

Formulation of a vision for the city in this way encouraged the participation of all LA members. Phil thinks that the visioning meetings helped to keep the interest of stakeholders. The tone of subsequent meetings, and the interviews with LA members further echoes this sense that SWITCH research and demonstrations and its learning alliance is very much about taking a long-term view on water management, with sustainability having a central place.

A comfortable space to discuss the future

Providing a comfortable sharing platform for everyone

Raj is a representative of the Consumer Council for Water and found the first meeting to be very interesting. Raj has since then attended every meeting since the LA started. For him it has always been useful and he has made it a point to always report back to his organization – for him the main use is around issues of the future of water for the consumer – sustainability will be useful for the consumer of the future. Raj has been with the CCW for 3 years and finds the LA platform as a place where he could learn more about the water industry

“It’s the people; I like to work with them and come to meet them..... We share findings openly and honestly without offending others. The culture here at the meetings is open culture, inputs are not suppressed.....Every meeting has been different and interesting”.

Raj thinks that SWITCH is one of the few projects that takes a forward looking view, and that makes it unique. He also finds the international nature of the project and the wide range of expertise represented in the SWITCH learning alliances useful. Initially he mainly listened and picked up various ideas and information from LA meetings which he fed back to his colleagues. Now he is also making inputs and says he is able to present the views of consumers. There is interest and enthusiasm about information, and think it is worthwhile to send someone here – a lot of knowledge and expertise here and learn how different disciplines interact together – energy, drainage, architecture etc. He also finds the coordinator easy to approach on any issue.

For him research should be directed towards a useful outcome that will make good use of resources but that will also benefit stakeholders. He has particularly been interested in Green roofs and sees it as one of the efforts that can be made to address flooding.

At the end of the day, he thinks there will be a paradigm shift in terms of water management because of external drivers and believes that SWITCH through the LA, could facilitate a response to the external drivers.

The importance of champions?

Interviewing various members of the Birmingham alliance it was apparent that levels of enthusiasm and optimism varied from one member to the other. While literature on change management points to the potentially important role of “champions” in driving change processes (Ginsburg and Abramson, 1991), it was not apparent that there is specific individual driving the SWITCH vision forward in Birmingham. Rather most of the LA members had developed a relatively high level of commitment to, and acceptance of, a multi-stakeholder platform at which issues of shared interest relating to water management could be explored, and a smaller number were distinctly enthusiastic. Given the fairly hierarchical and generally rule-governed organisational cultures inhabited by many of the LA water sector members the extent to which they may be receptive to a process of change led by an individual “champion” is a question for further exploration.

An Enthusiastic Member’s view

“In general people are not allowed to have a vision with their jobs. The LA process is a good opportunity to bring people together and have them to think with a vision and take existing rules and interpret them into activities and exciting new developments”. Rosemary Coyne

Learning and sharing with stakeholders

A key to learning and sharing with the city’s stakeholders has been the realisation that SWITCH is not, and is unlikely to be the only project of it’s kind looking at the future water related issues for Birmingham. SWITCH has shown respect for the earlier environmental and water strategy programmes that have gone on in the recent past and tried to pick up on these as part of the LA process.

SWITCH has joined and is associated with other projects working on climate change or urban flooding issues in the city sharing information and experiences with these groups.

The Scoping Study work carried out at the request of the LA Members for the Eastside Regeneration Project was a great leap forward in obtaining SWITCH credibility in the city and indeed of producing a platform for the city to share information with developers and utility services providers. This provided a very useful map of where opportunities exist for interventions in these proposals to provide a more sustainable outcome that may otherwise have been the case.

Attendance at workshops, seminars and presenting papers has enabled SWITCH to learn and expand awareness of its aims its influence in the city and country.

Communication within the learning alliance

Phil noted that while the approach to internal communication has evolved since the start of the project, with increasing reliance on meetings and the website, the person to person communications remain a key part of the process.

“In the initial stages initially we had to get people to be interested mainly through personal contacts. One-on-one meetings were arranged and stakeholders were interviewed about their vision and willingness to part in the SWITCH LA process.

“Communicating with stakeholders has been mostly by attendance at meetings, phone and emails. Emails are responded to reasonably regularly but sometimes it helps to have personal interactions and to meet at other events. Other forums such as Climate Change, Constructing Excellence and Making Space for Water have served as communications opportunities which have been widely used to meet with members and stakeholders.

“The City Website is starting to become a useful tool for communicating with LA Members and others. Recently a developer, not connected to the LA has emailed the facilitator to enquire about the research on green roofs as they would like to incorporate them into their developments but currently do not understand the basics of them never mind the design. A newsletter is planned specifically for Birmingham and this will complement the website.

“In general maintaining communications with LA members is done at an individual and often personal level in many different ways. As practitioners in the city the LA Facilitator and Coordinator use their daily roles as opportunities to speak stakeholders about SWITCH and LA matters.

Raising awareness in the wider community

Phil sees wider awareness raising as a challenge. “Raising awareness can be difficult in a busy society whose focus is often on the topics of today. Seminars, presentations, workshops and attendance at meetings (other than SWITCH) provide opportunities to raise awareness of SWITCH.

“Promotion through connections with Learned Societies such as ICE and CIWEM has been useful and far reaching. Planned future workshops and training sessions will greatly expand awareness of SWITCH and a proposal for a SWITCH Teachers Training Pack will hopefully add to this wider community exposure.

The website is becoming increasingly populated and as a result a developer has contacted the Facilitator to obtain information on how they can incorporate green and brown roofs into their developments. The expectation is that as more research is published on the website, it will become a more powerful tool and act as a central platform for knowledge sharing, and also be accessible to those looking for a more general overview of the science.

“The learning alliance has made SWITCH very visible in Birmingham and to the wider group of water professionals in the UK. This has been achieved through a number of presentations at professional institutions (e.g. ICE and CIWEM) Climate Change Groups, similar meetings and gatherings. The LA was instrumental in organising a workshop in London where SWITCH was presented. They linked up with the publishers of the newsletter for Institution of Civil Engineers (ICE) and suggested it will be good to have a general water summit because SWITCH was looking at all aspects of water and no other body appeared to be right now. They went further and helped to put together Water Summit in London – some of the sessions of the forum were chaired by SWITCH. The LA has also met with students from Huddersfield University and to a school in nearby Worcester to talk about water issues.

The coordinator and facilitator have also actively been sharing SWITCH information on their company’s internal skills forum network. SWITCH has also been represented on a number of committees. SWITCH was a member of the review group for Making Space for Water Workshop. SWITCH also sits in ICE Water Group, which is an international body.

“SWITCH in Birmingham sits as a “stakeholder” in a number of other forums such as the DEFRA Making Space for Water Study – for investigation into urban flooding in the Upper

Rea catchment, the Midlands Climate Change Adaptation Group and West Midlands Centre for Constructing Excellence. All of these meetings provide the opportunity for Birmingham SWITCH to expand its knowledge, meet with other stakeholders, influence decision making and promote the interest of Integrated Urban Water Management approaches.

Member's Suggestion for Improving Access to Information

One of the ways in which dissemination could be improved to interest people will be to have a good index to categorise various research results etc; documents of a few pages, a good summary of the project. People will find this useful then they can make further requests for more specific information. For reporting a similar approach could be adopted; where summary reports are shared with the details given on as needed basis. To make the websites interesting, it should be updated regularly but not with too much information – but a summary of new information as it becomes available. The LA could increase communications through the internet, but this would require more time to read emails. (*Raj Mehta*)

Ensuring Continuity

All stakeholders interviewed were particularly happy with their participation in the LA and referred to themselves as LA members, indicating a level of ownership. They indicated their commitment to the continued existence of the LA, even beyond the SWITCH Project. The coordinator and facilitator have started trying to organise a young SWITCH meeting with various young professionals in the water sector. This has the interest of some of the key stakeholders.

4. KEY LESSONS, CONCLUSIONS & RECOMMENDATIONS

4.1 Emerging lessons about the learning alliance process

Some things are working well in the Birmingham SWITCH learning alliance and offer useful lessons for other SWITCH cities and similar projects. Others are working OK, and there is room for further improvement. There have also been some less successful experiences over the first couple of years of the SWITCH project in Birmingham and a number of constraints and risks can be identified to sustaining an effective learning alliance process that puts research into use. Lessons emerging from experiences in Birmingham to date are:-

Existing linkages and dialogue between researchers and other stakeholders provide a sound basis for further development of relevant research initiatives and setting the foundations for a strong learning alliance. In Birmingham, the prior links between the University research community and professionals in the Environment Agency, Severn-Trent Water and the City Council provided a means of identifying relevant areas of research and also a firm basis for the establishment of the city learning alliance.

An active facilitator/coordinator with relevant experience and strong inter-personal skills is an asset for growing and sustaining the learning alliance process. In Birmingham, the learning alliance facilitation role was taken up by an experienced water engineer, Phil, who had strong networking and communication skills, and was able to easily relate to the interests

and cultures of all the main stakeholders. His age and experience enabled Phil to quickly gain the respect of other stakeholders.

Well planned, participatory and appropriately timed and spaced meetings have helped to sustain the momentum of the learning alliance process. The meetings of the learning alliance members have been kept to half-days, to accommodate the busy working culture of the senior managers invited from the main stakeholder institutions. The agenda has focused on specific tasks or thematic areas in order to provide the meetings with focus and a sense of direction and purpose. Involving various stakeholders in making presentations and sharing aspects of their work has helped to develop ownership and promote mutual understanding of where each of the stakeholders is coming from. Limiting the number of meetings to two or three a year has been judged to be about right in terms of avoiding a sense of “meeting overload” while sustaining a steady sense of momentum.

It is helpful to have a host organisation that is appropriately positioned and has the resources and ability to take the lead role in facilitating an inclusive process. ARUP as a partner of the University was well placed to ‘host’ the learning alliance. It has a large group of experienced water engineers working internationally and was able to support one of these to spend a generous amount of time on a cost-sharing basis to facilitate the learning alliance. It also has good meeting facilities. As an international consulting group ARUP does not have a direct role in policy regulation or water management in the city, or in the research stakes, giving it relative comparative neutrality as a stakeholder.

Build upon previous research activities, link with relevant existing initiatives and opportunities for knowledge application. SWITCH activities in Birmingham have built upon, previous research such as SMURF, and linked with other initiatives such as Making Space for Water and the Eastside Regeneration process, and particularly its focus on sustainability.

The importance of investing in training and coaching to support LA processes. The Birmingham learning alliance facilitator has participated actively in all the learning alliance training events. The new facilitator has not attended these events but has the benefit of on-the-job coaching by the first facilitator who remains the learning alliance coordinator. The LA coordinator noted “to a great extent the SWITCH training workshops served to support city LA’s by not only the actual training provided but the interactions with other cities in SWITCH and elsewhere.”

The importance of communication issues, considering these carefully, and investing in communication.

On reflection the LA coordinator thinks time spent on developing a Communications Strategy for SWITCH, both between LA Members but also between the Cities themselves would have been very useful - as these were all going through very similar learning curves at the same time.

Enabling a fuller participation of stakeholders in international aspects of SWITCH. It is felt that a more international SWITCH involvement by all players in the Birmingham and other city learning alliances, would have attracted greater stakeholder interest and the ability to share lessons and experiences between cities. International training opportunities provide a potential self-financing pathway to support this.

Importance of understanding the situation and work culture stakeholders: Facilitators require understanding that stakeholders by definition have “jobs to do and time constraints” and cannot always, even when they want to, allocate time in their busy schedules to attend

meetings or review documents. This understanding helps in planning meetings and deciding how best to organise communication and sustain interest and commitment.

The importance of investment in situation analysis at the design stage: In the case of Birmingham there were a number of initiatives already on the ground looking at flooding and climate change issues and also some larger national commitments on water strategy and policy which SWITCH needed to better understand and assimilate before setting their city agenda - although much of this was down to timing.

Managing expectations, setting realistic targets and post-project impact: There is a sense that perhaps SWITCH is trying to achieve too much within a 5 year period and at the same time that the real benefits of SWITCH will come long after the project ends. It is felt that it would be really useful to somehow monitor this impact over time and indeed to be able to promote the lessons and training that SWITCH will have provided. SWITCH pre-supposed a high level of time commitment from busy stakeholders in the initial LA development stages, and in hindsight this was perhaps unrealistic. Now that the practical results of the research are starting to come out it is expected that these Stakeholders will start to become more engaged in the process.

Additional human resources and complementary skills can further enhance the effectiveness of the learning alliance process. During the first two years the learning alliance facilitator had very limited time and funds allocated to perform this role and as a result aspects of internal and external communication were often constrained.. In the past six months the addition of another facilitator has improved the production and distribution of minutes from learning alliance meetings and also provided a boost to getting the city SWITCH website up and running.

The importance of providing appropriate guidance and getting systems are in place and making time available for documenting the learning alliance process. Related to the point above, the limited time available for the learning alliance facilitator meant that documentation of the processes in the establishment period was somewhat limited. However ARUP has a good system for archiving emails and other such documentation, and this provides the potential for further analysis of the processes and documentation of change based on these records.

4.2 CONCLUSIONS

The SWITCH research in Birmingham is addressing real UWM challenges and issues and has involved some key stakeholders as potential users of the results. However, the mode of research implementation remains largely “conventional” – there has been very limited attention, in the design of the research to include the institutional challenges around getting this research into use in the city as an integral part of the research (as would be expected in an action-research project). The challenge of moving from communication with stakeholders about research results, to achieving clear strategies and plans for up-scaling the results remains key for the research to achieve wider and lasting impact.

The learning alliance, and particularly some of its research and other specialist members, has readily taken up the challenge and opportunity of engaging with an ongoing regeneration project (Eastside) as a site for demonstrating and trying out some newer and more sustainable technologies and planning tools. The incentives and drivers for this type of engagement are relatively few, as it does not link to specific deliverables in the project workplan, and may be seen as marginal to the main research effort and the academic publishing route through which

the quality of research is conventionally judged. How can this type of engagement be encouraged through to the end of the project, and further into the future?

The future of the SWITCH approach will depend on sufficient enthusiasm from the leading Stakeholders to support its continuation. The city Learning Alliance is comprised of key actors, very experienced professionals from important organizations who are committed to meeting and dialogue around the main issues. The role of national organisations including regulatory and professional bodies in providing a foundation for this continuation cannot be underestimated. Engagement of all stakeholders in the process of placing the learning alliance on a secure footing at an early stage and continuing this through to the end of the current 5 year funding will be key to achieving success in this area. However, in a highly regulated and centralised sector, the risk is limited ambition and self-belief in the collective capacity to influence change. How can the learning alliance further enthuse and empower its members and their respective organizations to work in flexible ways with each other in addressing the future challenges of IUWM?

4.3 RECOMMENDATIONS

The following recommendations draw on our reflections about the process to date, and aim to make the project more effective in Birmingham and maximize its impacts and legacy.

4.3.1 Look further at ways of increasing the engagement with key stakeholders in the city

Judging from the comments from some members there is sufficient commitment and interest to step up the intensity of SWITCH learning alliance activities and plan for the longer term. The question is how to do this in a way that sustains momentum and engagement by the main stakeholders. This would be something to be worked through by the learning alliance. Some options (not mutually exclusive) that might be considered are:-

- Increasing the focus and visibility on green/brown roofs and other available technologies for sustainable drainage. This could include increase in the scale of demonstration activities and the range of technologies available, with more involvement from property managers the commercial providers of the available technologies.
- Sustaining and even stepping up the focus on Eastside re-generation with more emphasis on aspects of the water sector, perhaps linking with other relevant ongoing research in related sectors such as energy and renewed attention or action research on methods for undertaking rapid assessments, engaging with the local community and private developers, and fostering cooperation and alliances in areas of common interest and concern.
- Require Ph D researchers, as an applied part of their research topic, to document (e.g.in a thesis chapter or paper) their efforts to engage with city stakeholders and to apply their research outputs to the opportunities for change (e.g. city planning process, or uptake by construction industry, water companies, regulatory bodies) and the challenges faced and lessons learned in doing this.
- Widen the membership of the learning alliance, to include other stakeholders with interests in water management not currently “in the club – e.g. representatives from Eastside community association,
- Seek additional funding to scale-up the more strategic research relating to ground water quality, in order to better pin-point and quantify the extent of risks, and any implications for commercialisation of ground water use.

4.3.2 Engagement at national level

Allocate more resources and effort to dialogue and lobbying at a higher level in National “policy spaces” (e.g. parliamentary committees, ministers, sectoral initiatives and forums) to promote IUWM options for addressing future challenges relating to sustainability– e.g. flood risks from climate change,

4.3.3 Inclusion of and engagement with the future generation- “Succession Planning”

Develop information packs (jointly with Hamburg and Lodz) for use in city schools to educate children on water issues and encourage a new generation of water aware citizens.

Establish a YOUNG SWITCH Learning Alliance to act as Champions for Change so that they are able to better integrate the SWITCH training and thinking into their organisations at a more “grass roots” level.

4.3.4 Realising the potential for “Global Learning”

Step up the engagement of city operators and other stakeholders with their equivalents in other SWITCH cities to further explore common challenges and promising applications of new technology and knowledge and hence add a more global dimension to the perception of SWITCH in the city

The SWITCH main website perhaps needs a stronger image and should be more used for communicating with SWITCH interest groups and the public at large.

Notes

(1) The River Emscher is located in Western Germany in one of Europe’s most densely populated and industrialized areas, a region which has been affected by mining. An opportunity for the restoration of the catchment presented itself with the cessation of mining activities in the 1980s. The Emschergenossenschaft, the regional water board started a 4.4 billion € project in the 1990’s and it is expected to last at least two more decades. Major components of the new Emscher system will be treatment plants and large trunk sewer parallel to the rehabilitated rivers. Stormwater management plays an important in the restoration process: Due to the high level of urbanization the flow regime of the Emscher is strongly influenced by stormwater runoff. Also, overflows of the dominant combined sewer system are causing water quality problems and hydraulic stress. To address these, the Emschergenossenschaft introduced new source oriented stormwater management strategies at an early stage. Since the 1990’s many pilot projects for BMPs have been realized. With good experiences, in 2000 the phase of catchment wide implementation had been entered. (Sieker et al 2006). As part of the SWITCH Project, some demonstrations on Urban Storm Water Management are being undertaken in this region.

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Alastair Mosley, WSP, CIWEM President

Rosemary Coyne, Advantage West Midlands

Clive Wright, Birmingham City Council

Ewan Last, University of Birmingham

Professor Rae Mackay, University of Birmingham, Department of Earth Sciences.

Appendix 1: Schedule of Interviews

Date	Place	Interviewee
26.08.2008	Arup Campus, Blythe, Birmingham	Participation in the learning alliance meeting with a focus of flood water management.
26- 08-2008	Arup Campus, Blythe, Birmingham	Raj Mehta – Consumer Council for Water
27- 08- 2008	”	David Lowe- Environmental Agency
	Severn Trent Office, Coventry Road	John Martin Severn Trent Water Company
	Arup Campus	Alastair Mosley- WSP; Incoming President of CIWEM
28-08-2008	Advantage West Midlands Office	Rosemary Coyne
	Birmingham City Council Office	Clive Wright
	University of Birmingham Campus	Rae Mackay and Ewan Last
29-08-2008	ARUP campus	Phil Sharp and Jennifer Chlebek

Appendix 2: Framework for monitoring learning alliance performance

Box 3. Monitoring learning alliance outcomes

Five objectives (four are shared with other SWITCH cities, while one was added to specifically monitor issues related to the inclusion of peripheral actors in Birmingham). Each objective with related indicators is used in Birmingham to monitor learning alliance progress:

1. We know who learning alliance members are, and how to communicate with them effectively
2. Regular, effective and innovative events capture interest of learning alliance members
3. Demonstration activities are undertaken within a framework for scaling-up
4. We understand why change is occurring in relation to integrated urban water management, not just what happens
5. Inclusion within active learning alliance membership of key stakeholder that have been only peripheral to the learning alliance process to date.

For the third objective, demonstration activities are undertaken within a framework for scaling-up, indicators are the availability of demonstration plans, the level of ownership of these plans, and commitments made to scaling-up implementation. An example of how scenarios are developed based on the indicators and how these are used to assess progress is given below:

Scenarios for objective 3	Score
Demonstration activities are initiated without significant discussion in the learning alliance	0
Demonstration activities are decided after limited consultation with some members of the learning alliance	25
Demonstration activity plans are consistent and integrated within LA plans (city storylines) and are supported but without clear commitments to scaling-up	50 Benchmark
Learning alliance members with potential to scale up demonstration activities pro-actively made suggestions and proposals that were addressed in demonstration plans.	75
Learning alliance members maintain a keen interest in demonstration activities at all stages and report back against their initial commitments to scale-up interventions.	100
Justification of score (January 2008)	Score awarded
All LA Members (in Birmingham) have updates on demonstrations and key LA members are actively involved in these.	75

With relatively limited resources for monitoring, SWITCH learning alliances have initially agreed to implement this relatively simple method of monitoring in all cities using a mix of common and city-specific objectives and indicators.

Appendix 3: Table of some major activities in the process of the development of the Learning Alliance in SWITCH Project Birmingham, UK

Year	Qtr	Training and Monitoring activities	Learning activities in the city	Creating wider awareness	Behind the scenes facilitation and other activities
2006	1		Scoping Meeting involving the members of the SWITCH Management Team and core Birmingham LA (12 members participating)		Interviews, face-to-face meetings, presentations for identification of the core LA members
	2				Presentation of the project concept: World Water Forum in Mexico Setting the Action Plan for establishment of Learning Alliance
	3		SWITCH Birmingham		Preparation to the 1st Visioning Workshop – face to face meetings, letters and e-mail communication
	4		Various, small meetings with the LA members (e.g. EA, BCC) held to review the purpose of the LA and to get integration between research and industry.	Sharing of activities ongoing and planned for the city	Production of an integrated City Story Line (12-36M)
	5		Invitation for SWITCH to be a member of the Regional Climate Change Adaptation Group	Presentation on SWITCH and workshops with other stakeholders looking at climate change adaptation strategies.	Increased awareness of SWITCH and greater acceptance of the aims of the project in the city Preparation for the 1 st Scientific Meeting which is to be hosted by Birmingham.
2007	1	LA Facilitation training for the SWITCH LA facilitators (4 SWITCH cities)	SWITCH 1 st Scientific meeting hosted in Birmingham	Presentation and approval of the SWITCH Birmingham Project goals and objectives to the Birmingham City Council by the University of Birmingham and ERCE	Presentation of the RTD report to the LA
	2	Making Space for Water Pilot Study in Birmingham	SWITCH Birmingham invited to be member of the Making Space for Water Pilot workshop group and sit as a stakeholder in the city.		Review of inputs and outputs from the Study communication with the local residents, key stakeholders and media for assuring the project dissemination Meetings between the city coordinator and researchers (Prof. Mackay and Ewan Last) about City Water and the Eastside development.
	3	Participated in the establishment and delivery of the Water Summit in London in October 2007	A National Water Summit for Water Stakeholder in the UK to hear some 15 papers on various aspects of water management. SWITCH was presented to this audience by the LA Coordinator.	Sponsoring, supporting and providing information on the Global SWITCH Project enable key participants in the National Water sector to hear and learn about what SWITCH is doing.	
	4	Coordinator participated in training on process documentation.			Appointment of the LA Facilitator
	5		1 st visioning workshop held		Meetings held with British Waterways on the application of canal water to combined heating and power plants, and using the canal network for transportation of Biofuel within the Eastside

				redevelopment.
	6	Training on establishing and co-ordinating of LA Platforms Accra	The Birmingham City Facilitator, with colleagues from Lodz and Accra, presented papers in the Accra Training Workshop in December 2007.	Helped to share information and techniques for developing and sustaining an LA Platform. Launch of Birmingham LA website.
2008	1	Participation in LA learning and sharing workshop on M&E framework	2 nd Visioning workshop Setting up of City Website for SWITCH	First draft of Stakeholder analysis Identification of further institutions to be invited to join Birmingham LA Setting the City Story line (25-42M) Facilitator attended meeting in Delft
	2	City facilitator undertook online Stormwater course through the University of Abertay, Dundee.		
	2	Presentation to Chartered Institution of Water & Environmental Managers	Training session on SWITCH given to CIWEM Local Association followed by debate on Climate Change Impacts	Enabling younger members of CIWEM to learn more about IUWM and climate change impacts. Facilitator attended Theme 2 (stormwater management) meeting in Essen, Germany, which included a number of site visits
	3	SWITCH invited to act as expert commentator on Eastside Sustainability Review Workshop		Attendance at Lodz training on city reviewing. Opportunity to expand awareness of the SWITCH project and to comment on sustainable water services in the city.
	4	Coordinator and facilitator spend 5 days in Hamburg to review the activities of their LA.		Facilitator attended the Expo in Zaragoza, and represented SWITCH at the World Water Research Day as part of the Expo.
		In mid-October a training session on SUDS and green roofs is to be held.		

Appendix 4: Photographs



Guiding a group of stakeholders on a “Green Roofs Tour”



A group of students inspecting the green roofs