



018530 - SWITCH

Sustainable Water Management in the City of the Future

Integrated Project
Global Change and Ecosystems

Birmingham Eastside Utilities Report

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Birmingham City Council

Eastside

Eastside



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Please see separate file for these plans

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	Prepared by	Reviewed by	Approved by
Name	Rosemary Coyne, Ewan Last, R Mackay, Philip Sharp	R Coyne P Sharp	
Initials			
Date			

1 Executive Summary

This report provides a position statement, as at January 2008, on issues arising from utilities/services Infrastructure capacity and predicted demand for Eastside. It provides 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.

The conclusions from the study are set out in Table 1 below.

The recommendations for future action with regard to services infrastructure in Eastside are given in Table 2a below.

The recommendations for future action with regard to planning and management of redevelopment and growth areas across Birmingham are given in Table 2b below.

Conclusions

Table 1 - Conclusions drawn from the study

ASPECT	ISSUES	OPPORTUNITIES
<p>CO-ORDINATED APPROACH Some co-ordination has occurred due to facilitation by BCC Eastside team/AWM and developers engagement with the Eastside Developers Forum.</p>	<p>However, business as usual approach does not maximize opportunities to manage resource use/minimize ongoing disruption/future proof the area. The Draft Eastside Design and Movement Framework 2003 has influenced development but this document has not been adopted, is not a Masterplan and does not deal with the detail of sustainable development.</p>	<p>The draft guidance on Sustainable Design and Construction, The Draft Design and Movement Framework and other sustainable policies relating to Eastside should be adopted as soon as possible. This should include confirmation of a 'Merton Rule' for Birmingham.</p> <p>Strategic studies should be carried out urgently: CHP water management – supply and discharge Sustainable Urban Drainage Systems (SUDS) Enhanced use of existing resources e.g. canal and groundwater.</p> <p>Forward planning of services for Eastside could realize: cost savings; minimization of disruption; successful climate change adaptation and carbon management strategies; delivery of high quality,</p>

		sustainable developments.
CLIMATE CHANGE ADAPTION	Climate change adaptation measures are not being addressed on an area basis. Current regulatory controls apply at site level. There is no co-ordination in approaches to SUDS, urban heat island effect minimization across Eastside.	Climate change adaptation recommended actions should be produced for Eastside. An area-wide approach could deliver better long term benefits to Eastside in terms of minimizing climate change impacts.
CLIMATE CHANGE MITIGATION/CARBON MANAGEMENT	Reduction of CO2 emissions can be achieved through spatial planning, building design and energy management. Part L Building Regs that came into effect in 2006 have achieved a significant reduction on 1995 base levels.	Eastside developments should plan to meet and exceed the next revision of Part L if exemplar status is to be achieved regarding sustainable development in Eastside.
SUSTAINABLE DEVELOPMENT	Draft Eastside Guidance on Sustainable Design and Construction produced in 2007 needs to be aligned with Longbridge AAP and adopted. Further detail is required to address social issues.	Some work has already been completed on sustainability issues for Eastside. See www.sustainable-eastside.net for feasibility studies into renewable energy technologies, green roofs and community issues.
DEVELOPMENT TIMESCALES	Current market uncertainties mean that predictions of development timescales, phasing and site uses cannot be confirmed with any certainty at this stage.	Further delays in bringing developments forward allow greater scope for integrated masterplanning of Eastside.
ENERGY SUPPLIES	There is insufficient energy capacity to meet predicted demand for heating, cooling and power. In addition, energy use overall and per capita is still increasing. Awareness raising, behavioural change, reduction of energy demand through design and construction of the built environment are all required as part of energy management approaches for Eastside. Forthcoming regulation will require developers to connect to district heating networks if pipes run past site boundaries under the new European Services Directive around ESCOS – due to come into effect shortly. The Energy Performance of Buildings Regulations will not recognise	There is the opportunity to investigate benefits of a CHP/MUSCO for Eastside. Work on a potential CHP model for Eastside has already been started by Utilicom and a further feasibility study has just been commissioned to look more widely at other options.

	supplies to new developments from low carbon off site energy generation as fulfilling criteria for low carbon development unless the energy is provided by good quality CHP.	
WATER SUPPLIES	No forward planning at an area level has been carried out. Current practices are thought to be sufficient to ensure supply for the next 10-15 years. No study has been carried out to understand how to future proof Eastside for the duration of the proposed life of new developments.	Planning for Growth Points and other areas may help identify more sustainable solutions for Eastside in the near future.
DRAINAGE	There are some constraints on the system but current practices are thought to be adequate to deal with drainage needs for the next 10-15 years.	A strategic planning approach to drainage in general and SUDS in particular needs to be taken for Eastside, tied into green infrastructure planning.
SEWERS	Demand is expected to rise but the current network is not thought to need any reinforcement at this stage.	
GROUNDWATER	Site based feasibility studies have been undertaken at some locations in Eastside. There is no comprehensive strategy for groundwater management in Eastside to support more sustainable development.	A strategic approach to management of groundwater as a resource for heat exchange and for borehole supplies needs to be taken.
SUDS/GREEN INFRASTRUCTURE	There are some constraints on the use of SUDS in Eastside but no area wide green infrastructure planning has been carried out looking at SUDS/biodiversity/amenity benefits of green space.	Development proposals for Eastside feature green space. There is the opportunity to examine how integrated planning and design of this green space could benefit SUDS management and biodiversity. A study of the drainage network suggests that green roofs may be a cost effective SUDS element at some locations in Eastside.
CANALS	Canals can be used for heat exchange, water supply and discharge, transportation of energy and goods but a number of constraints apply to such uses. No detailed plan has been produced for use of canals to support sustainable development in Eastside.	The presence of the canal close to a number of development sites in Eastside gives the opportunity to explore sustainability gains.

COMMUNICATIONS	The capacity of the existing network to supply new developments is not known. At a site level, spare ducts can be laid. The impact of city initiatives around communications, the impact on sustainable living and the consequential requirement for additional physical infrastructure works is not known. There is not known to be an Eastside strategic approach to local delivery of connectivity programmes.	Digital Birmingham and the Connected Urban Development programmes offer the opportunity for Eastside to create a best practice case study in design of its IT and communications networks.
CHP/MUSCO	The creation of BDEC has resulted in the capacity and knowledge being available in Birmingham to bring forward CHP as a practical option for Eastside within required timescales	Options are being investigated in a feasibility study currently being undertaken.
RENEWABLE ENERGY	A number of feasibility studies testing the potential for renewable energies in Eastside were produced in 2003/4. Individual developments have investigated feasibility of renewable energy options for their sites; however, there is no 'Merton Rule' in Birmingham policy to support wider adoption of new technologies.	New planning guidance is expected in 2008, which will set out requirements for on-site renewable energy production.
DEVELOPMENT PROGRAMME	This is currently being revised due to recent market uncertainties.	
DIVERSIONS	A number of diversions have been identified.	Co-ordination has begun.
TRANSPORT	Eastside is affected by citywide difficulties over sustainable transport planning.	There is a large focus on sustainable travel within the Transportation department.
DISRUPTIONS	These have not been able to be costed at this time. Multi Utility Tunnels (MUTs) are not thought to provide a useful solution to services infrastructure for Eastside currently.	New regulation means improved co-ordination of streetworks in the future and improved sharing of digital services information.
FUNDING	Funding of large-scale services infrastructure changes has not been proposed except in areas of public investment to support the regeneration of Eastside. Mechanisms for 'bank rolling' such works in order to reduce disruptions in the future are not clearly identified for Eastside.	Case studies may provide potential solutions. Experience elsewhere in the Council can also help identify potential funding mechanism for works to improve the quality of sustainable development in Eastside.
PLANNING POLICY	There is no SPD on sustainable development for Birmingham at	The new Climate Change Strategy and proposed SPD on

	the current time which defines necessary activities and outcomes in detail. The new Climate Change Strategy for Birmingham will identify challenging CO2 emissions reductions targets for Birmingham and stress the need for climate change adaptation.	sustainable development will support more sustainable development in Eastside.
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Recommendations

A summary of recommendations is given below.

Table 2a – Recommendations for next steps and longer term actions for Eastside

	ACTION/ACTIVITY	LEAD	COMMENT
	IMMEDIATE ACTIONS		
1	Secure funding for feasibility study to investigate CHP options for Eastside and delivery funding mechanisms. Conclusion to help decision making on best CHP/MUSCO options and lead responsibility for taking the preferred scheme forward. This study will need to comment on current electricity supply and proposals for reinforcement.		Study underway – report due 31 March 2008
2	Further investigation of services diversions issues and best options for sustainable solutions to planning and management of services infrastructure		Workshop planned for 11 th April – to be run by Urban Design with reports back from this study, the CHP study and attendees to include key Eastside developments
3	Forward Developer Enquiry Request to STW for what we know about Eastside to identify any potential issues or opportunities.		Lack of definite information may limit value of this exercise but would give STW formal notification of the scale of proposed development
4	Submit Application for connection to Central Networks for additional electricity supply for Eastside to obtain accurate estimate of costs for new ring main		Planning for reinforcement of the main is based on best guesses at the present time.
5	Maintain internal BCC liaison regarding proposals to capture waste heat from Tysley. Feed information into services planning for Eastside and forward Eastside demand requirements, phasing, start dates to Tysley decision makers for their information.		ERDF investment proposed to create infrastructure needed to distribute heat. Timescales may work with 2 nd phases of Eastside

			developments. This would mean temporary heat supplies would be required for Eastside for the first development phases to come forward.
6	Undertake feasibility study into area-wide SUDS and green infrastructure strategy/plan. Co-ordinate site proposals for surface water run off attenuation and green infrastructure planning.		This approach will be undertaken in other Growth Points Areas in the city and Eastside must demonstrate the same level of planning, delivery of sustainability objectives and future proofing for the area.
7	Co-ordinate site investment into drainage network to identify any opportunities for aggregated funding to upgrade existing combined sewer network and to begin installation of rainwater harvesting network		Identify cost savings and infrastructure enhancement available through a co-ordinated approach funded by planned infrastructure investment.
8	Define new terms of reference for joint working between BCC/AWM/Eastside developers and other stakeholders to make the Eastside Developers Forum more able to demonstrate leadership and joint decision making. Consider Westside model of forum led by Argent where City Council is invited but does not facilitate.		Working groups to make decisions rather than talk about issues and opportunities.
GOING FORWARD - POLICY			
9	Confirm future policy to be adopted for Eastside with regard to built environment quality/sustainability standards in conjunction with adoption of Longbridge AAP and publication of consultation draft of SPD on Sustainable Development i.e. BREEAM Excellent and Code for Sustainable Homes 4 currently and rising to 6 by 2014 (to meet Government deadline of Code 6 by 2016). Policy to include requirement for appropriate actions to minimize resource use by end user before considering reinforcement of networks and increase in services capacity		Aligns with policy for Longbridge, Birmingham Climate Change Strategy and other significant policy drivers
10	Define infrastructure requirements required in order to facilitate delivery of most sustainable solutions. – i.e. all new development will be required to connect to district heating networks running past site boundaries.		Creation of the district heating network in advance of development will support adoption of low carbon energy

			solutions by developments.
11	Consider wider infrastructure issues such as waste, schools, health care, community etc, required to support new family focus for city centre development confirmed by Big City Plan		Respond to invitation in Big City Plan to refocus development
	GOING FORWARD - COMMUNICATIONS		
12	Development schedule for Eastside to be updated and circulated to key decision makers on a regular basis – including Dev Control, Building Regs, Streetworks,		To inform forward planning activities within different departments.
13	Develop a communication strategy and process to support direct, easily accessible and constantly updated database on current activity and proposed developments in Eastside, linked to other such investment areas across the city which includes detailed information on planning and management of services infrastructure		
	GOING FORWARD – FORWARD PLANNING		
14	Carry out further discussions with British Waterways for an area wide project proposal for use of canals in the Eastside area		
15	Following confirmation of Birmingham as 1 of 7 global cities involved in the Connected Urban Development project, invite CISCO to workshop on identification of Eastside opportunities to benefit from this project.		
	GOING FORWARD – RESOURCES TO SUPPORT SUSTAINABLE DEVELOPMENT ACTIVITY		
16	Consider potential role for carbon manager/sustainability advisor/facilitator to support information sharing, development of a database of opportunities and further definition of locally applicable guidance and best practice for Eastside – linking with other regeneration and Growth Points initiatives.		
17	Hold a Learning Alliance/Joint Fact Finding workshop to identify university research opportunities that Eastside developments could benefit from. Promote closer working relationships to develop beneficial synergies. Use existing university led research projects such as EPSRC and SWITCH projects using Eastside as a case study to help provide best practice information and invite to help with problem solving. Identify issues that could benefit from research funding to help research definition of best solutions. Work up joint bids as appropriate to help with Best Possible Options at investment stage regarding services and infrastructure.		Modern university research is required by funders to work with a number of partners. Funding can be used to help decision making as opposed to record decision making. Development proposals can be tested against theoretical models to help with assessment of quality

Table 2b – recommendations for city wide co-ordination of services infrastructure planning

In addition, support for Eastside actions would be required/enhanced by actions and activities carried out at a citywide level. These are summarized below:

1	Introduce SPD on sustainable development as soon as possible in order to support aspirations to become a low carbon city and to meet commitments to Nottingham Declaration
2	Consider level at which to set a 'Merton' rule requiring on site renewable energy production for inclusion in the sustainable development SPD.
3	Ensure climate change adaptation and local area resilience are built into emergency and forward planning
4	Establish a City Council based 'Sustainable Development Centre of Excellence' building on existing formal and informal mechanisms and systems to facilitate: sharing of best practice policy development Project Manger training induction on sustainable development standards, issues and opportunities for all new project teams at inception of project specialists networks and points of contact Learning Alliances Project 'mentor' or 'buddying' systems to support project with regard to sustainable development issues at key points in the programme – would help to focus on key issues, ensure information sharing around the city and consistent approach underpinned by understanding of best practice 'User Guides' for those occupying new, low carbon, low water developments Project manager networks Audit, monitoring, feedback and mitigation procedures Lessons learnt workshops and dissemination of case studies
5	Produce a BCC Directory for developers and project managers on specialist points of contact within the City. Indicate at what point on the development programme they should be involved.
6	Extend opportunities through Learning Alliances, hosting local Research and Consultancy summits on sustainable development issues using local specialist and experts – building capacity within the city and reducing the need to travel to national events
7	Produce a sustainable development checklist for Growth Points/Regeneration Areas including identification of dependencies and critical points within project management and decision making processes
8	Define process for early assessment of services issues and opportunities in any investment area – producing rough capacity and demand estimates to help with forward planning
9	Require services capacity study rather than services audit at earliest possible stage of development planning
10	Establish mechanism/working group for collating early services information from developers and advising individual sites on area wide issues and opportunities through Birmingham wide co-ordination
11	Liaise with new STW point of contact for RSS and LDF and support similar initiatives by other services providers
12	Build on existing Learning Alliances, such as SWITCH, EPSRC project looking at Eastside as a case study, Science City partners etc, in order to support information exchange that will allow development of best practice principles for sustainable development and support delivery of highly sustainable, low carbon communities
13	Establish a series of Learning Alliances with a focus on different sustainable

	development issues to assist with provision of data and establishment of best practice solutions – this would require resourcing of a facilitator and co-ordinator with the possibility of seeking additional resources for specific areas of work in response to needs identified
14	Ensure Big City Plan (city centre masterplan) includes full recommendations on how to deliver sustainable development through infrastructure planning and management and co-ordination of activity by all stakeholders.
15	Check on circulation list, degree of use and influence in planning workload and outreach arising from City development schedule currently prepared.
16	Produce new training leaflet identifying all current sustainability initiatives and aspirations for Birmingham so that all project managers can be fully informed about expectations for quality of new build.
17	Use existing mechanisms to help with forward planning e.g. quarterly streetworks meetings with services providers – add agenda item on identifying plans for Growth and Regeneration Areas and promote opportunities for joint working in advance of developer applications
18	Review opportunities for Building Regs and Services Infrastructure issues at Design Review Panels to identify sustainability gains
19	Develop Sustainable Procurement guide for new development occupants which promotes low resource use energy and water through purchase and installation of appropriate products
20	Develop Sustainable Procurement Club for Birmingham that achieves cost reductions for sustainable items purchased in bulk through early commitment to buy
21	Propose bi-annual workshop for developers and project managers across the city to share best practice

2 Introduction

This report provides a position statement on issues arising from utilities/services infrastructure capacity and predicted demand for Eastside. It provides recommendations on where opportunities might lie to increase the sustainability in environmental and economic terms of the development in Eastside through co-ordination of services infrastructure planning.

The data used in this report should be treated with caution. They are correct as supplied or estimated only for January 2008 and will be revised and refined as development proposals proceed. The data have been used to investigate high level issues and opportunities for services infrastructure planning and are not to be used as definitive predictions of demand.

The report also details issues of data collection, forward planning of resources and examples of what has been found through desk study of approaches taken elsewhere to facilitate area wide co-ordinated infrastructure/utilities/resource planning and management.

The report makes some 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 also seeks to set out issues and opportunities for development areas elsewhere in Birmingham so that lessons learnt from Eastside can be used to inform current spatial planning development decisions.

There have been 3 attempts over the last 9 months to gain information on predicted demand for energy for proposed developments across Eastside. There have also been 2 short overview studies on the drainage capacity of the area. In addition, there has been ongoing research into the potential value of services tunnels and water management in Eastside. This report notes the findings of each study/call for information and comments on those findings.

The facts, figures and available information have been reviewed jointly by Arup and the University of Birmingham through the resources provided by the SWITCH project. See Appendix 19.

A SWITCH report on Sustainable Urban Stormwater Management for Eastside is due in October 2009.

3 Background

Eastside has been described by Birmingham City Council as having the potential to be an exemplar of sustainable development. A number of partners and stakeholders in the regeneration of Eastside are supporting the possibility of this vision becoming real through their scheme proposals. However, there is recognition that it will be difficult to achieve the desired exemplar status for Eastside without a masterplan/adopted local development policy for Eastside. This would need to detail the approach and qualitative and quantitative standards necessary to support delivery of development which significantly exceeds (in terms of sustainability) that required by regulation and a 'business as usual' approach. Draft development standards have been piloted in Eastside. One finding was that there are likely to be a number of issues constraining delivery of sustainable developments which are largely outside the control of individual developers. These include transportation and the co-ordination of the planning and management of services and utilities infrastructure.

Current practice suggests that utility provision is largely reactive in that requests for services' connection and supply are dealt with on the basis of individual applications and that even for a large regeneration area such as Eastside, there is no significant level of forward planning by services providers. The consequence is that there may be a failure to ensure the infrastructure of the area is either of the appropriate size and quality to meet future potential demand. In addition, mechanisms to reduce unnecessary disruption to the community, through forecasting services demand and creation of sufficient capacity at an early stage are not normally available. This is seemingly due, at least in part, to financial controls that appear to preclude infrastructure providers from investing in advance of orders being placed.

It has become clear during the preparation of this report that there may be significant sustainability, economic and carbon savings through a more co-ordinated approach to development across Eastside. The current status of development of many of the larger sites in Eastside and the growing sustainability agenda together with an awareness of issues of energy and water capacity and security of supply have led to a focus on utilities supply and infrastructure. This report therefore seeks to assess and expose issues and opportunities for delivering a more sustainable and economic development in Eastside through consideration of utilities infrastructure co-ordination/planning.

A number of issues including inefficiency, disruption and cost of continuing reinforcement/upgrading of utility networks within an area have been noted over the past 50 years. Against this background, there are queries over the capacity, condition and extent of the existing utility networks within Eastside. The costs and timescales of meeting demand which has not been fully quantified and the uncertainties over timing and programming of new development give rise to the risk of lack of future-proofing for Eastside in terms of capacity, security of supply and control

of costs and disruption. Other topics which are not necessarily currently being addressed in detail include resilience: the ability of systems to survive intentional and unintentional threats and addressing such potential external threats.

This report outlines some of the knowledge that is known at this point in time for Eastside regarding predicted demand for utilities supply and the programme for connections, potential issues relating to capacity and where opportunities might lie to increase the sustainability in environmental and economic terms of the development.

The report also details issues of data collection, examples of forward planning of resources and what has been found through desk study of approaches used elsewhere to facilitate area wide co-ordinated infrastructure/utilities/resource planning and management approaches.

The report makes some 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 also seeks to set out issues and opportunities for development areas elsewhere in Birmingham so that lessons learnt from Eastside can be used to inform current spatial planning development decisions.

4 Methodology

4.1 Data Collection Strategy and Organisation

The Eastside development area studied comprises 17 development land parcels. The developments on the land parcels are at different stages of completion. In most cases, the developments are supported by Engineers and Architects. Services provision is being provided by several organisations. Severn Trent Water is largely responsible for water and waste water, although British Waterways have a potential interest here. In addition the City of Birmingham is responsible for highway drainage. The Environment Agency and BCC also have a role in regulating management of surface water drainage. Power (electricity and gas) are less centralised with a range of alternative providers. However, Transco are the major infrastructure provider for gas pipelines and Central Networks for electricity networks. Telecommunications are more varied again, with a broader range of potential infrastructure and services providers.

The primary concerns for utility provision across Eastside are (i) the capacity of the existing infrastructure; (ii) the need to modernise or expand the infrastructure; (iii) the timetable for implementation of infrastructure developments and (iv) the sustainability of the utility resource being delivered.

The primary issue for those interested in the sustainable development of Eastside is whether the approach to the planning of the development in Eastside is the most suitable approach to ensure delivery of the aspirations for sustainable development. If it is deemed that the approach is not optimal, the question then arises as to whether there are other approaches that may prove to be more effective and what would be the prospects for implementing one of these approaches at this stage in the development of Eastside.

To gain initial answers to these aspects of utility provision and the related questions, a shopping list of information was requested from the Developers and/or their Agents. See Appendices 4 and 5. Data collection has been undertaken through a programme of meetings with relevant members of the Developer's teams and/or telephone and email survey. Data have been collected as far as possible to be comparable for the evaluation phase of the study.

Where complementary data collected from prior surveys or investigations across Eastside have been undertaken, these have been included either within the formal data sets or have been combined with the data during the interpretation and evaluation of the data.

4.2 Approach to Interpretation and Analysis

The questions raised in section 2.1 have formed the basic framework for the interpretation and analysis of the data. The paucity of data in some instances has meant that only limited data interpretation has been possible. Little truly quantitative analysis has been possible: in part due to the variability of the data acquired during the collection process and, in part, due to the incompatibility of some of the data, but primarily because of the limited volume of data gathered. Thus, most of the inferences from the data are made qualitatively and are supported by application of supplementary commentaries that arose during the interview process or were provided by the contributors through written evidence or telephone conversations.

The completeness of the data sets for the different developments is a function, in part, of the stage that each development has reached, the knowledge of the particular contributors, the availability of relevant individuals from the developer teams within the short period of time agreed for the study and occasional delays with the delivery of the responses by the developers teams.

The quality of the data is variable. Information has necessarily been extrapolated or interpolated from the data where the information provided was lacking. As an example, storm water capacities for the sewer network have been estimated from given pipe diameter data rather than via direct data provision. This arises because the actual data for capacity would require model simulations by Severn Trent that lie outside the scope of the current programme of investigation.

The issues addressed in the data analysis and interpretation are summarised in Table 1 in the Executive Summary.

5 Data Collection

5.1 Overview of the data collection process

The Eastside developments considered in this report are: City Park, Curzon Park, Curzon Gateway, VTP200, Millennium Point, Multi-storey Car Park, BCU, Ventureeast, Masshouse, Martineau Galleries, City Park Gate, Warwick Bar, Typhoo Wharf, Custard Factory (Devonshire House), UB40, Aston Science Park and Aston University.

Utilities considered were electricity, gas, water supply, wastewater and communications. The main utility providers contacted for information were Central Networks (Electricity), Severn Trent Water, British Waterways (Canals), Transco (Gas), Birmingham District Energy Company (BDEC - CHP), BT (Telecoms), Virgin Media (Telecoms) and NTL (Telecoms).

Initial contact was made with most developers through an e-mail describing the nature of the project and requesting a face-to-face meeting. Subsequent communication involved telephone calls to arrange the meeting and to clarify aspects of the data. These were followed with further e-mail contacts and, where required, further meetings. The preference was to meet the stakeholders, when possible, to better inform the stakeholders of the aims of the data collection exercise and of the purpose of the report, as well as to answer any questions. The scoping information requested at meetings was then forwarded for collation electronically, where possible. Some developers or their agents provided information by e-mail without necessitating an actual meeting.

An overview (Appendix 5) of the data requested and a spreadsheet (Appendix 4) indicating the details to be completed was provided to each of the developers to ease the data collection and subsequent collation process. For each utility the main information requested included: the name of the service provider, the projected demand (peak and average including timing of peak demand), and an assessment of existing provision, the current status of the development plans and the existence and status of any utility agreements. Appendix 4 illustrates the form of the spreadsheet.

Commercially sensitive data are omitted from the reporting tables. Summary information is available within this report for examination by all parties. The raw data from which the summary tables have been derived are held on file. Requests have been made to each developer for permission to release the full data sets on each site. However, all

figures used within this report were those known or extrapolated for the period of January 2008 and should not be used again without further checking and updating.

5.2 Description of the contents of the database

The basic data collected from the questionnaires are identified in Appendix 1. The first section shows the name of the development, the name of the developer, the consulting firm and relevant contact details.

The following section shows the date of submission for planning permission (actual or expected) and a development timeline for the project. In general, data provided for this contribution to the data base were minimal.

The third section shows the electricity data. Peak energy demand and expected peak times are recorded. The times were requested in order to yield a realistic estimate of the total peak demand for Eastside, taking into account the diversity of loads. Accounting for diversity avoids the problem of over-estimation of the peak load that would arise from a simple arithmetic summation. The inclusion of data on the average demand acts as a good reference figure to yield data on typical loads and provides a useful comparison with the peak demand. Also included is an assessment by the Developer of the capacity of the current network to match the expected demand. The name of the electricity provider is presented and contact details included. The final row in the section shows a preliminary estimate of peak demand for the site prepared by Arup using available data for the site and an assessment of loads based as far as could be ascertained on the nature of the activities planned for the site. This figure is included for comparison with the data provided by the developers for peak demand. In general, few data were provided for the timings of peak demand or about the assessed capacity of the existing network to meet the peak demand.

The fourth section addresses water and waste water issues. The planned peak water supply is shown together with the average, where provided. Peak discharge estimates are shown (this includes wastewater and stormwater). Severn Trent Water is the utility responsible for both supply and wastewater to the area and contact details are provided. Where there are plans for stormwater reduction measures, the data defining these are included.

The fifth section addresses gas supply. Suppliers available for a particular development are identified and the final choice for supply is shown (with contact details). Peak and average demand are displayed (with the timing of peak demand). Information on the capacity of the existing network to meet the proposed demand is highlighted.

The next section shows the IT companies considered for provision of the communication infrastructure to the site and the final choice (with contact

details). Expected demand is shown and the capacity of the network to meet this demand is assessed. There were few data provided to complete this section. It seems to be the general consensus by the Developers and their consultants that there is already sufficient capacity within Eastside to meet future demands.

The final section deals with sustainability. Where information is available, efforts made by the developer that assist the sustainability of the development are highlighted including, where appropriate, any information on discussions between the developer and the Birmingham District Energy Company (BDEC) about the introduction of Combined Heat and Power.

Maps of the data provided by BT, Severn Trent Water (Foul only) and Transco have been produced using ArcMap and are included in Appendix 7. Other maps are provided as supplied by service providers (Central Networks and Virgin Media) but have not been incorporated into the ArcView Appendix 7 plans. A map supplied by BCC has been used as the base map.

5.3 Omissions and Issues

All Developers or their Consultants for each site were contacted on more than one occasion during the course of this three month project. There was a varying level of response.

Three sites are in the early stages of planning and so do not have significant data to contribute to the current exercise, although there was interest in assisting with future provision of the required data once they were available. Very limited responses were received from six sites, while no responses were received from three sites. A summary of the level of data provision against the stage of development is provided in Table 3.1. The Table illustrates the difficulties of obtaining data when the development stage for a site is either too early or too late in the development process.

In all cases, where it was thought that the data provided or its interpretation for inclusion in the data base needed checking, copies of the completed spreadsheet for the site were sent to the site contacts requesting verification. At the stage of submitting this report, few of these requests have elicited a response.

Information defining the layout of electricity mains in the Eastside area has been supplied but was too late to be analysed in this report. Similarly, a map of the water supply network was also not received in time to be analysed. Finally, some of the data for the communications links have not been provided.

5.4 Data infilling to complete database

Estimates of the peak and average demands for gas, electricity, water supply and wastewater for the new developments in Eastside were not provided for all sites. Therefore, some calculations were required to infill the missing values using available benchmark data. In this report, average demand values have been calculated based on the work of Hunt (2006) (Table 3.1). To estimate peak demand values for sites where no data were provided, an estimated ratio of peak to average demand was determined using those data for which the peak demand had been supplied. Although this value is approximate it has been used to infill the missing peak demand data. Peak demand values were obtained for all other sites through multiplication of the given or estimated average values by the determined peak to average ratio.

Table 3.4 below shows a summary of values provided by the developers (black) and values based on Hunt's benchmarks (red) for each site.

	Electricity (kWh/m ² /yr)	Gas (kWh/m ² /yr)	Water
Residential apartment	4521 (kWh/apartment/yr)	20111 (kWh/apartment/yr)	
Residential	68	163	125 (l/p/day)
Office	358	210	2.4 / 1.6 (l/m ² /day) (typical / best practice)
Hotel – varies according to * rating	44 (kWh/person/night)	147 (kWh/person/night)	5100 (l/m ² /year)
ALibrary	45	192	No benchmark
Supermarket	930	334	
Retail	76	74	unknown
University	43	114	

Table 3.1 Benchmark service consumption values for the 3 main utilities (adapted from Hunt, 2006).

The following sections summarise the different approaches used to complete the data sets for the different utility functions and to examine the capacity of the service networks and the potential disruption that may arise in the future.

5.4.1 Stormwater and Wastewater

The Environment Agency use a standard 1 in 30 year return period storm event (Environment Agency, 2005) as their measure of flooding potential for developments. It would normally be necessary to undertake a modelling exercise to establish the impact of the storm on the likelihood of flooding. While collection of the data for the return

period storm event is feasible, its translation into impact is beyond the scope of the current review. Therefore, to assess the capacity of the Eastside drainage network to cope with the new developments data from the rain gauge, observations made at the Winterbourne Climate Station have been used. In the 6 year period (2000-2005), rainfall data were recorded at minute intervals. During this time the peak intensity was determined to be 2.2mm/minute (or 0.037 mm/s) and took place in April 2000. The rainfall event was short. It was only a 5mm rainfall event. Nevertheless, for the current exercise, the basic calculation of the system capacity can only reasonably be based on intensity and not duration (i.e. assuming that there is no backwater reserve and that the temporal characteristics of the system are not important for a first estimate of response) and so this offers a suitable figure to use as an estimator of the risk. A reduction factor to account for the likely attenuation of the peak has been estimated based on the available data for those sites that have reported peak runoffs. Better estimators may be appropriate with the use of the computer based models currently adopted by Severn Trent Water Limited.

To assess the appropriate reduction factor to account for attenuation of the outflow from each site, the estimated peak values for runoff derived by the developers were compared with those calculated based on a 2.2mm/minute storm event. It was found that the latter give runoff rates that are on average 5 times larger. Therefore, the effective runoff rate has been estimated based on an instantaneous peak discharge equivalent to an instantaneous runoff from a precipitation event of 0.44 mm/minute. It has also been assumed that sites are 90% impermeable and that consequently 10% of runoff is infiltrated (with the exception of City Park which was assumed 40% impermeable). It is relevant to note that the peak values the developers have supplied for their sites are not presented in terms of the storm return period that has been adopted for design it is usual for the development drainage systems to be designed to a 1 in 2 year storm return period (Sewers for Adoption 6th Edition WRC Match 2006). It is therefore assumed that these are based on the highest standard currently required by the Environment Agency of no flooding for a return period of 1 in 30 years.

To account for the location of the outflow and the cumulative response through the storm sewer and combined sewer network that each site discharges to only one sewer as the point of connection (that sewer being chosen for its proximity to the site). The capacity of the network to cope with the flow is based on an assumed peak flow rate of 2 m/s and the pipe diameters (source: Severn Trent Water). The drainage network has been mapped so that certain sewers will carry flows from various sites – it is assumed that maximum flow from contributing pipes arrives simultaneously (i.e. as having the same time of concentration). There is an Environment Agency requirement to limit the flow from each site to 80% of its current unrestricted run of rate. It is also expected that an allowance for Climate Change may also be required of some 20-30%. This will add to the amount of local attenuation of outflows required at each site.

Each site is assigned a number for ease of reference (Table 3.2). For each site a point in the combined sewer system has been identified as a reasonable point of entry for all wastewater and stormwater (these are labelled A to P) (Table 3.3). In addition each point may receive flow from other sites (labelled "Contributing areas" in Table 3.3).

Site	Estimated Contributing area (m2)	Site Label
City Park	42900	1
Curzon Park	40470	2
Curzon Gateway	16200	3
VTP200		4
BCU	14164	5
Ventureast	52609	6
Masshouse	62483	7
Martineau Galleries	54997	8
City Park Gate	18939	9
Millenium Point	48562	10
Multi-storey	8462	11
Warwick Bar	18600	12
Devonshire House		13
Typhoo Wharf	37400	14
UB40	3965	15
Aston Science Park	89030	16
Aston University	0	17

Table 3.2 Site name, contributing area and reference number used for the calculation of stormwater discharges in the sewers.

At the time of calculation contributing areas for the VTP, Devonshire House and Aston University were unknown. It is expected that the omission of VTP will mean that there is an underestimation of the storm flows around Central Eastside. The flows from Aston University are mainly captured by the drainage system in the north of Eastside and will have little impact on most of the central developments. Devonshire House is assumed to have a small site area and so will have a relatively small contribution to storm flows.

To assess the capacity of the system at each point pipe, the pipe diameter data supplied by Severn Trent Water were used. For some of the pipes shown on the maps, the information was supplied as maximum and minimum possible diameters. The adoption of these two bounds thus provides a means of evaluating the potential upper and lower limits in the subsequent calculation of pipe capacity. No account of the potential loss of diameter over time has been taken into account and there is no account taken of slope (i.e. variation to the assumed velocity of the pipes at capacity has not been assessed).

Each point on the pipe network is assigned a descriptor based on its probability of overflowing - “Unlikely”, “Possible” and “Probable”. “Unlikely” means that the calculated flow is less than the minimum pipe diameter capacity. “Possible” overflows are indicated when the calculated flow is between the minimum and maximum values for the pipe capacity. The overflow is assessed as “Probable” when the flow estimate surpasses the maximum pipe diameter capacity.

Point	Contributing areas	Calculated total peak flow into pipe (m3/s)	Pipe capacity max. (m3/s)	Pipe capacity min. (m3/s)	Surcharge
A	1, 4, 6, 11	0.5	1.8	0.9	Unlikely
B	1, 2, 4, 5, 7, 8, 9, 10, 11	2.3	1.7	0.9	Probable
C	1 -12, 14, 15	2.8	5.1	5.1	Unlikely
D	4, 11	0.0	0.1	0.1	Unlikely
E	1, 4, 5, 6, 7, 8, I, 10, 11	1.9	1.7	0.9	Probable
F	6	0.4	0.6	0.6	Unlikely
G	7	0.5	0.1	0.1	Probable
H	8	0.4	0.6	0.6	Unlikely
I	8, 9	0.5	0.4	0.4	Probable
J	1, 4, 6, 10, 11	0.8	1.8	0.9	Unlikely
K	11	0.1	0.1	0.1	Unlikely
L	1,2,4,5,6,7,8,9,10,11,12,14,15	2.7	8.3	8.3	Unlikely
M	13	0.0	0.0	0.0	
N	14	0.3	0.1	0.1	Probable
O	1,2,4,5,6,7,8,9,10,11,15	2.3	1.7	0.9	Probable
P		0.7	1.8	0.9	Unlikely

Table 3.3 Calculated peak flow against estimated pipe capacity at the site discharge entry points in the sewer network assumed for the calculation of capacity. SEE PLAN 3 ATTACHED

From Table 3.2 it can be seen that there are six points that have been assigned “Probable” surcharge status. It should be noted however that points B, E and O are on the same sewer line.

It may be inferred that the adjacent sites to these locations are at risk on the basis of the current calculations. However due to the existence of a number of Combined Sewer Overflows in the Eastside network and the depths of the sewers it is unlikely that this will lead to any surface flooding. Nevertheless such spills to either the river Rea or canal network will lead to lowering water quality.

As noted above the Eastside area (in keeping with much of the rest of the city centre drainage network) is a combined system. Increasing the increase in population of the Eastside area will potentially increase the water demand and hence have a corresponding increase in wastewater which will add to the storm flows in the network. The drainage system discharges to Minworth Wastewater Treatment facility owned by Sever

Trent Water, which will increase the peak flows arriving at the works for treatment. This consideration is outside the scope of this report but will need to be considered as part of a sustainable drainage study.

5.4.2 Water supply

Some values have been provided by the developers for peak water demand. Average demand values have also been calculated based on work done by Hunt (2006). While it might be possible to transform the available data roughly to yield average and peak data for all sites, there are two problems with using the resulting information. Firstly, electronic communications from Severn Trent suggest that it will be policy for on-site storage of potable water to be required by the developments to meet future peak demand and that the supporting network of water supply pipes will be developed to cope essentially only with the mean supply demand. Secondly, there is little scope for assessing the diversity of timings of loads from individual developments on the system in the event that the on-site storage is inadequate to control the inflows to the site at the mean demand level. The basis for undertaking any calculations of the capacity of the present pipe network to meet the projected demand is therefore not available and the risk to the system remains a largely unknown quantity. It will be necessary for a study of the capacity of the current supply network (Severn Trent Water computer models) and to review this against projected future demands to ascertain if there are likely to be supply problems in the area. There are reasonable expectations (DEFRA Future Water – The Government’s water strategy for England - February 2008) that demand reduction by use of water efficiency measure will be a requirement for all new developments.

5.4.3 Gas

The European Directive 2004/67/EC concerning measures to safeguard the security of natural gas supply sets the security of gas supply in a European context. Both of the key trends it identifies are of particular significance to the UK: the growing importance of natural gas in European energy supply and the increasing dependence on non-European sources of natural gas. The Directive sets out the criteria to be met for the domestic market, which includes the need to supply 1 in 20 winter demand. UK gas demand is highly sensitive to temperatures in the winter months.

A number of developers have supplied estimated values for peak gas demand. Average demand values have also been calculated based on the results from Hunt (2006). In order to estimate peak demand values for sites where no data were provided, a mean ratio of peak to average demand was calculated and used to scale the average values to yield a predicted peak value for each site.

Average values were computed in kWh and m³/h using the following conversions:

$$1\text{kWh} = 3.6\text{MJ}$$

$$1\text{m}^3 \text{ gas releases } 38\text{-}40\text{MJ of energy.}$$

A factor of 6 has been applied to estimate peak values from averages for sites dominated by offices, apartments or university/library. Otherwise a factor of 14 has been applied. However a much more accurate peak demand would only be derived by using diversity or load factor approach.

However the total peak demand for the new developments in Eastside is estimated at 21,040 m3/hr and it will be necessary to review this against the current level of peak demand capacity.

5.4.4 Electricity

For just under half the sites, values have been provided by the developers for peak electricity demand. Where not provided, average demand values have been calculated based on the information in Hunt (2006).

Peak demand values for those sites where data were not provided were calculated in the following way. Average and peak demand values were provided for three sites. For two of these, the peak demand is 30% higher than the average and for the third site the peak demand is 400% above the average. The first two sites do not have significant areas of residential and office space, whereas the third does. So it was decided that a factor of 4 would be applied to sites similar in design to the third (which is most sites) and a factor of 1.3 would be applied to those sites without offices/residential.

Without taking into account issues of diversity (the data provided by developers were insufficient for this purpose), the total peak demand for the planned development in Eastside is estimated at 80 MVA. This is much higher than previous estimates and indicates a significant potential shortfall around the existing capacity. Diversity values will reduce this figure, but would be unlikely to reduce the figure to less than half (40 MVA) the previously determined figure derived by Arup.

There was insufficient information regarding the demands for heating, cooling and power within the total demand figures to provide analysis on the reduction in electricity demand that could be obtained from non electric heating and cooling.

5.4.5 Site usage assumptions

Where the size of a development is still unspecified, average values are assumed. For example, where hotel size is unspecified, the value assumed in this report is a 200 bed hotel with 15,000m² gross internal area (i.e. 75m² per bedroom). This is based on the area used by hotels in Masshouse (14,409m²) and City Park Gate (14,000 m²). Different * ratings will have a significant impact on the consumption of water and energy.

Where the occupancy is unstated for residential or apartments, occupancy of two is assumed. For student flats it is assumed there are five beds as an average. Residential/apartment units are assumed to have a gross internal area of 80m²/2-bed and 50m²/1-bed where the information is not provided explicitly.

A factor of 0.9 (best practice for new developments) is assumed when converting MVA to MWh where the relationship is:

$$\text{MVA} = \text{MWh} / \text{conversion factor}$$

Best estimate assumptions about site usage, where this is unclear, are included for each development in Appendix 20.

EASTSIDE	Electricity			Water Supply		Wastewater	Gas	
Plot	Peak demand / MVA	Average demand / MVA	Arup Estimate (Peak dem.)/MVA	Peak demand (l/s)	Average demand (l/s)	Peak discharge (l/s)	Peak demand (m3/hr)	Average demand (m3/hr)
1	0.6	Unknown	0.2	22.0	Unknown	50	Negligible	Negligible
2	Heating 15.5	4.1	9.0	32.5	5.8	314	1900	343
3	1.2	0.3	1.0	6.0	2.1	120	1062	76
4								
5	0.26	0.2	3.0	Unknown	Unknown	105	366	61
6	12	3.2	6.0	58.0	4.5	401	3774	270
7	13.6	3.4	9.0	Unknown	3.8	462	1927	321
8	10	2.5	11.0	Unknown	2.5	407	3851	275
9	16.4	4.1	2.0	Unknown	6.2	140	2409	402
10	1	Unknown		1.4	Unknown	360	210	35
11	Unknown	Unknown		Negligible	Negligible	63	Negligible	Negligible
12	2.6	0.6		10.0	1.0	104	300	58
13	0.6	Unknown		Unknown	Unknown	Unknown	48	Unknown
14	0.8	0.2		Unknown	1.1	277	222	37
15	0.8	0.2		Unknown	0.5	29	152	25
16	4.4	1.1		Unknown	3.0	659	2856	204
17	2	0.5		Unknown	3.5	Unknown	443	74
Total:	76.8	20.5	41	106		3491	19520	

Table 3.4 Summary of the key peak and mean load data for the Power and Water services: Electricity, Gas, Water and Waste Water.

Figures in red are estimated, based on available information on proposed site uses and floor areas.

Figures in black have been supplied by the relevant design teams.

6 Data Evaluation

6.1 The Sustainability Agenda

The Draft Eastside Design and Movement Framework 2003, sets out key principles for the redevelopment of Eastside and refers to a forthcoming Sustainability Strategy. The Draft Guidance to Sustainable Design and Construction for Eastside, together with the West Midlands Regional Sustainability Checklist and the AWM Sustainability Checklist set out approaches to achieving sustainable development of the built environment. However, issues of lack of adopted planning policy, unclear leadership roles at area level with regard to sustainable development and responsibilities for delivery still need to be clarified.

There is no master plan for Eastside. The regeneration was expected to be brought forward by the market following facilitation of the process by Birmingham City Council, AWM and with European funding support through ERDF for Objective 2 areas. The lack of a planned approach to Eastside has had the consequence that there has been early facilitation of economic development proposals for individual sites within Eastside. This included a focus on transportation issues and included delivery of a number of public sector led initiatives including the location of Millennium Point in Eastside and removal of Masshouse Circus. However, there has been no overall strategy in terms of programme/phasing of developments or prediction or provision services infrastructure in anticipation of development. There has been a need to address changing legislative requirements supporting more sustainable development, including Part L Building Regs 2006 and realization that proposals for an SPD for sustainable development for Birmingham, as well as the adoption of a Climate Change Strategy for Birmingham, will impact on development proposals. At the same time, there has been recognition that there is currently a lack of power supply capacity to Eastside and that the age, condition and capacity of other utility networks may be inadequate for the demands that development proposed will place on it.

As the sustainability agenda has come to the forefront and the business case is beginning to be made for an alternative approach to the construction and management of the built environment, information about the range of issues that need to be addressed has grown. This report gives an indication about what is known about services and utilities related issues in Eastside at the present time. It seeks to present a position statement that will allow decision makers to decide on what role they wish to take at this stage in the development of Eastside with regard to sustainable solutions for utilities provision and use in the new developments.

6.2 Heat and Power

Sustainability objectives require that all reasonable measures should be taken to reduce demand. Secondly, that more sustainable energy supplies should be secured. Once these criteria have been met, there is likely to be a need for grid supplies to be secured for Eastside.

6.3 Electricity

The existing capacity is fully committed. There is approximately 25-30MVA still available from Bordesley Primary Sub-Station that could be provided to Eastside at an estimated cost of £3.5 million. Most of this cost is associated with laying of new cables to create a new ring around the Jennens Road, Fazeley Street area of Eastside.

There is no guarantee that some or all of this supply will not be secured by others for use outside Eastside before it is secured by Eastside developments. There is an unverified report that an application for the whole of this supply has been made.

The likely demand has been calculated so far as lying between 40 and 80 MVA. Some of this load relates to cooling and heating and there may be opportunities to supply this power from new CHP or MUSCO plants in Eastside.

Nevertheless, the implications are that new sources are needed and that to ensure continuity of supply and diminish risks for the area, that multiple power supplies should be available.

A separate study has been commissioned by the Carbon Trust on the cost, risks, benefits and opportunities from the commissioning of a single CHP energy centre for Eastside, looking at a range of sites. This report will be available by the end of March 2008.

6.4 Gas

The current estimated demand for gas is 2300 m³/h average and 21000 m³/h peak. The supply capacity of the existing network is not presently known. Nor is the age and condition of the existing network. The capacity of the network to operate at the peak loads needs evaluation, but this can only be carried out by modelling of the system. Requests for such modelling would need to be passed to Transco. However, it is not known at this stage if there are plans for repairs/replacement/reinforcement to the Eastside network. A clear issue here is that the actual demand will depend heavily on any arrangements for alternative heating supplies and, therefore, without knowing the extent to which CHP will be taken up across Eastside, it is difficult to know whether gas demand will be significantly less than that identified in the present assessment. If development of CHP does go ahead, the figures quoted here may well reduce significantly.

6.5 Carbon Emissions

The Carbon Trust funded study into the risks, costs and benefits of a single CHP energy centre for Eastside includes a requirement to report back on potential carbon savings arising from different options.

Significant carbon savings will be achieved through the reduction of energy demand to run buildings in Eastside. It is useful to note that heating is not the only energy consumer to be considered in terms of Carbon savings. Some savings could come through the reduction of use of potable mains water, which requires energy input at treatment and pumping stages. It may be appropriate to explore the use of the available groundwater for non potable applications. To date, this does not appear to have been considered in this area. Reduction of treatment loads through separate storm and collection sewers could also prove to be advantageous, but are not yet being implemented as a matter of course for the whole of the Eastside area. While developers are being requested to implement separate sewers on site, off-site sewerage will largely continue to adopt combined sewers until replacement is required as these units age.

Energy savings may also be made through the adoption of ground source heat pumps. Control of the rising groundwater levels in Birmingham provides a further potential benefit of aquifer thermal energy storage (ATES) for the city. Some testing would be needed to explore the impact of groundwater contamination on the uptake of ATES. Equally, the Canal network in Birmingham has the potential to be used as a thermal source/sink for meeting some of the heating or cooling demand for the city. The design of buildings needs to be tailored to the requirements for balancing thermal energy demands over annual cycles to optimise the application of ATES, and so this option should be considered from the outset of any development planning. ATES is receiving considerable uptake in London as one clear route for reducing the carbon footprint of the city's buildings.

6.6 Water Supply, Stormwater and Waste Water

The sustainability objective is to reduce demand for supply and discharge and to separate foul and surface water. In addition, supplies and drainage networks should be future proofed through resource management.

No forward planning for water management at an area level has been carried out for Eastside. Current practices are thought to be sufficient to ensure supply for the next 10-15 years. No study has been carried out to understand how to future-proof Eastside for the duration of the proposed life of new developments.

There are some constraints on the drainage system but current practices are thought to be adequate to deal with drainage needs for the next 10-15 years.

Sewage flows are expected to rise although use of A rated appliances and low water fittings should help reduce the rate of rise. The current network is not thought to need any reinforcement at this stage.

Estimated demand and surface water run off are given in Table 3.4. Strategic forward planning by STW is currently at high level and does not deal with the detailed requirements of regeneration areas such as Eastside. Site based planning relies on reactive responses to site enquiries by developers.

6.6.1 Water Supply

Severn Trent Water has confirmed that for new developments they will generally require on site storage of potable water to reduce risks of over demand for

supply in peak periods. The cost to developers and end users of this storage has not been calculated as this would require a far more in-depth study of the current capacity of infrastructure and development of a “fully developed” demand model. However, the costs of undertaking any upgrading works in a piece-meal manner over that of an area wide planned provision would clearly be much higher than a single co-ordinated investment.

No data have been obtained to ascertain the extent to which the utility and the developers are interacting to achieve the best solution to the water supply problem. Moreover, no effort can be made at present to explore whether on site water supply and water reuse can be used to offset some of the demand, for example through grey water reuse.

Based on the current preliminary projection of water demand of 45 l/s and the adoption of on-site storage, STW suggest that they do not anticipate issues of lack of capacity to meet water demand being for the next 10-15 years. STW are indeed anticipating increasing demand for the city and are currently implementing an enhancement of the supplies delivered through the Frankley Water Treatment Works, this being a major capital expenditure.

In general something of the order of 6-7% of water demand is used for cooking or drinking the remainder (93-94%) is for non potable uses including toilet flushing, bathing, laundry use, irrigation of gardens, etc. and car washing. The emerging National Water Strategy is starting to dictate that new developments should be “Water Neutral” – which means that the water use in the area will remain the same as it was before development took place (excluding water re-use) and there are some examples of this now starting to be delivered. There is therefore a potential for a proportion of future demand in Eastside to be met from local boreholes sources, rainwater harvesting, canals and even “grey-water” reused. The scale of provision of such alternative water resources would potentially lead to some significant cost savings as well as providing a much more sustainable water provision for Eastside as a whole.

Use of non-potable water in Eastside developments would require installation of a “third” water utility pipe network along with controlled storage and treatment as appropriate.

The general condition of the water supply assets in Eastside is considered to be typical of the city as a whole although mains up-sizing and replacement works associated with the regeneration would bring about improvements to both asset condition and leakage in the area.

There are not understood to be any works planned during the current STW investment plan (AMP4 - investment programme running for five years 2005-06 to 2009-10).

The resilience of the system is not untypical of the rest of the conurbation as provision for dual feed supply in the event of mains burst or shut down will have been made.

Recently STW has established a dedicated liaison engineer/planner who's role will be to maintain a close contact with LPA's, review water Cycle Strategy Studies now being produced to inform the LDF's, particularly at growth points, so that STW can look at forward planning issues and contribute to the overall

delivery process. This role is seen to be strategic and supportive of the recently issued 25 year Strategic Direction Statement.

The situation with regard to rising groundwater and level of groundwater is such that although this is recovering at a lower rate that had been previously thought consideration of the use of borehole supplies and also groundwater heat exchange could add to the potential “mix” for more sustainable water management in Eastside.

6.6.2 Drainage

There are issues of localized surface water flooding in Eastside. For example, remedial works are currently being carried out around the Bullring due to localized flood events affecting leaseholders. In addition, parts of Eastside lie within the River Rea Flood Plain.

STW have a network of mostly combined sewers providing drainage to the area, much of this is old and will probably need to be diverted or modified within the context of the new development proposals. Both the Environment Agency and STW will require localized, on site attenuation to maintain run-off from these sites at their former use rate less 20% as an additional requirement for sustainability and climate change impact.

Drains in Eastside are generally combined although there are some surface water sewers available. There is no provision in the current and next AMP programme for any separation of the sewer network to be carried out although drainage within site boundaries will be required to be separated.

A major sewer runs at depth under the FMC building at the Warwick Bar site and under the canal this will no doubt form a constraint to development.

The general condition of the drainage assets in Eastside is probably typical of the adjoining areas of the city but will be older assets possibly nearing the end of their asset life or having recently undergone some rehabilitation to address any structural inadequacies.

A study on the potential benefits offered by green roofs in Eastside with regard to attenuation found that there are some development sites in Eastside where the existing drainage network is likely to reach capacity at very low return events and that there could be cost advantages to provision of a contribution to attenuation through installation of green roofs.

The resilience of the system is not untypical of a city centre area and with intensification of land use and changing rainfall patterns across the country there are inherent risks to drainage infrastructure to become overwhelmed during high levels of precipitation. The development need to have built-in resilience to such “flash” flooding possibilities.

The impact of the Water Framework Directive will be felt in terms of the water bodies within Eastside such as the river Rea and the canals and these will be expected to achieve good ecological status by 2015 although discussions relating to modified and heavily modified water bodies will continue. Nevertheless quality of storm water run off is and will become an issue which will

need to be addressed in Eastside where these are discharged to surface water sewers, canals or other water bodies.

6.6.3 Sewerage

The redevelopment of Eastside will result in increased discharge to sewers. STW expect discharges to increase as development occurs and will carry out modelling to test existing systems on the basis of information provided by developers when a degree of certainty around discharge rates can be calculated. Adoption of Code for Sustainable Homes and BREEAM will support use of low water appliances and fittings and should help to reduce rate of discharge to foul sewers. Site infrastructure works will be required to separate foul and stormwater drains but there are no current plans for works to the public network.

6.6.4 Sustainable Urban Drainage

There is no proposal for an area wide SUDS scheme currently. There are sustainability advantages to retention and use of water on site including the potential for supporting biodiversity habitats and amenity features. However, there are issues arising from the use of water retained in site that include: maintaining base flows in open water management systems; treatment of surface water retained in public spaces and used for publicly accessible water features; dealing with excess water; the timing, infrastructure requirements and financing of discharges of excess water to either STW or BW.

In relation to soak-aways the relatively high ground water levels may preclude much of this although use of porous pavements and landscaped areas are being considered as part of the surface water drainage strategy for the developments.

As noted above, there are also some about the capacity of the groundwater to receive excess storm water in the future. However, there is some evidence that the groundwater levels are stabilising at levels below those predicted from past modelling studies and that therefore some scope remains for enhanced recharge.

Proposals for the new city park, presented by a number of different consortia, included large water bodies. Detailed work suggested that there could be a role for water gardens and treatment of captured surface water. However, issues of discharge of excess water and the need to treat water that the public might come into contact with or inhale have not been fully investigated.

6.7 Communications Networks

6.7.1 Communications Networks

Network information received is shown in Appendix 7. There are currently no known plans for communications networks extensions. There are some constraints on how easily networks can be expanded without renewal of significant lengths of cable. Provision of spare ducting during redevelopment is a cost effective measure currently employed to reduce the risk of disruption due to network expansion.

Virgin Media has a large hub at Warwick Bar. This is part of a city wide network that serves much of Eastside including Millennium Point and Aston University.

Birmingham has just been announced as 1 of 7 global cities taking part in The "Connected Urban Development (CUD)" programme. This will give Birmingham free access to CISCO developers who will help the city develop "smart" homes and communities. The programme is part of the Clinton Initiative - a movement set up by the former US president to bring together world leaders, not for-profit organisations, charities and businesses to try to solve global problems. The city will initially focus on testing the technology in new housing developments. See Appendix 14.

Birmingham City Council is a partner in Digital Birmingham, a unique cross-sector alliance of partners including BT, Telewest, BBC, Post & Mail, BVSC (Birmingham Voluntary Service Council), the Chamber of Commerce and Birmingham City Council.

The aim is to embed and enable digital technology to contribute to the social, economic and environmental regeneration of the City through a series of pioneering projects and events. A small council project team is working with organisations and initiatives across the city to brand and promote digital developments.

Both Digital Birmingham and the Connected Urban Development programme offer the opportunity for Eastside to maximize benefits of the most modern communications initiatives planned for Birmingham.

6.8 Transport

There is substantial and on-going work by the City Council at a city level regarding traffic management, provision of sustainable transport options, investment in cycleways and definition of funding bids to help with future sustainable travel planning and management. The current proposals for highways, transportation and sustainable transport infrastructure works can be seen at <http://www.westmidlandsltp.gov.uk>. There has also been significant resource invested in investigating highways issues for Eastside. This report has therefore not addressed transport issues specifically. However, thought needs to be given, at this stage, to the location and provision of new fuelling points (electric car charging points, biofuels and LPG) as well as to transport nodes with interchanges from vehicular to pedestrian and cycle routes and facilitation of the use of public transport. This will require further investigation.

6.9 The Canals – British Waterways

As the Eastside is well connected to the Canal network, there is clear merit in addressing the extent to which the waterways can help to meet sustainability objectives for Eastside.

Discussions with British Waterways (BW) have identified the following options and issues.

BW is involved in a number of regeneration projects and sustainable developments.

Currently, the Nottingham Incinerator burns household waste and generates almost 20MW of thermal energy for heating 1000 local homes in addition to commercial developments. Canal water is used for the heat transmission through the district heating pipes. (<http://www.wrg.co.uk/eastcroft/>).

The Mailbox, Birmingham uses the canal as a heat sink to cool the building.

There are a number of Implications of using the canal as a resource

6.9.1 For cooling/heating, there are a number of environmental criteria that must be observed:

The EA state that the water in the canals cannot reach 28°C at the extent of the mixing zone or 3°C warmer than the receiving watercourse's ambient temperature. The lowest value must be taken for design purposes.

Generally, in London, the water in a canal can reach 21.8°C in summer and 8°C in winter. Even if the surface is frozen, the deeper water is still about 8°C. The water being discharged must be at least 8°C but no warmer than 24.8°C.

Well designed systems can cool the building by more than 3°C but this only result in the discharging water being 3°C warmer than the ambient canal temperature.

The discharging water cannot be introduced into the canal at velocities greater than 0.3m/s to avoid disruption to the narrow boats.

By feeding the discharging water through pipes in the ground, the water can be significantly cooled. The water can be cooled by 5-6°C through 100m of buried pipeline before discharge to the canal.

Passing the discharge through a water feature such as a fountain before the canal can also be beneficial. This enhances the area but also reoxygenates the water and allows it to become a spawning ground. Water wheels can also be incorporated whereby power can be generated for street lighting, for example.

BW have no examples of canal water being used to heat a development, however, the Barbara Hepworth Art Gallery, Wakefield has been designed to incorporate heating using canal water. The designer is Whitby Bird. The building has been fully designed and planned but is awaiting construction.

To use the canal effectively, it is useful to have the development within 50m of the canal and it would work well if there is a large head difference (i.e. a lock) to allow for gravity piping. Having the development in close proximity also reduces land cost and energy costs. The volume of water being abstracted not usually an issue unless it is being discharged into a different pound or separate watercourse.

Cables can be laid along the towpaths of the canal but cables and pipelines are not laid in the canal bed. The towpaths can be widened over short lengths, but this is unusual and is at the expense of the developer.

It is also important to keep the canal water system separate from any mains or other water systems to avoid contamination. There must be a maintenance team to clean the screens to avoid blockages and to remove any molluscs or mussels which tend to grow in the heat exchanger systems. Reversible systems which pump water backwards through the system for say, 20 minutes per day, can help to eliminate debris and any fauna which has entered the system.

6.9.2 Transportation:

Canals work well to bring in construction materials or remove debris, but are not so good for food transportation, for example. Biomass can be transported on the canal, but there would need to be allowances for storage when the canal is being maintained or if there is a problem with the boats.

Carrying biomass (willow or hazel compressed into bales) on the canal would be advantageous compared to road transportation due to congestion and carbon issues.

A barge on this stretch of canal can carry 30-40 tonnes. The Grand Union canal is a Broad Canal whose locks are approximately 15ft by 70 ft and can fit two boats. New canals can sometimes be introduced into a development which can improve capacity for heating/cooling and water resources and also the environment. Canals are generally slow moving, between 0-5Ml/day.

6.9.3 Water usage:

Raw/process water abstraction from a canal is difficult to achieve due to regulations as currently, there has to be back-up water provision from a water company, meaning two sets of infrastructure have to be installed. However, canal water would be suitable for purely flush water.

There is potential to get water from Edgbaston Reservoir through the canal network.

6.9.4 Storm water:

BW does not want to increase their flood risk by accepting storm water discharge from sites. Sometimes they will accept it if the developer will fund BW to carry out analysis of the flood mitigation measures and assess the problem downstream. EA approval would also be required.

If storm water is discharged to a canal there would need to be oil receptors and possibly settlement tanks for removal of suspended solids. These must be maintained by the developer. Salinity of the water is not usually an issue but urea can be.

Power generation:

This generally does not work well on canals as 2m of head difference is required in addition to a consistent mass flow rate.

6.10 Multi Utility Tunnels

Multi Utility Tunnels (MUTs) have been recommended for areas where complete new services infrastructure are required. Even in these areas there are requirements to keep a number of services separated either through the construction of separate pipe runs or through compartmentalized MUTs both for safety/operational reasons and in case of damage to services by third parties working on their own services. MUTs are used within estates where single management systems take responsibility for all services.

An opportunity for a MUT might have been taken when Jennens road was upgraded in preparation for the metro a few years ago.

6.11 Timetables and Disruption

It is clear from discussions with the utility providers, that investment in Eastside will only follow commitments from the developers for the supply of the service. Thus, the assessment of the need for upgrading of the utility conduits may not be made for some sites until a significant part of the development is complete. There is a strong likelihood that there will be disruption throughout the early part of the development life of the regeneration programme (up to 15 years from now).

Equally, it is clear that existing infrastructure will not be replaced under current plans until the age of state of repair of the pipework requires an upgrade. This creates a further long term potential for disruption of the area.

While the timetable for disruption is not known, it would be worth all developers and the utility suppliers collectively reviewing this issue to explore whether there is any benefit for the development of concerted action to minimise future disruption.

The new Traffic Management Act requires all utilities to share digital information by June 2008 and Birmingham City Council is currently reviewing its procedures for co-ordinating and managing streetworks. This is primarily driven by the need to reduce disruption to traffic movement but procedures for quarterly meetings between all service providers and longer term forward planning by working more closely with developers could also help reduce costs and improve sustainability.

6.12 Current Decision-making Patterns Regarding Services Infrastructure

Services planning is generally occurring on a 'business as usual basis' with one to one negotiations taking place between development teams and regulators and service providers. This approach is not necessarily supported by clear and up to date information about what is going on elsewhere in Eastside or Birmingham that might impact on the nature of decisions taken by any development team for their site.

There have been some attempts to reach a co-ordinated response to energy and water issues through workshops held at the Eastside Developers' Forum in 2007. See Appendix 15. However, no final course of action was reached at these meetings and sites have been pursuing individual enquiries to services providers. There is no common repository for the outcomes of such discussions and therefore no opportunity to build up a picture of issues and opportunities for Eastside arising out of day to day services planning activities at site level.

Investigation of opportunities for forward planning and co-ordination of decision making and investment with regard to services infrastructure in Eastside was carried out as part of this study. It is recommended that a centralized repository of information is held for use by all Eastside stakeholders. In addition, changing regulation regarding streetworks could help support a forward planning process. Discussions with services providers and BCC officers are detailed in Appendix 6. Further work is needed to fully map the current status of discussions between Eastside developments and service providers. Some information is considered commercially sensitive at the current time.

6.13 Critical Pathway for Decision making with Regard to Co-ordinated Services Infrastructure Planning and Sustainable Development Opportunities

Due to the confidentiality issues associated with bringing forward development and the current impacts of a slowing market, it has been difficult to complete the proposed critical dates table.

In order to assess opportunities to manage services infrastructure planning at an area level for Eastside, the following need to be mapped:

- Dates for making planning applications
- Dates for making applications for connection
- Start of construction dates
- Power on dates
- Known timescales for procurement of services
- Programmes for asset management works by services providers

6.14 Limitations to the analysis

There are significant limitations to the current analysis due to the nature of information available at this point in time. The data set that has been used to address issues of capacity is restricted by the level of detail that has been possible and by the requirement to infill a large proportion of the data using estimates of demand and approximate rules for translation of average to peak loads. Nevertheless, the report does provide some indications of the extent to which it may be possible to re-evaluate some of the sustainability options that could be employed throughout the development.

7 Discussion and Options

7.1 Communications strategies

Inclusive processes that bring people together to solve problems collaboratively are increasingly being seen as the best way to link practical and theoretical approaches in many situations where environmental problems are being addressed. Current processes (for example “Joint Fact Finding”, “Learning Alliances”) are evolving to solve issues that are essentially “Wicked” (i.e. we may not understand all the outcomes no matter how much effort we place on forward planning). Such approaches may depend on social as well as technical factors and there are many situations where collaboration can yield better environmental results than might be achieved by individuals or groups alone. The issue of sustainable development in Eastside falls into this category of activity. Designing an appropriate process that will ensure a strong outcome focussed on the objective, in this case sustainable development centred on utility provision, is therefore important. Indeed, process design is now seen as central to the success or failure of any collaborative effort.

A major goal in any collaborative effort must be development of the required communication strategies, notably centred on information management and sharing. Information exchange among the Developers, the City Council and the Utilities, provides a mechanism to yield opportunities for minimising the overall costs of the Eastside development as a whole. There are a range of communications strategies that can be considered that might be appropriate. The current Developers’ Forum offers one option. The current debate on the future of the Forum allows for a review of the potential future role of the group in collaborating on problem solving at an area wide scale. There is currently no evidence of a continuous information record being made of the needs of the individual developments and the timetable on which the services will be brought on-line. While it is possible to obtain some of the required information from the submissions for planning that are made to the City Council, there is little clear incentive to use these plans as a basis for inter-development discussions and to

merge effort and expenditure where this is appropriate. Some effort has been made to bring Utility companies to meet the forum and to discuss the options that are available. A recent example of this is the Utilicom presentation of the opportunities for combined heat and power plants that can reduce carbon emissions for the development. Thus, while co-ordinated efforts to expose the Developers' Forum to a wide range of options for utility provision could prove beneficial, it is unclear that the present format for the Forum will be able to provide the support necessary to drive such initiatives through to a conclusion.

Therefore as an extension to the Forum, a second but related option is the creation and funding of the role of a facilitator, with the clear role to identify opportunities for cost and carbon savings through collaboration and sound sustainability principles. The facilitator would be required to establish an ongoing database of opportunities and needs and would bring these opportunities to the notice of the Developers through bilateral communications as well as through the Forum. The funding of the role would be from the network of developers and could be housed in the Council Offices. Maintenance of open records of the activities that have multi-development interest would be an important component of this communication strategy. Developers would need to have direct access to the records and would need to be encouraged to revise and update these on a regular basis. The need for such a role has been identified by other regeneration/development areas across the City.

An alternative option is to transfer discussions of sustainable development in Eastside to a separate forum that could provide the necessary interface between the developers and the utility companies. The SWITCH Learning Alliance (LA) provides a basic model for such a Forum. While the current SWITCH LA is focussed on the development of a long-term integrated urban water management strategy for Birmingham, the form of the LA is such that it could expand to embrace a wider remit that includes the broader vision of utility provision. Alternatively, a new LA could be developed that is essentially only concerned with Utility provision. This could form part of an enhanced process for delivering the requirements of the new Traffic Management Act to co-ordinate streetworks at one level. It could also be the vehicle for identification of options to deliver the aspirations for sustainability identified for Eastside and for other Growth Points and Eco-Centre areas of Birmingham. The focus of the new LA might sensibly start with the Eastside development but could expand to include other new developments across the city or indeed the whole of the regeneration plans of the city and its environs. The benefits of employing a Learning Alliance approach to communications lies in the horizontal platform that it provides for linking stakeholders, developers, the Utility companies and the regulatory organisations, such that a partnership is forged for action. Learning Alliances are required to maintain records of all activities in order to learn about the processes that are effective but also to support future decisions. Thus, a Learning Alliance provides an appropriate platform to assist both the provision of data and the establishment of best practice solutions to complex problems involving multiple stakeholders. A Learning Alliance does require a facilitator to be employed as well as a coordinator. These may be the same individual or the same organisation.

7.2 Proactive versus Reactive Utility Provision

One aspect of the Eastside development planning that has become abundantly clear from the current data collection exercise is that there is little proactive planning by the Utility companies in support of the Eastside Development. Rather,

there appears to be an assumption that all requests for utility provision should be treated on a case by case basis. This is not to suggest that no forward planning is being carried out, but that the forward planning concentrates on the overall demand for resources rather than on the specific needs of a new development such as Eastside. A reactive provision approach might be regarded as perfectly satisfactory where the model for utility provision is fixed. However, to achieve a sustainability agenda such an approach must be regarded as unsatisfactory. There are few processes by which such an approach can offer significant sustainability advantages.

A new development is the appointment by STW of a single point of contact for LDF and RSS issues across the Region. This should allow development of a stronger forward planning approach to the Growth Points areas.

7.3 Managing Utility Data to support Sustainability Decisions

The present data collection has shown that an integrated understanding of the demands for different utility services provides a much better overall assessment of the potentials for carbon savings and improved sustainability of the Eastside development. There is, therefore, a very strong case to be made for the City Council to champion the acquisition of such data and to channel efforts by the developers into clearly identifiable options for enhancing sustainability of each development as well as the sustainability of the whole site.

There are substantial confidentiality issues that will need to be overcome due to the need for multi-agency/multi investor collaboration. However, with appropriate good will such issues can be overcome. This is principally the case where only gross figures are needed to understand the potential benefits of joint action. It is also the case that, in the end, all developers will need to establish a means to meet their demands. Openness will ensure that the success of the regeneration is not achieved through confrontational competition but through beneficial competition managed within an agreed framework of knowledge sharing.

7.4 Ensuring a Sustainability Agenda

Communications among the stakeholders are essential if the sustainability agenda is to be met. Efforts to develop a master plan at an appropriate point in the processes of developing any new regeneration site will assist the realisation of the opportunities and cost benefits of sustainable options. Leadership by the City Council that addresses the concerns of the stakeholders through processes such as joint fact finding or the establishment of a Learning Alliance approach is likely to be the most productive route for exploring options for future sustainability. Equally, as many sustainable options are untried, efforts will be needed to explore the extent to which research can minimise the risks inherent in adopting new methods that have not been refined through extensive prior application.

7.5 Setting Resource Demand Benchmarks

A major issue in resource management is to reduce demand. This can be partly addressed through design of the built environment. However, end user understanding and behavioural change is a huge issue. Electricity demand is currently rising faster than the provision of renewable energy sources. As part of the recommended actions for Eastside, there should be a focus on end user awareness raising and education with the necessary support and monitoring. This is a function that needs to be co-ordinated and sustained.

There is also resource issues associated with ongoing streetworks including costs of mobilisation of contractors, cost of landfill of spoil and of new fill materials, road congestion.

In conjunction, it would be useful to set demand benchmarks against which use could be measured.

8 Summary and Concluding Remarks

The issues and opportunities identified are summarized in Tables 1, 2a and 2b, set out in the Executive Summary at the front of this report.

8.1 Conclusions and recommendations

There is a wide range in quality and quantity of information relating to existing services capacity and predicted demand in Eastside. Plans are attached which give the latest information from a number of utilities/service providers and some of this information has been overlaid on a single ArcView Plan. The variation in predicted demand as gathered by 3 different approaches confirms that it is not possible at this time to provide any certainty over services demand. The predicted demand varies between studies by a factor of 3; however, all exceed current existing spare capacity of 25 MVA. There are identified issues relating to electricity supply capacity, drainage capacity in some areas and queries over water and gas supply capacity in the future.

The study confirms that a continuing and enduring co-ordination and facilitation role is required if sustainable development is to be achieved in Eastside and that more use would need to be made of masterplanning and capital financing models to support sustainable infrastructure provision and management.

There is a developing understanding of the need to co-ordinate and manage infrastructure demand and renewal across Birmingham and there are a number of key stakeholders and nominated posts that could help facilitate this process in the future.

8.1.1 Energy

There is not sufficient electricity supply to meet current predicted demand in Eastside and there is some doubt about whether the existing additional capacity currently available from Bordesley Primary Substation will be adequate even if secured. The condition and capacity of the gas network is currently unknown. There is a large query about the potential level of demand for heating, cooling and power for Eastside. The difficulty in ascertaining the degree of demand with any certainty is underlined by current concerns about the economy and the nature of the development mix that will occur in Eastside. A study into the role of CHP in meeting demand for heating, cooling and some power currently commissioned by the Carbon Trust will report back by the end of March 2008. This study may provide further information for decision makers.

8.1.2 Stormwater and Drainage

STW currently generally require developments to provide on site buffer storage for potable water to supply peak demands. There is no detailed breakdown on the requirement for buffering for Eastside.

Two preliminary studies have found that there may be localised constraints on the drainage networks.

8.1.3 Communications Networks

Information has been obtained from 3 service providers regarding networks. It has not been possible to forecast the level of any further extension to these networks at this stage.

8.1.4 Diversions

There may be a number of locations where services diversions will be required – diversions are already planned to accommodate the proposed new park, VTP200 and the multi storey car park.

8.1.5 Programming and phasing

There is not enough information available to predict the impact of development programming and phasing on infrastructure capacity and reinforcement.

8.1.6 Transport

There is substantial and on-going work by the City Council at a city level regarding traffic management, provision of sustainable transport options, investment in cycleways and definition of funding bids to help with future sustainable travel planning and management. This report has therefore not addressed transport issues specifically. However, thought needs to be given, at this stage, to the location and provision of facilities and infrastructure to support sustainable travel initiatives.

8.1.7 Canals

Canals can be used for heat exchange, water supply and discharge, transportation of energy and goods but a number of constraints apply to such uses. No detailed plan has been produced for use of canals to support sustainable development in Eastside. The presence of the canal close to a number of development sites in Eastside gives the opportunity to explore sustainability gains.

8.1.8 Current Decision-making Patterns Regarding Services Infrastructure

Services planning is generally occurring on a 'business as usual basis' with one to one negotiations taking place between development teams and regulators and service providers. This approach is not necessarily supported by clear and up to date information about what is going on elsewhere in Eastside or Birmingham that might impact on the nature of decisions taken by any development team for their site.

There is no common repository for the outcomes of such discussions and therefore no opportunity to build up a picture of issues and opportunities for Eastside arising out of day to day services planning activities at site level.

8.1.9 What is happening elsewhere

A quick survey of practice across the city confirms that co-ordination of infrastructure planning and management is regarded as an issue in a number of redevelopment areas including Longbridge and the Growth Points areas generally. At this time there is no model approach to addressing this issue.

Redevelopment elsewhere across the country offers some models of public sector leadership in facilitating advance investment in infrastructure with mechanisms for future payback by the private sector.

The new Community Infrastructure Levy offers a mechanism for managing infrastructure of kinds, including services and utilities, and has been used to influence the approach to development in Longbridge.

8.2 Summary of conclusions and recommendations

Table 1 – Conclusions drawn from the study - see the Executive Summary)

Table 2a– Recommended actions for services infrastructure planning and management for Eastside – see the Executive Summary

Table 2b- Recommended actions for services infrastructure planning and management for Birmingham – see the Executive Summary

Appendix A

**Feasibility studies
proposals – co-
ordination of services
infrastructure**

Appendix B

**Preliminary assessment
of CHP options –
December 2007**

Appendix C

**Brief for scoping
report/position
statement**

Appendix D

Data request form

Appendix E

**Copy of request for
information from
developers**

Appendix F

**Notes of
communications for
current study**

Appendix G

**Services networks
plans**

Appendix H

**Birmingham Eastside
Sustainability Research
Project Reports**

Appendix I

**Arup – energy demand
estimates - September
2007**

Appendix J

**CHP feasibility study
brief – February 2008**

Appendix K

Eastside Plan

Appendix L

**Sustainable Eastside
feasibility studies
schedule**

Appendix M

**Eastside Drainage
Study – Hyder
Consulting - 2007**

Appendix N

**Connected Urban
Development
Programme -
Birmingham**

Appendix O

**Eastside Developers
Forum Minutes May,
June, Dec 2007
regarding strategic
planning for water,
energy and CHP**

Appendix P

**Case studies regarding
area-wide infrastructure
investment**

Appendix Q

**Information regarding
streetworks and
research projects into
co-ordination of
underground services**

Appendix R

**Summary of Eastside
Planning Applications**

Appendix S

**SWITCH – Learning
Alliance**

Appendix T

Site usage assumptions

Filename: Eastside Utilities Report Final April 2008 SWITCH format
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