



SEVERN ROAD RESOURCE RECOVERY CENTRE

APPENDIX 14.2 HEAT PLAN

Viridor

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solutions for today's environment

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1.0 INTRODUCTION

1.1 Background

The proposed RRC is designed to contribute to the residual municipal waste disposal needs of the West of England, together with the industrial, commercial and other residual waste streams available in the area.

The West of England suffers from a shortage of facilities for dealing with residual waste. Residual waste is the waste which is not, or cannot be re-used recycled or composted. Until now it has been sent to landfill sites elsewhere in the country. This clearly is a waste of resources and subsequently damaging to the environment in a number of ways which do not reciprocate the government's vision of sustainability. It is also an increasingly expensive method as European laws will soon impose heavy fines on councils who send too much biodegradable waste to landfill. By 2020 there will be in the region of 800,000 tonnes of waste produced in the West of England every year which will need to be dealt with through recovery facilities.

The 4 Unitary Authorities of Bath and North East Somerset, Bristol, North Somerset and South Gloucestershire are currently preparing a Development Plan Document detailing the planning strategy for managing waste within the West of England and identifying where the large scale waste management facilities required by the strategy should be located. The latest consultation document, -the Preferred Options document has identified three different options for meeting the future waste management requirements for the West of England.

- Option A: Two recovery facilities which will each handle 400,000 tonnes annually;
- Option B: Eight recovery facilities each handling 100,000 tonnes annually; and
- Option C: A combination of different scale facilities suiting the density of the surrounding area.

Option C (the combination of small, medium and large scale facilities) is the preferred option of the West of England Partnership. It is proposed that the large scale facility identified by this Option will be located in Avonmouth. The document also identifies specific sites that are considered suitable sites for these strategic waste management facilities. The Sevalco site subject to this Heat Plan is identified as one of the sites considered suitable for this strategic waste management facility.

1.2 Energy from Waste Process

The energy from waste process involves the combustion of residual waste, which has been sorted to remove those parts which can be recycled and composted. The residual waste is fed into a specifically designed moving grate over which the material passes as it is burning at a temperature in excess of 850° Celsius. This high temperature and close air control via the grate system ensures complete combustion and the minimum amounts of pollutants are created. The heat generated by this combustion is then used to heat water within a water tube boiler to produce high pressure steam, which is then fed through turbines to generate electricity, much as in conventional electricity generation. The flue gases from the combustion are then scrubbed using technologically advanced scrubbing mechanisms and reagents such that pollutant levels entering the atmosphere are minimised and well within the prescribed limits of the Waste Incineration Directive.

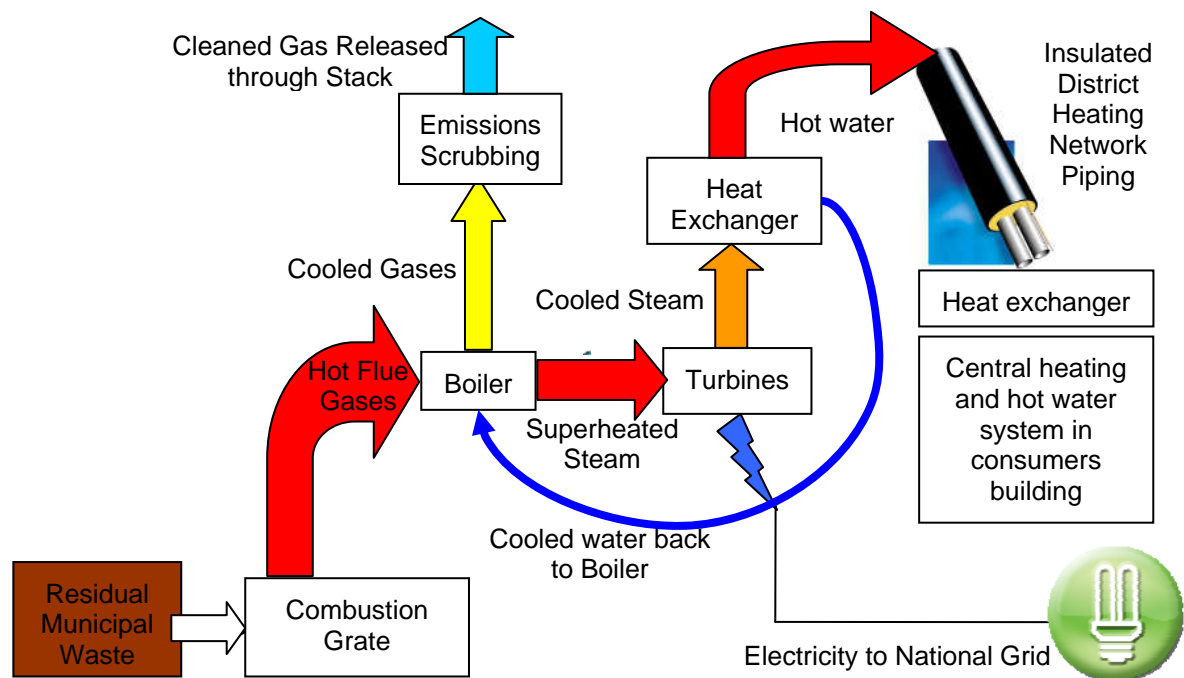
HEAT PLAN

APPENDIX 14.2

Superheated steam is supplied to the turbine which drives the electricity generator. The steam gradually reduces in pressure and can then be passed out from the latter stages of the turbine and used to heat a local water network i.e. Combined Heat and Power (CHP).

The CHP facility is able to provide heat to a local heating network, by transferring it through a heat exchanger and piped via insulated piping to nearby heat consumers. In this particular case, potentially to a combination of residential, leisure and commercial/industrial users. The co-generation of heat and power in a single facility represents a huge efficiency gain over a conventional power station as the heat that would normally be wasted in a power plant's cooling towers is put to beneficial use instead, reducing the primary fuel use of the heat consumers. An overview of the process is shown below in figure 1-1.

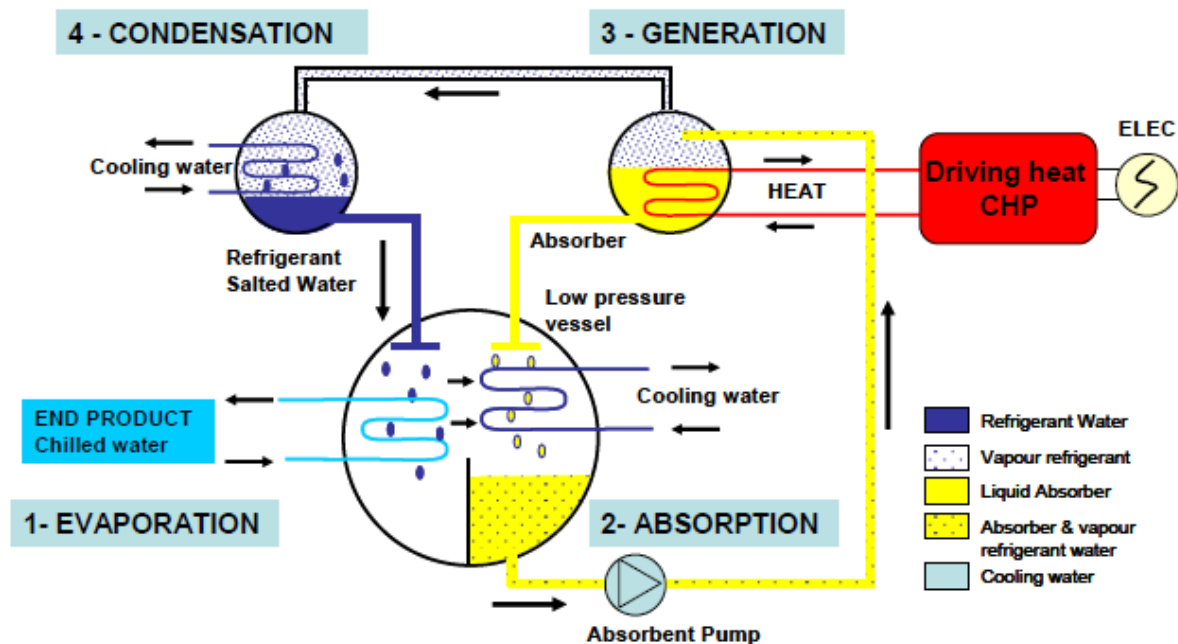
Figure 1-1 - CHP Process Overview



1.3 Tri-generation

Combined heat and power (sometimes referred to as co-generation) can be allied with other equipment to produce a third utility in the form of chilled water. This is achieved by the incorporation of absorption coolers into the CHP process. This chilled water is commonly used to cool buildings. A schematic of the absorption process is shown in figure 1-2 below.

Figure 1-2 – Heat Fired Absorption Cooling



The process works by the absorption of the heated water, which is at very low pressure, and so boils at very low temperature. This boiling causes refrigerant in the system to absorb heat from the medium being cooled, lowering the temperature of the water and producing chilled water.

Tri-generation systems are usually markedly more efficient than normal CHP systems since more of the heat that would otherwise be lost is utilised in the absorption chillers. This is of particular benefit during the summer months as the heat that is not required during this time would be dissipated through the heat exchangers in a CHP system, effectively going to waste, whereas in tri-generation the heat is efficiently utilised for users cooling demands.

1.4 Energy Recovery

The harnessing of the surplus heat from the electricity generation through Combined Heat and Power generation (CHP) is a much more efficient use of the fuel source than electricity only generation: surplus heat is not wasted as in conventional power generation, it is used where heat would have otherwise been generated using other fuels.

The exploitation of surplus heat from the electricity generation process can increase the overall energy efficiency of an energy from waste facility significantly, from approximately 22-26% to as much as 85% for combined heat and power generation¹, representing a significant environmental benefit. This use of surplus heat to provide heating for nearby premises through a district heating scheme therefore has the effect of significantly reducing the consumption of primary energy sources by the final user, thus representing potential significant benefit to the environment, as well as protection for consumers from rising fossil fuel prices and removal of vulnerable consumers from fuel poverty.

¹ Energy from Waste: A Good Practice Guide. CIWM, November 2003

1.5 Existing EfW CHP Schemes

There are a number of schemes in operation both in the UK and in Europe where residual waste or waste derived products used to generate combined heat and power successfully. These are outlined below:

1.5.1 Schemes in England

The Sheffield District Energy Scheme (DES) provides approximately 140 of Sheffield's landmark buildings with hot water for heating via a network of 44km of underground pipes as well as supplying electricity to the national grid. The EfW facility accepts 225,000 tonnes of waste per annum and produces up to 60MW of thermal energy and up to 19MW of electrical energy. The district heating network from this facility sells around 125 Million kWhours of thermal energy per annum to the surrounding heat users and is estimated to achieve savings of CO₂ emissions of around 45% compared to conventional gas heating.

The scheme, established in 1988, is the largest of its type within the UK and is still expanding. This scheme perhaps provides an example of what is possible for a scheme such as the SRRRC to achieve, or even surpass, as firstly the proposed facility will be able to install the pipe work system as a new network as compared to the Sheffield DES, which installed the network as a retro-fit to an existing facility and secondly, has a larger waste input capacity and therefore the potential for even larger scale heat generation and distribution.

Viridor has been operating the clinical waste incinerator at Derriford Hospital in Plymouth for 5 years. The facility utilises heat generated from the thermal treatment of clinical, confidential and some hazardous wastes to generate heat and hot water for use in the adjacent hospital, effectively reducing its fuel requirements.

Nottingham District Heating Scheme (DHS) was established in 1973 and currently provides heat and power to 4,800 homes, schools, shops, residential care homes, university buildings, hotels, leisure centres and swimming pools. The facility accepts approximately 145,000 tonnes of waste per annum and produces 15MW of thermal and electrical energy combined.

Cyclerval's plant near Grimsby produces around 3MW of heat and 3MW of electrical energy using 60,000 tonnes of waste per annum as fuel. The heat from the plant is fed directly to the adjacent Synthomer latex factory.

Coventry EfW plant accepts approximately 200,000 tonnes of waste per annum and produces 11MW of energy, of which the heat is exported to the surrounding factories, with surplus electricity being exported to the national grid.

1.5.2 European Schemes

Many countries in Europe currently employ a much larger number of EfW facilities than the UK, with countries such as Denmark, Switzerland, the Netherlands, Sweden, France and Germany generating significant amounts of energy from waste and heating significant numbers of buildings through district heating schemes. For Example, District Heating Schemes in Denmark provide heat for around 1.5 million homes², around 60% of the domestic heat requirement, with half of this coming from energy from waste, unlike in the UK, where this kind of application is yet to find widespread use. This is illustrated below:

² Danish District Heating Association

Figure 1-3
Percentage of Waste Treated in EfW Facilities by Country³

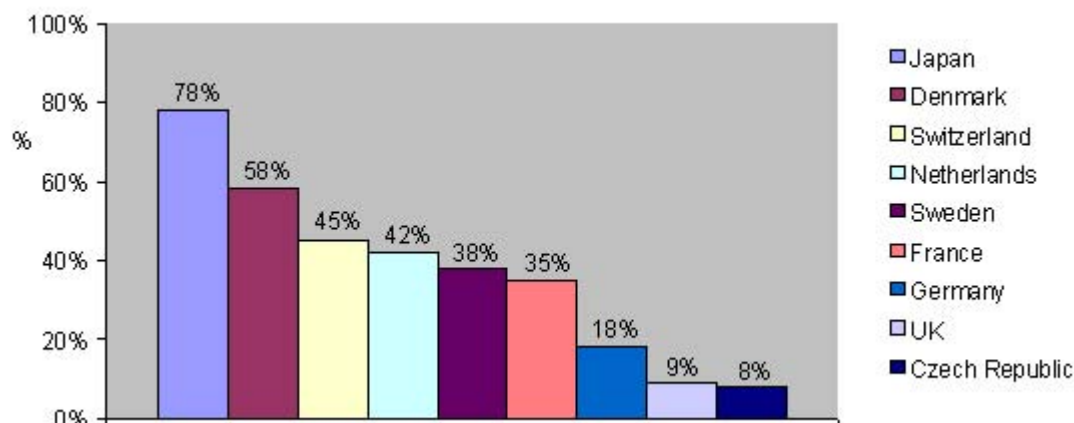


Table 1
District Heating Usage across Europe in 2003⁴

EU Country	Percentage of Heat Market Provided by District Heating
Iceland	95
Estonia	52
Poland	52
Denmark	51
Sweden	50
Slovakia	40
Finland	49
Hungary	16
Austria	12.5
Germany	12
Netherlands	3
United Kingdom	1

As can be seen from the table above, District heating and CHP use is limited in the UK. The number of EfW facilities incorporating CHP in the UK is also limited. There are 15 operational energy from waste facilities in the UK, of which only 3 (Nottingham, Sheffield and Coventry) generate CHP, and one (Lerwick⁵) generates heat alone. The European model of generating large amounts of EfW for district heating is often cited in UK planning guidance (section **Error! Reference source not found.**, above) as an example that the UK should be looking to move towards.

³ Environmental Services Association

⁴ Sabine Fröning, Euroheat & Power

⁵ Environmental Services Association

2.0 SEARCH METHODOLOGY

2.1 Specific Issues for CHP at the Severn Road Resource Recovery Centre

The application site at Avonmouth is ideally located for the integration of a CHP system, as it is sited close to many buildings of considerable size which could feasibly be linked by a district heating system. Avonmouth has attracted a number of industries and a large amount of commercial activity, as well as several large chemical manufacturing plants and a gas fired power station. There is also a significant residential area in Avonmouth between the industrialised zone and the M5 motorway.

The development of a metropolitan heating network for Avonmouth could represent a major advance in renewable energy generation to achieve the carbon emissions savings and assisting reaching the EU target of 20% of all energy from renewable sources by 2020⁶.

2.2 Potential Power Output

The Severn Road EfW facility will produce circa 30 Mega Watts of electrical energy, or 235 Million kWh per year based on an input of up to 350,000 tonnes of residual waste per annum, which would be exported to the National Grid.

The heat from the facility has the potential to be piped in a heat main to various end users, who would take heat from the main via heat exchangers, with meters such that heat use by each user can be measured. The heat in the heating network would be set at a relatively high temperature of 80-125° Celsius, from which the user would extract as much as necessary to satisfy their personal demand. No water is removed from the heat main, only the heat extracted from it.

2.3 Scheme Feasibility

2.3.1 General Principles

The feasibility of a CHP scheme relies on a consistent market for the heat supplied by the plant. In order to determine the existing potential market for heat in the Avonmouth area, a baseline assessment was carried out which involved looking at facilities in the local area such as industry, hospitals, schools, local authority housing and large commercial premises, all of which could provide an essential base load for the proposed CHP scheme. The possible heat demand accrued by these customers was then considered.

The study was carried out with five key considerations taken into account:

- potential heat users
- retrofitting
- feasibility of obtaining planning for connection
- potential cost
- disruption

The outputs which were considered most viable were those situated within close proximity to the site, and which used fairly large amounts of heat, preferably with 24 hour demand. These types of user are deemed to be more economically viable as the cost of pipeline can

⁶ www.renewableenergyworld.net

be up to £1000 per metre, thus short pipelines carrying large amounts of heat are most cost-effective, and also cause the least disruption during the installation process as compared to a large number of smaller pipelines.

As most of the potential heat users were existing buildings, the cost and ease of retrofitting was also considered in assessing the feasibility, and large centrally heated buildings were considered to have better potential as retrofitting to an already existing large central heating system is much easier and cheaper than to several small systems. The preferred option is the integration of a CHP scheme into a new development as it is being built. As such, the following are deemed to be the best potential outputs:

- industry;
- education facilities;
- amenity facilities (including leisure centres, swimming pools and hospitals);
- commercial properties and offices;
- hotels and communal residences; and
- high-density residential areas.

The success of the CHP scheme relies on an adequate heat demand throughout the day, and to achieve this, heat demand from users with different heat demand profiles to represent a good heat demand throughout the day and night is preferable to an uneven load.

2.3.2 Scope of Search

A radius of 5km from the site was chosen as the area to search for potential users. As the site at Avonmouth is situated close to Bristol, the 5km radius area encapsulated several wards of north west Bristol, as well as Bristol Docks and Cribbs Causeway. This area contains residential and commercial properties, with potential for CHP, while maintaining a realistic distance for pipelines in terms of costs and planning implications.

Given the potential technical issues of heat loss, no further consideration was given to the export of energy to facilities in excess of 5km from the application site.

Future developments were also investigated in terms of their potential for CHP to be integrated into their structure from new. This included reviewing local plans and planning applications to determine the location and nature of any planned future developments.

Once all of the potential users were established, those which presented the highest potential were contacted initially by letter to establish if there was a need. If a positive response was received from those contacted, either a meeting was set up to discuss the project and the specific issues relating to the CHP scheme, or a briefing note containing further specific information was sent.

3.0 BASELINE ASSESSMENT

3.1 Introduction

The Avonmouth area to the North of Bristol contains a considerable amount of commercial industrial along with a moderate amount of residential property in nearby areas.

The application site consists of approximately 8.3 hectares of land which was previously the northern part of the Sevalco plant adjacent to Severn Road and approximately 230 metres east of Chittening Road.

Much of the commercial property in the surrounding 5 km area is contained within the Cribbs Causeway retail outlet, which contains many retail outlets, several restaurants, two hotels and corporate business centres

There are also a large number of industrial areas and industrial facilities in the 5km radius surrounding the proposed development site where the use of heat was also assessed.

3.2 Potential Heat Users in the Search Area

3.2.1 Industry

There are 16 large scale industrial facilities and estates identified that may be able to benefit from the heat generated from a CHP facility at the site. These include;

- The Bristol Port Company, St. Andrews House St. Andrews Road (1)
 - Bristol Oil Storage Ltd, Royal Edward Dock, Avonmouth Docks
- Avonbank Industrial, Estate, West Town Road (2)
- Bristol Sewage Treatment Works Kings Weston Lane, Lawrence Weston (3)
- Chittening Industrial Estate, Chittening Road (4)
- Cabot Park Industrial Estate, Poplar Way East (5)
- Avonbridge Trading Estate, Atlantic Road (6)
- Portway Trading Estate, Portview Road (7)
- Bristol Filton Airport (8)
- Severnside Trading Estate St Andrew's Road (9)
- Esso Petroleum Co Ltd, Avonmouth Terminal, St Andrew's Road, St Andrews Road (10)
- Rhodia Organique Fines, Kings Weston Road (11)
- Augean Treatment Ltd, Smoke Lane (12)
- Tocris Cookson Ltd, Moorend Farm Avenue (13)
- Astra Zeneca, Severn Road (14)
- Albemarle Chemicals UK Ltd, Avonmouth Works, (15)
- Terra Nitrogen Ltd, Severnside Works (16)

3.2.2 Amenity

The assessment included leisure facilities museums, and hospitals. Where a facility falls outside of the 5 km radius, this is indicated. Below is a list of the facilities that may be able to benefit from local CHP.

Hospitals

There are two hospitals which could be considered for CHP; however both of these are currently in the process of being redeveloped with additional buildings being added to existing structures; however both fall outside of the 5km radius from the facility.

- Southmead Hospital, Southmead (~6 km) (17)
- BUPA Hospital Bristol, Redland Hill (~6.5km radius) (18)

Leisure Centre Facilities

There is 1 council operated facility with a swimming pool identified during the search, along with 1 private leisure facility having a pool and 1 without. Swimming pools require a large amount of heat in order to control the temperature of all of the water contained within them. The sports and leisure facilities identified below also have a high heat demand for hot water and heating.

- Council Leisure Centre
 - Henbury Leisure Centre, Avonmouth Way, Henbury, (19)
- Private Leisure Centres
 - David Lloyd, Greystoke Avenue Westbury-on-Trym (20)
 - Fitness First, Merlin Road, Cribbs Causeway (21)

Public Buildings

- HM Prison Bristol, Cambridge Road (22)
- Sea Mills Railway Station Sea Mills Lane (23)
- Avonmouth Railway Station, Gloucester Road (23a)
- St Andrews Road Railway Station, St Andrew's Road (24)
- Pilning Railway Station Pilning and Severn Beach (25)
- Blaise Castle House Museum, Henbury Road (26)

3.2.3 Commercial

Much of the commercial activity surrounding the proposed site is concentrated at the Cribbs Causeway retail outlet. Within this commercial centre there are a number of large retailers, contained within the main mall and other businesses, cinemas and restaurants in the wider shopping area that could benefit from the provision of heat from a CHP facility.

- The Mall at Cribbs Causeway, Patchway – 135 retail outlets spread over two floors with a total floor area of 92,400 m² (27)
- The Venue – An entertainment complex consisting of cinema complex, a bowling alley and numerous restaurants (28)
- The Retail Park, Lysander Road – Various large retail outlets (29)
- Morrisons Lysander Road, (30)
- Asda Patchway Super Centre, Highwood Lane (31)

Large Office Property

- Cribbs Conference Centre, Hollywood Tower Mansion, Hollywood Lane, (32)

3.2.4 Residential

There are a number of residential developments at varying stages of development in the local vicinity and the stages of development are indicated in the list below. The provision of heat infrastructure to existing housing developments is usually less preferable to that of new housing projects.

- Hazelgrove, Marissal Road, (proposed development) (33)
- Platform One Henbury, (under construction) (34)
- Kingfisher Court, Fishpool Hill, (extension to existing development under construction) (35)
- Old Barrow Hill, Shirehampton, (under construction) (36)
- Church Road, Severn Beach, (37)
- Severnpoint, Wyck Beck Road, (38)

3.2.5 Education Facilities

There are 16 schools identified within the radius and the number of students attending the school is indicated.

- Severn Beach Primary School, Ableton Lane, (103 Pupils) (39)
- Bristol Gateway School, Long Cross, (70 Pupils) (40)
- St. Bede's Catholic College, Long Cross, (922 Pupils) (41)
- Our Lady of the Rosary R.C Primary School, Tide Grove, (200 Pupils) (42)
- Henbury School, Station Road (826 Pupils) (43)
- Weston Park Primary School, Long Cross, (281 Pupils) (44)
- Avon Primary School, Barracks Lane (191 Pupils) (45)
- Pilning Primary School, Bank Road (136 Pupils) (46)
- Avonmouth C of E Primary School, (219 Pupils) (47)
- Blaise Primary School, Crow Lane,(382 Pupils) (48)
- Portway Community School Penpole, (736 Pupils) (49)
- Kingsweston School Napier Miles Road (180 Pupils) (50)
- Bank Leaze Primary School, Corbet Close, (202 Pupils) (51)
- Sea Mills Infants School, Hallen Drive, Bristol, (121 Pupils) (52)
- St Bernards RC School, Pembroke Avenue, (130 Pupils) (53)
- Shirehampton Primary School, St Marys Walk, (427 pupils) (54)

3.2.6 Hotels and Communal Residences

Hotels

- Travelodge Cribbs Causeway, (56 rooms) (55)
- Premier Inn Cribbs Causeway, Catbrain Lane, (106 rooms) (56)
- Henbury Lodge Hotel Station Road, (21 rooms) (57)

Communal Residences

- Churchill Hall University of Bristol, Stoke Park Road, (Outside radius, 350 rooms) (58)
- Hiatt Baker Hall University of Bristol, Parrys Lane, (Outside radius, 445 single study rooms) (59)

- Badock Hall University of Bristol, Stoke Park Road, (Outside radius, 440 Single study rooms) (60)
- Durdham Hall, Hollybush Lane, Stoke Bishop, (outside radius, 223 students in flats of six or seven study bedrooms per flat) (61)

4.0 FUTURE DEVELOPMENT

Integration of CHP into new developments is generally considered to be better than retrofitting to buildings that are already in place, as the communal heating system can be built into the buildings design and disruption to the normal operation of the building and extra costs are avoided. It is therefore sensible to investigate any proposed developments within the search area that would provide a potential use for CHP.

A number of future developments were identified by looking at press coverage and planning permissions granted by Bristol City Council. The council was also approached regarding planned redevelopment areas in the local plan in order to assess the scope of integrating CHP into any new development. The future developments with the highest potential are listed below. The developers of each of these sites were also contacted.

4.1 Commercial

- Bristol City Football Club – New Stadium at Ashton Vale

In July 2009 a planning application was submitted for a new 30,000 seat stadium and associated development including housing, restaurants/bars, and a hotel on land at Ashton Vale and the former Alderman Moore's allotment site.

The application site straddles the boundary between Bristol City Council and North Somerset Council. The main vehicular access to the B3128 (leading to the A370 Long Ashton bypass) falls within North Somerset and the majority of the development site falls within Bristol.

- Southmead Super Hospital

A reserved matters planning application has been submitted to Bristol City Council to construct the new acute North Bristol and Community Hospital at Southmead, together with:

- associated infrastructure
- public spaces
- internal roads
- car parking and
- landscaping

This application follows the granting of outline planning permission. Work is about to begin at the Hospital in preparation for the new state-of-the-art acute hospital that will open its doors to patients in 2013.

- New Supermarket at Ashton Gate stadium

On 17 August 2009 a planning application was submitted to Bristol City Council for a new retail development (comprising 5,500 m² net sales area) with associated car parking and petrol filling station at the existing Bristol City Football Club stadium, Ashton Gate in Ashton, Bristol.

4.2 Residential

- South West Bristol Urban Extension

The draft South West Regional Spatial Strategy proposes a new mixed-use urban extension to the South West of Bristol, to provide 10,500 new homes by the year 2026.

Bristol City Council is working with North Somerset Council to assess the potential impact of this proposal because the extension will cross the boundary between North Somerset and Bristol. Most of the development would fall within North Somerset.

- Ashton Park

A planning application has been submitted for a major development by Landtrust Developments at Ashton Park.

5.0 CONSULTATIONS

5.1 Introduction

In order to determine the potential for energy to be used by local businesses, a number have been contacted by SLR on the basis of considering the possibility of the proposed Severn Road Centre acting as a catalyst for heat distribution.

In each case, a letter of introduction has been sent that summarises Viridor's proposals, the role of the Resource Centre, and the possibility of energy supply. It should be noted that the approach has largely been undertaken on a "cold-call" basis at this stage, and that none of the Companies involved with the Avonmouth and Severnside Forum have been contacted separately.

The response rate has been low at this stage, but it is intended that a series of follow up contact will be undertaken during the course of the planning application determination process. Specific feedback has only been received from the Energy and Sustainability Manager of **North Bristol NHS Trust**, who oversee the operation and proposed development of Southmead Hospital. A meeting was held in October 2009 to discuss potential heat use for the proposed redevelopment of. The large scale hospital has recently been given planning permission and a range of sustainable energy supply options are being considered.

The development is due to be finished by 2014 which coincides with Viridor's timescale for the proposed facility. Although the hospital lies outwith the area of search, the response was generally positive subject to infrastructure and supply issues.

Additional feedback was received from the agents for Landtrust Development, the developers of the Aston Park proposals. They confirmed that they are already proposing a CHP plant within that development.

Although the rate of feedback has been disappointing, it is relevant that the nature of the enquiry is preliminary given the absence of a planning application, planning permission, details of infrastructure and business plan/costing.

A number of follow-up e-mails and letters have been sent, and the increased publicity as a result of the consultation exercise and the submission of the planning application is likely to increase interest in the scheme.

6.0 THE WAY FORWARD

This initial period of consultation has revealed a number of potential heat users within a 5km radius of the proposed development site. The opportunities are potentially significant, and will be subject to more consideration during the course of the determination of the planning application. If planning permission is forthcoming further opportunity will be available to consider and implement any scheme during the construction period.

In terms of the Severn Road Recovery Centre, the opportunities to supply heat would appear to be limited to industrial/distribution users including:

- Astra Zeneca;
- Avonbank Industrial Estate
- Bristol Sewage Treatment Works
- Chitting Industrial Estate
- Cabot Park Industrial Estate
- Avonbridge Trading Estate
-

The greater potential lies within the Avonmouth and Severnside Forum and the possibility of a wider District Heating scheme. This opens up the potential to supply more extensive areas and a larger range of users. However, as with any District heating scheme the following issues are likely to be relevant:

- security of supply, in terms of the supply of waste to power the process, and with regards to operation of the facility by Viridor;
- the provision of the associated infrastructure particularly with regard to cost, maintenance and relationship with existing infrastructure;
- the cost of the power, and the mechanism for securing longer term supply contracts;
- the involvement of the public sector to act as a catalyst for implements to the scheme;
- the potential to integrate into a wider area-based scheme using other energy exporters.

It is the intention of Viridor that the following further work will be required to include:

- follow-up of initial respondents to address the issues raised;
- continued involvement with the Avonmouth & Severnside Green Industries Forum;
- further chasing of other key potential users;
- additional liaison with public organisations,
- increased awareness of the potential benefits for the Avonmouth area; and
- monitoring of as-yet unidentified users, and potential new development schemes.

The long-term nature of the determination, procurement and construction processes enable Viridor to position itself so that by the time the EfW is full operational (2014) the infrastructure and contracts can be put in place to enable the aspirations of the Company, and the Council in respect of renewable sources of energy.

7.0 VIRIDOR'S EFW/CHP BACKGROUND⁷

Viridor Waste Management currently has one operational incineration with heat recovery facility in the UK, at Derriford hospital in Exeter, as well as two Energy from Waste plants in the design and construction phase, both of which have plans to incorporate CHP, as detailed below.

Exeter CHP Plant, Devon

Viridor has recently been given planning permission for a CHP plant in Exeter by Devon County Council. Viridor aims to provide renewable energy at a steady price, protected from the volatility of fossil fuel prices in the form of heat to nearby energy users, as well as feeding electricity to the National Grid.

The location of the plant offers the possibility of providing heat energy to a number of potential users, including a nearby rendering plant and a metal finishing company. Discussions with these and other potential users are to be held with the intention of entering into commercial and technical agreements. As the development is still in its early stage, no final heat uses have been agreed but this is hoped to be brought to fruition in the near future.

Lakeside EfW CHP Facility, Colnbrook, Slough

The Viridor site at Lakeside is currently under construction. The facility is designed to accept around 440,000 Tonnes of residual municipal waste per annum and produce around 30MW of electrical power which will be supplied to the national grid.

The facility will not have an operational facility to supply heat to nearby users from the outset; however the design of the facility is such that this is available for new development in the future. It is proposed that investigations and discussions into this will be ongoing.

⁷ Viridor Waste Management: www.viridor-waste.co.uk

8.0 GLOSSARY OF TERMS

CHP *Combined Heat and Power*

Where a single energy generation facility produces both electricity and useable heat.

DEFRA *Department for Environment, Food and Rural Affairs*

The UK Government body responsible for issues regarding the Environment, Food and Rural Affairs.

EfW *Energy from Waste*

The process of combustion of residual waste to produce electricity and/or heat for beneficial use by energy consumers.

EU *European Union*

The political and economic union of twenty-seven member states, located primarily in Europe

km *Kilometre*

ROC *Renewable Obligation Certificate*

A system introduced by the UK government to encourage renewable energy production through credits for energy supply companies for reaching target levels and fines for failing to reach these.

TW *TeraWatt*

International Standard unit of Power: 1×10^{12} watts (1,000,000,000,000W) where:

- **(th)** thermal energy
- **(e)** electrical energy

UK *United Kingdom*

WID *Waste Incineration Directive*

The EU legislation governing the incineration of waste including limits on emissions of polluting substances amongst other things.