

# DESIGN AND ACCESS STATEMENT

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**Severn Road Resource Recovery Centre, Severn Road  
Chittening, Avonmouth, Bristol**

**Design and Access Statement**



**September  
2009**

**Viridor Ltd**

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South West Design Review Panel Guidance -July 2009

Draft Response to South West Design Review Panel - September 2009

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## INTRODUCTION

This Design and Access Statement has been prepared to describe Viridor's architectural vision for the proposal to develop the Severn Road Resource Recovery Centre (RRC) at its site in Severn Road Chittening, Avonmouth Bristol BS11 0YU.

The document justifies and explains the design rationale of the proposed development. It considers the context behind the proposal and provides a description of the site and its opportunities and constraints. The statement then focuses on the design principles that have been followed. The proposal is then described, with the text providing an overview of the amount and use of development being provided, an indication of how it is to be arranged on site and a summary of the scale and appearance. The statement then focuses on landscape, access, drainage and sustainability matters and gives an indication of how the development is to be brought forward and its quality controlled.

This design statement has been prepared in accordance with current government guidance and the Commission for Architecture and the Built Environment's (CABE) document *"Design and Access statements: How to write, read and use them"*. It is prepared to satisfy part of the information requirements of the OCCISDS Method Statement Part 3 Design.

The design has been prepared with regard to the recommendations set out in the DEFRA/CABE document entitled 'Designing Waste Facilities: a guide to modern design in waste' together with the design principles formulated by the development team to meet the specific requirements of the Severn Road site.

This document supports the planning application to develop a Resource Recovery Centre that includes an Energy from Waste Facility, an Incinerator Bottom Ash Treatment and Storage Facility and a Materials Recycling Facility. The full description of development is set out below for clarity.

*"The construction and operation of a Resource Recovery Centre including a Materials Recycling Facility, an Energy from Waste and Bottom Ash Facility, associated Office, Visitor Centre, new access road and weighbridge facilities with associated landscaping and surface water attenuation features."*

This Design and Access Statement should be read in conjunction with the following information:

- Planning Application Forms and Drawings;
- Environmental Statement Chapters + Appendices;
- Planning and Sustainability Statements;
- Statement of Community Involvement.

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This statement is a tool to explain and justify the design and access principles and concepts on which the development proposal is based and on how these are reflected in individual aspects of the scheme.

## THE BRIEF

The site is centrally located in the Avonmouth Industrial zone at 7m AOD level and there will be clear views of the facility from parts of the M49, Smoke Lane and Severn Road, although some of these views will be interrupted by other local industrial buildings. There will be long distance views of the EfW for example from the Caldicote area across the Severn close to its landmark bridge and Portishead Point to the south west, as well as medium and short distances views for example from the ridge to the south west running at between 60-80m AOD along the Community Forest Path. It is therefore Viridor's intention to deliver a simple elegant building form with an interesting and well detailed, high quality external skin, as a landmark for the area.

## USES

### Resources Recovery Centre

The proposed development of the Resource Recovery Centre is intended to provide a Materials Recycling Facility capable of dealing with 150,000 tonnes per annum (tpa) and an Energy from Waste Facility (EfW) capable of dealing with 350,000 tonnes per annum (tpa) of residual municipal, commercial and industrial waste in two lines.

The main elements of the RRC are set out below;

- A materials recycling facility.
- Waste reception hall with storage bunker, shredder<sup>1</sup> and a waste feed system;
- Boiler hall with a grate, combustion chamber and a heat recovery boiler;
- Hall with storage bunker for the collection and loading of incinerator bottom ash and conveyor to bottom ash recycling area;
- Turbine Hall with Steam Turbine for generating electricity;
- Flue gas treatment hall with equipment to clean combustion gases;
- Facility for discharging and loading APC residue silos and other ancillary equipment;

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<sup>1</sup> This would be used to break down any bulky waste received from Refuse Transfer Stations which would otherwise clog or cause damage to the EfW system.

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- Twin chimney stacks to discharge the treated flue gases into the atmosphere;
- An air-cooled condenser (ACC) for cooling and recycling steam from the generating process;
- Central processing unit (CPU) room;
- Bulky and light storage areas and electrical room, workshops etc;
- Bottom ash treatment and storage areas to hold bottom ash on site prior to its sale for re-use by the construction industry;

In addition to the above volumes and components provision is to be made for the following;

- Visitor centre to enable community participation and the encouragement of recycling and waste reduction in the county;
- Offices for the staff of the EfW;
- Offices for the staff of the Materials Recycling Facility
- Ancillary accommodation for staff welfare, changing, showers etc;
- Staff and visitor's car park, a coach and mini-bus standing. Cycle spaces to encourage a reduction in car use;
- A secured entrance to the facility including weighbridges and gatehouse that would be staffed when necessary;
- Storage for the collection, recycling and rain water run off attenuation measures;
- A wheel wash facility to clean truck's tyres after operating in the Bottom Ash area;
- Landscaping.

## THE SITE HISTORY

The development site consists of the northern part of the Sevalco Plant which historically operated across two sites separated by Severn Road. The site is located at National Grid Reference 353797, 181739 around 7 miles outside of Bristol City Centre. The site is shown in its local context on the aerial photograph<sup>2</sup> set out below.

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<sup>2</sup> [www.googleearth.com](http://www.googleearth.com)

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Fig 1.0 Aerial Photograph of Indicative Site Boundary of Proposed Site at Severn Road.



## Avonmouth Industrial Estate

Avonmouth is an extensive, long established industrial area that serves the West of England sub region and beyond. It hosts a wide range of general industrial uses, specialist industries, port facilities, storage and distribution, power generation and waste management uses and has excellent links to the strategic route network.

## THE SITE - OPPORTUNITIES AND CONSTRAINTS

The potential opportunities and constraints of the development were studied prior to embarking on the concept design to establish the character of the area and the visual envelope of the RRC. This section identifies the main landscape and visual characteristics of the existing industrial site and the surrounding area. It has been used to inform and help formulate the development proposals, and minimise the potential effect of the development within its local context, whilst strengthening the identity of the locality within the landscape.

### The Site Context, Its Landscape and Visual Characteristics

Two Regional Character Areas (RCAs) as defined by Countryside Commission (now Natural England) cover the area of the site. These RCAs being the 'Severn and Avon

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Vales' (RCA 106) and 'Bristol, Avon Valleys and Ridges' (RCA 118). The key characteristics of these areas relevant to the site area are as follows:

- A landscape of very mixed landform, geology and settlement pattern, strongly influenced by the Avon Valley, Bristol at its centre and by its industrial history;
- Diverse range of flat and gently undulating landscapes, united by broad river valley character;
- Riverside landscapes with little woodland, often very open; Wooded scarps – with ancient woodland – and high, open, down land ridges.

Part of the written description for the 'Severn and Avon Vales' includes the following description;

*"At the mouth of the Severn, the river dominates the low ground. On the west bank, small villages sit on the edge of steeply rising ground and old orchards are prominent features. On the southern side the industrial complexes of Avonmouth and the riverside power stations dominate but just inland there is the rich pasture land of the Vale of Berkeley with a strong pattern of medium-size fields with frequent copses but few large woods and the tree cover depleted by Dutch Elm disease."*

## Baseline Landscape Features

The site is located on the flat low lying plain along the eastern bank of the River Severn, to the north west of Bristol. The elevation of the land is generally between 6-7m AOD, and is artificially drained by numerous 'Rhines' (drainage ditches). The site and much of the surrounding area supports a wide range of industrial use both past and present, within a background agricultural landscape of low lying fields.

To the north of the site is Severnside Works and Seabanks Power Station with a number of pylon lines running past the northern edge of the site, and then diverging across the landscape to the east. To the west of the site is the large area of Chittingen Industrial Estate on the edge of the Severn Estuary. Consent has been given for the development of two wind turbines approximately 220m directly west of the proposed SRRRC development area. The proposed development timescale would see construction beginning before 13<sup>th</sup> January 2014. These turbines would be a maximum of 131m to the tip of their blades when vertical, and would have a hub height of 85m, and would be located on open land between Chittingen Road and the Severn Estuary.

The proximity and position of these turbines would have landscape and visual effects on the local area and thus the proposed SRRRC development site. The effects would be related to the height of the consented turbines compared with the proposed stack for the EfW facility (90m height), and the potential visual distraction caused by the moving turbine blades.

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To the east, flat open agricultural land leads to a gas works, and the M49 motorway (linking the M5 to the southern Severn Crossing). Beyond the motorway an existing landfill operation is present, prior to the landform rising up to Spaniorum Hill. This hill forms part of a significant ridge of land (circa 60-90m AOD) that follows the line of the M5 running northeast to southwest.

Immediately south of the site lies a redundant industrial complex (Sevalco South) and then flat open farmland towards a sewage works and the outlying Bristol suburbs of Lawrence Weston and Shirehampton.

## Visual Baseline

The low-lying nature of the land around the site gives an open exposed character to the area. However, the scrub, small landscape features and large industrial buildings present combine to restrict distant views within the area. These features emphasises the scale of the wooded ridge to the east and makes it the backdrop to views from the west. Views from the ridge itself are restricted by the degree of woodland cover, but where views are present they can extend out west across the low-lying land and Severn Estuary to South Wales.

Sensitivity to visual effects within the immediate landscape will be low due to the industrial legacy and quality of the landscape present. Slightly further afield views from small settlements such as Easter Compton (to NE) and Hallen (to SE) will be more sensitive, but will be restricted due to their low lying nature.

Views from the west across the Severn Estuary already comprise a large proportion of industrial elements set against the background wooded ridge. These features are seen at a distance of around 9km and thus perception of the proposed development would be greatly reduced.

Views from the ridge to the east require greater consideration. In many places these are restricted by existing woodland cover but open views are present. The ridge is followed by the long distance Community Forest Path, which is utilised for informal recreation and includes various historic features. Of particular importance are views from the southeast near Lawrence Weston where residential areas rise up from the valley floor over the lower levels of the wooded ridge (circa 50m AOD). The ridge also provides a strong screen between the main sections of Bristol and the industrial land uses around the area of the site.

## DESIGN PRINCIPLES

In taking these opportunities and constraints together with the clients brief, the following broad design principles were set so that the design will be:

- Aspirational and distinguished: establishing itself as an excellent facility and a building that is a positive influence on its locality;
- Sustainable: minimising its effect on the environment and on climate change, for the benefit of future generations; (refer to Volume 1 for BREEAM rating information);

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- Secure: providing a safe environment for staff and visitors;
- Respectful of its context: responding to and complementing its setting and strengthening the quality of landscape locally;
- Welcoming and legible: providing the opportunity to visit with ease and comfort, and learn more about waste as a resource;
- Well designed: be distinctive, performing its required functions fitting, whilst providing an adaptable structure that may have use beyond its intended design life;
- Consultative: engaging positively with the community and other stakeholders to enable a successful outcome. (refer to Volume 1 for details of consultations, feedback and improvements)

## Design Strategy

In addition to these broad points of principle, the design team has developed a detailed strategy for the site. Studies were undertaken to establish the optimum arrangement of the main elements of the MRF, EfW and IBA storage within the site. An outline scheme for the most efficient and economical arrangement of the key elements of the SRRRC was conceived taking account of the following;

- its impact on and within the Severn estuary, the immediate Chittingen area and the wider landscape of the rising ground towards Bristol and Somerset.
- keeping the building form simple and elegant to respond to and improve the quality of the surroundings and distant views of the site;
- the visual impact across the Mouth of the River Severn, from the M4, M49 and A 403, important regional routes to the north, west and east of the site.
- the visual impact of a large scale facility on local people living in the areas around the site, the height of the EfW, in particular the prominence of the boiler hall and the chimney within the visual envelope;
- allowing for the movement requirements of large 16.5m long articulated lorries including analysis of gradients and turning circles and the provision of a peripheral emergency route;
- potential cycle access and cycle parking facilities;
- providing discrete staff and visitor parking in the interests of safety;
- responding to the topography of the site and any potential for visual impact mitigation;

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- reviewing the site ecology, aiming to achieve the preservation of species and the potential for improvement;
- the need for rainwater collection and re-cycling for use in process plant and water run off attenuation measures to control release to local watercourses;
- the need for sustainable construction and use of materials;
- the need for a access control facility, weighbridge and queuing availability off the public highway;
- use large span structure where feasible to minimise structural supports, thereby ensuring maximum flexibility for future use;
- minimising the land take, excavation and fill requirements of the base level of the RRC together with its peripheral access roads;

## The Design Response

A building of this size cannot be hidden. Viridor require the RRC building to be of an excellent design standard in terms of its architectural concept. The building aims to achieve the following;

- It will be integrated into the long estuary vistas; its immediate industrial setting and medium distance more rural landscape, to minimise its impact on local people living within its visual range;
- It will enhance the setting for visitors passing through the area and having glimpsed views of the facility from the main trunk roads;
- It will be designed to enable Viridor to create equal opportunities for employment access for people with disabilities and aid social cohesion and inclusion;

The facility is focused on the integrated construction of four main operational functions;

- The Materials Recovery Facility;
- The EfW itself, comprising Waste Reception, Combustion, Flue Gas Cleaning, Turbine Hall, Chimneystack, Air-cooled Condensers; offices for administration and Visitor's Centre;
- The Bottom Ash Treatment and Storage Facility; and
- Water Attenuation Lagoons for attenuation of surface water runoff (one will double up as a fire pond for retention of water for fire suppression).

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## General arrangements of the Main Elements within the site.

The site is essentially triangular and flat. The configuration of the site was arrived at following;

- A review of the operational management requirements, activities and alternative options for the location of process technology;
- A technical study of the options for the size of the technology available to process the specific throughput capacity of the plant;
- A number of basic studies of the options for locating the three main footprints in the most efficient way;
- Analysis of the road movements required by large articulated vehicles serving the three mainstream activities; and
- A survey of the mature trees on site, to establish location of mature trees in good health so as to incorporate them into the design.

The RRC facility is located at 7.8m AOD towards the south east of the site along its frontage with Severn Road. The offices and visitor centre are located on the south façade allowing the retention and reinforcement of the mature trees and landscaping that currently fronts the site. The IBA function is aligned along the northern side of the EfW and the MRF is set to the west of the tipping hall of the EfW as an extension of that building.

The National Grid co-ordinates of the centre of the stacks are as follows;

**Stack 1;**

X=353861.715

Y=181627.409

**Stack 2;**

X=353865.578

Y=181625.454

These decisions on location, orientation and base level provide for extensive queuing both within and outside the buildings to take place on site, in order to avoid queuing on the public access roads whilst maximizing the development potential of the site.

The water attenuation scheme adjacent to the north, east and south of the EfW facility will harvest rainwater from the EfW and IBA storage structures, for recycling and use within the EfW process itself.

## Appearance

The EfW Facility requires a distinctive, high quality and attractive appearance and a considerable amount of effort has gone achieving such an appearance. The building's

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appearance in relation to its site, surroundings and the views of it from local areas have all been carefully considered, in recognition of the challenges and opportunities that a proposal of this size and scale brings.

Given the size of the proposals, the aim is not to camouflage, but integrate the building form with the surrounding industrial landscape whilst at the same time celebrating the EfW's energy recovery function and contributing an improvement to the architectural character of the area.

Our aim is to design an attractive, sustainable, environmentally friendly, exemplar waste management facility that fits well into its industrial setting, enhancing the image of its location and having features that contribute to its sense of place.

The shape of the building envelope was arrived at following;

- Studies for the location of the three main elements on site referred to in above;
- Generation of a coherent, rigorous three dimensional geometry to arrive at a visual rational synergy between the three key building volumes of the business;
- Careful analysis for the options for the “wrapping” of the technology footprint.

The MRF is positioned as an extension of the EfW plant. The extension of the form in this way allows the building to be apparent as longer and lower than it is in reality. The bold soaring angular geometry that emerged from the iterative design process is a response to the importance of views into the site. It was chosen as the best option to ensure the integration of the RRC into the long expansive vistas of the industrial setting; the architecture is futuristic with maritime connotations and soars towards the rising uplands around the Bristol ridge.

The envelope is articulated by a series of vertical spines that express the rigorous geometry. The roof is not expressed as a single plane sailing over all equipment, as this would have enclosed unnecessary volume and made the building taller than it needs to be. Rather, the roof is broken down into a number of separate roofs that are set between the spine walls at the lowest functional level, so as to reduce the volume of the building without compromising operational necessity of maintaining and replacing components in the future. This device of breaking down the roof line is a recognised strategy for helping to break up the scale and mass of the building.

The building is large and cannot be hidden on the flat land of the estuary. The colour of these discrete spine elements forming the geometry of the facility is being studied to create an image which is complementary to its setting and creates a landmark to encourage the economic regeneration of this industrial area of Avonmouth.

The clarity of the geometry will be further reinforced by the proposed use of two colour tones on the cladding of the spine walls, which are intended to resemble sails set against the deck/roof planes. The cladding material is set at two different angles, and is treated in two tones that have a degree of contrast between them. The varying

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angles will catch the light differently, providing relief to the building, and breaking down the large volume into a series of related, but smaller forms, creating an optical illusion to reduce the visual impact of the building. This device will be enhanced by the use to two cladding tones to further emphasize the articulated building planes.

Currently we are undertaking colour studies to assess whether a single colour, or two colour tones, would be more effective in reducing the visual impact of the building.

## Arrangements for Incinerator Bottom Ash (IBA)

The IBA metals extraction takes place in the most economic location within the main hall and adjacent to the boiler. The residual bottom ash is then transferred by conveyor to the covered bottom ash pre-treatment storage area, thence to the adjacent treatment location and then on to the storage area prior to the material being sold and recycled for use in the construction industry.

The bottom ash area has a simple plan established by the robust geometry of the design, on its northern flank. It is formed of in-situ reinforced concrete push walls up to 6m high, having a smooth finish with exposed modular panel construction joints. The wall will be draped on the north side with a stainless steel wire Jacob trellis covered by climbing plants to form a vertical green wall reinforcing the detailed landscape design for the site. The design allows for all or part of the Bottom Ash treatment area to be roofed with a simple industrial 'north light' type roof. This arrangement allows natural light into the area and provides the opportunity for good cross ventilation, whilst containing any potential dust.

## The Air-Cooled Condenser (ACC)

The ACC, which can be a major visual intrusion if left in its raw state, is located on the linear axis of the process technology. It is within the external envelope of the facility and screened by a simple freestanding circular drum whose tangent points are the secondary basic generator of the spine wall geometry. The drum forms a counterpoint to the radial geometry of the main plant. The ACC is located at the eastern extremity of the EfW, and its perforated, translucent screen of contrasting colour to the spine walls will be illuminated at night.

## Size, Level and Scale

The general level of the site is around 6.8m AOD. The new base level of the complex is set at 7.8m AOD. The stack is currently 90m above base level, 97.8m AOD. This base level of the structure has been determined from detailed flood risk investigations and climate change predictions that have established the following constraints:-

- Critical infrastructure (that must remain operational at all times) including the turbine, control centre, and electrical plant etc should be protected to a minimum level of 10.1m AOD .
- 'Safe refuge' areas for site users to reside in the event of an extreme flood event should be set at a minimum elevation of 9.8m AOD (i.e. at 1<sup>st</sup> floor level within the EfW and MRF offices).

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- Less vulnerable areas such as the MRF, offices, permanently 'manned' areas, and other operational areas associated with the EfW should be set at a minimum elevation of 7.8m AOD.
- Storage / tipping areas and external hard standing areas should be set above the existing ground of 6.8m AOD.

External landscape / undeveloped areas remain generally at existing ground levels to help minimise displacement of flood storage, and provide an increase in potential flood storage wherever possible.

The overall size of the EfW facility including the MRF is 200m long, and varies from 21.8m to 49.0m in height to the apex of the main roof. The total width of the plant varies from 60.4m to 83.1m. (EfW-POR-09-21 P0)

- The internal area of the EfW - now 11308m<sup>2</sup>
- The internal area of the MRF – now 9714 m<sup>2</sup>
- The area of the Bottom Ash Storage is 7,961 m<sup>2</sup>
- The area of the glass and timber store is 2,327 m<sup>2</sup>
- The area for water attenuation is 4,000 m<sup>2</sup>.
- Lower parts of the building are located at the periphery of the building, with the highest parts of the building at its 'centre of gravity', ensuring that the scale of the development at the boundary is moderated by the smaller building components. These include the EfW and MRF offices, the low end of the MRF where bales are collected, and the bottom ash treatment buildings.

### The Offices and Visitor Centre

The Offices and Visitor Centre are located on the southern façade of the RRC. They are accessed from the discrete and safe staff and visitors' car-park at level +/-7m AOD. Internally they will be linked with the workshops, storage and control room of the EfW. This location was considered to be the most appropriate for the following reasons;

- Gives staff the best working environment over the lifetime of the facility with views through the mature trees along the south of the site. The offices are provided with a café, changing and showering facilities for staff and operatives;
- Have good natural lighting to reduce energy consumption;
- Co-location of the EfW offices, workshop and control room areas ensure efficient operation of the process, and effective use of staff resource.
- Integration of the EfW offices and the Visitor's Centre produces an economic space management solution giving flexibility of use between

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the functions initially and in the future running of the EfW Facility over time;

- Creates a smaller scale architectural statement on the main façade of the EfW at the entry point of visitors and staff into the EfW.

The EfW offices are arranged on two floors to accommodate;

- Ground floor will be the EfW workshop, a visitors centre comprising a reception, exhibition space, viewing area, refreshment facilities, a meeting room for 40 people, seminar rooms and toilet facilities (612 m<sup>2</sup>);
- First floor will be the EfW Facility offices providing reception area, general office space and individual office space for managerial personnel, laboratory and technology areas, and lockers (with clean and dirty areas) along with a cafe for staff and operatives . (Gross Area 646m<sup>2</sup> )This office level provides the safe refuge area required at times of flooding ( see section 10.7)

The offices are designed to have good natural lighting that will produce an energy efficient environment for the workers and visitors.

## The Visitor Experience

Viridor is a company with an evolving duty as a service provider, employer and educator. The development team have striven on this project to create an inclusive design that removes unnecessary physical barriers to the movement of people with and without disabilities. Whilst a view will be provided directly from the Visitor Centre into the EfW through the two-hour fire separating wall, it is felt that restricting the visitor to only such a view from the visitor accommodation into the main hall would be a limiting experience compared to the guided tour. The interior of the plant and its activities cannot be seen from any one location, the facility being approximately 200m long, with large separate main halls for tipping, bunker, and boiler/flue gas treatment.

Visits to the facility, for example by customers, schools, societies, and the general public, will be by prior arrangement. Following arrival, and viewing of the exhibition and an introductory audiovisual presentation illustrating the functioning of the facility, visitors will be taken on a guided tour along safe routes.

Tours will visit the control room at high level, the technological hub of the plant. From here visitors will see the activities in the tipping hall with articulated lorries delivering the residual waste fuel, the cranes collecting waste from the bunker and loading it into the hopper and waste being conveyed to the grate under the boiler. Visitors will continue along access routes through the boiler hall, the flue gas treatment hall with its bag filters which clean the flue gases and view the turbine hall where the electricity is generated.

In this way visitors will be provided with a full experience of the overall scale of the operation.

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## Chimney Stack

The simple slim twin tube chimney with its angular supporting structure is separated from the building, forming a type of industrial sculpture alongside the main plant. It can be seen from many vantage points around the area and has been specifically designed to be a simple attractive local feature, more an independent piece of sculpture, obelisk or tower rather than industrial chimney. It is likely to become a landmark around the area. The flues will be a matt light grey colour, with the blades between finished in the same green as the curved ACC screen to provide visual interest.

## The Subsidiary Buildings

Many of the required ancillary structures are incorporated into the main building. E.g. the weigh bridge control room is within the MRF office component, from where it has excellent visibility of the weighbridges and visitors' access road. Being an ancillary structure with a support function, it is considered that the gatehouse should be of simple, low-key design, complimentary in design to the main building.

## Materials

The acceptability over time of the appearance of the complex will depend on the ability of the materials of the building envelope to maintain their "as built" appearance over time.

We have not sought to overcomplicate the facades and a small palate of materials has been selected for the external envelope. They have been chosen to provide the following characteristics:

- Maximum reliability and stringent weather tight performance at height;
- Long life manufactured products with a guarantee in excess of 25 years have been selected to ensure that the materials 'grow old gracefully', particularly in this aggressive costal environment, in order to keep maintenance to a minimum.
- Economic and with the capacity to be used innovatively;
- Lightweight and easily mechanically fixed to enable the frames to be clad rapidly;
- Following erection, permit undercover working and provide protection to the internal plant and machinery at the earliest opportunity;
- Self-cleaning surfaces to reduce the frequency of maintenance;
- A high quality design appearance produced by the precision of their form and finish as indicated in the concept drawings;

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- Translucent material are glare free providing a diffused natural lighting to provide a good working environment for staff;
- Complement the strong concept when viewed from a distance, but provide more interest at medium and short range as a result of the textures and colours of the materials
- Are simple to assemble and detail due to their modular nature
- Construction systems that incorporate robust detailing and high quality specifications to ensure the air tightness of the offices external envelope;
- Systems that can be safely constructed and maintained (especially for working at height on the roof and high wall areas).

These material characteristics will be incorporated into the Employer's Requirement document and the design risk assessment of the CDM documentation. The EPC will have the freedom to offer alternative options that are equal to those indicated and approved by the client.

The scale of the building means that care will need to be taken to reduce risks to the construction and maintenance workforce both during the design, construction and maintenance of the building over its life cycle. These issues have been carefully addressed in the concept design.

The design includes gutters, meaning that the roof will need to be accessed for periodic gutter cleaning. The sides of all roofs have in-built edge protection as a result of the spine walls extending approximately 1.5m above the roof height at any point. Gutters will be designed in excess of .5m wide minimum so that a maintenance operative can walk in the gutter. Gutter lines will be provided with a fall restraint system along their entire length. Gutters are generally set in 2m away from the low point of roofs, thereby avoiding the need for edge protection at the low point.

Openings in the cladding at ground level, for articulated vehicles, will be protected from impact damage by robust concrete surrounds and Trief type safety kerbs or wheel guides which will prevent any vehicle approaching too close to the building fabric.

## Roof

A Kalzip aluminium standing seam roof with pre weathered finish will be used for the roof planes. The material will be rolled on site so that a continuous length will be formed over the entire length of the building to avoid joints and reduce significantly the risk of future maintenance.

## Translucent Façades and Natural Light

A key design principle is the provision of natural lighting for the operation of the plant and for the benefit of the workforce. Translucent polycarbonates are proposed for the planes of roof lights. The roof lights are located between the spine walls to provide natural light in key areas where vehicle movements and operational activities are

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taking place within the building envelope. These translucent areas are designed to give an attractive finely graded appearance and articulate the transition from wall to opaque roof. The panels will change appearance in fluctuating light conditions throughout the day and night. At night the panels limit light transmission and minimize light spillage to the outside of the building. The material, whilst translucent, limits the direct type of light spillage that is always associated with glass curtain walling.

The material used for all translucent panels will be Danpalon polycarbonate or an equivalent by Rodecca. Although this material is not well known in this country it has established itself through the manufacturers named above on innovative and award winning projects in this country and abroad. Examples can be provided if required.

## Opaque facades

The external opaque facades that form the geometry of the design are simply expressed as projecting spine walls of Corus colourcoat prefinished sinusoidal or trapezoidal sheeting.

## Offices and Visitor Centre

The materials proposed for the offices and Visitor Centre façade will bring interesting shapes, textures and colours to the medium and short distance views of the building at the entrance to the facility. Shading is provided to the south facing EfW offices by means of a free standing perforated aluminium screen. Behind the screen a gantry will provide access to the considerable area of south facing glazing for regular cleaning of the windows. The screen will be colour coated the same Viridor green as the curved ACC screen and chimney blades, forming a striking entrance to the complex for visitors and staff alike.

## Air cooled condenser

The ACC will be screened with a simple circular drum of perforated metal. Three materials are currently being considered:

- Corus profile TR 28/137-RV 8 -12 with a perforation diameter of 8mm and a perforation ratio of 40% and coated in a colour RGB = 68, 220, 132
- Kalzip perforated standing seam profile KZ65/305 P coated in a colour RGB = 68, 220, 132
- Potter and Soar metal meshes for architecture, type Coniston 319.

## Parking and Pathways

The parking areas and pathways to the offices and Visitor Centre are formed using concrete paving blocks in attractive linear tartan grid patterns related to and reinforcing the geometry of the building and containing contrasting colours and textures. The paving pattern will emphasize the route up to the entrance in the perforated screen. The parking area has been designed so as to retain undisturbed the healthy mature trees along the south boundary of the site.

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## PROPOSED LANDSCAPE STRATEGY

A high quality landscape treatment has been provided to surrounding the RRC. A key element of this has been to retain as many of the mature trees on the site as possible within the wider constraints of the design and brief. This has been achieved by surveying the existing trees along the southern edge of the site to identify the specimens in good condition and worthy of preservation. The intention is to retain as many of the healthy mature trees as possible to provide a high quality boundary treatment onto Severn Road and future neighbours to the south. Retaining established trees along the boundary will also form a visual screen and foreground to the angular composition of the RRC building behind.

The driving geometry of the architecture is carried through directly into the landscape strategy for the site in order to provide cohesion:- the geometry of the building and form of the air cooled condensers is reflected in the configuration of the access roads, the entry facilities, hard landscaping to the staff car parking and the visitors' areas, and soft landscape arrangement.

Structured tree planting reinforces the geometry and the quality of the soft landscape will alleviate the effect of the urbanising influence of the car park and access roads within the wider setting.

The car park and frontage to the building is designed as an integral part of the landscape treatment and ensure pedestrian movement is not determined and restricted by vehicular movement requirements. Tree planting and shrub planting will provide strong definition and legibility enabling integration of the car park into the wider setting.

Trees aligned to the road and car park spaces comprise species indigenous to the area. The trees and shrubs are chosen for their aesthetic quality, the locality, soil type and are native to the local landscape.

The land surrounding the plant is to be seeded with a low maintenance grass mix, with occasional benches that will be used for visitors and workers. Aquatic species will be integrated into the water collection and attenuation ponds. The bottom ash storage areas are set well within the site boundary in order to provide landscape zones to link the development to its surroundings.

## SUSTAINABILITY

Viridor is committed to sustainable buildings and will ensure that the facility meets high standards. Planning Policy Statement 1 (PPS1) - Planning and Climate Change, was published in December 2007. It is centred around the objective of reducing carbon emissions from all new development as well as ensuring that new developments are tolerant of predicted climate change.

A primary objective of the development team has been to address sustainable building principles from the earliest concept stage. Viridor will ensure that this objective is carried through to the detailed design and construction stages as a fundamental design requirement.

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Key issues including those discussed previously in this statement are summarised as follows:

- The use of residual waste following re-cycling to generate steam and power;
- The use of ground granulated blast furnace slag as a replacement for Portland cement in the concrete mixes for the works;
- The collection of water in tanks and the water attenuation ponds and its re-use within the process equipment, the offices and ancillary accommodation;
- The principles of low energy design for the design of the offices and visitor centre;
- The use of natural light and ventilation in the MRF and EfW.

The main EfW plant areas will not be provided with space heating or cooling systems since this is not a requirement of their function.

A sustainability statement has been prepared that will form part of the Employer's Requirements at tender. This statement sets out Viridor's aspirations for a sustainable solution, and sets standards that will have to be met by the contractor in order to achieve the credits necessary for a 'very good' BREEAM rating.

## PRINCIPLES OF LOW ENERGY DESIGN

Established principles of low energy design have been used in the offices and Visitors Centre including the following:

- The depth of the office components are limited to 12m to maximise the potential for natural lighting;
- The perforated screen to the south of the EfW offices acts as a brise-soleil, shading the south facing windows and cooling incoming air
- Walkways are incorporated into the brise soleil at floor levels to enable safe and easy cleaning of the façade.
- To reduce cooling requirements, the structure will be of reinforced concrete with exposed concrete soffits to the floor slabs. These soffits will form the ceilings;
- The energy requirement of the offices is generated on site by the EfW;
- The construction methods and systems will reduce air leakage to a minimum. The building envelope will be to or in excess of the new airtight standards required by the building regulations;

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## BREEAM Assessment

The Employers Requirements of the Engineering Procurement Contract will require the detailed design to achieve a “very good” BREEAM<sup>3</sup> rating. The scheme has been pre- assessed using the BREEAM industrial system.

## Water Harvesting and Management

The RRC building is designed with a sustainable drainage management scheme. It re-uses rainwater following collection in tanks within the building envelope for use in the process plant. The ponds around the northeast boundary and around the ACC (a part of the pond is for use in the event of fire on site) form an integral part of the green infrastructure and have been designed as surface water attenuation facilities to protect the RRC facility for up to and including the 1 in 100 year storm event (incorporating an allowance for climate change), to allow controlled release of runoff into the local watercourses. Further SuDS provision may be provided as part of a holistic surface water and fluvial flood risk management strategy to be formulated in partnership with the Lower Severn Internal Drainage Board.

## Sustainable Materials

Materials selection for the buildings has been informed by sustainability principles, in terms of the long-term performance of the materials and the integrated lifecycle management programmes of the manufacturers. Concrete, steel, aluminium, polycarbonate are the principle materials used and can all be recycled. Selection will avoid the use of construction materials which contain Chlorofluorocarbons (CFC) or which use CFCs in their manufacture.

Recycled aggregates or masonry will be used for structure and slabs where practicable including base material for the construction of the site access roads.

Ground Granulated Blast Furnace Slag (GGBS) will be considered for all concrete works during the detailed design stages as a replacement for Portland cement in concrete mixes to reduce carbon emissions. The decision on its use will be geared to the acceptability of the suppression of “strength gain” and programmatic issues such as whether the major concrete elements are to be constructed in summer or winter.

The Kalzip Aluminium standing seam roof is produced in a sustainable closed loop. Research shows that aluminium can be recycled infinitely with no loss in performance. The benefits of recycling aluminium lie with its high scrap value and low energy requirements in the recycling process, only 5% of the energy required in the original primary process is required for repeated recycling. The material has a long life. The Kalzip system is demountable and at the end of the buildings life as it can be unzipped and recycled with no loss in volume or quality.

The main buildings have steel frames and steel cladding to the walls. Steel is produced in a “sustainable loop”. It can be recycled again and again without

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<sup>3</sup> Building Research Establishment Assessment Method

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degradation and it is probably the most widely recycled material in the world with over 354MT recycled annually through a well-established infrastructure.

The translucent polycarbonate panels have low maintenance characteristics and are virtually self-cleaning. The manufacturing companies have well founded recycling policies with both closed and open loop outcomes. The material provides the advantages of high quality diffused natural lighting for the benefit of the workforce.

The main façades can be dismantled, reused or recycled if required at the end of the useful life of the building.

### Noise Attenuation

Operational noise has been an important consideration during the design process both to protect local people from intrusive noise and for staff to enjoy a good working environment.

The principle adopted has been that the best way to minimise noise levels is at source by selection and design of equipment and components. The Control of Noise at Work Regulations 2005 requires that operational staff should not be exposed to noise levels above a specified level without adequate hearing protection.

All processes with the exception of the Air Cooling Condensers (ACC) and bottom ash curing and long-term storage have been located within the building envelope. The noisiest sources, for example, the steam turbine, will be further enclosed to contain radiated noise levels down to the required level.

Materials chosen for the building envelope will contribute to the attenuation of the residual noise. The polycarbonate walls can be formed with twin panels where necessary to provide further noise attenuation. Enclosing walls have double skin built up metal panels with insulation.

Dominant sources at night will be dealt with as follows:

- the Induced Draft fan will be suitably silenced and has been incorporated in the building envelope to aid noise attenuation. The stack exhaust will be attenuated in the discharge duct from the ID fan;
- the large fans of the air-cooled condenser will be intrinsically low noise and selected to meet the strict noise limits as set out in Chapter 8 of the Environmental Statement;

Detailed analysis is set out in the Chapter on Noise and Vibration, in the Environmental Statement.

### Implementation, procurement and design control

Pre-planning consultation has taken place with the South West Design Review Panel (SWDRP) and with the public. The architectural design is now completed to the stage necessary for consultation to take place. Following consultation minor amendments

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will be completed and it is programmed to submit the design to Bristol City Council for planning approval in late October 2009.

The EfW will be procured through an Engineering Procurement Contract (EPC). The lead Contractor 'Construction Industrielles de la Mediterranee' (CNIM) will be a one-stop shop for the delivery of the detailed design, procurement, construction and commissioning of the facility. CNIM

CNIM will appoint all the consultants, engineers and architects and sub-contractors necessary to develop the detailed design and delivery of the project.

Control of the quality of the detail design remains with the employer, Viridor, their architectural advisor SLR-Architecture and the SLR project team of other necessary consultants. Standards will be set in the Employers Requirement Contract Documents together with the approved Planning Drawings and Illustrative Material. These written documents and visual images set the design standards for the EPC contractor's detailed design of the process plant and the building and set out all the information necessary for the successful implementation of the planning approval to the client's requirements.

The offices have been conceived, for example, using sound principles of low energy design. This will enable the EPC contractor to achieve a high standard energy efficient solution at the detailed design stage. For this discrete element of the facility the Employers Requirements will require the contractor to achieve a very good/excellent BREEAM rating for energy efficiency and the conservation of fuel and power.

Control and co-ordination of subcontractor design will be undertaken by CNIM/Lagan appointed architects and other consultants and agreed with the Viridor/ SLR professional team.

CNIM/Lagan are contractors with extensive experience in the construction of EfW projects. They will deliver the contract in a manner that will minimise the impact on the environment and the local community. The EPC contractor will be required to join any Considerate Contractor scheme Bristol City Council may have in place during the construction period.

## CONSULTATION

The concept design for the Severn Road Resource Recovery Centre forms part of a full public consultation process currently being undertaken by Viridor Waste Management. Viridor place high importance on consultation locally and regionally and have therefore engage a PR consultancy to assist in managing and getting maximum benefit from the engagement process.

Public exhibitions took place on Wednesday 22 July 2009 at Hallen Sports & Social Club (15:00-19:30), and on Thursday 23 July 2009 at the Avonmouth Community Centre (15:00-19:30). The exhibitions were publicised via an advert in the Bristol Evening Post as well as editorial in that paper. In addition, leaflets were posted through the door of every residence in Avonmouth and Hallen. The purpose of the exhibition was to describe the proposals, hear the views of local people and explain:

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- why planning permission is being sought for a Resource Recovery Centre;
- why the development is proposed at Viridor's site at Severn Road Chittening;
- the full content of the architectural proposals with rendered plans, sections and elevations, computer model images, architectural visualizations and a fly around of the RRC in its setting showing the adjacent developments and any necessary road improvements immediately adjacent to the site will be available.

A total of 38 people attended the exhibitions and this included representatives from:

- Bristol Port Authority,
- South Gloucestershire Council,
- Avonmouth Community Council,
- Shirehampton Community Action Forum,
- Hallen Village Committee
- Pilning and Severn beach Parish Council.

The general consensus from exhibition attendees was that the proposed facility is needed and cautiously welcomed, due to:

- recycling and waste management being such an essential service, and a topical and increasingly expensive issue;
- the proposed facility looked aesthetically very good and offering a vast improvement on the buildings already in the area
- the job creation being proposed is very needed.

The main concern expressed by residents has been the issue of traffic and the volume of vehicles travelling back and forth to the facility. This is something that Viridor is actively addressing in its Environmental Impact Assessment as part of its Planning Application. However, Viridor has also already sought to allay local resident's fears by confirming that no vehicles associated with the scheme would travel through the villages of Hallen or Avonmouth, and would instead use only the main A4 and A403 access, and that junction improvements off the Severn Road have been identified as appropriate.

In addition to the two public exhibitions, Viridor has also presented its plans to Avonmouth Councillor Siobhan Kennedy-Hall, Northavon MP Steve Webb and Jim Smith of the Avonmouth Community Council. A discussion has also taken place with Pilning & Severn Beach Parish Council (7 September).

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Viridor have recorded the comments of local people and are responding to their views and questions. The comments are reported within the Statement of Community Involvement that forms part of the appendices of the planning application in Volume 1.

The Architectural proposals have been discussed with Bristol City Council planning officers, and an information briefing was made to the Bristol City Council on 2 September 2009.

Viridor have put the project forward for consultation with Design champions as recommended in CABE's guide to designing waste facilities. Due to its regional prominence, the South West Design review Panel chose to review the design locally rather than offer it to CABE for central review. The project was therefore presented to a sitting of the South West Region Design Review Panel (SWDRP) on 14 July 2009. The Commission advised that a more detailed landscape scheme would be beneficial, and that the building form could benefit from some simplification. The panel's advice has been taken into consideration and as a result, a detailed landscape proposal is being submitted as part of the planning application, and the form of the building has been substantially simplified on the southern side. A copy of SWDRPs comments on the scheme and SLRs draft response to SWDRP are attached as appendices to this Design and Access Statement.

## ACCESS TO CLADDING, WALLS AND ROOF, CONSTRUCTION SAFETY AND CDM REGULATIONS

The cladding materials described in the materials section above are virtually self-cleaning. However, high level access will be required for the construction process and occasional cleaning during the life of the building. It is planned that this would be done from a cherry picker with appropriate height and reach. To this end, in addition to the perimeter roads, a strip of stable, hard and level ground will be provided around the perimeter of the building, from which the cherry picker can operate. The width, stand off from the building, finish and supporting layers, will be determined by the space requirements of cherry picker used for the construction by the Engineering procurement contractor and in future by Viridor's maintenance operatives.

A small number of EfW parts and equipment need to be located externally. A section of flat roof has been incorporated into the design to accommodate these. This area is accessed by stairs from the inside of the building through a roof hatch, and has built in edge protection by virtue of the area being recessed into the roof plane.

The main roofs will have gutters set in from the lower edge; Provision is made in the design for safe access for cleaning of these gutters from the roof. A fall restraint system is associated with all gutters. Access to the start of the fall restraint system will be provided from the inside of the building, with a clearly demarcated safe route laid out on the roof. Gutters will be sized during detailed design to provide a suitable capacity to take run off, the gutters will be in excess of 500mm wide to allow for a man to walk and clean them

### Access

#### *Inclusive access and design*

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Inclusive design aims to remove barriers that create undue separation between those with differing abilities. It enables everyone to participate equally, confidently and independently in everyday activities. Viridor requires that this is integral to the proposals.

This access statement will assist in ensuring that the “evolving duty” placed on service providers, employers and educators in the Disability Discrimination Act 1995 (DDA) can be better addressed. The document will pass to Viridor as the long-term managers of the facility and be incorporated in their structured programme of review.

Accordingly, the design of the facility has developed in accordance with the requirements of The Building Regulations (2000) Part M, Access to and Use of Buildings (2004 Edition), and the Approved Document to Part M (2004)

The following documents have been taken into account.

- designing for Accessibility (2004) Centre for Accessible Environments;
- colour contrast and perception (2004) University of Reading;
- building Sight (RNIB); and
- the Sign Design Guide (The Sign Design Society).
- The disability Discrimination Act 1995
- BS5588: Part 8:1988, Fire precautions in the design construction and use of buildings;
- BS 8300: 2001 "Design of Buildings and their approaches to meet the needs of disabled people –Code of Practice".
- BS 7954 Code of Practice for audio-frequency loop systems.
- BS EN 60118-4, Hearing aids - Part 4: Magnetic field strength in audio-frequency induction loops for hearing aid purposes.
- BS:8501: 2002 Graphic symbols and signs - Public Information Symbols.
- BS: 5588-8:1999 Code of practice for means of escape for disabled people.

## *Principles*

The site layout and the general arrangement of the RRC facility has, as far as is possible at this stage, considered the removal of unnecessary physical barriers to the movement of people with and without disabilities around the plant and offices.

The principles used to create an inclusive design are to:

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- provide equitable access;
- allocate appropriate space for people;
- ensure ease of use and understanding;
- design for minimum stress, physical strength and effort;
- design a safe, comfortable healthy environment; and

## Vehicle Access to the RRC Facility

Vehicle access to the site will be from Severn Road, via a revised junction and new access roads inside the boundary of the site. The access road will be provided with a new gatehouse. The weighbridge, integral to the MRF offices, will control all access to and from the site.

## Public Transport

The nearest bus stop to the application is located at the junction of the A403-Severn Road / A403-Chitting Road, which is within the desirable maximum walk distance of 400 metres. This bus stop is serviced by the 41 and 40A bus services that are operated by First Buses.

These services operate between Avonmouth and Cherry Gardens via Shirehampton, Bristol City Centre and Kingswood. The weekday services commence 06:13 and cease at 23:03. After 19:00 hours the 41 service ceases.

A Travel Plan will be developed by Viridor to encourage the use of public transport and discourage car use for the construction period and later during normal operation of the facility.

## Vehicle Circulation within the site

One of the primary aims of the access road circulation system has been to enable swift processing of both incoming and exiting vehicles whilst ensuring that incoming vehicles eliminate any queuing of vehicles on the public road external to the site. The second aim has been to minimise vehicle conflicts within the movement patterns and deliver a safe site.

Vehicles leaving the public highway, to access the RRC facility will enter the site via a redesigned junction on Severn Road and enter a "ferry style" queuing apron for entry and exit that mixes incoming and exiting vehicles in a fully controlled system supervised from the weighbridge control point located in the MRF Offices.

To minimise waiting times and eliminate conflict with large operational vehicles, staff cars and visitors will proceed immediately to the right following entry to the site. The crossing point with exiting vehicles will be signal controlled by the weighbridge control

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point. They immediately access a discrete car park at 7m AOD level to gain access to the Offices and Visitors centre.

Operational vehicles proceed via the weighbridges into the triple access way between and within the EfW and the MRF buildings.

- Waste vehicles will proceed into the tipping hall via the right hand access way and continue through the hall, reverse into the loading and unloading bays for the residual waste bunker, before returning to the weighbridge via the one way system of the roundabout and the peripheral road around the MRF. This movement arrangement allows the natural safe reversing of right hand drive vehicles depositing waste into the bunker.
- Lorries for the loading and transporting of incinerator bottom ash off site will proceed along the central access way straight through the roundabout turning right into the bottom ash treatment area to load residue separated from the ash or into the storage area to load treated bottom ash. All vehicles entering the bottom ash area will proceed through a wheel wash facility before returning to the weighbridges prior to leaving the site.
- Lorries for the MRF will take the left hand lane, turn left onto the MRF apron, reverse into the MRF unloading area to deposit their load before returning to the weighbridges via the one way peripheral road. Following sorting, the waste will be loaded onto smaller vehicles for transport to the EfW bunker around the peripheral road and weighbridge by returning to the tipping hall bunker.
- Vehicles for the residue Silo's, the flue gas treatment area and plant maintenance proceed along the central access way turn right at the roundabout, proceed along the east west route turning right into the flue gas treatment area load or unload within the building returning to the weighbridge around the peripheral road running between the turbine hall and the ACC.

Emergency vehicles are able to circumnavigate the building by the soft link connecting the car park access way to the peripheral road around the chimney. All loading and unloading will take place within the buildings.

### Vehicle parking

A safe parking area will be provided for staff and visitors in front of the offices. Parking provision at the site has been devised in line with car parking standards and guidelines operating in the Bristol City area.

The parking area has discrete circulation away from the lorry circulating routes. There will be 76 car parking spaces at the site, 4 of which will be larger spaces specifically designated for blue badge holders. A lay-by is to be provided for a visitor's coach or minibus standing.

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## Cycle Parking

In order to encourage staff to cycle to work in line with the Travel Plan initiatives, covered cycle storage for 20 bicycles will be provided for cyclists adjacent to the administrative building as shown on Drawing no 21.

## Pedestrian Access to the Building

Access to the entrance of the main facility, the Visitor Centre and the EfW offices is gently ramped, designed to wheelchair standards of gradient with non-slip surfaces. It also has contrasting coloured bands and textures to aid perception for people who have visual impairments. The spaces specifically designated for blue badge holders are located nearest to the entrances to the offices and main facility.

## Routes and External Lighting

Good quality signage is recognized as making a major contribution to orientation and way finding within a building, as well as assisting with locating fire escape exits and routes. A consistent, stylish signage format with clear contrasting graphics will be used throughout the facility and will be sited using the principles outlined in the Sign Design Guide. Braille text will also be used to assist those with visual impairments.

The main entrances to the plant and the offices will be highlighted using visually distinctive materials and luminance contrast. A suitable level of external lighting will be provided to the pedestrian footpaths, roads and car park areas to facilitate safe use at night. Fittings will be carefully positioned to minimise areas of strong contrast or deep shadow.

## The main entrance to the offices and Visitors Centre

The EfW and MRF staff entrance lobby is located in close proximity to the staff and visitors car park. This will be secured by means of a system to be specified by the operations staff at a later date. Any controls or communications device associated with the operation of this entrance will be located at a height suitable for disabled persons and in compliance with Part M of the building regulations. The entrances will be level, have flooring of non slip resistant materials and be kept free from hazards at all times.

## The reception areas, Visitor's Centre and seminar rooms

The areas will be designed to maximise inclusion, both actual and perceived. Reception desks will be procured during the fit out stage and will be designed to the latest design guidance available. Part of the desk will be reduced in height to provide a receiving point for wheelchair users. The reception desk will provide a contrast in colour to the background walls to enable people with a visual impairment to define the boundaries of the space. An induction loop will be provided to assist staff and visitors who are hearing aid wearers.

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## Internal circulation

The exact location of horizontal and vertical circulation and selection of materials for internal finishes within the RRC facility will be finalised during the detailed design phase. In many cases due to the nature of the plant detailed design decisions will be equal to but may exceed the latest best practice guidance in terms of width of corridors, doors and manoeuvring spaces. Surface finishes to walls, floors and ceilings, colour and luminance contrast, lighting and the usability features, for example, control panels and switches will be addressed in accordance with best advice.

## Corridors

Corridors will in general have a minimum width of 1.5m with passing places available at regular intervals. Finishes will minimise reverberation time and lighting levels will be uniform. Care will be taken that the need for concrete soffits to the ceilings does not conflict with this requirement. Where the unobstructed width of any corridor is less than 1.8m wide passing places of at least 1.8m long will be provided at reasonable intervals. Corridors between lift lobbies and adjacent sanitary accommodation will have a minimum width of 1.5m.

## Lifts

Lifts will be selected which maximise the opportunity for independent use by staff and visitors with disabilities and will be large enough to accommodate most self propelled and electrically powered wheelchairs. In the offices, the main lift up to the control room lift will be specified to take up to 17 persons. This will allow large groups of school children to be taken up to the control room with relative ease. The lifts in the plant will be large scale and adequate for all users. The lifts will be designed in accordance with Part M and will have audible and visual alarms. The lifts will be designed in accordance with Lift regulations 1997 SI 1997/831 and BS EN 81-70: 2003 'Safety rules for the construction and installation of lifts – Particular applications for passenger and goods lifts' to provide easy access for all.

Fire fighting lifts are designed for use as passenger lifts on a day-to-day basis in accordance with Part M. Disabled refuges will be provided within the fire fighting lift lobbies. The exact numbers and positions of lift cores will be finalised at detailed design stage when the plant and equipment choices are completed.

## Single Doors leaves

These will provide an effective clear width of 800mm with a 300mm clear space adjacent to the opening edge to allow wheelchair users and people with limited mobility to approach and open the door.

Closers will only be fitted where required for fire control and where ever possible will operate with a maximum force of 20 Newtons applied to the leading edge when opening the door leaf. Vision panels will be provided where possible.

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Ironmongery will be provided with good colour and tonal contrast to the background and can easily be grasped and operated e.g. use of lever handles in lieu of knobs and use of large thumb turns.

## Toilet Features

Wheel chair accessible lavatories are provided on all floors. Both male and female toilets will be suitable for wheelchair users and will be fitted with a different choice of left hand or right hand transfer at each alternate floor level meeting the recommendations of BS8300: 2001 and the guidance identified in the Approved Document to Part M (2004). All doors to wheelchair accessible lavatories will open outwards.

Sanitary accommodation will be in accordance with BS 8300, figure 60 specifications. Terminal fittings will comply with Guidance Note G18.5 Schedule 2 Requirements for Water Fittings, Water supply Regulations 1999. Doors to WC's will have a light action privacy bolt and an emergency release mechanism capable of being opened from the outside.

All walls and floors will contrast visually and surface finishes of sanitary fittings and grab rails will contrast with the background and floor finishes.

Doors will be outward opening with a horizontal closing bar fixed to the inside face. Minimum dimensions and arrangement of fittings are in accordance with M1/M3 diagram 18. The height and arrangement of fittings will comply with M1/M3 diagram 19. WC pans will conform to BS 5503-3 or BS 5504-4 for dimensions to accommodate variable height toilet seat riser and cisterns will have a flushing mechanism on open side/transfer side irrespective of handing.

An emergency assistance alarm with reset control is provided in each facility. The emergency pull cord will be red, as close to the wall as possible with 2 red 50mm bangles, one at 100mm and the second at 800-1100mm high. This will be connected to an external alarm or equivalent response system that is linked to a continually staffed area.

In addition to toilets, changing and shower rooms will be provided in the EfW plant area. These will be provided and available for all personnel based at the EfW Facility. These amenities, arranged with a clean/dirty division to improve hygiene standards and reduce cleaning, will also be available for those who choose to cycle to work.

## Other access features

Hearing enhancement systems will be fitted at the reception areas, in the seminar rooms in the ground floor Visitors' Centre and control room.

Detailed colour schemes are currently undefined to date. The colour schemes will be chosen to highlight walls, floors, counter doors and ironmongery. The guidance used will be from design guidance produced by the Royal National Institute for the Blind

Good natural and artificial lighting is crucial in ensuring that people with visual impairments are able to use the building and the surrounding environment

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conveniently and safely. The luminance on interior surfaces, the quality of the lighting, good colour rendering and the avoidance of glare are key factors that will be considered.

Detailed design of external lighting is undefined to date, however lighting levels will be appropriate to specific environments and have an even distribution of light, with no pools of bright light, dark and shadows. The use of matt surface finishes will avoid reflection and glare.

Room lighting and task lighting will be designed to provide a clear definition between work surfaces and manoeuvring spaces with task lighting at work surfaces in the offices having a higher illumination than the ambient room lighting.

### Means of escape and emergency evacuation

All features and materials will comply with Part B of the Building Regulations. Drawings and specifications will be kept under review during the detailed design process.

The fire alarm system will emit audible and visual signals to warn occupants. Detailed design of the vertical cores will be necessary in the next design stage; each would have protected fire escape stairs, thereby ensuring alternative means of escape. A refuge is provided at each floor level for wheelchair users unable to use the stairs. Disabled persons alarms will be provided in the refuges. The refuges are set away from the flow of people using the escape stair but in clear view of fire fighting personnel.

Fire fighting lifts may be used for the evacuation of disabled people prior to the arrival of the Fire Brigade. On their arrival the Fire Brigade will assume responsibility for the lift and the evacuation of any remaining persons. It will be the responsibility of the building management and occupants to ensure that people with disabilities are evacuated from the facility when the fire alarms are activated.

Staff working in the premises are 'known quantities' and their individual needs will need to be assessed and agreed with them. It is recommended that personal emergency egress plans (PEEPs) be devised for all members of staff who require assistance and that these be developed in consultation with the member of staff and the local fire officer, the Fire Precautions (Places of Work) Regulations 1997 and BS 5588 Parts 1,2,5 and 8.

Specific measures to meet the needs of disabled visitors in an emergency will include the training of staff to provide assistance where safe to do so. Emergency evacuation routes will be clear and unobstructed and clearly signed.

Notification of people with a hearing impairment of the need to evacuate the building, particularly where the person may be alone, e.g. in a lavatory or cellular office, will be provided by flashing lights.

### Staff Training

# DESIGN AND ACCESS STATEMENT

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Staff training needs will be cited and planned for in Viridor's management policies. Disability awareness training, the testing and use of specialised equipment such as induction loops, personalised lighting and communication equipment will be an integral part of Viridor's on going staff development programme.

Viridor's maintenance team will maintain the building and its facilities. A checklist of key specific maintenance points to ensure continuing accessibility will be included in the O&M manuals.

## REVIEW

Viridor is committed to undertaking a structured programme of regular reviews of new technologies, constructional developments and training to ensure that the on going and evolving obligations imposed by the DDA are met.

This design and access statement will form part of a suite of documents which Viridor management will keep under regular review throughout the procurement process and the on going operation of the plant.

## List of Drawings set out in Volume 1

Drawing EfW-POR-21 Plan at Level 0.0m

Drawing EfW-POR-22 Control Room Plan at Level 30.0m

Drawing EfW-POR-23 Roof Plan

Drawing EfW-POR-24 South West Elevation

Drawing EfW-POR-25 North East Elevation

Drawing EfW-POR-26 South East Air Cool Condenser Elevation

Drawing EfW-POR-27 North West Elevation

Drawing EfW-POR-28 North East Sectional Elevation

Drawing EfW-POR-29 South West Bottom Ash Store Elevation

Drawing EfW-POR-30 Cross Section

Drawing EfW-POR-31 Longitudinal Section

Drawing EfW-POR-32 Office Plans

Drawing 0036.00374.16\_SRC1 (Rev A) Conceptual Landscape Masterplan.

Architectural Visualizations

1. View from the South West after Gatehouse

# DESIGN AND ACCESS STATEMENT

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2. Aerial View from east

## Glossary

ACC	Air Cooled Condenser
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
BREEAM Method	Building Research Establishment Environmental Assessment Method
Brise Soleil	These are horizontal fixed louvers supported off the external face of the office building used to exclude the sun whilst letting in daylight and giving views through the windows.
CABE	Commission for Architecture and the Built Environment
CDM	Construction Design and Management
CFC	Chlorofluorocarbons
CPU	Central Processing Unit
DDA	Disability Discrimination Act
EfW	Energy from Waste
EPC	Engineering Procurement Contract
IBA	Incinerator Bottom Ash
MRF	Materials Recycling Facility
PC	Polycarbonate
PVF	Polyvinyl Fluoride
RNIB	Royal National Institute for the Blind
SNCI	Site of Nature Conservation Importance

28 July 2009

Mr D Butterworth  
SLR Consulting Ltd  
London Studio  
10 Forest Drive  
Keston Park  
Keston  
Kent  
BR2 6EF

Dear Mr Butterworth

**South West Design Review Panel**  
**SWDRP 55 14 July 2009**  
**Severn Road Resource Recovery Centre (SRRRC)**  
**Severn Road, Chittening, Avonmouth, Bristol, BS11 0YL**  
*Restricted circulation: this letter is not for publication\**

Thank you for coming to the Panel and for referring the case to us. We were grateful that your client and Bristol City Council were represented.

SRRRC is a major project, likely to be controversial, involving a range of issues. The Panel would like to make clear the limited role it is taking in response to the request for design review. We understand environmental impact is being assessed and we make no comment at this stage on emissions, noise, transport and access.

On location, we are not in a position to say that this is the best site in the area but it did seem to us to be suitable for the very large structure required. There may be sites closer to potential users of waste heat from the plant but these might well be less suitable for a large structure and with greater impact on residential areas.

It is an important principle that good use is made of the waste heat. If the heat is dissipated, then the efficiency of the process is low. The Panel is concerned that the process may be regarded as wastefully inefficient in 10 or 20 years time (and might even fall foul of a tightening regulatory framework). We ask therefore that every effort is made to market the heat, and we were encouraged to hear of the emerging Heat Plan. We also ask Bristol City Council to look carefully at how agreements or conditions can encourage and if possible ensure that good use is made of the heat.

A further and related principle is the need to allow for changes in technology and in policy and regulation. A structure tied to one specific process might be unusable even within its planned lifespan of 25 – 30 years. The principle of long life and loose fit is very relevant here (though we acknowledge that the structure for the Materials Recycling Facility has some flexibility). In particular, we urge that the possibility of installing photovoltaics is allowed for (if they are not included in the scheme itself); the case for PVs is likely to increase markedly in the next few years, and the very large area of roof required by the facility ought to be designed to accommodate them.

The Panel would like to offer comments on the architecture and landscape of the scheme shown to us.

You told us that Viridor's intention is 'to deliver a simple elegant building form with an interesting and well detailed, high quality external skin; a landmark for the area'. We think this aim is right, but do not consider that you have realised it yet.

There is a variety of forms and materials that make for complexity not simplicity. We'd encourage you to seek a quieter, more coherent envelope. This would be more rigorously functional and so have greater integrity. Simpler forms tend to be more flexible too. From the elevational views you presented us with we were reminded of a large boat and we felt the analogy was worth exploring further. This might lead you to a single structure with a more sculptural form. Large vessels, even super tankers, have walls leaning outwards and rounded or tapering ends – the end with the air-cooled condenser already has a marine elegance, but the opposite end is broad and blunt. A shift to a simpler structure might lead you to adopt just one colour and that might be to the good; if more than one colour is to be deployed, we suggest you experiment with less contrasting tones. The stacks, incidentally, work well displaced from the main structure.

Turning to site planning and landscaping, we welcome the retention of the more valuable trees on the site. We also welcome the principle of planting but the landscaping proposals were not well advanced as shown to us. We hope a strong landscaping scheme will be prepared and that sufficient space will be allowed for planting on the perimeter (where the hard surfaces seemed to allow little margin). We'd stress the need to offer a good front on all sides (the area is undergoing major change so that one should not assume that any aspect is unimportant). The quality and siting of the security fencing is important.

We hope our comments will assist you, your client and the Council to reach a worthwhile scheme. The Panel would be happy to help further with this scheme as it develops if this was thought helpful.

Yours sincerely

Timothy Cantell  
Manager, South West Design Review Panel

cc *Bristol City Council*  
*GOSW*

*\*Confidentiality*

*Since the scheme was not the subject of a planning application when it came to the Panel, this letter is offered in confidence to the addressee and those listed as being sent copies. There is no objection to the letter being shared within the respective practices/organisations. SWDRP reserves the right to make the guidance known should the views contained in this letter be made public in whole or in part (either accurately or inaccurately). The letter would also be made available to any public inquiry concerning the scheme. SWDRP also reserves the right to make the guidance available to a subsequent SWDRP session for the same site (or, if relevant, an adjacent site) or to another design review panel should a scheme go before them. If you do not require this letter to be kept confidential, please let us know.*

September 2009  
The Manager  
South West Design Review Panel

Our Ref: 409.0036.00413  
Your Ref:

Dear Mr Cantell

**RE: SWDRP 55 14 JULY 2009, SEVERN ROAD RESOURCE RECOVERY CENTRE (SRRRC)**

We would like to thank you and your panel for reviewing Viridor's projects at Avonmouth and New England Quarry, and for the constructive comments expressed on the review day and in your subsequent letters to us. We welcome your panels comments, have given due consideration to all the issues raised, and met with our client to agree our way forward. We respond under separate sections to the each of the issues raised on the two projects.

## **1. Severn Road Resource recovery Centre**

### **1.1 Use of surplus heat**

The heat generated by the combustion process is used to heat water within a water tube boiler to produce high pressure steam. This superheated steam is supplied to the turbine which drives the electricity generator. The generator has the ability to produce approximately 30 Mega Watts of electricity, enough to power some 30,000 homes.

An alternative use for this energy is that it can be passed out from the turbine and used to heat a local water network i.e. Combined Heat and Power (CHP). This is a more efficient use of the fuel source than electricity generation: surplus heat is not wasted as in conventional power generation, it is used where heat would have otherwise been generated using other fuels, such as fossil fuels.

Viridor are committed to maximising the opportunities for use of the surplus heat presented by the location of the Severn Road Resource Recovery Centre in the context of the industrial areas of Avonmouth and west Bristol.

In order to consider the potential for the use of heat, Viridor has contacted in excess of 50 companies, operators, developers, landowners, facility managers and amenity providers within a 5km radius of the application site. In addition, the Applicant is part of the Bristol Environmental Technologies & Services Partnership (BETS) which is aiming to deliver renewable energy solutions to businesses within the Avonmouth, Severnside and Bristol Port industrial zones. In collaboration with a number of other waste developers, the energy sector and proposed heat-users, the partnership is seeking to facilitate the delivery of sustainable energy solutions.

The result of user-search exercise has demonstrated that there is significant potential for existing and future development and significant enthusiasm from a variety of sectors to utilise the excess heat generated by the plant. With the facility designed to allow the removal of the heat, Viridor is confident that by the time the facility is fully operational (2014) the contracts and infrastructure will be in place to utilise this important source of renewable energy.

### 1.2 Future flexibility

The MRF is designed as a large span structure to reduce the number of supports within the foot print of the building. This approach will allow the MRF building to be used in other ways in the future. i.e. ensure future flexibility.

The EfW building however has very specific spatial requirements, such as a large bunker for waste storage, and a clear height in excess of 40m over the boilers. Such physical requirements ultimately mean that if the building is designed as a generic volume, it will have to be significantly bulkier than the current 'snug' fit design. Nevertheless, within the specifics of the brief, we are proposing a sufficiently 'loose fit' such that alternative technologies, such as gasification, could be fitted at a future date. In the case of an EfW, designing a 'loose fit' will inevitably lead to over sizing the building, with the associated problem of increased visual impact. We believe that our current design achieves a good balance by not enclosing unneeded volume with in the building envelope of the EfW, but the MRF being 'loose fit'.

### 1.3 Photo voltaic panels

The largest expanse of roof is oriented north west. Efficiency of PV panels on this roof would be much reduced due to this orientation. However, the roof over the boilers and bottom ash area are oriented south east, so there is scope to retrofit PV panels to these roofs. We are proposing a Kalzip standing seam roof for a number of reasons, one of which is that the system allows Photovoltaic laminates to be permanently attached to the standing seams as a retro-fit element. This allows Viridor the possibility of integrating renewable power generation at a later date when the pay back period of this technology becomes financially viable.

### 1.4 Envelope design

We have re-examined the shape of the building envelope. The design we presented provides the minimum satisfactory clearance above key equipment (crane, boilers, flue gas treatment area and turbines) from an operational point of view. Whilst the overall envelope could well be simpler and made up of fewer volumes, the result overall would be a building that was taller and bulkier, with a more intrusive visual impact. On balance, we believe that our strategy of making components compact, (which does cause the envelope to appear articulated), is a preferable approach, as it keeps the bulk of the building as lower, and breaks down what could become a monolithic mega structure. However, we have identified that the offices components could be simplified to produce a more elegant solution, and to this end have redesigning them as a simple linear component along the south edge of the EfW, with references to the language of perforated screens and ships established in the design.

### 1.5 Colour

With regard to your comments on colour, with the help of our VR team we are examining various colour options, to understand the effects that the variation of cladding angle will have on the tonality of the building. It may be that the variation in colour achieved through this simple device may be sufficient to articulate the separate planes. This process will lead us to

understand whether two cladding tones are beneficial, or whether a single colour achieves a better outcome. In any case, the cladding colours are likely to be conditioned, so this debate is likely to continue through the planning process, and undoubtedly the planning officer will contribute constructively to the final decision.

#### 1.6 Landscaping scheme

Viridor have commissioned our landscape section to develop a more detailed scheme for the site. A copy of the landscape design proposal is enclosed .A key aspect of the scheme has been to enhance the all perimeter and margins of the site as highlighted in your letter. To this end, a tree survey has been undertaken to pin point the location of the existing mature planting. The scheme has now been designed to get maximum benefit from the existing mature trees.

The following drawings are enclosed with this letter to illustrate the current proposals:-

Plan at Level 0.0m	EfW-POR-21.P0
Roof Plan	EfW-POR-23.P0
South West elevation	EfW-POR-24.P0
North East Elevation	EfW-POR-25.P0
South East Air Cooled Condenser Elevation	EfW-POR-26.P0
Cross Section	EfW-POR-30.P0
Longitudinal Section	EfW-POR-31.P0
Offices Plan- Sheet 1 of 1	EfW-POR-32.P0
Conceptual landscape master plan	0036.0037416_SRC1

We trust this letter describes the way in which your design panel's comments are being applied to the benefit of the designs as we progress the projects with our client to Planning. If you would like to discuss any of the issues further with us an informal basis, please do not hesitate to get in touch and we would be happy to do so.

Yours sincerely  
**SLR Consulting Limited**

**Ginny Dalrymple**  
**Principal**