

**Severn Road Resource Recovery Centre**

**Chapter 3 – Description of Development**

# Viridor

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# DEVELOPMENT DESCRIPTION 3

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### INTRODUCTION

- 3.1 Under Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 an Environmental Statement (ES) should provide a description of the development. In addition, it is normal practice for planning applications for waste management development to be accompanied by a supporting statement that describes, *inter alia*, the development proposals. As such, there is an overlap in the requirements of an ES and what is considered good practice for the submission of planning applications. Accordingly, Volume 1 (the Supporting Statement) also includes a description of the development. This section sets the basis against which the Environmental Impact Assessment (EIA) has been conducted.
- 3.2 This section describes the development for which planning permission is sought. These development proposals have been formulated following site investigations and assessment of potential environmental impacts arising from the scheme.

### OVERVIEW OF THE DEVELOPMENT PROPOSALS

- 3.3 As set out in Chapter 1 above, planning permission is being sought for the establishment of a Resource Recovery Centre incorporating a Materials Recycling Facility (MRF) and an Energy from Waste (EfW) facility on land off Severn Road, Avonmouth. The facility will be known as the Severn Road Resource Recovery Centre (SRRRC).
- 3.4 In summary, the MRF will sort and bulk up 150,000 tpa of recyclable waste and the EfW facility will generate energy and heat from the treatment by combustion of residual waste. The EfW will incinerate 350,000 tonnes of non hazardous waste, residual Municipal Solid Waste (MSW) and Commercial and Industrial waste (C & I) per annum and residues from other waste treatment processes. Residual waste is that which remains after materials suitable for recycling and composting have been removed.
- 3.5 In order to demonstrate the acceptability of the development proposals, a comprehensive development scheme has been prepared and is described in this section. The scheme addresses the construction and operation of the SRRRC and ancillary infrastructure; it describes the physical nature of the buildings and infrastructure to be constructed within the site, and the processes to be undertaken once the SRRRC is commissioned.
- 3.6 The development has been designed to ensure that the potential environmental impacts are kept to acceptable levels. This underlines the applicant's intentions and responsibilities to conduct its activities as a responsible neighbour and in a manner which is sympathetic to local amenity and causes minimal disruption to the local community. This section should be read in conjunction with the following drawings;

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Drawing No	Drawing Title
Drawing EfW-POR-21	Plan at Level 0.0m
Drawing EfW-POR-22	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

### SITE LAYOUT

3.7 Drawing EfW-POR-21.P0 illustrates the proposed layout of the facility. The Resource Recovery Centre would comprise the following elements:

- Materials Recycling Facility;
- Energy from Waste facility;
- Bottom Ash Recycling Facility;
- Visitor and Education Centre; and
- Ancillary development, including access roads, parking, weighbridges and landscaping.

3.8 Vehicles will enter the site from Severn Road to the south via an improved site access. Staff and visitors will turn to the right to access the car parking provided in front of the offices and visitor centre to the RRC. Operational vehicles will all turn left upon entering the site to access the weighbridge control area before proceeding into the site via a central access road off of which separate access to the MRF, EfW and bottom ash facility is provided.

### Materials Recycling Facility

3.9 The proposed MRF will occupy the western half of the proposed RRC building providing a large, flexible internal space which will enable a wide range of recycling options to be implemented as required by the market. The size of the building will, for example, enable the establishment of separate

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lines of recycling equipment enabling the plant to deal with a wide range of wastes and maximise the recovery of recyclate.

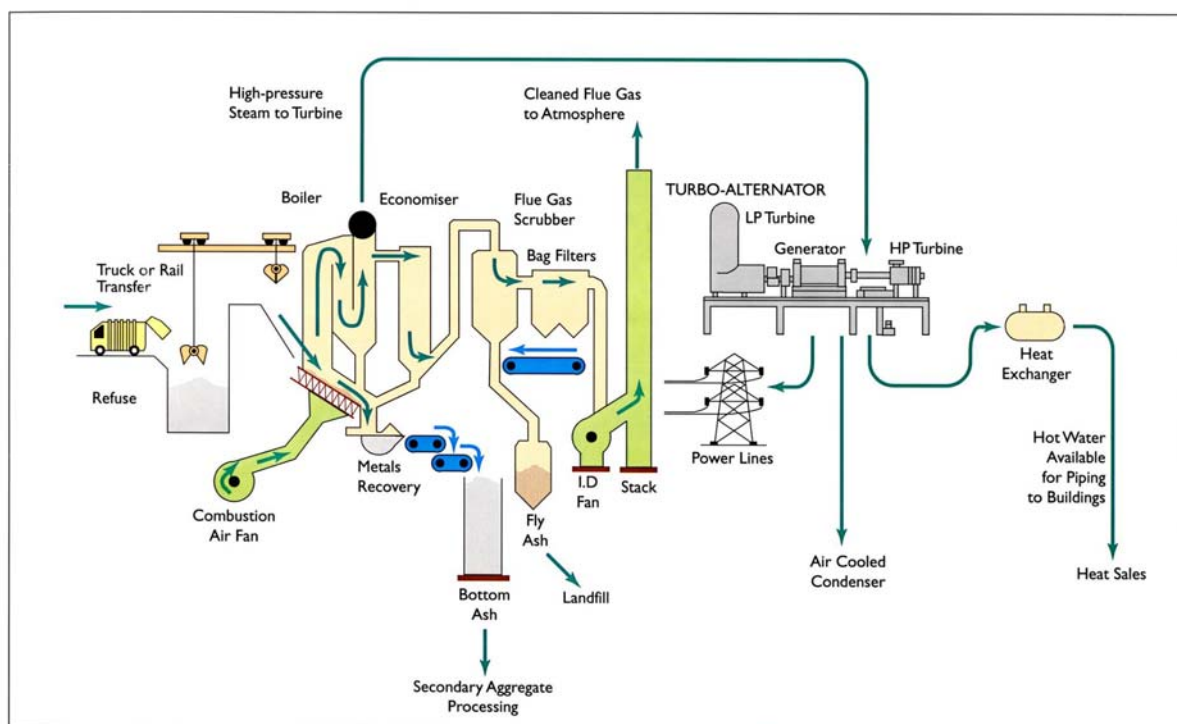
- 3.10 Waste materials will be delivered into the building and deposited within a designated tipping area. From here material will be loaded in to the processing equipment for the screening and sorting of recyclates and residual waste.
- 3.11 Recyclates from the process will then baled and stored within the building prior to dispatch from the bale collection area. Glass and timber, which cannot be baled, will be stored externally in an area adjacent to the bottom ash recycling facility.
- 3.12 Residual waste from the process will be placed in the waste store prior to dispatch to the EfW.

### Energy from Waste Facility

- 3.13 The proposed EfW will occupy the eastern half of the main RRC building. The main elements of the EfW proposals are:
- Waste reception hall with storage bunker, shredder and a waste feed system;
  - Boiler hall with a grate, combustion chamber and a heat recovery boiler;
  - 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;
  - Conveyor system to transport bottom ash to the recycling area;
  - Twin chimneystack to discharge the treated flue gases into the atmosphere;
  - An air-cooled condenser for cooling and recycling steam from the generating process;
  - Ancillary areas, control room, Central Processing Unit (CPU) room, bulky and light storage areas and electrical room, workshops etc.

3.14 Figure 3.1 below illustrates the EfW process.

**Figure 3-1**  
**Schematic Diagram of EfW process**



### Waste Reception

- 3.15 The waste will be delivered to a dedicated handling area using bulk transfer and street refuse collection vehicles (RCV's). All vehicles delivering residual waste to the EfW, including those from the MRF will be weighed before entering the tipping hall. From here, the vehicles will proceed to a vehicle delivery and tipping hall where they will back up and discharge the waste into a pit or storage hopper. From here the waste is transferred to the two parallel "energy-from-waste" process lines and to each combustion chamber via dedicated feed chute and airlock section using grab cranes.
- 3.16 The cranes are also used to mix and break-up the incoming materials to ensure homogeneity of feed to the combustion chambers. A shredder is provided to process any bulky household waste received in the hoppers and to reduce material to an appropriate size prior to the combustion process.
- 3.17 Air is extracted from the waste reception hall and used as waste combustion air which helps control odours arising in this area. The reception area is enclosed with access doors and air louvers to manage traffic and control air movements;

### Waste Combustion

- 3.18 Combustion takes place in two stages, with primary combustion undertaken on a moving mechanical grate to promote the mixing of burning/unburnt wastes. There are four generic types of moving grate; reciprocating, counter reciprocating, roller and oscillating, each with particular advantages/disadvantages associated with the degree of pre-preparation of waste required prior to combustion and the scale of the waste throughput. The combustion gas from the primary stage will be heated in the secondary combustion chamber to reach its specified temperature (850 degrees for a minimum of two seconds). Afterwards the residue from primary combustion on the moving grate is removed as incinerator bottom ash (IBA).

### Energy Recovery

- 3.19 The heat from combustion of the waste is recovered initially to form steam and ultimately as electrical energy of up to 30 megawatts. The heat that is produced is recovered within a waste boiler to form high pressure steam, which is used to drive turbines to generate electricity. A proportion of this site generated energy will be used within the facility itself, but the majority will be exported to the National Grid.
- 3.20 The design of the heat recovery boiler is particularly suited to waste combustion and incorporates facilities to minimise dust carry-over and for online cleaning through rapping systems and soot blowers to minimise maintenance impacts. Dust collected from the boilers is discharged as fly ash and collected with the flue gas treatment residues.
- 3.21 The power generation and auxiliary equipment include turbine/generator sets, air condensers and a facility with the potential to extract further value from the partially cooled steam or hot water after it has been through the turbines. This can be used to provide heating or process heat for homes and businesses within a reasonable proximity to the site.

### Air Pollution Control (APC) / Flue Gas Treatment

Air Pollution Control is an essential element of any modern incinerator. The air pollution control system forms an integral part of the plant and will ensure that the emissions from the plant will meet the stringent ES Waste Incineration Directive (WID) (2000/76/EC) standards. Residues from the process are classified as hazardous waste and these will be removed from site in sealed tankers for treatment and disposal at a suitably licensed facility.

### Bottom Ash Recycling Facility

- 3.22 It is proposed that Incinerator Bottom Ash will be treated and recycled to produce aggregate material at an on site plant adjoining the EfW. The material will be moved from the EfW via a covered conveyor to the bottom ash facility.

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- 3.23 The bottom ash material is wet on leaving the EfW and needs to be matured and turned for between 4-6 weeks before it can be processed for aggregate. The maturation and aggregate processing operations will be carried out under cover, with further storage areas provided for the finished product
- 3.24 At full capacity it is estimated that the plant will produce approximately 90,000 tpa of recycled aggregate for the local market. The screening, maturation and storage of this material will take place under cover in the northern part of the site.

### Ancillary Development

- 3.25 Ancillary facilities of the Resource Recovery Centre will include:
- A visitor centre to enable community participation and the encouragement of recycling and waste reduction in Bristol and the surrounding area;
  - Offices, changing rooms and showers etc for the staff of the RRC;
  - A staff and visitor's car park, a coach and mini-bus standing with cycle spaces to encourage a reduction in car use;
  - Weighbridges with gatehouse;
  - Combined Heat and Power (CHP) Infrastructure;
  - Transformer house (contains the meters, circuit breakers and Step Up transformers necessary to export electricity);
  - 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;
  - Storage bays for skips and containers;
  - New access road to the site from Severn Road, site access roads with lighting, CCTV and security measures, footpaths and vehicle manoeuvring areas and;
  - Landscaping and security fencing.

## THE BUILDING

### Arrangement

- 3.26 The EfW and MRF will be totally enclosed within purpose-built new building that is appropriately designed for its surroundings. Drawing EfW-POR-21-P0 illustrates the aerial layout of plant and buildings within the site. The bottom

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ash is stored and treated in a separate building to the north of the main building.

- 3.27 The main building would have a chimney stack on the southern side. Based on the findings of the air quality dispersion modelling, the chimney stacks would be 90 metres in height.
- 3.28 The proposed buildings and impermeable area will total 62,538m<sup>2</sup>.

### Design

- 3.29 The RRC requires a distinctive, high quality and attractive appearance and a considerable amount of effort has gone achieving such an appearance. The building's 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.
- 3.30 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 RRC's resource and energy recovery function and contributing an improvement to the architectural character of the area.
- 3.31 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.
- 3.32 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.
- 3.33 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 yet stands out in its setting and creates a landmark to encourage the economic regeneration of this industrial area of Avonmouth.
- 3.34 The proposed 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

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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.

### Materials

- 3.35 The building materials have been chosen to ensure that practicality in terms of the operations is complemented by a sustainable approach to their selection and use. The materials also need to be able to do justice to the strong design concept when viewed from a distance and create interest at medium and short range.

### Roof

- 3.36 A Kalzip aluminium standing seam roof with pre weather finish will be used for the roof deck plane. 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, Natural light

- 3.37 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 crystalline planes of roof lights. The translucent panels are located between the spine walls to provide natural light in key areas where vehicle movements and operational activities are taking place within the building envelope.

### Opaque façades

- 3.38 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.

## TRAFFIC

- 3.39 The site access shall be improved so as to accommodate two-way heavy goods vehicle traffic with relative ease. To this end, the southernmost site access, located 245-metres southeast of the junction of A403- Severn Road / A403-Chitting Road, will be improved to provide 15-metre radii. The proposals have also been designed to provide visibility in accordance with TD42/95, which requires visibility over 160 metres from a 4.5-metre set-back position.
- 3.40 Complimentary of the proposed improvements to the site access are proposals to widen the carriageway of Severn Road between the proposed site access and the A403-Severn Road / A403-Chitting Road junction, to provide a 7.3-metre carriageway. This is commensurate to accommodating

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two-way heavy goods vehicle traffic and is the traditional industrial estate standard. Forward visibility would also be improved through easement of the existing road alignment.

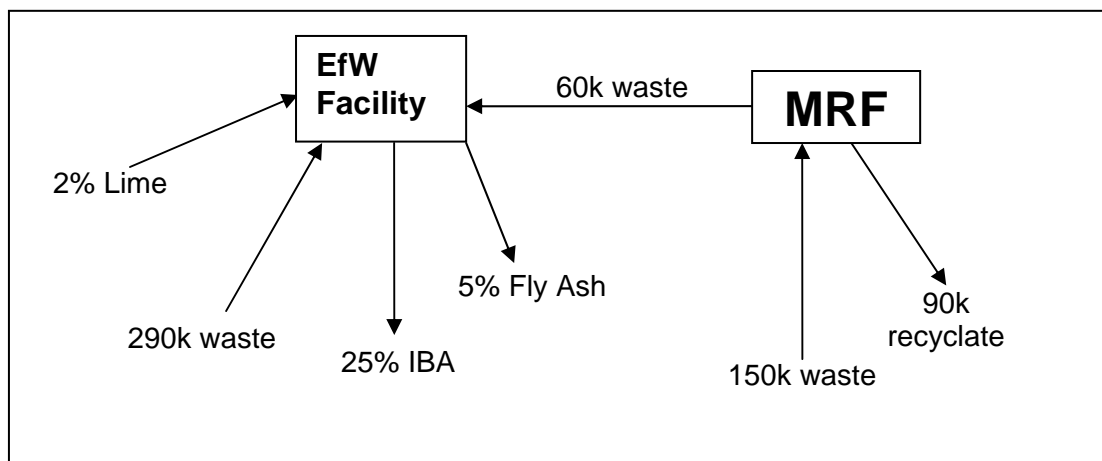
- 3.41 Under the proposals, the applicant also intends to signalise the existing priority T-junction comprising A403-Severn Road and A403-Chittening Road. However, it is noteworthy that, in consideration of the extant use of the application site, and the similarities in potential trip generation with the proposed development, the development proposals could be accommodated by the existing junction layout, both in capacity and safety terms. Nevertheless, the applicant is aware of the issues relating to excessive vehicle speeds, which are seen as contributory factors to accidents involving vehicles over-turning on nearby parts of the network, and consequently the applicant proposes the improvements as a wider community benefit.
- 3.42 In respect of the junction layout, it is proposed that a flared two-lane approach would be provided on the A403-Chittening Road approach; the nearside lane being for the left-turn onto the A403-Severn Road and the short off-side lane being for the right turn onto Severn Road, towards the application site. Single lane approaches would be provided on both Severn Road approaches and a Pelican crossing would be incorporated within the signal phasing over Severn Road (towards the application site) in order to tie-in with the National Cycle Route.
- 3.43 A review of the existing highway boundary indicates that all improvements could be accommodated within either the existing limits of the adopted highway or within land under the applicant's control.
- 3.44 In respect of the general operation of the EfW, it is anticipated that the facility would handle some 350,000 tonnes of waste every year. Of this, however, 290,000 tonnes would be delivered directly and 60,000 tonnes would be received as an internal transfer from the proposed MRF.
- 3.45 Of the 290,000 tonnes of waste that would be delivered directly to the EfW, it is anticipated that 230,000 tonnes would be delivered in bulk from waste transfer stations located throughout the region. The remaining 60,000 tonnes is expected to be received by way refuse collection vehicles (RCVs) collecting from the kerbside. It is noteworthy that waste delivered by RCVs will comprise a diverted trip since such traffic movements already take place on the wider road network.
- 3.46 Additional inputs are required for disposal of waste within the EfW and this comprises the delivery of lime which is used to control the temperature in the burning process. Lime input is typically equivalent to 2.5% of the waste input and so, in the case of the proposed development, equates to approximately 9,000 tonnes per annum.
- 3.47 Residual non-combustible material in the form of Fly Ash and Incinerator Bottom Ash (IBA) would remain as an output of the facility. IBA is a non-hazardous by-product which will be exported from the site for use as an aggregate within the construction industry. The exact proportion of IBA is highly dependant on the waste input. However, typically 25% of the input waste can be assumed as a rigorous estimate of IBA output. Therefore, in

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the case of the proposed development, the assessment assumes approximately 90,000 tonnes of IBA will be exported from the site annually.

- 3.48 Fly ash is considered a hazardous material due to its alkaline content and is typically produced at a ratio of around 5% of the waste input. With this in mind, the assessment assumes that approximately 18,000 tonnes of Fly Ash will be exported from the site to landfill sites capable of handling hazardous waste, each year.
- 3.49 The MRF is anticipated to process up to 150,000 tonnes of waste per annum and it is expected that 60,000 tonnes would not be recyclable and so would be transferred to the EfW facility for disposal. Consequently, the MRF is expected to output 90,000 tonnes of sorted material from the site annually.
- 3.50 For ease, the operation of the proposed development, comprising the EfW facility and MRF, can be usefully summarised by the Figure 3.2 below.

Figure 3.2



### Parking

- 3.51 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.
- 3.52 The parking area has discrete circulation away from the lorry circulating routes. There will be 79 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. Covered storage for 20 bicycles will also be provided.

### PROPOSED LANDSCAPING

- 3.53 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

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preservation. The intention is to retained 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.

- 3.54 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.
- 3.55 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.
- 3.56 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.
- 3.57 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.
- 3.58 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.

### SURFACE WATER MANAGEMENT

- 3.59 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.

### LIGHTING

- 3.60 External lighting within the site would be required to ensure the safety of manoeuvring vehicles and pedestrians around the site. Lighting would also enhance the security of the site. The main areas where lighting would be necessary are as follows:

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- Adjacent to roadways, footpaths and vehicle manoeuvring areas. This would include all site roads and hardstandings within the site, including the weighbridge area.
- Above doorways
- On the façade of the building.

3.61 There are no proposals for floodlighting the SRRRC, or for high level lighting.

### CONSTRUCTION

#### Duration

3.62 The construction period for the scheme is likely to take up to three years. Estimated timescales for the proposed development are as follows:

2011 to 2013- Construction of MRF and EfW;  
2014 - MRF and EfW operational.

#### Stages

3.63 The first stage of the process will be the demolition and site clearance of the industrial development that currently occupies the site. The proposed highway improvement works will also commence at this stage of the project to ensure that the improvements proposed are implemented as soon as is practicable

3.64 Following these operations the groundworks phase of the development would commence which would involve the importation of in the region of 45,000 m<sup>3</sup> of inert construction fill to create the required platform level for the construction of the RRC.

3.65 The construction phase of the project will consist of the following:

- Excavation and installation of services;
- Piling and construction of foundations;
- Construction of concrete and asphalt surfaces;
- Erection of steelwork and cladding for buildings;
- Installation of process equipment; and
- Provision of landscaping and fencing.

3.66 Upon completion of construction the plant will then have a commissioning period prior to going operational in 2014.

### OPERATING HOURS

3.67 The EfW will operate on a continuous basis, 24 hours a day, 7 days a week and the MRF may also need to operate in this way. Deliveries and exports may occur through the day and night but it is anticipated that the majority of deliveries will take place between 06.00 and 19.00.

### EMPLOYMENT

- 3.68 During the construction phase, it is estimated that the development could provide employment opportunities for up to 200 workers at any one time.
- 3.69 During the operational phase, the SRRRC will provide direct employment for around 65 staff. Staff will be employed in a number of roles within the site, including: weighbridge operation, facility operation, clerical and administration staff as well as plant management. There will also be a need for temporary and contract workers for periodic maintenance and other irregular tasks.