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DEVELOPMENT PROPOSALS 3

INTRODUCTION

3.1 In accordance with 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 The Centre will accept some 275,000 tonnes of residual waste per year. All waste accepted at the plant will be non-hazardous material. The EfW facility will use proven, highly regulated technology to extract energy from the residual wastes that remain after materials suitable for recycling and composting have been removed, and will be augmented by a materials recovery facility, incinerator bottom ash recycling, and an engineered and contained landfill. The Centre will deliver a long-term solution to materials recovery.

3.3 The information presented in this Section, allied with the submitted plans and additional details included in various subsequent technical reports represent the technical proposals. Further information on architectural issues is included within the Design & Access Statement.

3.4 The following considers each of the elements of the scheme in turn, followed by details of a series of issues common to all. The development scheme will primarily consist of the following elements:

- a new access road to the A38 at Lee Mill, incorporating a bridge over the river Yealm and a gatehouse with weighbridge;
- the creation of a flat, roughly circular platform of circa. 200m in diameter to accommodate the construction of a materials recovery, EfW and Incinerator Bottom Ash recycling facilities;
- the construction of a range of ancillary uses, including offices, welfare facilities, a visitors centre and parking facilities;
- the engineering of the existing quarry void to provide suitable containment for disposal of non hazardous waste; and
- the infilling of the landfill void to proposed pre-settlement landform, including progressive capping and restoration.

3.5 Details of each of these elements are set out below. Specific drawings relating to each element are listed in the relevant paragraphs and included at the back of this section.

ACCESS ROAD

3.6 The initial works associated with the scheme will be the construction of the access road from the A38 to the development plateau and quarry void. The details of the road and the improvements to the junction of the A38 westbound on and off slip roads as shown on **Drawing 0350/07**.

3.7 The current access to the site is gained via New England Hill to the south-west of the quarry void, and this entrance will be retained for emergency use only. The primary access of the dedicated haul road will connect the site to the public highway via an improved junction that incorporates the historic access to Strashleigh tip and the C194 (as shown on Drawing 0350/07).

3.8 The proposed haul road will be connected to the C194 by a short two-way carriageway road with markings provided at either end to direct site traffic to give-way. Consequently, travelling along the C194 onto the A38 westbound on-slip will maintain priority whereas vehicles entering onto the proposed haul road will give-way to traffic originating from the nearby waterworks and pallet storage area.

3.9 This junction will replace the three existing accesses that currently serve the former Strashleigh tip, waste water treatment works and pallet storage area and mirrors a layout that was suggested by the Highways Agency during the discussions as part of the Scoping process.

3.10 The combination of the above will therefore allow direct access from and to the westbound carriageway of the A38, and vehicles leaving or seeking to enter onto the eastbound carriageway of the A38 will travel a short distance via the local roads of the C194 and Western Road.

3.11 Further details of the access arrangement are set out in Section 6 below, and Drawing 6/2 shows the proposed haul road and junction improvements outlined above in detail.

3.12 Section 6 also describes the off-site works proposed for Lee Mill village, which fall outwith the red-line application boundary and therefore are not considered as part of the application details.

3.13 Initially the access road will run south between the western edge of the old partly restored Strashleigh Hams tip and the River Yealm. The access road will continue southwards into part of the Strashleigh Hams Ancient Woodland, before swinging westwards to cross the River Yealm on a new bridge. Cut and fill operations will be required along the length of the access road to create suitable gradients along its length: as shown on Drawing 00350/07.

3.14 The access road is approximately 1,325 metres in length, and will be tarmacadamed for its entire length. The majority (some 1,110 metres) will be 8m. wide to enable two-way traffic. A length of 215m (approximately 700m south of the A38) will be limited to a single carriageway of 4m to minimise the land-take of road in the vicinity of the woodland. The mitigation measures

proposed to ensure that woodland and habitat clearance is undertaken appropriately are included at Section12: Ecology.

3.15 Generally the new access road will be set 500mm above the current ground levels to the east of the River Yealm. The use of the access road alongside the river has given rise to consideration of flood zones. The Flood Risk Assessment (FRA) included at Appendix 9-8 has concluded that the only areas within the entire application boundary that require mitigation due to engineering works are along the access road on the eastern bank of the Yealm. These are detailed within the FRA and will involve reprofiling of the eastern bank of the Yealm to create a two stage channel over a 75 – 100m length.

3.16 Further to the south, at a location some 700m south of the A38, a new bridge will be constructed to cross the main transfer flow that heads east to the pond to the south of the Smithasleigh recycling operation. Details of this bridge are shown on **Drawing 0350/08**, and will include a 23m clear span deck with a total deck width of 8m (4m road and two 2m wide verges). The soffit of the bridge providing a 1m freeboard to the 100 year+20% flood event. .

3.17 In addition, a new bridge is proposed to cross the River Yealm. This bridge (illustrated on **Drawing 0350/09**) will constitute a 19m clear span at a width of 12m (8m carriageway and 4m verges). It has been designed to clear span the 1000 year flood event extent: the soffit of the bridge will provide at least 1m of freeboard to the 100 year+20% flood event because of the likely impact of trees being washed down river at this location. In the 1000 year event this freeboard is reduced by 170mm.

3.18 As these bridges cross watercourses and part of the road falls within 7m of a Main River, a Land Drainage Consent issued by the EA will be required to construct these parts of the scheme.

3.19 After the new bridge the access road will incline towards the EfW building platform. All waste vehicles entering the site will pass the gatehouse and cross the weighbridge (shown in detail on **Drawing EfW-Por-30**).

WASTE RECEPTION BUILDING

3.20 The proposed Waste Reception Building will occupy the north-eastern part of the site and providing a large, flexible internal space which will enable a wide range of recycling options to be implemented as required by the market.

3.21 The size of the building will, for example, enable the separate reception of residual municipal and commercial & industrial (C&I) wastes to enable the more efficient processing, shredding and recovery (where necessary). Waste materials will be delivered into the building and deposited within designated tipping areas. Most material will then be taken to the EfW for processing, although over-sized elements will be shredded. A quarantine area will also be established within the building to ensure that any undesirable elements will be removed from the waste stream.

3.22 The reception facility will consist of an enclosed building, curved within the road system on the eastern edge of the Energy from Waste building. The building will be 80m long, 17m wide and up to 12m high as shown on Drawings EfW-POR-21 to 29. The walls will be finished with reinforced insitu concrete wall with a smooth formwork surface and exposed panel joints established with vertical climbing planting on stainless steel wire trellis. The roof of the recovery facility will be finished in RAL8016 Brown (or similar). There will be no external lighting associated with the building.

ENERGY FROM WASTE FACILITY

3.23 The proposed EfW facility will be totally enclosed within a purpose-built building that has been appropriately designed for its surroundings. The full scale drawings are included in Volume Two of the application.

Table 3-1 Facility Layout Drawings

Drawing Reference	Drawing Title
EfW-Por-21	Ground Floor Plan
EfW-Por-22	Upper Plant Plan
EfW-Por-23	Roof Plan
EfW-Por-24	Office Floor Plans
EfW-Por-25	Cross Section
EfW-Por-26	South Elevation
EfW-Por-27	North Elevation
EfW-Por-28	West Elevation
EfW-Por-29	East Elevation
EfW-Por-30	Gatehouse Detail

3.24 The EfW facility will comprise of the following elements:

- a waste reception area including a tipping hall and bunkers;
- storage silos;
- two boilers and grates;
- a flue gas treatment system;
- two stacks;
- turbines and generators;
- heat extraction infrastructure;
- air cooled condensers;
- electrical connections to the National Grid;
- a visitors centre;
- offices and ancillary areas;
- a dedicated internal site access road network;
- car-parking; and
- HGV parking areas.

3.25 The following summarises the key components of the EfW. A more detailed description of the building, the design process and the site layout rationale is

set out in the Design and Access Statement submitted with the Planning Application.

The Building

3.26 The operational element of the EfW will be contained within a single building. The only external elements will be the weighbridge/gatehouse and the air control condenser fans. It is important to stress that all wastes will be deposited within the building, and there will be no external storage, handling or processing of any combustible wastes.

3.27 The A3 plans (EfW-Por-21 to 24) at the end of this section illustrate the facility in plan view at each level (i.e. refuse bunker, ground floor, upper plant, roof and office). Plan EfW-Por-25 shows the Cross Section of the development, and the elevations are illustrated in plans EfW-Por-26 to 29.

3.28 The building is effectively circular (although technically it is an icositetradecagon) with a gross diameter of 125m, and a nett surface area of 12271m^2. The building will be constructed on a development level of 60m AOD, and the external height of the building is 40m above ground level.

3.29 The proposed EfW building has been carefully designed as a result of an iterative design process, including early work on viewpoint selection and the potential visual effect of the proposed development. This work is illustrated in the initial design submissions and the building details included within the Design & Access Statement. The nature and scale of the proposed EfW Facility requires a distinctive, high quality and attractive appearance and this has been a fundamental element of the design process. In considering this the design team has recognised the challenges that a proposal of this type brings. Drawings EfW-PO1-40-PL0 and EfW-POI-41-PL1 on the following pages illustrate selected aerial views of the proposed facility, and the view from the proposed gatehouse at ground level.

3.30 The design team has also considered the building's appearance in relation to its site and surroundings, and the views of it from local areas. It should be noted that submissions have been made to the South West Design Panel (a constituency of the Commission for Architecture and the Built Environment (CABE)). This exercise is reviewed in the Design & Access Statement.

3.31 The design strives to synthesise the functional requirements of the process technology and the need to enclose, drape and screen this with the equally important consideration of the visual impact on the local community. This is achieved by providing an attractive, sustainable, environmentally friendly, exemplar waste management facility that fits well into the landscape setting.

3.32 In order to achieve those aims, the design team has concluded that the principle colour of the building should be a darkish copper brown (RAL 8016), chosen to match the red-brown soils of the area (as revealed through arable farming) without being too prominent within the landscape and reflecting the more muted greens of the application area's woodland setting. The roof of the building will be coated in sedum to provide a "green" or living roof, which provides benefits for nature conservation.

3.33 The dome building form is a reflection of the naturally rounded hill tops present. Key elements of the building are the two stacks, the tops of which will be 90m above the ground level (of 60mAOD). The design of the stacks has been an intrinsic part of the design process: their width of 1.5m; the absence of any shrouding or architectural detail; and their inclusion within the building all contribute to minimise their impact on the landscape. The full consideration of the building and its stacks is detailed at Section 7: Landscape.

3.34 The stacks will include aircraft warning lights at 45m and 90m above ground level. The requirement for lights, and their design and output, is in compliance with International Civil Aviation Authority and Civil Aviation Authority requirements. Details of the warning lights are included at Appendix 3-1.

3.35 Ancillary to the EfW are offices, workshops, and a visitor centre: all are integral parts of the main EfW building, and all are located on the southern side of the operational building to assist with solar benefit. Details of the offices and visitors centre are included at **Drwg EfW-POR-24**.

3.36 The nature and scale of the proposed EfW Facility requires a distinctive, high quality and attractive appearance and this has been a fundamental element of the design process. In considering this the design team has recognised the challenges that a proposal of this type brings. The design team has also considered the building's appearance in relation to its site and surroundings, and the views of it from local areas.

3.37 The design strives to synthesize the functional requirements of the process technology and the need to enclose, drape and screen this with the equally important consideration of the visual impact on the local community. This is achieved by providing an attractive, sustainable, environmentally friendly, exemplar waste management facility that fits well into the landscape setting, enhancing the image of its location and having features that contribute to its sense of place.

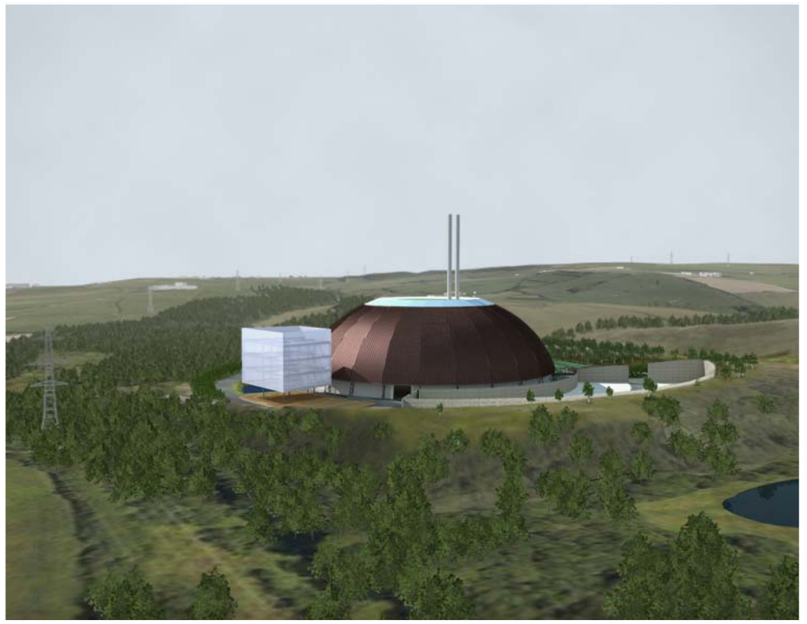
Operations

3.38 The operation of an EfW plant consists of five key elements described below:

1. Waste reception;
2. Combustion;
3. Energy Recovery;
4. Flue Gas Treatment;
5. Residue Handling

3.39 The technology to be implemented is known as moving grate technology, and the following describes the basic principles.

1. Waste Reception



For illustrative purposes only

Viridor

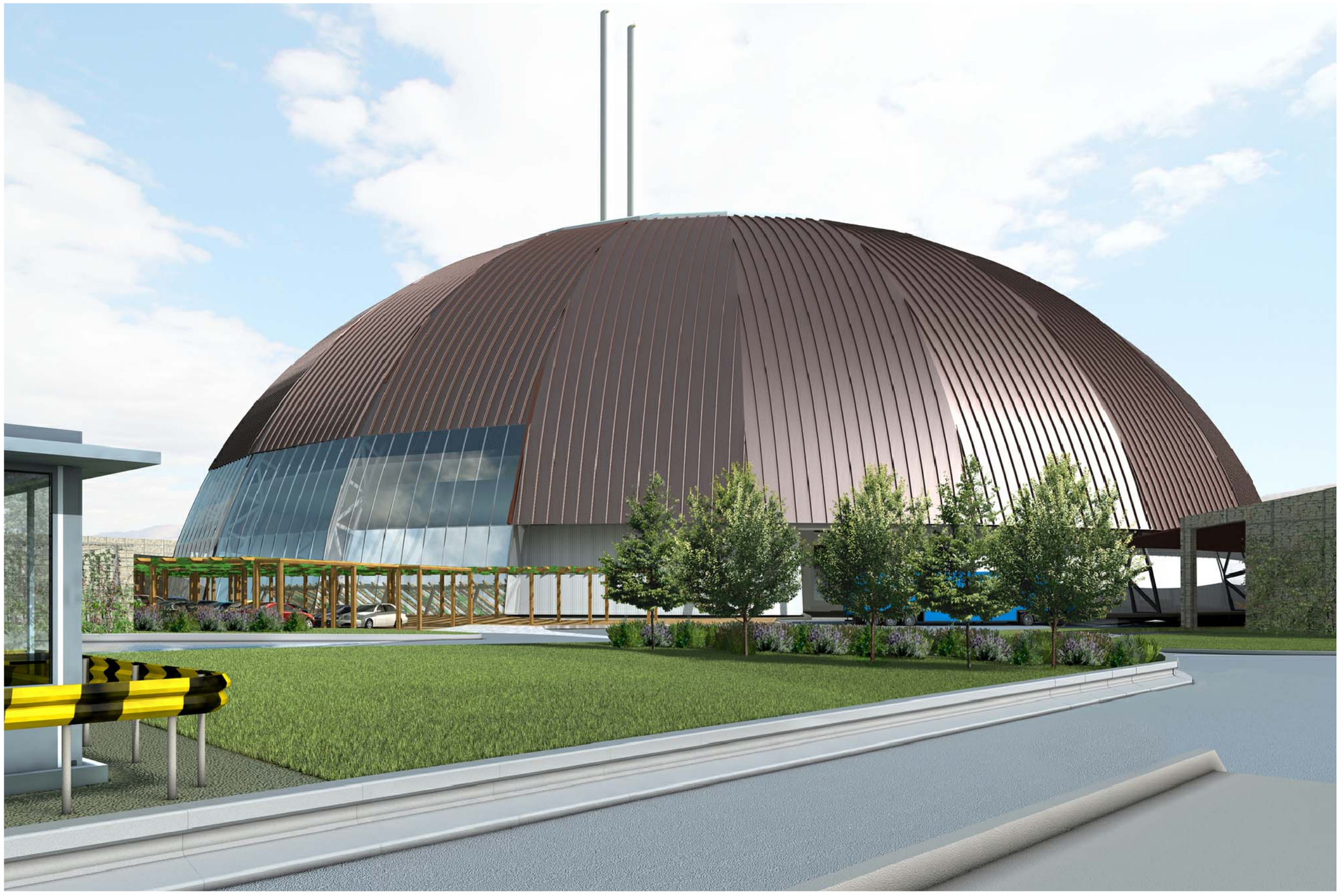
SLR - Architecture

Architects, Environmental Consultants, Architectural Visualisation

Viridor New England Energy from Waste Facility

November 2009
Project Ref. 0036.00424.25
Drawing No. EfW-POI-40-PL0

Treenwood House Rowden Lane Bradford on Avon Wilts BA15 2AU
Tel: 01225 309400 Website: slrconsulting.com



View From Gatehouse - for illustrative purposes only.

Viridor

SLR - Architecture

Architects, Environmental Consultants, Architectural Visualisation

Viridor New England Energy from Waste Facility

January 2010
Project Ref. 0036.00424.25
Drawing No. EfW-POI-41-PL1

Treenwood House Rowden Lane Bradford on Avon Wilts BA15 2AU
Tel: 01225 309400 Website: slrconsulting.com

3.40 Residual waste for combustion will proceed to the tipping hall where they will back up and discharge the waste into a pit or storage hopper. From here waste is transferred to the two parallel “energy-from-waste” process lines and to each combustion chamber via dedicated feed chute and airlock sections using grab cranes.

3.41 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 before returning shredded materials to the hoppers for processing.

3.42 Air is extracted from the waste reception hall and operates at negative air pressure. The air is used in the waste combustion process which helps control odours arising in this area. This reception area is enclosed with access doors and air louvres to manage traffic and air movements.

2. Combustion

3.43 Combustion takes place in two stages, with primary combustion undertaken on a moving mechanical grate to promote the mixing of burning/unburnt wastes. The combustion gas from the primary stage is heated further in the secondary combustion chamber to reach the specified minimum temperature of 850^{0}C for a minimum of two seconds. The burnt waste from primary combustion on the moving grate is removed as an ash, known as Incinerator Bottom Ash (IBA).

3. Energy Recovery

3.44 The heat from combustion of the waste is recovered initially to form steam and ultimately as electrical energy at approximately 25 Mega Watts. The heat that is produced is recovered within a waste heat 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.

3.45 The power generation and auxiliary equipment provided 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 could be used to provide Combined Heat and Power (CHP) for homes and businesses within a reasonable proximity to the site.

3.46 If the surplus heat is exploited through the implementation of a district heating scheme, the calculated overall efficiency figure of the facility can be significantly increased. The generation of CHP therefore represents a considerable environmental benefit and the potential for this has been considered extensively for this project.

3.47 The location of the site in close proximity to Lee Mill, Ivybridge and Sherford represent an opportunity for the implementation of a district heating scheme,

as there are several potential heat users who could be linked to a network supplying hot water from the facility.

3.48 To fully address this possibility, consultations have been undertaken with potential users including local authorities, landowners, academic institutions, public bodies, businesses and industries in the local area. The consultation process and details of all consultees and discussions to date are included in the Heat Plan provided within Appendix 14-2. The timescale associated with the determination of the planning application and the subsequent construction periods are such that discussions will continue in an attempt to secure potential heat users prior to the commissioning of the plant.

4. Flue Gas Treatment

3.49 The air pollution control system forms an integral part of the plant and will treat all flue gas prior to emission to ensure that emissions will meet the stringent EU Waste Incineration Directive (WID) (2000/76/EC) standards.

3.50 The flue gas treatment in the proposed facility will be a “dry” system, which will operate by injecting hydrated lime and activated carbon into the flue gases to control the pollutants. The gases are then filtered through a bag type filter, which removes the fly ash, reaction products and excess reagents from them. The treatment will also involve a process called “Selective non-catalytic reduction” (SNCR) to control the release of Nitrogen Oxide (NOx) gases. The process is a proven and widely used system of pollution abatement and will reduce the emissions from the facility to well within the stringent WID emission limits.

3.51 Residues collected in the final bag house filter process are collected in hoppers providing up to 3 days of storage.

5. Residue Handling

3.52 The EfW process generates three main waste residues:

- Incinerator Bottom Ash;
- Fly Ash; and
- Metals.

- Incinerator Bottom Ash (IBA)

3.53 IBA is generated from the grate combustion unit, and amounts to approximately 22% of input material (approximately 60,000 tonnes per annum at New England) The inert material can be used in concrete and concrete block construction, replacing up to 50% of the aggregate traditionally used.

3.54 IBA has also been used successfully in the sub-base and roadbase layers in road construction, after a process of hot asphalt stabilisation and mixing with cement or bitumen. The sub-base and roadbase layers refer to the intermediate layers of the road, below the final surface wearing course and above the lowest subgrade layer.

3.55 In order to fully maximise the recycling potential of the IBA an integral facility has been included within the RRC and is described below

- Fly Ash

3.56 Fly ash is the residue of combustion removed from the flue gases of the furnace prior to release into the atmosphere. This ash consists mostly of carbon dust, along with some pollutants, organic compounds and heavy metals. These are removed from the flue gases so that the emissions from the facility are clean prior to release, preventing pollution to the environment. Fly ash represents only about 3% of the waste feedstock (approximately 8,250 tonnes per annum), and is disposed of safely (by enclosed tanker) to a designated hazardous waste landfill. There is no facility of this nature in Devon: it is likely that the fly ash from New England will be disposed of at an appropriately licensed facility in Gloucestershire.

- Metal Recovery

3.57 Following the combustion of residual waste, metals are separated from the IBA by means of electromagnetic separators for ferrous metals, and eddy current separators for non-ferrous metals. This improves the composition of the IBA for after uses, and recovers valuable metals for recycling. The quantity of metal that can be recovered from the IBA is generally about 5% (approximately 14,000 tonnes per annum), depending on the waste feedstock, and thus represents a useful opportunity for significant amounts of metals recovery. All metals will be recycled and Viridor is currently in discussions with local recovery companies to carry this out.

INCINERATOR BOTTOM ASH FACILITY

3.58 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.

3.59 The proposed incinerator bottom ash recycling facility is 130m long and 57m wide and will provide processing and storage capacity for the anticipated 60,000 tpa of recyclable aggregate that will be generated by the EfW facility.

3.60 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 facility will consist of maturation and aggregate processing operations that will be carried out in the open air to allow the maturation process to occur.

3.61 Any run-off from the aggregate will be collected within an integral drainage system and discharged via a foul sewer to the Lee Mill Waste Water Treatment Works to the immediate east of the site access road.

LANDFILL OPERATION

3.62 The proposed Landfill operation at New England Quarry will accept some 33,000 tonnes per annum. This section describes the general site development designs for New England Quarry. The designs have been created to facilitate the construction and operation of the proposed energy from waste facility (EfW) and non hazardous landfill site. In accordance with the requirements of PPS10: Sustainable Waste Management and the Environmental Permitting (England & Wales) Regulations 2007, design and management details associated with the landfill construction are considered in greater detail in the EP submission.

3.63 In respect of the landfill, the following phases are proposed: the text should be read in conjunction with **Drawings 0350/010-12**.

Site Preparation

3.64 In order to minimise the amount of disturbance to the site, and to reduce the number of vehicles accessing the facility during construction, the materials for the construction of the landfill will be won from within the site.

3.65 To facilitate the construction of the EfW, a flat circular platform measuring circa 200m in diameter will be created in the northern part of the site, adjacent to the main quarry void. The platform will be constructed at an elevation of 60m AOD, an elevation chosen to minimise the visual impact, but also to reduce the volume of excavation and filling in order to create the flat platform, thus negating the need for importing or exporting material to and from the site.

3.66 To the north and east of the platform, the ground will be landscaped into a 1:2.5 (v:h) batter, sloping away to either existing ground or the base of the excavation, which is located in this region.

3.67 It is proposed that excavated materials that are not accommodated within this platform area will be placed in a retaining bank to the south of the EfW platform. This area will initially be filled to 60m AOD, thus providing an interim laydown area to aid the construction of the EfW. The bank will eventually be built up to form a 10 wide crest at 70m AOD: this will provide an area in which to tip waste against and allow the perimeter of the landfill profile to advance from a higher level, thus maximising the potential waste void volume.

3.68 The retaining bank will also be seeded and planted in line with the requirements of the restoration scheme to provide a visual screen and backdrop to the EfW and landfill operations.

3.69 The earthworks associated with the first phase of the development include the following excavations:

- 133,188m^3 of material excavated from the EfW platform area;
- 72,562m^3 of material excavated from the area to the north east of the EfW platform, adjacent to the access route.
- 10,000m^3 of material excavated in creating surface water attenuation lagoons;
- 15,000m^3 of material excavated in creating foundations and the underground bunker associated with the EfW.

3.70 The total volume of material excavated in forming the EfW platform and retaining bank is 230,680m^3. It is anticipated that the material excavated will be largely in-situ rock and therefore will 'bulk' as a result of the introduction of pore space between excavated fragments. A standard bulking factor for material of this type is 1.3 or 30%, thus the excavated volume of 230,680m^3 will when placed as fill, form a volume of 299,884m^3.

3.71 The construction of the retaining bank will comprise a 3m high gabion wall adjacent to the EfW, from which a batter will be created at a 1:2.5 (v:h) gradient up to 70m AOD. It is proposed that the crest of the bank is 10m wide. It is proposed that the southern batter of the bank is graded at 1:2 (v:h), from 70m AOD, down to the quarry base at circa 36m AOD.

Landfill Void

3.72 The proposed landfill has been designed to provide a pre-settlement void of 825,000m^3. The pre-settlement landform has been generated based on surcharging the proposed post settlement landform by a factor of 1.33 in order to account for the anticipated settlement of the landfilled wastes of approximately 25%.

3.73 It is proposed that the landfill will accept approximately 33,000 tpa of waste. Given the nature of the wastes, a density of 1 tonne per cubic metre has been assumed, on this basis, the landfill void is anticipated to be used at a rate of 33,000m^3 per annum. Waste will be deposited in the landfill from 2014 and will cease at the end of 2038.

3.74 The landfill has been divided into 6 operational cells, Cells 3, 4 and 5 have been further subdivided, with Cell 3 being divided into three sub-cells, and Cells 4 and 5 being subdivided into two sub-cells. Phasing plans showing the operation of the site (not to scale) are included at the rear of this Section. Scaled plans are included at Volume 2 of the Planning Application.

The landfill void per cell is as outlined in below:

- Cell 1 125,000 m^3
- Cell 2 77,500 m^3
- Cell 3a 100,000 m^3
- Cell 3b 90,000 m^3
- Cell 3c 104,000 m^3

- Cell 4a 67,500 m^3
- Cell 4b 90,000 m^3
- Cell 5a 61,500 m^3
- Cell 5b 66,500 m^3
- Cell6 43,000 m^3

Operational Schedule

3.75 The engineering and tipping of waste will be completed on a phased basis, where by the engineering/ lining of each phase is completed whilst the pre-cursor phase is being filled with waste.

3.76 The phase by phase tipping of waste would advance up to the proposed pre-settlement top of waste profile. As each phase reaches the proposed landform levels, they would be progressively capped and restored with a 2m thickness of restoration materials.

3.77 The operational schedule for each cell is listed below:

- Cell 1 2014 - 2017
- Cell 2 2017 - 2020
- Cell 3a 2020 - 2023
- Cell 3b 2023 - 2025
- Cell 3c 2025 - 2029
- Cell 4a 2029 - 2031
- Cell 4b 2031 – 2033
- Cell 5a 2033 – 2035
- Cell 5b 2035 - 2037
- Cell6 2037 - 2038

Capping and Restoration Schedule

3.78 Once pre-settlement levels have been achieved, the waste would be capped and restored as soon as possible. Due to the geometry of the site, pre-settlement levels are not achieved until 2020 when Cell 2 is filled – at this time, approximately 2% of the area of the landfill is capped and restored. There is no further capping and restoration until 2029, when Cell 3C is filled – Following this phase of capping and restoration, a total of 10% of the site would be restored. Further phases of capping and restoration will take place in years 2031, 2034, 2036, 2038 and 2039 as Cells 4a, 4b, 5a, 5b and 6 are filled. In total, 17% of the site will be capped and restored by 2031, 34% by 2034, 50% by 2036, 80% by 2038 and 100% by 2039.

3.79 Temporary capping will be adopted where practicable throughout the operational life of the landfill.

Landfill Engineering

3.80 The following summarises the engineering practices that will be employed at the site in accordance with Environment Agency requirements in respect of effective management of operational non-hazardous landfill sites. In

accordance with PPS10, more extensive details will be included in the Environmental permit application to be submitted and considered by the Environment Agency.

- Groundwater Management System

3.81 The static groundwater elevation at New England Quarry lies at approximately 50m AOD, and the basal subgrade elevation in Cell 1 lies at approximately 35m AOD. A groundwater management system is required to control the groundwater to facilitate the construction and operation of Cell 1 at New England.

3.82 The groundwater underdrainage system comprises a 300mm thick granular underdrainage layer to the base of Cell 1, and a geocomposite drainage medium to the sideslopes of Cell 1 and to Cell2. The groundwater underdrainage system will fall to a sump in the base of Cell 1, from which the groundwater can be pumped.

3.83 The groundwater extraction riser will be fitted with pumps on a duty standby arrangement, set to control the water level in the chambers to a maximum level of 36.4mAOD to provide a minimum factor of safety of 1.3 against heave of the basal liner. This is a worst case scenario for the basal liner, and assumes no loading due to the leachate drainage blanket or any waste.

3.84 In the longer term, once the waste filling reaches a level of 56.6mAOD the groundwater lowering chamber can be abandoned and no further pumping will be required. At this time, the groundwater lowering chamber would be sealed with a cement bentonite grout.

- Basal Lining System

3.85 In order to comply with the Landfill Directive, the minimum requirements of the basal lining system are a geological barrier 1m thick of maximum permeability of 1x10-9 m/s and an artificial sealing liner. The design of the basal lining system for New England has been justified by risk assessments; it complies fully with the minimum requirements set out in the Directive.

3.86 The horizontal benches at approximately 50, 56 and 70m AOD will also be lined to the same specification as the “basal lining system”.

3.87 The installation of all elements of the basal lining system will be subject to construction quality assurance (CQA). The CQA process ensures and documents, that the works are carried out in accordance with the specification. Prior to each stage of construction, a CQA Plan will be submitted for approval by the EA. This plan will present the specification for the works, and details the CQA activities and testing to be undertaken by the CQA engineer for each element of the works. Upon completion of the works a certification report shall be submitted to the EA, demonstrating that the construction works and CQA activities have been carried out in accordance with the CQA Plan.

- Side Slope Lining System

3.88 The minimum requirement for the side slope lining system in a non-hazardous landfill, as prescribed by the Landfill Directive, is a liner that is at least equivalent to a 1m thick geological barrier with a maximum permeability of 1x10-9m/s. Again, where the geological barrier does not provide sufficient environmental protection, it can be artificially enhanced using an artificial geological barrier that should have a minimum thickness of 500mm but it must be equivalent to a geological barrier 1m thick of maximum permeability of 1x10-9 m/s.

- Steep Wall Lining to Southern and Western Quarry Walls

3.89 The side slope lining system to the steep quarry faces within Cell 1, and between approximately 50 and 56m AOD, and 56 and 70m AOD and 70m and 80m AOD will be constructed using Tipform (or similar), a system that comprises a set of interlocking polystyrene slope formers, which will form a smooth side to the quarry face to allow the installation of a geosynthetic liner system.

3.90 The current sideslopes are cut at the following typical slope angles:

- ..... Cell 1 Sideslopes (except fill slope) 51°
- ..... 50 to 56m 30°
- ..... 56 to 70m 45°
- ..... 70 to 80m 51°

The sideslopes of the site have been excavated within the dolerite rock which forms a natural geological barrier underlying the site. It is, however, proposed to enhance the natural geological barrier by utilising low permeability fill between the quarry face and the polystyrene forms. This fill will comprise either a 1.0m thick low permeability engineered mineral liner or bentonite enhanced sand.

3.91 Prior to any sideslope lining work being carried out, the quarry faces would be inspected and protected against rockfall. This could involve local removal or loose rocks, treatment with sprayed concrete (shotcrete) or netting.

3.92 The Tipform (or similar) wall will be overlain by an artificial sealing liner. The artificial sealing liner shall comprise a 2mm thick double textured high density polyethylene (HDPE) geomembrane. A geotextile protector will be installed above the HDPE geomembrane to prevent damage to the geomembrane from the leachate drainage blanket.

- Steep Wall Lining to Northern Sideslope

3.93 The northern sideslope of the site will be formed from fill material with a slope angle of 1V in 2H (27°), overlying the dolerite rock. The dolerite rock forms a natural geological barrier underlying the site. The geological barrier will, however be enhanced with the placement of the fill. In addition, an artificial geological barrier will be constructed. This will comprise a 1.0m thick low

permeability engineered mineral liner. The artificial geological barrier will be placed with a maximum permeability of 1x10-9 m/s.

3.94 The artificial geological barrier will be overlain by an artificial sealing liner. Comprising 2mm thick double textured high density polyethylene (HDPE) geomembrane, forming a composite lining system with the mineral liner.

3.95 A geotextile protector will be installed above the HDPE geomembrane to prevent damage to the geomembrane from the leachate drainage blanket. The geotextile shall be suitably sized based upon the results of a cylinder test, undertaken using the actual leachate drainage stone and proposed geosynthetic materials. The test procedure shall be in accordance with the Environment Agency's guidance on protectors for geomembranes.

3.96 The geosynthetics shall be anchored in trenches 750mm wide by 750mm deep set 1500mm back from the crest of the sideslope.

3.97 The installation of all elements of the side slope lining system will be subject to construction quality assurance, detailed above.

- Capping System

3.98 It is proposed that the landfill will be capped using a welded very flexible polyethylene VFPE geomembrane.

3.99 Prior to placement of the capping system, the waste surface is graded and rolled and covered with a minimum 300mm thick regulating layer comprising free draining, non-cohesive soils with a maximum particle size of 20mm. The regulating layer acts as a gas drainage layer immediately below the cap, allowing the collection of landfill gas. The gas drainage layer has a second function as it relieves pressure build-up beneath the capping membrane that could otherwise result in instability of the capping system.

3.100 The capping geomembrane will be covered with a protection layer, comprising a minimum thickness of 300mm of selected free draining material; this material will allow surface water percolating through the restoration soils to drain to the perimeter of the site.

3.101 Restoration soils shall be placed overlying the protection layer to a minimum depth of 900mm across the entire cap and will comprise 600mm of subsoils and 300mm of topsoils to provide a suitable growth medium for the proposed restoration scheme.

3.102 The installation of all elements of the capping system will be subject to construction quality assurance, detailed above.

- Leachate Management and Monitoring

3.103 Above the lining system the Landfill Directive requires a leachate drainage blanket to allow the collection and extraction of leachate from the base of the landfill. The leachate collection system proposed for New England will

comprise a 300mm thick drainage blanket of clean suitably sized granular material.

3.104 The leachate drainage blanket will incorporate a herringbone system of leachate pipework laid upon a 100mm thick layer of 10mm (nominal size) granular material.

3.105 The leachate extraction system will consist of vertical telescopic extraction risers of 1000mm nominal diameter. The monitoring wells will be telescopic to accommodate settlement of the waste mass.

3.106 Leachate will be extracted from leachate extraction points and pumped to a raw leachate storage tank. The design of this tank will be agreed with the Agency prior to its installation. From the raw leachate storage tank, leachate will either be re-circulated back into the waste mass, or tankered off site for treatment. There is also the potential to have a future leachate treatment facility on site.

SITE LANDSCAPING AND NATURE CONSERVATION MITIGATION

3.107 An integral part of the application is the comprehensive landscaping of the site within the red line boundary. The intention of the landscaping is not to screen the built development entirely: the development platform arrangement of the site, allied with the design of the building has been developed to reduce the impact, but this is a large building that will inevitably be visible from certain locations. The intention of the landscape scheme is to re-enforce the woodland setting of the proposed development and provide wildlife corridors for woodland species around and through the site.

3.108 The landscaping proposals are set out in the following series of Drawings:

Drawing 3/L1	Conceptual Landscape Masterplan (Context)
Drawing 3/L2	Site Layout Plan
Drawing 3/L3	Detailed Landscape Features
Drawing 3/L4	Section A-A' – Southwest to Northeast
Drawing 3/L5	Section B-B' – Northwest to Southeast

3.109 The key elements within the application boundary are featured on Drawings 3/L3, 4 and 5 and include:

- 4.9 ha of woodland planting;
- 2.26 ha of open woodland/scrub planting;
- 3.34 ha of wildflower meadow created; and
- 3.38 ha of species rich grassland created.

3.110 These habitats will include the areas of the restored landfill. The un-vegetated area of the existing quarry and water body are roughly equivalent to the hard landscaped area of the proposed EfW development, although within this area a small amount of formal amenity shrub, grassland and individual tree planting will occur.

3.111 In addition to the on-site works, additional woodland management and planting is proposed to the east of the Yealm on land under Viridor's ownership. Planting within this area (6.2 ha) will further enhance the ecological benefits. Woodland planting is also proposed between the River Yealm and access road adjacent to the Strashleigh Hams Landfill area (2 ha).

3.112 Further details of the benefits and type of habitat management and planting proposed is included within Section 12 (Ecology) and the associated Appendices. Also included are detailed mitigation measures for the flora and fauna within and adjacent to the site, as well as a detailed woodland management plan (Appendix 12-9).

SUSTAINABLE DRAINAGE SCHEME (SUDS)

3.113 The scheme includes a series of water attenuation features designed to create a SuDS that will introduce effective surface water management to the site. The system of ponds and ditches is illustrated on Drawing 3/L3 and have been designed to reflect the current informal system wherever possible, to improve and extend the existing habitats of value through a suitable high quality design.

3.114 Water from the EfW area will be treated and feed into a peripheral ditch to discharge into the attenuation area. The intention will be to encourage water to percolate into the ground within the attenuation area, as well as providing increased areas of wetland vegetation. Excess water from the attenuation area will be discharged into ditches running through the wooded valley which runs eastwards to the north of the EfW and links into the River Yealm. The sensitive design and operational will have an integral benefit for the ecology of the application area and its surroundings. Attenuation from the landfill area will be diverted southwards and collected in a lagoon within the old quarry weighbridge area.

3.115 All design details associated with the SuDS scheme is included in Chapter 9 and its associated Appendices. In summary, the proposed surface water attenuation ponds in this part of the site will be excavated with maximum 1:3 side slopes, but with shallow shelves formed just below the mean average water level as a basis for ephemeral marginal aquatic vegetation. The upper slopes and rim of the ponds will be grass seeded and close mown to articulate their form.

CONSTRUCTION OPERATIONS

General

3.116 At this early stage of the development it is not possible to provide details of many areas of construction, but where aspects are known, information has been provided below. An outline Construction Environmental Management Plan has been prepared in advance of any works commencing on site and is included at Appendix 3-2.

Hours of Operation

3.117 Construction hours will be restricted to 0700 to 1800 hours Monday to Saturday.

Raw Materials Supply

3.118 The raw materials for construction will be transported to the site by road, with the vehicles entering the site using the new access road. The delivery of construction materials to the site is expected to generate around 25 trips per day at the peak construction periods, depending on the methods chosen by the successful contractor.

Construction Personnel Traffic

3.119 With up to 250 construction workers on site at any one time, there will also be a number of trips related to staff movements. The Outline Travel Plan (Section 6) considers the measures proposed to mitigate against unsustainable travel.

Construction Wastes and Waste Management

3.120 Excavation activities associated with implementing the proposed development will generate quantities of waste materials such as soil which, will have the potential to be recycled or reused within the site. The construction of the new EfW facility will also give rise to waste materials (e.g. packaging, handling losses and surpluses). Once completed and occupied the proposed development will generate commercial waste. All of these waste materials will need to be managed in a sustainable way. On-site sustainable waste management is an important part of the development, and will be adopted in accordance with the waste hierarchy.

3.121 Waste management priorities for the proposed EfW Site during construction will focus on reducing wastes: reusing materials; and recycling waste materials in order to minimise as far as practicable the amount of waste materials requiring disposal to landfill

Storage of Construction Plant Oil/Fuels/Minerals

3.122 Construction activities have the potential to give rise to pollution. The construction works are to be carried out in accordance with a Pollution Control Strategy which will be based primarily on the guidance given within “Pollution Prevention Guideline 6: Working at Construction and Demolition Sites”, produced by the Environment Agency. In preparing the strategy guidance will also be drawn from the following Environment Agency publications:

- Pollution Prevention Guideline 1: General guide to the prevention of pollution;
- Pollution Prevention Guideline 2: Above ground oil storage tanks;

- Pollution Prevention Guideline 4: Disposal of sewage
- Pollution Prevention Guideline 6: Working in or near rivers;
- Pollution Prevention Guideline 8: Safe storage and disposal of used oils;
- Pollution Prevention Guideline 13: High pressure water and steam cleaners;
- Pollution Prevention Guideline 18: Managing fire water and major spillages;
- Pollution Prevention Guideline 21: Pollution incident response planning.

Operational Management

Lifespan

3.123 The Resource Centre has a design life of 30 years, with the landfill and EfW being designed to ensure a contiguous operational life.

Hours of Operation

3.124 The EfW will operate on a continuous basis, 24 hours a day, 7 days a week and the MRF may also need to have the ability 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.

Staffing

3.125 The facility at will provide permanent jobs for up to 40 people, who 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.

Lighting

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

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

3.127 There are no proposals for floodlighting or for high level lighting.

Parking

3.128 The Transport Assessment (TA) and the Travel Plan consider the issues relating to parking at the proposed development. The proposals for providing the various forms of parking spaces have been designed in general accordance with local guidance. The key figures are:

- Car parking 52 spaces;
- Cycle stands 10 no.;
- Parking for Mobility Impaired 4 spaces.

Maintenance

3.129 Each year the facility will undergo a scheduled maintenance period, during which each of the EfW production lines will be thoroughly overhauled. The maintenance of each line will be staggered such that at no time will there be a lack of power and heat supply to any heat network that may be in place. The maintenance period will also be timed such as to coincide with a period of lowest heat and power demand in the area, typically in the summer.

3.130 There will also be a programme of continuous maintenance within the plant, to ensure that all machinery is functioning as efficiently as possible at all times and that the risk of mechanical failure of any part of the plant is minimised.

3.131 Any unscheduled maintenance will be kept to a minimum, but will inevitably occur as and when the need arises. The existence of two lines of incineration equipment will mean that any down time with one particular piece of machinery will not cause power generation to cease, and in this way security of supply will be ensured. Most unscheduled maintenance will be carried out by the on-site staff although in certain instances of breakdown of specialist equipment, outside contractors may be required.

Fire fighting

3.132 The design of the facility will include systems for firewater storage and automatic fire deluge and spray systems in order to control any fire that may occur, as well as preventative measures related to proper maintenance and inspection to reduce the risk of such an event occurring. The fabric of the facility will also be of suitable fire-retardant and non-flammable materials such that spread of fire outside of the combustion chamber is extremely unlikely.

3.133 The drainage system in the facility will also be designed such that potential fire water run-off will be easily and safely provided for.

Environmental Management System

3.134 Viridor operates its waste management facilities to the ISO14001 certification standard, and it is envisaged that this facility will also have this environmental accreditation in place.

Utilities and Infrastructure

3.135 The facility will be connected to the National Grid as an exporter of electricity. The proposed connection is immediately to the south of the site via an underground cable at a voltage of 33kV.

3.136 In terms of clean and foul water, the northern extent of the site is in close proximity to the Lee Mill Waste Water Treatment Works. As such, a connection will be made to that facility and clean water will be provided from the public water supply, although the ability of the facility to use grey water will reduce the demand placed on the public supply.