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In this Works Delivery Plan, any reference to the Contractor will be deemed to refer to the Construction Sub-Contractor (as appropriate) and satisfaction of any obligation or requirement of the Contractor in the Works Delivery Plan by the Construction Sub-Contractor and / or its Sub-Contractors will satisfy the Contractor's obligation or requirement in respect of the same.

1 Section 01. Organisation Structure

Construction Management

1.1 The Contractor will develop the ITSAD Facility at the Site (Bolton Road). The Contractor will provide the ITSAD Facility through an engineering, procurement and construction contract, the Construction Contract. The Contractor will also retain the TLS Facility at the Site (Grange Lane) but does not intend to significantly alter the fabric of the structure existing on site.

Management Structure

1.2 A management team will be established to execute the design, engineering, procurement, construction and commissioning of the Works. The management team will evolve with the Project needs, changing in emphasis as the Project proceeds through detailed design, procurement to construction and eventually commissioning.

1.3 The Contractor hereby acknowledges clause 28.6 of the Construction Contract, where the Construction Sub-Contractor has appointed Jones Celitc Bioenergy Limited ("**JCBE**") as the "**Principal Contractor**" in respect of the Works to construct the AD Facility and Birse Civils Limited in respect of all other Works. References in this Schedule 2 to the Principal Contractor shall be interpreted in accordance with the preceding sentence.

1.4 The detailed engineering task force will be formed by the Principal Contractor and the other sub contractors to produce the design and detailing of the facilities, utilising a multi-disciplined team of personnel supplemented by specialist discipline engineers (such as the structural designers) as required.

1.5 The works phase organisation chart identifies the key personnel and the main lines of communication.

Figure 01 [REDACTED]

[REDACTED]

Project Director

1.6 The project director shall have the following responsibilities:

- Delivery of the Project from award through commissioning, take over and transition to the Service Period of the Project
- Approval of variation orders from sub-contractors
- Request/Approval of Milestone Payments (as defined in the Construction Contract)
- Reporting to the Contractor board of directors on progress, key issues and costs
- Reporting to senior members of the Councils on progress and key issues
- Management of claims and legal issues
- Contract negotiations
- Community liaison involvement (as required by the Councils).

Project Manager

1.7 The project manager will assume responsibility for the execution of the contract from the date of contract award. The principal responsibilities of the project manager are summarised below:

- Completing the Works in accordance with the Contract
- Primary client liaison
- Monitor project programme
- Reporting to the Councils and project director on project progress

- Management of Site issues

Construction Sub-Contractor

1.8 The Construction Sub-Contractor will assume full responsibility for the design, procurement, construction and commissioning of the ITSAD Facility. The Construction Sub-Contractor will also provide parent company guarantees to indemnify the construction works.

1.9 In the lead up to construction, the Construction Sub-Contractor will provide the detailed design for all elements of the Project outside of the ITS process equipment and AD Facility.

1.10 Upon completion of the design, the Principal Contractor will be responsible for the day to day management of the construction works on site, reporting to the Construction Sub-Contractor. The Principal Contractor will be the single point of responsibility for works on ITSAD Facility that will provide an integrated, efficient approach. Each Principal Contractor will coordinate the activities of all other sub-contractors working on site working within their defined areas (see Ref DO in Schedule 8 of the Contract).

1.11 The limit of responsibility has been established as the building line of the AD Facility nearest the ITS Facility (as set out in the drawing above), this is referred to as the battery limit. Whilst JCBE will be responsible for the development of the site to the North of this line, responsibility for the formation earthworks; perimeter fencing and soft landscaping will rest with the Principal Contractor for the full Site (Bolton Road).

1.12 Full details of battery limits for the development of the site are defined in the Construction Contracts.

ITS Process Equipment Provider

1.13 Sistema Ecodeco UK Limited ("**Ecodeco**") will have responsibility for the engineering, design, supply and installation of the ITS Facility process, mechanical, electrical and control systems.

1.14 JCBE will complete the Works to meet the requirements of the Acceptance Tests and the Construction Sub-Contractor's performance requirements including the project programme.

AD Facility Provider

1.15 JCBE will complete the Works to meet the Construction Sub-Contractor's performance requirements and the project programme.

2 Section 02. Analysis of Sites

Analysis of the Sites

2.1 The Facilities will be developed as part of the overall delivery of the Service to the Councils. These are:

- Site infrastructure capable of processing 265,000 tonnes per annum of municipal solid waste.
- an Intelligent Transfer Station (ITS Facility) mechanical biological treatment plant that will process 250,000 tonnes per annum of municipal solid waste, and
- the AD Facility which will process 18,000 tonnes per annum of organic fines.

2.2 The ITSAD Facility will be located at Bolton Road, Wath Upon Dearne, Rotherham, S63 7LL. The OS Grid Reference for the site is SE 454015.

2.3 The existing transfer station at the Site (Grange Lane) will be transferred to the Contractor at the expiry of the existing contract and will be used as a delivery point for waste collected in the local area. All other waste streams will be delivered to the ITS Facility at the Site (Bolton Road) or other designated sites.

ITS Facility

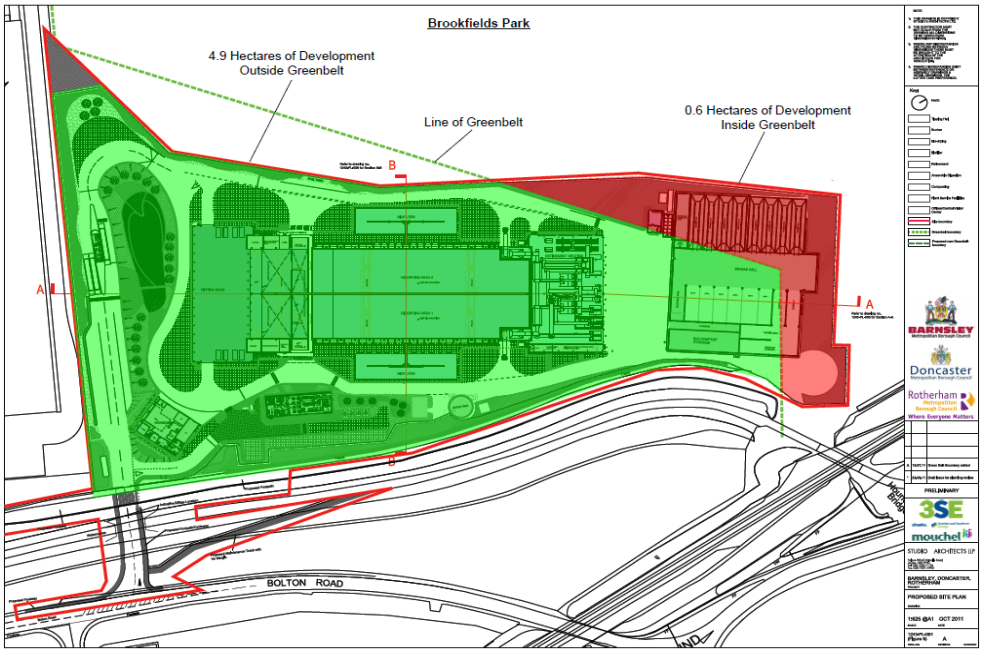
Outline Total Land Requirements

2.4 The Contractor's treatment technology is a twin line Ecodeco Intelligent Transfer Station (ITS) located at the Site (Bolton Road) with a capacity of 250,000 tonnes per annum. The Site (Bolton Road) has an approximate area of 5.7ha.

2.5 The extent of the Site (Bolton Road) (see Ref AE in Schedule 8) and full sized copies of all site drawings (Scale 1:1250) can be found in Schedule 8 (Design) of the Contract.

2.6 The developed part of the Site (Bolton Road) which lies outside the greenbelt area covers 4.2ha. The area within the greenbelt is 0.5 ha, giving a total land requirement of 4.7 ha. This is shown in Figure 02.

Figure 02 Area Outside the Green Belt to be Developed



2.7 The landscaping proposals for the Site (Bolton Road) are shown in the landscaping proposal drawing titled "Landscape Mitigation" which is Figure 12.3, Revision A of the planning submission.

Potential Access Solutions

2.8 A new access junction will be constructed to the Site (Bolton Road) from Bolton Road. It is located to the west of Bolton Road approximately 50 metres north of an existing junction leading to Patrick Tobin Business Park on the east side.

2.9 The new access will consist of highways works and a bridge facilitating road traffic over the Hound Hill Dyke. The existing footpath and bridleway will be brought up to the level of the road providing a crossing at grade enabling all users to continue to use the footpath and bridleway along the southern perimeter of the Site (Bolton Road).

2.10 The design for the bridge and road layout is presented in drawing Ref DQ in Schedule 8 (Design) of the Contract.

2.11 Dearne and Dove Internal Drainage Board require vehicle access to the eastern bank of the Hound Hill Dyke north of the new access road. This has been accommodated into the design of the access road.

2.12 A site entrance layout is shown in Ref CK in Schedule 8 (Design) of the Contract.

2.13 All vehicles will be directed to the approved routes.

2.14 The route suitable as the main access route to the Site (Bolton Road) for inputs and outputs is A6023 Manvers Way, which is of recent construction and serves existing major warehouse distribution developments.

2.15 The existing access junction on the east side of Bolton Road is a priority T junction with a right turning lane. The road has street lighting and a footway but no speed limit restriction and is 60mph in compliance with the national speed limit.

2.16 The new junction and access will:

- operate in conjunction with the existing junction;
- provide capacity and room for turning movements by the largest vehicles using the Site (Bolton Road);
- incorporate a bridge over the watercourse which runs parallel to and west of Bolton Road;
- incorporate a crossing of an existing public footpath and bridleway along the west side of the watercourse; and
- provide footway access to the Site (Bolton Road) for pedestrians.

2.17 A traffic survey has been carried out by the Contractor's planning consultant, Mouchel, during September 2010 to assess the capacity of the access junction design.

2.18 Bolton Road is a classified road (B6068), and the new access will be subject to planning approval and approval by the local highways officer.

2.19 The Site (Bolton Road) will be accessed by vehicles up to forty-four (44) tonnes laden weight and the new access will be a two-way road for all traffic in and out of the Site (Bolton Road). The structural adequacy of the road network is the responsibility of the local highway authority. The structural life of roads is expressed in terms of the

number of standard lorry axles. The cost of improvement, reconstruction or strengthening of the existing highway access routes near the access to the Site (Bolton Road), specifically the junction access works area, will be met by the Contractor if the road is considered inadequate.

2.20 The present structural condition of Bolton Road is undetermined, although it appears to be in good condition, partly of recent construction, and with no signs of major failure.

2.21 The bridge required over the existing watercourse will provide for flood flows as required by the Environment Agency and any other relevant drainage authority.

Local Network and Access Routes

2.22 Access routes to the Site (Bolton Road) are significantly restricted in terms of vehicle height by two low railway bridges. A bridge on Bolton Road north of the access has a height restriction of 13'6" (4.1 metres), and a bridge on the A6023 Doncaster Road east of the Site (Bolton Road) is restricted to 13'3" (4.0 metres). Both bridges carry the Wakefield Line railway.

2.23 These restrictions will prevent use of these routes for access by some heavy goods vehicles, which can be up to 4.9 metres high. Normal refuse collection vehicles require approximately 4.3 metres headroom. These and other specialist vehicles involved in the operation of waste disposal facilities are unlikely to fit under these bridges, including bulk haulage HGV's transferring Contract Waste from the TLS Facility. Measures to reduce the risk of accidental 'bridge bashing' (e.g., signs and over height vehicle detectors) will be supplied by the Contractor if the local highway authority and Network Rail consider them necessary in accordance with the provisions of the Contract relating to Off-Site Expenditure. The low bridges will limit the access for all HGVs and will form part of the routing agreement for the Site (Bolton Road).

2.24 None of the roads in close proximity to the Site (Bolton Road) are nationally strategic (trunk) roads but routes for output materials will affect strategic roads. Therefore it is not expected that the Highways Agency would require any alterations in respect of development of the Site (Bolton Road).

2.25 As a result of the low bridges, large vehicles will all be required to turn left in and right out of the new access. Light vehicles only could access and exit the Site (Bolton Road) via Bolton Road (north).

Public Transport Assessment

2.26 Bolton Road is not a bus route but Manvers Way is well served by bus routes from all local urban areas and there are existing stops within approximately 500 metres of the new site access. This is considered acceptable for work related journeys. Manvers Way also has good cycle and pedestrian facilities, which could be connected to the Site (Bolton Road) by the addition of a cycleway/footway on the west verge of Bolton Road as part of access junction works.

Construction laydown area and vehicle parking

2.27 Construction compound and laydown areas are shown in Ref DU in Schedule 8 (Design) of the Contract. Temporary compound location is shown in Ref DV in Schedule 8 (Design) of the Contract.

Layout and Expansion Potential

2.28 The layout of the Site (Bolton Road) can be found in Ref AE in Schedule 8 (Design) of the Contract.

2.29 The ITS Facility and associated structures; visitor centre, workshop, AD Facility, landscaping and site roads take up almost all of the available space on the Site (Bolton Road). This leaves little capacity for expansion on the Site (Bolton Road).

Protection and Diversion Works for Existing Infrastructure

2.30 There is no existing infrastructure within the boundaries of the Site (Bolton Road). Access to the Site (Bolton Road) will be over the Hound Hill Dyke and provision will need to be made for installing a bridge and an appropriate junction with Bolton Road.

Existing Structures and Facilities

2.31 There are no existing structures and facilities on the Site (Bolton Road). The lagoons will be emptied and filled after any protected species identified in the ecology surveys are moved and re-located.

2.32 The Contractor intends to provide replacement habitats on the Site (Bolton Road) should protected species colonise the area.

Utilities

2.33 The Contractor has employed the services of a specialist contractor to facilitate development of the design phase of the utilities needed for the Site (Bolton Road).

2.34 The Contractor has continued with the design process and has engaged with all relevant statutory utility providers to facilitate the ongoing dialogue with the Councils and has taken into account the outputs from these discussions/requests into our solution.

Gas – National Grid UK

2.35 The ITS Facility does not require gas to operate. A new dedicated natural gas supply shall be provided to the site boundary meter location. This new natural gas supply may be run to supply heating and domestic hot water within the workshop and administration buildings; consideration has been given to routing the new water and gas supply pipe work within a common trench. See site Infrastructure M&E Services drawing ref DL in Schedule 8 (Design) of the Contract.

2.36 National Grid UK has a 355mm diameter, medium pressure polyethylene gas main within the southern footpath running adjacent to Manvers Way. There are several tees off this main into existing properties. It has been confirmed by National Grid the domestic scale gas supply required at the Site (Bolton Road) will be connected into the existing gas infrastructure in Bolton Road. Recent enquiries for new connections have implied capacity exists in the local network.

2.37 Although, the Contractor will make use of gas at the Site (Bolton Road) for space heating and hot water at this stage, during the final design process a final decision will be made as to whether electric panel heaters and electric hot water systems will be used instead of gas. This decision will be based on the final BREEAM evaluation and affordability.

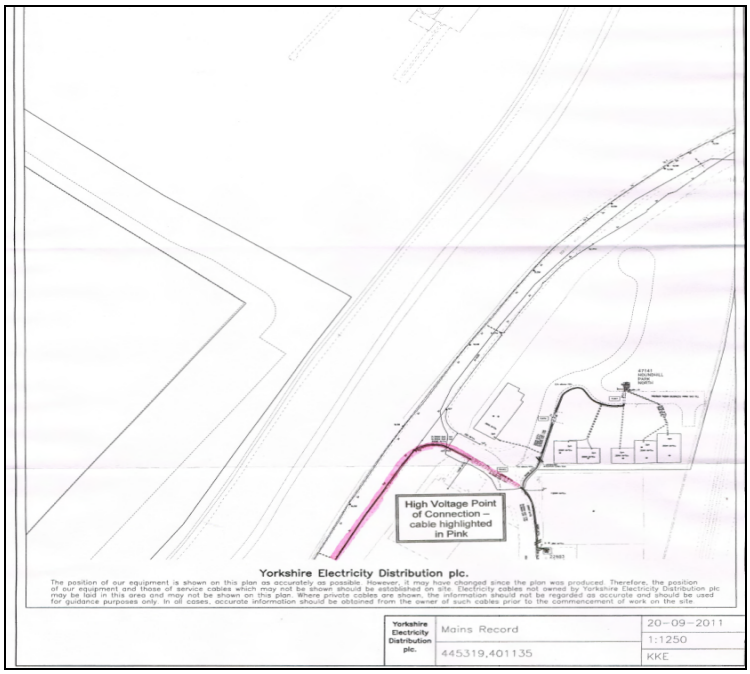
Electricity – Yorkshire Electricity

2.38 The Site (Bolton Road) will require an electrical connection for its operations for the import of electricity.

2.39 The Contractor requested its technical advisor Utility Connections Management Limited to undertake a grid connection study for the import of electricity required by the ITS Facility. The local distribution network operator is CE Electric UK through subsidiary company Yorkshire Electricity Distribution Limited, ("**YEDL**").

2.40 There is an existing below ground plant in both the south and north footpaths on Manvers Way feeding the industrial units along its length. CE Electric has confirmed the site would be connected into YEDL's 11kVA network, this would require a 180m extension to the existing network. Figure 4 shows the existing 11kVa network (pink line) on the opposite side of the road to the Site (Bolton Road).

Figure 03 CE Electric UK (YEDL) Point of Connection– Bolton Road



2.41 YEDL will require a substation on the Site (Bolton Road). The Contractor will be required to grant a lease for the substation and is responsible for construction of the building. All wayleaves and other statutory consents are the responsibility of the Contractor and the relevant authorities and statutory providers.

Water – Yorkshire Water

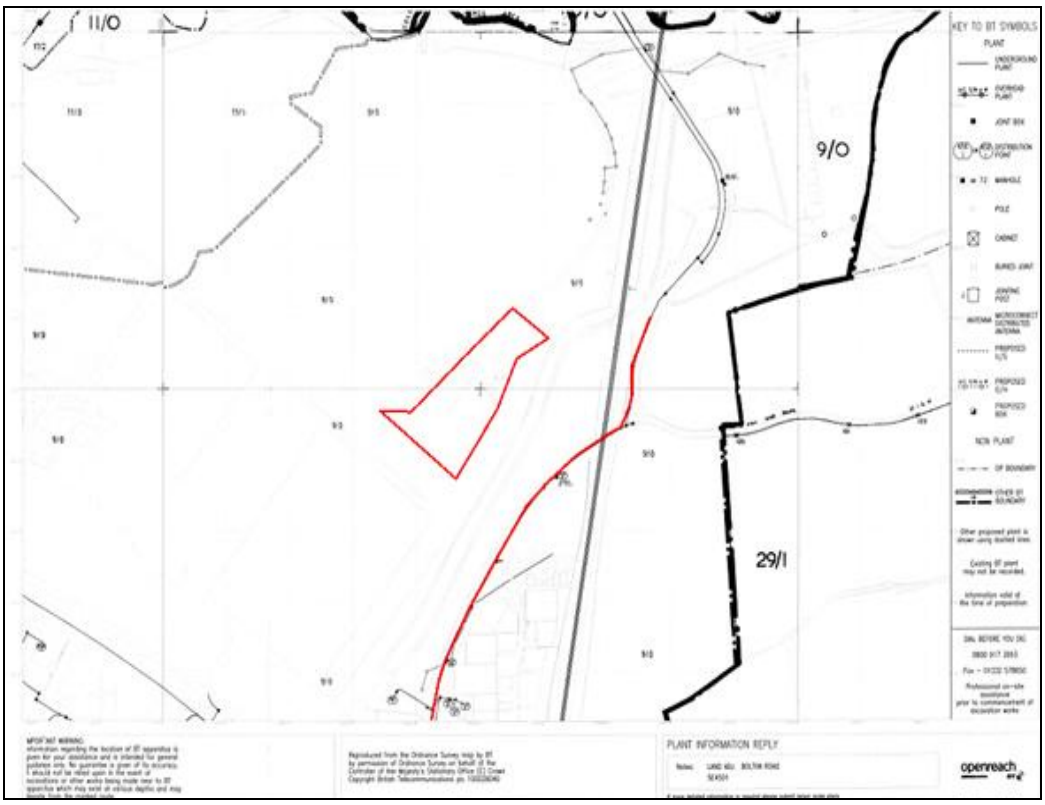
2.42 Yorkshire Water has installed a 250mm diameter water main beneath the southern footpath running adjacent to Manvers Way. Yorkshire Water has also confirmed that water for the waste treatment centre will be provided either from Manvers Way or Bolton Road.

Telecommunications

2.43 BT Openreach has provided 'safe digging plans' for the area immediately adjacent to the Site (Bolton Road) (see Figure 04). The plans detail plant buried along Bolton Road.

From the information provided by BT Openreach, the supply will be taken from Bolton Road.

Figure 04 BT Openreach Safe Digging Plan – Bolton Road



2.44 Telephone services are required on site for 3 key elements:

- landline telephone services to offices and ITS Facility control room;
- data communications; and
- emergency telephones for control rooms and gatehouse.

2.45 The telephone services and data communication will be carried out via the fibre optic cable installation. The Contractor will install two (2) separate cables, each of sufficient capacity to handle all future anticipated loads, to the PABX (private automatic branch exchange) to provide an automated electronic switching system to provide internal and external phone connections to all offices and the ITS Facility and AD Facility control rooms. The second cable will provide back-up in case of failure or additional future capacity for unforeseen circumstances. The implication of installing a second fibre

optic cable outweighs the problems of needing to install an additional cable in the future.

2.46 To comply with fire safety regulations, the supply to the emergency phones will be by copper lines which will provide a service to the control rooms and gatehouse. The gate house will also be provided with a mobile phone as a backup to all landline phone services.

2.47 Current BT infrastructure provides coverage within Bolton Road. Dialogue with BT has commenced and a developer enquiry has been submitted. The receipt of the enquiry has been acknowledged by BT. No connections will be made until approval has been granted. Recent dialogue with BT has shown that no additional infrastructure costs would be required.

Network Rail

2.48 Network Rail's General Engineering Requirements in Respect of Development Work Adjacent to the Operational Railway and Company Code of Practice, and the Requirements for Construction Work On or Near Railway Operational Land by Outside Parties will be addressed through the final design. These documents do not affect the proposals as presented, however both construction lighting and site lighting proposals will need to be agreed with Network Rail at detailed design stage and in advance of the works on site.

Grange Lane Transfer Station

2.49 The Contractor has allocated a maximum sum of one hundred and fifty thousand pounds (£150,000) (un-indexed) for works at the Site (Grange Lane). The exact nature of the works will be determined by the condition of the site in relation to the full and tenantable repair survey in accordance with clause 52.2 of the Contract. For the avoidance of doubt the maximum contribution from the Contractor will be one hundred and fifty thousand pounds (£150,000) (un-indexed).

Outline Total Land Requirements

2.50 The Contractor will utilise the existing TLS Facility at the Site (Grange Lane) to transfer Barnsley's waste to the ITS Facility at the Site (Bolton Road).

2.51 The Contractor will use just the existing footprint of the Sites and does not intend to take any of the other land potentially available.

Potential Access Solutions

2.52 The Contractor will not change the existing entrance to the Sites.

Planning Constraints and Opportunities

2.53 The Contractor will operate the TLS Facility under the conditions of the existing planning permission.

Layout and Expansion Potential

2.54 The Contractor will leave the layout of the Sites unchanged.

Protection and Diversion Works for Existing Infrastructure

2.55 The Contractor will retain all existing structures on the Sites.

Existing Structures and Facilities

2.56 The Contractor will retain all existing structures on the Sites.

3 Section 03. Design

Overview of the Treatment Process

3.1 The Contractor will develop a two hundred and fifty thousand (250,000) tonnes per annum twin line Ecodeco ITS Facility at the Site (Bolton Road), Rotherham. The AD Facility will also be built to process eighteen thousand (18,000) tonnes per annum of organic fines taken directly from the ITS Facility. The ITS Facility is designed to produce a SRF which will then be utilised in the Ferrybridge Facility currently being developed by the SRF Offtaker. The AD Facility will produce methane gas, to be used for on site power generation using a combined heat and power ("**CHP**") engine located adjacent to the AD Facility building. A compost like output will also be produced which will be taken for off site use as a land remediation product.

3.2 The Contractor's solution, seeks to recover the following outputs:

- Ferrous metals – recycled
- Non-ferrous metals - recycled
- Mixed plastics - recycled

- Glass and stone - recycled
- Organic rich fines – stabilised and sanitised through the fines stabilisation plant and used through an agreement with 4Recycling Limited or for restoration material at the existing Group joint venture landfill at Peckfield.
- Rejects – Parkwood landfill, Sheffield

3.3 Due to the central location of the Site (Bolton Road) (see Figure 05), it is not proposed that any new transfer stations are provided as part of the solution for either Doncaster or Rotherham. However, in order to drive transport efficiencies in Barnsley, the Contractor will take on the operation of the existing TLS Facility at the Site (Grange Lane).

Figure 05 The Contractor Waste Facilities

3.4 In total, the solution will utilise two (2) Sites which will include:

- The Site (Grange Lane) – TLS Facility
- The Site (Bolton Road) – ITSAD Facility (encompassing both ITS Facility and AD Facility)

Figure 06 Summary of Treatment Technologies

Facility	Technology	Capacity	Materials processed
Bolton Road	ITS (Ecodeco)	250,000 tonnes per annum (2x125,000)	mixed municipal waste
	Fines stabilisation housed AD and Composting, (JCBE)	18,000 tonnes per annum	ITS fines
Grange Lane	Waste Transfer Station	60,000 tonnes per annum	mixed municipal waste

Figure 07 Summary of Sub-Contract Facilities

Facility	Technology	Capacity	Materials processed
Ferrybridge multi-fuel CHP	Energy from Waste (EfW) Facility	500,000 tonnes per annum (subject to CV and fuel specification)	SRF

Intelligent Transfer Station

3.5 The ITS Facility designed for the Site (Bolton Road) is a twin line Ecodeco Intelligent Transfer Station with a capacity of two hundred and fifty thousand (250,000) tonnes/annum.

3.6 The ITS process system is designed to treat a blend of household residual waste or commercial waste which is similar in nature, and consists of three main stages:

3.6.1 Waste reception;

3.6.2 Bio-drying; and

3.6.3 Mechanical Refinement.

Waste Reception

3.7 The ITS Facility is housed in a fully enclosed building. Waste is discharged from refuse collection vehicles into reception pits, via the fully enclosed delivery and reception area. The reception and shredded waste pits, combined with the enclosed delivery and reception area, will be capable of storing up to **[REDACTED]** worth of input material. See Figure 08 for **[REDACTED]**.

Figure 08 [REDACTED]

[REDACTED]

3.8 The reception pits are maintained under negative air pressure to control dust and odour emissions. Extracted air will be discharged to atmosphere through a bio-filter. Once delivery vehicles are within the reception and delivery area, discharging takes place through rapid fabric doors into the reception pits. This is a controlled environment created by fine water sprays over reception pit doors combined with airflow management in order to minimise the emission of dust and odour.

3.9 The reception pits are connected to the air extraction system. Air is extracted from the reception pit area and discharged to atmosphere via a bio-filter. The bio-drying section has an elevated perforated floor. The process draws air through the stockpiled waste in the bio-drying section, preventing stagnation and removing odours.

3.10 An electro hydraulic gantry crane picks the waste from the reception pits and transports it to a shredder. Shredded material (sub 300 mm) is collected from the shredded waste pit using the same type of gantry crane that feeds the shredder and is moved into windrows in the biodrying area. The purpose of the shredding operation is to produce a homogenous material to improve the efficiency of the aerobic fermentation process.

[REDACTED]

3.11 **[REDACTED]**

3.12 **[REDACTED]**

3.13 **[REDACTED]**

3.14 **[REDACTED]**

3.15 **[REDACTED]**

3.16 **[REDACTED]**

3.17 **[REDACTED]**

3.18 **[REDACTED]**

3.19 **[REDACTED]**

[REDACTED]

3.20 **[REDACTED]**

[REDACTED]

[REDACTED]

3.21 **[REDACTED]**

3.22 **[REDACTED]**

3.23 **[REDACTED]**

3.24 **[REDACTED]**

3.25 **[REDACTED]**

3.26 **[REDACTED]**

3.27 **[REDACTED]**

3.28 **[REDACTED]**

3.29 **[REDACTED]**

3.30 **[REDACTED]**

3.31 **[REDACTED]**

3.32 **[REDACTED]**

Figure 09 [REDACTED]

Figure 10 [REDACTED]

3.33 **[REDACTED]**

3.34 **[REDACTED]**

3.35 **[REDACTED]**

3.36 **[REDACTED]**

3.37 **[REDACTED]**

3.38 **[REDACTED]**

[REDACTED]

3.39 **[REDACTED]**

[REDACTED]

3.40 **[REDACTED]**

3.41 **[REDACTED]**

Compost Exhaust

3.42 The digestate exiting the dry fermentation phase will have been subjected to >40 Days of anaerobic digestion and as result the odour potential from this material will be greatly reduced.

3.43 Nevertheless, once the material is aerated it can be expected that a 1-2 week period of increased odour potential will occur as aerobic conditions are established and fermentation residues are driven off. To manage this transition, the composting ASPs and tunnels are operated under negative air pressure, oxygen concentrations are managed at >12% throughout the biomass and an automated policy of air re-circulation is enacted to minimise the actual exhaust air volume.

3.44 All these features contribute to the effective prevention, containment and minimisation of the odour load from this stage of the process.

Building Ventilation

3.45 The ventilation of the main building void is designed for three air changes per hour and is primarily design to capture fugitive emissions from the delivery and handling of

waste within the main facility holding areas and corridors while providing good air quality and visibility for the facility operators.

3.46 This ventilation rate allied to a good building skin integrity ensure that all odorous air produced by the AD Facility will be contained and directed to the odour abatement system. While the building is designed to be operated under slight negative pressure, the air handling design for the building has been developed to minimize the volume of air to be handled and consequently the biofilter size and ultimate operating costs. The ventilation pipe work is installed in the head space of the building is connected to a high volume medium pressure blower that draws off the warm, buoyant contaminated air that is generated by a combination of emissions from the bio-waste on the floor, fugitive emissions from the movement of the biowaste between vessels, screening steam and diesel fumes.

3.47 This removal of any bio-waste building fog is also important in maintaining good visibility within the building interior for the purposes of good health and safety practice. The ventilation pipe work is located in the roof spaces and operates under vacuum. It services the reception hall, the mixing halls, screening area and compost storage building. This is illustrated in the attached drawings. The piping and blowers are sized to ensure that up to six air changes per hour can be applied to the building void. The ventilation system is designed to effectively capture building air while maintaining the buildings under a slight negative pressure to avoid escape of odorous air from the facility.

Odour Abatement System

3.48 The air flows from the AD Facility are categorized into three primary streams that are treated differently:

- (1) High strength fermenter exhaust that is thermally oxidized within the biogas engine.
- (2) Moderate strength aerobic exhaust from the composting ASPs & tunnels is subjected to acid scrubbing followed by bio-filtration utilizing a high performance bio-trickling filter system.
- (3) Building ventilation air is mixed with the compost exhaust and treated using the biofilter.

3.49 The re-circulated exhaust from the composting vessels and ASPs will be initially passed through an acid scrubber. The acid scrubber is designed to remove odorants that are poorly degraded in biofilters. This particularly includes ammonia and amines. The removal of ammonia is particularly important as its oxidation in biofilters can give rise to elevated emissions of nitrous oxide, a strong greenhouse gas. One scrubber will be installed to treat air from the proposed facility design. The following minimum design performance and specification will be attainable on the acid scrubbing plant (Table 1).

Table 1: Acid scrubber process characteristics for Phase 1 of the development

Parameter	Values
Air Flow rate (compost exhaust only)	7 m^3/s
Inlet NH_3 Concentration	100-250 mg/Nm^3
Liquid Recirculation Rate	30 m^3/h
pH in Sump	2.5-4.5
Packing Vol	10 m^3
Outlet NH_3 Concentration	<10 mg/m^3
NH_3 Removal Efficiency	>90%

3.50 With the removal of ammonia and amines, the airstream is mixed with the low to moderate strength building air and directed to the biofilter.

3.51 The combined pre-treated compost exhaust and the building ventilation air will be directed to the biofilter located to the south of the AD Facility. The subsequent exhaust will be passed through a biofilter bed that is composed of a proprietary high surface area inorganic micro-porous LECA (lightweight expanded clay aggregate) media.

3.52 The bio-trickling filter has been designed to allow an empty bed retention time (EBRT) of between forty-five (45) and sixty (60) seconds. This media has been found to provide excellent odour removal efficiencies of >95%. The bed medium chosen is inorganic based and of uniform particle size thereby preventing channelling.

3.53 The bed medium is lightweight, will not degrade, is free draining, has excellent structural integrity to allow an even distribution of air and has a low pressure headloss.

3.54 The biofilm which develops on the media is expected to develop to full design density within three (3) Months and is kept permanently moist through the use of sprinklers to maintain good biomass development.

3.55 The biofilm will be initially be seeded with activated sludge to accelerate the colonization. Irrespective of this, the performance of the biofilter will be >85% efficiency during hot commissioning. Therefore, coupled with the stack discharge, no off-site impacts are expected to occur at the sensitive receptors. Modelling of this period will be conducted during detailed design to demonstrate compliance.

3.56 The design considered contingency for media change-out and preventative maintenance so as to ensure optimal performance. Preventative maintenance or replacement of the biofilter media will only be scheduled during periods of anticipated low loading (i.e. periods when there are no planned vessel purges such as weekends). Furthermore as the biofilter is designed as a modular system bio filter media will only ever be replaced one module at a time to ensure ongoing emission compliance.

3.57 The biofilm inlet air distribution floor chosen will provide homogenous airflow throughout the biofilter bed medium thereby eliminating short-circuiting and poor treatment. The design life of the bed medium is in excess of seven years therefore reducing downtime associated with change-out. The operation of the bio-trickling biofilter with a continuous moving liquid film will ensure contaminant building up within the media will be minimised within the bed and allow for the continuous control and addition of nutrients, minerals, pH and biofilm development.

3.58 As part of the overall odour treatment system, an integrated SCADA monitoring system will be incorporated into the design of the biofilter to allow for continuous monitoring of performance of the ventilation and odour control equipment. The containment of the beds is within concrete walling with an air tight fabric roof. All air will be directed to a single emission stack to ensure good dispersion of the residual odour plume to ensure that no negative impacts are experienced off-site.

Odour Output to Atmosphere

3.59 The Biological Treatment Facility exhaust will be accordance with typical Environment Agency emission standards as per recent publications while allowing for the site specific issues associated with the site and the characteristics of the AD Facility design. The overall incorporation of robust preventative maintenance procedures, containment measures, focused extraction, zoned and cascade ventilation, SCADA control, monitoring, trending and data-logging and multiple stages of treatment will ensure that odours will not cause impact on the surrounding area and that the odour control system will operate at optimal capacity. The expected odour output profile is provided in Table 2.

3.60 The purging of the fermenter during emptying results in a flow rate of up to 10,000 m^3 per hour or 2.8 m^3/sec. As the biofilter has a nominal capacity of 22 m^3/sec at an EBRT of fifty (50) seconds, the biofilter will not be detrimentally impacted during purge events. Moreover, as the ventilation of the fermenters is drawn from the mixing hall, the overall mass balance of airflow remains within the 22 m^3/sec design capacity.

Table 2: Emission Limits Value for the BDR Biofilter

Parameter	Emission limit value	Typical value	Peak volumetric flow (m^3/s)	Typical output load/s
Odour OU/m^3	1,000	700	22	15,400
Ammonia (mg/m^3)	25*	<10	22	<220
Hydrogen sulphide (mg/m^3)	5*	<0.1	22	<2.2
Mercaptans (mg/ m^3)	5*	<0.1	22	<2.2

CHP Engine Emissions Abatement

3.61 The 500kWe rated CHP gas engine will be fitted with an exhaust emissions abatement system which will ensure that the following limits are not exceeded.

- NOx:<500 mg/Nm3
- CO:<1,000 mg/Nm3
- Formaldehyde:<40 mg/Nm3

Monitoring and Control

3.62 The dry fermentation process is automatically monitored for process stability and safety by the Siemens PLC and SCADA system as developed by BIOFerm Viessmann GmbH. This system allows for the automatic recovery of the biogas produced while ensuring optimum performance of the CHP system. Automatic alarm and shut-down procedures are a critical feature of the system to ensure safe operation.

3.63 The composting and pasteurisation system is similarly controlled in a robust automated manner. From an ABPR compliance stand-point, ten (10) temperature probes will be inserted into the organic rich fines within each composting vessel and these are connected to a dedicated computer system which acts as a data logger. The computer will record the temperature of the composting material continuously. The displayed temperature readings will be reviewed each Day by the Site Manager at the beginning

of each shift in order to ensure the composting process is proceeding satisfactorily. Adjustment of the temperature levels will be achieved by varying the amount of air supplied by the air-handling unit as necessary and through the heat exchanger linked to the CHP engine.

TLS Facility

3.64 A schedule of works (as yet to be agreed) will be undertaken to bring the TLS Facility at the Site (Grange Lane) up to a 'full and tenantable' condition in accordance with clause 52.4.3 of the Contract.

Works Specifications ITSAD Facility

3.65 The civil and structural element of the Project will be covered by a specification which is based on the National Building Specification and the Design Manual Roads and Bridges, all relevant British Standards ("**BS**") and European Codes ("**EC**").Where there is a conflict between BS and EC, BS will prevail. BS are used worldwide and offer construction professionals the ability to create up-to-date specifications for a wide variety of building projects.

3.66 Within this specification references will be made to the following particular specifications:

- National Structural Steelwork Specification for Building Construction;
- Specification for Highway Works;
- Specification for Piling and Embedded Retaining Walls – ICE;
- STANSPEC - Standard Specification Document For Road Markings & Road Studs; and
- Civil Engineering Specification for the Water industry (CESWI).

3.67 The Contractor's solution will incorporate best practice sustainability features.

3.68 BREEAM will be used throughout the Project to guide design and construction activities. The Contractor hopes to achieve a BREEAM 'GOOD' rating for the site as a whole and a 'Very Good' rating for the administration building.

3.69 Sustainable building products incorporating re-used and recycled materials will be specified where appropriate, ensuring the Project is as environmentally sensitive as possible, without jeopardising the performance and value for money of the components.

3.70 The on-site lagoon will be used to store some of the surfacewater run off generated by the site, once it has been filtered throughinterceptors. The water will then be dispersed to Houndhill Dyke at acontrolled rate (five (5) litres per second per hectare) via an outfall. Alldischarge flows to the dyke shall meet an adequate water qualitystandard. Rain water collected from the AD Facility roof will be stored for use as grey water in the process.

3.71 Recycled aggregates will be used in numerous parts of the plant, in particular the single storey ground-floor buildings, the control room, and the workshop / fines composting shed. These buildings all incorporate block work, which can utilise high levels of recycled aggregate. The sub base and capping layers for the site access roads and beneath ground-bearing concrete slabs will make use of recycled aggregates, as will the bedding for service pipes, subject to the correct size and grading of the aggregate in accordance with the Specification for Highways Works.

3.72 The construction method used for the grasscrete (specified for the administration building car park and other areas where access and maintenance is required) makes use of recycled plastic to form the voids for the grass. Recycled materials will be used within the Works. Soil arising from the excavations for foundations will also be used for seeding grass. The use of grasscrete is also classed as a sustainable urban drainage system ("**SUDS**"), reducing the quantity of surface water run-off by draining into the underlying strata, whilst still providing sufficient strength to be trafficked by heavy vehicles.

3.73 The mechanical, electrical, and public health aspects of the Project will be specified by means of a number of project specific general and particular specifications. The general specifications describe the overall scope of works and identifies the current codes, standards, and regulations which are to be considered in the design of the Works.

3.74 The contents of general specifications are as follows;

Standard Mechanical and Public Health Specification

- General requirements
- Pipe work and ancillaries

- Ductwork and ancillaries
- Thermal insulation
- Acoustic and vibration control equipment
- Electrical services associated with mechanical plant
- Automatic control systems
- Commissioning and testing
- Soil, waste, vent, pipe work and fittings

Standard Electrical Specification in accordance with BS 7671:2008

- General technical requirements
- Earthing
- Lightning protection
- Transformers
- Generators
- UPS
- Switchgear
- Distribution boards
- Air circuit breakers and switches
- Fuse switch unit, switch fuses, changeover switches and switch disconnecters
- Cartridge fuses
- Moulded Case Circuit Breakers (MCCB)
- Miniature Circuit Breakers (MCB)
- Labelling and engraving

- Cable trunking
- Conduit and systems
- Wiring of conduits and trunking
- Cable trays
- Power supply cables
- Cables laid in the ground
- Mineral Insulated Copper Sheathed (MICS) Cables
- Lighting installation
- Emergency lighting
- General power outlets
- Building and expansion joint
- Method of fixings
- Miscellaneous three phase and single phase power
- Termination at fixed equipment
- Wiring accessories
- Fire alarm systems
- Radio and television systems
- Security systems
- Inspection and testing
- Treatment - electric shock

3.75 The particular specifications describe in detail the individual aspects of work which are to be undertaken for each part of the ITSAD Facility. Tabulated design deliverables will be included to clarify requirements. As an example the particular specification for

the visitors' centre and administration building will identify the requirements of individual rooms within the building.

3.76 The contents of particular specifications for a facility similar to the visitors' centre and administration building are as follows:

Particular Electrical Specification

- General requirements
- Project description
- Scope of works
- Incoming supply
- LV panel
- Sub main cables
- Containment system
- Isolation devices
- Distribution boards
- Small power
- Lighting system
- Emergency lighting
- Fire alarm system
- CCTV camera
- Electrical services associated with mechanical services
- Lightning protection
- Earthing
- Testing and commissioning

- Operating and maintenance documentation (health and safety file)
- Record drawings
- Statutory requirement
- Distribution board circuit chart
- Luminaire schedules
- Manufacturer supply
- Schedule of tender drawings
- Tender schedule

Particular Mechanical and Public Health Specification

- General requirements
- Project description
- Scope of Works
- Design parameters
- LPHW heating systems
- WC, changing room and shower ventilation and heating
- Visitor centre ventilation and heating
- Entrance/reception area ventilation and heating
- Office area and meeting room ventilation and heating
- Kitchen ventilation and heating
- Gas supplies
- Gas system
- Domestic cold water system

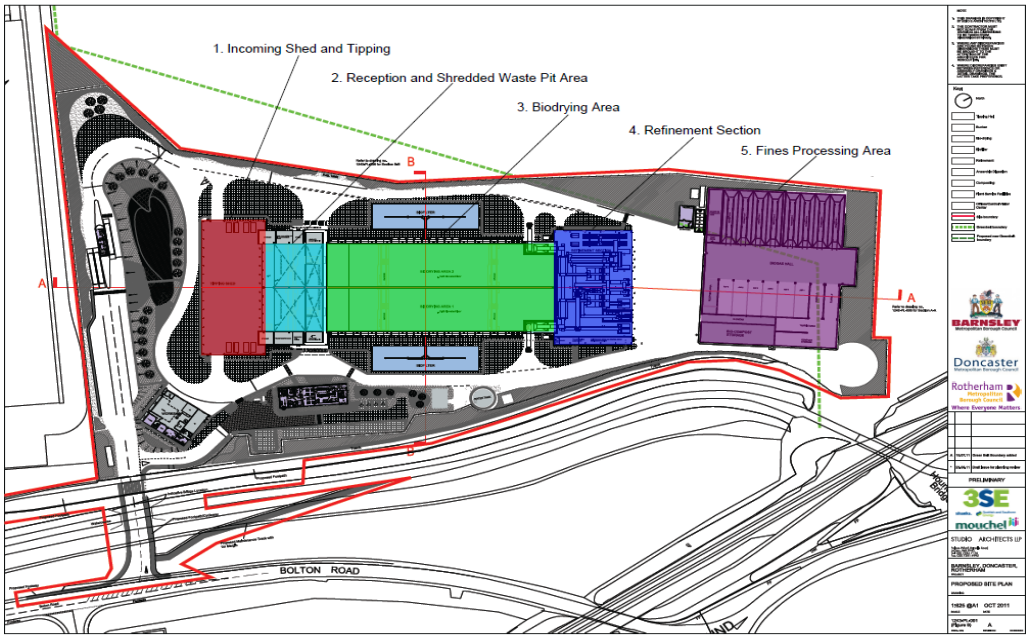
- Domestic hot water system
- Soil, waste, rainwater, overflow and drain relief systems
- Electrical services associated with mechanical plant
- Contractor's design responsibility
- Painting and pipe treatment
- Testing and commissioning
- Identification of plant and equipment
- Record documentation
- Contractors working drawings
- Provision of spares and tools
- Information to be provided at time of tender
- Equipment schedule

3.77 The Contractor confirms that all specifications will be included within the sub-contract documents.

Site Layout

3.78 Figure 11 below shows the layout of the ITSAD Facility identifying the five (5) main operational areas. Each of these areas is dealt with individually below. A short description of the landscaping for the area of the site within the green belt boundary is also included.

Figure 11 Site Layout Showing the Five Main Areas of the ITSAD Facility



Tipping Shed and Quarantine Area

3.79 The tipping shed and quarantine area is a single building approximately 76m x 31.5m x 14.4m (max) high. The purpose of the tipping shed and quarantine building is to ensure that the tipping activities are carried out in an enclosed building. This will ensure that the amount of windborne litter escaping to external areas of the site will be kept to a minimum. The building will support typical dead and live loads and will include services, roller shutter doors and profiled metal cladding. There is no overhead crane in the tipping shed.

3.80 The roller shutter doors incorporated into the ends of the tipping shed will alleviate any potential pollution from exhaust fumes. In addition to the dead and live loads acting vertically downwards, the potential uplift from wind blowing into the dominant opening has also been considered in its design.

3.81 The superstructure will be a structural steel frame. Stability in the transverse direction will be provided by portal action. Stability in the longitudinal direction will be provided by a horizontal bracing in the roof transferring horizontal wind loads into vertical bracing in the walls and, then, ultimately, into the foundations. Vertical bracing will be located to avoid roller shutter door locations.

3.82 Reinforced concrete pile caps will be provided with reinforced concrete ground beams spanning between. The floor slab is a ground bearing slab, isolated from the ground beams using a movement joint.

3.83 The external walls and roof will be profiled metal cladding with roller shutter doors. There will be no internal partitioning within the building.

Reception and Shredded Waste Pit Area

3.84 The reception and shredded waste pit area is as shown in Ref A of Schedule 8 (Design) of the Contract. This area is approximately 31.6m x 52.2m x 16.2m high. It houses the pits which receive the incoming waste, the shredders, the shredded waste pits and 2 No. overhead bridge cranes.

3.85 The superstructure will be a structural steel frame. Stability in the transverse direction will be provided by portal action. Stability in the longitudinal direction will be provided by a horizontal bracing in the roof transferring horizontal loads into vertical bracing in the walls and then, ultimately, into the foundations.

3.86 The substructure will consist of a combination of reinforced concrete pile caps, edge beams, slabs and the pit structures. The pits will be formed of reinforced concrete walls and bases and will be designed for maximum vertical downward loading from pits full of waste and leachate. The pit walls will act as stiff beams distributing loads from the column bases to the piles. Reinforced concrete pile caps will be built into the pit walls.

3.87 The external walls and roof of the pit area will be profiled metal cladding with roller shutter doors. There will be internal partitioning between the two lines and partitioning will be provided between the pit area and the annexe buildings and control room. The annexe buildings consist of transformer sub-station rooms, switchboard rooms and foam tank rooms.

3.88 The annexe buildings will be steel framed structures. The walls will be block work walls to provide a 1 hour fire protection between the annexe buildings and the pit area.

Bio-Drying Area

3.89 **[REDACTED]**

3.90 The superstructure will be a structural steel frame. The steelwork will be hot dip galvanized to BS EN ISO 1461:2009 to a minimum dft of 85 microns. Stability in the transverse direction will be provided by portal action, stability in the longitudinal

direction will be provided by a horizontal bracing in the roof transferring horizontal loads into vertical bracing in the walls and then, ultimately, into the foundations.

3.91 Piled foundations will be needed for this section of the construction.

3.92 The substructure will consist of a combination of reinforced concrete pile caps, edge beams, and ground slabs. The ground slabs will be supported on piles to limit settlements within the slab.

3.93 **[REDACTED]**

3.94 The walls retaining waste will be precast concrete walls supported on edge beams with the horizontal loading from retained waste transferred back into the steel columns. The walls above the level of the retained waste will be profiled metal cladding walls. The bio-drying area has been designed to provide a one (1) hour fire protection. This one (1) hour fire protection is required on all walls of the bio-drying area including the wall adjacent to the refining section.

Refinement Section

3.95 The refinement section is (ref issued doc "C066BDR000AB009R04 - ITS Plant 250k tonnes per annum - CFT Floor level plan" 63.5mx 38m x 16m high and it contains the process equipment which produces SRF and recyclates from the bio-dried waste. All of the process equipment will be supported directly on the floor. The building will support typical dead and live loads (ref issued doc "C066BDR09ZMA004R00 - ITS Plant 250k tonnes per annum - CFT Refinement Section loads on slab" and "C066BDR04ACS001R02 - ITS Plant 250k tonnes per annum - CFT Loads and technical specifications for civil works" max distributed load is 50KN/m^2 and max point load is 200KN) including services, roller shutter doors and profiled metal cladding. There is no overhead crane in the refinement section.

3.96 Roller shutter doors are provided in the north east elevation of the refinement section, in addition to the dead and live loads acting vertically downwards. The potential uplift from wind blowing into the dominant opening has also been taken into account in the design.

3.97 Reinforced concrete pile caps will be provided with reinforced concrete ground beams spanning between. The ground slab will be supported on piles and built into the ground beams. Additional piles will be provided to support major items of process equipment.

3.98 The external walls and roof will be single skin profiled metal cladding with roller shutter doors. There will be no internal partitioning within the building. The building does not form part of a fire escape route and boundary distances are greater than that required to prevent fire spread. Therefore there is no specific requirement for fire protection to the steelwork in the refinement section.

Fines Processing Building

3.99 The compost building is approximately 81m x 54m x 16m high and it contains the process equipment which processes the fines material from the refinement section of the ITS Facility. All of the process equipment will be supported directly on the floor. The building will support typical dead and live loads including services, roller shutter doors and profiled metal cladding. There is no overhead equipment in the compost section.

3.100 Roller shutter doors will be provided to suit the layout of the anaerobic digestion and in-vessel composting equipment, in addition to the dead and live loads acting vertically downwards. The potential uplift from wind blowing into the dominant opening has also been taken into account in the design.

3.101 The superstructure will be a structural steel frame. Stability in the transverse direction will be provided by portal action, stability in the longitudinal direction will be provided by a horizontal wind girder at roof level transferring horizontal wind loads into vertical wind girders and then, ultimately, into the foundations. The portal frame columns will be fixed at the base.

3.102 Reinforced concrete pile caps will be provided with reinforced concrete ground beams spanning between. The ground slab will be supported on piles and built into the ground beams. Additional piles will be provided to support major items of process equipment.

3.103 The external walls and roof will be single skin profiled metal cladding with roller shutter doors. There will be no internal partitioning within the building. The building does not form part of a fire escape route and boundary distances are greater than that required to prevent fire spread. Therefore there is no specific requirement for fire protection to the steelwork in the refinement section.

Landscaping

3.104 Full size copies of drawings which show the landscaping for the area of the site within the green belt boundary can be found in the Schedule 8 (Design) of the Contract.

3.105 With respect to landscaping for the Site (Bolton Road) the Contractor will:

- develop a landscape scheme in accordance with the landscaping proposal drawing titled "Landscape Mitigation" which is Figure 12.3 Revision A of the Environmental Statement, the character of which will improve the bio-diversity and character of the Site (Bolton Road);
- develop a landscape scheme to minimise visual intrusion towards settlements and cycleway and footpath;
- develop a scheme that physically links with establishing areas of vegetation to create wildlife corridors;
- increase on site tree and shrub planting along the cycleway boundary to complement the semi-mature vegetation planting;
- create a landscape that improves the environment for employees and visitors;
- recommend a landscape maintenance programme to ensure successful establishment of the landscape planting and the recreated habitats;
- maintain the established planting in an acceptable condition for the duration of the contract; and
- provide ongoing guidance on development of the new landscape scheme in liaison with ecologists.

Building Structure Designed for Adaptability

3.106 The ITS Facility and the AD Facility will be designed to allow for a degree of operational adaptability by incorporating into the design, process capacity redundancy within the building envelope and the process plant. This will include multiple discharging points, twin processing lines, multiple three (3) cranes per line and contingency capacity with the processing equipment. It would be difficult to adapt the structure itself as the structures are integral to the process in the case of the ITS Facility and AD Facility and therefore most of the flexibility is provided by the process equipment itself. However, the ITSAD Facility use can be adapted over the course of the Project to receive different waste streams. In addition, the building could be operated over longer hours in order to increase the throughput and storage if required.

Design of the Building's Services and External Infrastructure

3.107 The fixed non-process related lighting and power building services and external infrastructure have been designed to allow for future changes by means of accommodating a degree of redundancy within the installed electrical supply/cable ducts, control systems, signal cables and leachate collection and drainage systems. Including:

- The fixed non-process related lighting and power electrical equipment and installations shall be designed and installed by the Contractor in such a way that any problems caused by electro magnetic compatibility conditions are avoided and shall comply with all applicable legislation and applicable consents and will be in accordance with Good Industry Practice.

- Power transformers shall be of the cast-resin insulated type rated for the actual load plus twenty per cent (20%) spare capacity.

- Low voltage switchboards and motor control centres shall be of the fuse-less type with fixed pattern circuit breaker units for incoming feeders and motor feeders, and shall be suitable for the actual load plus 20% spare capacity at the Planned Service Commencement Date.

- All power cables shall have a maximum current-carrying capacity of seventy-fiver per cent (75%) of the current-carrying capacity of the cable conductor rating. All low-voltage power cables shall further be rated for 450/750 V and the minimum cross-sectional conductor size shall be 1.5mm2.

- Cable ladders and cable trays shall also be provided by the Contractor and shall be of the solid industrial type designed for the actual amount of cables plus twenty per cent (20%) spare capacity. The cable ladders and cable trays shall be a minimum of medium duty return flange type.

- The control system shall have sufficient spare capacity to allow a twenty per cent (20%) expansion of the amount of Input/Output signals connected to the control system after the Planned Service Commencement Date.

- The leachate collection and drainage system will be suitable for the actual design load capacity plus 50% spare capacity.

3.108 The flexibility and contingency in the ITSAD Facility electrical design will allow, for example, the addition of additional processing equipment to be installed within the pre-treatment or refinement section of the ITS Facility or the AD Facility, to allow for any future requirements to increase the quality of output material to reflect changes in market conditions, or to include new future technologies. This additional equipment power loading will be supplied from the twenty per cent (20%) spare capacity allocation in the transformer capacity. This may include, for example, equipment to further refine plastic streams, including increased near infra red equipment, magnets for improved ferrous separation, improved dust control systems to react to changes in legislation, additional refinement equipment within the fines stabilisation to improve bio-compost quality.

3.109 The external infrastructure also includes flexibility; there are several areas of landscaping and grass pavers which could be either upgraded to hard standing areas or used to erect additional ancillary buildings if required.

[REDACTED]

3.110 **[REDACTED]**

[REDACTED]

3.111 **[REDACTED]**

3.112 **[REDACTED]**

[REDACTED]

3.113 **[REDACTED]**

3.114 **[REDACTED]**

3.115 **[REDACTED]**

[REDACTED]

3.116 **[REDACTED]**

Storage of products from the refinement section

3.117 Products from the refinement process will be dropped into roll-on-roll-off containers by conveyors bringing the products out of each part of the process. As the containers are

full they will be removed using a roll on roll off vehicle and replaced with new containers.

[REDACTED]

3.118 **[REDACTED]**

Measures for fire control;

3.119 The potential for fire at the ITSAD Facility will be minimised through the use of comprehensive fire abatement equipment, coupled with good design and effective health and safety management systems. Activities such as shredding and mechanical refinement will also only be carried out during the Day in order to reduce the risk of fire at night when safety and security staff presence will be maintained.

3.120 The fire alarms and fire-fighting systems will be as developed for similar existing facilities and offer a high level of fire protection. Experience from current operational plants has shown that the systems can identify the earliest signs of combustion allowing appropriate actions to extinguish the source prior to fire taking hold. This enables in-house trained staff to manage and control incidents in a timely and safe manner.

3.121 The system at the ITS Facility will comprise of:

- Carbon monoxide (CO) monitoring of mixed exhaust air prior to discharge to the bio-filters. This system is capable of detecting the earliest indication of combustion within the waste. CO monitoring will be linked to the alarm and foam suppression system to enable automatic fire suppression. This system will also be coupled with other fire detection systems, including heat sensors and smoke detectors located at appropriate points and on appropriate process equipment such as shredders.

- Foam suppression blanket. This blanket can be automatically or manually operated and provides fire and smoke suppression. The foam system will be capable of covering the bio-drying hall with a two (2)m deep foam blanket in approximately five (5) minutes.

- Fire cannons located along external gantries. These cannons facilitate the accurate and localised dowsing of waste material stored within the building. The cannons can be used in conjunction with the manual operation of the crane to expose and extinguish any fire within the body of the waste.

3.122 The primary shredder will be protected with use of a deluge system with a water tank located above the mobile bridge. The shredded material pit is also covered by a medium expansion foam system.

3.123 Process equipment within the refinement section will be protected with use of a further deluge and sprinkler systems.

3.124 Fire hydrants and fire hoses will be provided around the site. Fire water for these measures will be supplied from fire tank with a capacity of 180m^3 and pumped by electric and emergency diesel pump sets. The pump sets will be located in a separate pump house isolated from the ITS Facility. Additional fire water can also be drawn by the emergency services from the surface water attenuation lagoon located to the South of the ITS tipping shed.

3.125 The fines stabilisation building will be fitted with heat detectors and fire alarms. The plant will be fitted with a fire ring main with eight fire hose reels. The CHP is located in a dedicated container away from the building to avoid fire spread to the main building in the event of an engine fire.

Measures for control of leachate;

3.126 Effluent produced by the ITS Facility comprises leachate from the waste processing and bio-drying areas as well from the bio-filters, which is combined and routed to leachate storage tanks prior to being used as process water in the fines processing operation. Surplus leachate will be tankered off site for treatment and disposal.

3.127 **[REDACTED]**

Engineering Service Proposals ITS Facility

3.128 **[REDACTED]**

3.129 Following receipt of waste into the reception pits, waste is transferred to the primary shredders by an overhead gantry crane (see Figure 12), with one crane specified for waste receipt and shredding functions per line. All three (3) cranes within each line is capable of performing this task, again ensuring that operations can be maintained should any scheduled or unscheduled maintenance be required on any one (1) of the reception and shredding cranes.

Figure 12 [REDACTED]

[REDACTED]

3.130 Within each line of the biodrying section of the facility, two (2) of the three (3) overhead gantry cranes will operate under normal operating conditions (although all three cranes can perform the duties of the other 2). The cranes transfer shredded waste from shredded waste storage pits to the biodrying section and also transfer biodried material from the biodrying section to the refinement section feed hopper. Each crane is capable of performing both tasks ensuring that these operations can continue should any one (1) crane require scheduled or unscheduled maintenance.

3.131 **[REDACTED]**

3.132 All waste reception activities will also take place within a purpose built, covered reception building. This provides additional environmental control and minimises the visual impact of waste delivery activities, as well as providing additional storage capacity.

Plant Areas & Zones (Internal & External)

3.133 The ITS Facility at the Site (Bolton Road) has the following main areas and zones.

3.133.1 **Tipping Shed and Quarantine Area**

- Covered reception building
- Quarantine Area ITSAD – within covered reception building

3.133.2 **Reception and Shredded Waste Pit Area**

- ITS waste reception pits
- ITS waste shredding
- ITS shredded waste pits

3.133.3 **Biodrying Area**

- Leachate collection and storage
- Refinement section hopper

- Refinement bypass

3.133.4 Refinement Section

3.133.5 Fines Processing

3.134 Other areas will be provided including the following:

- Workshop
- Baghouse filters – dust suppression system
- Biofilters
- Water tank – fire water
- Lagoon – fire water/site landscaping
- Substation
- Emergency access
- Weighbridges and queuing area
- Visitor and admin building

[REDACTED]

[REDACTED]

3.135 **[REDACTED]**

[REDACTED]

3.136 **[REDACTED]**

3.137 **[REDACTED]**

3.138 **[REDACTED]**

3.139 **[REDACTED]**

Figure 13 [REDACTED]

[REDACTED]

[REDACTED]

3.140 **[REDACTED]**

[REDACTED]

3.141 **[REDACTED]**

3.142 **[REDACTED]**

Figure 14 [REDACTED]

[REDACTED]

[REDACTED]

3.143 **[REDACTED]**

3.144 **[REDACTED]**

[REDACTED]

3.145 **[REDACTED]**

Figure 15 [REDACTED]

3.146 **[REDACTED]**

3.147 **[REDACTED]**

[REDACTED]

3.148 **[REDACTED]**

Figure 16 [REDACTED]

Figure 17 [REDACTED]

[REDACTED]

3.149 **[REDACTED]**

3.150 **[REDACTED]**

3.151 **[REDACTED]**

Figure 18 [REDACTED]

[REDACTED]

3.152 **[REDACTED]**

Figure 19 [REDACTED]

[REDACTED]

3.153 **[REDACTED]**

Figure 20 Process [REDACTED]

3.154 **[REDACTED]**

[REDACTED]

3.155 **[REDACTED]**

3.156 **[REDACTED]**

Figure 21 [REDACTED]

[REDACTED]

3.157 **[REDACTED]**

Figure 22 [REDACTED]

[REDACTED]

3.158 **[REDACTED]**

[REDACTED]

3.159 **[REDACTED]**

[REDACTED]

3.160 **[REDACTED]**

[REDACTED]

3.161 **[REDACTED]**

Figure 23 [REDACTED]

[REDACTED]

3.162 **[REDACTED]**

Figure 24 [REDACTED]

[REDACTED]

3.163 **[REDACTED]**

[REDACTED]

3.164 **[REDACTED]**

Figure 25 [REDACTED]

3.165 **[REDACTED]**

[REDACTED]

3.166 **[REDACTED]**

Process Flows

3.167 A mass balance for the ITS Facility is presented in Figure 26.

Figure 26 [REDACTED]

[REDACTED]

3.168 A detailed refinement section layout drawing and equipment list can be found in Schedule 8 (Design) of the Contract (Ref V).

Mobile Plant

3.169 In addition to the fixed plant listed above, the following items of mobile plant will also be provided.

3.170 This will include:

- 360 grab – to be used for isolating items unsuitable for processing through the ITS Facility.

- Front end loader with ventilated cab – to be used for loading activities in the ITS Facility covered reception area and the fines composting, as well as for general site housekeeping.

- Sweeper – to be used for site housekeeping in order to prevent nuisance caused by litter, and to maintain a clean working environment onsite and within the covered reception area.

- Shunter – to be used for moving containers onsite.

[REDACTED]

3.171 **[REDACTED]**

Figure 27 [REDACTED]

[REDACTED]

Fire Risk Assessment

3.172 The Contractor will undertake a fire risk assessment at the design stage and ensure that its recommendations are incorporated into the final design of the Facilities.

3.173 The ITS Facility fire fighting systems are fed by a 180m³ capacity fire fighting water storage tank. In the event of fire fighting water being required water any water used to fight fire inside the bio-drying hall will be prevented from escaping from the biodrying hall by the upstand reinforced concrete beams around the perimeter of the building and the HDPE leachate protection membrane.

3.174 The used fire fighting water will drain into the underground in situ concrete leachate storage tanks. There are two (2) no leachate storage tanks with a total combined capacity of 480m³. In the highly unlikely event of any additional storage capacity for used fire fighting water being required water is able to overflow from the leachate collection tanks into the adjacent underground insitu concrete shredded waste pits. There are two (2) no shredded waste pits with a total combined below ground capacity of 1,866m³.The total storage capacity available for used fire fighting water is in excess of ten (10) times the volume of the fire fighting water storage tank.

3.175 The used fire fighting water in the leachate collection system will either be used in the AD Facility or tankered away. No used fire fighting water will be discharged into the adjacent Houndhill Dyke.

Fire-fighting equipment

3.176 The potential for fire is minimised through the use of comprehensive fire abatement equipment, coupled with good design and effective health and safety management systems.

3.177 The fire alarms and fire-fighting systems will offer a high level of fire protection. The system will comprise of:

- Heat sensors and smoke detectors located at appropriate points and on appropriate process equipment such as shredders.
- Foam suppression blanket. This blanket can be automatically or manually operated and provides fire and smoke suppression. The foam system will be capable of covering the biodrying hall and pit area with a 2m deep foam blanket in approximately five (5) minutes.
- Fire canons located along external gantries. These canons facilitate the accurate and localised dowsing of waste material stored within the building. The canons can be used in conjunction with the manual operation of the crane to expose and extinguish any fire within the body of the waste.
- The primary shredder will be protected with use of a deluge system.
- Process equipment within the refinement section will be protected with use of a further deluge system.

3.178 Fire water for these measures will be supplied from either the SUDS lagoon pond or from the water tank which has a capacity of 180m^3. The pump sets will be located in a separate pump house isolated from the ITS Facility.

Design Program

3.179 The design programme is included within Schedule 8 (Design) of the Contract.

Design Risk Assessment

3.180 In accordance with the Construction (Design and Management) Regulations 2007 a full design stage risk assessment will be produced that will cover all aspects of the development, construction and commissioning of the ITSAD Facility. The aim of the design risk assessment will be to ensure that the design specification for the facility and

its various component elements fully comply with the provisions of the Workplace (Health, Safety and Welfare) Regulations, 1992 and other relevant health and safety law and regulation.

3.181 The appointed CDM Coordinator will review the design risk assessment and will advise on the relevant health and safety information received from the Contractor.

3.182 The designer will be responsible for the production of the design risk assessment. A holistic approach will be taken in the review of the risk in order to ensure that risk elimination/reduction measures that are adopted to address one hazard and do not disproportionately increase risks due to other hazards. This approach shall be developed from the conceptual design stage through to the detailed design stage as set out in Figure 28.

Figure 28 Risk elimination/reduction measures

Risk elimination/reduction measures	
Project stage	Risk elimination/reduction measures
Conceptual design	Risk assessment and management according to good design principles Demonstration that duty-holder's design safety principles meet legal requirements. Demonstration that chosen option is the lowest risk (or justification if not). Comparison of option with best practice, and confirmation that residual risks are no greater than the best of existing installations for comparable functions. Risk considered over life of ITSAD Facility and all affected groups considered.
Detailed design	Risk assessment and management according to good design principles Risk considered over life of facility and all

	affected groups considered Use of appropriate standards, codes, good practice etc. and any deviations justified Identification of practicable risk elimination/reduction measures and their implementation unless demonstrated not reasonably practicable Undertaking a Hazard and Operability (HAZOP) study.

Management of Risk During Design

3.183 During the design phase of the Project, the Contractor will manage risks by

- Employing an integrated team approach, involving designers, principle contractor, and CDM Coordinator.
- Appointing a lead designer.
- Carry out risk identification exercises during design.
- Agreeing a common approach to eliminating hazards that may give rise to risk.
- Provide risk assessments for risks that cannot be designed out.
- Regular meetings of the design team with contractors, CDM Coordinator, and other relative parties.
- Regular reviews of designs.
- Maintaining record of why key decisions were made.

3.184 Throughout the design phase the process and civil designs shall be reviewed by The Contractor and the technical advisor, Turner & Townsend. Specialists in the relevant fields, for biodrying, anaerobic digestion, health and safety, etc., shall review the designs to ensure good proven practices are adhered to and compliance with regulations. Figure 29 identifies the assessment criteria during the review process.

Figure 29 Design review assessment criteria

Design review assessment criteria	
Design stage	**Assessment criteria**
Conceptual design	Policy for safety in design Criteria for concept selection (e.g. life cycle aspects considered) Roles, responsibilities and competence of relevant personnel Adequacy of health and safety advice
Detailed design	As above, and: Application of relevant and current good practice. Effective approval processes, including interaction with risk assessment. Application of formal and structured risk assessments and their effectiveness in eliminating/reducing risks. Effective change control procedures. Development of appropriate information to enable safe operation, maintenance and repair.

3.185 The design risk assessment will be broken into three (3) key phases:

- Construction and commissioning
- Operation and maintenance
- Decommissioning

3.186 During each phase, the assessment will identify:

- any potential hazard;
- the people potentially at risk from that hazard (construction staff, operational staff, maintenance staff, members of the public, etc);
- the potential consequence(s) of the hazard;
- the level of risk before mitigation (calculated as the likelihood of an incident multiplied by the severity of the consequences);
- the design measures that can be put in place to eliminate the risk or mitigate it to an acceptable level; and
- the level of risk after mitigation (again calculated as the likelihood of an incident multiplied by the severity of the consequences).

3.187 This structured and stepwise approach will be used during the conceptual and detailed design phases to produce a comprehensive risk assessment.

Final Design Data

3.188 Final design data is described in Schedule 8 (Design) of the Contract.

Visitor Centre

3.189 During the works phase, the Contractor conduct site tours for interested parties on an ad hoc basis.

3.190 The community liaison group will be part of the offer made to local residents by the Contractor through the "Community Commitment" as part of the planning stage of this contract. It will provide feedback on specific details of the development of the ITSAD Facility at the Site (Bolton Road).

3.191 The Contractor will appoint a community and education liaison officer ("**CELO**") who will focal point for the Councils and community liaison. The CELO will be based in the temporary accommodation throughout the construction phase.

Construction Phase

3.192 During construction, the construction team will ensure interested parties are kept informed at all times, through:

- Scheme information boards erected along the site boundary where there is an interface with the general public. They will display project details, its advantages to the community, progress reports, and project team contact details.

Operational Visitor Centre

3.193 Elevations and layouts for the visitor centre are provided in the Schedule 8 (Design) of the Contract.

3.194 The Contractor has designed the ground floor with clearly defined areas for staff and visitors.

3.195 The staff changing facilities will be designed so that staff walk from the entrance into the clean end of the changing facility. Both male and female changing areas have been provided. Shower and toilet facilities have been provided in both the male and female changing areas.

3.196 A mess room will also be provided for staff lunch and tea breaks. Equipment including a fridge and microwave will be provided in this area.

3.197 Disabled access is provided from the lift in the visitor entrance. There is a large open space that will be used for exhibitions, meetings, and presentations. This area will be available to the Councils, stakeholders, liaison groups and any other parties that might need a meeting room. Seating will be provided for twenty five people.

3.198 An open plan office and manager's office provide space for the administrative functions of the Contract and an archive room is provided to ensure that all required archives are kept in an accessible, dry area.

3.199 Toilets and a small kitchenette are provided on this level and a conference room capable of seating eight people has also been provided. Access to the conference room has been provided from the visitor entrance should a small meeting room be required for small visiting parties.

3.200 The exhibition area provided on the ground floor will be fully equipped with modern communications technology and multi-media facilities. The suite will be air conditioned and equipped with good quality conference type furniture and a wireless internet connection. There will be a number of computer screens around the suite to provide visitors a view of operations as they occur.

3.201 Signage will be provided within the refinement section to enable easy identification of the process outputs.

Weighbridges

3.202 The Contractor will supply three Bridgemont BMS surface mounted weighbridges or equivalent. Each weighbridge will be 15m x 3m and will be capable of weighing up to 50 tonnes in 20kg units. This size weighbridge will be able to handle all vehicles likely to be using the ITS Facility including all Authorised Vehicles carrying Contract Waste and articulated vehicles carrying SRF.

Suitability

3.203 The weighbridges specified for the ITSAD Facility have been specifically selected for the following reasons;

- Large enough to weigh all vehicles using the ITSAD Facility.
- Weighing capacity up to 50 tonnes – will handle all vehicles up to the maximum weight permitted on UK roads.
- Robust construction reduces unplanned maintenance.
- Regular maintenance is facilitated by easily accessed weighbars.
- Links to total information management ("**TIM**") system to provide data capture and reporting.

Position

3.204 A site plan showing the location of the weighbridges is proved in Schedule 8 (Design) of the Contract.

3.205 Bypass lanes are provided around both the 'in' and 'out' weighbridges to maintain a flow of non weighbridge traffic (maintenance contractors vehicles or fuel deliveries, for example) around the weighbridges minimizing the impact of these vehicle movements on those of authorized users.

Weighbridge Office Design

3.206 The weighbridge offices have been designed to provide office space for an administrator/weighbridge operator and a small kitchen area and separate toilet

facilities. Toilet facilities are also provided for use by drivers and crew using the Site (Bolton Road). These are accessed by separate doors to the main office part of the building. Access to the weighbridge office for disable staff or visitors is provided by a lift adjacent to the main office steps. Layout drawings and elevations are provided in Schedule 8 (Design) of the Contract (Ref AR).

Logistics of weighing all waste

3.207 Traffic flows are as described in Appendix 1 of this document.

Output Specification and general design;

3.208 The Contractor will provide TIM system to capture weighbridge data. TIM is built using centralised computer architecture, providing operational data services to all of the Contractor's sites over a private wide area network (WAN).

IT Data Reporting System

3.209 The Contractor will provide all IT systems necessary to run the plant effectively. This includes data management systems such as that described for weighbridge systems, and general administration systems such as video conferencing facilities. **[REDACTED]**

Habitat Creation and Planting Proposals

Native Woodland Tree Planting

3.210 New areas of woodland would complement and extend the recent planting at Brookfields Park as well as extending the 'green corridor' along the cycleway and Hound Hill Dyke.

3.211 All planting mixes will be native, based on local species identified in the Extended Phase 1 Habitat Survey. Species include oak, birch, alder, ash, cherry sp., rowan, with an under-storey mix including, hazel, guelder rose and dog rose. Holly, Ilex sp., will be included to increase evergreen cover and improve screening.

3.212 The planting species and sizes chosen would adapt well to existing conditions. All tree and shrub planting would be maintained for a period of five (5) years to ensure optimum conditions for planting establishment.

Native Shrub Planting

3.213 Native shrub planting will be used where planting areas are restricted and where woodland edge species will complement the open habitats. Shrub species utilised would be suitable for existing ground conditions. Species include hazel, holly, field maple, hawthorn, dog rose, and honeysuckle, gorse and broom. The native shrub planting is designed to create wildlife corridors throughout the Site (Bolton Road) and link to surrounding establishing areas.

Wildflower seeding

3.214 The extensive wildflower seeding strategy would make full use of existing on site materials reducing the need for importing topsoil. In consultation with ecologists it was suggested areas of wildflower would increase the habitat potential for local fauna species such as birds and reptiles. Seed mixes will create a diverse sward to suit various soil conditions and characteristics across the Site (Bolton Road).

Wetland habitats

3.215 The Site (Bolton Road) has extensive marshy areas and developing common reed ponds. Two (2) new wetland areas will make use of ground water and encourage the wetlands to develop as suitable on-site replacement habitats for water voles and newts. The wetland area would to comprise open water lagoons with reed beds; shallow marginal areas; wetland edge. Planting species selection will comprise species suitable to the habitat in liaison with an ecologist.

Hibernacula and other habitats

3.216 Landscaping and planting plans will be designed in accordance with the recommendations of the Landscape and Ecology chapters of the Environmental Statement. Please refer to 10.6.2 and Figure 12.3.

Drainage

3.217 The drainage scheme for the Site (Bolton Road) will be developed to include a SUDS where appropriate for all car parks and hard standings. Porous surfacing and sub-bases will be designed to store and attenuate rain water thus reducing ongoing drainage infrastructure costs. Design software, such as WinDes MicroDrainage (or equivalent), has been used to model the drainage system and this will be linked into the ground modelling software, such as Landscape, to produce an economic integrated design.

Surface Water Drainage

3.218 Surface run off from the AD Facility roof will be collected and discharged via gravity sewers into the rainwater harvesting tank located adjacent to the ITS Facility. Please refer to Site Infrastructure M&E Services drawing Ref DK in Schedule 8 (Design) of the Contract for location of rainwater harvesting tank. Harvested rainwater will be used as grey process water in the fines processing building.

3.219 Surface water from roads and hardstanding areas on the Southern part of the Site (Bolton Road) will be collected through gravity sewer, discharging via a class 1 interceptor, to the attenuation lagoon. Please refer to Surface Water Drainage Layout Ref BB in Schedule 8 (Design) of the Contract for further details. Surface water collected from the Northern part of the Site (Bolton Road) will be collected via gravity sewer to a pumping station adjacent to the fines processing building. Water will then be pumped via a class 1 interceptor to the attenuation lagoon. Waters from the attenuation lagoon will be discharged to the open watercourse, via a headwall, to the East of the Site (Bolton Road).

3.220 The open watercourse which runs to the East of the Site (Bolton Road) is controlled by the Dearne and Dove Internal Drainage Board. Several of the industrial units in the area, including the neighbouring distribution centre discharge surface water into this watercourse through below ground culverts with engineered headwalls. Surface water from the Site (Bolton Road) will be discharged, subject to an agreed discharge consent, ensuring surface water is appropriately treated on site prior to discharge to the watercourse.

3.221 The Dove and Dearne Internal Drainage Board has indicated that to achieve a discharge consent, a surface water runoff of less than five (5) litres per second per hectare will be required. The Contractor achieves this requirement through the design of a SUDS and attenuation lagoon. The attenuation lagoon will provide temporary storage of rainwater runoff for the whole site, designed on a 1:100 yr flood event, before discharge to the adjacent drainage watercourse. Please refer to Surface Water Drainage Layout Ref BB in Schedule 8 (Design) of the Contract for further details.

Foul Water Drainage

3.222 To achieve constraints set out in discharge consents all drainage systems will be designed and installed to satisfy the requirements of the Councils, to correct lines and levels and in accordance with current British Standards, Chartered Institution of

Building Services Engineers ("**CIBSE**") Codes & Building Regulations - Approved Document H – Drainage & Waste Disposal Systems.

3.223 Following a meeting with the Rotherham principal drainage engineer on 8th October 2010, it was confirmed that Rotherham Metropolitan Borough Council has a foul water pumping station off Bolton Road, approximately 230m south of the Site (Bolton Road), although this has yet to be adopted (expected to be adopted by Yorkshire Water in 2011). The Council has confirmed it will allow the Contractor to discharge into this system at a limit of three (3) litres /second. In compliance with good practice, it was agrees that foul water drainage from the Site (Bolton Road) could be discharged just upstream of the pumping station under gravity only.

3.224 Further design evaluation has confirmed due to the Site (Bolton Road) levels a partial pumped scheme the most suitable. Foul water drainage from offices and mess facilities onsite will be via gravity sewer to a pumping station, located adjacent to the fines processing building. Foul water will be pumped via a rising main sewer to a break chamber manhole, located within the entrance road to the Site (Bolton Road). A 100mm gravity sewer will then be constructed, South, alongside the bridleway to intercept the existing pumping station. Please refer to Foul Water Drainage Layout Drawing Ref BA in Schedule 8 (Design) of the Contract for further details.

3.225 Discussions with the Council have concluded, the bridleway is highways land. As the off-site drainage route is through existing highways land, no way leaves or easements will be required for connection.

3.226 The Contractor can confirm all leachate will be used within the AD Facility as process water within the anaerobic digestion process. Therefore, the Site (Bolton Road) will only discharge sewage to sewer, and therefore will not require a trade effluent consent.

Sustainable solutions

3.227 SUDS have been incorporated into the surface water drainage designs when detailed site geotechnical parameters have been examined.

3.228 This solution mimics natural flood water attenuation features, controlling water run-off and flooding risk, whilst protecting water quality and providing a wildlife habitat. Collected surface water runs into a balancing lagoon through oil interceptors before being discharged to the Hound Hill Dyke.

3.229 The lagoon functions to provide attenuation to flow into the Hound Hill Dyke which has been limited to 5ls/ha (this discharge flow has been indicated as acceptable by the Dearne and Dove Internal Drainage Board).

3.230 In addition to minimise surface water runoff non-permeable areas have been reduced as far as practical. Any areas within the Site (Bolton Road) that are not roads or areas of hard surface required for vehicles to drive on have been specified as 'Grasscrete'.

Natural solutions

3.231 Where site layout and space permits, buildings have been located and orientated to maximise use of natural lighting and ventilation. Natural lighting will be maximised by consideration of building orientation and provision of suitable glazing systems, including roof lights.

3.232 Natural ventilation has been designed into waste reception areas and office space to minimise requirements for forced ventilation and associated energy consumption.

3.233 Our design seeks to achieve appropriate use of land and seek in all ways to enable the resident communities and businesses to co-exist more sustainably in close proximity and through reduced use of non renewable natural resources.

Sustainable materials

3.234 Appropriate modular/pre-fabricated construction techniques have been specified for the works. Such techniques can contribute to sustainability through:

- Higher quality leading to enhanced product life
- Increased scope to reduce production waste
- Simplified construction / erection activities, leading to reductions in construction periods
- Increased scope to manage and minimise material transportation requirements

3.235 Sustainability has been addressed by considering material whole life impact. Where possible materials will be chosen given consideration of energy and natural resource consumption during production, transportation requirements, design life and recyclability.

3.236 Additional consideration has also been given to material selection where performance will have a follow on environmental benefit. For example, insulation systems have been selected based on whole life costs and environmental benefit.

Recycled materials

3.237 Recycled materials will be specified where they meet performance and value for money criteria. The Contractor will achieve a fifteen per cent (15%) minimum target for specification and use of recyclable materials in the Project (by value where economically appropriate and in accordance with paragraph 2.4.3 of the Output Specification).

Sustainable construction practice

3.238 The Contractor seeks the highest standards from its appointed contractors for the construction of new facilities. A key objective, addressed at the design stage, is the protection of the environment particularly the local environmental quality as experienced by residents, workers, and visitors. Through appointment, contractors will be required to have a rigorous approach in contributing towards sustainability and wider environmental issues. In construction of the waste delivery points we will require our contractors to have adequate care and consideration for the community and environment during construction and to fulfil the following minimum requirements.

- Construction works have been programmed and implemented to minimise disruption caused by construction traffic. Vehicle movements will be minimised by maximising reuse of arising on site and by careful management of construction materials and waste. Construction waste will be managed and segregated to maximise recycling.

- Environmental nuisance will be mitigated by selection and control of construction techniques and management of the works. Management steps will include mitigation measures, such as dust suppression, in conjunction with strict limits on implementation, including restrictions on the duration and timing of certain key activities and the potential for light pollution

- Quality and integrity of the local ecology will be maintained at all times

- Pollution from construction plant will be minimised through selection and use of efficient and modern vehicles, plant and equipment

- All construction activities will be carefully managed. All activities will be rigorously controlled and implemented in accordance with the Environmental Management Plan which is defined in section 7 of this Schedule 2.

Building Product Information

3.239 The external finishing materials for the ITS Facility at the Site (Bolton Road) are as follows;

- Roof cladding – grey coloured cladding panels.
- External walls - grey cladding panels.
- External walls – timber rainscreen cladding, for control rooms to ITS building only.
- Low level concrete wall – precast panels.
- Windows – grey, polyester powder coated aluminium.
- External doors - grey, polyester powder coated steel.
- Louvres - grey, polyester powder coated aluminium

3.240 The design team will comply with recognised Good Industry Practice as set out in guidance on design quality available from:

- Constructing Excellence (www.constructingexcellence.org.uk)
- Office of Government Commerce (OGC) (How to achieve Design Quality in PFI Projects)
- CABE (Improving Standards of Design in the Procurement of Public Buildings, October 2002)
- 4p's (Achieving Quality in Local Authority PFI Building Projects)
- Defra (Designing Waste Facilities Guide 2008).

3.241 The design and access statement submitted as part of the planning application will show how the Facilities have addressed the CABE guidance on designing waste facilities and other relevant local design guidance.

3.242 Based on CABE published guidance, our design has included for the following key sustainable design principles within an urban setting:

- Character – ensuring that the Site (Bolton Road) has its own identity
- Continuity and enclosure – ensuring that private and public spaces are clearly distinguished
- Quality of the public realm – ensuring that the Site (Bolton Road) will have appropriately attractive outdoor spaces
- Ease of movement – the Site (Bolton Road) will be easy to get to and move through
- Legibility – the Site (Bolton Road) will have a clear, easily understood image
- Adaptability – the Site (Bolton Road) will be flexible as appropriate.

3.243 As part of the Building Research Establishment Environmental Assessment Method ("**BREEAM**"), the design team will consider the use of energy efficient equipment, the energy performance of the overall building fabric and the contribution that renewable energy, and the impacts these will have throughout the lifetime of the building.

3.244 Adhering to BREEAM principles will benefit the development of the solution, as follows:

- Through the provision of clearly defined sustainability guidance at the start of the design process
- By increasing the likelihood of obtaining high standards in relevant design stage and post-construction BREEAM assessments
- Facilitating easier integration with and implementation of other environmental tools, such as environmental impact assessment ("**EIA**"), environmental management systems ("**EMS**") and key performance indicators
- Demonstrating to stakeholders the Contractor's commitment to minimise environmental and sustainability impacts of the solution
- Increasing the likelihood of incurring cost savings and decreasing risk of legal exposure over the lifetime of the Project.

- Can contribute to planning process in demonstrating sustainable approach.
- Helps ensure the development contributes to Councils' sustainability objectives.

4 Section 04. Drawings

4.1 A full schedule of drawings is included in Schedule 8 (Design) of the Contract.

5 Section 05. Planning and Deliverability

Planning Programme

5.1 A summary of the key dates is provided in Schedule 22 (Proposed Site Timetable) of the Contract.

Planning Procedure

5.2 Satisfactory Planning Permission in accordance with clause 20 (Planning Permissions) of the Contract and discharge of any pre-commencement conditions will be obtained before the commencement of construction activities at the Site (Bolton Road).

6 Section 06. Permits Consents and Permissions

ITSAD Facility (Bolton Road)

6.1 A new Environmental Permit will be required for the ITSAD Facility.

6.2 The Contractor will apply for a bespoke permit in accordance with the requirements of the Environment Agency.

Permit Limitations

6.3 The Contractor will apply for an Environmental Permit that gives suitable permission to accept all suitable European Waste Catalogue ("**EWC**") codes that would cover the household and commercial waste streams that the contract required.

6.4 This would typically cover the Chapter 20 wastes of the EWC and will include as a minimum:

- 20.01 (.01,.02,.08,.10,.11,.38,.39,.40,.41)
- 20.02
- 20.03 (excluding .04 and .06).

6.5 Wastes under Chapter 2 of the EWC catalogue wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing will also be included in the permit application to cover any requirements for such waste during commissioning of the AD Facility.

6.6 An ABPR permit will be applied for from DEFRA.

Grange Lane Waste Transfer Station

6.7 Details of the planning permissions (permission number B/98/0411/BA) and consents for the transfer station at the Site (Grange Lane) are in place and the Contractor will manage the TLS Facility in accordance with the requirements of all the Necessary Consents. The Environmental Permit will be transferred to the Contractor.

7 Section 07. Environment

Nuisance & Environmental Impact Minimization During Construction

7.1 The Contractor will manage potential construction environmental and nuisance impacts, such as noise, dust, vibration, and run-off, by adopting a formal Environmental Management System accredited to ISO 14001:1996.

7.2 The Contractor project team, including key engineering, procurement and construction subcontractors Principal Contractor and Ecodeco will develop the EIA into the construction phase environmental impact statement for use by the Principal Contractor. An environmental risk assessment will be developed into the environmental management plan ("**EMP**") containing control measures for the identified hazards. The EMP will incorporate control measures specified in contract documentation, statutory consents, and the Considerate Constructors Scheme.

7.3 The Contractor will programme works to minimise nuisance within our methods of working and when selecting appropriate plant and equipment. Visual inspections shall form an integral part of monitoring, used for example to identify when a bowser is needed for dust suppression on an 'as needs' basis. All monitoring techniques will be carried out in accordance with best practice using best practicable means and best available technology, examples of which are provided below. Any monitoring equipment will also be used in accordance with manufacturer specifications.

Key Sensitive Receptors:

7.4 Figure 31 provides a summary of the sensitive receptors surrounding the Site (Bolton Road). All nuisance mitigation measures will be implemented to reduce the impact of the construction works on these key receptors as well as the surrounding environment.

Figure 30 Key Sensitive Receptors

Figure 31 Key Sensitive Receptors for the Bolton Road ITS Facility

Receptor	Type	Distance from site boundary
1	Surrounding industrial area	~ >20m
2	College	~ 1km
3	Wath-upon-dearne Housing Estate	~ 1.5km
4	Old Moor Wildlife Centre	~ 1.5km
5	Bolton-upon-dearne Housing Estate	~ 1km
6	River Dearne	~ 600m
7	Mexborough Housing Estate	~ 1.6km
8	Dovecote Farm	~ 2.2km
19	Old Denaby Wildlife Sanctuary	~ 3.5km

Light Pollution

7.5 The Clean Neighbourhoods and Environment Act 2005 extended statutory nuisance to include light pollution and insects. Section 102 of that specifically covers artificial light emitted from premises so as to be prejudicial to health or a nuisance. The Contractor and Principal Contractor will follow guidance published by Defra (Statutory Nuisance from Insects and Artificial Light, 2006) as well as the Considerate Constructors Scheme.

7.6 Works lighting will be checked periodically through the use of light meters. Any complaints from members of the public will be logged and investigated by the Contractor, liaising with environmental health as appropriate.

Noise Monitoring

7.7 Noise monitoring will be carried out daily at the boundary using an appropriately calibrated noise meter.

7.8 Monitoring will be carried out in accordance with BS7445:1991 description and measurement of environmental noise.

7.9 Noise surveys will be made to identify sources of noise. This information will be recorded as a noise register on the Principal Contractor's central register and prominently displayed on site. The noise register will identify:

- Control measures
- Action plans for instances where the first action level (80dBA) and the upper action level (85dB(A)) are reached. Current legislation requires mandatory ear protection at 85dB (A). Action plans are put in place on site that are then closely monitored and managed.

Vermin and Flies

7.10 During construction, high standards of housekeeping will be maintained. All construction operations shall be organised to prevent and minimise vermin and insect infestation or colonisation. Proactive routine inspections will be carried out to ensure early detection and quick action against any vermin and pest species. For example, inspection of the site perimeter could reveal potential entry routes for rodents. Professional advice may be sought from local environmental health agencies where required. Any appointed pest controllers will be qualified appointed contractors and will be safe contractor approved.

7.11 Pest control often requires the use of use of pesticides. Checks will be undertaken to ensure that only approved pesticides are used in accordance with the Control of Pesticides Regulations 1986 and 1987 (as amended).

7.12 Significant problems with flies (houseflies in particular) are primarily associated with inappropriate storage or disposal of putrescible or animal waste. Putrescible waste from

construction works (i.e. from staff and catering) will be sited, stored, and disposed of in accordance with best practice.

7.13 The risk of fly problems is greatly increased in warm weather. In the event of such problems, the waste storage area used during construction may need re-locating, the waste removed more frequently and waste containers cleaned after emptying. Inspection and treatment by a professional pest control organisation will be arranged if required.

7.14 All pest management, including vermin and fly control, will be carried out in accordance with best practice (Pest minimisation - Best practice for the construction industry, Chartered Institute of Environmental Health, 2008) and the Considerate Constructors Scheme.

Litter and Fly tipping

7.15 The early erection of a security fence at the Site (Bolton Road) will help prevent the spread of windblown litter. A litter picking routine will be adopted in the event of any nuisance from litter occurring. The boundaries of the Site (Bolton Road) shall be inspected on a regular basis for the presence of litter or any other waste materials resulting from site operations, and shall be removed as required.

7.16 The area, including the public highway for one hundred (100) metres in all directions, will also be inspected for fly tipped material. Fly tipping is the illegal deposit of any waste onto land and any incidents would be reported to the local Councils along with a record of:

- the date, time and place of the occurrence;
- a visual description of the waste and estimate of quantity;
- a description of any vehicles involved along with their vehicle's registration numbers.

7.17 If visual inspection of fly tipped waste suggested a particular hazard, then the incident would be reported to the Environment Agency. These actions would provide an opportunity for an investigation into potential waste offences.

Site Waste Management Plan

7.18 A site waste management plan ("**SWMP**") will be developed for the construction phase.

Site Waste Management Plans Regulations 2008

The Contractor will appoint the Principal Contractor. The Principal Contractor

- Will be responsible for producing the initial site waste management plan (SWMP)
- Will obtain the relevant information from the subcontractors.
- Will keep the SWMP on site during the Project.
- Will regularly update to ensure it's accuracy
- Will allow other contractors access to it during the Project
- Keep the SWMP for two (2) years after completion

The SWMP will include:

- Project description
- Who is involved with the Project
- Types of project waste to be moved
- Quantities of waste anticipated
- Identity of persons removing waste
- Location of site where waste removed to
- A Comparison of estimated and actual quantity of each waste

The Principal Contractors will use 'in house' quality proforma developed in line with SWMP Regulations 2008

In preparing the SWMP, it will cover the following –

- Policy
- Procurement
- Project planning

- Site operations
- Post completion

In addition to these requirements The Principal Contractors will

- Optimise site recycling opportunities vs. updated environmental permitting regulations.
- Implement Contaminated Land: Applications in Real Environments Code of Practice, which:
- Details a materials management plan
- Demonstrates when treated materials cease to be controlled waste

Materials

7.18.1 This section will record major materials used on site including:

- ready mixed concrete
- steel
- non ferrous metals (e.g. aluminium)
- aggregates
- tarmac
- pre-cast concrete
- timber/formwork

7.18.2 Along with details of any recycled materials and chain of custody/responsible sourcing issues.

Dust Management

7.19 Dust is defined as all particulate matter up to seventy-five (75) µm in diameter (according to BS6069) and comprising both suspended and deposited dust.

7.20 The impacts of dust and other emissions could impact on sensitive areas such as wildlife sites in the vicinity of the construction site. The Contractor will undertake a baseline survey as part of the Environmental Impact Assessment to formulate acceptable thresholds for dust.

7.21 Dust and particulate emissions arising from the Works shall be minimised and action taken to ensure visible dust does not cross the Site (Bolton Road) boundary. Damping down will be used appropriately to suppress dust emissions whilst having regard to mud generation and the need to keep roads clean.

7.22 Principal Contractor environmental management manual adopts the recommendations in the Environment Agency's pollution prevention guidance documents, and will be implemented where relevant:

- appropriate siting and protection of stockpiled materials will minimise dust and run-off;
- particular care will be taken to ensure water contaminated with cement does not enter watercourses or sewers;
- concrete trucks/equipment will be washed-out into a dedicated receptacle. Recovered debris will be recycled;
- procedures in our EMP will minimise risk of pollution from run-off containing oil and chemicals;
- materials are stored in bunded enclosures or tanks;
- all plant is refuelled over a drip tray;
- plant, and other potential pollutants, will be removed from flood-risk areas (e.g. the river cofferdam) when not in use;
- wheel-cleaning facilities will be considered where there is a risk of roads/footpaths being contaminated by vehicles leaving the Site (Bolton Road);
- the Site (Bolton Road) and adjacent highway will be road-brushed whenever required; and
- dust from earthworks or surfaces will be minimised by controlled dampening.

7.23 The use of long-term stockpiles on site will be avoided wherever possible unless they perform the function of visual or noise screening.

Emissions Management

7.24 The Contractor and Principal Contractors will take into account the impact of air quality and dust on occupational exposure standards to minimise worker exposure and breaches of air quality objectives that may occur outside the Site (Bolton Road) boundary, such as by visual assessment. The Principal Contractors will also maintain an accurate log of any complaints by the public.

7.25 The Contractor and Principal Contractors will seek to lower exhaust emissions from off-road construction vehicles and plant used wherever possible. The Contractor and Principal Contractors will adopt a hierarchy to control the emissions of dust and other emissions to reduce potential exposure appropriate to the scale of development by:

- prevention;
- suppression; and
- containment.

7.26 Construction traffic shall adhere to the following guidelines wherever possible:

- All vehicles should switch off engines and they shall not be allowed to idle.
- Vehicles shall be washed or cleaned effectively (including wheel washing if required) before leaving the site if close to sensitive receptors.
- All loads entering and leaving the site are to be covered.
- Site runoff of water or mud will be prevented.

Spillages

7.27 To avoid the risk of contamination to land / surface and foul water drainage, all refuelling and servicing operations will be carried out in a defined area to prevent any spillages soaking through the ground. This will ensure that any incidents are confined to one area of the Site (Bolton Road) and environmental damage will be minimised. When a spillage occurs the oil should be soaked up using sand and all contaminated

material should be excavated and disposed of according to the Contractor's duty of care. This will be carried out as soon as possible after the spillage.

7.28 In addition:

- All drainage systems will be clearly marked on site and all refuelling operations will be carried out in defined areas away from drainage systems.
- All fuel will be stored in a bunded area with a volume of one hundred and ten per cent (110%) of the storage tank.
- Storage tanks will be located on level ground and away from watercourses.
- Generators will be plumbed directly into fuel tanks to eliminate the need for refuelling operations.
- Storage areas will be secured.
- Bowsers will be easily identifiable and locked at all times when not in use.
- Fuel nozzles will be locked and secured within the confines of the bund when not in use.
- Extinguishers will be in place adjacent to storage areas.
- No smoking areas will be marked out.
- A site fire plan will be prepared and displayed on the notice board.
- Assessments will be made to identify high-risk areas to trespass and vandalism.
- Security will be installed in the office on site during non-working hours.

Fuel / Chemical Spillage

7.29 A member of staff trained to deal with potential spillage and prevent a pollution incident will supervise all deliveries. Storage tank levels will be checked before delivery to prevent overfilling and to ensure that the product is delivered to the correct tank.

7.30 The storage of materials in the main compound and the respective work sites will be controlled in such a manner to ensure that materials are not damaged prior to use either through any vehicle or people movements or through exposure to the elements. All fuel, oil, and chemicals will be stored on an impervious base within a bund / drip tray and secured. The bund / drip tray shall have a capacity of one hundred and ten per cent (110%) of the volume of the products stored within it. All tanks and containers will be kept in a secure compound and be protected from vandalism, and will be clearly marked with their contents. Stores shall be located at least ten (10) metres from any watercourse.

7.31 All mobile plant will be refuelled in a designated area on an impermeable surface and away from drains. In case of any spillages there will be a spill response kit available at each refuelling point and within each machine working within the highway corridor. Where it is impractical to refuel within a bunded area, a drip tray will be available as a minimum to catch any spills caused by over fuelling.

7.32 Mobile plant and equipment will be sourced preferably with built-in drip trays where possible. Otherwise loose drip trays will be utilised.

Concrete / Mortar Washout

7.33 There will be a designated area for the washout of concrete wagons, chutes, and mortar bins at the Site (Bolton Road). This will be either a lined skip or a pit lined with heavy-gauge polythene to prevent the escape of alkaline and silty waters entering groundwater or surface water. These pits will be located in areas of low groundwater sensitivity. Excess concrete remaining in the delivery wagon at the end of a pour will be returned to the batcher. Once each worksite has been completed any solid concrete in the washout area will be broken out and used either as suitable fill or disposed of in a licensed landfill site.

7.34 There will be specific environmental emergency procedures developed for spillages; all procedures will be communicated to all operatives and staff who are working on the Site (Bolton Road) during their site induction and through display boards at prominent places around the site. Inspection and audit processes will check that operatives and staff are prepared in the event of an incident.

Odour Management

7.35 Odour during construction works is primarily associated with the inappropriate storage or disposal of putrescible waste. Putrescible waste from construction works (i.e. from staff and catering) will be stored and disposed of in accordance with best practice (e.g. CIRIA and Chartered Institute of Environmental Health).

7.36 Odour emanating from the preparation of catering / food will be controlled by appropriate extraction and discharged at a suitable height, taking account of location and sensitive receptors.

7.37 Construction odour is unlikely to become a statutory nuisance as it is unlikely to affect an individual's use or enjoyment of their property.

Construction Traffic Management

7.38 Work area and access

- The work area will be fenced off. Traffic management will be provided to permit safe work access and egress. Works access signage will be erected on the highway. An agreed route to the Site (Bolton Road) will be signed from the major roads.

7.39 Public interface

- Any route used by both site traffic and the public will be segregated into trafficked area and footway with the use of suitable barriers.
- Traffic management proposals - planning
- Through safe, clear and practical traffic management design and phasing, we will:
- maintain existing traffic flows;
- minimise disruption to road users ; and
- ensure safety of the public and workforce.

Traffic Management Layouts and Schematic Diagrams

7.40 Draft traffic management proposals will be submitted to the local councils, Police authorities and other affected parties such as local bus companies. An inaugural traffic management meeting with all concerned will be held after award to discuss and develop our proposals. The Contractor's final proposals will be submitted two (2) weeks before implementation.

7.41 Entry and exit from the site works will be controlled so that no hazards are created for main traffic.

Strict Control of Site Traffic Movements

7.42 The prescribed route for construction traffic and deliveries will be briefed to all staff, operatives, and visitors. The route will be strictly adhered to. The Contractor's detailed proposals will be reviewed and agreed at traffic management meetings. Strict speed limits will be enforced within the Site (Bolton Road) and on the bridleway access. High visibility clothing will be mandatory.

Traffic Design for the Operational Site

7.43 The Site (Bolton Road) design focuses on the need to get vehicles of all types over the weighbridge, through the waste reception area and back over the weighbridge as quickly as possible.

7.44 The vehicle swept path checking programme (Auto Track Pro) was used to determine if the site access layout was designed to allow routing of vehicles without conflict with other oncoming vehicles or possible conflicts with the site infrastructure.

7.45 Two types of vehicles were assessed during the running of the Auto Track Pro programme:

- articulated waste delivery vehicles (16m long); and
- rigid waste delivery vehicles (9m long).

7.46 The parameters in Figure 32 were used in the calculations;

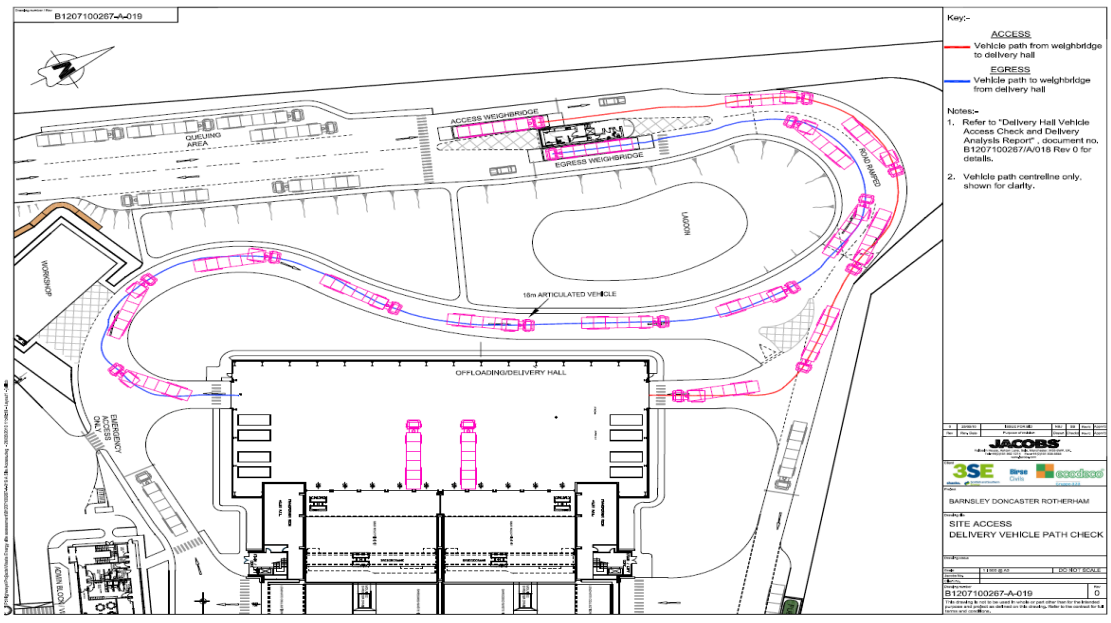
Figure 32 Parameters Used in Jacobs Turnaround Time Analysis

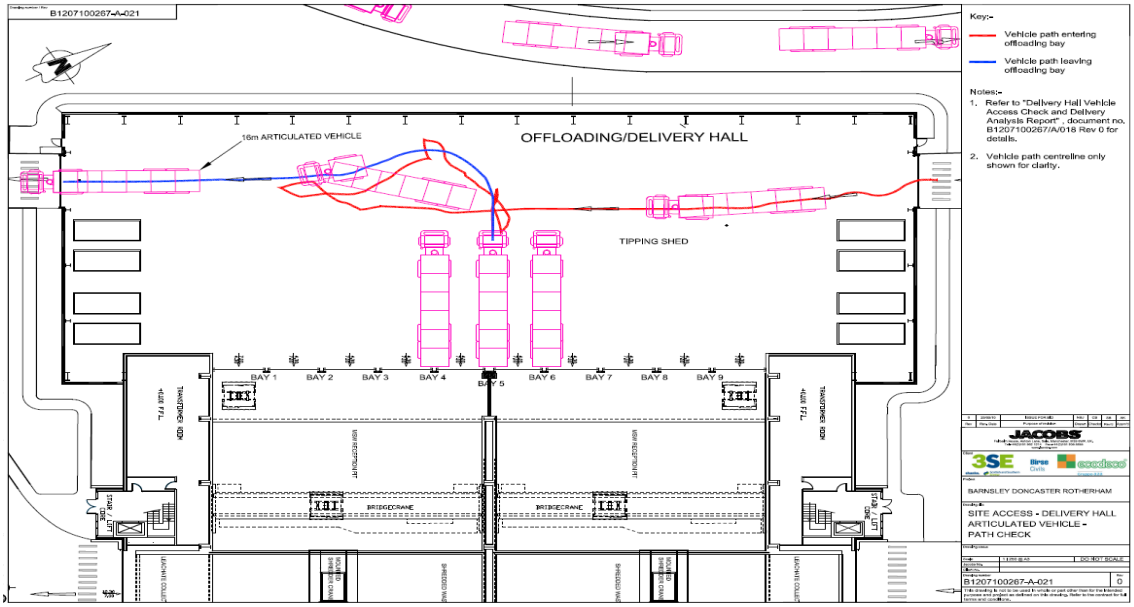
Parameter	Value
Offloading time for articulated vehicles	10 mins
Offloading time for rigid vehicles	4 mins
Site speed limit	10mph/16km/h
Assumed parking speed in delivery hall	3mph/4.8km/h
Peak vehicle delivery rate	20 veh/hour = 1 vehicle every 3 mins

7.47 The swept path analysis for articulated vehicles is presented in Figure 33. Articulated vehicles were used as a worse case scenario, though 9m rigid vehicles were also modelled.

7.48 These figures are also available in the delivery vehicle access check and delivery analysis report presented in Appendix MS1-25a.

Figure 33 Tipping Hall Swept Path Analysis





7.49 The calculations showed the turnaround times listed below.

Figure 34 Calculated Vehicle turnaround Times

Vehicle Type	**Calculated Turnaround Time**
Articulated Vehicle	minutes 26 seconds
Rigid Vehicle	minutes 5 seconds

7.50 The layout of the Site (Bolton Road) is acceptable for Authorised Vehicles of the type used by the Councils.

7.51 The target of achieving a fifteen (15) minute cycle time for Refuse Collection Vehicles ("**RCVs**") and a twenty-five (25) minute cycle time for non RCVs can clearly be met and no delays or queuing should occur if the vehicles are restricted to a maximum of one every three (3) minutes (in the peak hour) and the drivers are constrained to parking in the correct order and bay numbering system.

Vibration Monitoring

7.52 Works liable to cause vibration transmission which could affect nearby structures or residents fore example, will be assessed and reported. Certain activities and locations near sensitive receptors may trigger specific surveys of vibration due to the works e.g.

challenging ground conditions can demand heavier mechanical efforts which could create unplanned noise/vibration.

7.53 The Contractor will minimise noise and vibration nuisance by proactive management, for example:

- Where night work is unavoidable, taking all practicable steps to minimise nuisance. The Contractor will seek the local authority's formal consent to our:
  - methods of working; and
  - steps to minimise noise.
- The Contractor will regularly measure noise at neighbouring properties and monitor levels against permissible limits.
- The Contractor is conscious that perception of noise sometimes varies from objective measurement.
- Our community liaison officer will liaise with neighbours to get early warning of perceived nuisance.
- Noise-reduction barriers will be erected if necessary.
- The Principal Contractor's policy is strictly adhered to in:
- selecting silenced plant; and
- shutting off all plant when not in use
- For driving piles and safety posts, The Principal Contractor uses the quietest, lowest practicable vibration system.

8 Section 08. Construction

General Approach

8.1 The Contractors approach to managing the construction phase will ensure successful delivery of the works by:

- prioritising safety;

- engaging with the public and other stakeholders;
- planning - proactive programme management;
- quality - delivering the required quality first time;
- environmental - minimising environmental impact; and
- use of a defined risk management strategy.

8.2 The Construction Sub-Contractor will appoint a dedicated construction manager at the preferred bidder stage of the Project. The construction manager will be responsible for all construction administration activities and will be the Construction Sub-Contractor's official representative on the Project.

8.3 The Construction Sub-Contractor for the Works will select the site management team for its experience in major facility construction projects, with a proven track record in construction delivery and in safety compliance.

8.4 Time slices for the construction phase of the Project, indicating the sequence of development of the Site (Bolton Road), and some timescales are shown in Appendix 3 of this Schedule 2.

Construction Phase Plan

8.5 This plan will be a fully comprehensive document and will be developed in the initial stage of the design to refine the strategy and procedures for the construction phase and will be essential to outline the 'game plan' for a safe and successful project delivery. This plan will be an integral part of the project execution plan.

8.6 The plan typically covers:

- Project objectives;
- Project scope of work;
- Project milestones;
- scheduling;
- subcontract plan;

- cost control;
- safety, health and environmental plan;
- quality control; and
- turn-over.

8.7 The pre-construction information collated by the CDM Coordinator (as defined in section 8 below) will be reviewed by the project team in order to assist in developing the construction phase plan.

8.8 The construction phase plan template contains relevant information relating to:

- description of the Project;
- management of the work;
- arrangements for controlling significant risk; and
- Health and Safety File requirements.

8.9 The level of detail in the plan will be proportionate to the risks involved in the Project. The plan will be submitted to the CDM Coordinator in order that he can advise the Contractor on the suitability of the initial plan. The plan will be continually developed and updated throughout the Project and will remain available on site. Relevant aspects of the plan, including its implementation, will be reviewed during the monthly Health and Safety Executive ("**HSE**") planning meeting.

Considerate Constructors Scheme

8.10 Immediately following the achievement of Financial Close, the Principal Contractor will register this Project with the Considerate Constructors Scheme or equivalent should the Considerate Constructor Scheme no longer be available.

CHAS

8.11 Immediately following Financial Close, the Contractor will seek registration under the Contractor's health and safety assessment scheme ("**CHAS**") scheme (or equivalent).

Programme Management & Control

Managing the Works Programme

8.12 The Principal Contractors will manage the Works Programme on behalf of the Construction Sub-Contractor.

8.13 The approach to be taken for this Project has been contrived to enable the Works to be delivered to a reliable and robust programme with minimum risk; the main points are explained below:

- Production of a constraints schedule identifies key programme influences, thereby eliminating disruption from unplanned work.
- Programme is agreed with designers and supply chain members based on achievable durations and exploiting lessons learnt from previous projects.
- Resources are assigned to the programme and key activity resources smoothed, to ensure realistic requirements are being requested form the supply chain.
- Fully interlinked programme shows true effect of any change.
- Local issues are included within the programme enabling proactive management.
- "What-if" scenarios enable contingency plans to be available, plus informed decision-making.
- Weekly reviews and formal monthly reporting to the project manager enable mitigation measures to be agreed and implemented immediately.

8.14 A site based planner with proven experience in programming and planning complex multi disciplinary projects will provide and maintain the optimum robust programme as necessary. Typical duties of the planner will include:

- establish an accurate and realistic programme which is owned by the team;
- ensure project risks are recognised and mitigated;

- allow sufficient time for the Works to be undertaken safely and to a high quality; and

- consider possible design reviews that could produce significant value engineering ("**VE**") savings.

8.15 The construction programme will be managed using a number of mechanisms that govern construction sequence, methodology, and resources:

- Key resources are levelled across the whole Construction Programme to ensure that peaks in activity are managed to reduce the risk to the critical path by either increasing the time allowed or providing support resource to accelerate the element in question.

- Productivity is monitored daily and data collected is graphically represented thus easily identifying problem areas allowing time to implement delay mitigation strategies before the critical path is affected.

8.16 Construction methods are planned in advance of activity through the preparation of comprehensive, bespoke method statements. Clear and concise planning in this document can be effectively communicated to the project team, defining roles, responsibilities, and actions incumbent on all parties involved in the undertaking of the works package. Clear definition of tasks from the outset reduces risk from miscommunication, lack of information or ill-defined responsibilities and ensures the final product is delivered on time, to the highest possible quality and with a minimum of defects.

8.17 Regular meetings will be utilised to coordinate activities. A key element in coordinating activities will be communicating the programme to all parties. Setting and communicating targets for each activity will focus the team on completing individual tasks to programme. Allocating individual owners for programme activities will improve time predictability. It is intended to achieve this through:

- weekly progress meetings with the site management team and the supervisor;

- weekly meetings with key suppliers; and

- briefing out and issuing copies of the programme to the whole team.

8.18 It is critically important in the management of a programme of works that change is effectively controlled and to this end a robust change management procedure will be established (in accordance with Schedule 32 (Change Protocol) of the Contract). The system will provide a series of checks upon the proposal of a change to ensure that there is a valid reason for the change, the effect of the change on the overall programme (if any) and budget and the approval, or otherwise, of that change by a party with the requisite authority to do so in advance of the works being carried out on site.

8.19 Regular re-programming will maintain realistic targets and minimise the effects of change. The master construction programme will be updated with real time information on a monthly basis. Changes, actual progress, and occurrence of risk and opportunities will be fed in. This will provide a fundamental baseline showing progress achieved against planned. Output charts will show actual progress against planned for critical activities. Mitigation measures of any detrimental programme effects will be identified by the planner and reviewed with the project manager.

8.20 In updating the programme, the planner will run several "what-if" options, critically examining resources, durations, and links, using current knowledge. Re-programming of future activities will optimise opportunities for programme savings and mitigation of delays. Contingency plans will be developed for the most sensitive activities.

8.21 The programme will be maintained as a live document that responds to situations as they develop.

Document Control

8.22 The Principal Contractor's document controllers will collect and collate all equipment manuals, data, and as-built drawings into the handover packages at the completion of the Project, including the Health and Safety File and Operating Manuals, maintenance manuals and as-built drawings.

8.23 All controlled documents will carry a unique control number, which identifies the recipient. The responsibility for the distribution of controlled documentation bearing an issue number/letter and date, including procedures, standards, whether originating internally or externally to Principal Contractor, rests with the nominated manager.

Inspection and Testing Procedures

8.24 Mandatory inspections and tests, as detailed on the inspection and test plan or trade check sheet, and random surveillance inspections will be carried out. Results are

recorded on the verifying proforma. In addition, the construction manager may identify critical elements that require further inspection and/or tests.

Material Control

8.25 All materials received on site will be identified by contract number, order number, and supplier, and cross-referenced to the applicable delivery note. Each consignment is inspected and the accompanying documentation i.e. certificates of conformity, test certificates etc., particularly in respect of structural material and reinforcement are checked to ensure the goods meets specification.

8.26 Any non-conforming/suspect material will be quarantined, identified and returned to supplier.

8.27 All inspection and test records together with supplier's delivery notes and certificates will be retained on site until project completion.

Change Control and Additional Works

8.28 On-site changes or additional work will be dealt with using a change control system. This requires a change notice to be written and submitted to the Contractor's Construction Manger for approval. No additional works proceed on site until the change order is signed by the Contractor's construction manager.

Procurement of Sub-Contractors

8.29 The qualification of contractors will take the following selection criteria in to account:

- successful completion of the HSE questionnaire;
- 'good' and validated HSE records;
- proven deliverable record with regards to schedule and quality;
- availability of suitable qualified and experienced resources;
- appropriate project control systems;
- formalised quality assurance/quality control systems;
- correct commercial conditions.

8.30 All sub-contractors employed at the Site (Bolton Road) shall discuss with the project manager within the pre-order meeting the issues to address the quality, safety, and environmental requirements on the Project. The process control is managed through project control and the project delivery plan, which is continually reviewed and revised throughout the duration of the contract. It details the individual work packages, procedures to be adopted and the documentation by which to record progress and compliance. Each item will be broken down into individual inspection and test plans. These will include key parts of the specification, testing requirements, hold points, site checks, and the relevant forms to record the information and details of the final inspection.

8.31 All objectives will be reviewed in the monthly quality review meeting; the site team will focus on what areas have been identified as important right at the start of the scheme. The site team will break them down into smaller objectives that can be identified, reviewed and appropriate actions plans implemented to manage and ensure successful delivery.

8.32 All subcontractors will be selected from the Principal Contractor's approved contractor database. All will have completed a comprehensive vetting procedure prior to approval by the senior management team.

8.33 Subcontractors' performances will be reviewed on a monthly basis and on completion of their works. This review will cover quality, programme, health and safety, environment etc., and scores will be fed back into our database.

8.34 Selection of subcontractors will be based on a variety of criteria, including:

- Cost
    - Offers the most economical solution
- Experience
    - Have appropriate experience.
    - Can offer added value at design or construction phase
- Performance
    - Previous history and measurement against established key performance indicators.

Procurement Deliveries

8.35 Procurement delivery schedule will be developed by the Contractor's construction procurement manager. This Schedule 2 must be complied in alignment and strict consultation with the construction schedule.

Control of Sub-contractors

8.36 Subcontractors will work to the quality management, safety, and environmental plans developed by the construction manager. Weekly meetings with the subcontractor's team will be held to review performance and also to look forward and agree programme and targets for the next period.

Sub-contractor Relations

8.37 The Contractor's construction management team will be located at site and interface daily with the Principal Contractor. It is again critical to the Project success that the site team maintain good working relations with all parties involved.

Quality Management System

8.38 The Contractor shall implement a quality management system ("**QMS**") that is compliant with ISO9001 throughout the Works Period.

8.39 The Contractor, Principal Contractor, and technology providers Ecodeco and JCBE each operate under existing separate quality management systems certified to ISO 9001 standards.

8.40 The Contractor will develop and implement a project specific quality management system covering all aspects of the detailed design, procurement, and construction and commissioning of the Works.

8.41 The system will be fully documented and will consist of a series of company policies, standards, procedures, guidance/advice notes, reference and training documents and legal documents. The documents relevant to a particular set of business sectors will be detailed in a management plan, which will then become specific to those business sectors.

8.42 The Contractor will maintain an up to date list of relevant legal documents such as licences, permits, authorisations, consents, and working plans, plus other documents such as procedures and risk assessments.

8.43 Personnel from the Construction Sub-Contractor will have nominated responsibility for implementing the requirements of the documented systems relevant to their part of the business. It will be a requirement of all supply chain members to achieve ISO 9001 accreditation within an appropriate timescale.

8.44 The QMS will support the internal programme of continual assessment and improvement and will develop both environmental and health and safety policies and management systems. Subsequently the Contractor will also be registered to both ISO 14001 environmental management systems standard and ISO 18001.

8.45 The QMS will be communicated to the project delivery partners in a series of workshops to ensure face to face communication of the processes and procedures to be put into practice.

8.46 The Contractor will implement a series of quality reviews internally with its delivery partners to monitor that the QMS is being used correctly, to obtain feedback as to possible improvements that can be made, and to determine that standards are being consistently met and exceeded by all parties.

Control of Non-conforming Product

8.47 Non-conformances may be identified at any stage during the Project and in any work area. Non-conformances will be managed and identified in accordance with the QMS.

Corrective and Preventive Action

8.48 The nominated manager will be responsible for closing out any non-conformance or quality alerts by carrying out corrective action that facilitates conformance, or by obtaining a concession from the client and preventive action that addresses the root cause. This will be verified and documented.

8.49 All non-conformances will be reported in the monthly reports.

Quality Audits

8.50 Audit and measurement will be carried out through the Contractor's internal dedicated safety, health, and environment ("**SHE**") department on a monthly basis.

8.51 External audits through the British Standards Institution will be carried on an annual basis to ensure robustness of the QMS and compliance with accreditation requirements.

8.52 Internal quality audits will be carried out every four weeks by the Principal Contractor. The 'on site' quality management and results of audits will form part of the agenda at the four weekly quality review meetings intended to be held on site as part of the overall project quality management plan. Other items discussed at these meetings include:

- changes to contract details;
- review of current and new works;
- quality alerts raised;
- performance review of subcontractors;
- inspection and testing requirements; and
- individual staff responsibilities.

8.53 Regular management system audits are carried out, on and off-site, by staff independent of the project management team under the control of the Contractor's construction manager.

Quality Records

8.54 All quality records will be maintained and archived in accordance with the QMS. The comprehensive master project file containing all records will be located within the site office under the control of the nominated manager during the project activity. After contract completion and handover to the Contractor, the contract records will be archived.

8.55 Quality risks are eliminated by:

- strict quality management procedures;
- only using 'quality approved' supply chain;
- inspections before handover of work packages;
- experienced staff with ownership of quality;
- rectifying defects immediately if found.

Environmental Management

8.56 The Contractor will implement an EMS that is compliant with ISO14001 to manage environmental issues, during the Works Period.

8.57 As the implementation and maintenance of an EMS is a requirement of the Environmental Permit, the Contractor will pursue the development and implementation of an ISO 14001 compliant EMS for the Works Period immediately following financial close. The EMS will be developed to the point where it is certification-ready, so that it may be certified through an accredited third party.

8.58 The Contractor will utilise the Group's internal safety, health and environment ("**SHE**") department to support the EMS preparation and implementation.

8.59 The EMS will be based on the "plan-do-check-act" management model. The overall objective is to ensure compliance with relevant environmental legislation and provide environmental improvements where appropriate, in particular for commercial advantage.

Pre-Construction Activities

Construction Management Team Mobilisation

8.60 The Contractor will mobilise the construction management team at Financial Close.

8.61 The following pre-construction activities will be undertaken by the construction manager:

- attend the 'project strategy' and 'kick off' meetings to reaffirm the project plan and objectives and record areas for action;
- participate in the project interactive planning sessions;
- interface with the project design team members to review all proposals, studies and drawings etc as necessary, in order to promote and achieve safe practical and efficient construction conditions, with minimal disruption and ease of co-ordination.

Buildability Review

8.62 Buildability reviews will be a key part of the design phase. They will focus on the detail of construction provision and the suitability of the design for ease of construction, maintenance, operation, and (ultimately) demolition.

8.63 The construction process will consider both design buildability and arrangements for construction. The latter will for instance include details of permitting arrangements, warehousing, laydown and storage provision, etc.

8.64 This buildability review process commences in the early stages of design to ensure the following are considered and appropriately addressed.

8.65 Sequence and timing of engineering deliverables.

- Construction sequence
- Construction methodology
- Equipment required on site dates
- Construction friendly specification
- Fabrication and erection considerations
- Lifting materials handling requirements
- Job site accessibility
- Sequence and timing of preparing tie in connections

8.66 Items which will be given special consideration will be equipment delivery dates to site, major civils works, equipment foundations/bases, heavy lifts, installation of major equipment, piping installation, utility connections.

Enabling Works

8.67 The access road from the public highway (including the bridge) will be designed in accordance with 'Design Manual for Roads and Bridges'.

8.68 Foundations for the ITS Facility and the AD Facility will either be piled or the foundations will be designed based on site investigation and allowable bearing pressures.

Clearance and Demolition Activities Required

Bolton Road ITS Facility

8.69 There are no above ground existing structures on the Site (Bolton Road). No above ground removal or demolition will be required for development of the ITS Facility.

8.70 Following a review of the phase 2 site investigation report it appears that only low levels of hydrocarbon contamination exist at a number of locations on the Site (Bolton Road). These indicative levels are below the Environment Agency's soil guideline values for industrial sites and therefore this material can be used or remediated on site.

8.71 The Contractor will remove and reuse where it can. Any additional below ground structures, obstacles or contamination will be dealt with by the Contractor in accordance with clause 19 (Adverse Ground Conditions and Contamination) of the Contract.

Grange Lane Transfer Station

8.72 It is the Contractor's intention to retain the existing TLS Facility, also referred to herein as the transfer station at the Site (Grange Lane). Refurbishment works will be required to the existing structure; although it has been assumed that the TLS Facility will be received in full and tenantable condition.

Grange Lane Transfer Station

8.73 It is the Contractor's intention to retain the existing transfer station at the Site (Grange Lane). Any changes to the provision of utility services to the Site (Bolton Road) is unlikely, therefore risk of interruption to utility services to neighbours is minimal.

Site Levels and Topological Information

8.74 The topographical survey will be used to determine the most appropriate levels of the facilities to minimise volumes of cut and fill. Any excess excavated material will be used in landscaping areas and bunds. Where this is not possible material will be disposed of off-site in accordance with current regulations. Any imported fill will be in accordance with the specification for highway works. Where possible the existing

levels on the Site (Bolton Road) will be utilised to reduce the need for reprofiling, importing, or exporting soil materials.

8.75 The access to the Site (Bolton Road) utilises the existing level of Bolton Road and the ground level on the Site (Bolton Road) to bring the access across horizontally at approximately 22m to 21m above ordnance datum ("**AOD**").

8.76 From the weighbridge, as the site road bends round towards the tipping shed it falls from 22m AOD to 20.5m. The remainder of the Site (Bolton Road) will be at approximately 20.5 AOD. This approach to the site levels is designed to reduce the need for importing or exporting large amounts of soil materials.

Construction Regulations

8.77 Protection of the health, safety, and welfare of the Bolton Road, Rotherham and Grange Lane, Barnsley sites and staff, visitors and other persons will be incorporated during the design stage of the Project.

8.78 The Contractor will place an emphasis during the design so that hazards are eliminated where possible and reduce risk during the construction, operation, and decommissioning stages through intelligent design. In particular, the design will comply with the Workplace (Health, Safety and Welfare) Regulations, 1992, and the Construction (Design and Management) Regulations 2007 ("**CDM Regulations**").

8.79 The Contractor will use the principles of the CDM Regulations to integrate health and safety into the design and management of the Project to:

- improve the planning and management of the Project from the start through commissioning;
- identify hazards early on, so they can be eliminated or reduced at the design or planning stage and the remaining risks can be properly managed;
- target effort where it can do the most good in terms of health and safety; and
- discourage unnecessary bureaucracy.

8.80 In accordance with the CDM Regulations, the Contractor will appoint the following duty holders:

- "**CDM Coordinator**" – Turner and Townsend Limited;

- Designers – Shanks Waste Management Limited; Ecodeco and JCBE as designer of the process plant; and Birse Civils Ltd as civil designer; and

- Principal Contractor – Birse Civils Ltd and JCBE (in accordance with Drawing Ref DO in Schedule 8 (Design) of the Contract.

8.81 The competency of each of the above parties to perform their allocated role has undergone initial assessment by the Contractor and each duty holder has been assigned specific responsibilities throughout the Project. This will include for a number of stages within the Project lifecycle, including concept, design, and construction phases. These are set out, in synopsis, below:

Figure 35 Concept Phase

Duty Holder	Organisation	Responsibilities
Client	The Contractor	Structure all contracts to allow other duty holders to carry out their duties. Ensure that design specification complies with the provisions of the workplace (Health Safety and Welfare) Regulations 1992. Ensure that every person designing the Facilities and every Contractor who has been or is likely to be appointed is promptly provided with relevant information e.g. any as built drawings or asbestos surveys. Appoint competent designers. Appoint a competent CDM Coordinator.
CDM Coordinator	Turner & Townsend	Inform the client of their duties. Notify the project to HSE via form F10.

Duty Holder	Organisation	Responsibilities
		Propose timetable for pre-construction health and safety information pack. Consider contents of the pre-construction health and safety information pack. Advise the client on competencies and resources of designers, Principal Contractor and contractors. Attend design team meetings to evaluate the suitability of the proposals and to advise on any health and safety related issues.
Designer	The Contractor as Construction Sub-Contractor; Ecodeco and JCBE as process designers; and Birse Civils Ltd as civil designer.	Inform client of his duties. Take steps to avoid risks to the health and safety of any person involved in any phases of the Project from construction to eventual demolition. Identify hazards which may give rise to risks and mitigate in accordance with CDM Regulations and Good Industry Practice. Ensure that any structure designed for use as a workplace has been designed so as to comply with the provisions of Workplace (Health, Safety and Welfare Regulations) 1992.

Duty Holder	Organisation	Responsibilities
Principal Contractor	Principal Contractor	Assist in identifying hazards and risks and consider how to eliminate or investigate the effects. Consider any temporary works which may be required and liaise with CDM Coordinator and designer to ensure that such works can be incorporated into the Project with due regards to health and safety.
Client	The Contractor Consortium	Provide information for pre-construction health and safety information pack. Consider how contractors will fulfil their obligation to provide welfare facilities and how quickly this could be achieved. Involve the Principal Contractor and any special contractors to ensure that designs can be constructed safely. Ensure that designer has robust procedures to ensure that health and safety is properly considered at all stages of design development. Ensure that the CDM Coordinator has been appointed before commencing design.
CDM Coordinator	Turner & Townsend	Collect health and safety information from client and distribute to all involved in the design for inclusion within the pre-

Duty Holder	Organisation	Responsibilities
		construction health and safety information pack. Make sure all parties talk to each other. Facilitate co-operation and coordination between all persons concerned with the Project. Advise the client as to the intrinsic safety of the design in all of its aspects.
Designer	The Contractor as Construction Sub-Contractor; Ecodeco & JCBE as process designers; and Birse Civils Ltd as civil designer.	Continue to develop design in accordance with principles of criteria set out in concept phase. Help prepare tender documentation and input to pre- construction Health and Safety information pack. Ensure that all the information relating to the design which is likely to be included in the pre-construction Health and Safety information pack is promptly provided to the CDM Coordinator. Not start design work until CDM Co-ordinator has been appointed
Principal Contractor	Principal Contractor	Continue duties identified at the concept phase.

Figure 36 Concept Phase

Duty Holder	Organisation	Responsibilities
Client	The Contractor Consortium	Ensure the Principal Contractor has adequate time to develop a construction phase health and safety plan prior to work commencing. On construction phase completion receive Health and Safety File from CDM Coordinator and pass to the maintenance and operations staff.
CDM Coordinator	Turner & Townsend	Talk to all parties about their health and safety responsibilities. Update the F10 notification to HSE as Principal Contractor is identified. Advise the client of the adequacy of the Principal Contractor's construction phase health and safety plan. Ensure that Principal Contractor has systems to manage health and safety in all works. On construction phase completion hand the Health and Safety File to the Client.
Designer	The Contractor as Construction Sub-Contractor; EcoDeco as Process	Continue to develop design - in the case of additional work or changes in scope of works, ensure that the CDM Coordinator, Principal Contractor, and contractors are

Duty Holder	Organisation	Responsibilities
	Designers; and JCBE as Civil and Process Designers Birse Civils Ltd as civil designer.	fully involved at an early stage. Provide information to CDM Coordinator for Health and Safety File.
Principal Contractor	Principal Contractor	Continue to plan, manage, and monitor construction work in a way which ensures it is carried out without risks to human health and safety. Ensure that contractors have adequate and appropriate competencies. Ensure that contractors are informed of the amount of time allowed for planning and preparation. Ensure workforce and that of contractors are provided with information and training. Take reasonable steps to prevent access by unauthorised persons to site. Pass on all relevant information promptly to the CDM Coordinator to compile the Health and Safety File.

CDM Coordinator

8.82 The Contractor has appointed a CDM Co-ordinator ("**CDMC**") for the Contract. The selection of the CDMC appointment was based on a competency assessment, which will be scored against:

- qualifications;
- experience (relevant to the Project); and
- resource availability.

8.83 The Contractor has selected Turner and Townsend to be the CDMC. The named CDMC for the Project will be:

Richard Dryden

Richard.dryden@turnertown.co.uk

8.84 The role will require the CDMC to:

- encourage cooperation of all parties to adhere to guidelines pertaining to the CDM Regulations;
- Assist the Contractor in the competency assessment of the designer and Principal Contractor;
- Attend design team meetings to evaluate the suitability of the proposals and to advise on any health and safety related issues;
- Submit the initial and revised F10 notifications to the health and safety executive;
- Advise the Contractor on the 'client' duty holder responsibilities under the CDM Regulations;
- Gather sufficient information from the project team, and taking into account any client, local environment or survey information to produce a construction, health and safety information pack.

- Assess the Principal Contractor's construction phase health and safety plans, and judge that the response is proportionate to the risk, and has incorporated appropriate risk mitigation for any items raised in the information pack.

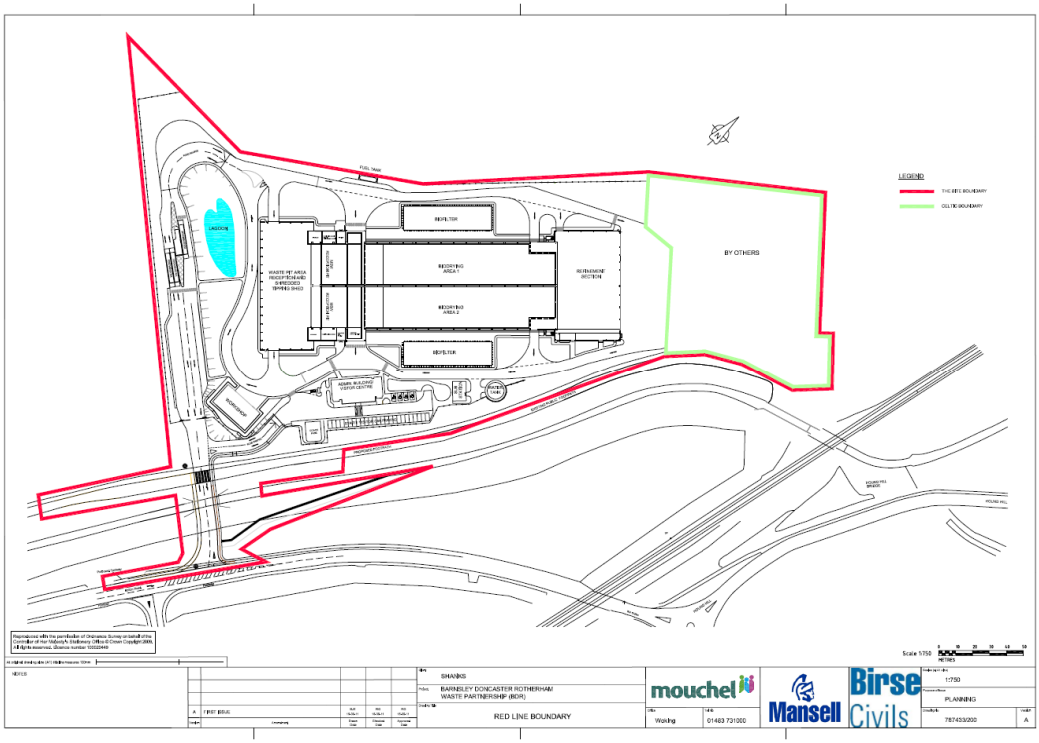
- Agree with the Contractor the format for the Health and Safety File, communicate with the Principal Contractor and assemble the file on project completion to be handed to the client.

- Although outside of the CDMC prescribed duties, should the Contractor require it; to monitor the construction phase to advise and report on the Principal Contractors' compliance with the construction phase health and safety plans and associated health and safety legal duties.

Principal Contractor

8.85 The Contractor has appointed Birse Civils Limited and JCBE as the Principal Contractors for the whole of the construction phase of the Project. They will coordinate the activities of both Ecodeco and JCBE during the M and E installation phase of the development. Drawing DO at Schedule 8 (Design) of the Contract sets out the red line and green line boundaries (also included in Figure 37).

Figure 37 Red Line / Green Line Boundaries



8.86 This appointment is based on:

- track record;
- an assessment of the Principal Contractors competence, and evaluation of the safety management system and past experience;
- financial stability;
- best value.

8.87 The Principal Contractor will be responsible for:

- the delivery of the Project to acceptable quality and safety standards;
- the production and implementation of a construction phase health and safety plan;
- the appointment of competent sub contractors;
- carrying out site health and safety inductions for all workers prior to commencement on site and ensure suitable health and safety information and training is delivered throughout the construction period passing relevant information on hazards and risks to contractors;
- regular auditing of the Site(s) and reporting any significant breaches to the client and for health and safety to the CDMC;
- liaising with the CDM co-ordinator on design carried out during the construction phase, including design by specialist contractors, and its implications for the plan;
- providing the CDM Coordinator promptly with any information relevant to the Health and Safety File including any test certificates;
- ensuring that the workforce is consulted about health and safety matters;
- displaying the project notification and relevant health and safety information on the health and safety notice board.

Designers

8.88 Those appointed by the Contractor to have designer responsibilities including Birse Civils Limited, Ecodeco and JCBE will play a key role within the project team. In order to comply with the CDM Regulations and associated health and safety and accessibility regulations they will, when carrying out design work, act to avoid foreseeable risks to those involved in the construction and future use of the structure: They will in the design consider the maintenance and cleaning strategy and advise the Contractor on any residual hazards/risks. This will involve:

- ensuring those involved in design work are competent and adequately resourced to address the health and safety issues likely to be involved in the design;
- as lead designer, checking that clients are aware of their duties;
- when carrying out design work, as far as is practicable, eliminating hazards and reduce risks associated with those hazards which remain;
- providing adequate information about any significant risks associated with the design;
- co-ordinating the design with others in order to improve the way in which risks are managed and controlled.

8.89 Information on significant risks will be provided to those that need it either by risk assessments or:

- notes on drawings;
- written information provided with the design;
- suggested construction sequences when not obvious.

8.90 In the period between the readiness and acceptance tests the Construction Sub-Contractor will introduce the operational heath and safety management plan.

Health and Safety

Inspections

8.91 A key component of operational control for quality, environmental and health and safety excellence will be the routine inspection of the Works. Inspection reports will be reviewed by the Contractor's construction manager and where necessary by the CDMC. Any relevant events will be reported to the Contractor. These events include spills or excess emission events for example. Employees will be trained and refreshed to recognise reportable events and alert management at the ITSAD Facility upon detection.

Risk Assessments

8.92 The construction manager ensures that a safe system of work is utilised on the Site (Bolton Road). The preparation of written risk assessments and method statements will be a critical part of the planning for a safe system of work.

8.93 The contents of the risk assessment and method statement will include (but are not limited to):

- a detailed description of the work
- an indication of time scale and resources
- details of plant and equipment to be used
- responsible persons
- risks identified and mitigation actions
- special safety or environmental considerations
- any third party involvement
- permit to work requirements
- all statutory provisions to be complied with.

Monitoring Project Safety

8.94 Managing safety will be the most important activity on this Project. All site supervisors are safety advisors in the field. Each supervisor will:

- analyse and comment on relevant risk assessments;
- perform a daily walk down on site and gives feedback and follow-up actions to the subcontractors;
- monitor and address compliance of regulatory requirements for all construction workers;
- hold/attend weekly safety meetings with relevant sub-contractors;
- ensure all tools and equipment are certified and suitable for their specific tasks, including plant and cranes;
- attend Contractor's tool box meetings.

Health and Safety

8.95 The Principal Contractors will work to a health and safety policy the philosophy of which is based on the core skills of successful management, teamwork, detailed planning in all activities, a commitment to directed training and strong discipline. The Principal Contractors expect high standards in all areas of business, none more so than in the health, safety and environmental ("**HSE**") management of projects.

8.96 The Principal Contractors' HSE management systems will be implemented through all levels of management, supervisors, and staff on site throughout the construction phase. An integral part of this is the preparation of a health and safety plan.

8.97 HSE managers are supported by a regional health, safety, quality and environmental ("**HSQE**") manager.

Monitoring and Review of Health and Safety Performance

8.98 All activities will be formally monitored daily by the Principal Contractors' site management teams, Ecodeco, and JCBE site team during the M&E installation phase and Shanks as well as each contractor's supervisor(s).

8.99 Regular formal monitoring of site activities by the Principal Contractors and Ecodeco staff will be via the weekly inspection report, ensuring that non-conformance towards safety standards can be rectified without delay.

8.100 The Principal Contractors and Ecodeco will also monitor the health and safety standards on site through weekly site meetings and monthly HSQE planning meetings. The objective of meetings is to review the current standards being achieved on site and plan ahead for the next six (6) weeks.

8.101 Site management organograms will be displayed on site notice boards with monitoring and review of health and safety performance.

8.102 At the end of commissioning, a review is undertaken, with particular emphasis on the performance of safety, health, and welfare. This is invaluable in ensuring that lessons are learned and that positive and innovative activities undertaken are spread throughout the rest of the business.

Structured Process for Dealing with High-Risk Operations

8.103 High risk operations will be discussed at the contract pre-start health and safety meeting and a plan of action agreed. The health and safety plan is the starting point for identifying the various hazards. Items for discussion will include:

- Identification and use of approved specialist suppliers;
- Arrangements for pre-start safety meetings with specialist suppliers;
- Seeking support from external experts if necessary;
- Where possible, use of other methods / materials to eliminate or reduce hazards and risks.

8.104 The Principal Contractors, Ecodeco, and Shanks Waste Management Limited will require the senior site manager and safety manager to review, approve and sign method statements for high risk activities. This "hold point" ensures that all risks are recognised and addressed. The supervisor then briefs the workforce, with written records kept on site before work starts.

Risk Assessment through Fortnightly Safety Planning Meetings

8.105 The Principal Contractors and Ecodeco (during the M&E installation phase) will review each work activity at fortnightly safety planning meetings. Hazards are identified and risks assessed before any activity starts on site. The risk assessment is written and becomes part of the method statement for the particular work activity. It forms part of the briefing to operatives doing the work. An electronic file of generic risk assessments is available and assists in preparing method statements. These generic assessments are reviewed and amended to account for site-specific hazards and work processes.

Operatives' Briefing and Activities Monitored by their Supervisor

8.106 All personnel will be briefed by their immediate supervisor on the method of working, the residual risks and the control measures to be adhered to throughout the operation. The supervisor will be responsible for:

- providing appropriate resources;
- monitoring activities;
- recording briefings;
- advising management of any changes to working methods. Such changes can only be made on approval by management.

8.107 All activities will be:

- monitored daily by the site management;
- recorded weekly via audit proforma S50;
- formally reviewed at every 2-weekly safety planning meeting.

Adherence to Method Statements

8.108 If the situation on site changes such that the method statement cannot be complied with, then work will cease immediately. An agreed amended method of working will be formulated, signed-off as above, and the personnel involved re-briefed. Only then will work permitted to restart.

Dealing with the Significant and Unusual Hazards and Risks

8.109 The specific approach of Principal Contractors and Ecodeco for dealing with the significant and unusual hazards and risks identified in the health and safety plan is outlined. They will be addressed further in the pre-start health and safety meeting and the subsequent 2-weekly site safety planning meetings. They will be highlighted in all relevant method statements, risk assessments, and operative briefings.

Training for Contract-Specific High-risk Operations

8.110 Training will be given to operatives using toolbox talks, selected videos and safety briefings on areas including:

- steel erection;
- traffic management;
- underground services;
- scaffolding;
- confined space working.

8.111 During the M&E installation phase, both the Principal Contractors' and Ecodeco's health and safety managers will have access to the latest information and best practice through such media and sources as:

- Construction Information Service;
- British Safety Council;
- Croners;
- RoSPA;
- HSE;
- IOSH;
- The Principal Contractors' own internal library of video material.

8.112 The Works Period of the Project will be sequenced whereby the civils elements of the Works undertaken by Principal Contractors will be carried out in advance of the installation of a majority of the process equipment by Ecodeco. The Principal Contractors will retain overall site health and safety responsibility as Principal Contractors during the installation works in accordance with Drawing Ref DO in Schedule 8 (Design) of the Contract.

Health and Safety File

8.113 The scope, structure, and format of the file will be agreed between the Contractor and the CDM Coordinator at the start of the Project.

8.114 The level of detail of the plan will allow the likely risks to be identified and addressed by those carrying out the work and include:

- a brief description of the work carried out
- any residual hazards which remain and how they have been dealt with
- key structural principles
- hazardous materials used
- information regarding the removal or dismantling of installed plant and equipment
- health and safety information about equipment provided for cleaning or maintaining the structure;
- the nature, location and markings of significant services
- Information and as-built drawings of the structure, its plant, and equipment.

8.115 The CDM Co-ordinator at the end of the Project will give the completed Health and Safety File to the client. If the client disposes of his interest in the property, he is required to deliver the Health and Safety File to the person who acquires the property.

8.116 Any potential conflict between the designer or contractor role and the CDM Co-ordinator will be resolved by means of ensuring that the CDM Co-ordinator acts independently. The CDM Coordinator will report directly to its client and will ensure

competent designers and contractors are appointed and will ensure adequate arrangements are in place to manage the Project.

Pre Construction Information Pack

8.117 The Contractor will prepare, with assistance of the CDM Coordinator, a pre-construction information pack, which will identify the relevant hazards and safety requirements associated with the implementation of the design. A framework of contents of this pre construction information is already in place and its contents are outlined below:

- Description and programme details including any key dates;
- Details of client, CDM Co-coordinator, designers, Principal Contractor and other consultants;
- Extent and location of existing records and plans that are relevant to health and safety on site, including information about any existing structures;
- Management structure and responsibilities;
- Health and safety goals for the Project and arrangements for monitoring and review of health and safety performance;
- Arrangements for regular liaison between parties on site;
- The exchange of design information between the client, designers, CDM Coordinator and contractors on site;
- The exchange of health and safety information between contractors;
- Site security, inductions and on site training;
- The reporting and investigation of accidents and incidents including near misses;
- The production and approval of risk assessments and written systems of work;
- Fire and emergency procedures;
- Location of existing services and structures – including site drawings;

- Traffic systems and restrictions – including the site traffic management plan;
- Ground conditions - including stability issues and possible contamination;
- A detail of hazards which may be present and where possible precautions might be necessary;
- Any hazards associated with the construction materials – such as possible need for control of substances hazardous to health ("**COSHH**") assessments and/or data sheets to be provided;
- Provisions for access, egress, parking and deliveries;
- Details of temporary accommodation, first aid and welfare facilities for the contractors;
- Consideration of any issues, which may arise regarding the interaction with existing operations;
- In relation to the construction of complex handling plant it is advisable to send samples of the type of the material to be handled;
- Details of any site rule requirements.

8.118 The Principal Contractors, will be required to prepare a construction health and safety plan ("**Project Management Plan**" or "**PMP**") in accordance with the regulations for the approval by the Contractor. A framework of the expected contents of the construction phase plan is outlined below:

- Description of project, such as nature of works and timetable;
- Extent and location of existing records and plans;
- Site history, including services, nuisance restriction and site access;
- Management of the Works, such as site management structure, health and safety goals, safety standards, Project objectives and arrangements for monitoring;
- Arrangements, such as communications and co-operation, consultation with people on-site, selection procedures, information for contractors, site security,

information and training of personnel on site, induction and site familiarisation, site layout, site restrictions, site access, welfare facilities, loading/discharging arrangements, storage of materials, accidents, visitors, production and approval of safe systems of work and risk assessments and site rules;

- Emergency procedures;
- Site layout plan;
- Arrangements for controlling site risks including safety, health and hygiene risks;
- Hazards materials and soil contamination;
- Manual handling;
- Noise and vibration;
- Health and Safety File, including its layout and format, arrangements for collations and storage for information.

[REDACTED]

8.119 **[REDACTED]**

8.120 **[REDACTED]**

[REDACTED]

8.121 **[REDACTED[**

Figure 38 [REDACTED]

[REDACTED]

[REDACTED]

8.122 **[REDACTED]**

8.123 **[REDACTED]**

8.124 **[REDACTED]**

8.125 **[REDACTED]**

8.126 **[REDACTED]**

8.127 **[REDACTED]**

8.128 **[REDACTED]**

8.129 **[REDACTED]**

8.130 **[REDACTED]**

8.131 **[REDACTED]**

[REDACTED]

8.132 **[REDACTED]**

8.133 **[REDACTED]**

8.134 **[REDACTED]**

8.135 **[REDACTED]**

8.136 **[REDACTED]**

[REDACTED]

8.137 **[REDACTED]**

[REDACTED]

8.138 **[REDACTED]**

8.139 **[REDACTED]**

8.140 **[REDACTED]**

8.141 **[REDACTED]**

8.142 **[REDACTED]**

Reporting during Construction

8.143 The Contractor shall submit to the Councils within ten (10) Business Days following the end of each Month during the Works Period, a monthly construction progress report covering the construction activities carried out in the preceding Month (the "**Monthly Construction Progress Report**"). The Monthly Construction Progress Report shall include as a minimum a description of the following:

8.144 Assessment of actual progress by comparison to the latest Works Programme including any issues that may impact on the deliverability of the Works Programme;

- Progress with obtaining Necessary Consents;
- Progress with discharging any requirements of the Necessary Consents;
- Report on any material risk to achieving the Planned Service Commencement Date;
- Health and safety issues;
- Environmental issues;
- Performance of the Quality Management System; and
- Where the Monthly Construction Progress Report covers the period in which the completion certificate is issued, the Monthly Construction Progress Report shall include a copy of the completion certificate.

9 Section 09. Commissioning

Acceptance Testing

9.1 The Contractor's technology partners, Ecodeco and JCBE, will be responsible for the commissioning of the ITS Facility and the AD Facility at the Site (Bolton Road).

9.2 Each system will be tested without and, where appropriate, with waste to demonstrate it functionality. Full details of the Acceptance Tests are set out in Schedule 9 (Acceptance Tests) of the Contractor.

Mobilisation Pre-Commissioning

Interim contingency

9.3 In the event that the Service Commencement Date is not achieved the Contractor will continue to use the TLS Facility at the Site (Grange Lane) and in accordance with the Contract will offer an interim service to the Councils, it is anticipated that this will be provided for by entering into new short term contracts with Veolia Environmental Services (UK) PLC and/or Sterecycle Ltd.

9.4 In addition, the Contractor will offer landfill disposal at the Caird Bardon Landfill site at Peckfield, part of the Shanks Group.

9.5 As the commissioning phase begins the Contractor will request that the Councils divert vehicles away from the Interim Contingency Delivery Points to provide the ITSAD Facility with the required tonnage of Contract Waste as set out in the Service Delivery Plan.

Commissioning - Liaison with collection contractors

9.6 The Contractor will contact all WCAs via the Councils' Representative at least six (6) weeks before it expects to receive waste at the ITSAD Facility. The Contractor will offer all WCA drivers the opportunity to attend a site induction to familiarise the drivers with the operation of the ITS Facility, the site rules, traffic flows, access and egress procedures, and any other health and safety information that may be relevant to the delivery of waste to the Site (Bolton Road).

9.7 The Contractor will require that drivers sign a register of induction to confirm that an induction course has been received.

[REDACTED]

[REDACTED]

9.8 **[REDACTED]**

Figure 39 [REDACTED]

[REDACTED]

9.9 **[REDACTED]**

[REDACTED]

9.10 **[REDACTED]**

[REDACTED]

9.11 **[REDACTED]**

9.12 **[REDACTED]**

[REDACTED]

9.13 **[REDACTED]**

9.14 **[REDACTED]**

[REDACTED]

9.15 **[REDACTED]**

9.16 **[REDACTED]**

[REDACTED]

9.17 **[REDACTED]**

9.18 **[REDACTED]**

9.19 **[REDACTED]**

[REDACTED]

9.20 **[REDACTED]**

Commissioning Tonnages

Required Commissioning Tonnages

9.21 A summary of the tonnages required during the commissioning phase (to be delivered by the Councils) is presented in Figure 40 (see the Contract clause 35.3.5). This data is also presented to the Councils in "Financial Proforma 13".

Figure 40 Commissioning and Acceptance Testing Tonnages

				Quantity of Waste Required (tonnes)*			
Week Number:	**Mon**	**Tues**	**Weds**	**Thurs**	**Fri**	**Total**	**Cumulative Total**
1	240	240	240	240	240	1,200	1,200
2	240	240	240	240	240	1,200	2,400
3	240	240	240	240	240	1,200	3,600
4	240	240	240	240	240	1,200	4,800
5	481	481	481	481	481	2,405	7,205
6	481	481	481	481	481	2,405	9,610
7	481	481	481	481	481	2,405	12,015
8	673	673	673	673	673	3,365	15,380
9	673	673	673	673	673	3,365	18,745
10	769	769	769	769	769	3,845	22,590
11	962	962	962	962	962	4,810	27,400
12	962	962	962	962	962	4,810	32,210
13	962	962	962	962	962	4,810	37,020
14	962	962	962	962	962	4,810	41,830
15	962	962	962	962	962	4,810	46,640

				Quantity of Waste Required (tonnes)*			
Week Number:	**Mon**	**Tues**	**Weds**	**Thurs**	**Fri**	**Total**	**Cumulative Total**
16	962	962	962	962	962	4,810	51,450
17	962	962	962	962	962	4,810	56,260
18	962	962	962	962	962	4,810	61,070
19	962	962	962	962	962	4,810	65,880
20	962	962	962	962	962	4,810	70,690
21	962	962	962	962	962	4,810	75,500
22	962	962	962	962	962	4,810	80,310

Commissioning tonnages by Month

9.22 The Contractor discussed the potential for agreeing a minimum tonnage during the commissioning and Acceptance Test stages below the tonnages reported in Figure 41 and is willing to accept a low tonnage due to the flexibility of the storage of wastes in the ITS Facility. Waste can be stored until sufficient is available to complete the commissioning and Acceptance Tests at full flow.

Figure 41 Commissioning and Acceptance Testing Tonnages - By Month

Month	**Tonnes**
October 2014	1,200
November 2014	6,005
December 2014	13,847
January 2015	20,778
February 2015	19,240
March 2015	19,240

Total	80,310

Pre-Commissioning Checks

9.23 Visual inspection electrical and mechanical scope

Scope

9.24 Any installation whether undertaken by in-house resource, supervised external resource or contractors shall be subject to a formal visual inspection. These tests may proceed independently on a sector by sector basis.

Method

9.25 48 hours before commencement of visual inspections, the Contractor shall notify the Councils of the intention to undertake visual inspections. Notification shall include details of the system (or part of) to be inspected.

9.26 Upon substantial completion of the installation works (or part thereof), a visual inspection of the electrical scope shall be undertaken by the Contractor. This inspection is to identify any areas of non-compliance with the Contractor's approved electrical specification, any particular specification identified within the contract, BS7671: 2001, Electricity at Work Regulations 1989 and any other relevant British standards.

9.27 Upon substantial completion of the installation works (or part thereof), a visual inspection of the mechanical scope shall be undertaken by the Contractor. This inspection is to identify any areas of non-compliance with the Contractor's approved mechanical specifications, any particular specification identified within the contract and any other relevant British standards.

9.28 In addition to the Contractor's inspections, the Councils may witness visual inspection, or undertake their own inspections at their discretion.

9.29 The installation will be split into discrete sub-systems or areas to aid the identification of non-compliances. It will also be split the installation into the following construction stages:

- Staged inspections
- Cable support systems

- Cable installation
- Equipment / instrumentation installation
- Glanding and terminating
- Substantial completion.

9.30 The Contractor shall be responsible for determining the staging of inspections. When undertaking a non staged inspection, it may assist if the inspection is undertaken in the order of the staged inspections to ensure no aspects of the installation are missed.

9.31 Any area of non-compliance shall be recorded by the Contractor or the client's verification team, legibly on the non-compliance report form – A12 (for electrical non-compliance) or M1 (for mechanical non-compliance).

9.32 Non-conformance reports raised by the client shall be copied to the installer / supplier or their representative (i.e.: main contractor). Every effort shall be made by the Contractor and client's verification team to identify all non-compliances during a single visual inspection or staged inspection by those teams (excepting latent defects).

9.33 After rectification of non-compliances, a repeat inspection shall take place to confirm remedial action is satisfactory. Non-compliance must be grouped in 3 groups: 1. for immediate rectification (commissioning cannot continue with this non-compliance), 2. for addition to the future snagging list, 3 for non-compliances deemed acceptable without further action classification shall be by the Contractor and agreed by the client's verification team. Any non-compliance deemed satisfactory shall be signed and dated by client's verification team on the original non-compliance report form – A12/M1 (as applicable). Any further non-compliance caused by any remedial actions shall be notified in-accordance with the classification system outlined in this paragraph. On close-out of non-conformance actions the client's verification team countersign non-compliance report forms (A12/M1), that works have been undertaken to the client's satisfaction.

9.34 Class 1 non-conformances shall form a hold-point on commissioning. Further commissioning on the section of works shall not proceed until the client's verification team have countersigned that remedial actions have been completed to their satisfaction.

9.35 When classifying non-conformances, consideration shall be given to accessibility for undertaking remedial actions at a later date, if commissioning is allowed to proceed.

Visual Inspection Records

9.36 The following record sheets will be used to record the results of the visual inspections described in this section.

- A Forms
- A1 Continuity / insulation cable test
- A2 General earth loop impedance test
- A3 Equipotential earth bonding
- A4 Phase rotation
- A5 Instrument calibration
- A6 Configurable instruments parameters
- A7 I/O loop checks
- A8 Interlocks
- A9 Motor Drives
- A10 Motor Starters
- A11 Control Functionality
- A12 Electrical scope non-compliance report
- A13 CRF Index
- Notification of Energisation
- A15 Trip-Amp calibration
- A16 Instrument Switches
- A17 Complex Loops

- A18 Lighting Levels
- M Forms
- M1 Mechanical scope non-compliance report
- M2 Mechanical cold test record sheet

Electrical Integrity Tests and Mechanical Cold Tests

Scope

9.37 With respect to the electrical installation the following series of tests shall be undertaken by the Contractor to determine that the basic cable installation is sound, that power cables / CPC's are of adequate size to meet design disconnection times, connection polarities are correct and that adequate equipotential bonding has taken place.

9.38 For the mechanical side these cold tests and checks shall be undertaken by the Contractor to ensure that the equipment has been erected and finished in accordance with specifications, relevant standards and is basically mechanically functional. It is permitted for contractors to use their own record sheets for the following tests subject to prior approval by the client.

9.39 These tests may proceed independently on a sector by sector basis. However as a rule the completion of the entire sector's visual inspection is a pre-condition to start cold tests.

Notification

9.40 The Contractor shall notify the client forty-eight (48) hours prior to commencing tests of the intention to proceed. Notification shall include details of the sections of work to be tested.

Continuity

9.41 Pre-requisites: Cable is permanently identified, cable need not be glanded. The purpose of this test is to ensure that the cable source/ destination is installed in-accordance with the cable schedule/ cable block diagram.

9.42 The test is to be undertaken with a voltage not exceeding 24Vdc. Multicore cables require only a single core to be tested. Result of test to be recorded on electrical integrity record sheet - A1.

Insulation Resistance

9.43 Pre-requisites: Cable has passed continuity test and is glanded, all cores of cable under test are to be disconnected. The purpose of this test is to ensure all LV cables with a working voltage of 110Vac and above have adequate insulation around conductors.

9.44 The test voltage is to be twice the working voltage. The test is to be undertaken in-accordance with A.P.12 with the results recorded on electrical integrity record sheet - A1.

Equipotential Bonding Tests

9.45 Pre-requisites: Installation substantially complete, equipotential bonding applied as initially considered necessary.

9.46 The purpose of this test is to ensure that all extraneous metalwork is at or about the same potential with respect to a reference earth point.

9.47 A low ohmmeter is to be used to compare the resistance of the extraneous metalwork under test with that of a reference point (the reference point to be a direct connection back to the earth of the source of supply for the area).

9.48 A series of points are selected that will demonstrate the effective bonding of extraneous metalwork back to the area supply earth. Each point is tested in-accordance with A.P.13 with the results recorded on electrical integrity record sheet – A3.

Earth Loop Impedance Testing

9.49 Pre-requisites: Insulation resistance test is completed, equipotential bonding tests are satisfactorily completed for an area of two (2) metres around equipment under test, and power terminations are complete.

9.50 The purpose of this test is to confirm that the earth fault loop impedance is sufficiently low to enable operation of the protective device within the desired trip time.

9.51 A loop impedance tester is to be used in-accordance with A.P.14. Note: this test may involve exposed live conductors, where procedure A.P.14 can not be safely applied. In this case further clarification shall be sought from the client

9.52 Results from the test shall be recorded and evaluated on pre-commissioning record sheet – A9 for motor drives or electrical integrity record sheet – A2 for all other circuits.

Residual Current Operated Device Tests

9.53 Pre-requisites: A satisfactory earth loop impedance test shall have been completed as described in section 2.6.

9.54 The purpose of this test is to ensure that a residual current operated device ("**RCD**") effectively operates at the intended trip current and within the intended trip time.

9.55 A RCD tester is to be used that is capable of supplying the full range of test current to an accuracy of ten per cent (10%) including the effects of voltage variations around the nominal voltage of the tester.

9.56 The effectiveness of the test button shall be checked both before and after the test sequence.

9.57 The RCD tester is to be connected to the load side of the RCD with the load completely disconnected.

9.58 The RCD tester is to be used in-accordance with A.P.16. Note: this test may involve exposed live conductors, where procedure A.P.16 can not be safely applied. In this case further guidance shall be sought from the client.

9.59 Results from the test shall be recorded and evaluated on electrical integrity record sheet – A2.

Phase Rotation of Motor Control Centres, Switchboards and Distribution Boards

9.60 Pre-requisites: All outgoing circuits are isolated, earth loop impedance test completed on power supply cable. The purpose of this test is to ensure that the phase rotation at all points of distribution match the colour and rotation to that of the site incoming supply.

9.61 A phase rotation indicator is to be used in-accordance with A.P.15. Note: this test may involve exposed live conductors, where procedure A.P.15 can not be safely applied. In this case further advice shall be sought from the client

9.62 Results from the test shall be recorded on electrical integrity record sheet – A4.

Phase Polarity on Small Power Outlet Sockets

9.63 Pre-requisites: Earth loop impedance test completed on supply cable and installation is complete with no exposed conductors. The purpose of this test is to ensure that the phase polarity of all small power 240Vac sockets are correct.

9.64 A polarity indicator with the appropriate test plug (BS1363 or BS4343) shall be used. No conductors are to be exposed using this test.

9.65 With the circuit energised, the indicator is plugged into each outlet on the circuit in turn noting that polarity is correct in each case. Any failure of correct polarity fails the whole circuit necessitating a complete re-test following remedial action. The results of the test shall be recorded on electrical integrity record sheet – A4.

Mechanical Cold Tests

9.66 Pre-requisites: Installation mechanically and electrically substantially complete.

9.67 Each element of delivery is checked to ensure that it is in accordance with the specifications and drawings (including the piping & instrumentation diagrams), and has been labelled correctly.

9.68 Pressure test on piping is done and the quality assurance ("**QA**") documentation filed in the commissioning folder, transport helps and breathers have been removed. Further checks concern alignment, cleanliness (all tanks, vessels, pipes, etc must be inspected and cleaned), first lubrication, stuffing and packing/mechanical seals, guards and couplings, and a formal confirmation from the erection manager, that the relevant equipment is mechanically complete. The results of these tests/checks are recorded in mechanical cold tests record sheet M2.

9.69 Non-compliances are recorded in M2 as well and critical non-compliances ((Group 1) need to be corrected immediately; Group 2 (Snagging List) and 3 (no action) non-compliances go on snagging list as required.

Hardware Functionality Tests

Scope

9.70 This series of tests is to determine the functionality of installed hardware. The tests are not generally designed to check performance of the hardware but simply the operation. These tests may proceed independently on a sector by sector basis if the process allows this. However as a rule the completion of the entire sector's cold test is a pre-condition to start pre-commissioning tests.

Notification

9.71 The Contractor shall notify the client 48 hours prior to commencing tests of the intention to proceed. Notification shall include details of the sections of work to be tested.

Data Highways

9.72 Data highways can use a variety of transmission mediums, physical standards, and data protocols. Whatever form of data highway is used, the functional testing remains similar. All settings and results from these tests shall be recorded on the pre-commissioning record sheet – A6 (using custom attachment sheets if deemed necessary).

9.73 Ensure if relevant, all devices on the highway are configured to the desired baud rate, start/stop bits, parity, and ID address (for multidrop systems). These settings can be made either by the use of dipswitches or soft configured from a terminal. Ensure that the data highway is correctly terminated. Identify handshaking requirements (hard or soft).

9.74 Establish communications between each device on the highway (use online diagnostics if available). Check for transmission from all talkers by modifying signals or generating instructions and ensure that these are 'seen' by all listeners. Do not limit these test to one form of signal, e.g. check for a limited number of each type of signal / instruction.

Instrument Calibration

9.75 All instruments are to have a traceable calibration / test certificate valid at the time of the commencement of the commissioning tests. Manufacturer certificates are valid but

shall be attached to a duly completed Contractor calibration record sheet (excepting the calibration results section). Note: manufacturers' certificates of conformity or type test calibration certificates are not valid as a calibration record sheet.

9.76 Any instrument indicating a value or transmitting an analogue signal from a process variable shall be check calibrated to the desired accuracy (determined by the process operating requirements that may be less onerous than the manufacturers claim). Results shall be recorded on pre- commissioning record sheet – A5.

9.77 Any instrument that has configurable parameters shall in addition to any other record sheet have a pre-commissioning record sheet – A6 completed. This is for any parameter altered from the manufacturers default.

9.78 All trip-amps (a device operating a discrete switch contact(s) from an analogue signal) or equivalent shall be calibrated at the desired trip point. Results shall be recorded on pre-commissioning record sheet – A15.

9.79 Instruments that indicate or signal (discrete) the state of a process condition e.g. a low level float switch shall be functionally tested with the point(s) of operation recorded on pre-commissioning record sheet – A16.

Loop Checks

9.80 A loop is considered to be made up of one transmitting / signalling device and one or more indicating / measuring / repeat transmitting devices. Each device in the loop shall have been calibrated (where applicable) in accordance with section 3.4.

9.81 Where the loop contains a single transmitting / signalling device and the only other device in the loop is a programmable controller (PLC, DCS multiplexer etc.), pre-commissioning record sheet – A7 shall be used. This sheet permits the loop checking to be undertaken in two stages – field to I/O card (to prove field cabling) and I/O card to indicating medium (to prove panel wiring, controller addressing) / configuration) in any order.

9.82 Where the loop is more complex than that described in 3.5.2, functionality shall be checked for all devices in the loop with the results recorded on pre-commissioning record sheet – A17 as well as A7 if applicable.

Mechanical Checks

9.83 Prior to energising any electrically actuated / driven mechanical equipment, permission must be sought from the person responsible for ensuring that the mechanical equipment is available for operation and any constraints imposed on this operation. Areas to confirm are fixing, lubrication, alignment, packing/glands or mechanical seal, mechanical rotation test (no touching of rotors, etc.), line flushing ready for medium, guarding, and priming. If possible, any coupling between the electric motor and the mechanical equipment should be temporarily removed. If incorrect direction of rotation could result in damage to the mechanical equipment, the motor shall be mechanically isolated from the mechanical equipment. The results of these checks/tests are recorded in mechanical pre-commissioning record sheet M3. Only when this is signed off up to position 6 (Clear for 1st Rotation) on the record sheet by the person responsible can commissioning proceed energising for first rotation. At this moment an equilocking padlock is placed on the local maintenance switch by the responsible person. This commissioning safety lock is only removed permanently after pre-commissioning (receipt of CoMC).

Motor Starter Functionality

9.84 Each motor starter shall be fully functionally tested and correctly set up for safe operation. Pre-commissioning record sheets – A9 & A10 shall be used to record all test results and settings.

9.85 Before proceeding with energisation of the motor, the electrical load impedance test shall have been satisfactorily completed (see section 2.6). Note: Clamp test for maximum duty running current can be undertaken during the commissioning tests or as soon as maximum duty can be simulated.

9.86 Check starter operation in test mode (or if not available with the motor disconnected in the starter) as detailed in pre-commissioning record sheet – A10. The requirement for process interlock can be undertaken using simulated conditions (note that verified functionality of this test shall be performed in section 3.8). Any additional tests not covered in sheet A10 shall be recorded in the comments section.

Hardwired Interlocks

9.87 Any signal that is hardwired direct to a motor starter (or similar) or via a safety circuit shall be fully tested for satisfactory operation. Pre-commissioning record sheet – A8 shall be completed with the test results.

Motor Rotation Tests

9.88 After satisfactory completion of pre-commissioning record sheet – A10, re-connect the motor if applicable, ensure section 3.6 has been undertaken, and complete the direction of rotation test. The use of local controls where available is recommended, alternatively remote operation by an assistant with the use of walkie-talkies.

Notification of Energisation

9.89 After satisfactory completion of all tests required on an item of electrical apparatus and its availability for use in hand or commissioning in auto (if applicable) shall be notified to interested parties using the "Notification of energisation form – A14".

Demonstration of Readiness to Accept Waste

Readiness Tests

9.90 Prior to commissioning with waste the Contractor will demonstrate to the Councils and the Independent Certifier that the ITS Facility is ready to accept waste. Once the ITS Facility has been proven ready to receive waste in accordance with the Readiness Test Schedule 9 (Acceptance Tests) of the Contract.

Dry Commissioning Tests

Introduction

9.91 The Contractor shall notify the client forty-eight (48) hours prior to commencing tests of the intention to proceed. Notification shall include details of the sections of work to be tested.

9.92 This series of tests is to determine the functionality of installed logic but without MSW. The tests are not designed to check performance of the hardware but its point of operation under defined conditions / actions. These tests may proceed on a sector by sector basis provided the interface functionality is given. However it is only

permissible to go to wet commissioning if all sectors have worked simultaneously and interfaces have been fully 'dry tested'.

9.93 A series of tests shall be defined uniquely for the project that demonstrates the functionality / feature of every element of the controlling logic. The series of tests can be based upon the user requirement specification, the functional design specification ("**FDS**") or the factory acceptance test plan as deemed most appropriate. It is likely that operational knowledge may be required in determining the desired functionality of the logic. Consideration shall also been given to including a series of tests that are designed to ascertain the consequences of abnormal conditions. In principle, every control logic and every hardwired interlock must be tested as well as foreseeable abnormal conditions and equipment or operator error. During the dry commissioning phase the drives, etc. are locked at the end of each working shift.

9.94 Each defined test shall be undertaken using where practicable real plant conditions and recorded using control functionality table A11. As a rule the single drive logics are tested before the overarching, complex control logics. The use of simulation shall be avoided, as shall the use of forcing signals within control logic unless it is unreasonable in all other circumstances to do so.

Lighting Levels

9.95 For each area requiring artificial lighting, its purpose of use shall be defined and a minimum lighting level intensity determined based on the CIBSE recommended lighting levels.

9.96 A survey shall be carried out with an approved lux meter to determine the actual lighting levels during periods of darkness (or where no natural lighting exists). Commissioning record sheet – A18 shall be completed with the test results.

ITS Facility Dry Commissioning Tests

9.97 The dry commissioning tests as outlined in Figure 42 will be undertaken for the ITS Facility prior to moving to the wet commissioning phase.

Reactors Structure	**Commissioning Checks**	**Test**
Structures (general)	The biodrying reactors are inspected and checked for conformity with the construction	Inspection test

	issue drawings. The full QA documentation is reviewed prior to commencement of commissioning.	
Leachate System	**Commissioning Checks**	**Test**
Sub-floor leachate pipework integrity (construction)	During construction, all runs of leachate system will be tested in sections to ensure water tightness prior to enclosure.	Demonstration test
Leachate drains	Each drain will be checked for integrity and fit.	Inspection test
Leachate lift pumps	The leachate lift pumps will be checked for integrity and installation against the facilityP&ID.	Inspection test
Leachate tanks	The leachate tanks will be filled with water and subjected to a falling head test to demonstrate water tightness.	Demonstration test
System functionality	When the leachate tank is filled, the water can be pumped out.	Demonstration test
Drain channels	Drain channels will be checked for obstruction and will be flushed if necessary.	Inspection test.
Waste Handling System	**Commissioning Checks**	**Test**

Waste Reception Grab	Both waste reception grabs will be checked for full range of movement and speed of movement against spec.	Demonstration test
Waste Reception Shredders	Shredders will be checked for correct shaft rotation and wiring, isolators.	Demonstration test
Bio-Reactor Section Grab	All bio reactor grab cranes will be checked for full range of movement and speed of movement against spec	Demonstration test
Air Flow	**Commissioning Checks**	**Test**
Air Circulation blowers	Air circulation blowers will be checked for correct rotation and air flow output.	Demonstration test
Temperature probes	Temperature demonstrated to be within calibration range.	Demonstration test
Manifold pipe work	All welding certificates will be reviewed and signed off.	Inspection test
Manifold pipe work	Stainless steel pipe work will be checked for integrity and fit.	Inspection test
Manifold pipe work	Pressure tests will be undertaken in sections.	Demonstration test

MBT Process Control	Commissioning Checks	Test
PLC system	All wiring, labelling and cabling will be inspected for conformity with the P&ID.	Inspection Test
Variable speed drives	All wiring, response and labelling will be inspected.	Inspection test
Personal computer with printer, UPS and modem	PC will be inspected to ensure installation is complete and working as expected.	Inspection test
Windows operating system software	Inpected to ensure installation is complete and working as expected.	Inspection test
ECODECO process control software	This will be inspected to ensure installation is completed and working as per specification and P&ID.	Inspection test
Communications	All sensors, valves, pumps, and blowers will be tested for communication, response, and control.	Demonstration test
Alarm systems	All alarm and safety shut down scenarios are simulate and tested for responsiveness.	Demonstration test
Pile logistics software	Pile logistic software will be inspected to ensure	Inspection test

	installation is complete and working as expected.	
Material Refinement System	**Commissioning Checks**	**Test**
Conveyor and screen support structure	Check structural supports are in place as per layout drawing, and secured appropriately.	Inspection test
Conveyor and screen installation	Check all conveyors and screens have been properly installed as per the layout drawings, and are clean and free of debris.	Inspection test
Conveyor and screen operation	Ensure all conveyors and screens function correctly, are wired up correctly, and drive motors and shafts are turning with the correct rotation.	Inspection test
Test Emergency Stops and Isolators	Ensure all emergency stops are accessible, appropriate for their location, operational and stop the correct sections of the plant. Check isolators are accessible and operational.	Demonstration test
Test plant start up and shut down sequencing	Ensure that the conveyors and screens start and stop in such a way that the electrical	Demonstration test

	demand is spread, and waste material is completely emptied from the system upon shutdown.	

Figure 42 ITS Facility Dry Commissioning Tests

AD Facility: Dry Commissioning Tests

9.98 The dry commissioning tests as outlined in Figure 43 will be undertaken for the AD Facility prior to moving to the wet commissioning phase for the AD Facility.

Fermenter Structures	Commissioning Checks	Test
Structures (general)	The fermenter structures are inspected and checked for conformity with the construction issue drawings. The full QA documentation is reviewed prior to commencement of commissioning	Inspection test
Through wall fittings	All through wall and roof fittings will be checked for integrity and fit to ensure that there are no leaks or gaps prior to initiation of pressure tests on each fermenter.	Inspection test
Fermenter Doors	Each door will be checked for defects and seal integrity. All manual locking clamps will be checked for correct alignment and functionality.	Inspection test
Concrete structure	Each sealed fermenter will be subject to a pressure test to ensure gas tightness of all components.	Demonstration test

CHP and Heating System	Commissioning Checks	Test
CHP installation	The CHP installation will be checked for conformity with the specification and configuration.	Inspection test
CHP Operation	The CHP will be initially started up on an external fuel source (propane) to check functionality. The cooling and lubrication system will be checked for normal performance.	Demonstration test
Flare	The flare will be inspected with installation conformity. Biogas release will be simulated and the ignition and burn system will be checked for conformity.	Demonstration test
Heat exchanger	The efficiency of heat transfer through the heat exchanger will be measured compared with the specification.	Demonstration test
Hot water circuit	The control of hot water flow to each fermenter will be checked and each valve will be checked for rotation and functionality.	Demonstration test

Heating of fermenters	The temperature development within the floor will be checked with an infra-red scanner to demonstrate even heating to the target temperature.	Demonstration test
Heating of percolate tank	The heating of the percolate tank floor will be inspected using an infra-red scanner to demonstrate even heating to the target temperature.	Demonstration test
Percolate System	**Commissioning Checks**	**Test**
Sub-floor percolate pipe work integrity (construction)	During construction, all runs of HDPE percolate system will be pressure tested in sections to ensure gas tightness prior to enclosure.	Demonstration test
Sub-floor percolate pipe work integrity (dry commissioning)	The sub-floor percolate pipe work will be subjected to a falling head test to ensure that system integrity is retained.	Demonstration test
Above grade percolate pipe work	All above grade pipe work will be pressure tested in sections prior to ITS Facility start-up.	Demonstration test
Percolate drains	Each drain will be checked for integrity and	Inspection test

	fit.	
Percolate lift pumps	The percolate lift pumps will be checked for integrity and installation against the facility P&ID.	Inspection test
Percolate tank	The percolate tank will be filled with water and subjected to a falling head test to demonstrate water tightness. The tank will be then sealed and pressure tested to ensure gas tightness.	Demonstration test
Pneumatic percolate valves	Each valve will be checked for integrity and functionality utilising the ITS Facility pneumatic system	Demonstration test
System functionality	When the percolate tank is filled, the water is pumped through the circuit. The efficiency of the percolate spray nozzles will be visually inspected to ensure even spraying of percolate within each fermenter in turn.	Demonstration test
Tunnel drain channels	Tunnel drain channels will be checked for obstruction and will be flushed if necessary.	Inspection test.

Gas System	Commissioning Checks	Test
Gas system (general)	The complete installed system will be checked for conformity with the construction issue P&IDs for the ITS Facility.	Inspection test
Motors	Motors will be checked for correct rotation and wiring, isolators	Demonstration test
Motor housing	Motor housing will be inspected for conformity with specification	Inspection test
Biogas input blowers	Biogas input blowers will be checked for correct rotation and air flow output.	Demonstration test
Biogas CHP blowers	Biogas CHP blowers will be checked for correct rotation and air flow output.	Demonstration test.
Gas bag tank	The gas bag will be filled with air and subjected to a pressure test to ensure foil integrity in accordance with specification.	Demonstration test
Temperature probes	Temperature demonstrated to be within calibration range.	Demonstration test
Pressure sensor	Reading and response will be checked for all	Demonstration test

	pressure sensors.	
Gas sensor	Fermenter sensors (O_2 and CH_4 calibrated and checked for range response).	Demonstration test
Gas analyser	The inline gas analyser is checked for functionality and calibrated for H_2S, CH_4, O_2 and CO_2.	Demonstration test
Pressure release system	The pressure release system for each fermenter will be tested to ensure release at the specified over-pressure setting.	Demonstration test
Pneumatic gas valves	Each valve will be checked for rotation and pneumatic functionality.	Demonstration test
Manifold pipe work	All welding certificates will be reviewed and signed off,	Inspection test
Manifold pipe work	Stainless steel pipe work will be checked for integrity and fit.	Inspection test
Manifold pipe work	Pressure tests will be undertaken in sections.	Demonstration test
Biogas Process Control	**Commissioning Checks**	**Test**
PLC system	All wiring, labelling and cabling will be inspected for conformity with the	Inspection Test

	P&ID.	
Variable speed drives	All wiring, response and labelling will be inspected	Inspection test
Personal computer with printer, UPS and modem	PCs will be inspected to ensure installation is complete and working as expected	Inspection test
Windows operating system software	Inspected to ensure installation is complete and working as expected.	Inspection test
BIOFERM process control software	This will be inspected to ensure installation is completed and working as per specification and P&ID	Inspection test
Communications	All sensors, valves, pumps, and blowers will be tested for communication, response, and control.	Demonstration test
Alarm systems	All alarm and safety shut down scenarios are simulate and tested for responsiveness.	Demonstration test
Pile logistics software	Pile logistic software will be inspected to ensure installation is complete and working as expected.	Inspection test
Fermenter Ventilation System	**Commissioning Checks**	**Test**

Ventilation blower	Installation will be checked against P&ID, anti-vibration and motor rotation will be checked.	Inspection test
Ventilation butterfly valves	Motor operation and conveyer operation demonstrated	Demonstration test
Ventilation pipe work	Integrity and installation in accordance with P&ID will be checked.	Inspection test
Control Protocol	The fermenter emptying cycle will be simulated and the functionality of the valve opening and shutting sequence will be checked. The actual air flow velocity is measured to ensure that design velocity and air exchange rates is achieved.	Demonstration test

Figure 43 AD Facility Dry Commissioning Tests

Wet Commissioning Tests

ITS Facility Wet Commissioning Tests

9.99 The following wet commissioning tests will be undertaken for the ITS Facility:

- process waste is less than process guaranteed figures
- noise level tests – to ensure that noise levels in all areas allow operations, cleaning and general maintenance operations to proceed without the need for personal protective equipment ("**PPE**")
- reliability tests – to ensure that all plant has been robustly commissioned and can run without service interruption

- throughput tests – to ensure that the ITS Facility can run for a prolonged period at operating capacity
- over-capacity tests – to ensure that the ITS Facility can for continuous period, operate at the maximum design capacity
- bio-drying performance tests – to ensure that the bio-drying process is working in line with performance guarantees
- output recovery performance – to ensure that the mechanical refinement is working in line with performance guarantees
- fuel quality tests – to ensure that the SRF is being manufactured in line with the minimum specification requirements

AD Facility Wet Commissioning Tests

9.100 The following wet commissioning tests will be undertaken for the AD Facility (Figure 44).

Fermenter Start-up	**Commissioning checks**	**Test**
Initial fermenter start-up	Each fermenter is filled with biomass mixed with an anaerobic sludge or manure inoculums. The hydraulic performance of each vessel is assessed in turn to ensure against seepage, leakage and the initial percolate flow.	Inspection test
Fermentation star-up	The percolation cycle is initiated and the fermenter atmosphere is monitored for the CO_2, CH_4 and O_2 ratio in the period immediately following percolation	Demonstration test

	initiation. The SCADA controlled pressure controls on biogas draw off is monitored and the biogas blowers are checked for automatic functionality.	
Percolate quality	As the initial fermenter loads are processed the strength of the percolate within the percolate reservoir/tank reaches full operational concentration. This is monitored based on physio/chemical testing of the percolate liquid and observing and recording the development of the atmosphere above the percolate within the tank.	Inspection test
Process functionality	All dry commissioning tests are repeated under loaded conditions to ensure full functionality of gas, percolate, ventilation and containment and control systems.	Demonstration test
Biogas production	Once all fermenters have been filled and passed through an initial fermentation cycle, the	Demonstration test

	plant is set up for full biogas production trials. During a designated thirty (30) Day period, the total biogas production from the fermenters is logged and stored on the computer. The tonnage, volume, and quality of the bio waste entering the fermenters are logged. Once a steady state biogas production is achieved for thirty (30) consecutive Days as per warrantee, the plant will be deemed commissioned from a biogas perspective. When gas is produced the results will be issued to the Councils.	
Temperature testing	The required temperature for ABPR of 70^{o}C for 1 hour will be demonstrated for each pasteurisation tunnel.	Demonstration test
Biocompost quality	The biocompost output will be demonstrated to be in conformance with the iocompost specification.	Demonstration test
Training	During the initial fermenter start-up period,	Demonstration test

	the operators will be trained in the operation, management, and optimisation of the biogas process. Full health and safety training will be provided.	
documentation	All Operating Manual, drawings, method statements, test certificates, and standard operating procedures will be presented to final sign off of fermentation plan as per specification.	Completion test

Figure 44 Wet Commissioning Tests

Operational Handover

Introduction

9.101 This section describes what is required to be in place to enable handover of the electrical and mechanical, instrumentation and controls element of a project.

Training

9.102 Training shall be provided sufficient to ensure that key personnel are familiarised with the operation and maintenance of the relevant elements of the Project.

9.103 Training can take the form of classroom and or 'hands on' training. Every effort shall be made to ensure that all relevant personnel are trained. This may require repeat training sessions to cover shift-working patterns.

Documentation

9.104 The level of documentation to be in place to enable operational handover shall be:

- a completed commissioning file ("**CF**"), marked up 'as build' record drawings, relevant manufacturers manuals;

- completed Operating Manuals and Health and Safety Files shall be made available on completion of commissioning.

Acceptance

9.105 Acceptance shall be sought from the project manager that the electrical and mechanical, instrumentation and controls has been commissioned to their satisfaction. A record of this shall be made in the CF.

Measures for odour control;

9.106 The entire ITS process is housed within a purpose designed building that operates under a slightly negative air pressure.

9.107 This provides a high degree of environmental control within the building, thus minimising potential escape of dust, odours, and flies. All air extracted from within the waste reception areas and bio-drying halls passes through bio-filters for treatment before being released to atmosphere.

9.108 Bio-filtration, that relies on microbial populations present in organic material, is a widely accepted form of emission control at waste management facilities in addition to other established applications.

9.109 Emissions released from the bio-filters will be monitored in accordance with best practice to include, but not limited to NH4 and odours against Environmental Permit emissions limits.

9.110 Samples of air released from the bio-filter will be collected from the surface of the bio-filters at pre-determined locations and intervals as defined by the ITS Facility Environmental Permit.

9.111 The AD Facility will also be equipped with an acid gas scrubber. This scrubber, located to the south of the AD Facility, will process air recovered from the aerobic IVC stabilisation, fermenter purge and pasteurisation system, prior to release to atmosphere via a stack.

Fire Strategy

9.112 The potential for fire at the ITSAD Facility will be minimised through the use of comprehensive fire abatement equipment, coupled with good design and effective health & safety management systems. Activities such as shredding and mechanical

refinement will also only be carried out during the day in order to reduce the risk of fire at night when safety and security staff presence will be maintained.

9.113 The fire alarms and fire-fighting systems will be as developed for similar existing facilities and offer a high level of fire protection. Experience from current operational plants has shown that the systems can identify the earliest signs of combustion allowing appropriate actions to extinguish the source prior to fire taking hold. This enables in-house trained staff to manage and control incidents in a timely and safe manner.

9.114 The system will comprise of:

- Carbon monoxide ("**CO**") monitoring of mixed exhaust air prior to discharge to the bio-filters. This system is capable of detecting the earliest indication of combustion within the waste. CO monitoring will be linked to the alarm and foam suppression system to enable automatic fire suppression. This system will also be coupled with other fire detection systems, including heat sensors and smoke detectors located at appropriate points and on appropriate process equipment such as shredders.

- Foam suppression blanket. This blanket can be automatically or manually operated and provides fire and smoke suppression. The foam system will be capable of covering the bio-drying hall and pit area with a 2m deep foam blanket in approximately five (5) minutes.

- Fire cannons located along external gantries. These cannons facilitate the accurate and localised dowsing of waste material stored within the building. The cannons can be used in conjunction with the manual operation of the crane to expose and extinguish any fire within the body of the waste.

9.115 The primary shredder will be protected with use of a deluge system.

9.116 Process equipment within the refinement section will be protected with use of a further deluge system.

9.117 Fire hydrants and fire hoses will be provided around the Site (Bolton Road). Fire hoses water will be supplied from the fire tank. The fire hydrants will be supplied by a dedicated ring main. The pump sets will be located in a separate pump house isolated from the ITS. Additional fire water can also be drawn from the surface water attenuation lagoon by the emergency services as required.

9.118 The fines processing system will be equipped with fire hydrants, heat, and smoke detectors. The CHP engine will be located in a dedicated container away from the main building.

Measures for control of leachate (if appropriate);

9.119 This is covered in Section 3.10 (Design).

Material handling proposals

9.120 Wastes will be tipped directly from the delivering vehicles into the reception pit in the ITS Facility. Waste spilled in the tipping shed or stockpiled in the tipping shed will be managed using a wheeled loading shovel as and when necessary.

9.121 Once waste is in the reception pit it will be handled by one of three overhead cranes which will feed the waste into the shredders. Shredded waste will be discharged into a shredded waste pit where it can either be stored or transferred into the bio-drying area via one of the overhead cranes.

9.122 Once the bio-drying process is complete the over head cranes will move the waste into the refinement section where a series of conveyors and sorting processes will separate the wastes into a number of fractions. Recovered materials will be dropped into roll on roll off containers and SRF will be compacted into articulated trailers for removal from the Site (Bolton Road).

9.123 Fines from the refinement section will be transferred to the AD Facility by slave vehicle and 40yd open topped containers. A wheeled loading shovel will be used to move the fines during the fines processing process and to load vehicles collecting the composted product.

Measures to maintain the integrity of the quality of processed waste material whilst in storage until time of application;

9.124 Wastes will be stored on site for no longer than is needed to complete the treatment processes. Wastes received in the reception pit will be shredded and placed in the bio-drying area as soon as practicably possible following receipt.

9.125 The wastes will be stored for up to two weeks in the bio-drying area to ensure that the drying process is complete. Once removed from the bio-drying area, transit through the refinement section is rapid and sorted products will be removed from the site as soon as

a full load is created. Loads of SRF will be loaded into articulated trailers from the SRF compactors as soon as the compactors are full and will be stored on site until removed to the Ferrybridge Facility.

9.126 The fines from the refinement section will be transported into the AD Facility by slave vehicle and 40yd open topped containers where they will be processed for six (6) weeks. Wastes will be visually inspected during the course of a normal working day.

9.127 Visual inspections (either by CCTV camera or in person) will be supplemented by a range of monitoring carried out automatically by computer software managing the various control systems on the process.

Commissioning Phase Reporting

9.128 The Contractor shall submit to the Councils within five (5) Business Days following the end of each Contract Month during which Acceptance Tests have been carried out, a draft Commissioning Report which shall include as a minimum a description of the following:

- assessment of actual progress by comparison to the submitted Acceptance Testing Plan;
- summary of the Acceptance Tests undertaken in the following monthly period; and
- a summary identifying any aspect of the Acceptance Tests that may result in a delay to the delivery of Facilities and the Contractor's proposal for minimising the impact of such delays.

9.129 The Councils will review the draft report and submit any queries or comments within five (5) Business Days of receiving the draft. The Contractor shall then submit a final Commissioning Report within five (5) Business Days of receiving the Councils' comments. Where no queries or comments are submitted by the Councils the report is deemed to be complete and accurate.

Appendix 1- Traffic Flows Information

The table below shows the deliveries made by Authorised Vehicles on a typical Day.

Number of Vehicles Delivering

Time of day	Quarter of hour	Barnsley	Doncaster	Rotherham		**Total**
06:00-07:00	**:00-**:15				06:00-07:00	**0**
	:15-30					
	:30-:45					
	45-:00					
07:00-08:00	**:00-**:15				07:00-08:00	**0**
	:15-30					
	:30-:45					
	45-:00					
08:00-09:00	**:00-**:15	1			08:00-09:00	**5**
	:15-30	2				
	:30-:45		1			
	45-:00		1			
09:00-10:00	**:00-**:15			1	09:00-10:00	**7**
	:15-30		1			
	:30-:45		2	1		
	45-:00		2			
10:00-11:00	**:00-**:15		2	1	10:00-11:00	**14**
	:15-30		3	1		
	:30-:45		4	2		
	45-:00			1		
11:00-	**:00-**:15	1	3	3	11:00-12:00	**10**

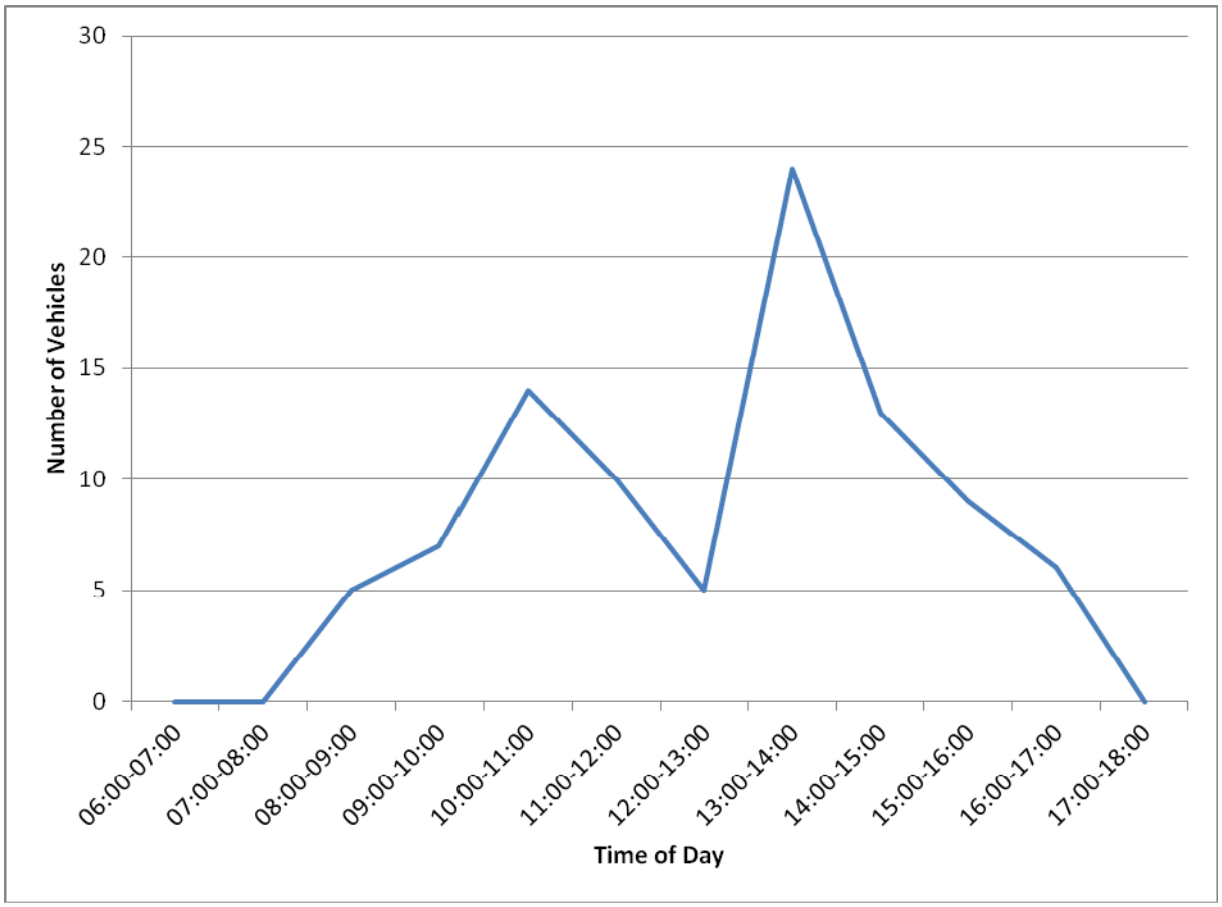
Number of Vehicles Delivering

Time of day	Quarter of hour	Barnsley	Doncaster	Rotherham		**Total**
12:00	**:15-**30	2				
	:30-:45		1			
	45-:00					
12:00-13:00	**:00-**:15				12:00-13:00	**5**
	:15-30	1				
	:30-:45	2		1		
	45-:00		1			
13:00-14:00	**:00-**:15		3	3	13:00-14:00	**24**
	:15-30		2	3		
	:30-:45	1	2	4		
	45-:00	2		4		
14:00-15:00	**:00-**:15		2		14:00-15:00	**13**
	:15-30			6		
	:30-:45			3		
	45-:00		2			
15:00-16:00	**:00-**:15			1	15:00-16:00	**9**
	:15-30		2	1		
	:30-:45		2			
	45-:00		3			
16:00-17:00	**:00-**:15		4		16:00-17:00	**6**
	:15-30		2			
	:30-:45					
	45-:00					
17:00-	**:00-**:15				17:00-18:00	**0**

Number of Vehicles Delivering

Time of day	Quarter of hour	Barnsley	Doncaster	Rotherham		**Total**
18:00	**:15-**30					
	:30-:45					
	45-:00					

The graph below summarises the above information to indicate the time of peak vehicle movements.

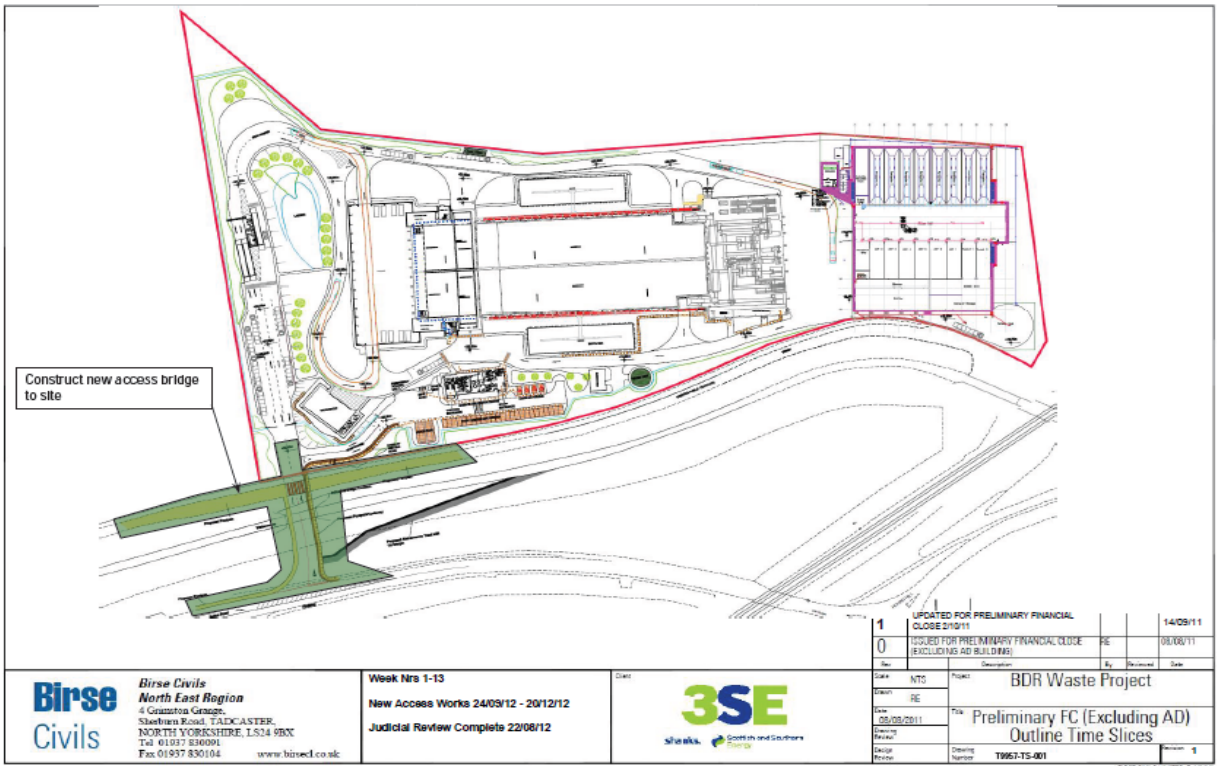


Appendix 2 – [REDACTED]

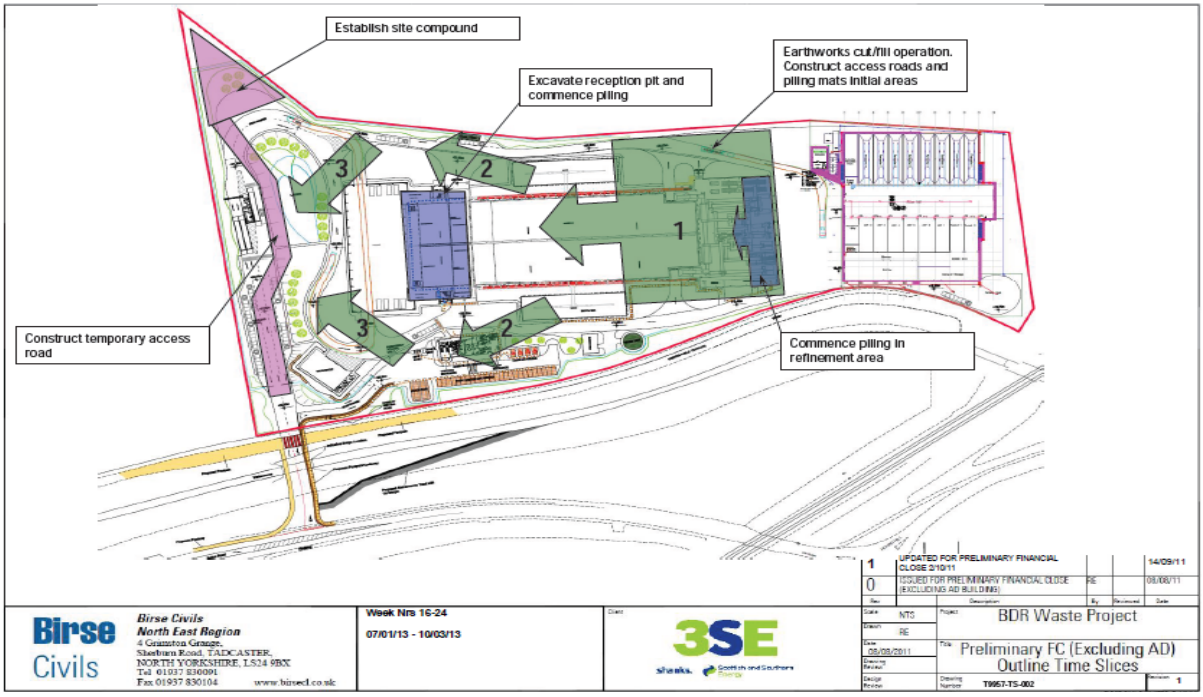
[REDACTED]

[REDACTED]

Appendix 3 – Timeslices for Construction



Week Numbers 1 – 13



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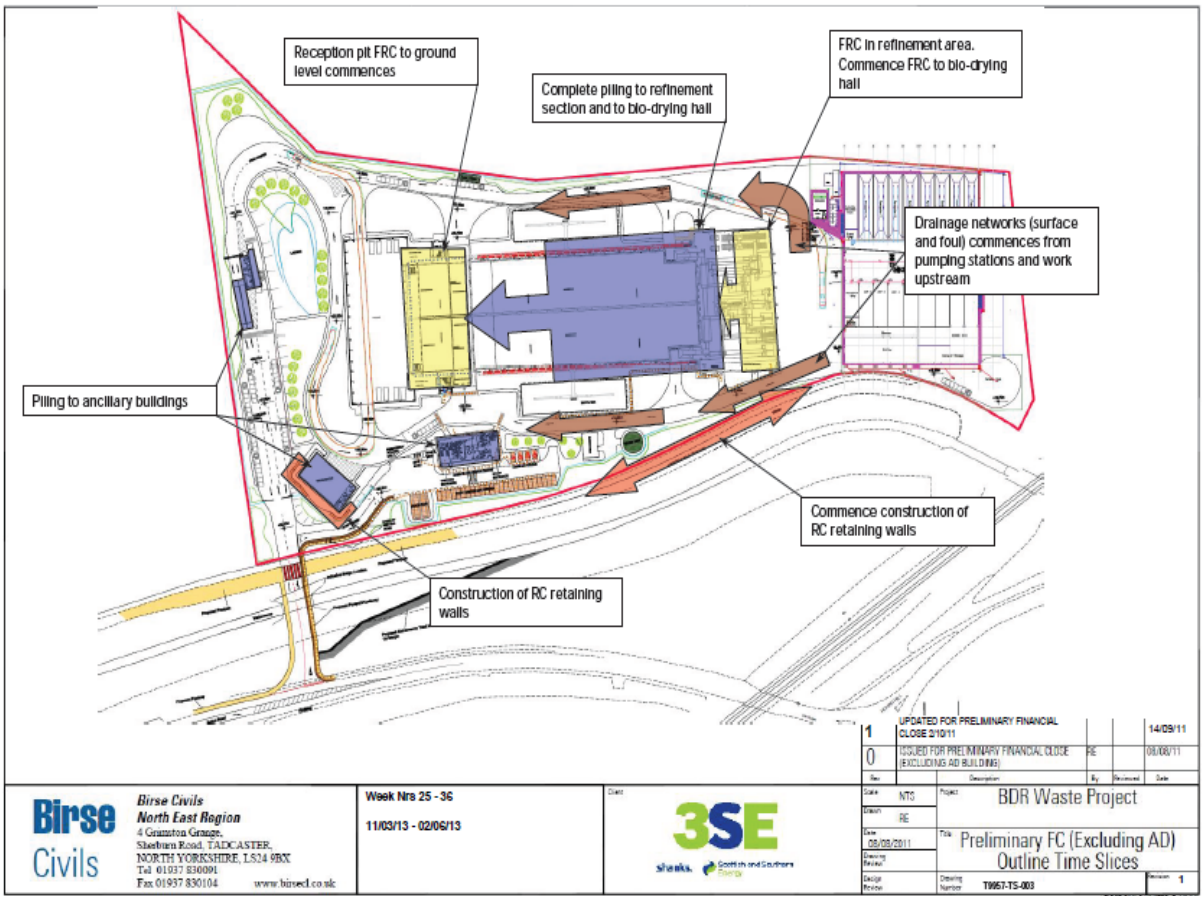

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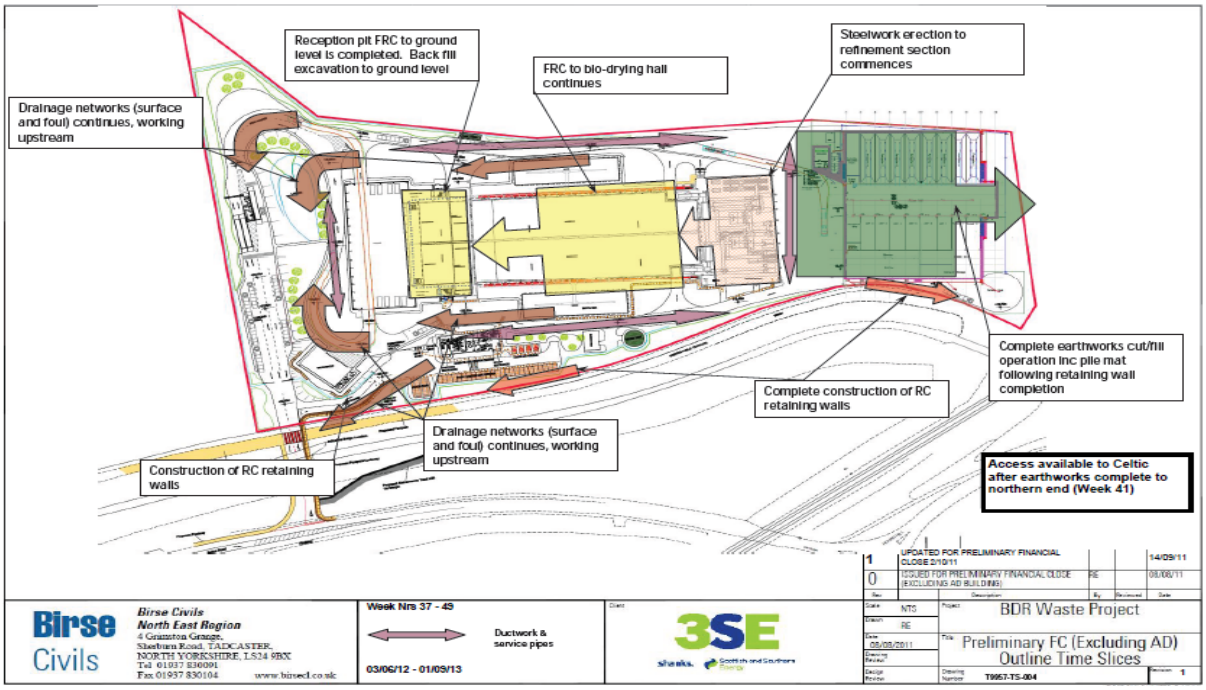

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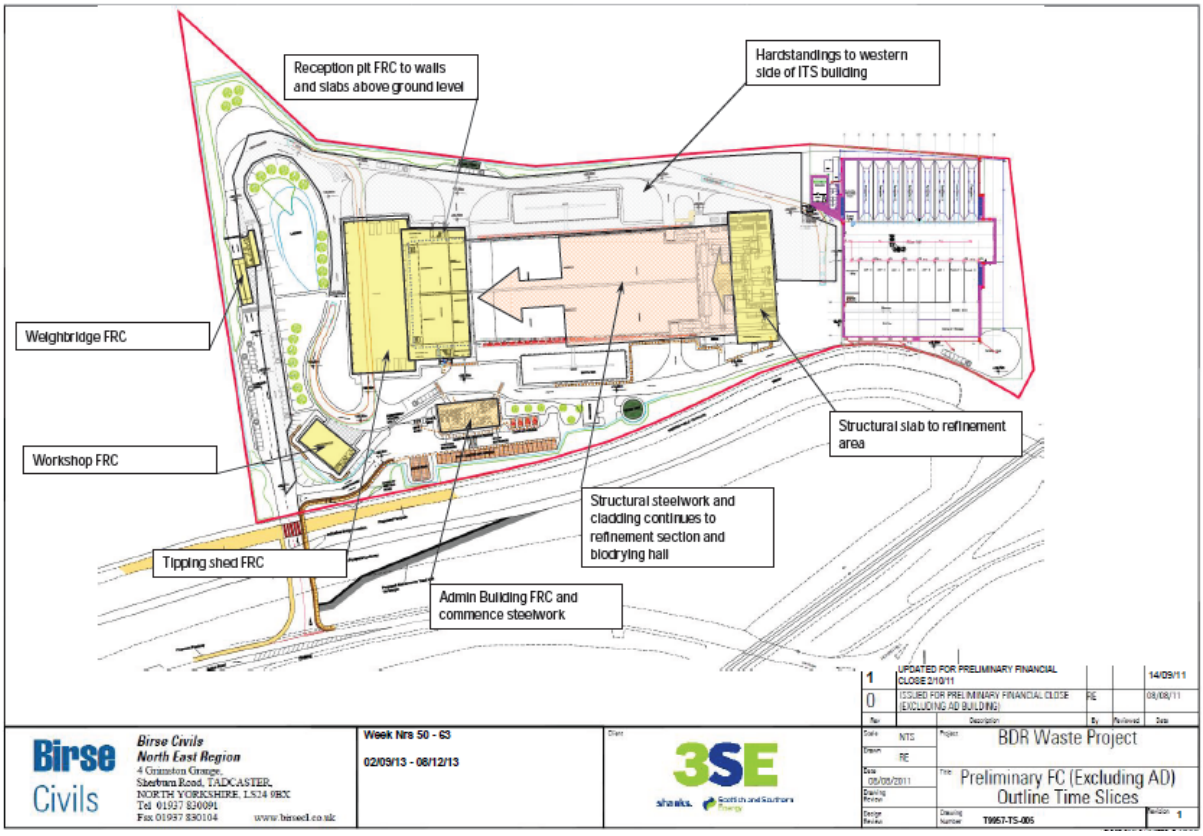

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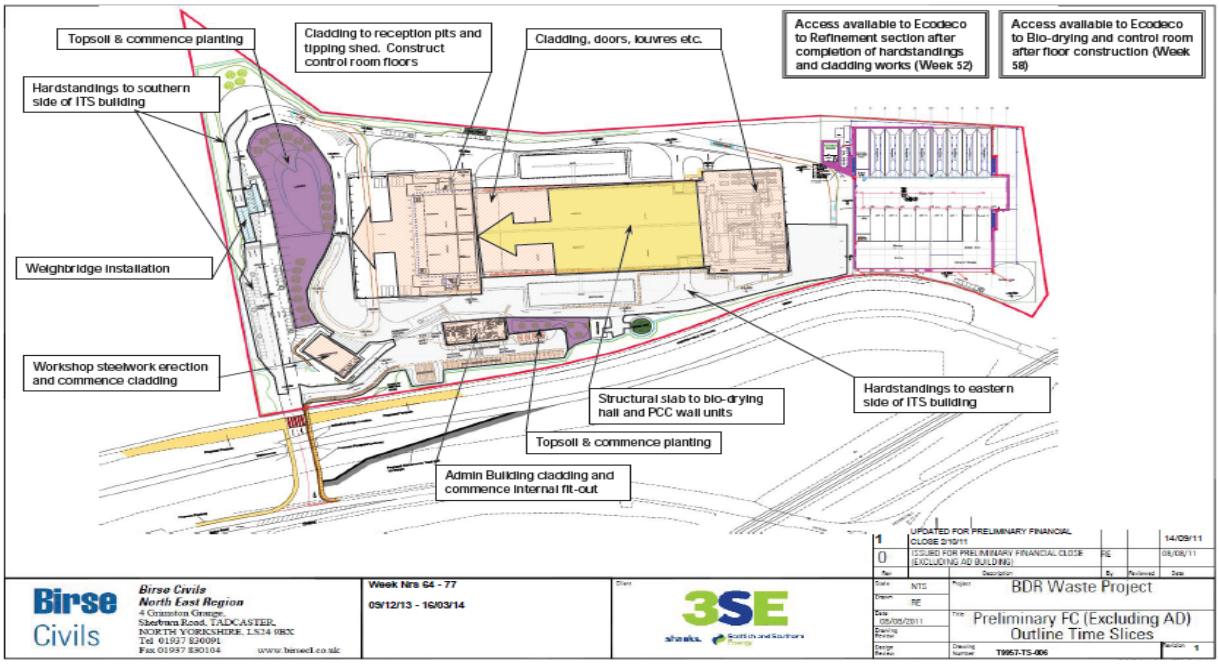

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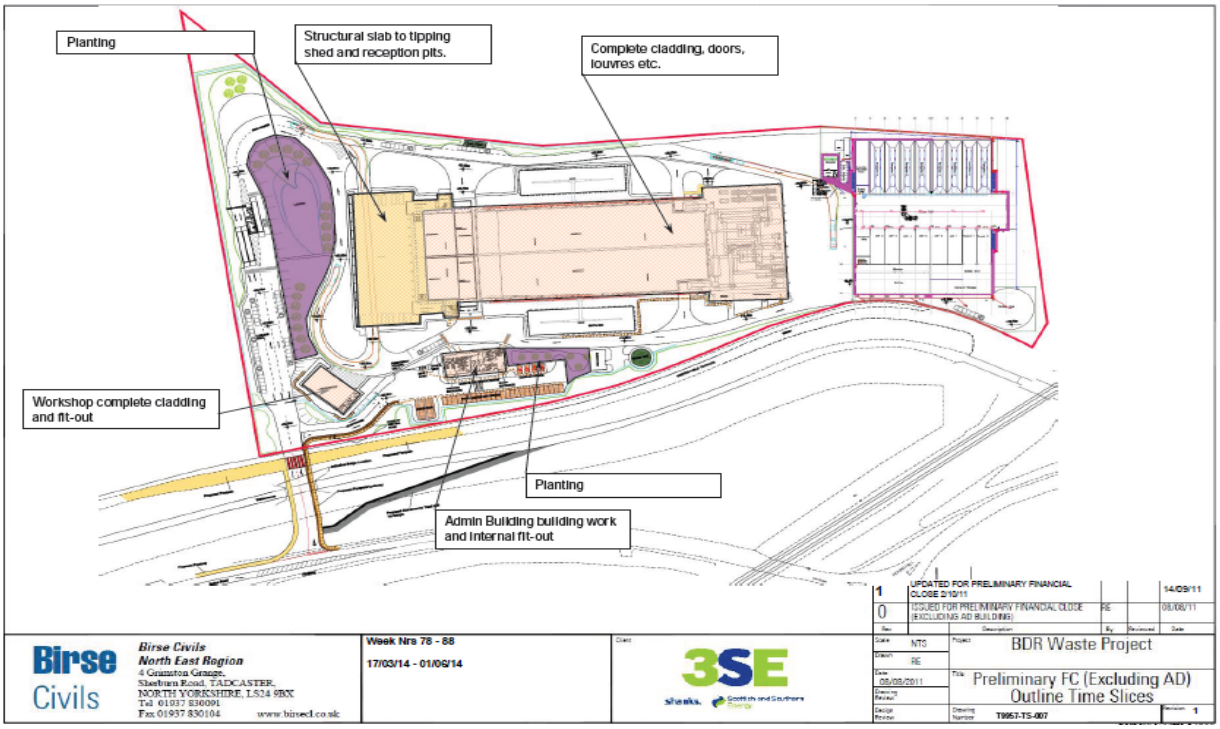

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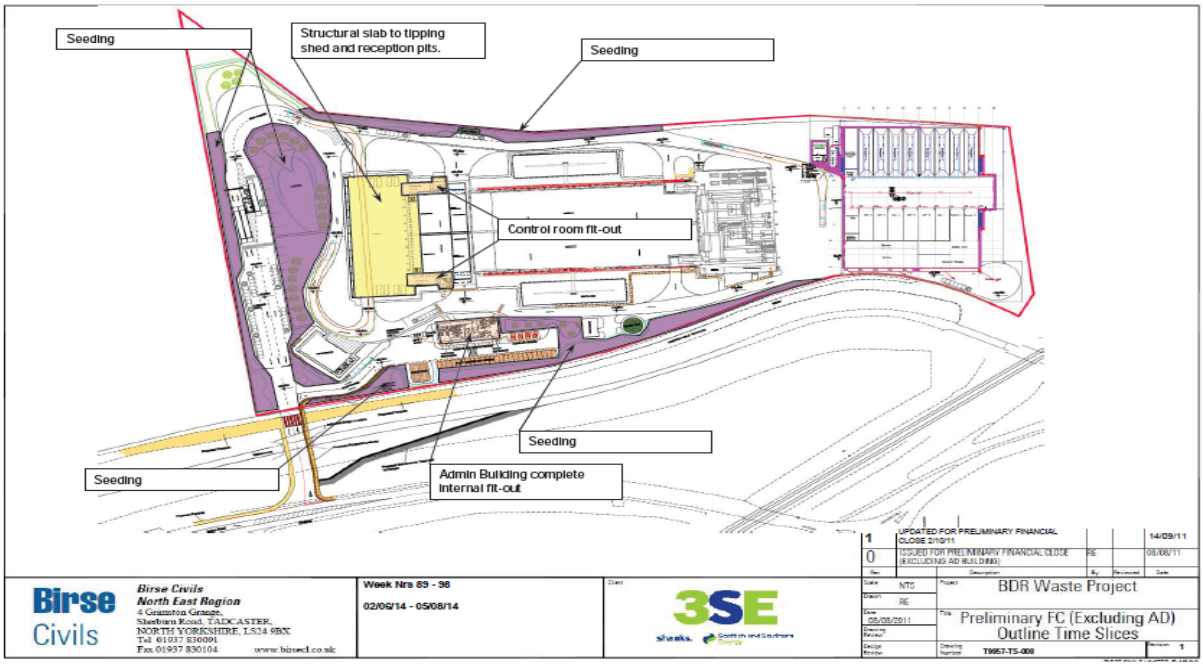

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