6. DEVELOPMENT PROGRAMME AND CONSTRUCTION

6.1 Introduction

This chapter of the ES describes the anticipated programme of development works and the key activities that will be undertaken on the Site during construction. The construction of the Proposed Development is expected to be very similar in nature to that of the Consented Development and limited, non-material updates have been made to this ES chapter. Detailed consideration of construction-related environmental effects for the various technical topics assessed, together with their associated mitigation measures, are provided in each of the technical chapters of this ES.

As per the Consented Development and planning condition 17 of the extant permission, it is proposed that a Construction Environmental Management Plan (CEMP) be prepared and implemented. This will be discussed and agreed with NCC prior to the commencement of works at the Site. An outline of the content of the CEMP is provided in this chapter.

Planning for construction is necessarily broad at this stage and may be subject to modification. For example, specific construction activities could vary in frequency depending upon the particular stage of works. Consequently, where uncertainty exists the assessment has assumed a 'worst-case' situation. It is considered, however, that sufficient information is available at this stage to enable the likely significant environmental effects relating to the construction works to be identified and their significance assessed.

6.2 Programme of Works

Following financial close, construction works on the Site are estimated to take a total of 30 to 33 months, with hot commissioning (i.e. with waste) and testing of the plant commencing immediately thereafter. **Table 6.1** provides an approximate duration for the main construction activities.

Table 6.1 Indicative Construction Activities and Duration

Activity	Approximate Duration of Works (within the 30 - 33 month programme)
Engineering and Procurement	17 months
Establishment and Preparatory Works including site levelling, set-up and piling	4 months
Construction including building substructures, superstructures and fit out	22 months
Plant Commissioning (cold and hot i.e. with and without waste)	12 months
Plant Testing	14 months

6.3 Description of the Works (No material change to 2016 ES)

6.3.1 Enabling Works and Site Preparation

The enabling works will entail the decommissioning and removal of what little exists in the way of existing infrastructure within the Site.

All contaminated land investigation work and remedial works will be completed prior to the main construction works commencing. The Site will then be levelled to 106.5 m AOD, to allow construction of the facility. Currently it is intended that this levelling will be completed, using excavated materials from the Site, with excess volumes being used for landscaping purposes. This should then ensure as little material as possible is removed from the Site. Any remaining excess materials will be transported to suitably licenced facilities for treatment/disposal.

In the absence of any buildings, Site preparation works will therefore be limited to infrastructure works and earthworks.

All internal and external processing areas will be constructed with impermeable concrete hardstanding which will be designed in accordance with the load bearing requirements of the processing equipment and vehicles used at the facility. Typically, all non-structural concrete areas will comprise reinforced concrete hardstanding of at least 300 mm thickness. All other load bearing elements will be significantly thicker as required and determined by the structure they support.

The construction of the facility will introduce new buildings and hence new impermeable internal and external areas which will require capture and runoff retention and attenuation.

Furthermore, the Proposed Development will give rise to a number of process effluents which although retained and recycled will still require eventual discharge from the Site.

The areas of the Site where new buildings will be constructed will be underlain by an impermeable concrete pad. All run off arising from the operational areas of the Site will be contained and treated within a packaged water treatment plant. Wherever possible, liquids and effluents collected within the process will be harvested and recirculated. There will be no discharges from the Site to controlled waters.

All rainwater falling directly onto the buildings will be harvested, treated and used within the process where practicable.

6.3.2 Services, Utilities, Drainage and Infrastructure

As part of the preparatory works, the Site will include provision of utilities (e.g. electricity, etc.) and new drainage infrastructure.

The operation of construction vehicles and general construction activities may give rise to the potential for surface runoff to become contaminated with hydrocarbons, silt or other construction materials. This may in turn lead to a contamination event should Site drainage be allowed to enter watercourses. Excavations may require dewatering (of accumulated rainfall or runoff) during construction. In such circumstances, it will be important to ensure that the quality of this water is sufficiently high to allow discharge to an appropriate point. Further details on drainage and mitigation are provided in Chapter 12 (Water Quality and Hydrology).

The Site will require new mains water, foul and surface sewer plus IT/telephone connections.

6.3.3 Excavations, Foundations and Substructure Construction

Although the detailed foundation design is yet to be completed, the intrusive Site Investigation work carried out in 2015 indicates that the facility will require piled foundations.

The buildings will be constructed around structural steel frames which will support the cladding between the main structural members.

The floor slab will be generally designed to take 50 kN/m^2 or to accommodate plant loading as required.

There will be a number of tanks incorporated within the main building. All tanks will be installed with suitable containment and designed to comply with CIRIA Report C736 – *Containment Systems for the Prevention of Pollution: Secondary, Tertiary and Other Measures for Industrial and Commercial Premises.*

The floor slabs, roadways and fire water tank bases will generally be constructed with a reinforced concrete slab constructed as follows:

- 200 mm reinforced concrete slab laid upon;

- 300 mm thickness compacted hardcore base (Type 1 hardcore material of crushed stone <25 mm size), laid upon; and
- 300mm thickness compacted capping material (6F2 <75 mm crushed stone).

6.3.4 Superstructure, Cladding and Roof Construction

The main building of the facility will be an engineered sealed industrial construction using a portal steel frame with composite insulated external cladding panels (approximately 175 mm thick). The structural steel frame will be fabricated off-site and delivered in the largest possible sections that could be safely lifted into place by a mobile crane. Unloading from lorries will take place on-site, as close to the working areas as possible.

As above, building cladding will be made of an external panelised system, maximising the amount of off-site fabrication to minimise construction timescales as well as the waste generated on-site. The preferred method will be to use a module size that could be erected using mobile cranes.

The roof will be of sandwich-style construction and, similarly, will be fabricated off-site and installed using mobile cranes.

6.3.5 Plant Installation and Commissioning

Office and conference/education/training rooms will be created in the dedicated building by the use of non-load bearing internal partitions. The control room will be created at a mezzanine level within the main process buildings, in a suitable location to provide oversight of both the waste bunker and main processing halls.

All major mechanical plant and equipment will be delivered to Site in the largest possible loads for erection and assembly on site, using flat-bed trailers or other required transport means. At this stage the maximum size of loads is unknown, and it is anticipated that erection of the main process equipment will need to be undertaken prior to completion of the building envelope.

Most plant items will be delivered, as far as practicable, pre-constructed to dedicated skid units for installation to their final locations.

Following installation of main plant items, further works such as piping interconnections, electrical and controls works will be completed. Again these items will be fabricated off Site as far as is reasonably practicable, before shipment to Site for installation and final fabrication (if required).

Under the Environmental Permitting regime, a detailed commissioning and testing programme will be required to be submitted, approved and overseen by the Environment Agency.

6.3.6 External Finishing Work

A weighbridge will be constructed at the entrance and exit to the Site. The access roads, delivery and service area and the area surrounding the fire water tanks will be made of hardstanding. The Proposed Development will also include drainage, as well as soft landscaping, where possible.

6.3.7 Plant and Equipment

The plant and equipment shown in **Table 6.2** is anticipated to be used during the construction works.

Table 6.2 Indicative Plant used during Construction

Plant and Equipment	Enabling Works	Construction of Foundations and Substructures	Construction of the Structural Envelope, Shell and Core	Infrastructure Construction		Services Installations	Fit out	Landscaping
Piling rig		X						
Concrete silo and ready-mix lorries.		X	X	X				X
Concrete cutter, saws and splitters.	X	X						
Cranes and hoists.	X	X	X	X		X	X	X
Cutters, drills and small tools.			X			X	X	
Excavators and breakers.	X	X	X					X
Floodlights.		X	X	X			X	
Fork lifts trucks.		X	X	X		X	X	
Hydraulic benders and cutters.			X			X	X	
Road Brush Vehicles.		X	X	X		X	X	
Lorries/vans		X	X	X		X	X	
Tarmac laying equipment.			X	X				
Scaffolding and access platforms.			X	X			X	X
Temporary supports.			X	X			X	
Tipper lorries.		X		X			X	X
Wheel washers.		X	X					X
Skips and Skip trucks.		X	X	X			X	X

6.3.8 Hours of Work

It is proposed that hours of working during the construction phase will be as per condition 18 of the extant permission, i.e.:

- 0700-1900 hrs on weekdays;
- 0700-1600 hrs on Saturdays; and
- no working on Sundays or bank holidays.
- 24 hours working, internally to the buildings, once the envelope has been closed.

These proposed hours will be agreed with NCC prior to commencement of the works. Special working outside these hours, such as heavy plant activities, and crane and equipment assembly, (prior to closure of the building envelope) would be kept to a minimum and would be subject to prior agreement with reasonable notice by the Local Authority's Environmental Health Officer (EHO).

6.3.9 Potential Environmental Effects

All construction sites have the potential to cause temporary disruption to neighbouring occupants, highway users, pedestrians, and other sensitive receptors. Detailed assessments of potential environmental effects resulting from the construction works are described within each of the technical chapters within this ES.

6.4 Environmental Management and Mitigation

6.4.1 Environmental Management Plan

A principal construction contractor will be responsible for all aspects of the construction operations. In line with best practice, the construction contractor will subscribe to the CCS (Considerate Contractors Scheme).

A CEMP will be prepared by the Principal Contractor which will include all details of relevant environmental management controls necessary for environmental protection during the construction works. This will follow best practice guidelines and will be agreed with the EHO.

The CEMP will include:

- restrictions and targets for specific work activities in order to minimise environmental effects, including disruption and disturbance to local residents (if relevant), workers and the general public;
- details of the means by which appropriate environmental monitoring, record keeping and reporting would be managed to ensure the above targets are being met;
- procedure(s) to deal with necessary 'abnormal' works that may result in deviation from the agreed procedures and targets; and
- provision for a programme of regular environmental audits and reviews at key stages in the construction programme.

The CEMP will place stringent contractual and procedural performance obligations upon trade contractors. These will be maintained and reinforced by commitments detailed below. Such obligations will be enforced through subsequent detailed agreements with, and consents provided by the Planning Authority. A clear management structure and description of the responsibilities and authority of a specific Project Environmental Manager (PEM) will be included.

The PEM will have primary responsibility for liaising with NCC and other statutory agencies on environmental matters. It is anticipated that regular meetings will take place to review progress and to agree necessary options. Notwithstanding this, it is recognised that positive action and reaction by

Site operatives at the time of any environmental incident or breach of targets are essential components for effective environmental management.

The CEMP will address requirements in relation to environmental controls and will allow for, and include, the following:

- the appointment of an experienced PEM responsible for the preparation and implementation of the CEMP;
- details of the phasing of the works, including information on construction works that may be carried out by trade contractors;
- procedures for construction activities, highlighting any operations likely to result in adverse environmental effects, with an indication of the mitigation measures to be employed;
- reference to, and provision of a framework for compliance with all legislation and consent conditions that would be relevant;
- emergency procedures that would be implemented on the Site;
- prohibited or restricted operations;
- control limits of target criteria for environmental issues, where practicable;
- requirements for monitoring and record-keeping;
- mechanisms for third parties to register complaints and the procedures for responding to complaints;
- provisions for reporting, public liaison and prior notification, especially where dispensations would be required;
- details of construction operations, highlighting the operations most likely to result in disturbance and/or working outside core working hours, together with an indication of the expected duration of each activity;
- possible departures from target criteria, and details of how any adverse effects would be minimised, or potential complaints addressed;
- details of proposed routes for HGVs travelling to and from the Site;
- provisions for auditing by the PEM, Local Authority and other regulatory authorities where appropriate;
- details of plant to be used;
- details of all construction works involving interference with a public highway, including temporary carriageway/footpath closures, realignments and diversions; and
- housekeeping procedures and environmental management controls.

6.4.2 Contract Conditions

Individual trade contracts will be required to incorporate appropriate requirements in respect of environmental control, based largely on the standards of ‘good working practice’ outlined in the CEMP in addition to statutory requirements. Contractors will therefore be required to demonstrate how they would achieve the provisions of the CEMP, how targets would be met, and how potential adverse environmental effects would be minimised.

6.4.3 Management of Construction Works

The PEM will be responsible for dealing with queries from the public and other complaints and enquiries. This nominated individual will be named at the Site entrance, with a contact number, and

will be identified to the Planning Authority and community groups, prior to the start of the Site activities, and whenever a change of responsibility occurs.

Any complaints will be logged and reported to the relevant individual within the Planning Authority (and vice versa) and soon as practicable.

The CEMP will specify the roles and responsibilities of the PEM and the appropriate Officers within the Local Authority in respect of any breaches or complaints from the public. The required actions would be different in each specific case, depending on the operation, equipment or location.

6.4.4 Emergencies and Accidents

The works will fall under the provisions of the Construction (Design and Management) Regulations 2015, including the appointment of a Principal Contractor. The Principal Contractor will be required to maintain high safety standards on-site, and to be fully compliant with current health and safety legislation.

An Emergency Incident Plan would be in place to deal with potential spillages and/or pollution incidents. Any pollution incidents would be reported immediately to the regulatory bodies.

6.4.5 Materials Storage and Handling

Environmental issues will be considered in the procurement of raw materials and manufactured building components and all such materials will be appropriately stored on the Site to minimise damage by vehicles, vandals, weather or theft. Deliveries of hazardous materials will be supervised and a just-in-time deliveries system will be implemented to minimise storage times and reduce the risk of spillage on-site. Tanks and drums of liquid chemicals and fuels will be stored in bunded compounds. Packaging materials will be returned, where possible.

Contractors and their sub-contractors will be expected to maintain a tidy Site and where practical, to operate a ‘just-in-time’ policy for the delivery and supply of materials for the works.

Where possible, pre-fabricated elements will be lifted directly into position from delivery vehicles. This will assist in reducing on-site storage and labour requirements and construction noise levels at surrounding sensitive receptors.

Mobile cranes will be used for general unloading and hoisting during the structural and envelope works. Materials hoists, fork lift trucks and other electric or hydraulically operated plant may be used to distribute and transport materials around the Site.

6.4.6 Waste Management and Minimisation

Waste will be generated during all stages of the construction works. Although specific materials cannot be identified at this stage of the design, major and potential sources of waste within the construction process are anticipated to comprise:

- excavated material;
- packaging, including plastics, wooden pallets, expanded foams;
- waste materials generated from inaccurate ordering, poor usage, badly stored materials, poor handling, spillage; and
- dirty water, for example from Site runoff containing silt.

At this stage, it is anticipated that on-site excavations will generate minimal material for off-site disposal. It is the intention of the project to use all excavated material on-site, wherever possible.

A Site Waste Management Plan (SWMP) will be developed and implemented detailing how waste created during the construction phase will be managed. This will be prepared by the Principal Contractor in accordance with good industry practice. The Site Waste Management Plan Regulations

2008 have been repealed but the Principal Contractor will follow its own, similar guidelines, to manage waste materials from construction. All relevant contractors will be required to investigate opportunities to minimise waste arisings at source and, where such waste generation is unavoidable, to maximise the recycling and reuse potential of construction materials.

All waste will be stored on the Site in accordance with the relevant legislation, in particular the Duty of Care Regulations, 1991 (as amended) (Ref 6.1) and no burning of construction waste will be undertaken at the Site.

The destination of all waste or other materials removed during construction will be notified to the relevant authority by the Contractor/Construction Manager for approval. Loads will only be deposited at authorised waste treatment and disposal sites. Deposition of waste will be in accordance with the requirements of the Environment Agency, The Environmental Protection Act 1990, The Controlled Waste Regulations 1992 as amended (Ref 6.2), the Hazardous Waste Regulations 2005 (Ref 6.3), the List of Waste Regulations 2005 and the Duty of Care Regulations.

6.4.7 Traffic and Access Management

As assessment of the potential effects of the Proposed Development on traffic and the local transportation network is presented in Chapter 7 (Transportation and Access).

Specific detail relating to the management of the construction traffic will be developed within a dedicated construction transport plan, which will be submitted for approval by the Planning Authority post planning consent.

Deliveries will be phased and controlled on a 'just-in-time' basis, wherever possible. This will minimise travel time and traffic congestion around the Site.

Abnormally large loads will only be associated with the delivery of the major mechanical plant and equipment during the construction phase of the plant. The delivery of these components will be subject to an agreed special access and delivery agreement with the local Police and Highways Authority.

The majority of all deliveries will be made by standard HGVs, with no special access / delivery requirements.

The Traffic Management Plan will detail the management of the above measures as well as the management of car parking on the Site and the site labour force travel to the Site. No parking on public roads will be allowed and the Contractor/Construction Manager will be responsible for enforcing this requirement. Any local traffic management measures for Site access will be agreed with the relevant authorities.

During on Site construction works, an area of land immediately adjacent to the main construction Site is available for use to accommodate the following;

- Site office accommodation, welfare and mess facilities;
- contractors stores;
- fabrication workshops small scale to allow efficiency in Site modifications (if required);
- equipment laydown, should installation from delivery vehicles not be possible; and
- vehicle parking.

Office accommodation, welfare stores etc. will be in temporary shipping container type structures, stacked up to three units high, to maximise space efficiency. Office and welfare facilities will be directly connected to locally available, power, foul sewers and IT infrastructure which is available at Shelton Road.

Workshops and laydown areas will be ground level only. Environmental management of these facilities will be subject to the same provisions as for the main construction Site.

Vehicle parking will be clearly segregated from the office and welfare areas, with clearly defined and maintained access routes, with no contractors' or other vehicles allowed on the main construction Site, without specific authorisation.

6.4.8 Air Quality and Dust

Site-specific best practice measures will be implemented by contractors to minimise the disturbance to neighbouring receptors. These measures will include:

- ensure effective site planning locating layout machinery and dust causing activities away from sensitive receptors;
- erect solid barriers around the Site boundary and ensure these are kept clean at all times;
- all vehicles should switch of engines when not in use i.e. no idling vehicles should occur on site;
- ensure stockpiles are kept for the shortest time possible and, if necessary, the use of sprinklers and hoses for dampening of exposed soil and materials should be employed;
- ensure an adequate supply of water on site if using sprinklers and hoses for dust suppression;
- where possible, enclosed chutes and covered skips should be used;
- observation of wind speed and direction prior to conducting dust-generating activities to determine the potential for dust nuisance to occur, avoiding potentially dustt generating activities during periods when wind direction may carry dust into sensitive areas and avoiding dust-generating operations during periods of high or gusty winds;
- stockpiles of soils and materials should be located as far as possible from sensitive properties, taking account of prevailing wind directions and seasonal variations in the prevailing wind;
- completed earthworks should be covered or vegetated as soon as is practicable;
- regular inspection of local highways and site boundaries to check for dust deposits (and removal if necessary);
- visual inspection of site perimeter to check for dust deposition (evident as soiling and marking) on vegetation, cars and other objects and taking remedial measures if necessary;
- ensure concrete batcher, where used, has a permit to operate and is operated in accordance with Process Guidance Note 3/1 (04);
- use of dust-suppressed tools for all operations;
- ensuring that all construction plant and equipment is maintained in good working order;
- ensure an adequate supply of equipment on site to clean any dry spillages;
- only use registered waste carriers to remove waste from site;
- no unauthorised burning of any material anywhere on site.
- construction vehicles should be kept clean and sheeted when on public highways. Timing of large-scale vehicle movements to avoid peak hours on the local road network will also be beneficial.

Full assessments of the potential effects of the construction works on air quality are presented in Chapter 8 (Air Quality and Odour).

6.4.9 Hazardous Materials and Contaminated Land

Owing to the historical land uses of the Site, there is potential for ground contamination (refer to Chapter 13: Soils, Geology and Contaminated Land). Prior to construction, the Contractor will be required to prepare a Method Statement and Risk Assessment demonstrating how the safety of construction workers and the public would be addressed in the event of encountering potentially harmful substances. Protective measures would typically include:

- provision of adequate facilities and procedures for personal washing and changing;
- provision and use of personal protective equipment (PPE);
- implementation of dust suppression methods; and
- implementation measures to avoid surface water ponding and the collection and disposal of the Site runoff.

Any necessary measures would be carried out in accordance with the Protection of Workers and the General Public during the Development of Contaminated Land document (Ref 6.4) and CIRIA Report 132: A Guide for Safe Working on Contaminated Sites (Ref 6.5).

Other practical methods of limiting risks from hazardous materials and contaminated land will include:

- the storage of all potentially hazardous materials on hard-surfaced areas, with bunding to the satisfaction of the Environment Agency;
- the storage of oil in accordance with the Control of Pollution (Oil Storage) (England) Regulations, 2001 (Ref 6.6); and
- the treatment of any excess dewatering effluent prior to discharging to the surface sewerage system, and only on the achievement of an approved discharge consent and compliance with quality requirements.

6.4.10 Site Drainage and Effects on Water Resources

The assessment of the potential effects of the Proposed Development on water resources is presented in Chapter 12 (Water Quality and Hydrology). In summary, a precautionary approach will be adopted to appropriately manage construction-derived surface water run-off. As such, particular care will be taken to prevent any release or mobilisation of pollutants, which could pose a potential risk to receptors such as groundwater.

Best practice pollution prevention measures will be put in place to isolate environmentally damaging substances and prevent their release. These measures will be agreed in consultation with the Environment Agency and the planning authority and include:

- secure, careful siting and bunding of fuel storage facilities and any areas used for the storage of potentially hazardous materials;
- use of drip trays when filling smaller containers from tanks or drums to avoid drips and spills;
- careful control of works involving concrete , e.g. ready-mix concrete wagons to be washed out in a safe designated area;
- the avoidance of stockpiling materials wherever possible to prevent spills and where undertaken, sheeting and covering these stockpiles and haulage vehicles loads;
- management of the Site drainage to prevent sediment laden/ contaminated runoff entering the wider environment;
- passage of surface drainage through settlement and oil interceptor facilities where required;
- provision for the treatment and safe disposal of wastewaters, including water from dewatering pumping operations;

- appropriate management and transportation of the Site waste including the establishment of dedicated waste storage areas designed to prevent pollution, regular inspections and the implementation of waste minimisation and management plans as described above; and
- ensuring that any water which may have come into contact with contaminated material is disposed of in accordance with the Water Resources Act (1991) (Ref. 6.7) and other legislation, to the satisfaction of the Environment Agency.

Furthermore, piling systems will be designed to minimise the risk of potential pathways for contamination to reach groundwater resources. Information on potential groundwater effects is provided in Chapter 13 (Soils, Geology and Contaminated Land).

An Emergency Plan will be implemented, forming part of the CEMP, outlining procedures to follow in the instance of any accidents involving spillages. This will involve the provision of on-site equipment for containing spillages, such as emergency booms and chemicals to soak up spillages. Should an incident occur, the Environment Agency and Anglian Water would be contacted immediately.

6.4.11 Protection of Ecological Resources

An assessment of the potential effects of the Proposed Development on ecological resources is presented in Chapter 11 (Ecology and Nature Conservation), which identifies relevant mitigation. This includes installation of protective exclusion fencing at the boundary of amphibian habitats during construction. Clearance of breeding bird habitat along the northern and eastern Site boundaries will take place outside the main breeding season (March to August inclusive) where possible, or checks of habitat will be made by a suitably qualified ecologist prior to the works. Tree protection fencing in accordance with BS5837 will be installed prior to works commencing around the root protection zones of all retained trees within the eastern part of the Site and the southern edge of the adjacent Local Wildlife Site.

6.5 Summary

The construction effects of the Proposed Development will be managed through the development of a project and Site specific CEMP. The CEMP will be agreed with NCC and other relevant bodies prior to the commencement of works, which as a minimum would comply with the mitigation measures set out in this ES. The CEMP will outline methods for contractor and general public liaison, hours of work, methods to deal with complaints, and outline management practices to control dust, traffic and access, waste, water resources, ecological and archaeological effects, ensuring a high level of control throughout the construction works.

The procedures within the CEMP should facilitate the delivery of a high level of environmental control throughout the construction phase, thereby minimising the potential for adverse effects. Further detail regarding specific mitigation during construction works for the Proposed Development is presented within Chapters 7 to 15 of this ES.

6.6 References

Ref 6.1: Office of the Deputy Prime Minister (ODPM) (1991) ‘The Environmental Protection (Duty of Care) Regulations’ SI 1991 No. 2839. HMSO, Norwich.

Ref 6.2: HMSO (1992) ’The Controlled Waste Regulations’ 1992 (as amended).

Ref 6.3: Office of the Deputy Prime Minister (2005) The Hazardous Waste (England and Wales) Regulations, SI 2005 No.894. HMSO, Norwich.

Ref 6.4: Health and Safety Executive (HSE) (1991) Protection of Workers and the General Public During the Development of Contaminated Land.

Ref 6.5: CIRIA (2002) CIRIA Report 132 Good Practice Guidance For The Management of

Contaminated Land. Safe Working Practices on Contaminated Sites.

Ref 6.6: HMSO (2001) Control of Pollution (Oil Storage) (England) Regulations.

Ref 6.7: Water Resources Act (1991)