

The Lighthouse Green Fuels Order

Application Reference: EN0110025

Applicant: LGF Projects Limited

Environmental Statement Volume I Chapter 4: Proposed Development

Document Reference: 6.1.4

Revision: 00

APFP Reg. 5(2)(a) and EIA Reg. 14

Document Information

Document Title	ES Chapter 4: Proposed Development
Document Ref	6.1.4
Author	Arup

Revision record

00	Purpose	DCO Application Submission
	Date	September 2026

Information classification

Information Classification	Date	Reason
Public	September 2026	Proprietary information which will have no impact on the company if disclosed publicly

Contents

Abbreviations	1
4 Proposed Development	3
4.1 Introduction.....	3
4.2 Overview of the Proposed Development.....	7
Feedstock sourcing	13
4.3 Feedstock and product handling and storage (Work No 3)	13
4.4 SAF Production Facility	14
Feedstock pre-treatment (Work No. 1A)	14
SAF processing (Work Nos. 1B, 1C and 4)	15
Product storage and export (Work Nos. 3 and 11A)	17
Combined Heat and Power (CHP) plant (Work Nos. 2, 3 and 4)	20
4.5 Other components of the Proposed Development	21
Marine infrastructure (Work No. 6)	21
Natural gas connection (Work No. 8)	21
Oxygen and nitrogen supply (Work No. 9)	22
Electrical connection works (Work No. 7)	22
Water connection works (Work Nos. 10 and 12)	23
Raw water supply	23
Industrial wastewater treatment	23
Surface water drainage, attenuation and discharge	24
Potable/mains water supply	24
Other infrastructure (Work Nos. 5, 13 and 14)	24
Chemical and material storage	24
Heavy Goods Vehicle (HGV) movements	25
Landscaping and biodiversity	25
Security fencing and gates	26
4.6 Design parameters	26
4.7 Proposed Development operation	29
Hours of operation	29
Operational staff and access	29
4.8 Process inputs	29
Maintenance	30
Hazard prevention and emergency planning	30
External lighting	32
4.9 Routine and emergency access/egress	33
4.10 Decommissioning	33
4.11 Elements of the Proposed Development consented under a Deemed Marine Licence	35

Quay works 35

Tees crossings 35

References 36**Tables**

Table 4.1	Design parameters of the Proposed Development.....	28
-----------	--	----

Figures

Inset 4.1	Indicative layout of the Main Site (perspective view looking north-west - not to scale).....	6
Inset 4.2	SAF production process	19

Abbreviations

Abbreviation	In full
AGI	Above Ground Infrastructure
AGRU	Acid Gas Removal Unit
AIL	abnormal indivisible load
ALARP	as low as reasonably practicable
ASU	Air Separation Unit
CHP	Combined Heat and Power
CIBSE	Chartered Institution of Building Services Engineers
CO	carbon monoxide
CO ₂	Carbon dioxide
COMAH	Control of Major Accident Hazards Regulations 2015
CSU	Continuous Ship Unloaders
DEMP	Decommissioning Environmental Management Plan
DML	Deemed Marine License
DNO	District Network Operator
DSEAR	Dangerous Substances and Explosive Atmospheres Regulations
EA	Environment Agency
EERA	Escape, Evacuation and Rescue Analysis
ENVID	Environmental Hazard Identification
FEED	Front End Engineering Design
FT	Fischer-Tropsch
GHG	Greenhouse Gases
H ₂	hydrogen
HAC	Hazardous Area Classification
HAZID	Hazard Identification
HAZOP	Hazard and Operability
HGV	Heavy Goods Vehicles
HSE	Health and Safety Executive
LOPA	Layer of Protection Analysis
MCAA	Marine and Coastal Access Act
MHWS	Mean High Water Springs
MLA	Marine License Application
MMO	Marine Management Organisation
NEP	Northern Endurance Partnership

NO _x	nitrogen oxides
OBRA	Occupied Buildings Risk Assessment
PCB	polychlorinated biphenyls
PCCU	Post-Combustion Carbon Capture Unit
QRA	Quantitative Risk Assessment
RTFO	Renewable Transport Fuel Obligations
SAF	Sustainable Aviation Fuel
SIL	Safety Integrity Level
SIS	Safety Instrumented System
WwTW	Wastewater Treatment Works

4 Proposed Development

4.1 Introduction

4.1.1 The Proposed Development comprises the construction, operation (including maintenance) and decommissioning of a second-generation Sustainable Aviation Fuel (SAF) Production Facility in Teesside along with the pipeline infrastructure within the connection corridors to allow the export of SAF Product and renewable naphtha and the necessary utility connections. A combined heat and power (CHP) plant will provide power and steam to the SAF Production Facility, and a new quay will be developed on the River Tees.

4.1.2 Subject to commercial agreement carbon dioxide (CO₂) produced by the Proposed Development will be compressed and transported by pipeline to the separately consented Northern Endurance Partnership (NEP) infrastructure in Teesside for high-pressure compression and offshore transport and underground storage.

4.1.3 This chapter is supported by **Figures 4.1: Indicative Proposed Development Layout, 4.2: Indicative Main Site Layout and 4.3: Parts of the Wider Site (ES Volume II, Application Document Ref. 6.2)** which show the components of the Proposed Development, including the Main Site and the Wider Site. The 'Work Nos.' referred to in this Chapter are the corresponding work numbers in Schedule 1 of the **draft DCO (Application Document Ref. 3.1)**, as shown on the **Works Plans (Application Document Ref. 2.4)**.

4.1.4 The Proposed Development comprises several processing steps, supported by utility provisions and connections, which are listed below and discussed throughout this chapter:

- feedstock reception and storage;
- feedstock pre-treatment;
- SAF Production (including feedstock grinding, gasification and gas to liquids processes); and
- product processing, storage and export.

4.1.5 This Chapter provides:

- an overview of the Proposed Development (Section 4.2);

- a description of the SAF Production facility (Section 4.3);
- a description of other components of the Proposed Development (Section 4.5);
- design parameters secured in the draft DCO (Section 4.6);
- a description of the operation of the Proposed Development (Section 4.7);
- a summary of the approach to decommissioning of the Proposed Development (Section 4.10); and
- a description of the parts of the Proposed Development which will be included in a Deemed Marine Licence within the draft DCO (Section 4.11).

4.1.6 The Main Site of the Proposed Development is to be located in Seal Sands, off Seal Sands Road in Stockton-on-Tees Borough. This location has been carefully chosen by the Applicant due to its size and proximity to necessary infrastructure required to support the SAF Production, notably access to the River Tees for construction and operational logistics, and proximity to marine facilities for export. The Main Site is also located close to the consented NEP CO₂ transport and storage infrastructure for potential CO₂ capture and storage which is due to commence operation in 2028. The Main Site is located to the north east of the proposed former Lighthouse Green Fuels site (which is discussed in **Chapter 6: Alternatives (ES Volume I, Application Document Ref. 6.1)**), located on the Tees Valley 1 and Tees Valley 2 sites, off Huntsman Drive in Seal Sands, TS2 1TT.

4.1.7 The Proposed Development boundary (the Site or the 'draft Order Limits') is shown on **Figure 1.2: Proposed Development Boundary (ES Volume II, Application Document Ref. 6.2)** and an indicative layout of the main elements of the Proposed Development is shown on **Figure 4.1: Site Location (ES Volume II, Application Document Ref. 6.2)**. The Proposed Development encompasses an area of 190.79ha. The Proposed Development is comprised of the Main Site, where the SAF Production Facility (including CHP plant and Air Separation Unit (ASU)) and quay will be located, and the Wider Site which includes the access and utility connection corridors associated with the SAF Production Facility and other elements of the Proposed Development located off the Main Site, as set out in detail below.

- 4.1.8 The Main Site occupied by the SAF Production Facility is currently a largely brownfield industrial site. The majority of the Main Site was previously occupied by the now demolished INEOS Nitriles chemical plant occupying an irregularly shaped site south of Seal Sands Road with a closed and revegetated landfill site to the west. A rectangular shaped parcel of undeveloped land lies immediately to the north of Seal Sands Road. The Main Site is on land that the Applicant has secured under an option agreement, whilst the utility connection corridors pass through third party land.
- 4.1.9 The proposed SAF Production Facility represents a First-of-a-Kind assemblage of technologies intended to help decarbonise the aviation industry and support the UK's transition to a Net Zero future.

Inset 4.1 Indicative layout of the Main Site (perspective view looking north-west - not to scale)



4.2 Overview of the Proposed Development

4.2.1 The Proposed Development includes the following elements (references to Work Nos are as described in the **draft DCO (Application Document Ref. 3.1)** and shown on the **Works Plans (Application Document Ref. 2.4)**):

- a SAF Production Facility (**Work No. 1**), including –
- feedstock pre-treatment , flue gas treatment, waste heat boilers, exhaust stack and storage of pre-treated feedstock (**Work No. 1A**);
- SAF processing (**Work No. 1B**) As including -
 - i. feedstock preparation, gasification, syngas clean-up, acid gas removal and carbon dioxide vent, Fischer-Tropsch reactors and product upgrading,
 - ii. compression, and
 - iii. thermal oxidiser, flue gas treatment, exhaust stack; and
- up to two flare structures (**Work No. 1C**).
- a CHP plant of over 50MWe (Work No. 2) including –
 - i. boilers and steam turbine generators (Work No. 2A); and
 - ii. flue gas treatment and stack (Work No. 2B).
- feedstock handling and storage, and intermediate and final product handling and storage, including conveyors, storage silos, tanks and buildings (**Work No. 3**).
- cooling infrastructure including towers and basins for SAF Production Facility and CHP plant (**Work No. 4**).
- provision of a means of crossing over or under existing infrastructure including bridge, culverts, embankments and supporting structures (**Work No. 5**).
- marine infrastructure (**Work No. 6**) including –
 - i. construction of permanent quay and associated wing walls (Work No. 6A) including demolition of existing jetties and associated infrastructure, demolition and reinstatement of existing mooring infrastructure, relocation of existing navigational buoys, and extension of existing outfall;

- ii. permanent quay (Work No. 6B); and
- iii. capital and maintenance dredging activities (Work No. 6C).
- electrical connection works (**Work No. 7**) including –
 - i. underground and overground 132kV electrical cabling connections and associated equipment from North Bank Supply Point to the Main Site (**Work No. 7A**); and
 - ii. 11kV electrical connection works (**Work No. 7B**).
- natural gas connection works including modification of existing or construction of new Above Ground Infrastructure (AGI) (**Work No. 8**).
- supply of industrial gases (**Work No. 9**) including –
 - i. industrial gases connection works (**Work No. 9A**) including:
 - oxygen pipeline connection works between existing industrial gases facility and Work No. 1 including upgrading of existing oxygen pipeline up to 355mm external diameter,
 - high pressure nitrogen pipeline connection works between existing industrial gases facility and Work No.1 including installation and repurposing of new and existing pipelines, up to 355mm external diameter, and
 - connection to existing low pressure nitrogen supply, up to 406mm external diameter; or
 - ii. ASU facility and connection pipework and utilities to the Main Site (**Work No. 9B**).
- modification or removal of existing pipelines and replacement of new industrial wastewater pipeline up to 324mm outside diameter, connecting the Main Site into existing wastewater infrastructure (**Work No. 10**).
- export pipeline works (**Work No. 11**) including –
 - i. up to two pipelines of up to 355mm external diameter for the export of SAF and renewable naphtha from the Main Site to third party marine export facilities (**Work No. 11A**); and
 - ii. a pipeline of up to 610mm external diameter between the Main Site and the NEP AGI C1 for the export of CO₂ (**Work No. 11B**); or

- iii. a pipeline of up to 610mm external diameter between the Main Site and the NEP AGI C2 for the export of CO₂ (**Work No. 11C**),
- surface water attenuation infrastructure and drainage and discharge works in connection with the Main Site (**Work No. 12**).
- laydown areas (**Work No. 13**) comprising –
 - i. temporary construction compounds and laydown areas (**Work No. 13A**); and
 - ii. permanent laydown and storage (**Work No. 13B**).
- access and private street improvements, including works to create, improve, repair, or maintain access roads and access points (**Work No. 14**).

4.2.2 To the extent that it does not form part of any of the above works, Further Associated Development is proposed (as detailed in Schedule 1 of the **draft DCO (Application Document Ref. 3.1)**) and has been assessed within this ES including:

- site clearance (including vegetation removal and demolition of existing structures), remediation and temporary hardstanding;
- works to alter existing services and utilities apparatus and connections (overground and underground);
- channelling, culverting, crossings and works to existing drainage ditches and systems;
- temporary lighting, security fencing, gates, boundary treatment and other means of enclosure;
- temporary generators and bunded storage tanks;
- creation of temporary construction access points and roadways;
- wheel wash facilities;
- signage;
- temporary materials and plant storage and laydown areas;
- contractor facilities including offices and staff welfare facilities;
- temporary vehicle, pedestrian and cycle facilities;
- ancillary plant and equipment, drainage and pipework in the Main Site; and

- administration, welfare, control, warehousing, workshop and stores buildings in the Main Site.

4.2.3 The Applicant's approach to drafting schedule 1 and the use of further associated development is described in the **Explanatory Memorandum (Application Document Ref. 3.2)**. Each element of the Proposed Development is described in further detail below. The maximum dimensions of certain elements of the Proposed Development are detailed in Section 4.6 of this chapter.

4.2.4 The locations of the elements of the Proposed Development described above within the Site are shown in **Figure 4.1: Indicative Proposed Development Layout (ES Volume II, Application Document Ref. 6.2)** and the **Works Plans (Application Document Ref. 2.4)**.

4.2.5 For ease of reference in the ES, parts of the Site are described using the terms introduced in **Chapter 3: The Site and Surrounding Area (ES Volume I, Application Document Ref. 6.1)** and illustrated on **Figure 4.2: Main Site and Wider Site (ES Volume II, Application Document Ref. 6.2)**. The parts of the Site referred to in the ES are:

- Main Site (including quay); and
- Wider Site comprising:
 - i. Construction laydown area north of Seal Sands Road,
 - ii. Marine areas, and
 - iii. Connection corridors.

4.2.6 As set out in PINS Pre-Application Advice on Environmental Impact Assessment [Ref 1], the EIA adopts a Rochdale Envelope for the purposes of assessment. This approach involves assessing the maximum (or where relevant, minimum) parameters for the elements of the Proposed Development where flexibility needs to be retained (such as the building dimensions or operational modes). Where this approach has been applied to the specific aspects of the EIA, this is confirmed within the relevant chapters of this ES.

4.2.7 The Rochdale Envelope approach is employed where some details of a proposed development are yet to be confirmed and therefore some flexibility is necessary to address uncertainty. Where this is the case, the ES needs to assess a worst-case scenario of what a proposed development could reasonably be to ensure potential significant effects are assessed within the ES. To ensure that a worst case scenario is

considered, all of the works as described at Schedule 1 of the **draft DCO (Application Document Ref. 3.1)** have been assessed to the maximum of areas shown on the Land Plans, the minimum and maximum parameters set out in the draft DCO, and taking account of the Design Principles secured by Schedule 2 (Requirements) of the **draft DCO (Application Document Ref. 3.1)**.

- 4.2.8 This is consistent with the Rochdale Envelope section of PINS Pre-Application Advice on Environmental Impact Assessment [Ref 1] which states:

“The Inspectorate acknowledges that flexibility may be required where parts of a proposed development are not confirmed at application stage and would be determined post-consent...”

Maximum design parameters should be clearly defined in the project description chapter of the ES and be in accordance with those defined in the draft DCO and associated documents...

The maximum adverse effect from a particular project element may differ depending on the aspect and matter being assessed. For example, a tall chimney stack may be beneficial for air quality but have greater landscape and visual effects. The ES should therefore identify and justify the parameters which are likely to result in the maximum adverse effect (the worst-case scenario) for each aspect and matter assessed...

Applicants should ensure the range of possible effects implicit in the flexibility provided by the draft DCO or DML have been assessed in the ES.”

“If, in the course of preparing an ES, it becomes clear that it will not be possible to specify all the details of the Proposed Development, the ES must explain why and how this has been addressed. The ES will need to establish the relevant parameters for the purposes of the assessment. Where this approach is adopted the assessments in the ES should be undertaken on the basis of the relevant design parameters applicable to the characteristics of the Proposed Development included within the DCO. The assessment should establish those parameters likely to result in the maximum adverse effect (the worst case scenario) and be undertaken accordingly to determine significance.”

- 4.2.9 Justification for the need to retain flexibility in certain parameters is outlined in this chapter. As such, this ES presents a reasonable worst-case assessment of the potential impacts of the Proposed Development at its current stage of design.

- 4.2.10 As the Proposed Development is a First-of-a-Kind technology assemblage and has not yet reached the detailed design stage, the sizes of process plant and equipment may vary depending on the Engineering, Procurement and Construction ('EPC') Contractor(s) selected and their specific configuration and selection of plant and equipment. It is also important that the consent retains some flexibility to allow for changing economic conditions and the advancement of technology in the period between preparing the Application, granting of consent, construction and starting SAF production. Therefore, at this consenting stage of the project, a number of the design aspects and features of the Proposed Development cannot be confirmed until the detailed design of the Proposed Development has been completed.
- 4.2.11 Construction of the Proposed Development is described in **Chapter 5: Construction Programme and Management (ES Volume I, Application Document Ref. 6.1)**. At this stage in the project development, a detailed construction programme is not available as this is normally determined by the EPC Contractor(s) which has/have not yet been appointed; however, an indicative construction programme is presented within **Chapter 5: Construction Programme and Management (ES Volume I, Application Document Ref. 6.1)** on which the potential environmental effects of the Proposed Development are being assessed.
- 4.2.12 Construction of the Proposed Development could (subject to the necessary consents being granted and an investment decision being made) start in 2028. Assuming an approximate three and a half year construction programme followed by a period of commissioning, the Proposed Development has a target date of commercial operation of the end of 2031, onwards.
- 4.2.13 It is assumed that the Proposed Development will be designed to operate for at least 25 years. At this stage, it is expected that the Proposed Development will have some residual life remaining, and an investment decision would then be made based on an assessment of the technical feasibility and the market conditions prevailing at that time. At the point it is decided by the undertaker that the Proposed Development has reached the end of its operating life the most likely scenario is that the plant would be decommissioned as outlined in Section 4.10 below.
- 4.2.14 For the avoidance of doubt, decommissioning of the Proposed Development may incorporate retention of supporting infrastructure on the Main Site that has residual design life and is capable of reuse. These would typically comprise the development platform, drainage and

roadways, and the quay. Decommissioning will be controlled by Schedule 2 (Requirements) of the **draft DCO (Application Document Ref. 3.1)** which requires a plan for decommissioning of any part of the authorised development to be provided to the relevant planning authority for approval. This plan will set out whether certain parts of the authorised development would remain in situ, which will depend on a number of factors to be considered at that time.

Feedstock sourcing

- 4.2.15 The Proposed Development feedstocks will comprise biomass from biogenic wastes and residues, including forestry residues, sawmill residues and agricultural residues, together with waste wood to be used solely within the CHP plant. All feedstocks will be procured in accordance with the applicable regulatory requirements for the intended use.
 - 4.2.16 The UK SAF Mandate [Ref 4] requires SAF to be produced from eligible feedstocks that satisfy the sustainability criteria and other applicable requirements of the Renewable Transport Fuel Obligation (RTFO) [Ref 5].
 - 4.2.17 As the CHP plant forms an integrated part of the Proposed Development, the biomass from biogenic forestry, sawmill and agricultural residues supplied to the CHP will be managed in accordance with the same RTFO sustainability requirements as those used in the SAF production process. Grade C waste wood, which is not considered biomass under the Industrial Emissions Directive [Ref 2], will be permitted for use exclusively in the CHP plant and is therefore subject to the applicable waste management and environmental permitting requirements, rather than the RTFO sustainability requirements applicable to SAF feedstocks.
 - 4.2.18 Compliance will be demonstrated through recognised sustainability assurance schemes, chain of custody requirements and independent verification in accordance with the RTFO Carbon and Sustainability Guidance and any additional requirements introduced under the SAF Mandate. This is expected to include certification under recognised voluntary schemes such as International Sustainability and Carbon Certification, Sustainable Biomass Programme and Forestry Stewardship Council, independent third-party audits, and annual reporting to the RTFO administrator.
- 4.3 **Feedstock and product handling and storage (Work No 3)**
- 4.3.1 It is envisaged that the biomass feedstock will be delivered in a range of vessels up to Panamax size (typically 230m in length). These will navigate into the Tees estuary from Tees Bay and berth at the proposed new quay.

- 4.3.2 Waste wood feedstock for the CHP plant will be delivered to the Main Site by road or by ship offloaded at the quay (**Work No 6B**).
- 4.3.3 Continuous Ship Unloaders (CSUs) on the quay will unload the feedstock during the operational phase. The CSUs will be rail mounted on the topside of the quay. Mobile or rail mounted cranes may also be used.
- 4.3.4 A variety of biomass feedstocks are likely to be used by the Proposed Development, and these will be segregated and stored on the Main Site in a combination of silos and covered stores depending on the nature of the material and any permit obligations.
- 4.3.5 The biomass feedstock will primarily be moved around the Site using covered conveyors and stored in storage silos and flat sheds. The largest silo will be up to approximately 70m in diameter and up to approximately 70m in height (with an additional 20m on top for the conveyor). Up to 265,000 tonnes of feedstock will be stored within the Main Site at any one time.
- 4.3.6 The storage silos and flat sheds will be fitted with fire detection, protection and suppression systems, as will be required by the Environmental Permit.
- 4.3.7 Future use of other feedstock remains under consideration and would be consented separately once the Proposed Development is operational.

4.4 SAF Production Facility

Feedstock pre-treatment (Work No. 1A)

- 4.4.1 The sustainably sourced biomass feedstock for the SAF Production Facility will need to be thermally pre-treated before use in SAF production. Pre-treatment will be carried out within the Main Site. The thermal pre-treatment will homogenise the feedstock to optimise gasification.
- 4.4.2 Pre-treatment will take place in multiple modular units to be built and operated within the Main Site. The tallest structure within the pre-treatment unit will be a single stack (with multiple flues) which will be up to 100m high.
- 4.4.3 Biomass will be charged into the pre-treatment unit via a local storage vessel. Pre-treatment will be undertaken as a continuous process. Once charged, biomass feedstock will be thermally treated in a low-oxygen environment between approximately 200–400°C, producing a homogenous, grindable biocarbon product. Treated feedstock will be conveyed to silos for temporary buffer storage on the Main Site.

- 4.4.4 During operation there will be emissions of combustion products from the pre-treatment units; these emissions will be directed via a flue gas treatment system and dispersed to atmosphere. The flue gas treatment plant will remove residual particulate, acid gases and heavy metals and dioxins/furans prior to the treated gas being released to atmosphere through an exhaust stack. Abatement with ammonia slip control will be used to control emissions of nitrogen oxides (NO_x). Dispersion modelling of stack emissions has been undertaken to inform the proposed stack height.
- 4.4.5 Waste heat will be recovered from the flue gas via waste heat recovery boilers.
- 4.4.6 Solid residues from the pre-treatment process will comprise fine treated biomass material and other residues (such as ash, spent sorbents), which will be discharged from pre-treatment and stored prior to recovery or disposal.

[SAF processing \(Work Nos. 1B, 1C and 4\)](#)

- 4.4.7 This section provides an overview of the SAF Production process which is illustrated schematically in Inset 4.2. Thermally pre-treated feedstock will be transferred from the pre-treatment unit silos into the Gasification Facility where it will be converted into synthesis gas ("syngas").
- 4.4.8 Feedstock will be homogenised before being transferred to the gasifier. Gasification is a continuous process whereby feedstock is partially oxidised at high temperature in the presence of oxygen, producing a crude syngas containing hydrogen (H₂), carbon monoxide (CO), carbon dioxide (CO₂) and contaminants. Crude syngas will be scrubbed to remove major contaminants and particulate matter before being transferred to the syngas clean-up unit. Solid residue slag will be discharged from the bottom of the gasifier. This inert byproduct will be re-used in the process or disposed of off-site.
- 4.4.9 Within the syngas clean-up and compression section will be several adsorbent and catalytic processes designed to remove residual contaminants from the syngas and adjust the ratio of H₂ to CO, generating an ultra-pure gas for conversion to liquid products in the Fischer-Tropsch (FT) reactor. The syngas clean-up and compression system will also feature an Acid Gas Removal Unit (AGRU). This will remove acid gases to increase the H₂ and CO content in the syngas. Sulphur-containing off-gases from the AGRU will be treated in a thermal oxidiser followed by

caustic scrubbing. The treated gas stream will be dispersed to atmosphere via a single stack.

- 4.4.10 Ultra-clean syngas will be converted into long-chain hydrocarbon waxes and other light hydrocarbon species in the Fischer-Tropsch reactor. These are then stored in intermediate storage tanks prior to the next step in the process. Hydrocarbon waxes will be upgraded in a hydrocracker within the Main Site, producing a mixed hydrocarbon stream. Conventional fractionation technology will be used to separate the desired final product, which is technically known as synthetic paraffinic kerosene (SPK), a type of SAF, and by-product renewable naphtha which can be used as a chemical feedstock or fuel blending component.
- 4.4.11 The draft DCO includes two potential alternative pipeline connection routes for CO₂ export to NEP infrastructure. These are **Work No. 11B and 11C**, and only one of these would be developed. This is controlled by wording in article 22 'Compulsory acquisition of rights' of the **draft DCO (Application Document Ref. 3.1)**.
- 4.4.12 The purified CO₂ off-gas from the AGRU can be compressed (in **Work No. 1**) for export via the proposed pipeline connection (**Work No. 11B or 11C**) to the consented CO₂ pipeline being developed by NEP as part of the East Coast Cluster (see **Chapter 5: Construction Programme and Management (ES Volume I, Application Document Ref. 6.1)**). This would result in the Proposed Development achieving negative carbon emissions, since the captured CO₂ will be biogenic in origin, and will reduce the carbon intensity of the final SAF Product. Until the connection to CO₂ transport and storage infrastructure is available and access agreed, the surplus biogenic CO₂ from the AGRU will be discharged to atmosphere via a vent. Consequently, the Proposed Development is not dependent on the NEP CO₂ pipeline being operative.
- 4.4.13 In addition, in future, CO₂ from the CHP plant and thermal pre-treatment of feedstock may be sent to a Post-Combustion Carbon Capture Unit (PCCU) and directed via the selected CO₂ export pipeline route (either **Work No. 11B or 11C**) to the NEP CO₂ Gathering Network pipeline for transport and permanent storage. This would result in the Proposed Development achieving even greater negative carbon emissions and further reducing the carbon intensity of the final SAF Product. Whilst the Main Site design allows sufficient space for a future PCCU to be developed to serve the CHP plant and thermal pre-treatment facility, development of a PCCU does not form part of the Proposed Development, is not considered in the EIA and would be developed under

separate consent. Decarbonisation readiness will be demonstrated as part of the environmental permit application for the Proposed Development in accordance with Schedule 25C of The Environmental Permitting (England and Wales) Regulations 2016, [Ref 6]. One of the specific requirements of decarbonisation readiness is demonstration of compliance with the 'space test' and space has been allowed for a future PCCU within the Main Site [Ref 6]. The SAF Production Facility requires up to 200MWe of electricity plus steam for its operation, which will be provided by the CHP plant (**Work No. 2**) (described below). During operation, supplies of high pressure oxygen and high and low pressure nitrogen are also required. These are discussed further in Section 4.5. Raw process water will be supplied using a connection on or near the Main Site.

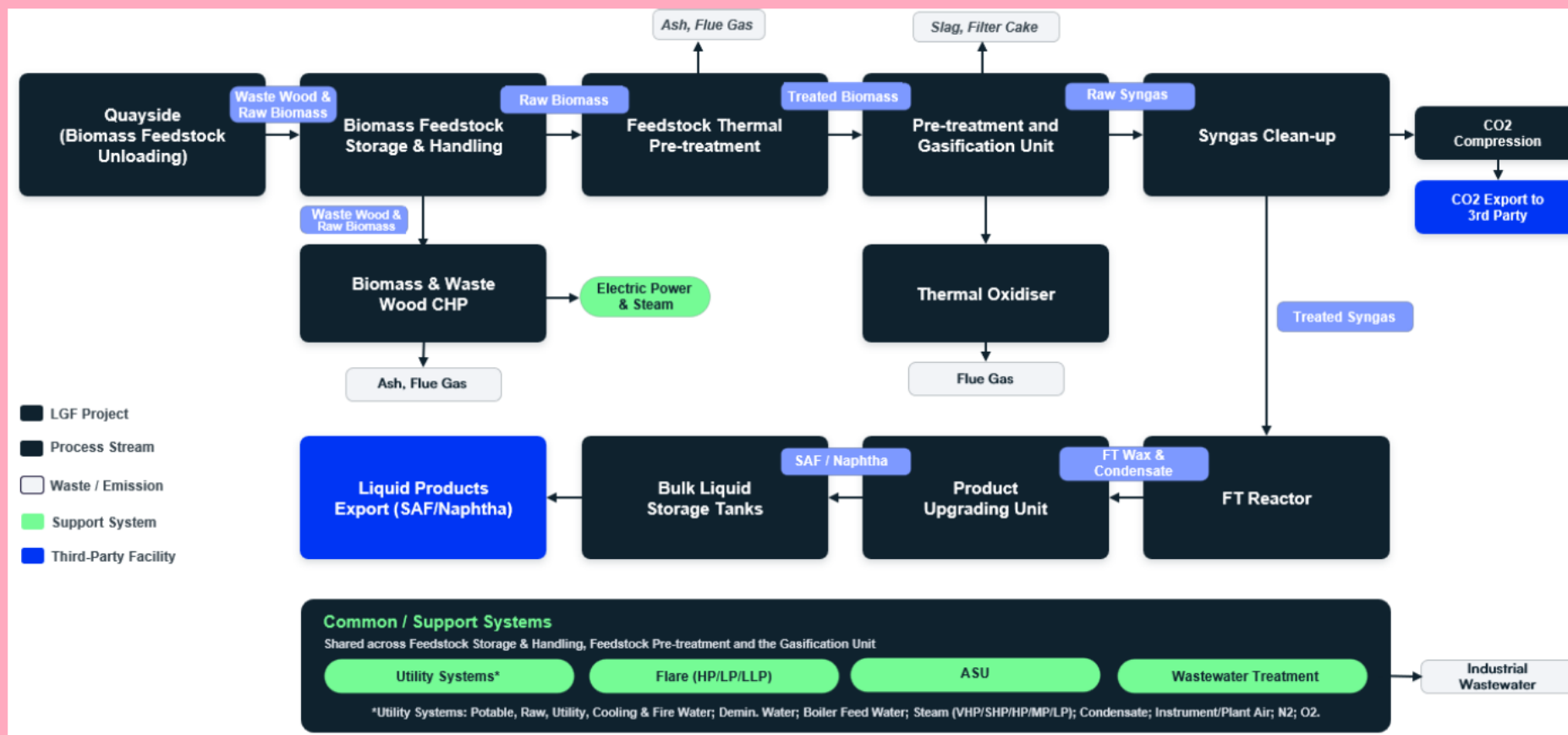
- 4.4.14 During normal plant operation, process emissions to air from the SAF Production Facility primarily will be directed through the thermal oxidiser unit as discussed above, although there are a number of smaller vents and relief valves installed that could be required in an emergency. Dispersion modelling of stack emissions has been used to set a suitable minimum stack height as a reasonable worst case.
- 4.4.15 To start the SAF production process (feedstock pre-treatment, gasification and CHP plant operation), an auxiliary fuel is required. This will be provided by a supply of natural gas. However, once the process is operational, minimal supplementary fuel is required.
- 4.4.16 The SAF production process is designed to operate for periods of up to 36 months in continuous operation, with shut-down only required in the event of periodic maintenance, statutory inspection, or an emergency.
- 4.4.17 In an emergency, the electricity and steam to the process will be safely shut-off and the vent headers will be purged to a flare for safe combustion within the Main Site. Flaring will only be used for safety reasons or non-routine operational conditions (e.g. start-ups, shutdowns). The ES has assessed a maximum parameter for 140m in height of the flare, though it is likely to be less than 140m when installed.

Product storage and export (Work Nos. 3 and 11A)

- 4.4.18 SAF and renewable naphtha products will be directed via above ground pipelines to an above ground buffer storage tank where it will be tested and quality checked before being transferred by pipeline to local third-party bulk liquid storage facilities. SAF may also be stored within the Main Site in above ground bunded tanks of steel construction. The Proposed Development design currently allows for up to 60,000 tonnes of product to

be stored within the Main Site but subject to commercial agreements with third parties a large proportion of this storage may be available off site.

Inset 4.2 SAF production process



- 4.4.19 Products will then be transferred by above ground pipelines to storage vessels at existing third-party local marine loading facilities outside of the Proposed Development. As a contingency, road tanker loading facilities will also be required for export of products by road. HGVs will also be used for removal of out of specification material (if this cannot be reprocessed) and/or other wastes.

Combined Heat and Power (CHP) plant (Work Nos. 2, 3 and 4)

- 4.4.20 To provide low carbon electricity and steam to the Proposed Development, a CHP plant with an output of up to 200MWe will be constructed and operated within the Main Site. The CHP boilers are likely to be a fluidized bed type. The CHP will be fuelled by either biomass or waste wood feedstock or a blend of the two.
- 4.4.21 Biomass and waste wood will be fed from storage and charged into the boilers, where it will be combusted at temperatures of 750 - 900°C. The steam from the boilers will be used to generate electricity using steam turbine generators with extracted steam from the boilers also let down in pressure separately and exported to the SAF Production Facility for use in the process. The heat from the flue gas can also be recovered for further utilisation e.g. in combustion air preheating and heating of feed water.
- 4.4.22 Steam exiting the steam turbines will be cooled and condensed, with the condensate returned to the boilers for re-use. Water used within this steam/water cycle will be demineralised and dosed to control pH and dissolved O₂. To further manage this, it will be necessary to intermittently purge a small amount of the boiler water (known as 'blowdown') to the cooling tower basin. Blowdown water removed from the cycle will be replaced with fresh demineralised water.
- 4.4.23 The condensation of steam exiting the steam turbine will be achieved using cooling water from the cooling towers no more than 40m high. The cooling towers are designed to minimise the formation of visible plumes, although some may occur dependent on the ambient weather conditions. The cooling towers will also be used to provide some cooling for the SAF Production Facility.
- 4.4.24 The flue gas will be passed through a flue gas treatment plant, comprising a bag house filter to remove particulate, dry additive injection to remove acid gases and activated carbon to remove heavy metals and dioxins/furans prior to being released to atmosphere through a single stack (with multiple flues) up to 140m high. NO_x abatement with ammonia slip control will be used to control NO_x emissions. Dispersion modelling of

stack emissions has been undertaken to inform the proposed stack height.

4.5 Other components of the Proposed Development

Marine infrastructure (Work No. 6)

4.5.1 The marine infrastructure will comprise a new quay located at the eastern end of the Main Site on the River Tees for the import of modules and materials during construction and the import of feedstock during operation. To construct the quay it will be necessary to demolish two existing jetties and associated infrastructure, plus demolition and reinstatement of some of the existing mooring infrastructure, temporary relocation of an existing navigational buoy (No. 4) and permanent relocation or removal of an existing navigational buoy (No. 21) (see **Chapter 5: Construction Management and Programme (ES Volume I, Application Document Ref. 6.1)**). Having direct access to a quay to enable deliveries of the feedstock is beneficial since it will avoid double handling of that feedstock and secondary transport prior to use. It will also be used during the construction phase for the shipborne import of prefabricated plant modules (abnormal indivisible loads (AILs)), fill material and other construction materials required for construction (see **Chapter 5: Construction Programme and Management, ES Volume I, Application Document Ref. 6.1**). Topside infrastructure including cranes will facilitate the unloading of feedstock.

4.5.2 Capital dredging will be used to excavate a berthing pocket adjacent to the quay and access channel. Maintenance dredging will be required to maintain access from the berth to the River Tees main channel. The berth will be capable of handling a variety of vessels up to Panamax size.

Natural gas connection (Work No. 8)

4.5.3 Natural gas will be required during plant start-up and as an auxiliary fuel for the feedstock pre-treatment, gasification and the CHP plant. A small flow of natural gas is also required for ancillary systems including the flare pilots. It is proposed to construct a new connection (or re-use an existing connection) to the natural gas supply network which is located within the Main Site.

4.5.4 Should a new connection be required, then a new tie-in to the existing natural gas supply network will be undertaken as part of the Proposed Development. This is assumed to comprise the construction and operation of an AGI.

Oxygen and nitrogen supply (Work No. 9)

- 4.5.5 Oxygen and nitrogen are required for the operation of the SAF Production Facility. These gases will either be provided by connections to supply from a third party provider or, alternatively, from an ASU within the part of the Main Site north of Seal Sands Road (see **Figure 4.1: Indicative Layout of the Proposed Development, ES Volume II, Application Document Ref. 6.2**). This is controlled by wording in article 22 'Compulsory acquisition of rights' of the **draft DCO (Application Document Ref. 3.1)**.
- 4.5.6 Where the supply is from a third party the high-pressure oxygen connection will be supplied via an existing oxygen pipeline in North Tees which links to an existing industrial gases facility in South Tees via a crossing under the Tees. The section of the existing oxygen pipeline in North Tees which runs adjacent to Seal Sands Road will need upgrading (any other replacement and/or improvement works along the route will be confirmed by future surveys and engineering studies).
- 4.5.7 Low-pressure nitrogen will be supplied by a connection to an existing pipeline crossing the Main Site.
- 4.5.8 A high-pressure nitrogen supply from an existing industrial gases facility in South Tees will utilise an existing crossing but will require new pipeline infrastructure to be developed both north and south of the Tees.
- 4.5.9 The application provides an alternative to the use of third party oxygen and nitrogen by the construction and operation of an ASU proposed to be located on the part of the Main Site to the north of Seal Sands Road. The ASU would work by filtering and chilling ambient air to separate out the fractions and compressing it for use. The EIA considers this option as well as connections to existing supplies.

Electrical connection works (Work No. 7)

- 4.5.10 As outlined above, the electricity and steam required to operate the SAF Production Facility will be provided by the proposed CHP plant within the Main Site.
- 4.5.11 To provide power for construction, startup and to maintain ancillary site supplies, this requires an electrical connection. The Applicant is progressing through the connection process for a connection to the local 11kV grid network operated by the District Network Operator (DNO). The connection will be integrated into the site systems (**Work No. 7B**). A below ground 132kV electrical connection (**Work No. 7A**) is also being explored with the DNO which would be constructed northward to the Main Site from the existing North Bank Supply Point which is located approximately 500m

to the south of the Main Site. This connection may require a trenchless crossing beneath the link-line corridor.

[Water connection works \(Work Nos. 10 and 12\)](#)

Raw water supply

- 4.5.12 It is proposed that raw water will be supplied by NWL to the Proposed Development via existing or new raw water connections (which will be provided by NWL subject to further survey and engineering work to be undertaken by NWL) within the Main Site to NWL water supply infrastructure located within the Wider Site. Raw water connections will be developed by NWL. Raw water will require treatment on-site for use as process water.

Industrial wastewater treatment

- 4.5.13 The Proposed Development will be designed to recycle water back into the process wherever possible, using treatment facilities within the Main Site. Industrial wastewater will be exported for any required treatment and discharge using a replacement for an existing disused pipeline. The pipeline to be replaced runs from the Main Site, through an existing tunnel under the River Tees and along the northern side of the Dabholm Gut in South Tees. It will be then necessary to construct a new connecting pipeline into NWL's Bran Sands Wastewater Treatment Works (WwTW). The pipeline will carry industrial wastewater treated using the treatment plant on the Main Site for any required additional treatment and appropriate discharge from Bran Sands WwTW.
- 4.5.14 Currently, Bran Sands WwTW discharges treated wastewater to Dabholm Gut, which in turn discharges to the Tees Estuary. NWL is proposing to construct a long sea outfall (LSO) underground northward from Bran Sands to Tees Bay. NWL is in the process of submitting a planning application for the LSO to Redcar and Cleveland Borough Council as the Local Planning Authority which is currently at the scoping stage (planning application reference R/2026/0419/SCP). This LSO will comprise an approximately 3km onshore and 4.5km offshore pipeline and is planned to be operational by 2030. The LSO will divert treated wastewater discharges from the Tees Estuary to the North Sea to reduce nutrient nitrogen concentrations within the Tees Transitional Waterbody and Tees Bay. When operational, this LSO will discharge treated wastewater from industries within Teesside including the Proposed Development.

Surface water drainage, attenuation and discharge

- 4.5.15 Site drainage systems will collect surface water and direct it to a series of attenuation (balancing) ponds where it will be tested prior to being pumped and discharged to the Tees via a relocated outfall located to the south of the new quay (**Work No. 6B**). In the event of contamination being identified, the water will either be treated on site and discharged under the environmental permit requirements or tankered off site for treatment or disposal.

Potable/mains water supply

- 4.5.16 It is proposed that potable water will be supplied by NWL to the Proposed Development via existing or new potable mains water connections (which will be provided by NWL subject to further survey and engineering work to be undertaken by NWL) within the Main Site and directed to NWL water supply infrastructure located within the Wider Site. Raw water connections will be developed by NWL.

Other infrastructure (Work Nos. 5, 13 and 14)

- 4.5.17 The Proposed Development will also include:
- crossings over or under existing infrastructure, including a temporary modular bridge over the Linkline corridor which is described further in **Chapter 5: Construction Programme and Management (ES Volume I, Application Document Ref. 6.1)**;
 - temporary construction compound and laydown areas on the Main Site and Wider Site (**Work No. 13**);
 - permanent laydown and storage within the Main Site (**Work No. 13**); and
 - access, use of and maintenance of private roads, including improvement works and access points required for both construction and operation (**Work No.14**).

Chemical and material storage

- 4.5.18 All potentially hazardous raw materials, chemicals, intermediates and products will be stored in appropriate bunded vessels and managed in accordance with an Environmental Permit that will be regulated by the Environment Agency (EA). Where any substance could pose a risk to the environment through its uncontrolled release (e.g. surface water drains), the substance will be stored within appropriate containment facilities

including impermeable concrete surfaces and appropriately designed and sized bunds.

- 4.5.19 The inventory of materials to be stored on the Main Site will be developed through the detailed design. However, where storage of hazardous materials, individually or in-combination exceeds the relevant thresholds, separate permissions will be sought from the Health and Safety Executive (HSE) and local planning authority as appropriate for their storage, under the Planning (Hazardous Substances) Regulations 2015 and Control of Major Accident Hazards Regulations 2015 (COMAH) regimes. An Environmental Permit will be required for the operation of the Proposed Development which will include conditions on the storage of all chemicals with the potential to cause pollution.
- 4.5.20 The SAF process, pre-treatment units and the CHP plant will all produce solid waste streams which will be handled, treated and recovered or disposed of in accordance with permitting requirements and waste legislation.

Heavy Goods Vehicle (HGV) movements

- 4.5.21 Heavy Goods Vehicles (HGVs) will use the A1185 to access the Site. Operational traffic movements are described in **Chapter 18: Traffic and Transport (ES Volume I, Application Document Ref. 6.1)**. In summary it is anticipated that during the operational phase of the Proposed Development, total HGV movements at the Main Site will be up to 141 one-way movements per day. These figures include movements associated with delivery of consumables and removal of waste products. The air quality, noise and transport assessments (**Chapter 8: Air Quality, Chapter 9: Noise and Vibration and Chapter 18: Traffic and Transport respectively (ES Volume I, Application Document Ref. 6.1)**) consider impacts associated with operational traffic.
- 4.5.22 Construction traffic movements are described in **Chapter 5: Construction Programme and Management (ES Volume I, Application Document Ref 6.1)** and are also assessed in **Chapter 8: Air Quality, Chapter 9: Noise and Vibration and Chapter 18: Traffic and Transport respectively (ES Volume I, Application Document Ref. 6.1)**.

Landscaping and biodiversity

- 4.5.23 **A Framework Landscape and Biodiversity Management Strategy (Application Document Ref. 5.8)** accompanies the DCO Application and sets out the principles of habitat creation, management and enhancement and amenity landscaping that will be adopted in the detailed design

process. Implementation of the proposed measures is secured by Schedule 2 (Requirements) of the **draft DCO (Application Document Ref. 3.1)**.

Security fencing and gates

- 4.5.24 Security measures will be provided across the Main Site where required, such as fencing, gates, lighting, intruder alarms, CCTV and other measures. Temporary compounds on the Wider Site will also require appropriate security measures during construction.
- 4.5.25 Implementation of suitable measures is secured Requirements (Schedule 2) to the **draft DCO (Application Document Ref. 3.1)**.

4.6 Design parameters

- 4.6.1 Further to the Applicant's use of the Rochdale Envelope approach described in **Chapter 2: Assessment Methodology (ES Volume I, Application Document Ref. 6.1)**, the design of the Proposed Development is not yet finalised and will not be completed until the detailed design phase. However, the final design will be within the parameters assessed in the EIA including the physical design parameters presented in Table 4.1. The evolution of the Proposed Development to date is outlined in **Chapter 6: Alternatives (ES Volume I, Application Document Ref. 6.1)**.
- 4.6.2 Wherever an element of flexibility is required to be maintained within the design, each technical assessment has considered which scenario represents a worst-case for likely environmental effects and that scenario has been described and assessed in the associated chapter.
- 4.6.3 Table 4.1 sets out the maximum parameters that will be consented under the DCO for the principal components of the Proposed Development, which will be secured via the parameters table within Schedule 2, Requirements of the **draft DCO (Application Document Ref. 3.1)**. These parameters have been used as the basis for the technical assessments undertaken and presented in this ES. Maximum parameters including heights of tallest elements, along with their footprints and massing, have been devised to enable the EIA to provide a robust assessment based on a reasonable and appropriate worst-case option.
- 4.6.4 Six main emission points (stacks) have been identified as requiring air dispersion modelling to inform the EIA – one for feedstock pre-treatment (**Work No. 1A**), four for SAF production (**Work No. 1B**) and one for the CHP plant (**Work No. 2**). The heights of the tallest of these (the exhaust

stacks from the feedstock pre-treatment process (**Work No. 1A**) and the CHP plant (**Work No. 2**) are specifically secured by Schedule 2 of the **draft DCO (Application Document Ref. 3.1)**, which also specifically secures the height of the flare structures in **Work No. 1C**, in accordance with the maximum parameters set out in Table 4.1 below. The heights of stacks in **Work No. 1B** are not specified in Table 4.1 because they will be lower than the 95m maximum height parameter for **Work No. 1B**. The exact positions of the emission stacks and the flare structures cannot be fixed until the detailed design stage as they will depend on the final technical configuration and plant optimisation, but their locations are restricted to the relevant Works Areas within the Main Site as shown on the **Works Plans (Application Document Ref. 2.3)**. Several other smaller stacks will also be required within the Main Site – their heights will be controlled by the maximum height for the relevant Work No. as set out in Table 4.1 and secured by Schedule 2 of the **draft DCO (Application Document Ref. 3.1)** but the final number of stacks cannot be confirmed as this is subject to detailed design which has not yet been completed.

- 4.6.5 For the purposes of the air quality and landscape and visual amenity assessments, the stacks have been assessed at representative locations within the Main Site at this stage. The assessments reported in the technical chapters of the ES demonstrate that the realistic worst-case impacts at different receptors have been presented.
- 4.6.6 Similarly, for noise and vibration, to ensure that the impact assessment presented is robust and conservative, a number of plant configurations have been assessed to determine a worst case. **Chapter 9: Noise and Vibration (ES Volume I, Application Document Ref. 6.1)** describes this further.
- 4.6.7 In assessing landscape and visual effects, the assessment is based upon the largest possible dimensions for the Proposed Development, and worst-case flare and stack heights of up to 140m AGL, to represent the realistic worst case scenario. **Chapter 13: Landscape and Visual Amenity (ES Volume I, Application Document Ref. 6.1)** describes this further.

Table 4.1 Design parameters of the Proposed Development

Component of the Proposed Development	Maximum Length of component (m)	Maximum Width of component (m)	Maximum height above ground level of the tallest building/ structure (mAGL)	Indicative maximum height (mAOD as defined upper limit) based on development platform at 5.1mAOD and quay topside elevation at 6.0m AOD
Feedstock Pre-Treatment (Work No. 1A)	400	100	75 (buildings)	80.1
	6m outer diameter		100 (stack)	105.1
SAF Production (Work No.1B)	235	100	95 (column)	100.1
Flare structure(s) (Work No. 1C)	24 (at base)	24 (at base)	140 (flare structure)	145.1
CHP Plant (Work No. 2)	200	125	100 (buildings)	105.1.1
	6m outer diameter		140 (stack)	145.1
Feedstock Reception and Storage (multiple blocks) (Work No. 3)	500	335	90 (including conveyor)	95.1
Cooling Towers (Work No. 4)	180	60	40 (cooling towers)	45.1
Quay (Work No. 6B)	300	50	60 (ship unloaders)	66.0
			70 (cranes)	76.0
ASU (Work No. 9B)	245	130	65 (main plant)	70.1

- 4.6.8 In addition to a development platform level of 5.1m Above Ordnance Datum (AOD), further flood mitigation measures are proposed for critical operational infrastructure within the plant as defined in the **Flood Risk Assessment (Application Document Ref. 5.7)** which provide an additional level of resilience.

4.7 Proposed Development operation

Hours of operation

- 4.7.1 The Proposed Development will be capable of operating for 24 hours a day, 7 days a week. Following start-up, it is envisaged that the plant will remain in continuous operation for a period of up to 36 months before a routine maintenance shut-down.

Operational staff and access

- 4.7.2 Operation of the Proposed Development is anticipated to create over 300 full-time operational roles.
- 4.7.3 Plant operative staff are likely to work on a two 12-hour shift pattern, with the first shift between 07:00 - 19:00 and the second between 19:00 - 07:00.
- 4.7.4 Administrative staff will typically work an office-hour pattern of 08:30 – 16:30.
- 4.7.5 Operational access to the Main Site and associated utility connections in North Tees will be via Seal Sands Road which connects to the trunk road network via the A1185 and the A689/A19.
- 4.7.6 In South Tees, access for operational traffic undertaking inspection and maintenance of utility connections will be from the Wilton International North Gate located off the A1085 Steelhouse Gate Roundabout and then via the internal Sembcorp Road network to Dabholm Gut, or alternatively, via the A1053, Tees Dock Road.

4.8 Process inputs

- 4.8.1 The Proposed Development will use various consumables during operation delivered to the Proposed Development by road. Storage capacity at the Main Site has been designed to reflect the process requirements and delivery capability. Materials including chemicals to be stored and used within the Main Site will be subject to control via the Environmental Permit, COMAH Regulations (if applicable) and other necessary consents required.

Maintenance

- 4.8.2 The objective of plant maintenance is to ensure that the Proposed Development, including connection corridors, operates safely and reliably.
- 4.8.3 During scheduled, routine maintenance periods lasting typically 4-6 weeks approximately every 36 months, there will be approximately 300 additional contractors working within the Main Site. They will use temporary laydown and welfare facilities within a dedicated area within the Main Site. HGV movements are anticipated to be similar to or less than normal operation.
- 4.8.4 Plant, equipment and process units will be taken offline during maintenance periods in order to undertake routine maintenance activities, which will include:
- inspection of safety critical equipment;
 - calibration, testing and certification of safety and process control systems;
 - planned, preventative maintenance;
 - replacement or repair of equipment subject to corrosion, erosion or other damage;
 - replacement or regeneration of process catalysts, absorbents and adsorbents;
 - internal cleaning of process equipment to restore performance.
- 4.8.5 The assessment of operational impacts in **Chapters 8-21 (ES Volume I, Application Document Ref. 6.1)** includes consideration of maintenance activities.

Hazard prevention and emergency planning

- 4.8.6 The Applicant aims to protect human health by safely and responsibly managing activities on the Site. A Construction Phase Plan will be prepared in accordance with the Construction (Design and Management) Regulations 2015 (CDM Regulations) [Ref 8] for the construction phase, together with separate health and safety management arrangements for commissioning and operation.
- 4.8.7 For design and construction, a competent and adequately resourced Principal Designer and Principal Contractor will be appointed. The Applicant will ensure that its own staff, its designers and contractors comply with the CDM Regulations 2015 and associated HSE guidance on the CDM Regulations [Ref 9].

- 4.8.8 Prior to operation, the Applicant will prepare an on-site emergency plan in consultation with site personnel, the emergency services and relevant health authorities. The Applicant will also provide the local authority with the information required to prepare an off-site emergency plan. Both plans will be tested periodically and reviewed and updated as necessary, at intervals not exceeding three years. Procedures will be subject to audit and contingency plans written in preparation for any unexpected complications.
- 4.8.9 The inventory of hazardous substances on the Main Site will be finalised during detailed design. The Applicant will notify the Competent Authority and submit a safety report under the COMAH Regulations 2015, and will apply to the Hazardous Substances Authority for Hazardous Substances Consent where required.
- 4.8.10 The Environmental Permit from the EA for the operation of the Proposed Development will include conditions on the storage of all chemicals with the potential to cause pollution.
- 4.8.11 The HSE is a statutory consultee for all applications for development consent under the PA 2008, including the Proposed Development. Therefore, consultation with the HSE has been undertaken and engagement will be ongoing through the detailed design and pre-construction phase as the HSE is part of the Competent Authority under the COMAH Regulations 2015.
- 4.8.12 The Proposed Development is using 'safety in design' principles to take into consideration safety issues and risks and to enable the ongoing design to reduce risks from the installation as a whole to "as low as reasonably practicable" (ALARP). As part of the layout evolution, the following safety in design mitigation hierarchy has been adopted:
- Eliminate;
 - Reduce;
 - Isolate;
 - Control;
 - Personal Protection; and
 - Develop Procedures.
- 4.8.13 The design safety management process involves a number of safety engineering activities including Hazard Identification (HAZID) and

Environmental Hazard Identification (ENVID) studies, Hazard and Operability (HAZOP) studies, Safety Integrity Level (SIL) assessment, Layer of Protection Analysis (LOPA), Quantitative Risk Assessment (QRA) including ALARP demonstration, fire, explosion, toxic and flammable gas risk assessment, Occupied Buildings Risk Assessment (OBRA), Escape, Evacuation and Rescue Analysis (EERA), Hazardous Area Classification (HAC), Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002 [Ref 10] Assessment, and constructability reviews.

- 4.8.14 A QRA and a fire, explosion, toxic and flammable gas consequence analysis were completed during the Front End Engineering Design (FEED) study based on the design, systems and operating philosophy developed at that stage. Their purpose was to quantify the consequences and risks associated with the major accident hazards identified through the HAZID and HAZOP studies, identify any significant safety concerns or regulatory compliance issues, and provide recommendations for progression into detailed design.
- 4.8.15 The safety programme will be developed further during the detailed design stage, including activities such as Safety Instrumented System (SIS) verification and validation, explosion protection documentation, 3D fire and gas detector mapping and a Pre-Start-up Safety Review.
- 4.8.16 **Chapter 19: Major Accidents and Disasters (ES Volume I, Application Document Ref. 6.1)** provides an assessment of effects of the Proposed Development on the environment arising from the vulnerability of the Proposed Development to risks of relevant major accidents or disasters, including measures envisaged to prevent or mitigate any likely significant adverse effects and details of preparedness for and response to emergencies.

External lighting

- 4.8.17 A Framework Lighting Strategy is provided in **Appendix 13C: Framework Lighting Strategy (ES Volume III, Application Document Ref. 6.3)** and lighting is controlled by Schedule 2 (Requirements) to the **draft DCO (Application Document Ref. 3.1)**. A detailed lighting scheme will be submitted to the local planning authority for approval. The external lighting scheme will be designed in accordance with relevant standards, including the Guidance Notes for the Reduction of Obtrusive Light (2020) published by the Institute of Lighting Engineers [Ref 3] and/or Chartered Institution Building Services Engineers (CIBSE) requirements, as appropriate.

- 4.8.18 The external lighting scheme will be designed to provide safe working conditions in all relevant areas of the Proposed Development whilst reducing light pollution and the visual impact on the local environment.

4.9 Routine and emergency access/egress

- 4.9.1 Permanent access to the Main Site (including to the ASU) during operation will be from Seal Sands Road via the A1185 from the A1/A19 junction (**Figure 4.1: Indicative Proposed Development Layout, ES Volume II, Application Document Ref. 6.2**).

- 4.9.2 The Main Site will include a main car park, including muster point(s) in the event of emergency, manned gatehouse(s), and control building(s) which would be designed as a place of safety in the event of emergency. Secondary emergency accesses (both pedestrian and vehicular) from the Main Site will be available onto Seal Sands Road. The emergency access(es) will be gated, and under normal operation this gate(s) will be closed and unmanned. The locations of these access points are illustrated on **Figure 4.1: Indicative Proposed Development Layout (ES Volume II, Application Document Ref. 6.2)**. The adequacy of escape routes, muster point locations, and places of safety for all on-site personnel - including those working in remote areas of the facility - will be confirmed through the EERA.

4.10 Decommissioning

- 4.10.1 At the end of its operating life, the most likely scenario is that the Proposed Development will be decommissioned, noting that the quay has been designed to be retained for potential use by future developments if required.
- 4.10.2 The design of the Proposed Development will seek to use recyclable materials wherever possible to aid recycling of materials during the decommissioning and demolition phase. It is expected that the bulk of the relevant plant and equipment will have some limited residual value as scrap or recyclable materials, and the demolition contractor will be encouraged to use demolition working practices that enable effective recycling of the construction materials used.
- 4.10.3 Prohibited materials such as asbestos, polychlorinated biphenyls (PCBs), ozone depleting substances and carcinogenic materials will not be used within the design of the Proposed Development. Other materials recognised to pose a risk to health, but which are not prohibited, will be subject to a detailed risk assessment.

- 4.10.4 Prevention of contamination is a specific requirement of the Environmental Permit for the operation of the Proposed Development and therefore it is being designed such that it will not create any new areas of ground contamination or pathways to receptors from construction or operation. Once the relevant plant and equipment have been removed to ground level, it is expected that the hardstanding and sealed concrete areas will be left in place. Any areas of the Proposed Development which are to be decommissioned and that are below ground level will be backfilled to ground level to leave a levelled area.
- 4.10.5 In accordance with Schedule 2 (Requirement) to the **draft DCO (Application Document Ref. 3.1)**, within two years of the date that the Applicant decides to decommission any part of the Proposed Development, a Decommissioning Environmental Management Plan (DEMP) for that part will be produced and agreed with the relevant planning authority. The DEMP(s) will consider in detail all potential environmental risks and contain guidance on how risks can be removed, mitigated or managed. This will include details of how surface water drainage should be managed during decommissioning and demolition and whether certain parts of the Proposed Development will remain in situ.
- 4.10.6 It is anticipated that it will take up to a year to decommission the Main Site, with demolition following thereafter, taking at least two years to complete. Any demolition contractor will have a legal obligation to consider decommissioning and demolition requirements under the CDM Regulations 2015, or the equivalent prevailing legislation at that time.
- 4.10.7 Decommissioning activities will be conducted in accordance with the appropriate guidance and legislation at the time of the Proposed Development's closure and in accordance with the approved DEMP (unless otherwise agreed with the Local Planning Authority). All decommissioning activities will be undertaken in accordance with the waste hierarchy.
- 4.10.8 Prior to removing the relevant plant and equipment, all residues and operating chemicals will be cleaned out from the plant and disposed of in an appropriate manner. Materials and waste produced during decommissioning and demolition will be stored in segregated areas to maximise reuse and recycling. All materials that cannot be reused or recycled will be removed from the Proposed Development and transferred to suitably permitted waste recovery/disposal facilities. It is anticipated that a large proportion of the materials resulting from demolition will be recycled.

- 4.10.9 Upon completion of the decommissioning programme, including any remediation works that might be required, the EA will be invited to witness a post-decommissioning inspection by site staff. Records from the decommissioning process will be made available for inspection by the EA and other relevant statutory bodies, in accordance with the Environmental Permit requirements.

4.11 Elements of the Proposed Development consented under a Deemed Marine Licence

Quay works

- 4.11.1 In England, the Marine and Coastal Access Act (2009) (MCAA) requires that a Marine Licence (ML) is required for certain 'licensable activities' within the UK Marine Area (Section 42, MCAA). These activities include deposits, removals and construction/'alteration' works (Section 66, MCAA) which are below Mean High Water Springs (MHWS).
- 4.11.2 A ML can be issued via a 'standalone' Marine Licence Application (MLA) or a licence 'deemed' within the body of the DCO i.e. a Deemed Marine Licence (DML). The Marine Management Organisation (MMO) is the body responsible for issuing, revoking and enforcing a ML, other than where a licence is in the form of a DML, in which case the Secretary of State has the power to grant it. The MMO remain responsible for enforcing, post consent monitoring, varying, suspending and revoking any DML.
- 4.11.3 The construction of the quay will involve activities below Mean High Water Springs within the Tees Estuary and will thus require an ML from the MMO. The Application therefore includes a request to grant a DML within Schedule 10 of the **draft DCO (Application Document Ref. 3.1)** for the construction and operation of the quay (**Work No. 6C**) (including offshore disposal of dredgings).

Tees crossings

- 4.11.4 Following consultation with the MMO there is no identified need for a ML for the components of the Proposed Development using either existing pipeline or tunnel infrastructure which are wholly under the river bed of the River Tees (**Works Nos. 9A and 10**). This is because use of these existing crossings will not adversely affect any part of the environment of the UK marine area or the living resources that it supports; and so are not included in the DML within the **draft DCO (Application Document Ref. 3.1)**.

References

- Ref 1 PINS (2026) Nationally Significant Infrastructure Projects: Pre-Application Advice on Environmental Impact Assessment. Available online: <https://www.gov.uk/guidance/nationally-significant-infrastructure-projects-pre-application-advice-on-environmental-impact-assessment> [Accessed August 2026]
- Ref 2 European Union (2024) Industrial Emissions Directive 2010/75/EU. Available online: <https://eur-lex.europa.eu/eli/dir/2010/75/oj/eng> [Accessed September 2026]
- Ref 3 The Institute of Lighting Engineers (2021) Guidance Notes for the Reduction of Obtrusive Light (GN01). Available online: <https://theilp.org.uk/resource/gn01-ilp-guidance-note-1-the-reduction-of-obtrusive-light-2021.html> [Accessed July 2026]
- Ref 4 Department for Transport (2026) Sustainable Aviation Fuel (SAF) Mandate. Available online: <https://www.gov.uk/government/collections/sustainable-aviation-fuel-saf-mandate> [Accessed August 2026]
- Ref 5 Department for Transport (2026) Renewable Transport Fuel Obligation (RTFO) and SAF Mandate technical information. Available online: <https://www.gov.uk/government/publications/rtfo-and-saf-mandate-technical-information> [Accessed September 2026]
- Ref 6 H.M. Government (2026) Decarbonisation readiness in environmental permit applications. Available online: <https://www.gov.uk/government/publications/decarbonisation-readiness-in-environmental-permit-applications/decarbonisation-readiness-in-environmental-permit-applications> [Accessed September 2026]
- Ref 7 H.M. Government (2016) The Environmental Permitting (England and Wales) Regulations 2016 (SI 2016 No. 1154). Available online: <https://www.legislation.gov.uk/ukxi/2016/1154/contents/made> [Accessed August 2026]
- Ref 8 H.M. Government (2015) The Construction (Design and Management) Regulations 2015. Available online: <https://www.legislation.gov.uk/ukxi/2015/51/contents> [Accessed August 2026]
- Ref 9 Health and Safety Executive (2015) Managing health and safety in construction ("L153"). Available online: <https://www.hse.gov.uk/pubns/priced/l153.pdf> [Accessed August 2026]

- Ref 10 H.M. Government (2002) The Dangerous Substances and Explosive Atmospheres Regulations 2002. Available online:
<https://www.legislation.gov.uk/uksi/2002/2776/contents> [Accessed August 2026]



www.lighthousegreenfuels.co.uk

