PROJECT DRAGON

A sustainable aviation fuel (SAF) production facility, Land at Crown Wharf, Port Talbot Docks

DESIGN AND ACCESS STATEMENT

Document	2143.01-IA-XX-XX-RP-A-0910 P6 Design and Access Statement
Date Issued	14th August 2023
Author	CH/NC
Checked	NC
Authorised	NC
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Wales office: 28 Cathedral Road, Cardiff, CF11 9HB – 02920 109135 England Office: Heywood House, Heywood, BA13 4NA – 01749 605006

Contents:

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1.0 Summary of the Proposal

1.1 Applicant & Agent

The applicant is LanzaTech UK Limited. (Link to LanzaTech website)

The agent is Turley Associates Limited. Contact: Jadine Berry e: jadine,berry@turley.co.uk t: 0117 989 7000. All contact regarding the planning application is to be via the agent.

1.2 Site Location

The site is located at Crown Wharf, Port Talbot, SA13 1RB.
What three words: Loft.counters.automate.
Co-ordinates: 51.582969,-3.784794

1.3 Proposals summary

This development is a facility for the manufacture of sustainable aviation and sustainable diesel fuels. Sustainable fuels of the types proposed are used to replace fossil fuels thereby reducing CO2 emissions and the climate change effects of aviation, road and rail vehicles, and small power generation.

Physically, this development involves demolition of existing structures and erection of a Sustainable Aviation Fuel (SAF) production facility, including enclosed ground flare, storage tanks, installation of pipework and electrical, processing and utility equipment, administration, warehouse and laboratory buildings, new access, car parking and transport infrastructure including a truck loading area and associated works, hard and soft landscaping, areas for temporary construction laydown, and associated development.

The wider development also involves establishment of shipping links to the facility via the construction of a loading/unloading jetty; these aspects will be covered under a separate application and / or appropriate marine licenses. Once operational, the development, will provide up to 130 - 150 FTE jobs, many of which are for high-skill / high-value positions. The development will also provide a wide range of other jobs in the wider community in support of the proposed operation.

1.4 Application Type

This application is for full planning permission.

1.5 Application information

This application includes architectural information as listed overleaf:

OrganisationEcom	Role
LanzaTech Uk	*Applicant*
Turley	*Planning consultant*
Turley	*EIA assessment*
EDP	*Archaeology and Heritage*
Turley	*Sustainability*
Turley	*Economics*
Turley	*Strategic communications*
Turley	*LVIA*
Karius	*Air quality*
JBA Consulting	*Flood risk and drainage*
Hunter Acoustics	*Acoustic*
EDP	*Landscape*
RPS	*Ecology*
SCP Transport	*Highways and transport*
Part B	*Fire Risk Assessment*
AECOM	*Lighting Assessment*
Technip	*Engineering Contractors*
Inspire Architects	*Architecture*

***Table 1** – Navigation table to application document contents*

Source	Doc No	Revision	Document Name	Description
Turley			Covering Letter	
Turley			Application Form and Certificates	
Turley			Planning Statement including Draft Planning Obligations	
Turley Strategic Communications			Pre-Application Consultation (PAC) Report	
Turley Sustainability			Sustainability and Energy Statement	
SCP			Transport Assessment (including Transport Implementation Strategy and access plans)	
JBA			Flood Consequence Assessment	
JBA			Outline Drainage Strategy	
EDP			Landscape Strategy	
EDP			Arboricultural Baseline Report (inc. Tree Survey)	
EDP			Archaeology and Heritage Assessment	
TEC Consulting			PDZ Phase 1 Report	
TEC Consulting			PDZ Desk Study	
TEC Consulting			Margam Wharf Phase 1 Report	
TEC Consulting			Detailed UXO Risk Assessment	
Stopford			Preliminary Waste Management Plan	
AECOM			Lighting Strategy	
Fire Strategy			Part B	
Odour Note			LanzaTech	
Framework Construction Environmental Management Plan			Technip	

Table 2 (continued overleaf) – List of application contents

Source	Doc No	Revision	Document Name	Description
			Environmental Statement Chapters	
Turley EIA			Major Accidents and/or Disasters	
Turley EIA			Terrestrial Ecology	
Turley EIA			Landscape and Visual	
Turley EIA			Socioeconomics and Human Health	
Turley EIA			Climate Change	
Turley EIA			Air Quality	
Turley EIA			Noise and Vibration	
Turley EIA			Marine Ecology	
Turley EIA			Environmental Management Plan	
			Appendices to the Environmental Statement	
RPS			Ecological Impact Assessment	
RPS			Maintenance Plan	
RPS			Mitigation and Enhancement Strategy	
Turley LVIA			Townscape, Landscape and Visual Impact Assessment (Appendix 8.1)	
Ocean CGI			Verified Visualisations (Appendix 8.2)	
Kairus			Air Quality Assessment	
Hunter Acoustics			Construction Noise Assessment (Appendix 12.2)	
Hunter Acoustics			Operational Noise Impact Assessment (Appendix 12.3)	
Marine Space			Underwater Noise Modelling (Appendix 13.1)	

Table 2 *(continued overleaf) – List of application contents*

Source	Drawing Number	Revision	Drawing Name	Description
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0100	P12	Site location plan	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0101	P7	Site location plan – Ownership Boundaries	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0200	P10	Existing site key plan	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0201	P8	Existing site plan (Area 1)	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0202	P8	Existing site plan (Area 2)	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0203	P8	Existing site plan (Area 3)	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0204	P8	Existing site plan (Area 4)	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0210	P9	Proposed site key plan	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0211	P10	Proposed site plan (Area 1)	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0212	P10	Proposed site plan (Area 2)	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0213	P10	Proposed site plan (Area 3)	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0214	P11	Proposed site plan (Area 4)	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0215	P10	Proposed PDZ layout & equipment list	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0216	P7	Proposed PDZ layout – external surface finishes	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0217	P8	Proposed site plan – PDZ & temp. construction areas	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0220	P8	Proposed site key plan – EIA boundary shown	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0227	P8	Site location plan – EIA boundary shown	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0228	P7	Existing site key plan – EIA boundary shown	
Inspire Architects	2143.01-IA-ZZ-ST-DR-A-0240	P4	Proposed Site Fencing Layout	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0400	P8	Existing site sections	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0401	P8	Proposed site sections – sheet 1 of 2	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0402	P8	Proposed site sections – sheet 2 of 2	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0500	P4	Proposed zone 1 plant elevations – enclosed ground flare	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0501	P5	Proposed zone 2 plant elevations – substation 3000 & collection basin	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0502	P5	Proposed zone 3 plant elevations	

***Table 2** (continued overleaf) – List of application contents*

Source	Document Number	Revision	Document Name	Description
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0503	P5	Proposed zone 4 plant elevations – tanker loading	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0504	P5	Proposed zone 5 plant elevations – sustainable diesel tanks	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0505	P5	Proposed zone 6 plant elevations – ethanol tanks	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0506	P5	Proposed zone 7 plant elevations – process modules	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0507	P5	Proposed zone 8 plant elevations – sustainable aviation fuel tanks	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0508	P5	Proposed zone 9 plant elevations	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0509	P4	Proposed zone 10 plant elevations – hydrogen generation	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0510	P5	Proposed zone 11 plant elevations	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0511	P5	Proposed zone 12 plant elevations –metering & water tanks	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0512	P5	Proposed zone 13 plant elevations – water package & tank	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0513	P5	Proposed zone 14 plant elevations	
Inspire Architects	2143.01-IA-ZZ-ZZ-DR-A-0514	P4	Proposed zone 15 plant elevations – substation 2000 & liquid nitrogen storage	
Inspire Architects	2143.01-IA-01-ZZ-DR-A-0300	P6	Proposed process control building plans	
Inspire Architects	2143.01-IA-01-ZZ-DR-A-0301	P6	Proposed process control building elevations	
Inspire Architects	2143.01-IA-02-ZZ-DR-A-0300	P7	Proposed laboratory plans and elevations	
Inspire Architects	2143.01-IA-03-ZZ-DR-A-0300	P7	Proposed gatehouse 1 plans and elevations	
Inspire Architects	2143.01-IA-04-ZZ-DR-A-0300	P6	Proposed gatehouse 2 plans and elevations	
Inspire Architects	2143.01-IA-05-ZZ-DR-A-0300	P8	Proposed workshop plans and elevations	
Inspire Architects	2143.01-IA-06-ZZ-DR-A-0300	P7	Proposed warehouse store plans and elevations	
Inspire Architects	2143.01-IA-07-ZZ-DR-A-0300	P4	Proposed compressor house 1 plans and elevations	
Inspire Architects	2143.01-IA-08-ZZ-DR-A-0300	P4	Proposed compressor house 2 plans and elevations	
Inspire Architects	2143.01-IA-09-ZZ-DR-A-0300	P7	Proposed admin building plans and elevations	
Inspire Architects	2143.01-IA-10-ZZ-DR-A-0300	P2	Proposed amenity shelter 1 plans and elevations	
Inspire Architects	2143.01-IA-11-ZZ-DR-A-0300	P2	Proposed amenity shelter 2 plans and elevations	
Inspire Architects	2143.01-IA-12-ZZ-DR-A-0300	P2	Proposed cycle store plans and elevations	
Inspire Architects	2143.01-IA-XX-XX-RP-A-0910	P4	Design and Access Statement	

***Table 2** (continued overleaf) – List of application contents*

1.0 Summary of the Proposal

1.6 Consultation and Collaboration

This planning application has been informed by extensive and detailed discussions with officers across various disciplines at Neath Port Talbot Council (NPTC), as well as other stakeholders. Further information is detailed in the accompanying Planning Statement and Pre-application Consultation Report.

Discussions with officers at NPTC have progressed over the past two years from the very early stages of the proposal and the open nature of the pre-application process illustrates the collaborative approach taken by LanzaTech. Initial discussions with NPTC's Development Management team started in 2021 and regular pre-application meetings have taken place throughout 2023. These have involved planning, environmental, highways and other specialist officers. LanzaTech has also facilitated joint meetings with NRW and NPTCBC, where relevant. These covered key crossover topics, such as noise, air quality and marine / permitting elements. The feedback received throughout pre-application discussions has informed the design evolution and technical detail set out in this planning application.

ABP is the landowner of the PDZ and the majority of the land within the site boundary. LanzaTech has actively engaged with ABP throughout the project development process, which has included bi-weekly meetings to discuss the various elements of the proposed development and any associated agreements. This demonstrates the commitment of both LanzaTech and ABP to the successful delivery of the proposed development.

LanzaTech launched its initial communications website in respect of the project in April 2023 and has hosted a number of public consultation events in the local community. The proposal was well received, with recognition of the site's context, potential, the need to decarbonise and the opportunities associated with the production of sustainable aviation fuel. Comments raised regarding environmental topics, biodiversity and health and safety have been addressed as part of this planning submission. Items such as flare design and the prominence of the development have been modified to reflect comments and guidance received.

LanzaTech also completed the mandatory Pre-application Consultation (PAC) process with owners / occupiers, community consultees and specialist consultees during August 2023. The process was carried out in accordance with The Town and Country Planning (Development Management Procedures) (Wales) Order 2012.

1.0 Summary of the Proposal

1.7 Planning Policy Compliance

The Development Plan comprises Future Wales: The National Plan 2040 (February 2021) and the adopted Neath Port Talbot Council Local Development Plan ("LDP"), adopted in January 2016. The LDP guides the future development for NPTC, and sets out where, when, and how much new development can take place during the plan period (2011 to 2026). The proposed development has been assessed against the policies contained in these documents. A Planning Policy Matrix (included within the submitted Planning Statement) sets out each policy in detail and provides an analysis demonstrating how the application proposal complies with the requirements of each. Specifically, in terms of policy relating to design, ***Policy BE1 (Design)*** *states that all development proposals are expected to demonstrate high quality design which considers the natural, historic, and built environmental context, and contributes to the creation of attractive, sustainable places. The Policy states that proposals will only be permitted where specified criteria are met. It states that:*

"All development proposals will be expected to demonstrate high quality design which fully takes into account the natural, historic and built environmental context and contributes to the creation of attractive, sustainable places. Proposals will only be permitted where all of the following criteria, where relevant, are satisfied:
1. It complements and enhances the character and appearance of the site, building or area in terms of siting, appearance, scale, height, massing and elevation treatment; 2. It respects the context of the site and its place within the local landscape, including its impact on the important arterial gateways into the County Borough, its effects on townscape and the local historic and cultural heritage and it takes account of the site topography and prominent skylines or ridges; 3. It utilises materials appropriate to its surroundings and incorporates hard and soft landscaping and screening where appropriate; 4. It would not have a significant adverse impact on highway safety, the amenity of occupiers of adjacent land or the community; 5. Important local features (including buildings, amenity areas, green spaces and green infrastructure, biodiversity and ecological connectivity) are retained and enhanced as far as possible; 6. It achieves and creates attractive, safe places and public spaces, taking account of 'Secured by Design' principles (including where appropriate natural surveillance, visibility, well-lit environments and areas of public movement); 7. It plays a full role in achieving and enhancing an integrated transport and communications network promoting the interests of pedestrians, cyclists and public transport and ensures linkages with the existing surrounding community; 8. It uses resources, including land and energy, as efficiently as possible through: (a) Making the best and most efficient use of the land available through being of appropriate density taking into account the character and appearance of the area, normally a minimum of 35 dwellings per hectare in the Coastal Corridor Strategy Area or a minimum of 30 dwellings per hectare in the Valleys Strategy Area; (b) The layout and form of the development does not preclude the reasonable use of other adjacent land; (c) Developing brownfield land in preference to greenfield land where possible; (d) Minimising building exposure while maximising solar gain. 9. Its drainage systems are designed to limit surface water run-of and food risk and prevent pollution; 10. The layout and design of the development achieves inclusive design by ensuring barrier free environments, allowing access by all and making full provision for people with disabilities"

Policy SP4 (Infrastructure) *states that development will be expected to make efficient use of existing infrastructure, and where required make adequate provision for new infrastructure.*

Policy TR2 (Design and Access of New Development) *states that development proposals will only be permitted where criteria set out in the policy are satisfied. It states that:*

"Development proposals will only be permitted where all of the following criteria, where relevant, are satisfied: 1. The development does not compromise the safe, effective and efficient use of the highway network and does not have an adverse impact on highway safety or create unacceptable levels of trafc generation; 2. Appropriate levels of parking and cycling facilities are provided and the access arrangements for the site allow for the safe manoeuvring of any service vehicles associated with the planned use; 3. The development is accessible by a range of travel means, including public transport and safe cycle and pedestrian routes; 4. Transport Assessments and Travel Plans are provided for developments that are likely to create significant traffic generation".

The site is accessible by sustainable modes of transport, offering future employees a range of transport options. Access to the ABP site entrance on foot and by bike is of a good standard and there are multiple transport connections within close-proximity, which provide access to a range of local destinations. Prospective staff will not be wholly reliant on the private car for travel to work. All relevant design criteria set out in Policy BE1 have been complied with and considered in the evolution of the scheme design which has been designed to ensure compatibility with the surrounding area and environment.

2.0 The Brief

2.1 The Brief

LanzaTech is a carbon capture, transformation and recycling company headquartered in Skokie, Illinois, USA. LanzaTech have developed a novel gas fermentation process that can utilize a range of solid and gases waste materials that are pre-treated before being fed to specially bred microorganisms that produce ethanol. The ethanol is converted into sustainable aviation fuel, sustainable diesel and a wide range of other products.

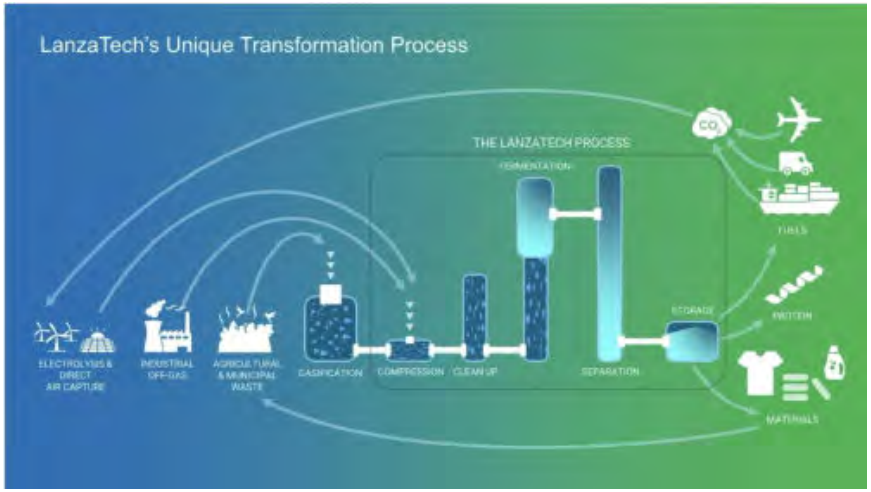
An explanation of this process can be seen in the Turley Environmental Statement chapter 4 and in this external link: Lanzatech process

The brief for this project is to develop a suitable industrial manufacturing facility for the latter stages of this process, the conversion of ethanol to sustainable aviation and sustainable diesel fuels using the LanzaJet ATJ technology.

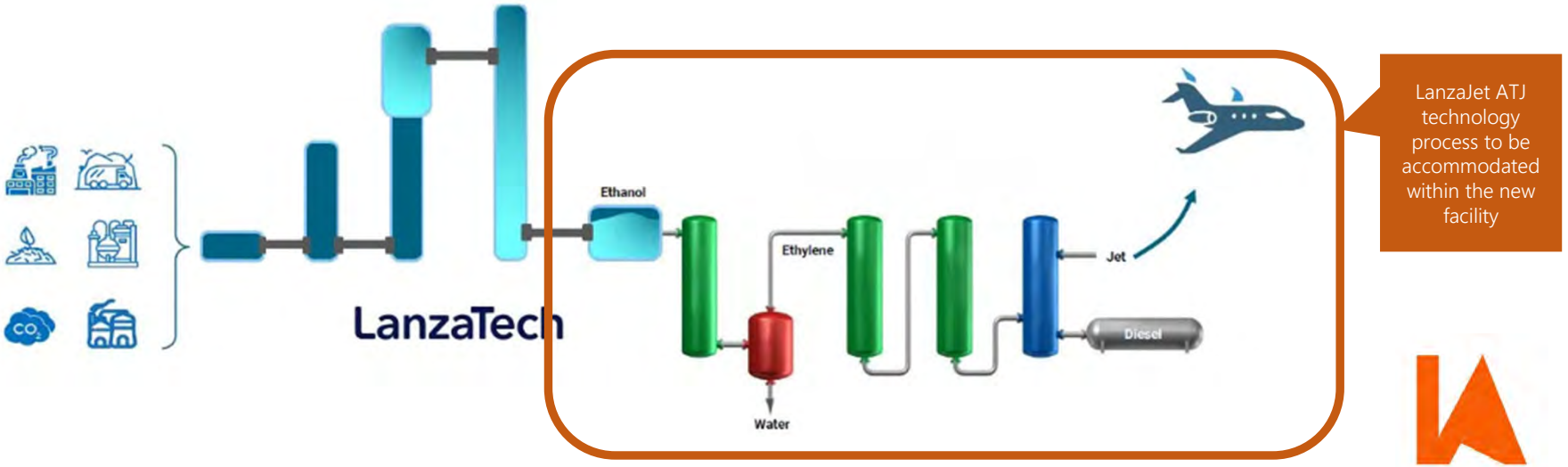
2.2 The Vision

LanzaTech is working towards a post-pollution future in which the carbon needed in fuels and products is recycled in a circular system rather than being sourced from virgin fossil fuels and the proposed development reflects this vision. The proposed facility is envisaged as a long-term, carbon reducing, sustainable source of sustainable aviation and biodiesel fuels that is an asset to Port Talbot and the wider area, providing jobs and contributing to the industrial heritage of the district.

LanzaTech



Figures 1 (top) and 2 (below) *– High level overview of the Lanzatech process*



3.0 Site and Context Analysis

3.1 Site Description

The proposed development site is located on Crown Wharf, Port Talbot Docks and was formerly used in connection with industrial activity. Whilst the land is largely flat, industrial activity has contributed some mounded areas and levelled others (see topographical survey). There is no existing built development on the area of the site to be developed, but to the East of the site are an arrangement of redundant buildings and industrial equipment that may be demolished as required to provide sufficient construction lay down space. Otherwise, the site remains largely empty with a low covering, naturally occurring vegetation typically resembling coastal scrub but also containing Japanese knotweed. Immediately prior to the development of the site, the landowner will carry out extensive works to remove and / or contain the Japanese knotweed, with a process of herbicidal treatment being undertaken in September 2023. To the north of the site there is a quayside allowing maritime access which compliments the nearby road and rail connections in providing ample transport solutions for the proposed facility. The site is particularly well suited to the proposed use in terms of geographical location, previous use, delivery of feedstock material and distribution of product.

Key facts:

- *Application Area: 17.87ha*
- *Site area for development: 9.12ha (Known as the production development zone or PDZ)*
- *Site area required to provide sufficient space for construction and material storage spaces until such time as the development of the PDZ is complete: 8.75ha (Known as the Temporary Construction Areas or TCA's)*
- *GEA of buildings to be demolished: 4,526m2*

3.2 Context

Immediately neighbouring the site are a cement factory, the remaining elements of the steel production facility of which some parts are functional and operational, and a range of other heavy industry employers including construction and crane hire. These uses occupy the low-level land around the harbour. Port Talbot has been notable and distinguished by its long history of heavy industry, particularly metal ore processing which includes tin, copper and ferrous metals, and transportation of coal products. These industries have left a built legacy in the area characterised by tall industrial structures that are particularly visible from the M4 and surrounding hills. It has changed and reshaped the land reclaiming marshland from the estuary and sea. Finally, it has and created a distinct local culture and pride. More widely, there are significant areas of residential housing, other employment uses, and some leisure uses associated with the harbour. The M4 motorway sits within a mile of the site, as does the mainline rail line, both of which are main transportation routes running from South-Western Wales to London.

Away from the flat, low-lying area around the harbour there are extensive hills that form an edge to the settlement running parallel with the M4 motorway. These hills offer a vantage point on to the town, industrial area and harbour including the proposed development site.

Details of the existing site can be found in the following documents:

- *Inspire Architects – Existing site drawings*
- *JBA Consulting - Flood Consequences Assessment*
- *Turley Associates - Environmental Impact Assessment and Environmental Statement*
- *Hunter Acoustics – Baseline Noise Survey*
- *Turley Associates - Archaeology and Heritage assessment*
- *Turley Associates / Ocean CGI - Landscape and visual impact assessment*
- *RPS – Preliminary Ecological Appraisal*
- *SCP – Transport Assessment*
- *AECOM – Lighting Assessment*

Figure 3 - Aerial view of Port Talbot demonstrating the clear zones that form the town being industrial, residential, motorway and countryside

Figure 4 *– Site location and surrounding land uses. Note that the site benefits from transport options including road, rail and sea. Along with projects in Pembrokeshire the docks area of Port Talbot is part of the Celtic Freeport Area (see inset) an initiative that will provide Wales with a sustainable green energy industry and provide an accelerated pathway towards a Net-Zero economy.*

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Figure 5 – *Land use diagram*

Figure 6 *– Access & Movement Diagram – Travel Modes*

Key

- Site
- Motorway
- A roads
- Rail
- Shipping
- Cycle

Figures 7 (top) and 8 (bottom) *– View from A4241 towards the proposed development site, and aerial view over harbour*

Figures 9 to 11 *– view from the centre of the site. The site is largely flat with vegetation ranging from 0.5m high to 3m+ in places. The main cover is a mixture of indigenous species and Japanese knotweed. Most of the existing trees on site are self-seeded but there are some planted leylandii on the eastern boundary. Some exploratory works were ongoing at the time of the photographic survey and will remain ongoing during the planning application. These works include the monitoring and recording of contamination using boreholes, the erection of reptile fences and the spraying of Japanese Knotweed. It should be noted that there are tall structures such as chimneys, towers, industrial buildings or flares overlooking the site from all directions.*

Figures 12 to 18 *– Typical plants and trees on site. The main body of the development area is subject to Japanese knotweed but the areas around the perimeter of the site, the quayside and the area set aside for lay down are home to native species often pioneering land recovered from the steel works process.*

Figures 19 to 21 *– The cement factory, operated by Hanson / Heidelberg.*

Figures 22 to 24 *– Other surrounding buildings, especially those to the East of the site are derelict or in poor condition.*

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Figures 25 to 28 *– The eastern lay-down area. This area is one of those to be used to receive deliveries of construction materials during the erection of the facility. There is substantially less vegetation in this area and the ground is of poorer quality being stoney in nature.*

Figures 29 to 31 *– The existing quayside facilities are currently derelict. Works to replace any jetty will include the removal of redundant structures. These matters are covered under a separate application for a marine license.*

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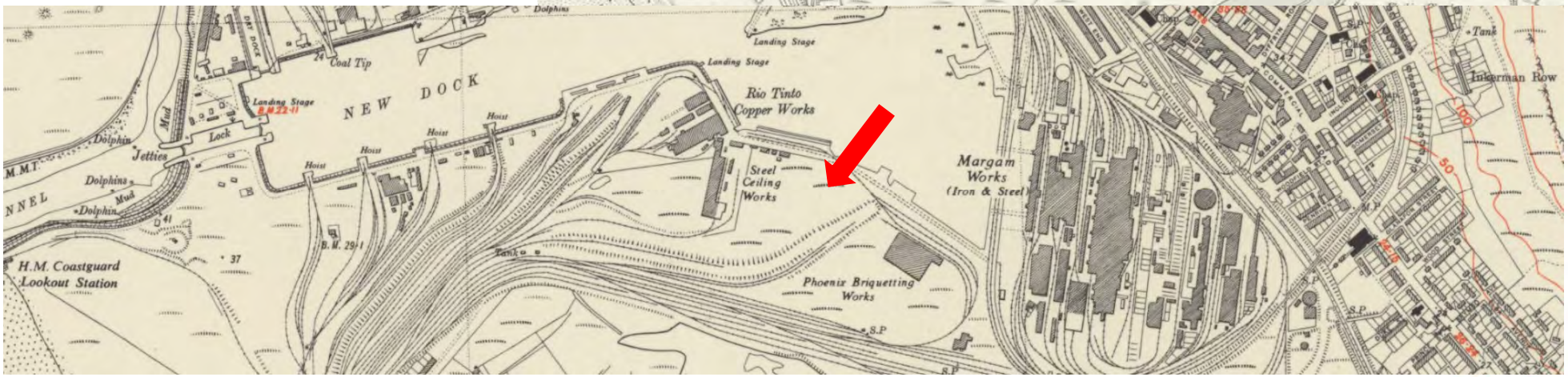
3.0 Site and Context Analysis

3.3 Usage History

The site area has been in industrial use since at least 1876 where the site can be seen as being adjacent to a copper works with the outlining area around the docks being indicated as marsh and named Morfa Newydd (New Marsh) suggesting the land was being progressively reclaimed from the estuarine sea.

By 1913, more of the land on the marsh has reclaimed and is beginning to be developed. A coal works is noted on the site and there are extensive rail connections provided to the dock where a hydraulic power station has been created. The copper works is also accommodated in different buildings.

Later, by 1947, Buildings appear to have been altered to include a steel ceiling manufacturer and a Briquette works. Copper works are comprehensively replaced with steel works.



Figures 32 (top) to 34 (Bottom) *– Historic maps of the site surveyed during 1876, 1913 and 1947.*

3.0 Site and Context Analysis

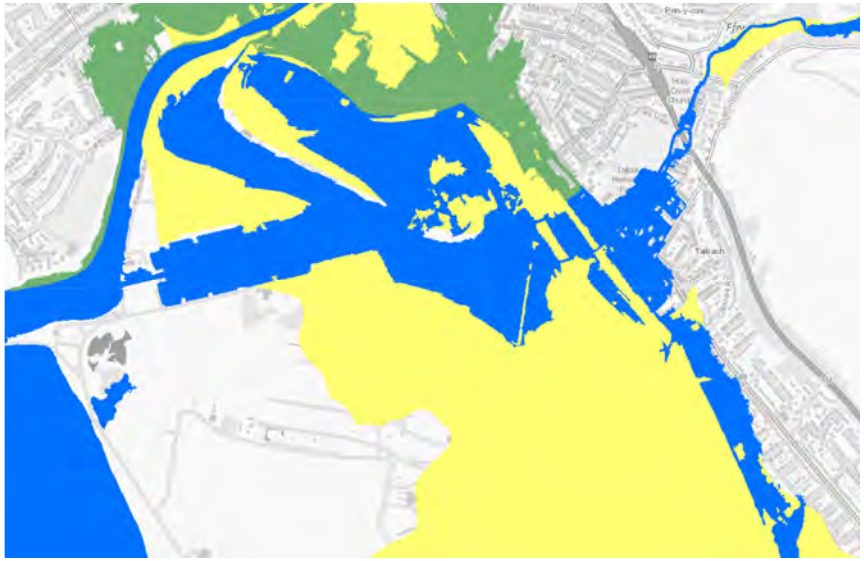
3.4 Constraints and Opportunities

The constraints that inform the development are:

a) Potential for flooding as the site lies in an area of tidal flooding. This affects the level of the site and the drainage solutions. Refer to the flood risk assessment, the SUDS/SAB documentation and the drainage information provided with this application.
b) Potential for contamination to affect the development and for the development to create contamination that affects the wider area, especially the docks. Refer to the sustainability assessment and the contamination report provided with this application.
c) The presence of knotweed (to be removed prior to construction of the development)
d) The visibility of the site from areas around the docks. Refer to the LVIA and other visualisations for details.

The opportunities that inform the development are:

a) Excellent transportation options for industrial materials and similarly excellent active travel credentials for operational staff
b) Relatively flat site with few constraints allowing design flexibility and efficient design, full accessibility and safe working
c) The possibility of using some of the areas of the site for ecological remediation
d) The existing uses that surround the site and the similarly sized (mass and scale) buildings and industrial equipment mean this development should not be out of place.
e) The local availability of skilled industrial workers.



***Figures 35** – Flood map showing the site lies in zones B and C2*

3.0 Site and Context Analysis

3.5 Site Selection Process

A thorough site selection process was undertaken in August 2021. A number of sites across the Borough were assessed for their suitability for the proposed development, and a structured methodology was applied to the analysis, assessing the key opportunities, constraints and relevant planning policies and allocations. The following matters formed part of the assessment criteria:

a) Accessibility – to key utilities, resources, hydrogen and transport modes including options for road, rail and sea
b) Environmental constraints including flood risk, biodiversity, contamination, noise and air quality
c) Minimum site size and configuration
d) Land ownership arrangements
e) Landscape and visual impact
f) Safeguarding of land and COMAH status
g) Residential amenity
h) Future development intentions and surrounding context
i) Policy position, designations, and allocations
j) Associated consents and requirements

The site at Crown Wharf was identified as the preferred option for functional, operational, and planning reasons. Key to this is the site's strategic location within the industrial core of Port Talbot and surrounding dock facilities, adjacent to active industrial uses and the Port Talbot Steelworks. It represents under-utilised, previously developed land with excellent access to industrial skills, products and resources to support the development.

The site is included in the ABP Future Port Talbot Programme, which aims to create a new low-carbon manufacturing cluster and will act as a catalyst for surrounding development.

4.0 Design Development

4.1 Precedent material

Similar processes transforming ethanol to sustainable aviation fuel are in operation globally. This includes a very similar large scale production facility that will shortly begin production in Georgia, USA operated by LanzaJet. The production of the SAF involves a three-step conversion process for which each individual process-step is widely used in the chemicals industry. The scale of the proposed facility will make it a global leader for this technology. The majority of the items that will be on site concern the industrial process and, in this instance, the industrial layout is concerned with:

a) Delivery and storage of feedstock materials including a jetty (jetty under separate application)
b) Processing of the feedstock materials and conversion to sustainable fuels
c) A ground flare for discharging excess gas
d) Storage of sustainable fuels
e) Buildings and supporting services for the running and maintenance of the operation.
f) Substations and supporting utilities
g) Distribution facilities

***Figures36**– A similar facility to Project Dragon, LanzaJet* ATJ plant at *Freedom Pines Biorefinery in Georgia, USA is approximately 1/3 the size of proposals in area. Heights of equipment are comparable.*

***Figures 37 to 41** – Other LanzaTech Technologies from around the world.*

4.0 Design Development

4.2 Industrial Process - Transport Options

The scale of the proposed development's operation requires the transfer of materials both feedstocks and finished products. The site selected for this project has excellent infrastructure owing to the:

a) The harbour side and dock area which is large enough and has deep enough water for large shipping
b) Road connections to the M4 motorway

There is also rail connections very close to the site, but these would require a prohibitively expensive investment to re-commission. LanzaTech has therefore elected to receive feedstock via ship and distribute their finished products via road (sustainable diesel, which represents 10% of the product created) and sea (sustainable aviation fuels, 90% of product created). These are the most appropriate and efficient methodologies. Two major elements of the project will therefore be the construction of:

a) A road tanker turning and loading area for collecting sustainable diesel fuel products
b) A jetty into the dock to receive shipping, unload the feedstock and load the finished sustainable aviation fuel products (jetty under marine license).

Figure 42 *– Diagram of available transport options*

Figure 43 *– A ship typical of those delivering feedstock material.*

Figure 44 *– Typical loading of a tanker with sustainable diesel.*

4.0 Design Development

4.3 Industrial Process - Storage of feedstock materials

The storage of feedstock materials in this instance is via a large bunded tank complex. The tanks for this application are typically 20m high and have a diameter of 22m and will store around 7,600 m3 per each of the four tanks of ethanol pumped from delivering ships at the jetty position. Ethanol is a colourless, organic compound with a pleasant odour, which has a wide range of applications. It is widely used as a fuel in vehicles, usually blended with petrol; has extensive applications as a solvent and chemical feedstock; is widely used in the food and beverages industry, used in personal care & cosmetics; and pharmaceuticals

Being a fuel in itself, ethanol is flammable and combustible so fire and security precautions around the facility will be carefully considered.

Ethanol is also a potential contaminate and pollution prevention measures include bunded tanks with impermeable walls and floors, interceptors and a strong system for recovery of any spilt materials.

***Figure 45** – Typical vessels for the storage of feedstock ethanol in a bunded compound.*

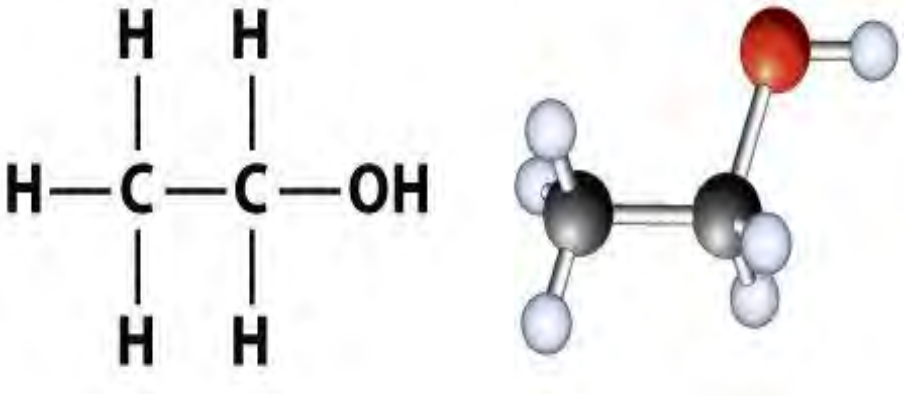
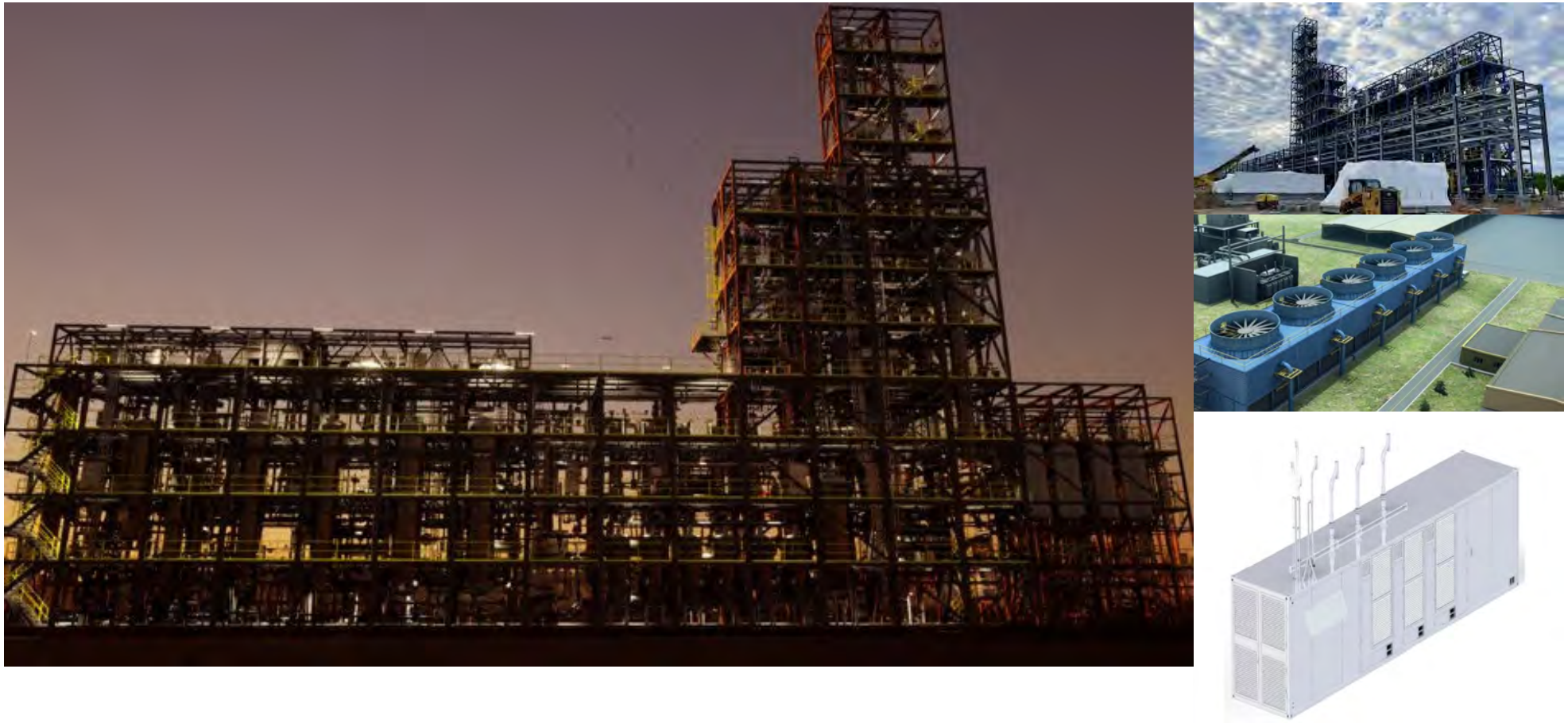


***Figure 42** – Ethanol molecules*

4.0 Design Development

4.4 Industrial Process - Processing of the feedstock and conversion to fuels using the LanzaJetTM ATJ technology

The process for converting ethanol to sustainable fuels involves multiple stages and the resulting equipment is complex in design. Such complex equipment is normally supported and accessed via a lattice of steelwork structures and stairways. Safety and identification of items are always key in industrial process design, and the colour schemes involved tend to be determined by these factors and economy of production.



Figures 46 to 49 *– early-stage design modelling for the process element of the development, plus (inset) an example of a LanzaJet development's process module under construction. It should be noted that the process relies on other equipment such as coolers, compressors and other packaged equipment.*

4.0 Design Development

4.4 Industrial Process - Processing of the feedstock and conversion to fuels using the LanzaJetTM ATJ technology.

The following diagram explains the processes involved in converting sustainable sourced ethanol to more complex fuels types including sustainable aviation fuel.

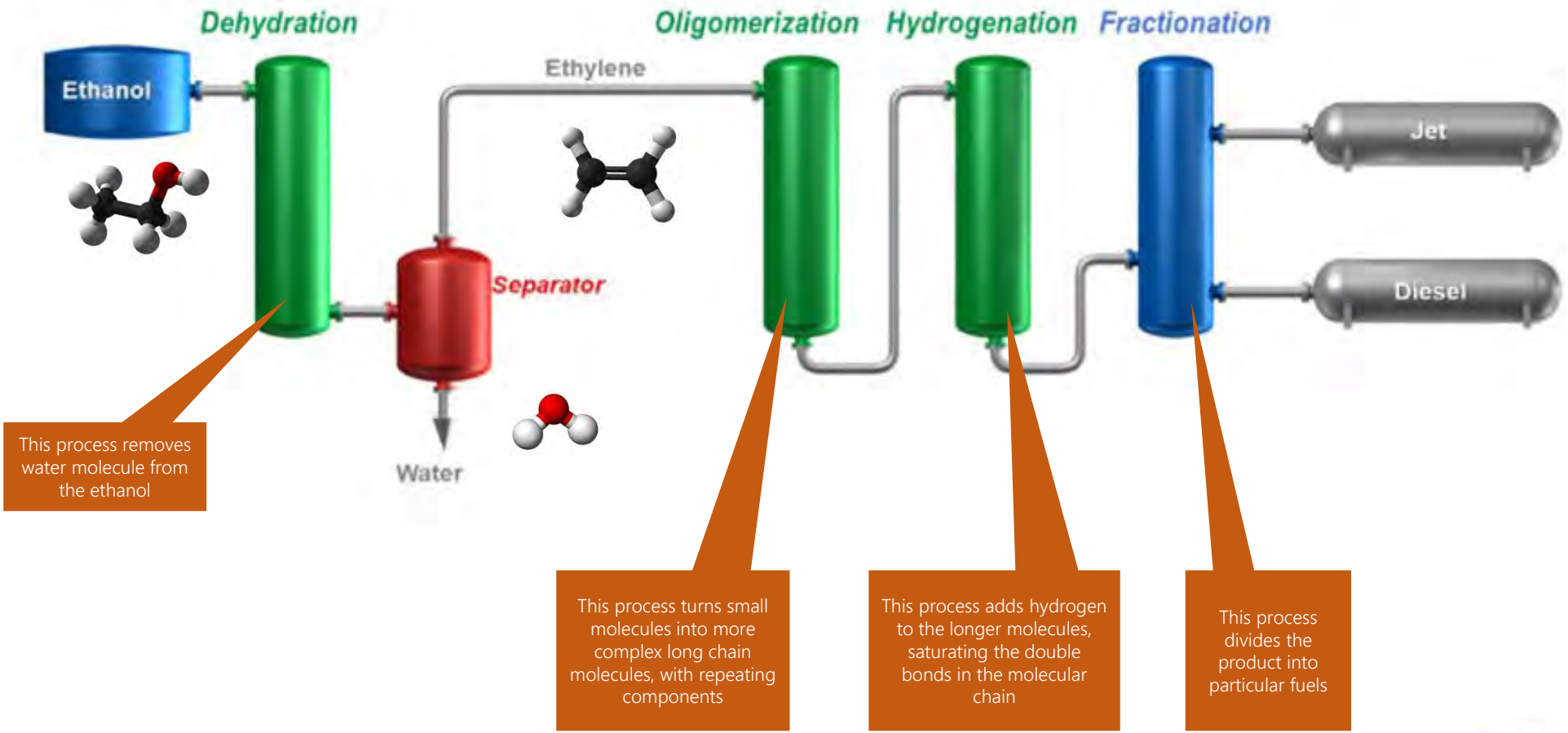


Figure 50 *– LanzaJet ATJ process.*

4.0 Design Development

4.5 Industrial Process – Disposing of waste gas

During abnormal working conditions the production process can generate excess flammable gas which on occasions needs to be vented and burnt. To allow this part of the process to take place and the gas not escape creating a possible hazard, a flare is required. There are two types of flare commonly used for this activity; an elevated flare and an enclosed ground flare. In this instance, a ground flare is preferred as it will be less intrusive into the surroundings in terms of appearance, size, noise and smoke emission.

Details of the expected frequency and conditions that require the operation for the flare can be found in the Environmental Statement and the table 4. The proposed ground flare has been extensively discussed and assessed with the local planning authority at pre-application stage, with details being agreed on the site-specific circumstances.

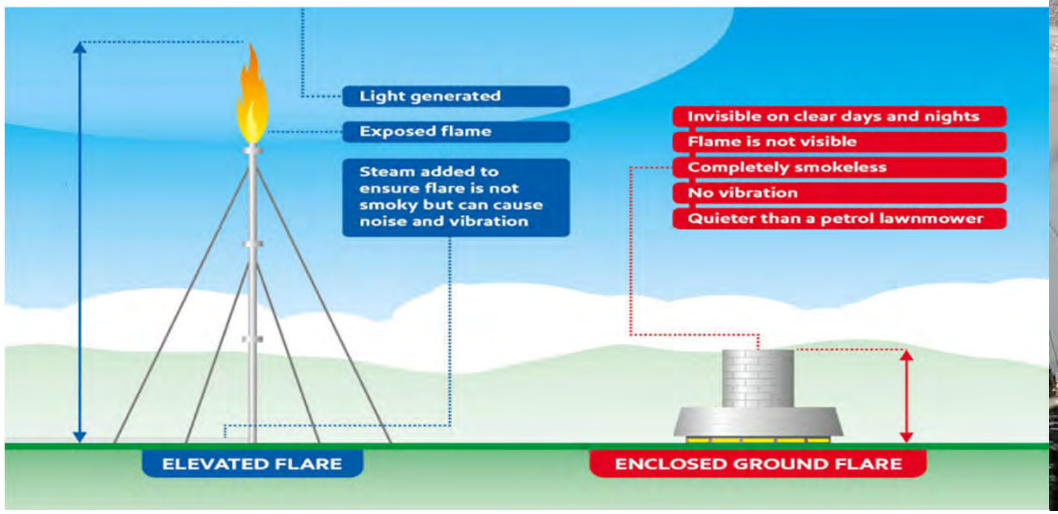


Figure 51 *– Typical flare types and their respective advantages*

Figures 52 to 55 *– Details of ground flares used in other similar facilities.*

4.0 Design Development

4.6 Industrial Process - Storage of sustainable fuel products

Following manufacture but prior to loading for distribution, fuel products are stored in unpressurised tanks. The tanks for this application are typically 20m high and have a diameter of 18.5m and will store around 5,370m3 of sustainable aviation fuel product pumped from the process area.

The volume of sustainable diesel fuel produced and stored on the site is lower and the tanks are correspondingly small.

As with the ethanol storage there are risks associated with fire, security and contamination and appropriate measures are required to ensure safety. The required mitigation is inherent in the detailed design for these items and will be complemented by the LanzaTech site operational process and procedures following discussion with the Health and Safety Executive as the relevant regulator.

Other prominent items on site include a station in a secure compound allowing biodiesel to be loaded in road vehicles for delivery and within the PDZ, liquid nitrogen tanks for cooling purposes.

Figure 56 *– Equipment for sustainable fuel delivery to road vehicles*

Figure 57 *– Liquid nitrogen tanks are also a prominent feature of the development*

4.0 Design Development

4.7 Site Layout

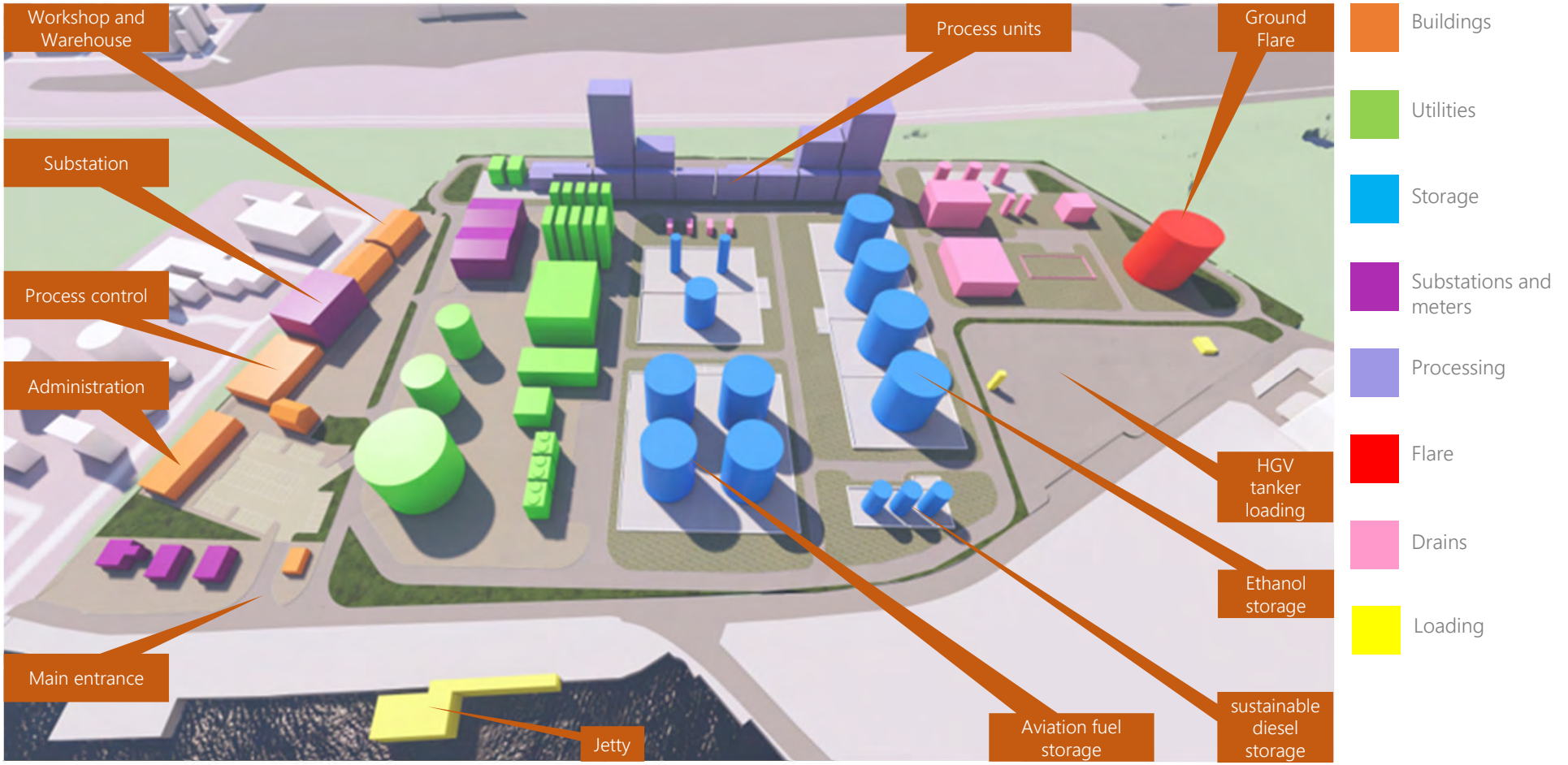


Figure 58 *– This initial site arrangement was established during scheme development.*

4.0 Design Development

4.7 Site Layout

Figure 59 *– Receipt of Ethanol feedstock and on-site storage. Feedstocks and products from the plant will pass to the jetty via below ground pipeworks.*

4.0 Design Development

4.7 Site Layout

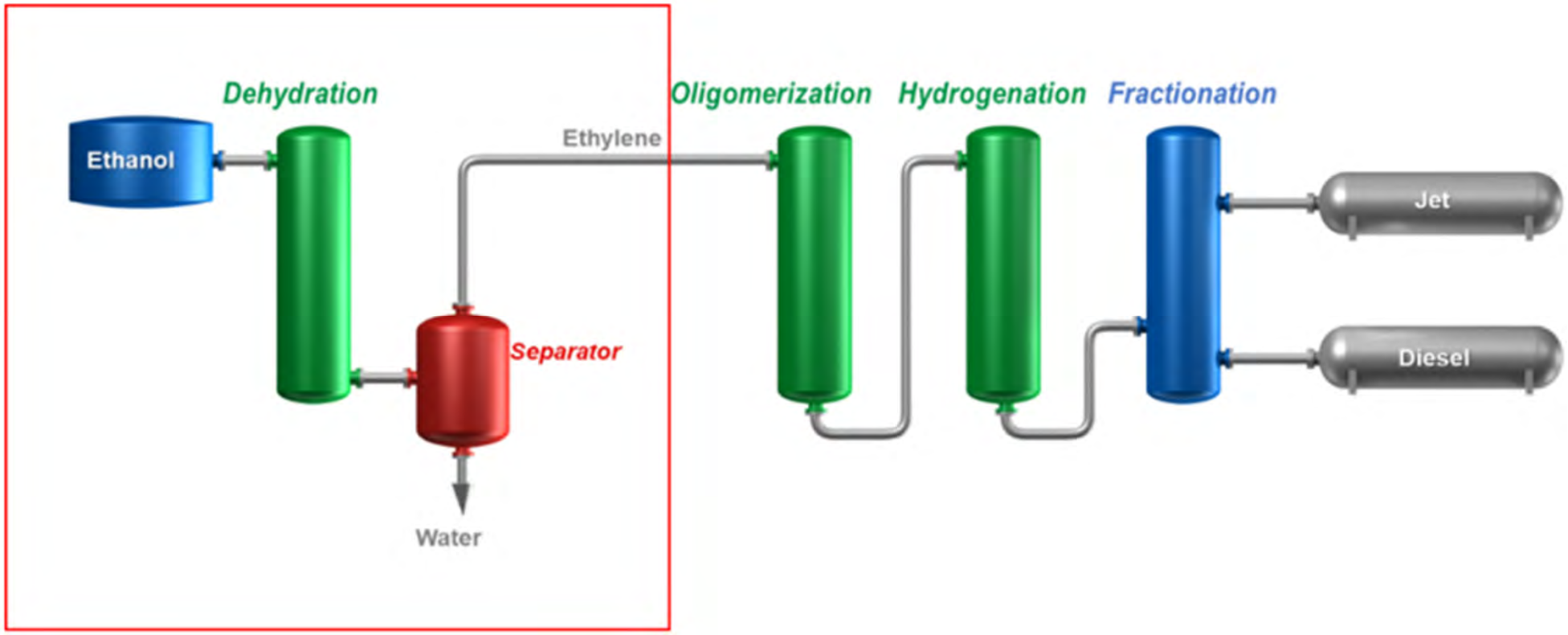


Figure 60 *– The first phase of the industrial process is to remove water from the ethanol. This process produces ethylene and water.*

4.0 Design Development

4.7 Site Layout

Figure 61 *– Ethanol is de-hydrated and ethylene separated*

4.0 Design Development

4.7 Site Layout

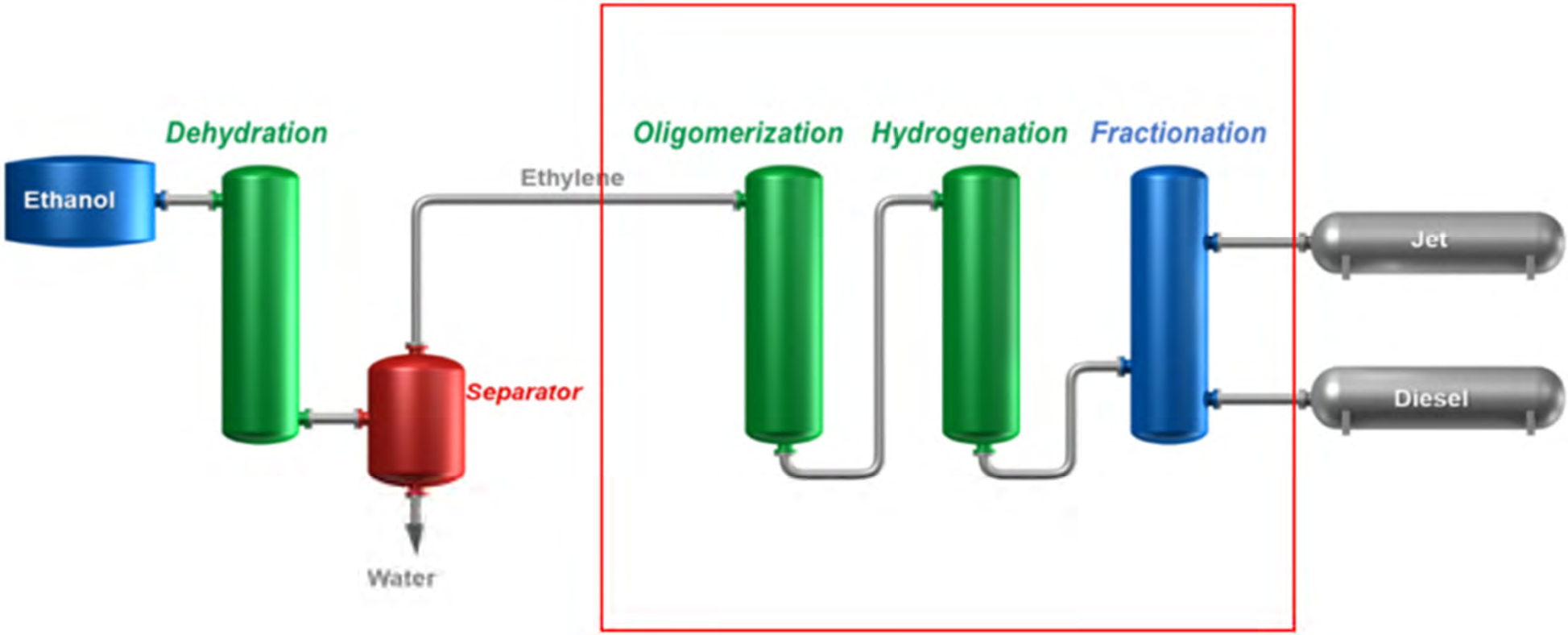


Figure 62 – The second phase of the industrial process is oligomerisation, a process that changes small molecules such as ethanol, into larger molecules normally consisting of a small number of repeating units. Thereafter the process switches to hydrogenation, a process that saturates the oligomerised molecules with hydrogen. Finally, the resulting product is fractionalised, a common process used to separate grades of fuel using temperature.

4.0 Design Development

4.7 Site Layout

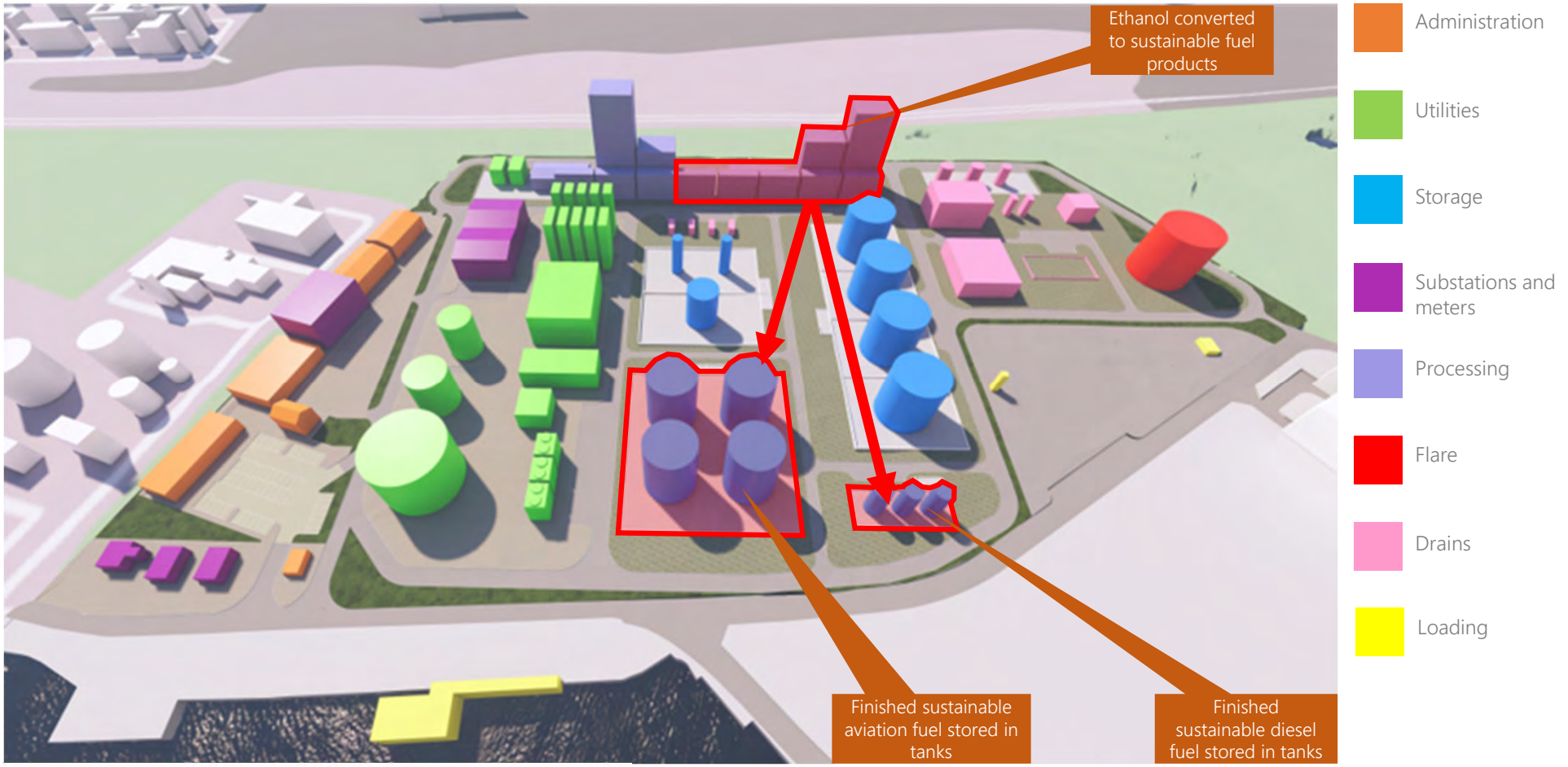


Figure 63 *– Site storage of finished products*

4.0 Design Development

4.7 Site Layout

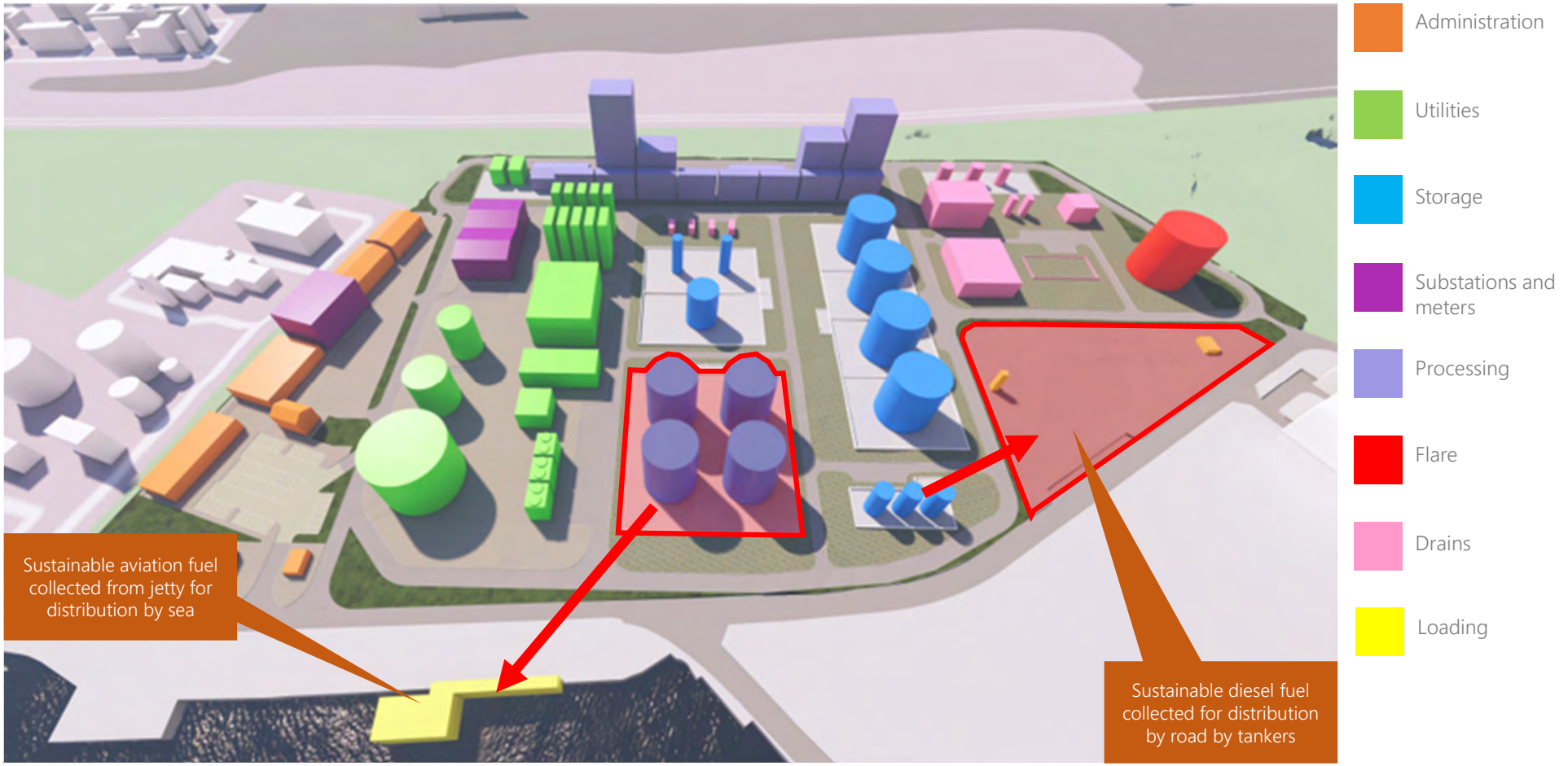


Figure 64 *– Distribution of finished products. Products will be moved around the site via pipe runs that are not shown in this diagram for clarity. For details of pipe runs refer to the architectural drawings.*

4.0 Design Development

4.7 Site Layout

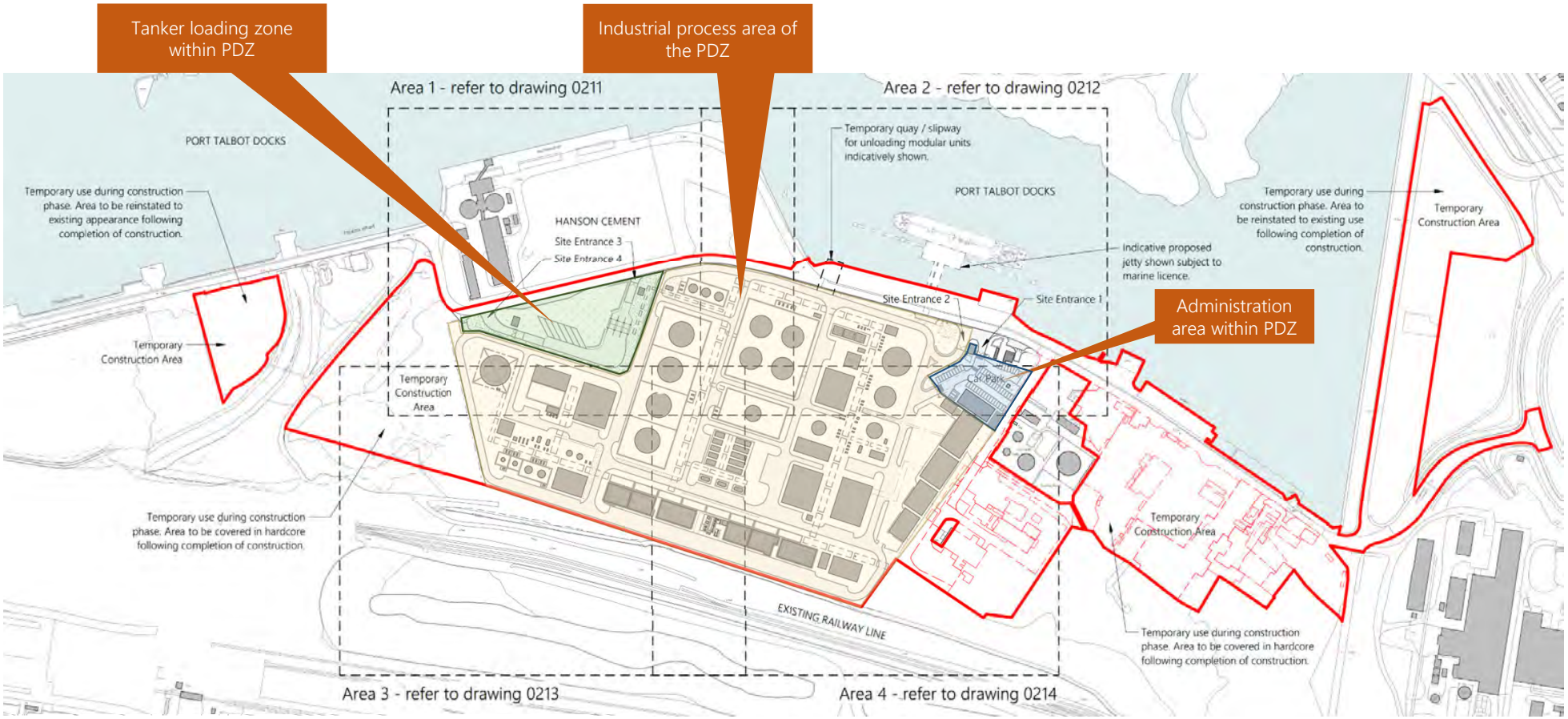


Figure 65 *– Site Areas.*

4.0 Design Development

4.8 Buildings

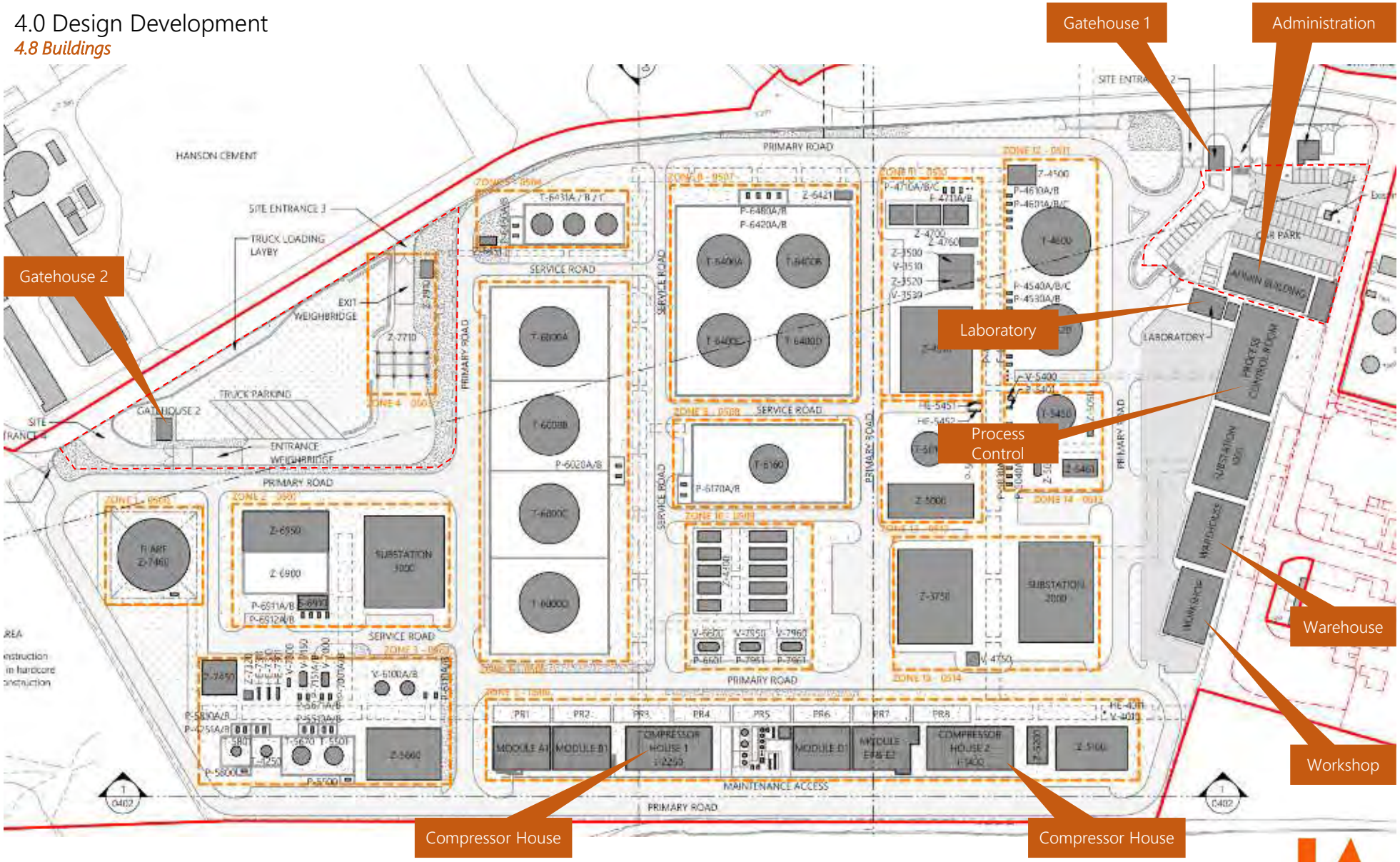


Figure 66 – Major building locations in the PDZ as identified during design development. Note that all other items on site are termed 'equipment' and are part of the industrial process. Refer to drawing 2143.01-IA-ZZ-ST-DR-A-0215_Proposed PDZ Layout & Equipment List for details of items.

4.0 Design Development

4.8 Buildings

There are several buildings required on the site including the following:

In the Administration Area of the PDZ

a) ***Gate house 1*** *– This is the primary access to the developed area of the site (known as the production development zone, PDZ) excluding the tanker loading zone. The proposed occupancy of this building is likely to be 1no person, but space is provided to accommodate an additional security guard when required. In order to allow the security guards to remain continuously on-post, this building includes a small kitchenette and an accessible toilet. This building, like the administration building, is public facing and materials and construction have been selected accordingly. It is also worth noting that this gatehouse is outside the industrial process area of the PDZ and therefore can be afforded a brown roof treatment as the risk of fire overall is lower owing to separation from the industrial process equipment.*

b) ***Administration building*** *– This building, also outside the industrial process area of the PDZ, is a small facility for authorised visitors and office-based employees to the site. Accommodation provided includes office space, meeting rooms, a kitchen and toilet facilities. The administration building also provides plant space for itself and plant space that serves the nearby process control building and laboratory. Locating this enlarged plant room outside the more secure industrial process area of the PDZ allows for regular maintenance of building services without requiring access to what is a restricted space.*

In the tanker loading area

c) ***Gatehouse 2*** *– There is a designated area of the site set aside for the road transportation of the sustainable diesel fuel product, known as the tanker loading area. This area is separated from the main body of the PDZ for reasons of safety such as fire, security, the avoidance of potential for contamination and safe interaction between vehicles of differing types. This area is controlled by a second gatehouse, of a more simplistic aesthetic design reflecting its more industrial role. Otherwise, the design of the gatehouse is alike that of gatehouse 1.*

Inside the industrial process area of the PDZ

d) ***Process control building*** *– The industrial process activity on site is controlled from the process control building. In order to ensure the operation of the building and its control of the industrial process during an emergency, this building is constructed to be blast proof and have limited windows and doors. A central feature of this building is a large control and instrument monitoring suite. Other facilities in the building include a permit office, changing and mess facilities for staff working in the industrial process area of the PDZ.*

e) ***Laboratory*** *– A small industrial building is provided for testing sustainable fuels, feedstock materials and product during the stages of the process. This building will only be occasionally occupied as the need arises but includes a small bathroom in addition to the main testing area.*

Figure 67 – Early-stage development of building arrangement, site access and building form. It was later decided to move the process control building out of the administration area into the industrial process area of the PDZ. This assists in communication and control of security for the facility.

4.0 Design Development

4.8 Buildings

Inside the industrial process area of the PDZ (Continued)

*f) **Warehouse** – There is a need to store spare equipment and other consumables on site to ensure the industrial process can remain operational in all circumstances. The warehouse is a functional building sized to accommodate the likely needs of the industrial process. It is likely to contain racking and have a floors and entrance ways suitable to allow a forklift truck to bring items from an HGV on the apron outside into the building. The building will be clad with simple insulated panels to all sides, have a roller shutter door to the main elevation and have rooflights to reduce its energy consumption.*

*g) **Workshop** – Periodically, an item of equipment will require repair or maintenance and a small industrial building, similar to the warehouse provides a suitable environment for this work. The building will be equipped with a crane to allow lifting of heavier items.*

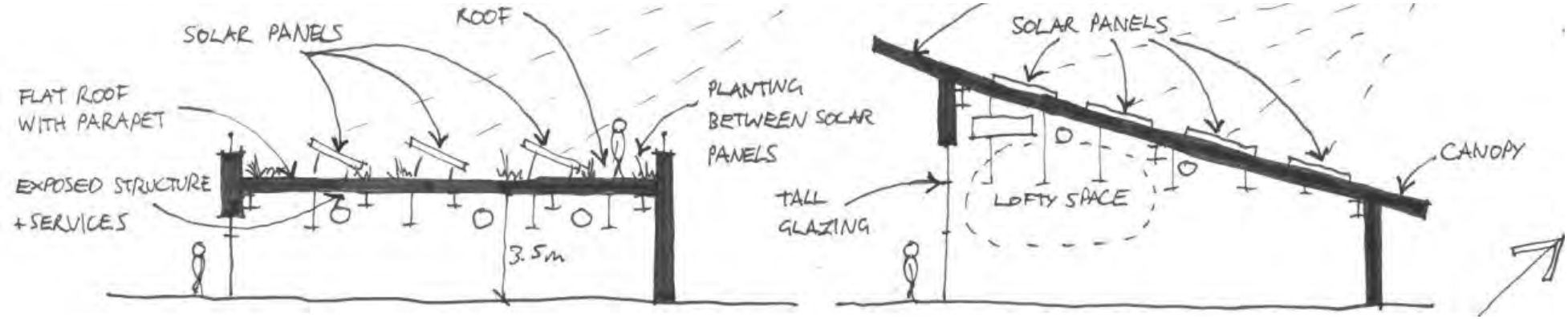
*h) **Amenity Shelters** – Shelters for staff are provided in two locations, one in the administration area and one in the industrial process area, allowing staff from each access without changing secure zones.*

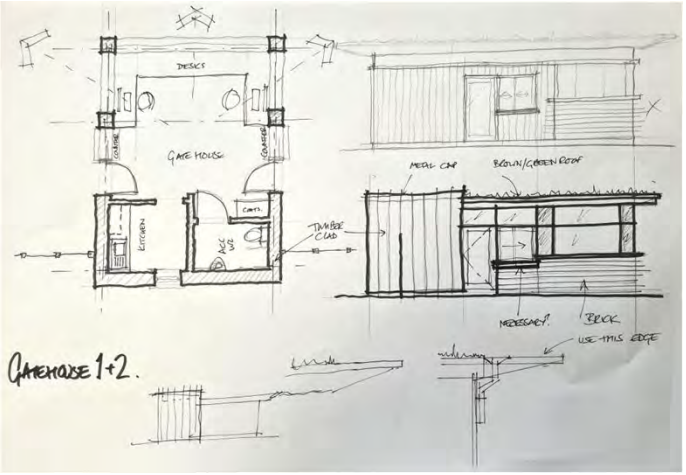
*i) **Waste Collection** – An area of the administration building is set aside for the temporary storage of general commercial waste. Locating the waste collection in this area allows for a collection lorry to enter the car park area and leave without venturing into the industrial process area of the PDZ. For further details on waste management refer to the Waste Management Plan provided by Stopford*

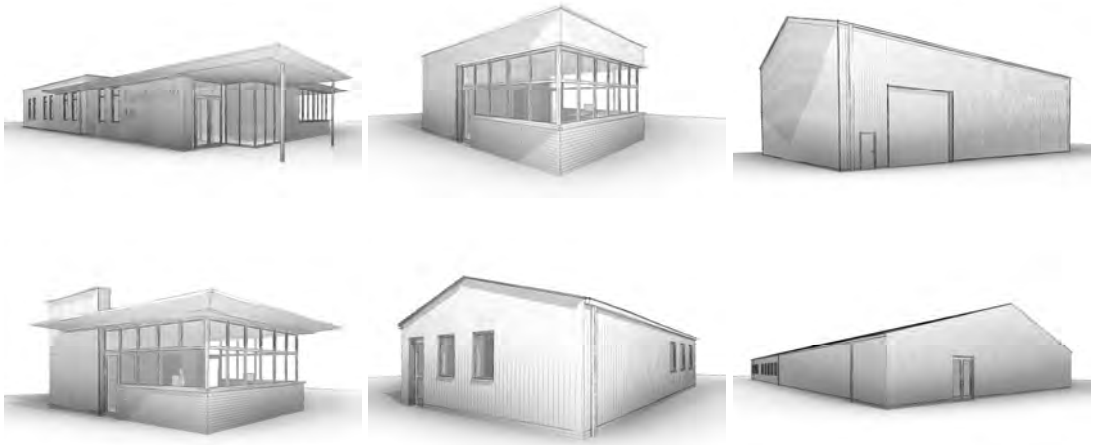
*j) **Compressor Buildings** – Two buildings are provided to house compressors that are part of the industrial process. Both will house compressors that are a source of noise and as such will have noise-attenuating insulated cladding to all aspects and where intake or exhaust air is anticipated large acoustically attenuating louvres will be installed in the walls.*

4.0 Design Development

4.8 Buildings and site







Figures 68 to 76 *– Ideas have progressed from simple sketches exploring the possible arrangement for roofs to detailed visualisations. One key component of the design has been trying to secure sustainability and ecology measures in an environment where maintenance, control and critically, fire protection are high priorities. The viable options include provision of solar panels to enable some on site energy generation, and brown roofs to provide some additional habitat space. Buildings are split into two types, the first being where they face the public and are of a more aesthetic nature and the second being those inside the PDZ that are primarily functional in design.*

4.0 Design Development

4.8 Materials and Colours

Figure 77 - *Colours and Materials – For the industrial installation. Mostly colours such as silver coloured or galvanised metals, white coatings for tanks, pipework, ducting and supporting structure. Some items will be finishes in warning colours such as yellow or red, typically being access walkways, stairs, balustrades, safety equipment.*

Figure 78 - *Colours and Materials – For the buildings. Materials include insulated panels used chiefly on functional buildings and grey bricks used on administration buildings. Feature colours, used sparingly, and selective are based on LanzaTech corporate colours. The emphasis in colour selection is on ensuring the overall development is discrete when viewed from the wider Port Talbot area and creating low landscape and visual impact.*

4.0 Design Development

4.8 Buildings and site

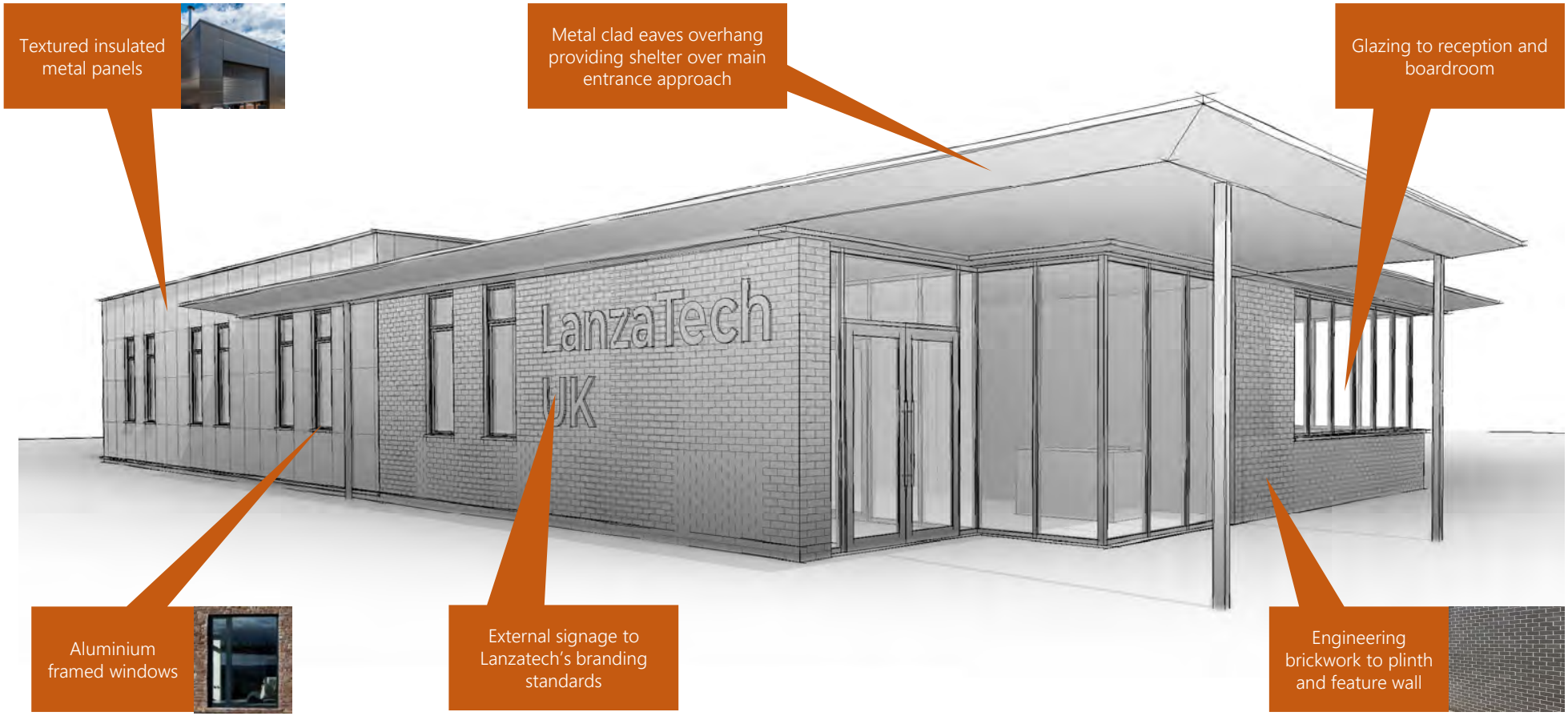


Figure 79 *– Ideas and development of the administration building. This is the most prominent building in the development and will be used as an office a meeting space for authorised Lanzatech representatives, as well as site-based employees.*

4.0 Design Development

4.8 Buildings and site

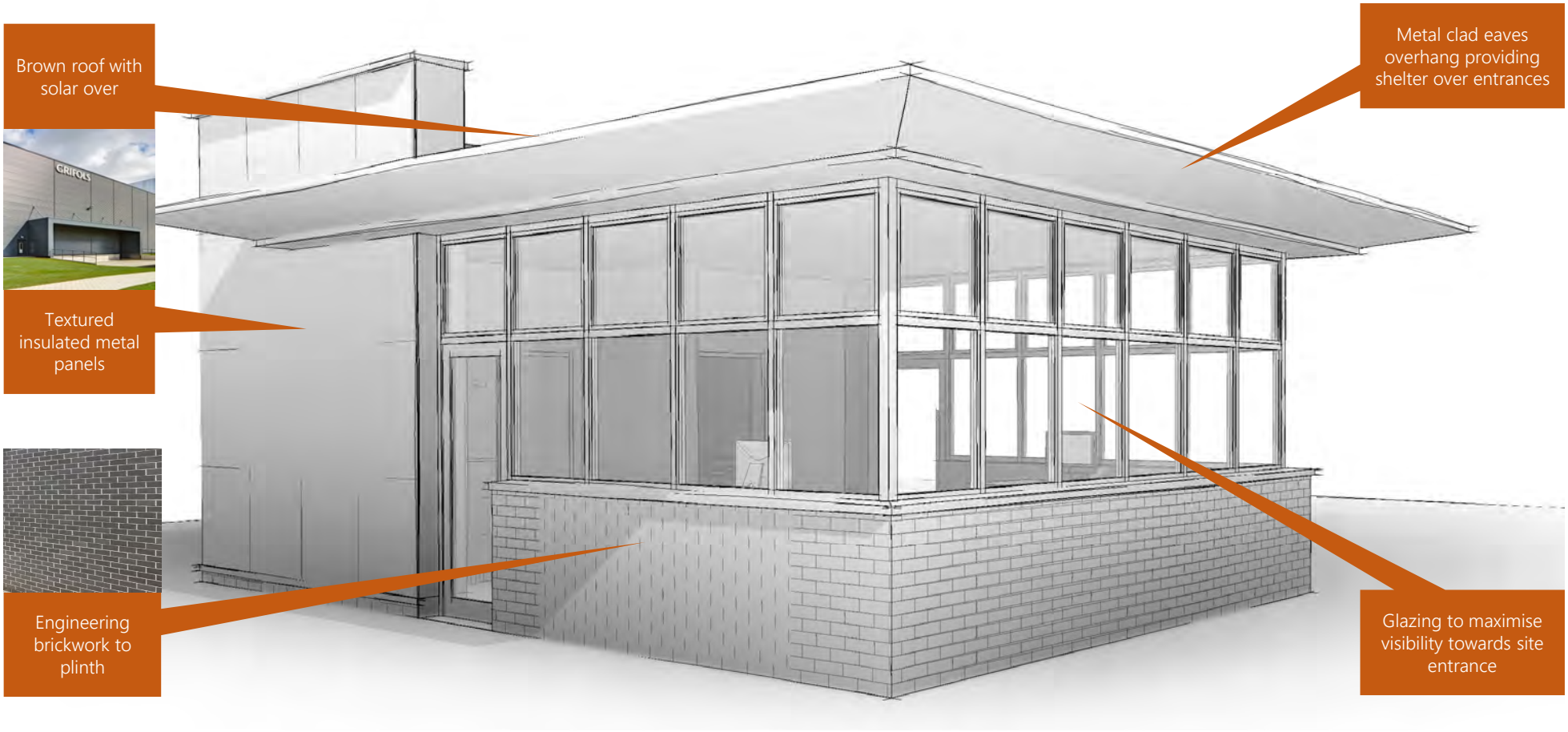


Figure 80 *– Ideas and development of the gatehouse 1 building. This building controls the main entrance to the site, including the administration area.*

4.0 Design Development

4.8 Buildings and site

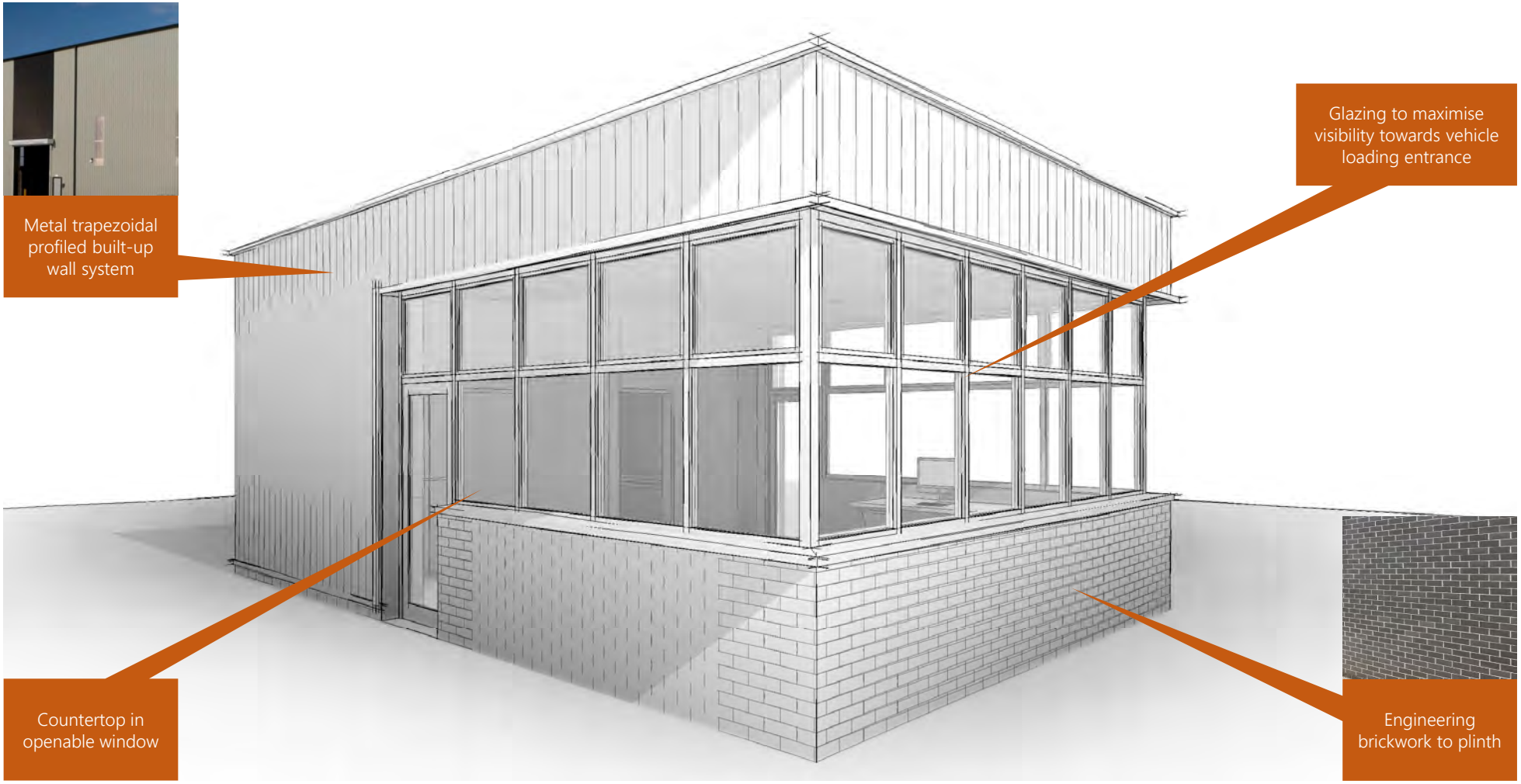


Figure 81 *– Gate house 2 controls the HGV tanker refilling area where road-based vehicles take sustainable diesel fuel for use. As with gatehouse 1 there is extensive glazing allowing observation of the area under control, a small office space for up to two employees, a toilet facility and a small kitchenette with the building.*

4.0 Design Development

4.8 Buildings and site

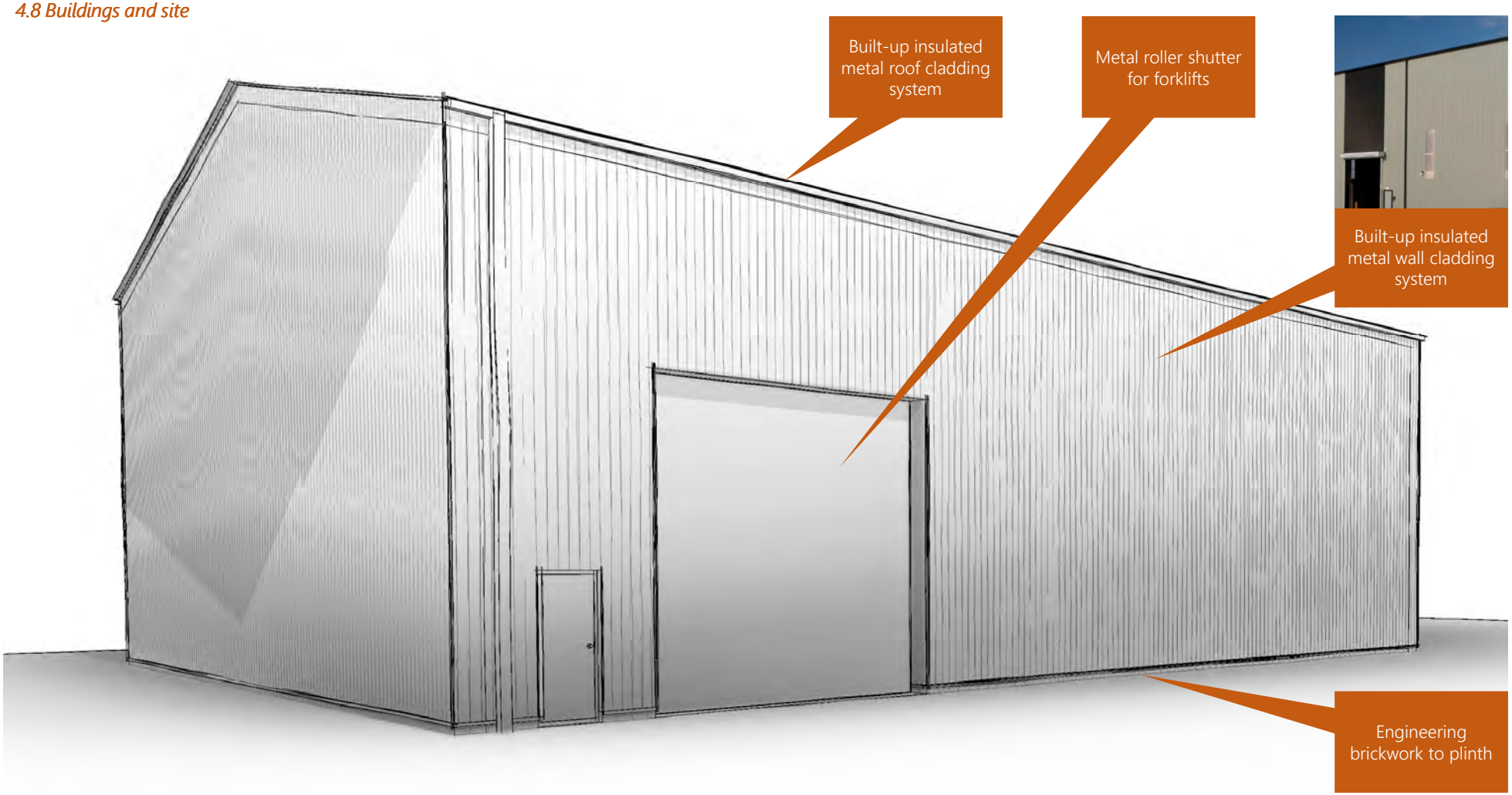


Figure 82 *– The warehouse building is an economically constructed, tall storage unit with large format roller shutter doors and personnel access. The building is secure and utilitarian in nature and will store components for the industrial process and related consumables.*

4.0 Design Development

4.8 Buildings and site

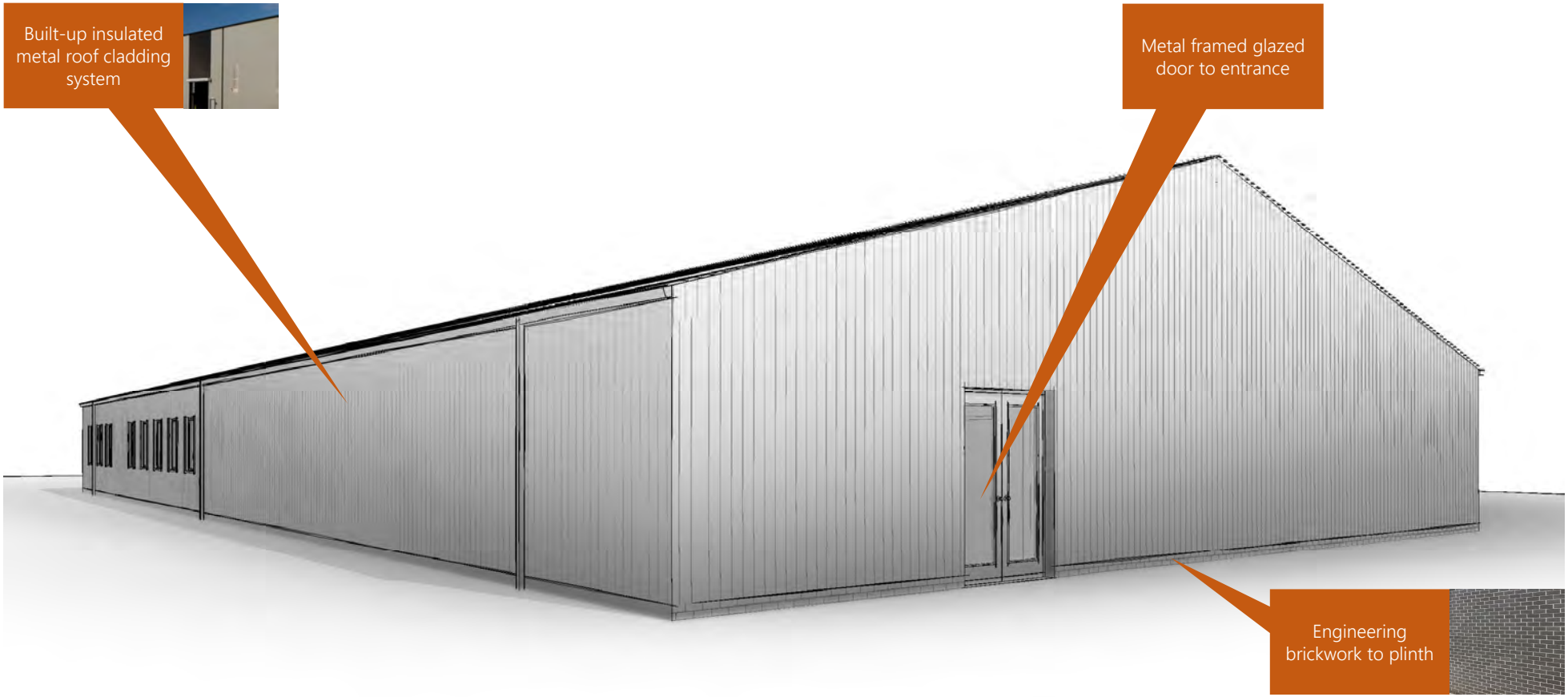


Figure 83 *– The process control building is a blast proof building in which all aspects of the industrial process are monitored and controlled. The main elevation, facing towards the plant area is largely featureless to assist with blast protection and the side facing away from the plant houses the occupied spaces such as staff accommodation.*

4.0 Design Development

4.8 Buildings and site

Figure 84 *– The laboratory building is a small unit for monitoring and testing the quality of the sustainable aviation fuel product, feedstock materials and product during the stages of the process.*

4.0 Design Development

4.8 Buildings and site

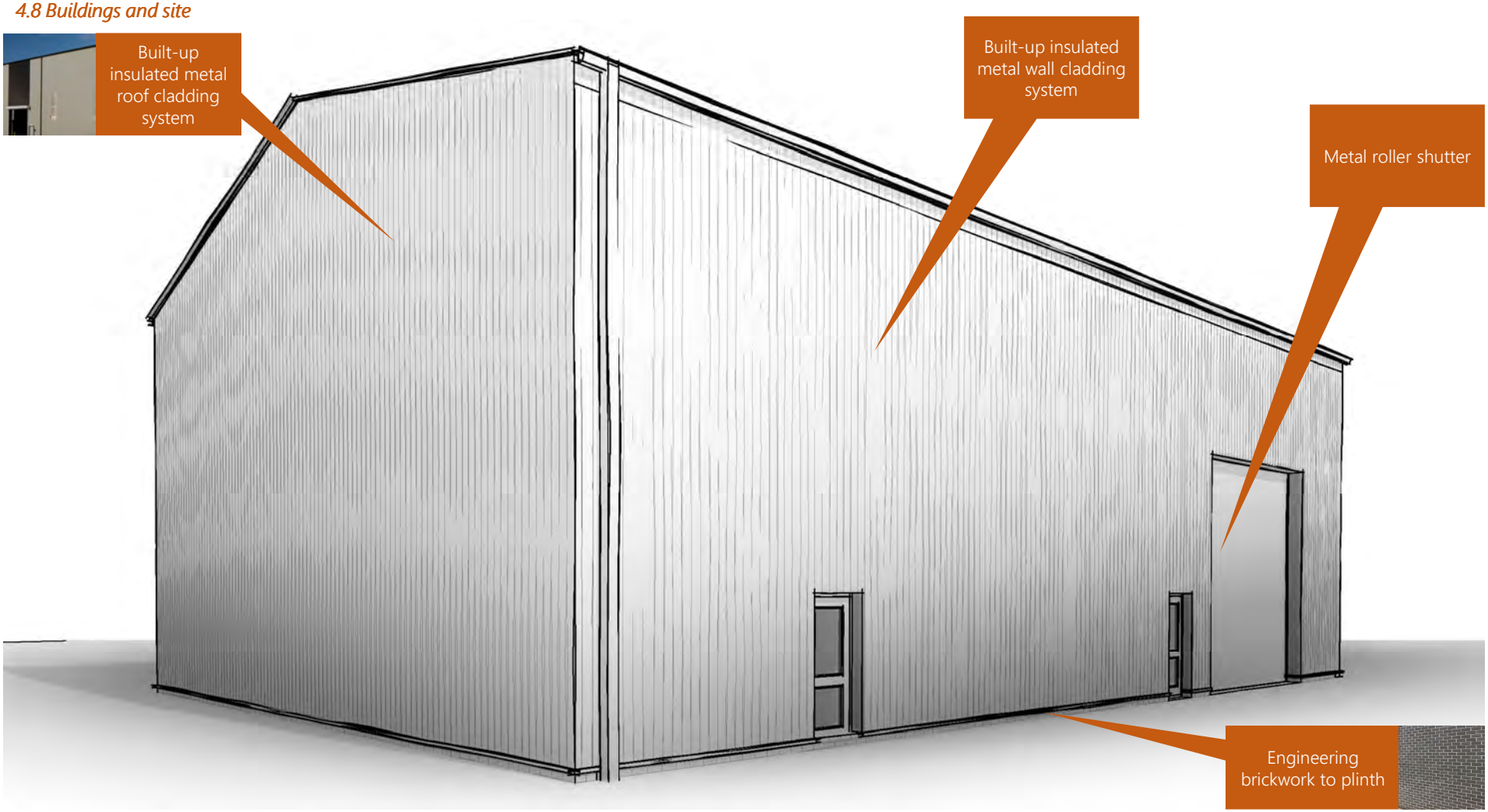


Figure 85 *– The Workshop building is similar to the warehouse building but its purpose is to allow for the maintenance, repair and assembly of items for industrial process. Contents will include a large workshop space, a crane and basic staff facilities.*

4.0 Design Development

4.9 Marine environment

There are two main factors in assessing a development in an exposed marine environment. The first is that in a marine environment some building materials and construction types can be adversely affected. Key points include the effects of driven wind, salt laden air and high levels of humidity. The proposals respond to these environmental factors in the:

- *Selection of materials – using corrosion resistant materials throughout the site such as galvanised steels and anti-corrosive cladding panels and coatings.*

- *Selection of building forms – limiting development heights, selecting roofs forms and constructions suitable for exposed area. – no tall roofs to habitable buildings, canopies to provide shelter near building entrances and simple, durable forms have been adopted.*

The other important considerations is the prospect of construction materials having an unseen deleterious effect on the nearby marine environment and the proposals will therefore avoid, where possible the following materials: alkylphenols, asbestos, bisphenol, cadmium, chlorinated polyethylene, chloro-sulphenated polyethylene, chlorofluorocarbons, chlorobenzene, chloroprene, chromium, chlorinated polyvinyl chloride, formaldehyde, halogenated flame retardants, hydrochlorofluorocarbons, lead, mercury, polychlorinated biphenyls, perfluorinated compounds, phthalates, polyvinyl chloride, polyvinylidene chloride, short chain chlorinated paraffins, wood treatments containing creosote, arsenic or pentachlorophenol and volatile organic compounds.

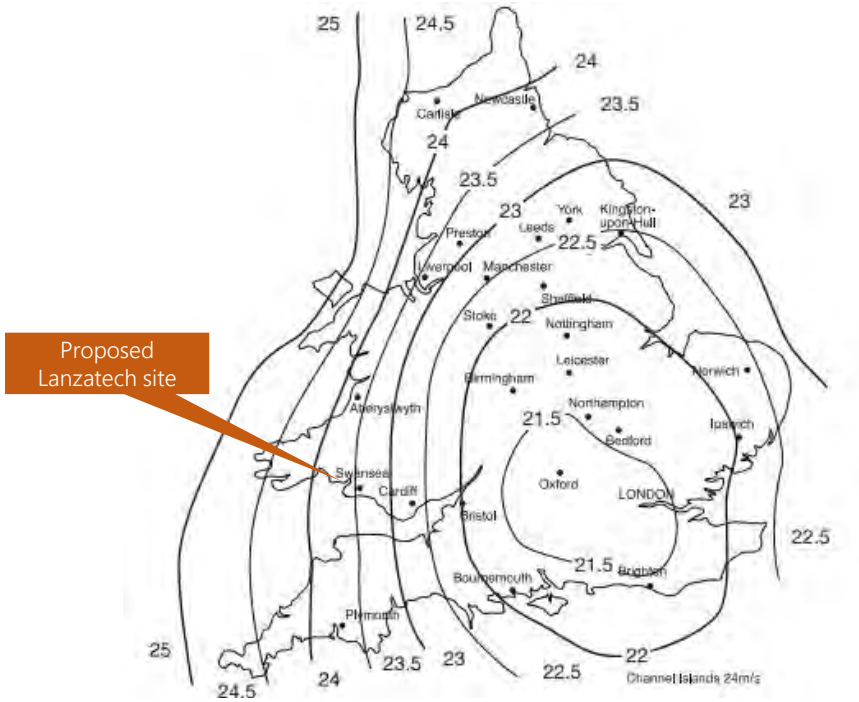


Figure 86 *– Wind exposure areas in Britain.*

5.0 Sustainability

5.1 Sustainability summary

There are four major aspects to the sustainability of the proposals, which are:

a) ***The sustainability benefits of the development -*** *Producing sustainable fuels from waste based ethanol is an important step in reducing the emission of climate changing gases associated with aviation travel and the various uses of fossil diesel fuels. When compared with conventional fossil fuel jet fuel, SAF made by the facility is expected to reduce greenhouse gas emissions by around 70% on a lifecycle basis. The facility has the potential to produce approximately 100 million litres of SAF a year, making up around 10% of the UK Government sustainable aviation fuel 2030 target. For further details on this please refer to Turley's document 'Sustainability Strategy Position' and the 'Environmental Statement Chapter 10 Climate'.*

b) ***The sustainability measures within the development -*** *There is scope to provide some sustainability measures within the PDZ, but these are limited by the needs of the industrial process, general security, safety in operation and in particular fire safety. With these constraints in mind, only some areas of the landscape and external works will be able to receive ecological treatments that encourage pioneer species and aid bio-diversity. Careful and thorough thermal radiation modelling has been conducted in order to ensure that brown roofs and solar will only be placed in safe areas. These areas are demonstrated in EDP's landscape proposals drawings. Similar constraints apply to buildings within the industrial process area of the PDZ and only some buildings will be able to receive treatments such as brown roofs and solar power. Smaller sustainability measures within the development include the provision of 25% of car parking spaces being equipped with electrical car charging points. Heating and hot water supplies for the buildings will be powered by air source heat pumps.*

c) ***Waste management during demolition and construction -*** *Control of this element of the project is important as it can be a considerable contributor to CO2 emissions, disruption to local roads, generation of noise, casual pollution of the environment through improper waste management procedures. It therefore proposed that a 'Construction Waste Management Plan' aligning to WRAP Cymru vision is produced and agreed by condition with the local planning authority.*

d) ***Waste management during operation*** *- There is a comprehensive assessment of the industrial process in operation in the Turley document 'Sustainability Statement' and in the submitted 'Waste Management Plan' prepared by Stopford. The chief waste product from the industrial process is water from the dehydration of ethanol to ethylene. Notably, this water is cleaned and used as a source of water for the boiler equipment, thereafter it is lost as clean steam to the atmosphere or condensed for re-use. There are some other forms of waste including some solid waste that originate from the process, and these are documented in Waste Management Plan.*

6.0 Proposals

6.1 Preparation of the Site

Some works are being undertaken by the site owners prior to planning application, these include:

a) The clearance, containment and treatment of the Japanese knotweed in the PDZ. This is an extensive process and involves repeated spraying over a lengthy period to minimise the impact of the plant on the development in the future. It will be necessary over time to ensure that it does not re-grow as part of a site-wide maintenance programme. The buildings and plant installation will be constructed mindfully and managed to minimise adverse consequences should any Japanese knot weed persist.

b) A scheme of contamination investigation is underway and will be prepared ready for this application. Works to remediate any contamination risks will be underway before this application is determined. Details of these works can be found in the suite of site investigation documents completed by TEC and submitted in support of the application.

c) The introduction of reptile barriers across the site to ensure that any such animals can be safely relocated prior to the works proceeding.

d) Demolition of buildings to the East of the PDZ to create additional laydown space. The details of the demolition can be seen on Inspire Architects 200 series drawings and accounts for the demolition of buildings with a gross external footprint of 4,526m2.

Figure 87 (Left) *– Area of building to be demolished to make additional construction laydown space. The extent of demolition will be to ground level only. Where possible any masonry or concrete materials will be crushed and re-used as hardcore surfacing to the laydown area. On complete the area will be left as a hardcore finish for pioneer species to recolonise.*

Figure ***88 (Below)*** *– Typical buildings in the area of demolition are low level, industrial use and constructed of masonry, concrete and steel.*

6.0 Proposals

6.2 The Proposed Development

Preparatory work following the grant of planning permission
A major component of the development of the site will be levelling the site. At present there is some undulation across the site with levels varying from c.7.0 AOD to c.9.6 AOD (refer to drawing 2143.01-IA-ZZ-ZZ-DR-A-0400 for details). The proposal is to provide levels across the site that are a level and flat working surface at approximately 8.0m AOD. This is a balance of cut and fill that allows for the formation of a good working substrate that is above the current flooding level (7.5m AOD) and the envisaged, future flooding level (7.75m AOD). Refer to JBA Consulting's document 'Crown Wharf Flood Consequences Assessment' for further details.

Development works
The developed area of the site (the PDZ) will be divided into three areas:

i. ***Administration Area*** *- an administration area situated at the main entrance to the site. This area will contain a gatehouse which will control entry into the industrial process area and the administration building. Car parking will be concentrated in this secured area with 57no spaces provided including accessible spaces as generally cars will not be permitted into the industrial process area. HGV's and van that operate in the industrial process area are also controlled via the gatehouse when arriving and exiting. A small covered cycle stand is also provided adjacent to the gatehouse. 25% of the car parking spaces in this area will be provided with an electrical charging point.*

ii. ***Industrial Process Area*** *- an industrial process area which will consume the majority of the site and its function is documented in preceding chapters.*

iii. ***Tanker Loading Area*** *- a loading area for sustainable fuels onto tankers for distribution is provided on the north-western corner of the site. This area contains a separate gatehouse building, weighbridges, parking and fuelling gantries.*

A jetty will also be constructed to allow shipping to deliver ethanol and export finished sustainable fuel products, this will be subject to a marine license.

6.0 Proposals

6.2 The Proposed Development - Building summary

Building Name	GIA (m2)	Anticipated Occupation	Function	Description / Notes
Gatehouse 1	35	1 - 2 persons	A control point for Northeastern entrance to site, this building represents the main point of control for the car park area and PDZ. It controls access and the CCTV making it a focal point for security.	This building and the administration building have enhanced architectural materials and design as they are in the more prominent areas of the site and are more likely to be visited by people outside the operation of the industrial process.
Gatehouse 2	35	1 - 2 persons	Control point for HGV fuelling area controlling both the entrance to the area and the exit via secondary gates. This building is linked to gatehouse 1 and holds security responsibility for an area with an enhanced risk of unauthorised access and fuel theft.	As above, but functional in design
Administration Building	342	Varies, typically 5 persons, max capacity 20 persons	Office and meeting space for staff on site and other Lanzatech employees visiting site.	This building lies outside, but on the edge of, the PDZ. Large plant room to serve building and the process control building, reducing the need for maintenance personnel entering the more secure area.
Amenity 1	Ext	1 - 5 person	External shelter for workers	Covered space, not enclosed
Amenity 2	Ext	1 - 5 persons	External shelter for workers	Covered space, not enclosed
Process Control Building	700	Typically, 5 persons	Dedicated control centre for the industrial process where instruments and controls monitoring the plant are located and monitored.	The building is of blast proof construction and has limited windows and doors to promote blast security.
Laboratory	84	Normally unoccupied but occasionally 1-2 persons	Small building for monitoring the quality of feedstock materials, partially processed materials and the finished products.	Basic industrial building with specialist fit out
Compressor Building 1	415	Normally unoccupied	Weatherproof, acoustically-attenuating housing to compressor equipment	Basic industrial building with acoustic cladding and louvres to reduce noise from within
Compressor Building 2	415	Normally unoccupied	Weatherproof, acoustically-attenuating housing to compressor equipment	Basic industrial building with acoustic cladding and louvres to reduce noise from within
Warehouse	399	Normally unoccupied but occasionally 1-4 persons when working	Storage of spare parts and consumables for the industrial process.	Basic industrial building with internal racking
Workshop	337	Normally unoccupied but occasionally 1-4 persons when working	Workshop space for the repair and maintenance of items in the industrial process.	Basic industrial building with workshop facilities including a crane

***Table 3** – Building descriptions*

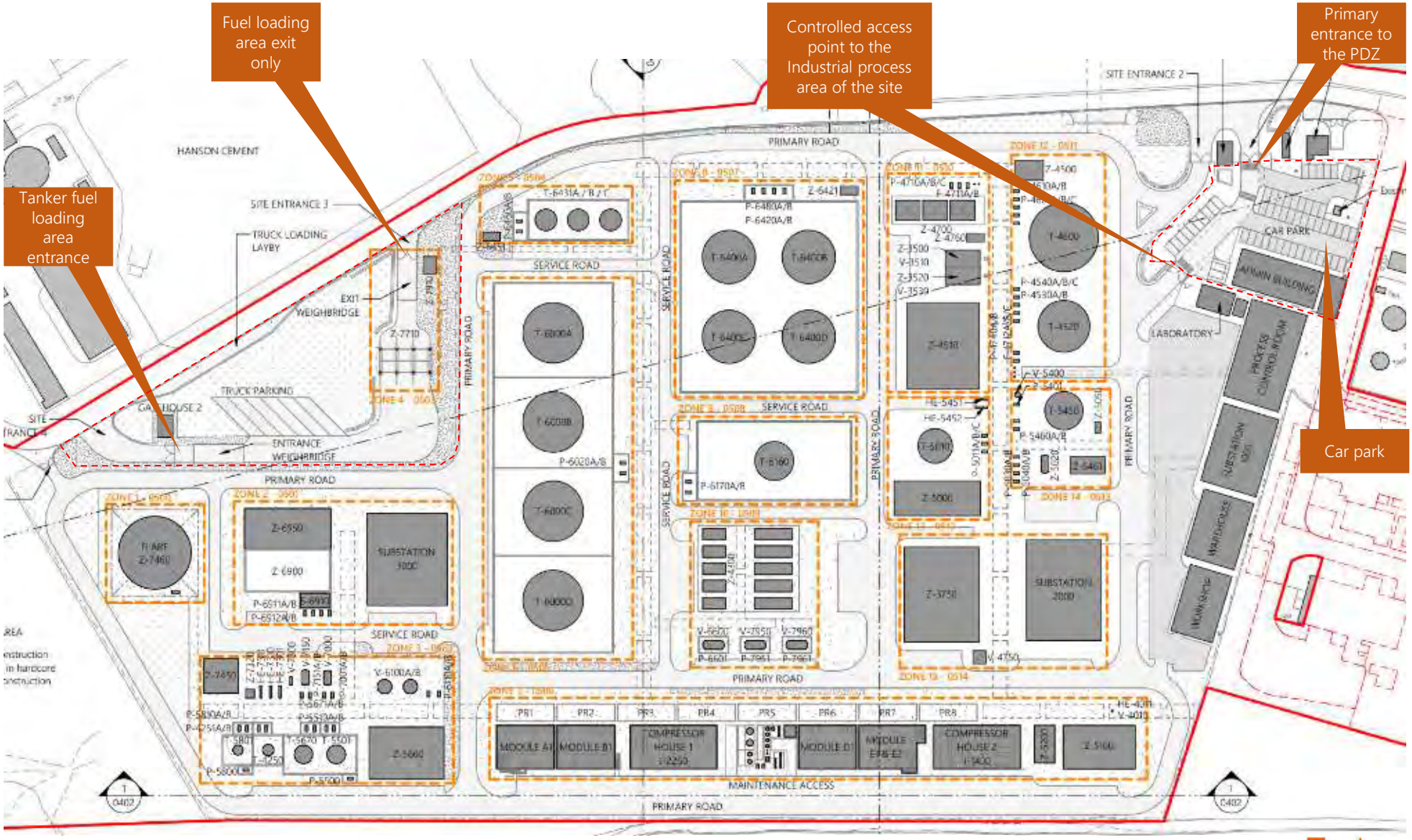


Figure 89 – Vehicle access strategy. Key components are fire separation, access to all areas for fire-fighting, division of traffic types into sensibly organised security focused operations.. Refer to drawing 2143.01-IA-ZZ-ST-DR-A-0215_Proposed PDZ Layout & Equipment List for full details.

6.0 Proposals

6.3 Amount, Mass and Scale

The amount, mass and scale of this development is dictated by the requirements of the industrial process design, but efforts have been made to contain the impact of the proposals by:

- *Minimising heights through careful engineering of the equipment, and in particular the flare*
- *Containing individual masses to a sensible amount and breaking equipment such as tanks into small items*
- *Ensuring large items are provided in muted, matt colours*
- *Configuring the development arrangement to reduce visual impact where possible by moving large equipment away from the prominent water frontage.*

The key constituents to the amount, mass and scale are:

a) Site Area – The PDZ has an area of 91,212m2 of which:
i. Administration area 4,280m2
ii. Tanker loading 6,624m2
iii. Industrial Process Area 80,308m2
b) Buildings – The buildings have a combined GIA of 2,762m2 (See table 4)
c) Equipment – The equipment has a combined volume excluding pipework and racking of 163,363m3

EQUIPMENT TAG No.	DESCRIPTION	No	L (M)	W (M)	DIA (M)	H (M)	VOL (M3)
F-4711A/B	FILTERS	2			0.4	6	15.07
F-4712A/B/C	WATER FILTERS	3			0.4	6	22.61
HE-4011	EXCHANGER	1			0.5	6	9.42
HE-5451	HEAT EXCHANGER	1	0.8	4.3		6	20.64
HE-5452	HEAT EXCHANGER	1	0.8	4.3		6	20.64
HE-7301	HEAT EXCHANGER	1	0.8	4.3		6	20.64
HE-7310	HEAT EXCHANGER	1	0.8	4.3		6	20.64
HE-7311	HEAT EXCHANGER	1	0.8	4.3		6	20.64
J-1400	COMPRESSOR HOUSE	1	30	15		10	4500.00
J-2250	COMPRESSOR HOUSE	1	30	15		10	4500.00
P-4251A/B	PUMP	2	1	2		3	12.00
P-4530A/B	PUMP	2	1	2		3	12.00
P-4540A/B/C	PUMP	3	1	2		3	18.00
P-4601A/B/C	PUMP	3	1	2		3	18.00
P-4610A/B	PUMP	2	1	2		3	12.00
P-4710A/B/C	PUMP	2	1	2		3	12.00
P-4740A/B	PUMP	2	1	2		3	12.00
P-5011A/B/C	PUMP	3	1	2		3	18.00
P-5030A/B	PUMP	2	1	2		3	12.00
P-5040A/B	PUMP	2	1	2		3	12.00
P-5401	PUMP	1	1	2		3	6.00
P-5460A/B	PUMP	2	1	2		3	12.00
P-5500	PUMP	1	1	2		3	6.00
P-5510A/B	PUMP	2	1	2		3	12.00
P-5671A/B	PUMP	2	1	2		3	12.00
P-5800	PUMP	1	1	2		3	6.00
P-5810A/B	PUMP	2	1	2		3	12.00
P-6020A/B	PUMP	2	1	2		3	12.00
P-6110A/B	PUMP	2	1	2		3	12.00
P-6170A/B	PUMP	2	1	2		3	12.00
P-6420A/B	PUMP	2	1	2		3	12.00
P-6450A/B	PUMP	2	1	2		3	12.00
P-6480A/B	PUMP	2	1	2		3	12.00
P-6601	PUMP	1	1	2		3	6.00
P-6911A/B	PUMP	2	1	2		3	12.00
P-6912A/B	PUMP	2	1	2		3	12.00
P-7001A/B	PUMP	2	1	2		3	12.00
P-7151A/B	PUMP	2	1	2		3	12.00
P-7951	PUMP	2	1	2		3	12.00
P-7961	PUMP	1	1	2		3	6.00
S-6910	SUMP	1	10	5		4	200.00
T-4250	STORAGE TANK	1			4	12	150.72
T-4520	WATER TANK	1			21.5	17	1147.67
T-4600	WATER TANK	1			24	20	1507.20
T-5010	WATER TANK	1			12	14.5	546.36
T-5450	STORAGE TANK	1			13.3	17.4	726.66
T-5501	STORAGE TANK	1			6.5	5	102.05
T-5670	TANK	1			6.4	9.4	188.90
T-5801	STORAGE TANK	1			3.5	5	54.95
T-6000A/B/C/D	STORAGE TANK	4			21	20	5275.20

EQUIPMENT TAG No.	DESCRIPTION	No	L (M)	W (M)	DIA (M)	H (M)	VOL (M3)
T-6160	TANK	1			13.5	13	551.07
T-6400 A/B/C/D	TANK	4			18.5	20	4647.20
T-6431 A/B/C	TANK	3			7.5	9	635.85
V-3510	RECIEVER	1			1.2	6	22.61
V-3530	RECIEVER	1			1.2	6	22.61
V-4010	DRUM	1	1	1		5	5.00
V-4750	DRUM	1	4.5	4.5		7	141.75
V-5400	DRUM	1			2	7	43.96
V-6100 A/B	HYDROCARBON VESSEL	2			5	15	471.00
V-6600	DRUM	1	3	7		8	168.00
V-7000	DRUM	1	2.7	5.2		5	70.20
V-7150	DRUM	1	2.7	5.2		5	70.20
V-7300	DRUM	1	1.2	2.9		6	20.88
V-7950 / V-7960	DRUM	2	3	7.5		8	360.00
Z-3500 / 3520	AIR COMPRESSOR PACKAGE	2	12	6		4	576.00
Z-3750	LIQUID NITROGEN PACKAGE	1	26	33		12	10296.00
Z-4300	HYDROGEN GENERATION PACKAGE	1	35	30		20	21000.00
Z-4500	METERING PACKAGE	1	10	7		5	350.00
Z-4510	TREATMENT PACKAGE	1	25	30		4	3000.00
Z-4700	COOLING TOWER PACKAGE	1	27.56	6.85		6.9	1302.62
Z-4760	PACKAGE	1	6	3		3	54.00
Z-5000	PACKAGE	1	30	12		8	2880.00
Z-5020	PACKAGE	1	2.6	6.3		8	131.04
Z-5050	DOSING SYSTEM	1	2	4		6	48.00
Z-5100	BOILER PACKAGE (STACK)	1	25	15		4.4	1650.00
Z-5200	BOILER PACKAGE	1	7	13		4.4	400.40
Z-5461	PACKAGE	1	12	6		8	576.00
Z-5660	PACKAGE	1	26	18		10	4680.00
Z-6421	PACKAGE	1	6	3		7	126.00
Z-6451	PACKAGE	1	6	3		7	126.00
Z-6900	COLLECTION BASIN	1	30	15		5	2250.00
Z-6950	PACKAGE	1	30	14		4	1680.00
Z-7320	PACKAGE	1	3	3		6	54.00
Z-7450	PACKAGE	1	12	12		4	576.00
Z-7460	GROUND FLARE PACKAGE	1			24.3	20	1526.04
Z-7710	TANKER LOADING PACKAGE	1	8.6	18		5	774.00
Z-7910	PACKAGE	1	6	4.5		6	162.00
N/A	MODULE A1	1	20	15		28	8400.00
N/A	MODULE B1	1	20	15		24	7200.00
N/A	MODULE C1	1	20	15		20.5	6150.00
N/A	MODULE D1	1	20	15		16.7	5010.00
N/A	MODULE E1 + E2	2	23	15		46.3	31947.00
N/A	SUBSTATION 1000	1	20	28		10	5600.00
N/A	SUBSTATION 2000	1	35	26		10	9100.00
N/A	SUBSTATION 3000	1	32	28		10	8960.00
N/A	NATIONAL GRID SWITCHROOM	1	7.5	8		10	600.00

Approximate volume of Equipment (m2) 163,813

Excludes buildings and piperacks

Table 4 – *Equipment Sizes Table*

6.0 Proposals

6.3 Amount, Mass and Scale

The amount scale and mass can also be seen in the LVIA computer generated graphics of the proposals. Refer to Turley LVIA Assessment'. In this document it is clear to see that the proposals are generally low lying in the context of the neighbouring industrial developments, discreetly coloured finishes and in-keeping with the surroundings.

Figure 90-92 *– Images demonstrating the amount of development, its scale and mass.*

6.0 Proposals

6.4 Community safety

The proposals for this site are designed to promote safety as a priority. The key risks that are addressed are unauthorised access, theft of product, materials and equipment, fire safety and contamination each of which has a series of implications for other aspects of the scheme. Security design solutions to these issues include:

a) ***Counter Terrorism statement and Security*** *- The site is located in a secure port environment, with controlled gated access to all visitors. The PDZ gated access and egress routes (including the wharf) will also be secure and closely controlled by LanzaTech. The site perimeter will be enclosed by steel palisade fencing. LanzaTech will work closely with Associated British Ports (ABP) to ensure long-term safety and security of the facility, in line with the relevant standards at any given time.*

b) ***CCTV Scheme*** *- A comprehensive scheme of CCTV will cover the site and the entrance areas. This will be monitorable from both gatehouses and the process control building. Key aspects of the surveillance scheme will include control of the 4no access/egress points to the site, the perimeter of the site, key process activities, all fuel storage locations and major buildings within the industrial process area of the PDZ. The CCTV will include infra-red surveillance, connections to passive detections systems, security lighting and site-wide tannoy.*

c) ***Passive protection measures*** *- There is a large, existing bund to the rear of the site which raises the land up to the level of the former railway. This acts as a passive protection to vehicle access to the site along the southern perimeter. This extends along the western boundary and is supplemented by gabion retaining in places.*

d) ***Active surveillance, guarding/security personnel*** *- The attendance at the gatehouses will be a 24 hour a day operation. Each gatehouse will be staffed by a minimum of 1no person and at some time 2no people.*

e) ***Fencing and security*** *- The perimeter of the site is subject to a 2.4m high steel palisade fence with security topping. Inside the administration area on the boundary to the industrial process area of the PDZ the fence is 2.4m high palisade without a security topping but the palisades will be spiked. Inside the site areas such as substations are subject to 2.4m high chainlink fencing. All fencing has steel post set in concrete. Gates are formed in galvanised metal with the same screening as the fence of which they are part.*

f) ***ANPR*** *- Automatic number plates recognition will be in use at all entrances / exits to the site to track which vehicles have entered and left the site.*

g) ***Locking and management of the equipment that dispenses fuel*** *- To reduce the risk of theft of sustainable diesel fuel from the facility all dispensing equipment will be suitably fenced or enclosed and only operable with control keys available only from the gatehouses.*

h) ***Lighting*** *– A controlled scheme of lighting has been provided that balances the needs of energy conservation, site security and wider visual amenity. Details can be found in the AECOM lighting information.*

6.0 Proposals

6.4 Community safety
Fire design solutions to these issues include:

a) ***Assessment*** *- A detailed assessment of the fire risk and in particular the potential thermal radiation in the event of a fire has been made by ERM. A key point of this assessment has been the decision to limit the presence of potentially combustible items on site in so far as is possible to ensure safety. Notably significant landscaping and brown roofs within the site curtailed to the administration area only, limiting not only the combustible energy on site but also any sources of ignition from maintenance.*

b) ***Material choices*** *- All building and equipment materials are constructed from non-combustible materials regardless of building height.*

c) ***Building Design*** *- All buildings are to be built in accordance with Part B of the approved documents (Building Regulations) and are constructed to be low fire risk in nature with clear escape routes and few sources of ignition. It should be noted that some areas such as the warehouse, laboratory and workshop have inherent fire risks in terms of their function and careful planning of fire safety measures inside the building will be necessary.*

d) ***Fire Fighting*** *- All aspects of the equipment and buildings are readily accessible by fire-fighting equipment with the provision of fire-fighting routes being considered from inception.. As the scheme progresses in design development hydrants and water tanks will be added to provide fire-fighting water supplies. These supplies are fed primarily by on site private water reserves. Key components of the active fire-fighting include deluge water suppression and foam systems that are designed specifically to accompany specific equipment and risks across the site.*

e) ***Fire Planning*** *- A comprehensive scheme for the operation and management of the facility will be produced in conjunction with the fire service as the design progresses. It should be noted that the design of the scheme has been determined by various international and where available, British Standards, to determine a safe layout.*

For more information on fire safety refer to documents supplied by Part B and ERM.

Contamination design solutions to these issues include:

a) ***Bunding of tanks*** *- All tanks and vessels containing potential contaminants will either be double skinned tanks with detection in the internal void or have external bunding arrangements capable of containing 120% of the volume stored. Typically, bunds will be a proprietary metal tank wall system in a finish to match the other aspects of the development on an impermeable concrete base. Each base will be fitted with an interceptor device that when full will close and ensure all spilt material is contained within the bund environment. Clean-up of bunds will involve material being drained from the enclosure by specialists and where possible, cleaned for re-use. The area would then be cleaned, repaired and recommissioned as required.*

b) ***Interception*** *- A comprehensive scheme of drainage interception is provided and can be seen in JBA's documents and drainage design.*

c) ***Control of effluents*** *- Waste materials and trade effluent are described in detail in Stopfords 'Waste Management Plan'*

Flammable materials	Combustible materials
A material is considered **flammable** if it has a flash point of any temperature below **37.8 °C**.	A material is considered **combustible** if it has a flash point higher than **37.8 °C** and below **93.3 °C**.

6.0 Proposals

6.5 Materials and Colours

Usage area	*Material Description*	*Finish*	*Comments*
Road - surface	Blacktop finish	Blacktop	Impermeable for SUDS purposes, road drainage required.
Road - Car park surface	Permeable pavoirs		Permeable for SUDS
Road - Kerbs	Concrete kerbs	Plain concrete	Variety of sizes/profiles to suit situation
Road - Whitelining	Thermoplastic markings	Relective topping and colours to suit location and purpose.	
Road - Pathways in car park area and around buildings	Blacktop finish	Blacktop, concrete kerb edging	Impermeable
Road - margins in PDZ, car park areaand around tanker area	Aggregate	Grey colour	Suitable for pioneer species
Road - High traffic turning areas	Reinforced concrete	Plain concrete, brushed or tamped finish	Loading bays, weighbridges, turning areas
External works - Fencing 1	Palisade fence	Galvanised finish	Perimeters and sub-division of spaces. All 2.4m high with additional 300mm element below ground. Steel posts and security topping. Suggest rota spile to front facing areas and barbed wire elsewhere.
External works - Fencing 2	Chainlink	Galvanised finish	To substations within the site etc. All 2.4m high. Steel posts.
External works - Gates 1	Palisade framed gate, manual operation	Galvanised finish	Perimeters and sub-division of spaces. All 2.4m high with additional 300mm element below ground. Steel posts and security topping (rotaspike)
External works - Gates 2	Chainlink framed gates, manual operation	Galvanised finish	To substations within the site etc. All 2.4m high. Steel posts.
External works - Traffic Barriers	Automated traffic barriers to entrances and exits	na	Controlled from gatehouse
External works - columns	Lighting , tannoy, CCTV columns	Galv steel to marine grade	Various locations
External works - Retaining structures	Stone filled gabbions	Stone to match buildings	Various locations

Table 5 *– Materials and Colours – External Works*

6.0 Proposals

6.5 Materials and Colours

Usage area		*Material Description*	*Finish*	*Comments*
Industrial equipment - Tanks		Metal, steel or aluminium	Geenrally PPC / PVF type finish in white colour.	
Industrial equipment – Racking		Steel	Galvanised steel finish	
Industrial equipment – Stairs, guard rails		Steel	PPC finish in signal yellow RAL 1003/1018	
Industrial equipment – Flare		Steel	Galvanised steel finish	

Table 5 – Materials and Colours *– Industrial Equipment*

Usage area		*Material Description*	*Finish*	*Comments*
Buildings - cladding 1		Textured insulated panels	PVF, colourcoat or similar	For use on gatehouse 1 and admin building
Buildings - cladding 2		Built-up insulated cladding system	PVF, colourcoat or similar	For use on all other buildings
Buildings - Stonework		Welsh slate in rubble / splitface blockwork	Coloured mortar	For use on gatehouse 1 and admin building
Buildings - Below DPC course		Engineering bricks	Blue / Black facework quality masonry units, coloured mortar only on admin and gatehouse 1	For use on all buildings at low level
Buildings - Windows and doors		Aluminum double windows with glazing to MOD standard type 1	PPC type finish in dark grey	For use on all buildings at low level
Buildings - Roofs 1		Brown roof system	Aggregate	To assist ecology
Buildings - Roofs 2		Metal cladding and eaves detail around brown roofs	PPC aluminium, steel or similar, suited to marine environment	Shaped profiles
Buildings - Roofs 3		Built-up insulated cladding system	PVF, colourcoat or similar, system selected to suit marine environment	For use on all other buildings
Buildings - Rainwater goods		Aluminium cladding and eaves detail around brown roofs	PPC aluminium, steel or similar, suited to marine environment	All buildings
Buildings - Exposed columns and steelwork		Steel columns	Paint system for marine environment.	Admin building

Table 6 *– Materials and colours - Buildings*

6.0 Proposals

6.6 Visualisations

Figure 93 – *Visualisation of the main entrance area*

6.0 Proposals

6.6 Visualisations

Figure 94 *– Visualisation of the gatehouse area*

6.0 Proposals

6.6 Visualisations

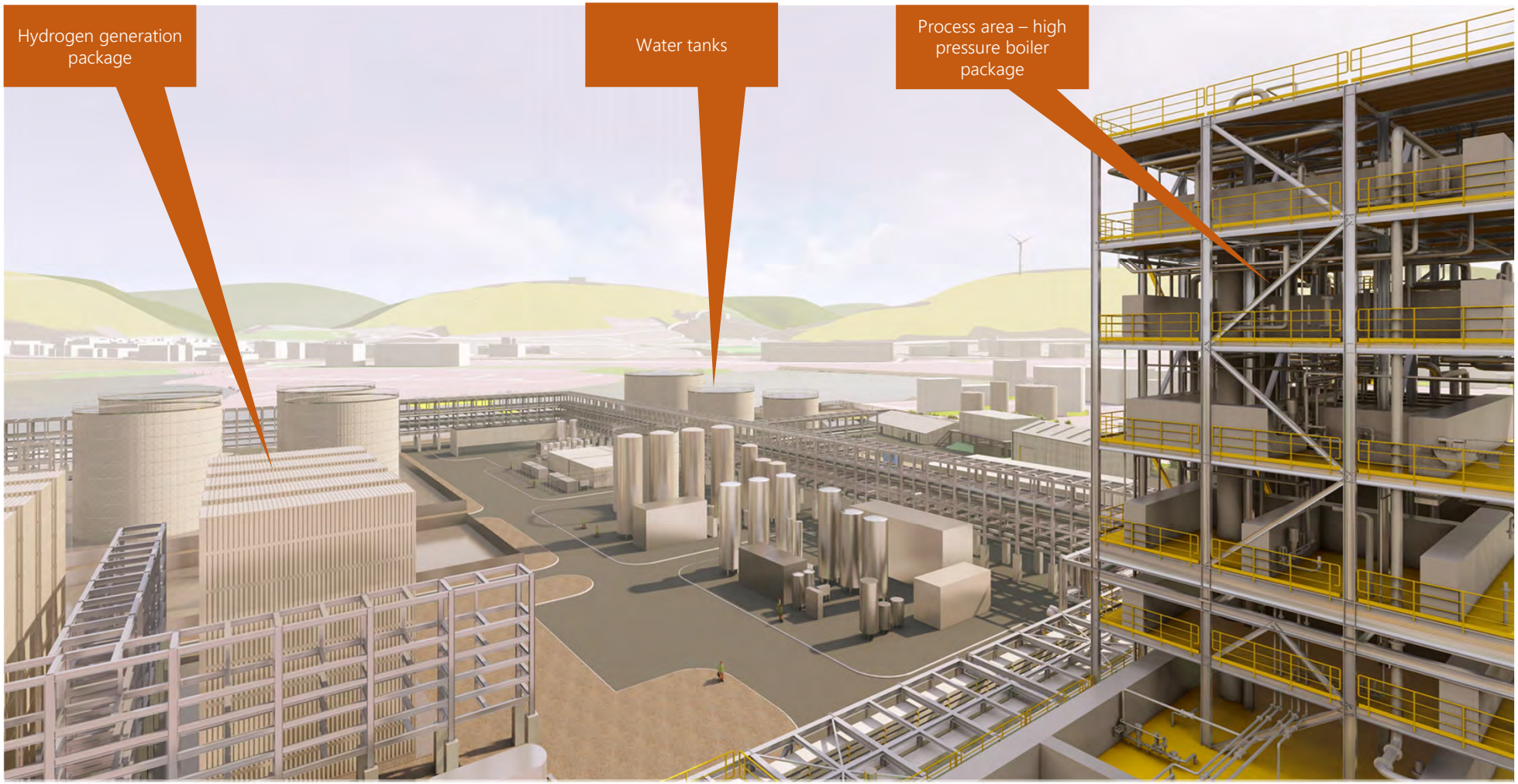


Figure 95 *– Production development Zone, showing equipment and buildings*

6.0 Proposals

6.6 Visualisations

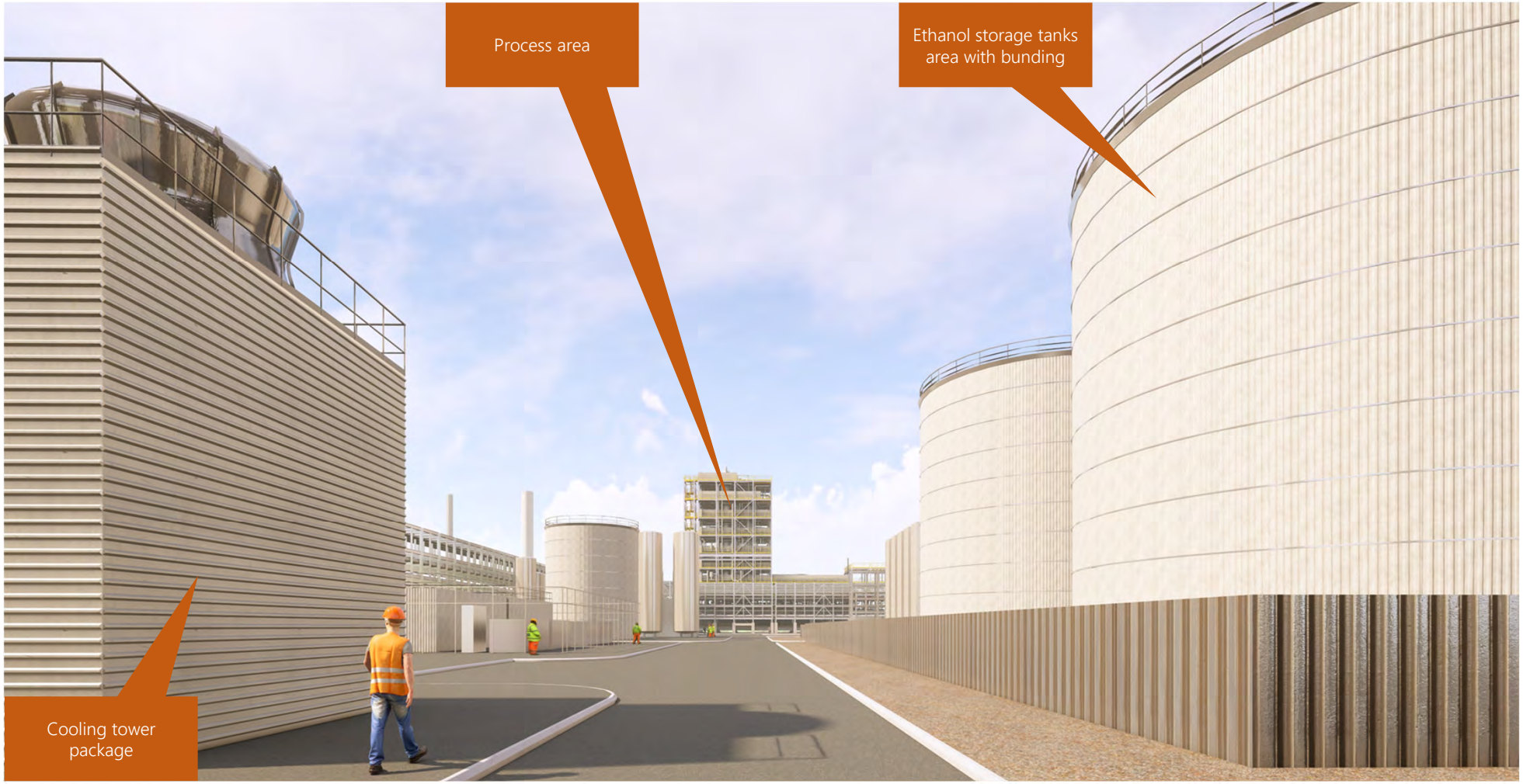


Figure 96 *– High level view of the development, showing ethanol storage tanks, bunding and cooling towers*

6.0 Proposals

6.6 Visualisations

Figure 97 *– High level view of the development*

Figures 98 (top) and 99 (bottom) *– View from A4241 towards the proposed development site, and aerial view over harbour*

7.0 Proposals

7.1 Access and Movement

A full description of the access and movement on site can be found in the 'Transport Statement' prepared by SCP.

Lanzatech has chosen road and maritime delivery connections as the primary modes of access to the site. To manage the maritime aspects of this strategy a new jetty will be required, this is subject of a marine license. Ethanol will be delivered via the jetty and sustainable aviation fuel will be exported from the site via the same route.

The road access is much simpler in content with all vehicles arriving to the site from the controlled road environment of the port. Once at site vehicles will be signposted to one of two entrances.

a) *The first entrance is the general entrance to the PDZ and is controlled by gatehouse 1. Vehicles for employees and visitors commuting to the site will be collected in the administration area car park to the front of the site and not permitted to pass into the broader area of the site, (the industrial process area). Vehicles requiring access to the industrial process areas of the site, typically vans and other light goods vehicles will be permitted to pass the internal gates and travel via the network of roadways within the site. A key feature of the internal roadway layout is a perimeter road that allows maintenance vehicles to circulate the site freely. This is also an important component in ensuring that emergency vehicles can reach all areas easily. It is anticipated that the majority of visitor and staff travel to this area site will be by cars, vans and LGV sized vehicles, but the site is sized and designed to allow HGV's to pass freely. Cycles will not be permitted on the site therefore a covered cycle shelter is provided at the first entrance.*

b) *The second entrance is to the West of the site and for tankers collecting sustainable diesel fuel for distribution. Again, a gyratory system has been selected so that vehicles can enter this area of the site under the control of a gatehouse, be weighed on an entry weighbridge, park / wait, when necessary, then proceed to loading, reweighing and departure via an exit gate.*

These design characteristics ensure that the site is safe in use as well, as providing a workable system of secure and surveillance by restricting access and monitoring access points.

Accessible parking spaces are provided in the car park area immediately adjacent to the administration building where they are most likely to be used. It should be noted that the site is largely both flat and level promoting good access for all when required.

8.0 Conclusion

8.1 Conclusion

This application is for the development of a world-leading facility for the production of sustainable fuels that will significantly reduce the carbon emissions from aviation and uses for diesel fuels both in the United Kingdom and beyond. There are also extensive local benefits including:

- *Provision of local high-value employment opportunities directly at the facility*
- *Generation of a range of other employment opportunities in the immediate area in supporting services.*
- *Regeneration of the Crown Wharf area*
- *A significant contribution to the Celtic Freeport Initiative and South Wales Industrial Cluster*
- *Making an ongoing contribution to the Welsh economy*
- *Contribute to the advancement of specialist knowledge in the field of sustainable fuel production in Wales*

The proposals are carefully formulated and designed to minimise any adverse impact on the wider Port Talbot area being well situated in an existing industrial area, creating low visual noise, lighting, traffic and air quality impacts.

It is concluded that this application is in the interests of Port Talbot, Wales and the UK and should be granted consent.

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