

# RWE

# PEMBROKE GREEN HYDROGEN PROJECT: A PEMBROKE NET ZERO CENTRE PROJECT

**Chapter 2: Proposed Development Description**



## Glossary

<b>Term</b>	<b>Definition</b>
AGI	Above Ground Infrastructure
ALC	Agricultural Land Classification
AOD	Above Ordnance Datum
BMV	Best and Most Versatile
CCGT	Combined Cycle Gas Turbine
CCS	Considerate Constructors Scheme
CEMP	Construction Environmental Management Plan
COMAH	Control of Major Accident Hazards
CTMP	Construction Traffic Management Plan
ES	Environmental Statement
FCA	Flood Consequences Assessment
FSC	Forest Stewardship Council
GHG	Greenhouse Gas
HGV	Heavy Goods Vehicle
HV	High Voltage
LDP	Local Development Plan
LPA	Local Planning Authority
MAFF	Ministry of Agriculture, Fisheries and Food
MV	Medium Voltage
NIA	Noise Impact Assessment
PCC	Pembrokeshire County Council
PDAS	Planning, Design and Access Statement
PSA	Pressure Swing Adsorption
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# 2 PROPOSED DEVELOPMENT DESCRIPTION

## Introduction

- 2.1. This chapter provides a description of the Proposed Development and forms the basis for the environmental assessment provided in this Environmental Statement (ES). Further information can be found in the appendices to this chapter provided in Volume 3 of this ES.
- 2.2. The effects of the Proposed Development have been assessed throughout the ES based on likely and realistic scenario. For example, construction information is presented as the 'likely case'. A number of measures which would reduce or avoid adverse environmental effects arising have been included as part of the Proposed Development design. Details of these measures are provided in this chapter and set out in each topic chapter. This chapter, together with the subsequent topic chapters, provide the data required to identify and assess the main and likely significant effects of the Proposed Development in accordance with Regulation 17 and Schedule 4 of the EIA Regulations.
- 2.3. This chapter provides a description of the Development Site and the key components of the Proposed Development, including an overview of the approach to construction.

## The Development Site and surrounding area

### Development Site location

- 2.4. The Development Site lies within the administrative boundary of Pembrokeshire County Council (PCC) ("the Local Planning Authority" or "the LPA") and is located circa 3.75 km to the east of the town of Pembroke Dock. The location is identified in **Figure 2.1** Development Site Boundary.
- 2.5. The Development Site Boundary extends 23.7ha and comprises the Main Electrolyser Area, a Hydrogen Gas Pipeline Corridor, an electrical connection to a high voltage transformer all located to the west of Pembroke Power Station, and an area for connections into the Pembroke Power Station and a Cable Corridor for connection into the National Grid Substation. Pembroke Power Station is a combined cycle gas turbine (CCGT) station which began commercial operation in September 2012.
- 2.6. The Main Electrolyser Area covers approximately 4ha of land to the west of the Pembroke Power Station. The area was previously the original Pembroke A Power Station sports and social club, although has not been utilised as such since the early 2000's. The area is mostly laid to grass, with trees and other vegetation around the perimeter and in the southern section.

- 2.7. The Hydrogen Gas Pipeline Corridor will accommodate an approximately 1.5km pipeline which will provide Hydrogen Gas from the Electrolyser to the Valero Refinery which is located to the west of the Development Site. The Hydrogen Gas Pipeline will follow the route of an existing natural gas pipeline. It is envisaged that most of the Hydrogen Gas Pipeline from the Electrolyser will be underground, passing across farmland and a wooded area to the west of the Electrolyser. It is expected to emerge above ground, within the Valero Refinery.

### Geology and topography

- 2.8. The Development Site is located within a *Hard Rock Resource* area. The bedrock geology throughout the majority of the Development Site is interbedded Limestone and Mudstone part of the Avon group. In the northeast corner of the Development Site Boundary where the Electrolyser is located (at the location of the water supply/drainage pipe) there are bedrock deposits of Limestone from the Black Rock Subgroup and Gully Oolite Formation. Where the Hydrogen Gas Pipeline runs along Third Street (within the Valero Refinery), there are small areas of sandstone belonging to the Skrinkle formation. There are no superficial deposits across the majority of the Development Site, although there are small areas of superficial clay, silt and gravel where the connections are made to the Pembroke Power Station.
- 2.9. The lowest level within the Development Site Boundary is at Main Electrolyser Area, in the north-east corner where an existing above ground installation (AGI) is positioned. At this point, the level is 17.46m above ordnance datum (AOD). Levels rise towards the south-west of the Main Electrolyser Area, reaching 23.23m AOD. The levels along the Hydrogen Gas Pipeline Corridor heading westward from the northeast corner of the Main Electrolyser Area show a slight elevation increase to 22.4m AOD up to the waterway where levels steadily decline to approximately 7.2m AOD in the channel. Across the bank, levels rise continually approaching the Valero Refinery, reaching levels of 36.7m AOD. Along the Cable Corridor heading eastwards towards Pembroke Power Station, there is an immediate decrease in ground levels from approximately 26.9m AOD where the route leaves the Main Electrolyser Area to between 7m AOD and 8m AOD. Levels continue to steadily decrease from here, to levels where the Cable Corridor reaches the National Grid Substation of approximately 4.8m to 6m AOD.

### Development Site history

- 2.10. The Main Electrolyser Area was previously the original Pembroke A Power Station sports and social club and is operational land comprised in the red line boundary of that consent. Historic mapping indicates that this area was largely undeveloped agricultural land until the sports and social club was established in the 1970s. The use of this area of land ceased in the early 2000s following the closure of the original Pembroke A Power Station and has since been used for storage of materials. The area is now mostly laid to grass, with trees and other vegetation around the perimeter and in the southern section.
- 2.11. The Hydrogen Gas Pipeline Corridor and Cable Corridor have historically comprised undeveloped agricultural land, more recently interspersed with infrastructure associated with the Pembroke Power Station. The Water Connection Corridor is developed with drainage infrastructure associated with Pembroke Power Station.

## Planning context

- 2.12. The Development Site lies within the administrative boundary of Pembrokeshire County Council (PCC). Consequently, the Development Plan for the purposes of Section 38(6) of the Planning and Compulsory Purchase Act 2004 comprises:
- Future Wales: The National Plan 2040, published February 2021
  - The PCC Adopted Local Development Plan (LDP) adopted February 2013.
- 2.13. The LDP Proposals and Constraints Map indicate the Development Site is allocated for “*Port and Energy Related Development*” under Policy SP2. The wording of Policy SP2 confirms that development at the Port of Milford Haven will be permitted for port related facilities and infrastructure, including energy related development. Whilst the Development Site lies outside of the Port of Milford Haven, it lies within the allocation, and it is likely that it this is the case due to its historic Power Station use.
- 2.14. The Development Site is also identified, in part, as a “*Hard Rock Resource*” under Policy GN22 and is located within proximity to, although outside of an allocation for “*Sites Protected by Designations*” under Policy GN37.
- 2.15. PCC is currently preparing the Local Development Plan Review (LDP2) which will replace the current adopted LDP. The Deposit LDP2 was published for consultation in January 2020. According to the LDP2 Proposals Map, the Development Site remains allocated for “*Strategic Employment Provision*” under allocation reference S/EMP/095/00001. Due to ongoing issues associated with the effects of phosphates to water ecosystems and species, the LDP2 is on hold and there is no indication of when the process will re-commence. The Adopted LDP therefore remains the basis for decision making.
- 2.16. Chapter 5 (Planning Policy and Legislation) of this ES provides an overview of the relevant legislation and policy and each topic chapter provides an overview of relevant legislative and planning policy in respect of that topic. A separate Planning, Design and Access Statement is submitted with the planning application which provides an assessment of the relevant policy and legislation.

## Proposed Development description

- 2.17. The Proposed Development comprises: the development of a green Hydrogen production facility with Electrolysers, Hydrogen Gas storage, HV transformer and Electrolyser control building, and Hydrogen Gas pipeline ‘off-take’; together with associated infrastructure, including water supply pipeline to the Pembroke Power Station and electrical supply connection to the National Grid Substation, lighting, security fencing, hard and soft landscaping, drainage, vehicle circulation, and construction laydown areas.

## Summary of key parameters

- 2.18. The assessment of effects in this ES has been undertaken based on an envelope approach to assessment to provide flexibility in design options in the absence of final design options. This

approach to assessment has been adopted to ensure that the impacts of the final development have been assessed based on a worst-case scenario to assessment methodologies.

2.19. The table below provides a summary of the key parameters which have formed the basis for the assessment of effects in this ES.

**Table 2.1 Key Parameters for Environmental Assessment**

<b>Element of the Proposed Development</b>	<b>Key Parameter for EIA</b>
Development Site Area	23.7ha
Building footprint (development platforms)	Up to 1.3 ha of development platform.
Other developable area (including access roads and areas of hardstanding)	Up to 1.9ha
Building heights	Maximum height 25 m for the flare stack. Electrolyser building and compressor building up to 17m height. All other equipment is of lower height than the Electrolyser building.

## Key components

2.20. The Proposed Development includes the following key components:

- Electrolyser building housing the Electrolyser units
- Flare stack
- Compressors
- Hydrogen Gas Purification System
- Water supply, cooling system including cooling water storage
- Electrical infrastructure and connection to substation
- Hydrogen Gas Pipeline to nearby industrial off-taker
- High Voltage transformer with switch field
- Lighting, security fencing, hard and soft landscaping, drainage, vehicle circulation, and construction laydown areas.
- Temporary offices and welfare facilities
- Gatehouse, Control Room and Welfare
- Engineering Workshop



- Emergency Generator and Fuel Storage
- Storage area for materials, fuels, plant and equipment
- Waste management areas
- Temporary car parking facilities

2.21. An indicative Development Site Layout Plan is provided in **Figure 2.2**. Further details of the key components are provided below.

### **Electrolyser building housing the Electrolyser units**

2.22. The main Electrolyser building will be located at the south of the Development Site Boundary, north of the existing National Grid Substation. The Electrolyser building will contain the Electrolyser units and other associated plant and machinery including stacks, process cycle, rectifiers and the medium-voltage (MV) transformer.

2.23. The building itself will be largely rectangular in shape and will be up to 60 m wide, up to 110 m long and up to 17 m high. The external materials will be agreed with PCC and are likely to be similar in appearance to those used at Pembroke Power Station.

2.24. Shell and tube heat exchangers will be positioned to the east of the Electrolyser building to regulate and remove heat from the Electrolysis process. These will be up to 13 m long and up to 3 m wide. An emergency generator and fuel storage area is located to the south of the electrolyser building, adjacent to the engineering workshop.

### **Flare stack**

2.25. Flaring of Hydrogen Gas will be required to support events such as periodic depressurisation of Hydrogen systems, to allow a safe shutdown for routine and emergency situations, as well as to prevent the accumulation of a hazardous atmosphere within the plant.

2.26. The Hydrogen flare stack will be located towards the northern boundary of the Development Site. The flare stack will be up to 25m in height and will require a clear area of 50m diameter surrounding it. The flare stack will comprise galvanised metal.

### **Gatehouse, Control Room & Welfare and Engineering Workshop**

2.27. The Gatehouse will be located to the south of the electrolyser building and will accommodate rest rooms and common areas for staff. It will also be the main point of control for the facility. The Engineering Workshop will be located adjacent to the Gatehouse. The Gatehouse will be up to 25 m wide and 15 m long and the engineering workshop will be up to 25 m long and 20 m wide. Both buildings will be of lower height than the electrolyser building.

### **Hydrogen Gas compressor building and treatment system**

2.28. Hydrogen Gas produced in the Electrolysis process is compressed to higher pressure for export off-site for use by end users. The compressors are contained within the Hydrogen Gas compressor building which is located to the north of the Electrolyser building.



- 2.29. The Hydrogen Gas compressor building will be rectangular in shape and will be up to 34 m long, up to 15 m wide and of lower height than the electrolyser building. The external materials will be agreed with PCC and are likely to be similar in appearance to those used at Pembroke Power Station.
- 2.30. Adjacent to the Hydrogen Gas compressor building is the Hydrogen Gas treatment system. This containerised unit is also rectangular in shape and will be 21 m long, 8 m wide and of lower height than the electrolyser building. The external materials will be agreed with PCC and are likely to be similar in appearance to those used at Pembroke Power Station.
- 2.31. A pressure swing adsorption (PSA) instrument and compressed air unit will be located to the north of the Hydrogen Gas compressor building. This will comprise 3no. rows, measuring up to 3 m wide and up to 13 m long. The PSA is required as part of the purification process.

### **Water supply, cooling system including cooling water storage**

- 2.32. Process and cooling water for the Electrolyser is expected to be taken from the existing supplies at Pembroke Power Station provided by Dwr Cymru Welsh Water. It is not intended that the abstraction licence of Pembroke Power Station be used. However it is intended that discharges from use of cooling water for the Electrolyser will be made via Pembroke Power Station discharge point authorised under its environmental permit but without exceeding the discharge limits in terms of volume and concentrations within the existing Pembroke Power Station Environmental Permit. It is anticipated that the Electrolyser will share the existing water treatment plant at Pembroke Power Station.
- 2.33. The Electrolyser will be served by a purpose-built cooling system, separate to the cooling water system used by Pembroke Power Station. The cooling water system is located at the north-east of the Main Electrolyser Area and comprises a cooling tower system, cooling water vessel, cooling water supply pump and main cooling water pump. A fire water pump as well as a demineralised waste tank and pump will also be positioned at this location. The cooling water system comprises rows of tubes within a frame which measures up to 28 m wide and up to 66 m long. The cooling tower system is of lower height than the electrolyser building and comprises galvanised metal tubes set on a metal frame. Each tube measures up to 3 m wide and up to 14 m long and is positioned in double rows at a 3 m distance.
- 2.34. The cooling water vessel measures up to 20 m diameter and up to of lower height than the electrolyser building and the demineralised water tank measures up to 15 m diameter and of lower height than the electrolyser building. These comprise galvanised metal and are located to the west of the cooling system adjacent to the cooling water supply pump and the demineralised water pump. The main water pump is located immediately south of the cooling system.
- 2.35. Additional chemical storage including a liquid nitrogen instrument, compressed air and lye storage will also be located in this area to the north of the electrolyser building.

### **Electrical infrastructure and connection to substation**

- 2.36. The Proposed Development will connect into the existing 132kV National Grid Substation located at the Pembroke Power Station to receive its electricity supply, which will come from

grid-connected renewables. This will mean that the Electrolyser will be powered with low carbon electricity and will create 'green hydrogen'.

- 2.37. A High Voltage (HV) transformer with switch field will enable the Proposed Development to connect into the existing National Grid Substation. These are an 'open air' design, surrounded by a fence. It is anticipated the transformer will be up to 50 m long and up to 30 m wide.
- 2.38. A HV cable will route from the transformer south and connect into the National Grid Substation. The cable will be installed via surface dug trenches of up to approximately 1 m deep and 50 cm wide and backfilled, utilising existing access tracks and road options wherever practicable.

### Hydrogen Gas Pipeline to nearby industrial off-taker

- 2.39. Most of the Hydrogen Gas produced by the Electrolyser will be transported to the Valero Refinery via a circa 1.5 km Hydrogen Gas Pipeline, at a rate of approximately 1.9 te/hr. The Hydrogen Gas Pipeline will be routed underground as it crosses farmland and woodland between the Main Electrolyser Area and the Valero Refinery and is expected to be above ground within the Valero Refinery.
- 2.40. The underground section of the pipeline will be installed via surface dug trenches of up to approximately 1 m depth and 50 cm width and backfilled.

### Security fencing

- 2.41. Security fencing will be located around the perimeter of the Development Site to secure the Proposed Development. The security fencing will be welded mesh, with the colour to be agreed with PCC ahead of construction.

### Access and parking

- 2.42. Access to the Development Site is from the main road network via the B4320 Pembroke to Angle Road to the junction at grid ref. SM 926 000, then via the road running north towards Pwllcrochan to the junction with the Pembroke Power Station access road at grid ref. SM 923 023.
- 2.43. Construction traffic for the Proposed Development would access the Development Site using the existing Pembroke Power Station access road. Construction traffic would be managed appropriately alongside the existing traffic associated with access and egress of the operational Pembroke Power Station. Temporary parking provision will be incorporated on-site during construction works to prevent any car parking on the highway. During operation, car parking facilities at Pembroke Power Station would be available for staff and visitors.

### Transport management

- 2.44. A Transport Statement has been undertaken and is included at **Appendix 2.1**. The Transport Statement confirms that the construction phase would have minimal impact on the local highway network, particularly as all HGVs would travel to and from the Development Site using the established access route for Pembroke Power Station. Once operational, given the scale

and nature of the Proposed Development, the Transport Statement confirms that the Proposed Development would have a negligible impact on both the capacity and safety of the local highway network.

- 2.45. In order to manage construction stage impact, a CTMP has been produced and is included at **Appendix 2.2**. The CTMP confirms the construction staff, construction working hours and construction access arrangement. The CTMP also details management and control processes for the construction period. Further detail is included under the 'Construction' section below.

### Appearance and design

- 2.46. The Proposed Development comprises an industrial installation, similar in character to the existing Pembroke Power Station. The appearance will more developed than the existing redundant sports and social site but will be in-keeping with the wider energy related developments in the area.
- 2.47. The PDAS produced in support of the planning application contains further detail of the appearance and design of the Proposed Development. The Development Site Layout Plan (**Figure 2.2**) provides an overview of the arrangement of the Proposed Development within the Development Site Boundary.

### Landscape and open space strategy

- 2.48. The Development Site currently comprises redundant previously developed land which has been reclaimed to a degree by vegetation but sits against the context of the industrialised Pembroke Power Station and Valero Refinery.
- 2.49. A Landscape Strategy has been produced and is at **Figure 2.3**. The Landscape Strategy includes retention of existing boundary trees and hedgerows which provide well-established screening to the Development Site. An area of amenity grassland is proposed to the north of the Development Site which will provide open space for staff and visitors. Further information in respect of the Landscaping Strategy is set out at Chapter 6 (Landscape and Visual Impact).

### Drainage and flood risk

- 2.50. There are a number of surface water features located within the Development Site Boundary acting as small surface water drains. In addition, isolated ponds are located around 100 m – 200 m east of the Development Site Boundary.
- 2.51. The watercourses in the surrounding vicinity are Pembroke River 1.3km to the east and Milford Haven Waterway approximately 650m to the north of the Development Site.
- 2.52. The Proposed Development would result in an increase of impermeable surfacing within the Development Site Boundary. As such, a Flood Consequences Assessment (FCA) and Conceptual Drainage Strategy have been produced in accordance with Planning Policy Wales Edition 12 (February 2024), Technical Advice Note 15: Development and Flood Risk (July 2004) and latest climate change data to ensure flood risk and hydrological impacts are managed appropriately. The FCA and Drainage Strategy are at **Appendix 2.3**.

### Lighting

- 2.53. Some temporary task lighting will be required during construction of the Proposed Development however, this will only be used as necessary and on a temporary basis.
- 2.54. The lighting scheme will be designed such that during operation, the light spill at the field boundaries is reduced to negligible (taken as 0.2 lux horizontal and 0.4 lux vertical), subject to achieving appropriate safety requirements. The pipeline will be underground (except at its western end, within the industrial off-taker's land), and thus unlit once operational. The development of a sensitive lighting scheme will allow the Proposed Development to meet its operational requirements, whilst minimising any impact from lighting on bat activity or other ecology at the field margins.

## Sustainability

- 2.55. This section outlines the effects of the Proposed Development on sustainability factors such as energy demand, waste, use of natural resources and residues and emissions.

### Energy demand

- 2.56. The Proposed Development is a green Hydrogen Electrolysis Plant that will consume circa 100-110MW of electricity to produce around 2 te/hr green Hydrogen Gas for third party uses unrelated to Pembroke Power Station. Including the balance of plant, the total energy consumption for the Proposed Development will be approximately 140MW.
- 2.57. The consequent reduction in use of fossil fuels due to substitution by green Hydrogen Gas, and avoided greenhouse gas (GHG) emissions, is a beneficial operational effect of the Proposed Development.
- 2.58. The Welsh Government formally committed Wales to legally binding targets to deliver the goal of net-zero emissions. The Climate Change Committee recommended the following targets that the Proposed Development will contribute to:
- Carbon Budget 2 (2021-25): 37% average reduction with credit ("offset") limit of 0%
  - Carbon Budget 3 (2026-30): 58% average reduction
  - 2030 target: 63% reduction
  - 2040 target: 89% reduction
  - 2050 target: 100% reduction (net zero)
- 2.59. The Proposed Development will contribute to cost-effective local energy generation and energy security with limited governmental subsidy and will, therefore provide socio-economic benefits.

### Waste

- 2.60. Waste produced during construction will be kept to a minimum and will be managed and sorted accordingly. Only registered waste management companies will be utilised to dispose of construction waste (packaging, wood, metal) or waste from the construction team (general domestic or canteen/kitchen waste). The appointed contractor (the "Principal Contractor")

will ensure that all waste is disposed of responsibly using only licensed waste management companies. This will be subject to appropriate due diligence checks prior to contracting.

### Use of natural resources

- 2.61. An Agricultural Land Classification (ALC) Survey has been undertaken for the Development Site and is at **Appendix 2.4**. The ALC Survey confirms that a small area of land in a single agricultural field to the west of the Development Site would be affected by the proposal, but that this would only be on a temporary basis during the construction of the water Hydrogen Gas Pipeline.
- 2.62. The Main Electrolyser Area Site is situated in land previously used for the operational purposes of the old oil-fired Pembroke A Power Station and is strategically located next to the existing Power Station site which will provide the required water supply as well as in proximity of the National Grid substation and the off-taker site. The land Agricultural Land Classification within the Main Electrolyser Area has been confirmed as non-agricultural.
- 2.63. The single agricultural field containing Best and Most Versatile agricultural land would only be disturbed on a temporary basis during construction. Appropriate soil management measures will be implemented through a Construction Environmental Management Plan (CEMP) to ensure that soil function is not affected as a result of the construction of the Proposed Development. This will include the reduction of above and below ground works to minimise any compaction of soil mitigating any potential impact on the soil structure and ability to infiltrate water. Where soil excavation is necessary, topsoil will be removed from the relevant areas and set aside separately from any subsoil. When backfilling, the subsoil will be replaced first, followed by the topsoil. It is anticipated that through good soil management measures, the agricultural value of the land contained within the Hydrogen Gas Pipeline Corridor will be unaffected.

### Residues and emissions

- 2.64. In relation to residues and emissions, the Proposed Development contributes a likely significant beneficial effect in terms of climate change. This is achieved through its displacement of carbon intensive forms of electricity generation and contribution to Welsh Government targets for the reduction of greenhouse gas emissions.
- 2.65. The contribution of residues and emissions associated with the construction of the Proposed Development are negligible in the context of the wider beneficial effect of the operation of the Proposed Development. Further details of these residues and emissions are included within several standalone documents that accompany this ES, including the FCA in relation to water (**Appendix 2.3**), the Air Quality Assessment in relation to GHG emissions (**Appendix 4.1**), the PRA in relation to potential contamination (**Appendix 4.3**) and the Noise Impact Assessment (NIA) (**Appendix 4.5**).

### Vulnerability to accidents and disasters

- 2.66. The EIA regulations state that an EIA must identify, describe and assess, in an appropriate manner, the direct and indirect significant effects arising from the vulnerability of the Proposed Development to risks of major accidents or disasters. Vulnerability of the Proposed

Development to major accidents introduced by the location should be considered as well as risks that are an inherent characteristic of the development.

- 2.67. The objective of such an assessment is to establish whether the Proposed Development increases risks to existing receptors or increases the sensitivity of those receptors to the consequences of the hazard. For example, by introducing new links/pathways between a possible hazard and a receptor. Further assessment of the risk of major accidents and disasters is included in Chapter 4 (Environmental Assessment Methodology).
- 2.68. The Proposed Development will be constructed and operated in accordance with the relevant health and safety legislation including the Health and Safety at Work etc Act 1974 and the Control of Major Accident Hazard Regulations 2015 (COMAH). Furthermore, the Principal Designer has fully assessed risks and appropriate mitigation during the design stage as part of the requirements of the Construction (Design and Management) Regulations 2015.
- 2.69. Access to the Development Site will be in full accordance with RWE’s operational health and safety management measures which control access and works within the Pembroke Power Station.

## Construction

- 2.70. The details of construction methods, timing and phasing are necessarily broad at this stage of the Proposed Development. The limits of the assessment, however, have been set sufficiently wide to allow a robust assessment to be undertaken of a reasonable worst-case scenario.

### Indicative phasing of construction works

- 2.71. The timing of the project would be dependent on securing planning permission and the discharge of planning conditions. The indicative construction programme sets out a programme of approximately 24 months duration. It is assumed that the construction is likely to be phased as shown in **Table 2.2** below.

**Table 2.2 Indicative phasing of construction**

Phase	Indicative Dates	Activities
1	Q4 2024 – Q2 2025	Development Site preparation, fencing, internal access and compounds.
2	Q2 2025 – Q3 2026	Creation of development platform, trenching, foundations laying, and drainage works.
3	Q3 2026	Installation of electrical and communications infrastructure.
4	Q3 – Q4 2026	Installation of Electrolysers and associated equipment.
5	Q4 2026 – Q1 2027	Landscaping works.



2.72. The broad sequence of construction activities is likely to be:

- Development Site preparation which may involve clearance as necessary
- Establishment of construction compound
- Erecting of the security fence and creation of internal access road
- Creation of a level platform (impermeable and permeable surfaces)
- Trenching to interconnect all system components
- Foundations of all containers, including construction of site drainage
- Laying of electrical and comms infrastructure
- Installation of Electrolysers and associated equipment
- Landscaping works in accordance with the Landscape Strategy
- Commissioning

2.73. The Development Site will be fenced during construction. It is the intention of the applicant that the Development Site would be registered under the Considerate Constructors Scheme (CCS) or a similar, locally recognised certification scheme.

#### Construction working hours

2.74. Working hours would be 07:00 to 19:00 hours Monday to Friday, 07:00 to 13:00 hours on Saturday and at no time on Sundays or on public or bank holidays. However, noisy activities will be undertaken 08:00 to 18:00 hours Monday to Friday and 08:00 to 13:00 hours on Saturday. These hours would be subject to agreement with the LPA.

2.75. In the event that works are required outside of these hours in exceptional circumstances, this would be agreed with the LPA prior to commencement of the activity, as necessary.

## Environmental management during construction

2.76. Construction would be undertaken in accordance with good practice environmental management procedures that will be set out in more detailed plans and method statements contained within a CEMP to be developed by the Principal Contractor. The CEMP will set out the key management measures that contractors would be required to adopt and implement. These measures will be developed based upon those effects identified during the EIA process and set out in the topic chapters of this ES. They will include strategies and control measures for managing the potential environmental effects of construction and limiting disturbance from construction activities as far as reasonably practicable.



- 2.77. The CEMP would be prepared during the pre-construction period once the Principal Contractor has been appointed. The final CEMP would be submitted to the LPA for approval.

### Construction working areas

- 2.78. A number of temporary facilities would be required during construction including:
- Temporary offices and welfare facilities
  - Storage area for materials, fuels, plant and equipment
  - Waste management areas
  - Temporary car parking facilities
- 2.79. Storage areas will be located within the temporary laydown areas identified on the Development Site Layout Plan (**Figure 2.2**). These will be positioned away from any sensitive receptors. Such storage areas would be bunded to mitigate any spillages of potential contaminants and would avoid location in areas of vegetation or habitat to be retained.
- 2.80. All construction works will be carried out within the Development Site Boundary and no additional land would be required outside of this area.

### Construction access

- 2.81. Access to the Development Site Boundary at the Main Electrolyser Area will be taken from along the access road to Pembroke Power Station using the existing access junction. The Development Site access and access road are well established and can safely accommodate regular vehicle movements, including those by rigid and articulated HGVs.
- 2.82. Every effort would be taken to minimise the effects of traffic associated with the construction phase of the Proposed Development. Materials and resources would be sourced locally where possible, and deliveries and construction traffic would endeavour to avoid travel during commuter peaks. A CTMP detailing the delivery routes, construction routes, construction compounds and any associated parking or management of construction traffic is at **Appendix 2.2**.

### Construction vehicles

- 2.83. The type of construction vehicles would be selected by the Principal Contractor prior to and during the construction phase. A range of construction vehicle types will be used to make deliveries to the Development Site during the construction phase of the Proposed Development, including rigid and articulated HGVs. It is anticipated that Electrolyser units will be delivered by HGVs in prefabricated units. The existing jetty to the east of Pembroke Power Station will also provide an option to make large and / or heavy deliveries to the Development Site where practical to do so. There will be sufficient space within the curtilage of the Development Site to ensure that no vehicles wait on the surrounding highway network.
- 2.84. While the number of construction workers at the Development Site will likely fluctuate over the 24-month construction phase depending upon the activity that is taking place, it is estimated that there will be approximately 100 at the Development Site per day. Although it is not expected that the Proposed Development would generate any abnormal loads, if this was

required, the routing and nature of such loads would be agreed with the highway authority prior to work commencing.

- 2.85. It is anticipated that the peak periods for traffic movements associated with the construction phase would be 07.00-08.00 and 15.00-16.00. Further details of predicted traffic flows associated with the project are provided within the CTMP.

### Drainage

- 2.86. The construction phase would incorporate pollution prevention and flood response measures to ensure that the potential for any temporary effects on water quality or flood risk are reduced as far as practicable.

- 2.87. Such measures would be implemented through the CEMP, which will require the following:

- Installation of wheel washing facilities at the entrance to the construction compounds
- Covers for lorries transporting materials to/from the Development Site to prevent releases of dust/sediment to watercourses/drains
- Bulk storage areas to be secured and provided with secondary containment (in accordance with the Oil Storage Regulations and best practice)
- Storage of oils and chemicals away from existing watercourses, including drainage ditches or ponds
- Concrete to be stored and handled appropriately to prevent release to drains
- Preparation of a flood response plan in the event of flooding during construction works. This would include a procedure for securing or relocating materials stored in bulk
- Treatment of any runoff water that gathers in the trenches would be pumped via settling tanks or ponds to remove any sediment
- Obtain consent for any works (e.g. discharge of surface water) that may affect an existing watercourse. The conditions of the consent will be specified to ensure that construction does not result in significant alteration to the hydrological regime or increase in fluvial risk
- Use of a documented spill procedure and use of spill kits kept in the vicinity of chemical/oil storage
- Storage of stockpiled materials on an impermeable surface to prevent leaching of contaminants and use of covers when not in use to prevent materials being dispersed and to protect from rain
- Stockpiles to be kept to minimum possible size with gaps to allow surface water runoff to pass through.

### Construction waste

- 2.88. The Principal Contractor hired to construct the Proposed Development will ensure that any waste that is required to be taken off-site will be disposed of responsibly to registered waste companies from the sites during and immediately following construction.
- 2.89. The potential waste generated during the construction process will primarily be related to packaging, and will include:
- The pallets that many construction materials are packaged in. These will be either wood crates, or cardboard boxes. These will be removed on a regular basis. If they arrive on wooden pallets, which have a financial value, these will either be returned to the manufacturer/distributor, or collection by a local contractor will be arranged. If they arrive packaged in cardboard boxes, then these will be removed on a regular basis, either through a hired skip, or through trips to the closest appropriate recycling station
  - Packing materials for various components. Any non-recyclable waste will be stored in a skip for regular removal to an appropriate landfill
  - Food waste from workers. Personal rubbish will be collected along with non-recyclable packaging materials, for disposal at an appropriate landfill
  - Portable toilets will be hired for the duration of the construction period; therefore there will be no human waste issues
  - Excavated soil associated with the required ground works – excavated soil will be used for backfilling activities. Topsoil will be managed as detailed in paragraph 2.65 above.

### Use of natural resources

- 2.90. The CEMP will consider the main types and quantities of materials required for the Proposed Development to assess potential for sourcing materials in an environmentally responsible way.
- 2.91. The CCS (and similar certification schemes) include measures relating to the use of resources, including categories in relation to minimising the use of water. Any timbers used would be required to be Forest Stewardship Council (FSC) certified.
- 2.92. The construction process would take into account the principles of good practice in soil handling and restoration set out in the following documents, wherever possible, to reduce the possibility of damage to soil materials during the construction process:
- Ministry of Agriculture, Fisheries and Food (MAFF) (2000) Soil Handling Guide
  - Department for Food and Rural Affairs (Defra) (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (including the Toolbox Talks).

- 2.93. The EIA Directive (as transposed into UK law) also refers to the use of land and biodiversity resources. Further details are provided in Chapter 7 (Biodiversity) of this ES, the ALC Survey (**Appendix 2.4**) and the PDAS that accompanies the planning application.

### Residues and emissions

- 2.94. Details of residues and emissions are included within several standalone documents that accompany this ES, including the FCA in relation to water (**Appendix 2.3**), the Air Quality Assessment in relation to GHG emissions (**Appendix 4.1**), the PRA in relation to potential contamination (**Appendix 4.3**) and the Noise Impact Assessment (NIA) (**Appendix 4.5**).
- 2.95. The CEMP will consider ways of minimising construction activity residues and emissions, including spills, noise, vehicle emissions etc. during the construction phase.

### Utilities

- 2.96. A small third-party natural gas above ground installation (AGI) is located in the north-west corner of the Development Site. This will be retained in-situ.
- 2.97. The Proposed Development includes connection to an existing National Grid Substation which is located in the south-west corner of the adjacent Pembroke Power Station. This electricity supply will be utilised in both the construction and the operation phases.
- 2.98. The Proposed Development also includes a connection to the existing water supply within the Power Station. The provision of process and cooling water from this supply is not expected to exceed the abstraction and discharge limits in terms of volume and concentrations within the existing Pembroke Power Station Environmental Permit.

### Vulnerability to accidents and disasters during construction

- 2.99. Foreseeable construction hazards to the environment could include fire and flooding, though risk is considered limited with good construction practices. Flood risk is assessed at **Appendix 2.3** (FCA). Recommendations for action plans in the event of flooding during construction and for managing fire risk will be addressed by the Principal Contractor when formulating the final CEMP.

## Operation and maintenance

- 2.100. The Hydrogen Gas produced at the Electrolyser will be transported to the Valero Refinery by pipeline.
- 2.101. The operational phase of the Proposed Development will therefore only generate a small number of vehicle trips to and from the Development Site per day by those employees who will drive to and from work. There will also be routine maintenance of equipment at the

Development Site, although it is expected this will be undertaken once per year by RWE maintenance staff.

- 2.102. The operation of the Proposed Development will be in-line with RWE’s health and safety management operations which are well established for the Pembroke Power Station. The Proposed Development will also be contained within perimeter security fencing to prevent unauthorised access.
- 2.103. Emissions from activities from the Proposed Development shall be free from odour, noise and vibration at levels likely to cause pollution outside the Development Site.

## Measures adopted as part of the Proposed Development

- 2.104. In order to avoid or reduce the environmental effects, a number of measures have been designed into the Proposed Development. Details of these can be found within each topic chapter of the ES and are summarised in **Table 2.3** and **Table 2.4** below.

**Table 2.3 Schedule of measures to be adopted as part of the project during construction**

<b>Topic</b>	<b>Proposed measures during construction</b>
<i>General / design</i>	Construction work to be kept clear of root protection zones.
<i>Historic Environment</i>	<p>If archaeological remains are found, a programme of archaeological investigation would be agreed with the archaeological advisors to the LPA, where required. This would allow for the development of an appropriate strategy to avoid, reduce or offset any impacts that could occur as a result of construction.</p> <p>Additional landscaping to be incorporated through implementation of the Landscape Strategy to further reduce any intervisibility.</p>
<i>Landscape and Visual Impact</i>	<p>Retention of existing boundary vegetation as far as practicable to maintain existing screening.</p> <p>Proposed planting included in the Landscape Strategy to be incorporated during the latter phases of construction to prevent any damage by construction activity.</p>
<i>Biodiversity</i>	The Proposed Development will retain the hedgerow network and all of the mature and large semi-mature trees, maintaining

	<p>the existing higher value biodiversity features over the lifetime of the Proposed Development.</p> <p>The retention of mature and semi-mature trees will preserve habitat with intrinsic value which would otherwise not be possible to re-establish over the lifetime of the Proposed Development.</p> <p>The perimeter fencing will be set back from any mature tree canopies to prevent any adverse impact on existing trees.</p>
<p><i>Traffic and Transport</i></p>	<p>Implementation of the CTMP to reduce any adverse impact on the local road network.</p> <p>A weekly booking system will be implemented for the delivery of plant and materials.</p> <p>RWE will strive to procure local contractors, thereby minimising transport costs and impact on the local environment.</p> <p>All delivery vehicles will be required to switch off their engines as they are waiting at the site, thereby preventing unnecessarily idling of vehicles.</p> <p>Use of the permitted vehicle routes shall be included as a contractual requirement and will be communicated to all individuals associated with the works.</p>
<p><i>Noise and Vibration</i></p>	<p>Good practice guidance will be implemented throughout the construction stage. Standard industry practice measures would control and manage construction noise to avoid significant adverse effects.</p>
<p><i>Climate Change</i></p>	<p>Where practicable, prefabricated elements will be delivered to the Development Site to reduce on-site construction waste and reduce vehicle movements as part of the construction process.</p> <p>Construction materials will be sourced locally where practicable, to reduce the impact of transportation.</p> <p>Vehicles used in road deliveries of materials, equipment and waste arisings will be loaded to full capacity to reduce the number of journeys associated with the transport of these items.</p> <p>All staff members will be encouraged to car share where practicable and to arrive on-site prior to the morning network peak hour.</p> <p>All machinery and plant will be procured to adhere with emissions standards prevailing at the time and should be maintained in good repair to remain fuel efficient.</p>

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When not in use, vehicles and plant machinery involved in operations would be switched off to further reduce fuel consumption and engine emissions.

Where practicable, local waste management facilities would be used to dispose of all waste arisings, to reduce distant travelled and associated emissions.

The volume of waste generated would be reduced so far as practicable, and resource efficiency maximised, by applying the principles of the waste hierarchy throughout the construction period. Segregated waste storage will be employed to maximise recycling potential for materials.

Equipment and machinery requiring electricity will only be switched on when required for use. Procedures should be implemented so that staff adhere to good energy management practices, e.g. through turning off lights, computers and heating/air conditioning units when leaving buildings.

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*Land Contamination and Ground Conditions*

The construction process would take into account the principles of good practice in soil handling and restoration wherever possible, to reduce the possibility of damage to soil materials during the construction process.

Standard construction protocols in accordance with CDM Regulations (2015) will be adopted during construction.

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*Hydrology and Flood Risk*

Dust suppression equipment would be used to reduce the spread of sediment within the Development Site, so that any dust created during construction is diverted into specific drainage systems equipped with sediment interceptors.

Construction material and / or spoil within construction compounds would be positioned away from surface watercourses / significant ecological receptors and no hazardous substances would be stored within close proximity of the drainage network.

Any area at risk of spillage, such as vehicle maintenance areas and hazardous substance stores (including fuel, oils and chemicals) would be bunded and carefully sited to reduce the risk of hazardous substances entering the drainage systems, the local watercourses as far as practicable. Additionally, the bunded areas would have impermeable bases to limit the potential for migration of contaminants into surrounding watercourses and significant ecological habitats following any potential leakage/spillage event.

Disturbance in areas close to watercourses reduced as far as practicable.

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	<p>Excavated material will be placed in such a way as to avoid any disturbance of areas near to the banks of watercourses and any spillage into the watercourses.</p> <p>Construction materials will be managed in such a way as to effectively reduce the risk posed to the aquatic environment so far as practicable.</p> <p>Plant machinery and vehicles will be maintained in a good condition to reduce the risk of fuel leaks.</p> <p>Drainage works will be constructed to relevant statutory guidance and approved by NRW and PCC prior to the commencement of construction.</p>
<i>Agricultural Land</i>	<p>Appropriate construction techniques will be implemented to reduce above and below ground works and to reduce any compaction of soil as far as practicable, mitigating any potential impact on the soil structure and ability to infiltrate water.</p>

**Table 2.4 Schedule of measures to be adopted as part of the project during operation**

<b>Topic</b>	<b>Proposed measures during construction</b>
<i>General / design</i>	<p>The layout of the Proposed Development has been designed such that efficient operations can take place and will therefore, not cause adverse environmental effects as far as can be reasonably controlled.</p>
<i>Historic Environment</i>	<p>No archaeological effects are anticipated during operation and therefore no further mitigation measures are required in terms of archaeology.</p> <p>No mitigation measures are required in respect of built heritage receptors, taking into consideration the distance at which they are located from the Development Site and the minimal visual effects which will likely arise as a result of the Proposed Development. The implementation of landscaping would, however, assist to soften the limited views of the Proposed Development which may exist.</p>
<i>Landscape and Visual Impact</i>	<p>Boundary hedgerow reinforcement will improve the Development Site's boundary screening.</p>
<i>Biodiversity</i>	<p>Implementation of the Conceptual Drainage Strategy will ensure that there will be no uncontrolled run-off from the Development Site into the Estuary, via either surface water or groundwater during the operational phase.</p>

	<p>A Habitat Management Plan has been produced and will be implemented throughout the operation of the Proposed Development to ensure that habitats are managed to enhance their biodiversity value.</p> <p>Implementation of a sensitive lighting scheme will reduce light spill to the retained boundaries to avoid impacts of lighting on bat activity.</p> <p>Retention of species-rich grassland and re-seeding of areas affected by construction activities.</p> <p>Management of grassland such that 20% of the grassland within each grassland block is kept more than 7cm tall (allowed to grow tall and set seed) and at least 20% is routinely cut shorter than 7cm (with a greater proportion allowed to grow long).</p> <p>The wooded periphery of the Development Site will be enhanced by the additional of bat and bird boxes, insect hotels and reptile hibernacula.</p>
<i>Traffic and Transport</i>	<p>Given that the Proposed Development is located adjacent to the existing operational Pembroke Power Station, and will utilise the existing Pembroke Power Station access road, no specific mitigation is required. The Transport Statement has confirmed that operational traffic movements will not cause significant impact on the existing highway network.</p>
<i>Noise and Vibration</i>	<p>Ongoing compliance with noise limits associated with the Section 36 consent for the operational Power Station will mitigate against any adverse impact during operation. Therefore, no specific mitigation is required in terms of noise and vibration.</p>
<i>Land Contamination and Ground Conditions</i>	<p>Following implementation of any required remedial measures identified as part of the ground investigation during the construction phase no further mitigation measures are considered necessary during operation.</p>
<i>Climate Change</i>	<p>As a renewable energy development, climate change mitigation is an inherent aim of the Proposed Development.</p>
<i>Hydrology and Flood Risk</i>	<p>The Proposed Development includes a drainage strategy to effectively control operational flood risk and water quality. Based on the flood risk identified and the nature of the Proposed Development, no specific mitigation measures are required to alleviate the risk of flooding.</p>
<i>Agricultural Land</i>	<p>Once operational, it is not anticipated that the pipeline/cable routes will have any impact on agricultural land. The Development Site area which comprises the Electrolyser will be subject to an appropriate soft landscape management strategy and surface water drainage from the site</p>

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will be controlled to mitigate against any impact on surrounding soil function.

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## References

Department for Food and Rural Affairs (Defra) (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites. [Available online at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/716510/pb13298-code-of-practice-090910.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/716510/pb13298-code-of-practice-090910.pdf)]

Ministry of Agriculture, Fisheries and Food (MAFF) (2000) Soils Handling Guide. [Available online at: <https://webarchive.nationalarchives.gov.uk/20090317221756/http://www.defra.gov.uk/farm/environment/land-use/soilguid/index.htm>]

