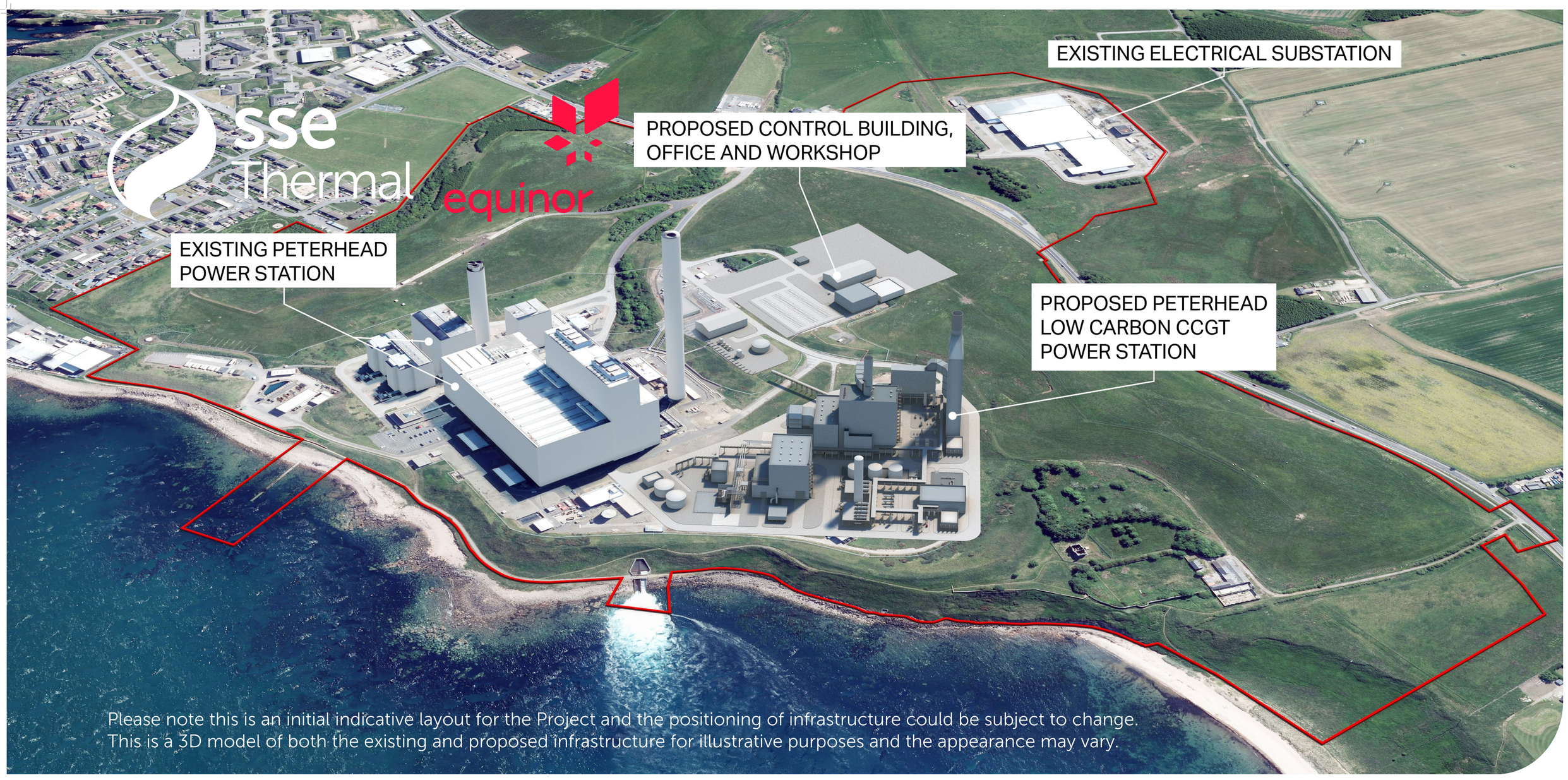


PETERHEAD LOW CARBON CCGT **POWER STATION PROJECT**

Welcome

Stage 2 Consultation

SSE Thermal and Equinor are seeking to develop and operate a new low carbon combined cycle gas turbine (CCGT) power station with a carbon capture plant (CCP) at Peterhead. This project, which will be known as Peterhead Low Carbon CCGT Power Station Project or 'Peterhead Carbon Capture Power Station' (hereafter referred to as 'the Project'), will be located on land at the existing Peterhead Power Station in Aberdeenshire. The Project will have a generating capacity of up to 910 megawatts (MW) and will utilise existing connections at the Peterhead Power Station such as cooling water, gas supply and grid connections.

In line with both companies' vision and commitment to a net-zero future, the Project will use natural gas as its fuel and will be fitted with a carbon capture plant to remove the carbon dioxide (CO_2) from its emissions. The CO_2 will be transported by a pipeline to be safely stored in an offshore storage site typically comprising depleted oil and gas fields. The CO_2 pipeline from the Power Station will be subject to separate consent applications and undertaken as part of a separate project known as the Acorn Project.

In order to develop the Project, we will need to obtain consent under Section 36 of the Electricity Act 1989. We are therefore preparing a Section 36 application for submission to the Scottish Government Energy Consents Unit (ECU). Successful development of the Project will also be subject to support for the shared CO_2 infrastructure from the UK Government through its industrial clusters process[1].

What has changed since Stage 1 Consultation?

The Stage 1 Consultation ran from 10 May to 7 June 2021 and was intended to introduce the Project to the local community and provide an opportunity to comment on the early proposals. As part of the consultation, newsletters (which included a Freepost Feedback Form and details of a Virtual Exhibition Event) were posted to every residential and business address within a 5km radius of Peterhead Power Station. The feedback received at Stage 1 was mostly positive, with all comments recorded and taken into account when preparing this latest stage of consultation. Full details of the consultation methods employed to engage with the local community and a summary of the feedback received from participants at Stage 1 can be accessed in the Virtual Consultation Portal.

An Environmental Impact Assessment (EIA) Scoping Report was submitted to the ECU in May 2021, identifying likely significant environmental and social impacts of the Project, and the proposed scope and methodologies for the EIA. Feedback has been received from a number of consultees which will be addressed throughout the EIA process. In addition, we have been engaging directly with a range of consultees such as Scottish Environment Protection Agency (SEPA) and NatureScot on specific technical aspects of the EIA. The Project design has also been progressing iteratively alongside the EIA and we are now able to provide initial visualisations of the Project.

[1] https://www.gov.uk/government/publications/cluster-sequencing-for-carbon-capture-usage-and-storage-ccus-deployment-phase-1-expressions-of-interest

About the Peterhead Carbon Capture Power Station

The Project will consist of one combined cycle gas turbine (CCGT) unit with a total electrical output of up to 910MW. The CCGT will comprise one high efficiency gas turbine and associated Heat Recovery Steam Generator (HRSG, a type of boiler) and steam turbine. The CCGT will combust natural gas to drive a gas turbine, which is connected to a generator producing electricity. A by-product of this process is usable heat which remains in the gas; this is passed into an HRSG which makes steam to generate additional electricity via a steam turbine.

Approximate heights for the main buildings are as follows:

- HRSG building 56m
- HRSG stack 85m
- Steam turbine 35m
- Gas turbine 32m.

The Project will also include a post combustion Carbon Capture Plant (CCP), allowing for the capture and compression of the carbon dioxide (CO_2) from the Power Station's emissions; this will be connected to a CO_2 transport pipeline that forms part of the Acorn Project Carbon Capture and Storage (CCS), under development by other parties. The destination for the CO_2 transport and storage system is subject to a separate study and consent application.

Approximate heights for the core CCP buildings are as follows:

- Exhaust gas cooling and conditioning plant (approximately 36m)
- Absorber column (approximately 100-130m)
- Solvent reclaimer tower (approximately 53m)

For reference, the existing Peterhead Power station has two stacks at 170m and 90m in height.

An illustrative site layout is provided in the image below depicting potential locations of core Project components. This is an initial indicative layout and will be subject to refinement throughout the Environmental Impact Assessment (EIA) process and as engagement with technology suppliers progresses.

sub text for image if required.

The Project will be constructed alongside the existing Peterhead Power Station, but with the long-term vision for the Peterhead site to only deliver low-carbon power generation.

The existing power station continues to provide essential flexible and efficient generation to keep the lights on while supporting the continued growth of renewables on the system. It currently has a contract to provide capacity to the grid until September 2022 and will have opportunities to secure further agreements in future auctions. As part of our Environmental Impact Assessment work for the Project, we will make appropriate assumptions regarding the likely future running hours of the existing station.

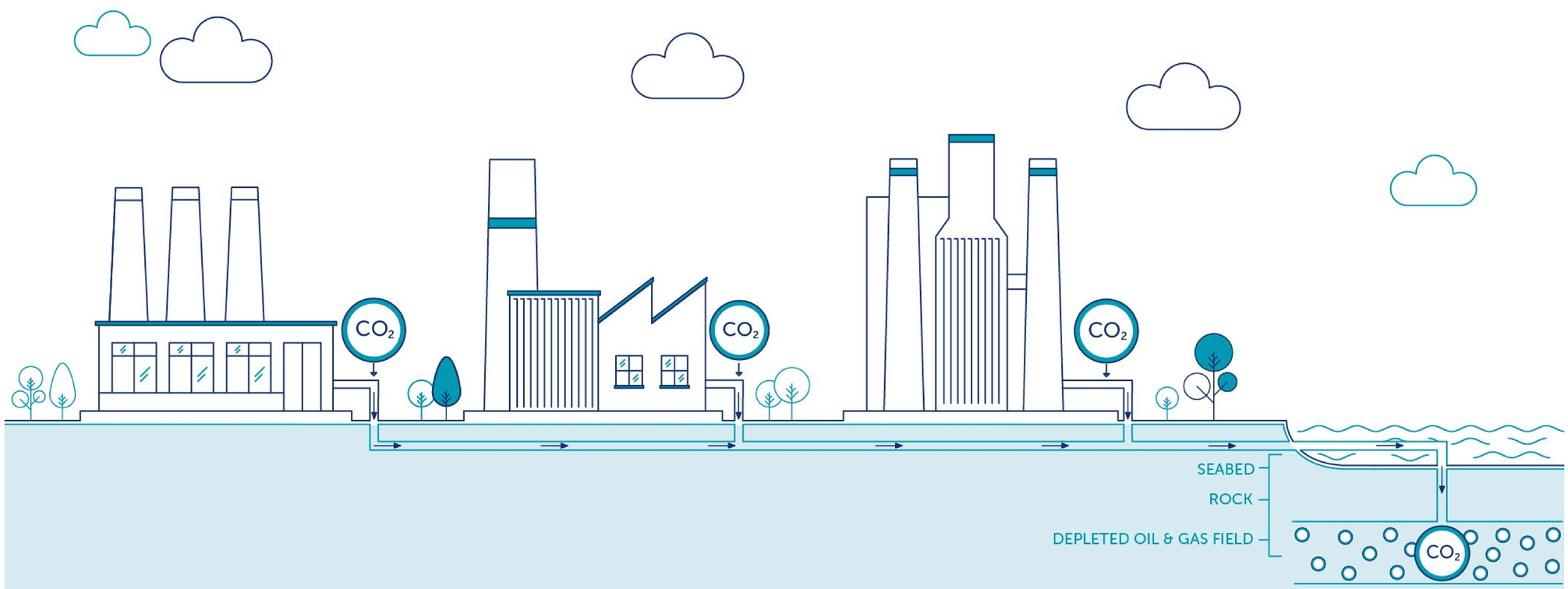
The Project and its low carbon operation will be prioritised over the running of the existing Power Station and while ultimately Peterhead Carbon Capture Power Station is designed to replace unabated generation (i.e. without carbon capture) at the site, the Project is in the early stages of development and no decisions have yet been made about when the existing station will close.

About the Acorn Project

It is proposed that the Project will be a key customer to the Acorn Project Carbon Capture and Storage (CCS). This project is led by Storegga with their partners Harbour Energy and Shell, with funding support from the UK and Scottish Governments, and the European Union. Based at the St. Fergus gas terminal in North East Scotland, the Acorn Project will make use of existing gas pipelines and infrastructure to transport CO_2 directly to the Acorn CO_2 storage site below the Central North Sea for safe storage. The Acorn Project is subject to a separate planning consent application and will be undertaken by the Acorn Project partners.

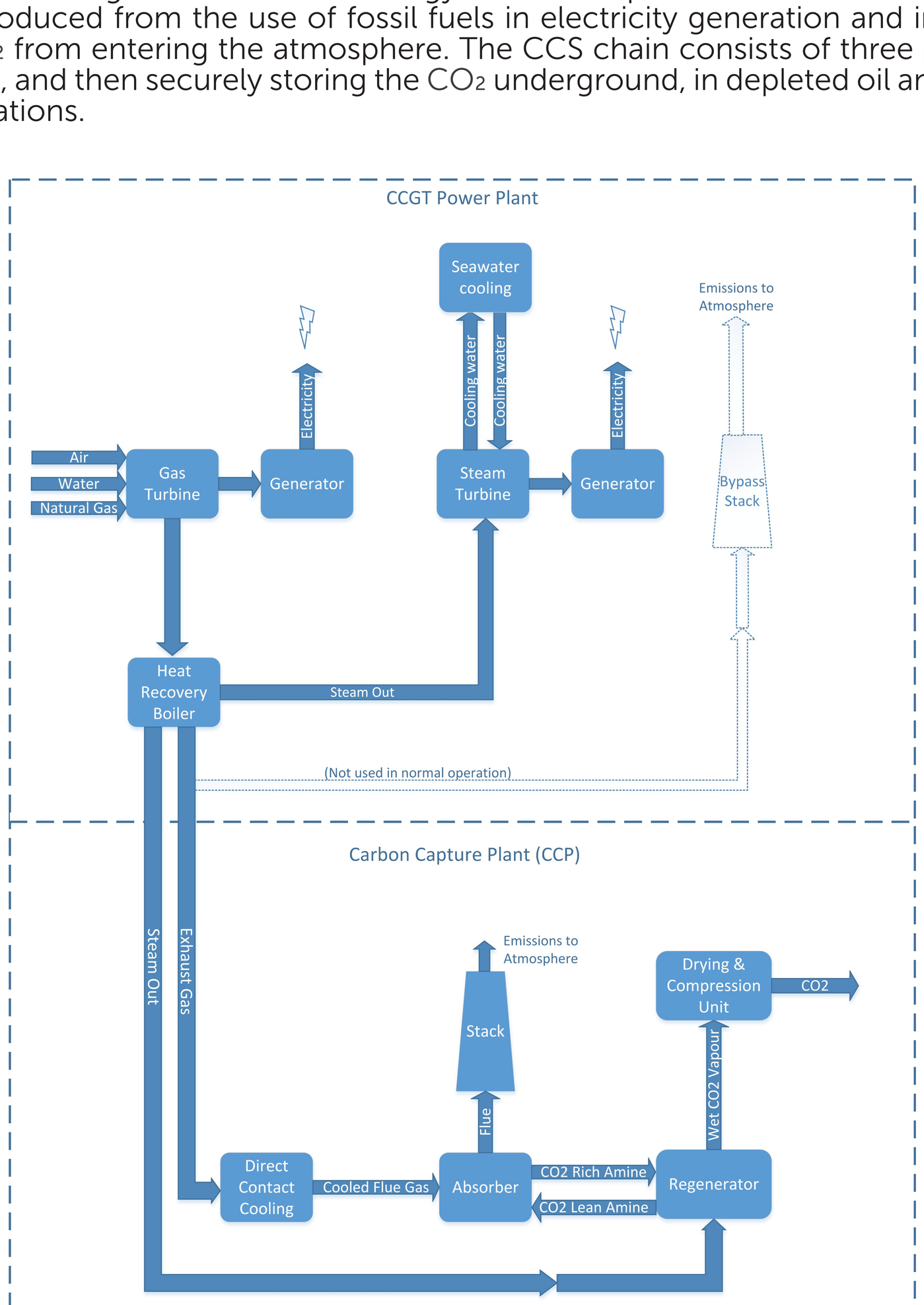
For more information on this project, please visit **https://theacornproject.uk/**

What is Carbon Capture and Storage?



A diagram to demonstrate a CO_2 storage system

Carbon Capture and Storage (CCS) is a technology that can capture at least 90% of the carbon dioxide (CO_2) emissions produced from the use of fossil fuels in electricity generation and industrial processes, preventing the CO_2 from entering the atmosphere. The CCS chain consists of three parts; capturing the CO_2, transporting it, and then securely storing the CO_2 underground, in depleted oil and gas fields or deep saline aquifer formations.



Schematic of CCGT Power Plant and Carbon Capture Plant

Energy generation at Peterhead

SSE Thermal operates the existing Peterhead Power Station in Aberdeenshire. The Power Station became operational in 1982 and has an output of up to 1,180MW. In the 2000s, the plant underwent a major repowering project to convert it into an efficient CCGT power station. At the present time, Peterhead Power Station is the largest power station of its kind in Scotland and SSE's only Thermal plant in Scotland, playing a crucial role in supporting the system and providing reliable and flexible generation.

Carbon Capture at Peterhead

In 2011, the UK Government selected Peterhead Power Station as a potential candidate for a pilot project of carbon capture and storage (CCS) in the UK. The project, developed by SSE and project partners Shell, would have been a world-first fully integrated commercially operating CCS solution. However, in 2015 the Government announced that the £1bn grant for developing new CCS technology was no longer available.

Since this time, many factors have changed and advanced. The UK has legislated to cut national greenhouse gas emissions to net zero by 2050, and Scotland has committed to being net zero by 2045. This will require a major transition in the way we generate and use energy, with carbon capture and storage being one of the crucial technologies able to support a renewables-led power system and as a necessity for reaching the net zero ambitions.

There has been significant progress and momentum from UK Government in developing policy and routes to market which will enable investment in carbon capture technology and we have engaged with the Scottish Government, where there is also support for these technologies. This, combined with the legislative imperative to reach net zero emissions by 2050 or before, provides confidence that the UK will see investment in power stations with carbon capture this decade.

We believe efficient gas-fired generation is essential to delivering net zero emissions by 2050, providing the flexibility needed to back up a system based on renewables. The Project will only be built with a clear route to decarbonisation, by equipping it with post-combustion Carbon Capture Plant (CCP) technology.

Environmental Impact Assessment (EIA)

EIA is the process of identifying, evaluating and mitigating the likely significant effects of a Project. A team of environmental specialists are conducting a range of studies to assess the potential effects that the Peterhead Carbon Capture Power Station Project could have. The scope of these studies is agreed by the Energy Consents Unit (ECU) in consultation with the appropriate regulating bodies such as SEPA and the local planning authority. The results of these studies will inform the design of the Project and protect the environment by minimising potential effects on receptors such as the local community, wildlife, water quality, landscape, recreation and tourism.

The studies will be presented in an EIA Report which will also contain a non-technical summary. The results of the EIA will ensure that the potential effects of the Project are known to decision makers such as the Scottish Ministers and the planning authority to inform their decision-making on the application.

The following topics will be included in the EIA:

Air Quality

Air quality impacts could arise due to construction activities, construction vehicle movements and from stack emissions during operation. An air quality assessment is being carried out utilising available baseline monitoring data and dispersion modelling techniques.

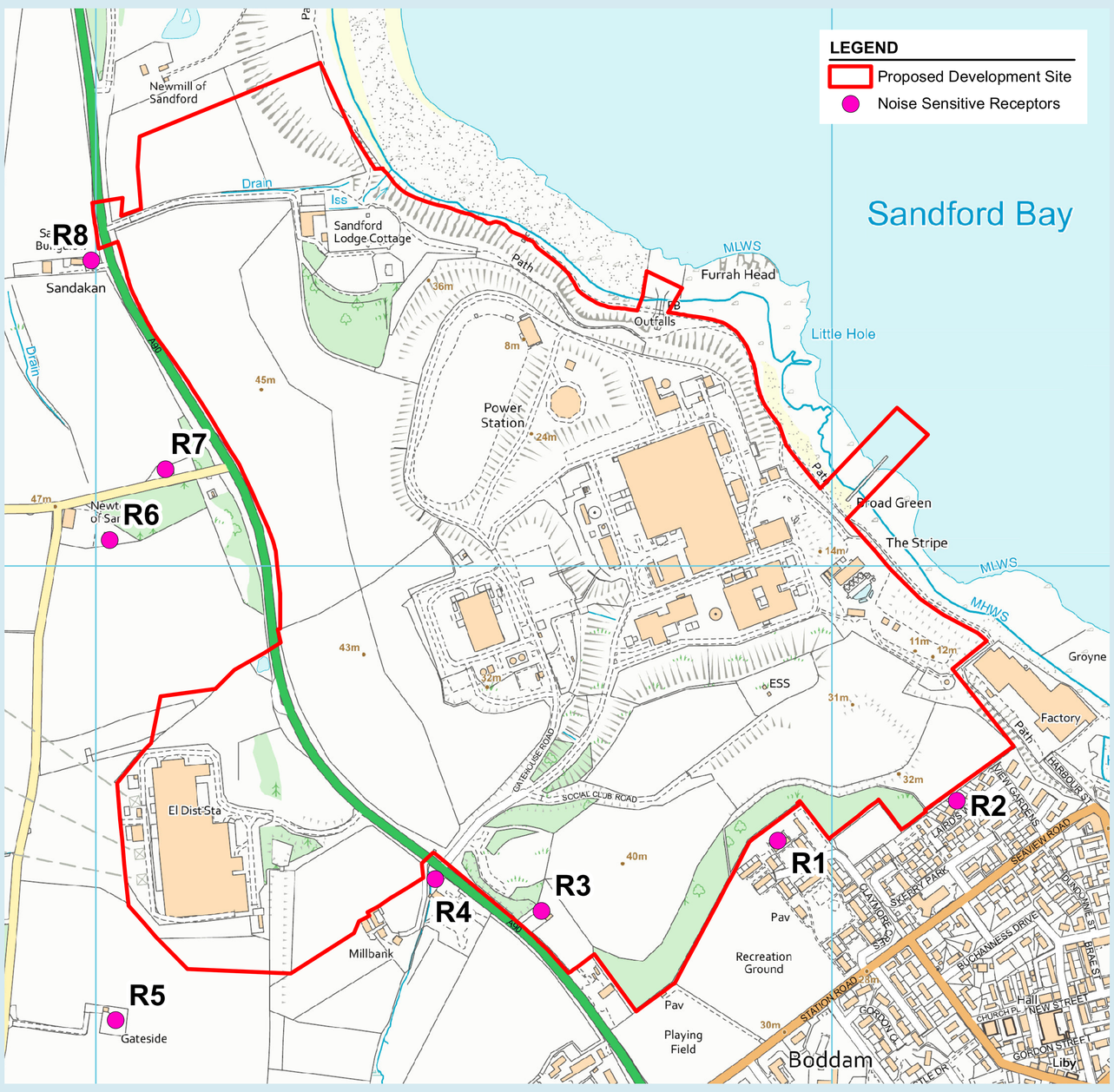
Emissions will be assessed as part of the EIA and mitigation controls will be included in the Construction Environmental Management Plan. Operational emissions will also be assessed in the EIA and compared to assessment criteria established for the protection of human health and ecological protection. Emissions from the existing Power Station are controlled by a permit under the Pollution Prevention and Control (PPC) (Scotland) Regulations 2012. The PPC permit would be subject to variation to ensure operational emissions from the Project are managed. The Project will be designed to comply with the relevant regulatory framework in line with SEPA guidance and best available techniques (BAT) guidance prepared by the Environment Agency.

Landscape and Visual Impact Assessment

The Project Site is located within a landscape characterised by both natural coastal features and man-made features such as the village of Boddam, the existing Power Station, and an operational quarry. Parts of the coastline to the north of Peterhead, and to the east and south of Boddam are within the North East Aberdeenshire Coast Special Landscape Area (SLA). The SLA is locally designated by Aberdeenshire Council. The landscape and visual assessment aims to provide an objective way of understanding and assessing the likely change that the Project will have on the character and appearance of the surrounding landscape and on views experienced by people. The assessment will be based on a series of representative viewpoint locations that will be agreed with Aberdeenshire Council and statutory consultees. The viewpoints will be used to help understand the likely change that could be experienced and help influence the design of the Project in order to limit the effects on views and the landscape. For example, through ensuring effective use of vegetation for screening and careful construction material selection to integrate the Project as effectively as possible into the surrounding landscape.

Noise

The noise assessment will be informed by baseline noise monitoring and modelling. Monitoring locations will be agreed in consultation with Aberdeenshire Councils Environmental Health Officer. Noise monitoring will determine the existing noise levels and allows future noise limits to be set for the construction and operational phases. During construction there is the potential for temporary noise and vibration impacts upon the closest receptors, however with the use of suitable mitigation significant residual construction noise and vibration effects are not anticipated. Noise impacts will be minimised with careful consideration of the location and design of any noise producing equipment and with the incorporation of suitable mitigation measures, no significant residual operational noise and vibration effects are anticipated.



Socioeconomics, Tourism and Recreation

The EIA Report will assess the potential effect the Project could have on employment, local businesses, recreation and tourism. The Project is anticipated to create temporary employment during construction which is expected to last approximately 4 years. This in turn could result in increased spend on local services and accommodation during the period. Construction activities may also have a temporary adverse effect on local receptors such as walkers and users of recreational routes. A desk-based study is currently being undertaken to determine the capacity of accommodation within the surrounding area to meet with increased demand from construction workers travelling to the area.

The operation and maintenance of the Project will create employment which could have a beneficial socio-economic effect over its anticipated 25-year life span.

Climate

The EIA Report will identify and assess the potential for effects to and from climate change as a result of the Project. A Greenhouse Gas (GHG) Impact Assessment will use a lifecycle approach to consider effects on the climate of GHG emissions arising from the Project over its lifetime. A Climate Change Risk (CCR) review will be carried out to assess the resilience of the Project to future climate change impacts. Best practice methods and guidance will be used in these assessments and results will be presented within the EIA Report. Once operational it is anticipated that there will be a net decrease in GHG emissions in comparison to the current emissions due to the use of carbon capture and storage technology. During construction GHG emissions will likely increase from the embodied carbon of the products and materials used in the construction of the Project.

Ecology and Ornithology

Desk-based research identified a number of internationally and nationally important sites for nature conservation within 15km of the Project Site. A suite of ecological surveys looking at the habitats and wildlife around the Project Site are currently underway to establish current biodiversity conditions. Relevant surveys for the area have been selected based on what the local habitat can support, and agreed with NatureScot. The surveys cover habitats, vegetation, aquatic ecology, waterbird, breeding birds, badgers, otter and water vole, red squirrel and bats. The surveys are conducted by suitably qualified specialists in line with statutory requirements and methodologies provided in national guidelines. Survey results will factor into the design of the Project and will also influence the construction programme to ensure effects on ecology are minimised.

Potential impacts on ecological features will be assessed and appropriate mitigation will be put in place to avoid and reduce these impacts. Ecological enhancement, for example through habitat creation, will also be incorporated into the Project where possible. The ecological assessment, including results of the surveys will be reported within the EIA Report.

**These images were not taken at the Project Site.*

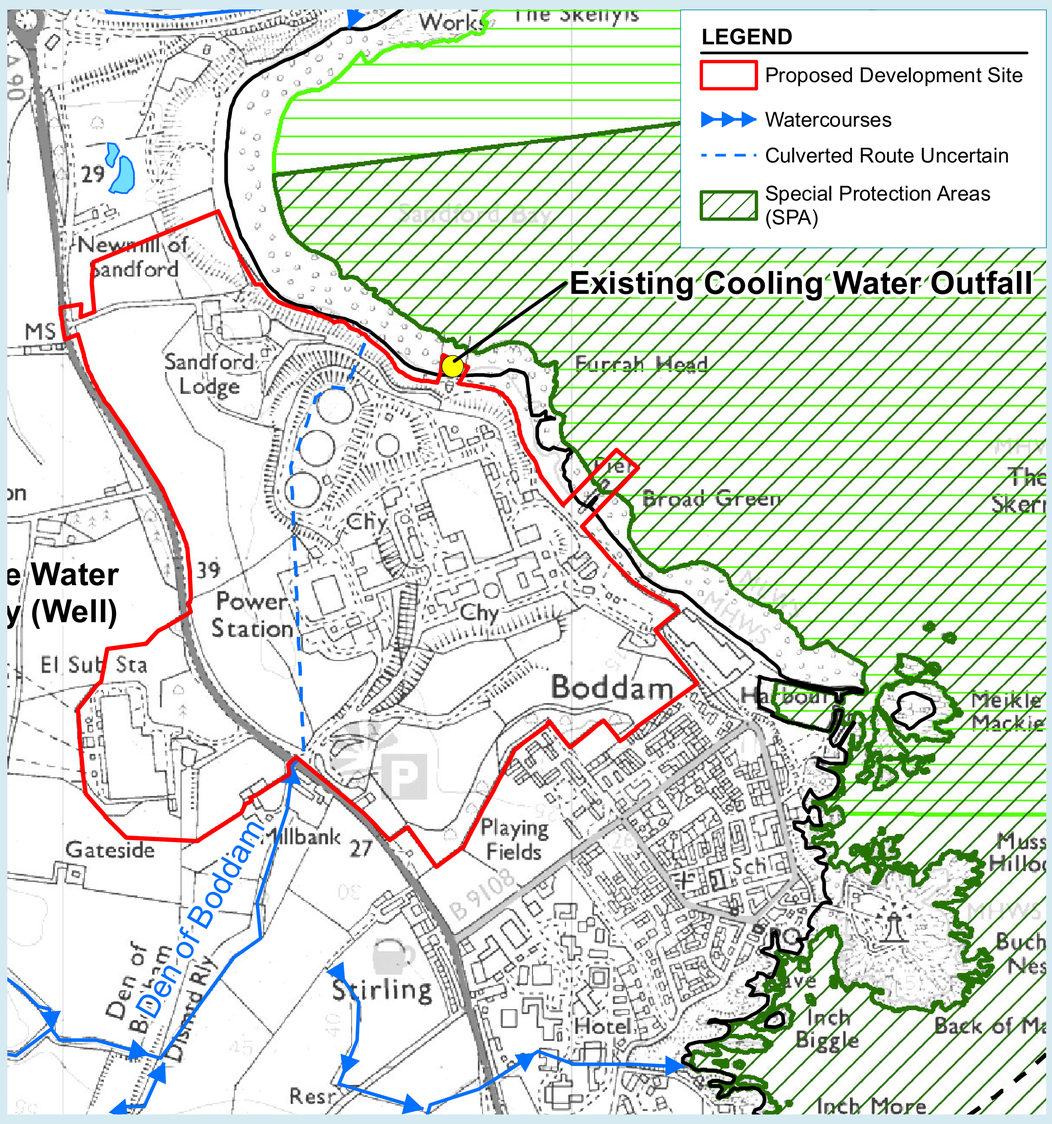
Traffic and Transport

The Traffic and Transport study will assess and quantify the traffic likely to be generated by the project during the construction phase and will determine the most appropriate routes(s) to the Project Site. Access to the Project Site during construction for HGVs is expected to be from the A90 either using the existing Gatehouse Road, existing Sandford Lodge access track, and/or a purpose-built new road with an access road between Gatehouse and Sandford Lodge. Traffic surveys will be undertaken to provide information on the current volume and type of traffic and will allow traffic patterns to be established. An assessment will be undertaken to determine potential impacts during construction and operation of the Project. During operation, impacts are likely to be associated with accessibility of the site from the junction and will also require suitable space for servicing vehicles and staff parking. A Construction Traffic Management Plan will be developed and will seek to manage and minimise traffic and transport impacts.

Water Environment and Flood Risk

The EIA Report will assess impacts of the Project with regard to: water resources (the effects on surface and ground waters); water quality (the chemical composition and ecological status of the water resources and potential effects); and water supply (drinking/ private water supplies). Flood risk will also be assessed, wherein modelling will be undertaken to determine the peak flows in the Den of Boddam and the potential flood risk at key receptors.

These assessments will feed into the design, construction, and operation of the Project and will seek to prevent or manage any adverse effects such as water resource contamination or increased surface water flooding. Water discharge from the existing Power Station is currently controlled by a PPC permit, an application to SEPA will be submitted to vary the current permit and ensure discharges associated with the operation of the Project fall within acceptable limits.



Ground Conditions

A geological and ground conditions assessment will be undertaken to consider soils, geology, hydrogeology, and land contamination and potential effects on receptors such as nearby residences and the North Sea. The design of the Project will be informed by ground investigation which the requirement for remediation and will inform siting of Project elements.

A desk-based study has identified the main potential source of contamination as the former Heavy Fuel Oil (HFO) Tank Farm within the Project Site, remediation has been undertaken in the past however potential residual contamination may require further assessment. With the use of mitigation, for example through remediation and the development of environmental management plans, no significant effects to or from ground conditions are anticipated. It is possible that the Project will result in beneficial effects by implementing remediation measures.

Heritage

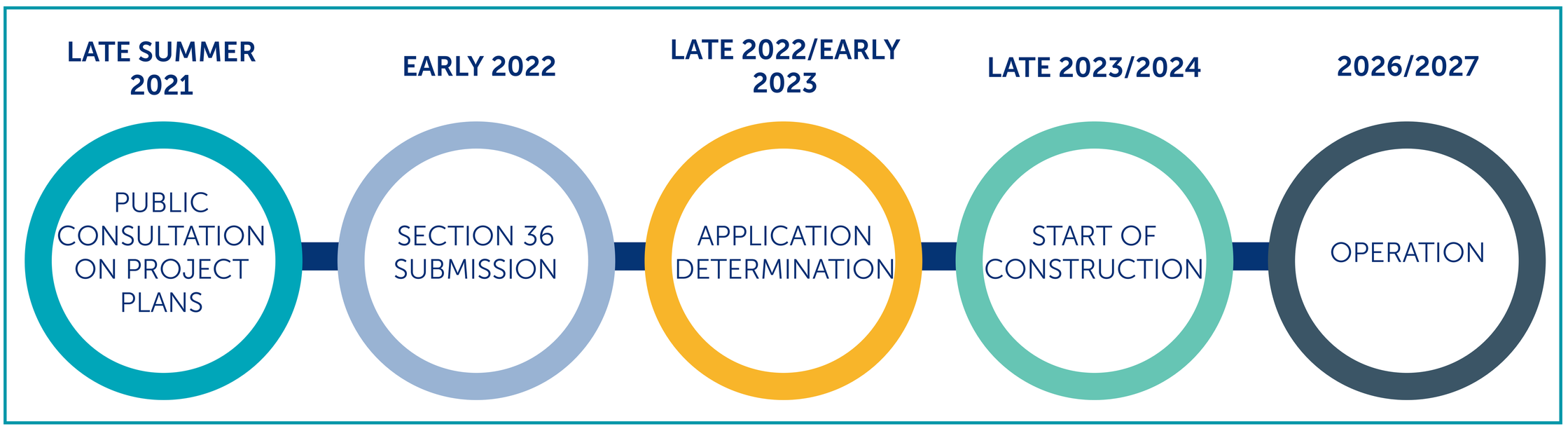
A desk-based study and site survey has been undertaken to establish the heritage baseline conditions. From this, a number of statutory and non-statutory heritage assets have been identified. The Category B listed Sandford Lodge and associated Category C listed Walled Garden are located within the Project Site and will be retained as part of the Project. Within 1km of the Project Site there are a number of designated features including: Boddam Conservation Area and listed buildings; Boddam Castle scheduled monument; the Category B listed Windmill Tower at Glenugie Distillery; and the Category A listed Buchan Ness Lighthouse.


Sandford Lodge

The Project has the potential to impact the setting of these assets which will be assessed within the EIA however appropriate mitigation will be considered and identified where required. The assessment will be informed by national and local heritage records and the findings of site surveys will be included within the EIA Report.

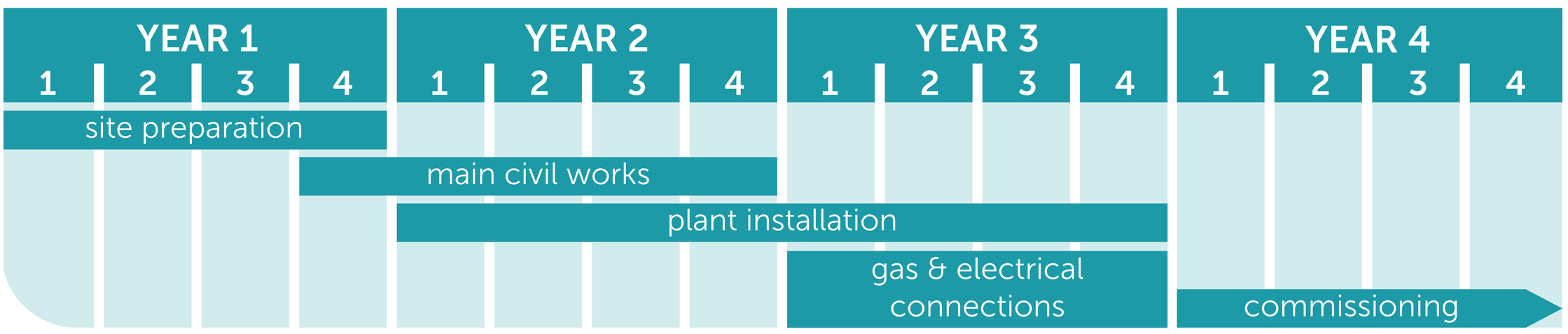
Indicative Programme

It takes several years to plan and develop this type of project and there are several factors which need to be clarified and confirmed before we would be in a position to take a Final Investment Decision (FID), including consenting. The process would take at least two years, and a FID would be some months after that. Construction would take a further three years approximately. The diagram below sets out an indicative programme.



Construction

Construction of the Project could potentially start as early as Quarter 4 2023, with construction activities to be completed within three years followed by a commissioning phase. The figure below shows an indicative programme.



Haul Routes and Laydown Areas

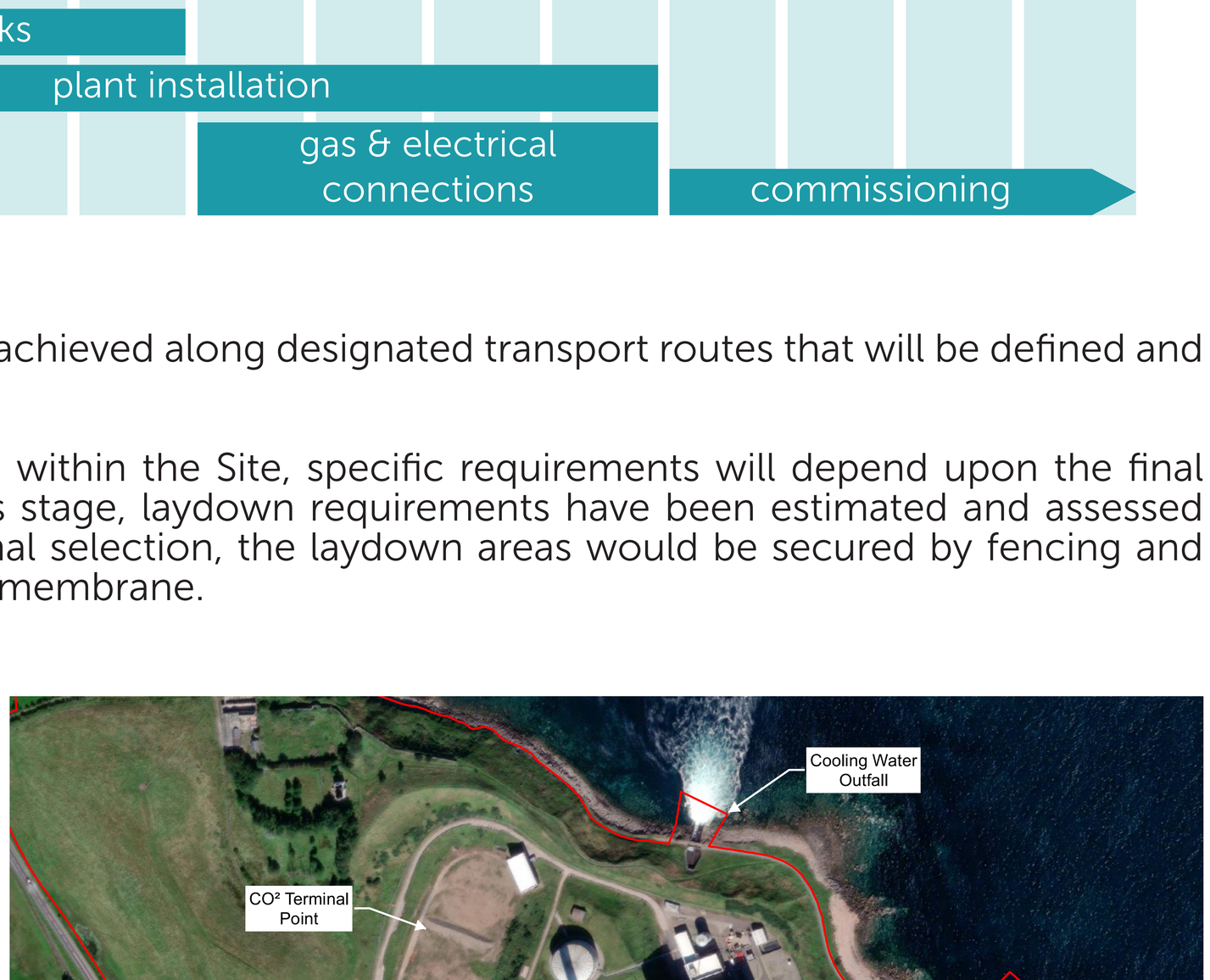
Construction traffic and road haulage will be achieved along designated transport routes that will be defined and assessed as the design progresses.

Construction laydown areas will be required within the Site, specific requirements will depend upon the final choice of technology and contractor. At this stage, laydown requirements have been estimated and assessed using worst-case assumptions. Subject to final selection, the laydown areas would be secured by fencing and gates, levelled and underlain by a permeable membrane.

Earthworks and Connections

Some earthworks may be required to reprofile the site. As far as practicable, excess spoil will be reused as part of the construction works although some movement of materials to and from the site may be necessary. Soils will be stored away from watercourses and areas of higher flood risk.

The existing cooling water abstraction intake and outfall used for Peterhead Power Station will also be utilised for this Project and new connections and pipework will be installed to facilitate the use of these. The water abstraction point is located in Boddam Harbour to the south-east and a water outfall discharging into Sandford Bay to the north-east. The existing gas pressure reduction station located within the existing Power Station site will be used and new gas pipework will be installed. Electricity transmission infrastructure will be required to connect the Project to the National Grid electricity transmission system through the existing SHETL 275kV substation.



Construction Phase Mitigation

We would require our contractor to produce and maintain a Construction Environmental Management Plan to control construction activities to minimise, as far as reasonably practicable, impacts on the environment and amenity. This would include industry best practice measures as well as specific measures set out in our EIA Report. A Framework Construction Environmental Management Plan will be produced in support of our Section 36 application and will set out a range of measures such core construction working hours, key management and monitoring activities to be carried out by the contractor. It is also expected that a range of mitigation measures will be secured through conditions attached to the S36 consent.

Find out more and provide comments

Webinar Sessions

We are holding online webinar sessions where members of the Project Team will provide an overview of the Project followed by an opportunity for you to raise any questions you may have. The dates and times for the webinar sessions are provided below along with the joining details.

To attend on of these:

- Click on the 'add to calendar' link below for your preferred date to add the joining instructions as an appointment in your desktop/table/smartphone calendar.
- Then a few minutes before the start time on your chosen date, click the link (or dial the telephone number) in the joining instructions. The link will open in a browser window, or in Microsoft Teams if it is installed on your device.
- Each webinar will be around one hour in length and will include a presentation followed by a question and answer session. Those joining the session online will be able to use the 'Chat' function to submit questions which will be logged and covered during the question and answer section. Those joining via telephone will be given the opportunity to ask questions at the end of the session.
- The webinar sessions will be public events so please be aware that your name/username will be visible to all other attendees.

Date and time	Joining link	Join by phone (audio only)
Tuesday 31 August, 3pm	Click here to join the meeting	+44 20 3880 2798 UK, London 0800 048 9030 UK, freephone Phone Conference ID: 851 303 626#
Thursday 2 September, 7pm	Click here to join the meeting	+44 20 3880 2798 UK, London 0800 048 9030 UK, freephone Phone Conference ID: 350 722 970#
Wednesday 15 September, 1pm	Click here to join the meeting	+44 20 3880 2798 UK, London 0800 048 9030 UK, freephone Phone Conference ID: 610 922 336#

Provide Comments

We encourage you to provide feedback on our proposals. There are a number of different methods you can use:

- The Feedback Form –The Feedback Form is available on the Project Website www.ssethermal.com/peterheadccs and as part of this virtual exhibition. Paper copies will also be available at the in-person public exhibition events.
- By post to - Freepost Peterhead Low Carbon CCGT Project
- By email to thermalenquiries@sse.com
- Leave a message on 0800 211 8270 – if you would like us to call you back, please include your name and number as part of your message.

Postal services may take longer at present due to COVID-19. Please observe all relevant precautions. We cannot guarantee consideration of feedback provided via methods not listed above (such as on social media).

Please provide any comments by **Friday 1 October at 5pm.**