

Project overview

The Exeter Energy Network is a planned low-to-zero carbon heat network being developed for the city centre, allowing businesses and organisations to decarbonise their heating systems, along with delivering other benefits to Exeter.

By connecting to a centralised energy centre:

- Buildings can remove the need for individual gas boilers
- Exeter will enjoy cleaner air with less reliance on fossil fuels
- We can help Exeter meet its commitment of becoming net zero by 2030

It is a more efficient, and eco-friendly way of heating buildings and it is already used successfully in many countries around the world, as well as the UK.

The Energy Centre is proposed to be sited next to Marsh Barton station, near the Water Lane Solar Park and will connect businesses around the city to a centralised heat source.

The first customers are likely to be public sector. These customers have some of the biggest heating requirements in the city, concentrated in a relatively small area which makes them economical to connect to the network. Once the heat network is built, we will be able to serve many smaller buildings across the city.

Ofgem is set to become the regulator for heat networks across England, Scotland, and Wales. This role, facilitated by the Energy Act 2023, is expected to begin in spring 2025 and will ensure all customers receive a fair price and reliable supply of heat and hot water.



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A heat network is a big, communal heating system that heats multiple buildings. Instead of each building having its own gas or oil boiler, there is one central source that creates heat. There are three distinct parts to the Exeter Energy Network:

The Energy Centre – creating the low-carbon heat

- A water source heat pump will take heat from the River Exe
- The heat pump is similar to a fridge: it cools in one place and heats another
- The water is returned to the River Exe, slightly cooler but otherwise untouched
- The network is also intended to take heat from other low-carbon sources such as an air source heat pump on the site, a decarbonised data centre, and in the future potentially using waste heat from other nearby industries
- The extracted heat is then used to heat up the water to 80°C within the Exeter Energy Network

Distributing the heat

- The heated water is pumped through the city via a network of highly insulated buried pipes
- All buildings connected to the network can take as much or as little heat as they need through a “plate heat exchanger”. This connects into the customer’s existing heating system and replaces the boiler in each building

Storing the heat

- Any excess heat extracted will be used to heat up a thermal store; this is a large tank of water that acts as a reserve
- If there is more demand than what the network can provide through the heat pump and thermal store, a top-up system will kick in to make sure customer’s heating needs are always met, even on the coldest winter days
- This top-up system currently runs on gas, but the intention is to completely remove the use of gas in the coming years so the heat network can provide zero carbon heat



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Across the world

While large-scale heat networks, also known as district heating, are relatively new to the UK, they are common in other parts of Europe. For example, 98% of the heat demand in Copenhagen is served by heat networks.

UK ambitions

The UK Climate Change Committee wants to expand heat networks across the country. They envisage that:

- By 2030, 32% of all public and commercial heat demand is met by district heating rising to 42% by 2050

Currently, there are over 2,000 large-scale heat networks operating in the country with many more in development.

UK success stories

There are many large-scale heat networks being built across the country. 1Energy is currently

constructing a £50m network in Bradford that will heat thousands of homes and businesses across the city.

Heat pumps are becoming more common in heat networks. Most extract energy from ground or air. However, there are already successful large-scale water source heat pumps in operation:

- The Bristol Heat Network: is a £200m project which aims to deliver low-carbon heat to 12,000 homes and businesses across the city. The Castle Park phase of the work is now complete, which takes water from the local harbour to deliver heat to over 1,000 properties.
- Queens Quay in Clydebank: this network was Scotland's first major water source heat pump and the first of its type in the UK. It takes energy from the river and once fully connected it will service over 1,200 homes across the entire 23-hectare site.



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Project benefits

The Exeter Energy Network will bring a range of benefits to Exeter including:

Environment

- Saving over 13,000 tonnes of carbon emissions a year
- Committed to improving the biodiversity of the riverbank and the area surrounding the Energy Centre by 20% – twice the legal requirement
- Reducing emissions and the use of fossil fuels, meaning cleaner air for everyone in Exeter

Economy

- A £110m investment into the city with low-carbon heating making Exeter a more attractive site for further investment
- 1Energy will use local suppliers where possible. Already over £1.7m of work is committed to businesses in Exeter alone and a further £70m in the South West
- Providing businesses with a cost-effective way to decarbonise heat

Education

- 1Energy will create an educational room in the Energy Centre and will proactively organise student visits as well as undertaking an outreach programme to young people in the city
- 1Energy will also offer opportunities for collaboration with University of Exeter academics and student placements

Employment

- 1Energy is a member of the 5% Club – a commitment to ensure 5% of the workforce are deployed on apprenticeships, sponsorship or graduate training schemes
- The project is expected to create 4-10 apprenticeships per year during the network installation
- 90 people will be employed in the construction of the Energy Centre, and a further 60+ people to deliver the installation of the buried network
- Four new high quality technical jobs will be created in Exeter to run the Energy Centre and ensure customers are served with heat once the network is built

Community

- 1Energy is hoping to sponsor training of 25 energy champion volunteers through Exeter Community Energy to help promote sustainable heating and reduce energy use
- When carrying out any road works, 1Energy will work with Devon County Council to undertake any feasible improvements to the area as works progress

If you have any other ideas of community schemes you think the team could be involved in, please contact Exeter@1energy.uk

About Exeter Energy



Exeter Energy Limited has been established to construct and operate the Exeter Energy Network.

Exeter Energy is a joint venture between the 1Energy Group and Asper.

Asper is an investment company with over 100 renewable projects to its name with plans to invest £220m into heat network projects in the UK over the next 5-10 years, including more than £70 million in the initial phase of the Exeter Energy Network.

1Energy has brought together the most experienced people in the UK and beyond with collective experience of developing more than 50 heat networks. Staff include:

- The commercial advisor and project director for Bristol's Heat Network – using a large water source heat pump, similar to Exeter
- The founder of the Heat Trust, the voluntary regulatory body for heat networks
- The former head of the Government's heat networks delivery unit

1Energy are currently developing large-scale heat networks in Milton Keynes, Bradford, Rotherham and of course Exeter.



A photograph of Exeter Cathedral, a large Gothic stone church with a tall, spired tower and intricate stonework. The cathedral is set against a bright blue sky with scattered white clouds. In the foreground, there is a grassy area and a paved walkway.

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Energy Centre: Building and layout overview

The Energy Centre will be sited near the Water Lane Solar Park next to Marsh Barton railway station.

The main building will house the heat pumps and boilers. This building will be connected to two pipes that lead down to the River Exe. One will take water from the Exe, and the other will discharge the water, slightly cooler, back into the Exe. Rivers are tending to overheat so a very slight cooling is beneficial to fish in the Exe.

The site includes six thermal heat stores; large water containers that store excess heat, acting like batteries for the heat that the network does not use right away. There will also be space for more thermal stores in the future to store more low-carbon heat and reduce the need for gas boilers.

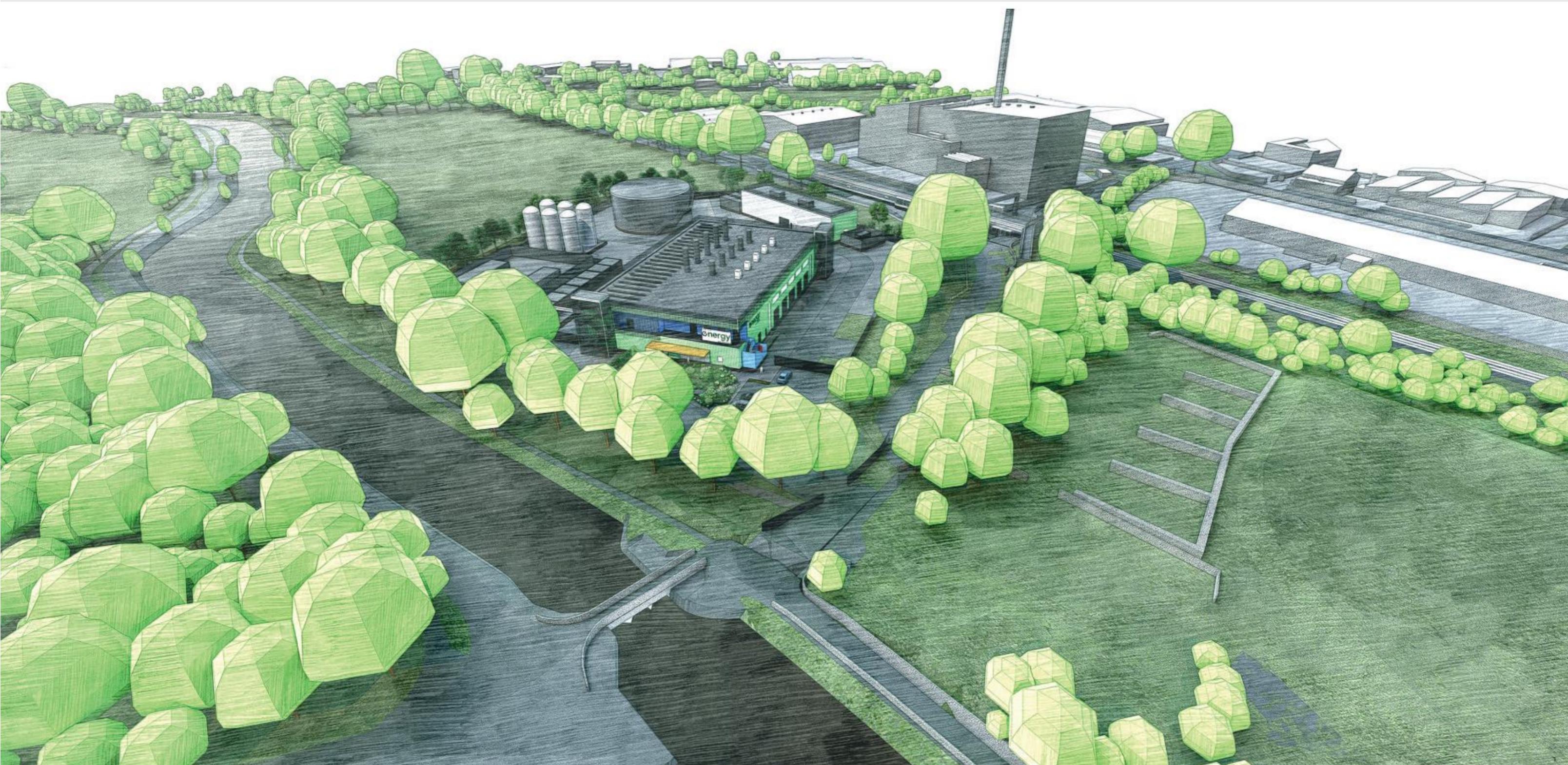
A data centre is also proposed on site as part of the plans. Data centres produce a lot of waste heat

so instead of the heat going into the atmosphere it will be injected into the heat network. Using waste heat is a very efficient way to decarbonise the network.

The Energy Centre building at the highest point is 13m high and there will be 3m flues for when the back-up gas boilers are in use. The adjacent Viridor Energy Recovery Facility is 27m high and its chimney is 65m.

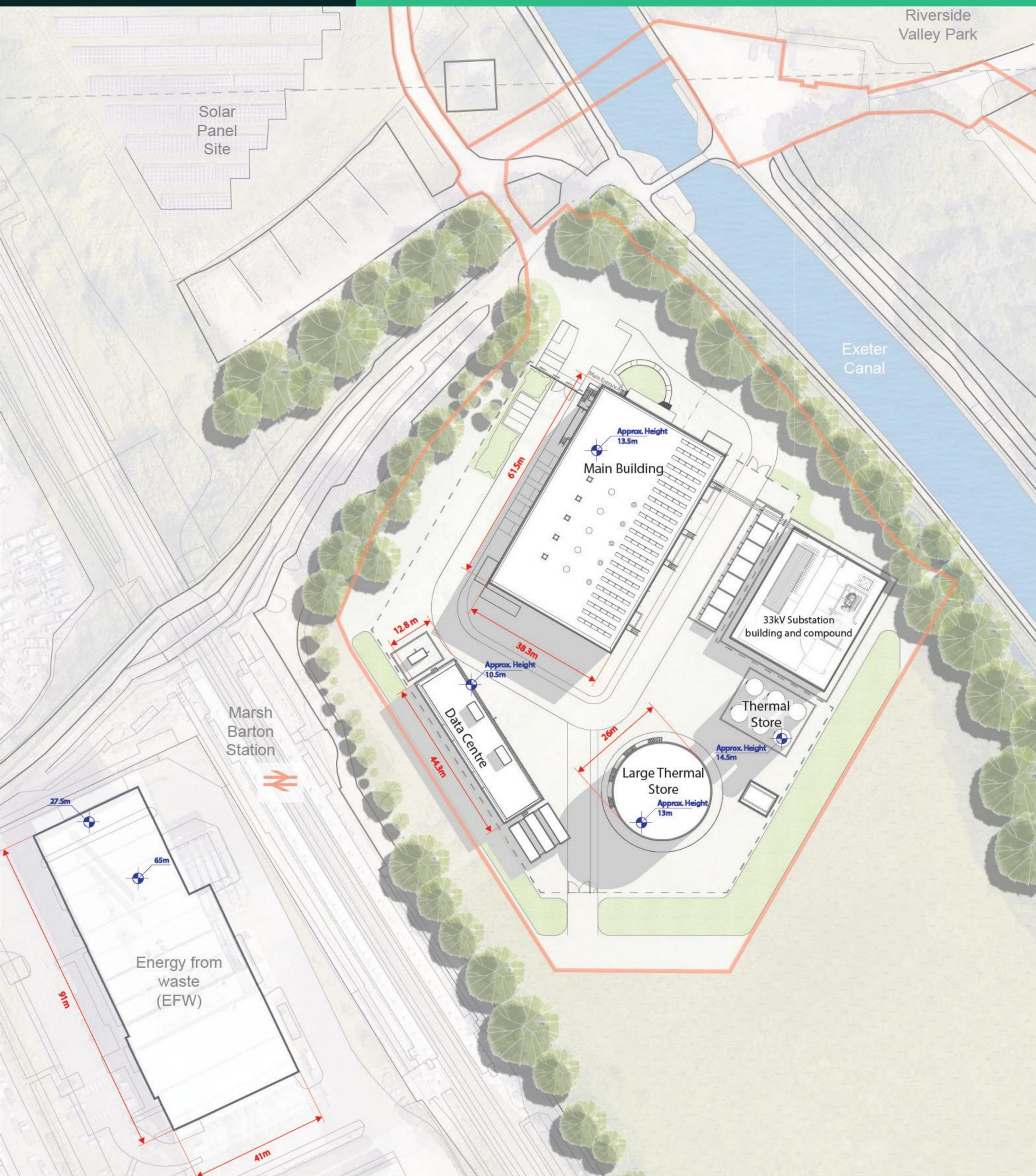
The site will be suitably screened and views of the site will be assessed through a Landscape and Visual Impact Assessment.

There is potential to enhance the capacity of the Energy Centre in future, but this would not increase the building size. Any further development would require planning consents from the local authority.



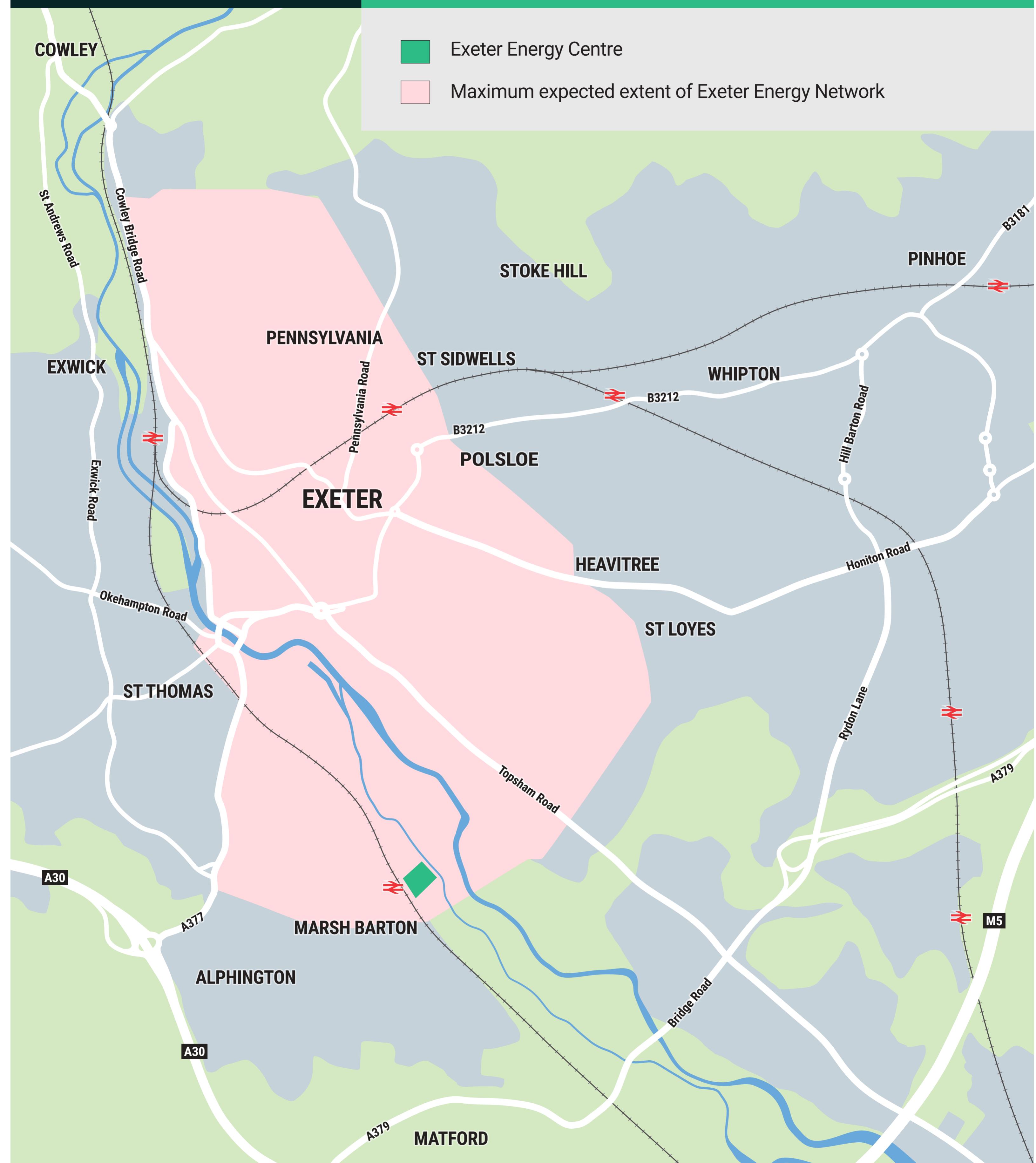
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Site layout diagram



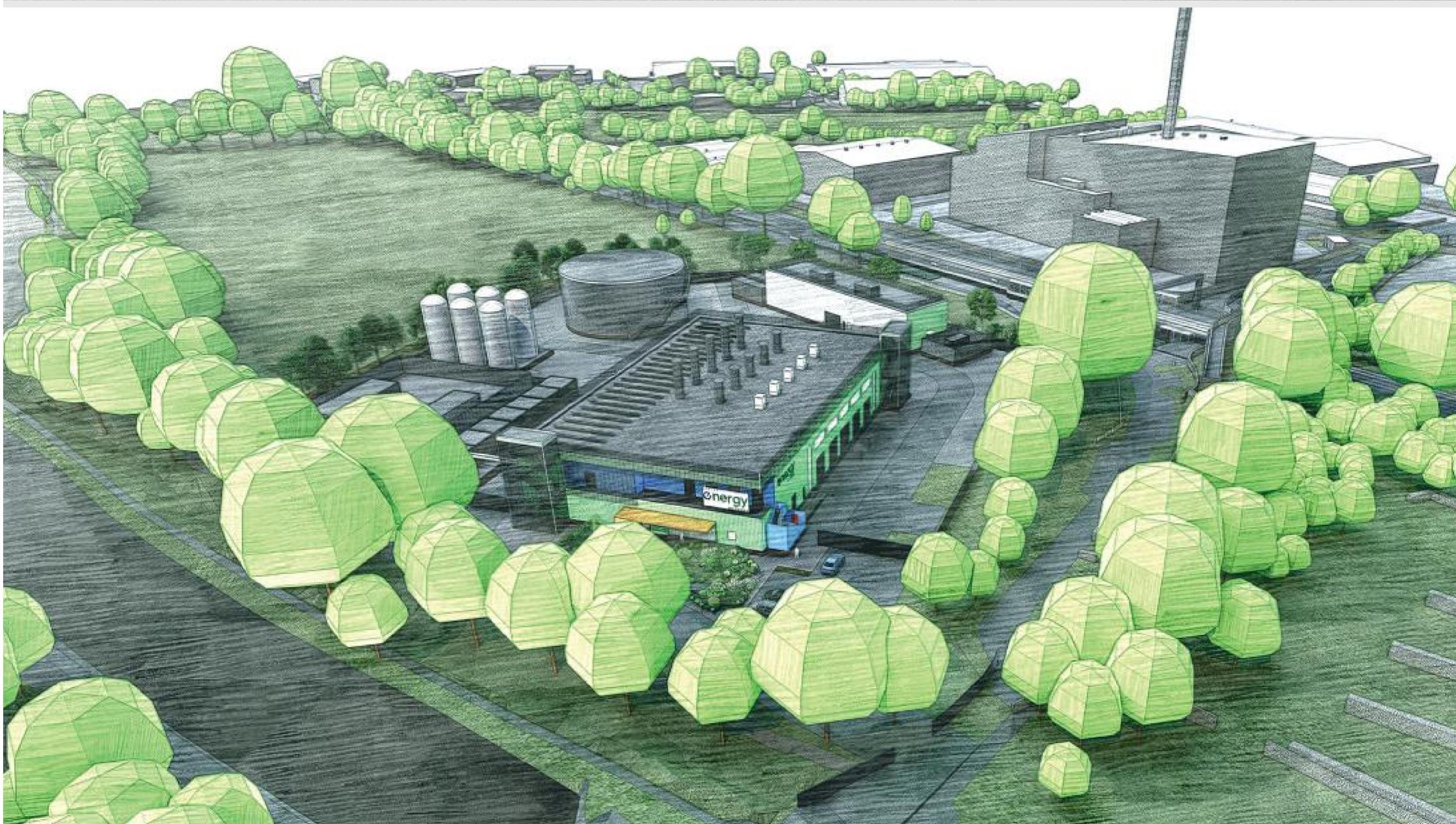
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Site location map



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Artist's impressions of the energy centre



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Public visual links



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Energy Centre construction management

Subject to planning permission being granted, it is expected that construction works for the Energy Centre will start in spring 2025 and are expected to take approximately 18 months to complete.

A Construction Environment Management Plan will be in place to ensure that any impacts of construction are minimised. This plan will be backed by localised studies and will include:

- Construction traffic management
- Dust and noise management
- Ecological management
- Permitted working hours
- Pollution prevention and control

The management plan will be developed in consultation with Exeter City Council and

Devon County Council. There may be times where deviations are needed, for example when delivering large equipment to site. Any deviation will be discussed and agreed with the local authority to ensure it is managed in the best possible way.

Construction works along the river are expected to last around six months, with works sited south of the Duckes Marsh Cycle and Footbridge on the River Exe. During these works, part of the riverbank will be fenced off but returned to normal use once completed. River users will still be able to pass freely along the Exe as the works will be screened behind a temporary dam. 1Energy will work closely with Devon Wildlife Trust to ensure that the work aligns with their requirements and to identify additional opportunities to help improve existing habitats.



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Traffic management

A traffic assessment has been undertaken and will be submitted as part of the planning application for the Energy Centre. During construction:

- The main access to the site will be along Water Lane from the north. There will also be some access along the track through Riverside Valley Park from Bridge Road for the riverside construction works
- Vehicle numbers will be managed carefully through a construction traffic management plan. This is to ensure that there is minimal impact on nearby communities and businesses and includes the safe separation of pedestrians and cyclists from any construction vehicles
- It's estimated that 25 HGVs will come and go from the main Energy Centre site each day for the first six months of construction, reducing to

five HGV deliveries each day for the rest of the construction period. Up to 25 cars or vans will visit the site each day.

- For the riverside works, it is estimated that five HGVs will come and go from the site each day. There will also be up to five car or van deliveries visiting this site each day
- Large deliveries will be planned and coordinated with the local highways authority to reduce disruption
- The pedestrian and wildlife crossings during the works on the river will be carefully managed

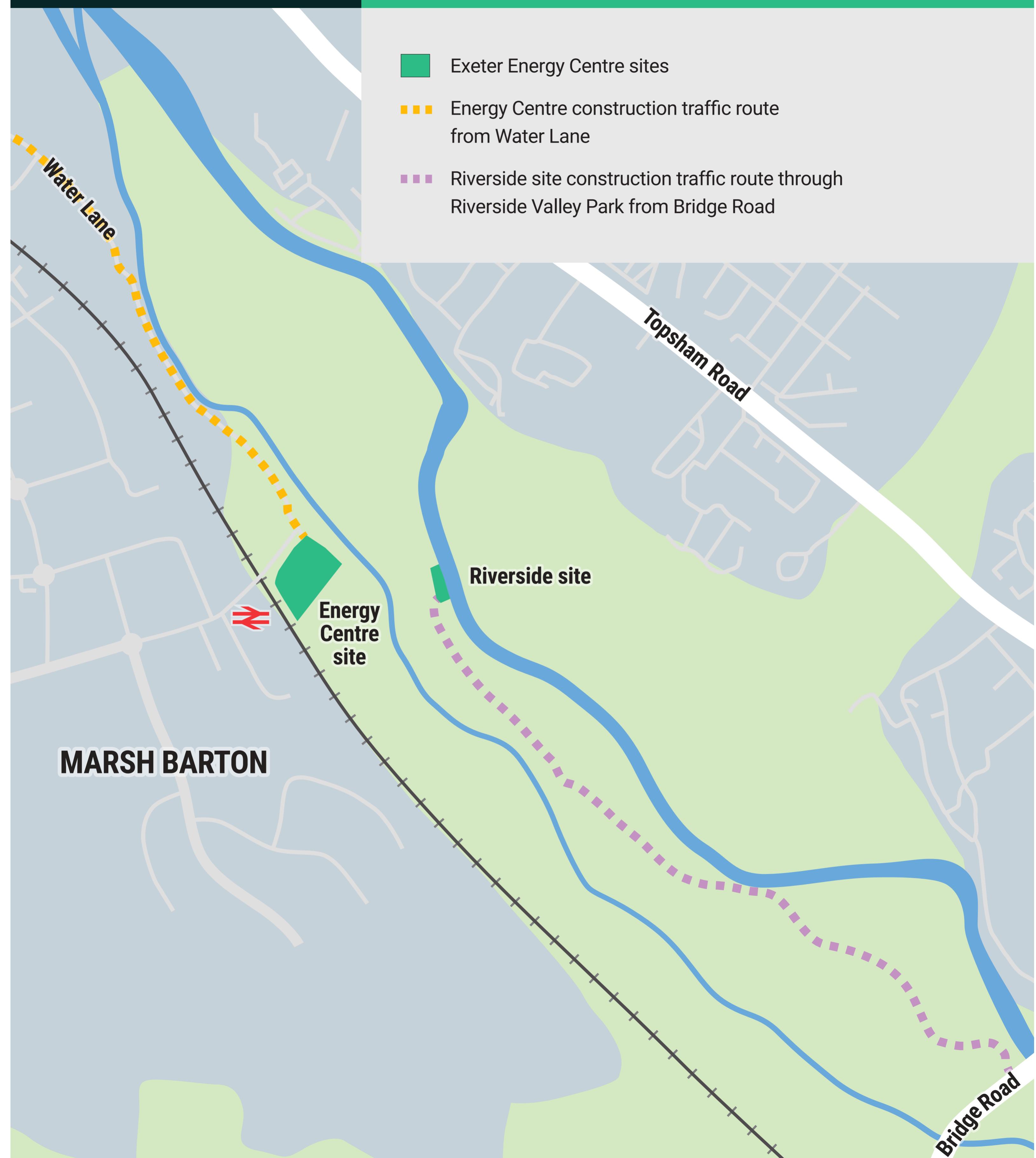
Once the energy centre is operational, traffic will be minimal, with one or two small vehicles visiting the site each day for maintenance.



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Construction traffic routes

- Exeter Energy Centre sites
- Energy Centre construction traffic route from Water Lane
- Riverside site construction traffic route through Riverside Valley Park from Bridge Road



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Air quality

Energy production is the second largest producer of nitrogen oxides (after road transport). These are known to contribute towards health issues such as asthma and other breathing difficulties and can exacerbate heart and lung disease.

The Exeter Energy Network will remove the need for gas to be burned in individual buildings throughout the city. This will result in a reduction of nitrogen oxides of over 11 tonnes per year, a 91% reduction compared to individual gas boilers. For context, short-term exposure to concentrations of nitrogen oxides higher than 200 millionths of a gram/m³ can cause inflammation of the airways (WHO, 2013).

Gas boilers will be used in the Energy Centre on the coldest days, but these will be modern ultra-low emission boilers. Our air quality assessment for the Energy Centre found that any changes in air quality due to the sporadic operation of our gas boilers will be insignificant, and will remain within the UK Air Quality Objectives.

The gas boiler use within the Energy Centre will comply with the medium combustion directive which will be regulated by the Environment Agency.



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The environment

Extensive studies are being undertaken as part of the planning application process to make sure the Energy Centre proposals do not have any significant adverse impact on the environment.

A noise assessment will establish a baseline acoustic output for the area and the acoustic performance of the plant so that measures such as acoustic insulation and baffles, can be put in place to ensure that it has little impact on noise levels, if required. Lighting will be installed in line with the ecology studies to ensure the best protection for local wildlife and to avoid impacts to neighbouring business.

Noise, dust and any other nuisance during construction will be kept to a minimum and managed through a Construction Environmental Management Plan.

To protect local ecology, a management plan will be in place throughout the lifetime of the Energy Centre. Moreover, the project is committed to a 20% net gain in biodiversity, twice the legal requirement and we will be working closely with the Devon Wildlife Trust and Exeter City Council.

Once the planning application is submitted to Exeter City Council, the local authority will then consult with organisations such as the Environment Agency, local highways authority and Natural England to ensure they are satisfied that the Energy Centre will comply with every appropriate standard.

The River Exe

Renewable, clean energy for the project will come from a Water Source Heat Pump which will draw heat from water withdrawn temporarily from the River Exe. This will be done without disrupting the habitat, fish population and river users.

- During normal operation circa 5% (up to a maximum of 20%) of the total water volume of the Exe is removed from the river and then returned slightly cooler a few minutes later. Water abstraction will naturally be greatest in the coldest months, when river levels tend to be high
- A 2mm fine mesh protects river life preventing fish including juvenile eels (elvers) and salmonids from entering the pipework
- The Energy Centre will extract the heat from the water, but the water will otherwise remain unchanged
- The Energy Centre will return the water on average 2-3°C cooler, but when dispersed across the River Exe, this equates to around a 0.15 °C temperature change. In summer, when river flow is at its lowest, the change in temperature across the river may be up to 0.6 °C. This change is in line with the typical daily variance on the river

- This cooling is expected to provide a net-benefit to aquatic species as the river temperature is slowly rising because of global warming. Some species, such as salmon, are struggling with these higher temperatures in the summer, which the scheme will help to mitigate
- All in-river works will be completed under a construction methodology agreed and consented by the Environment Agency to ensure no disruption to aquatic fauna and flora in the Exe
- Construction is expected to last around six months, with works sited south of the Duckes Marsh Cycle and Footbridge on the River Exe
- During this process, part of the riverbank will be fenced off but returned to normal use once completed
- River users will be able to pass freely along the Exe as the works will be screened behind a temporary dam

The Environment Agency will regulate the abstraction and discharge licences for the Energy Centre.



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Both the Energy Centre, and the network is safe.

- A heat pump relies on a heat exchanger which uses a compressed gas as a refrigerant. In the case of the Exeter Energy Network, ammonia will be used as it is the most effective gas to use in this type of heat pump. It will be handled using the highest safety standards and ammonia levels will be monitored so in the unlikely event of a leak it will be quickly detected and resolved
- The pipes used to deliver heat around the city are highly insulated and run at much lower pressure than the gas network, meaning there is no risk of explosion
- The facility is unmanned but will be constantly monitored by a system of sensors to ensure that the system is running as expected. Any change in operations outside expected parameters will trigger an early warning and engineers will visit the site to rectify these

- The process does not add anything to the river water, this is returned untouched to River Exe other than a slight temperature change which overall is in line with the typical daily variance
- The water used within the heat network does not mix with the water taken from the River Exe. It is a separate, “closed loop” system which will be maintained at the correct water quality to prevent corrosion or inefficiencies
- The waterway will be protected using the best available techniques successfully used in Bristol, Glasgow and across Europe
- 1Energy prioritises the safety of everyone that comes into contact with our projects. We have an exemplary “zero harm” safety record. So far in 2024 1Energy and our contractors have worked over 62,000 hours without a single hour lost to injury



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Pipe route

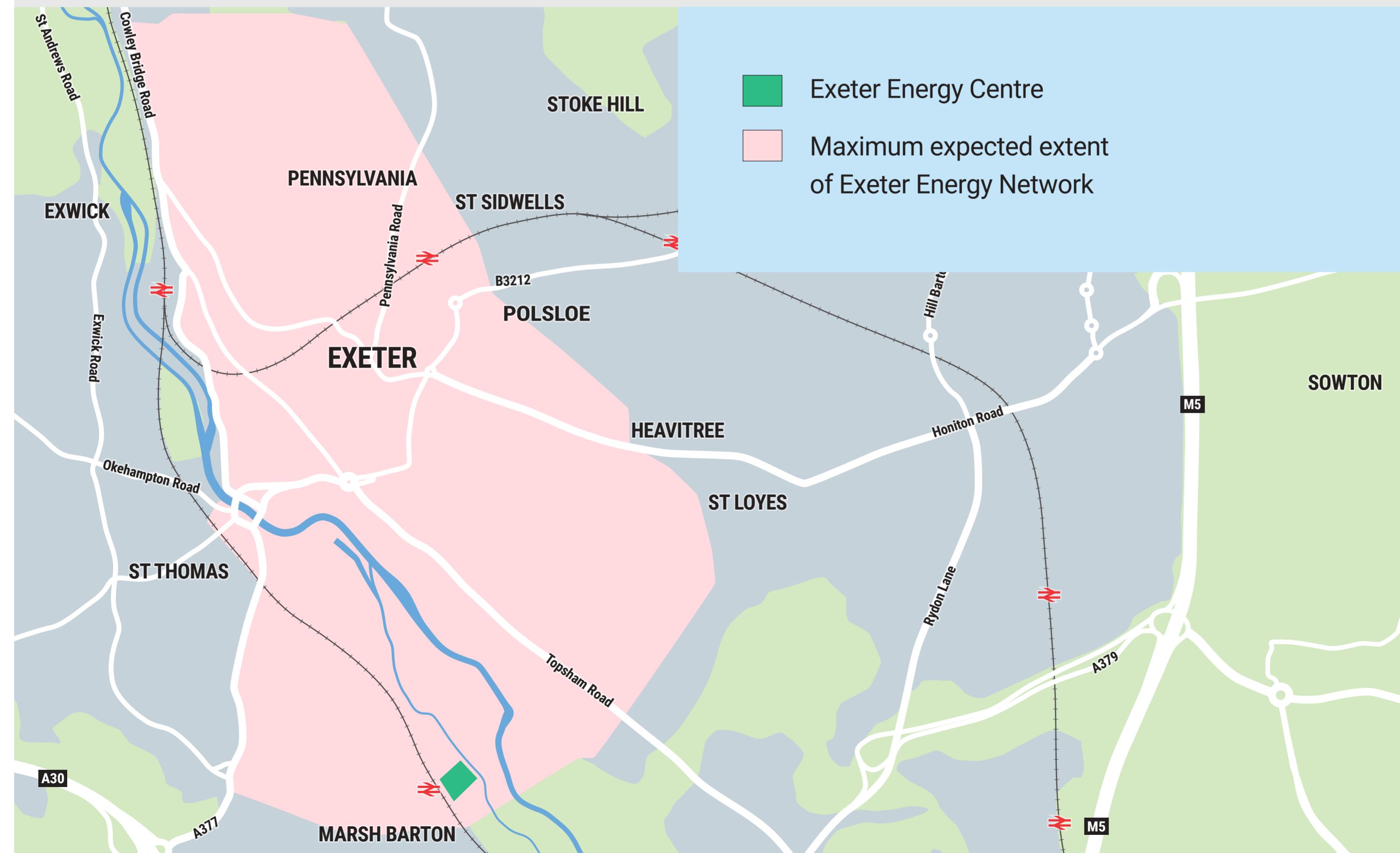
The heat network requires a network of pipes that will be laid underneath verges, footpaths and roads across the city.

While the route for the pipes is not part of this consultation and is managed under a Local Development Order that falls outside of the scope of this event, 1Energy know the local community will be keen to understand where and when the pipes will be laid.

- The chosen network routes will be dependent on which customers connect to the Network
- Specific routes under discussion with landowners and Devon County Council Highways

- The route for the pipes is not yet finalised; however detailed plans will be available in due course
- 1Energy is working closely with the highways team at Devon County Council to ensure the works will be completed as efficiently as possible
- As part of this work, we are committed to an extensive engagement exercise and will publish the planned works widely when available

We're currently scanning the roads with ground penetrating radar to understand what is below the ground, and detailed archaeology and unexploded ordnance studies will be carried out along the final route.



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What happens next and have your say

Indicative project timeline

- **August 2024:** the planning application will be submitted with determination expected by the end of 2024
- **Autumn 2024:** first installation of buried network begins in areas where there are time constraints
- **Spring 2025:** construction of the Energy Centre and main work on buried network begins
- **Autumn 2026:** construction of the Energy Centre is completed
- **End 2026:** heating is switched on to first customers

Have your say

We welcome feedback on our proposals and our consultation is open until 1st August.

You can either:

- Fill in a feedback form at this venue
- Visit our website www.exeter.energy and fill in the online form
- Write to us at PO Box 359, Saltash, PL12 9AS

You can also subscribe to our newsletter, either by signing up at our website Exeter.energy or by filling in one of the forms at this venue.

If you would like to get in touch on anything other than the consultation, email us at any time at exeter@1energy.uk



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