

# **Stublach Gas Storage Project**

## **Non Technical Summary**

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- S.1 INEOS Enterprises Limited is seeking planning permission and associated consents for the development of a storage facility for natural gas at its Holford Brinefield in Cheshire. The facility will consist of underground cavities that will be produced by solution mining and associated equipment to import and export gas from the storage.
- S.2 Gas storage is a fundamental part of the UK gas infrastructure required to ensure sufficient supplies of gas are available to meet the demands of consumers. It provides an important function in managing variations in the supply - demand balance to provide flexibility, reliability and competitive prices. Underground salt cavities are a safe and proven method for the storage and supply of natural gas, used in the USA, the UK and across Europe and offer many advantages over other storage methods.
- S.3 INEOS Enterprises Limited (and its forebears) have a long history of solution mining salt cavities in the Holford Brinefield to provide brine (salt) to the chemical industry of Cheshire and has an on going need to provide this brine by the development of additional salt cavities. INEOS Enterprises Limited also has experience of operating existing flammable gas storage cavities on the Holford Brinefield.
- S.4 This area of Cheshire is one of the few areas in the UK that has favourable geology for the creation of gas storage salt cavities and the only area with appropriate existing solution mining industry to provide water and a market for brine.
- S.5 INEOS Enterprises Limited has extensive experience in the safe manufacture and handling of hazardous chemicals. The business is at the forefront of developments in the responsible handling and use of its products, and in the management of environmental issues.

### Project description

- S.6 The site lies in Cheshire, about 2km due west of the M6 and approximately 4km north of Junction 18. The nearest village is Lach Dennis (SJ 708 720), which is north of the site. The application area is approximately centred on Stublach Grange Farm(SJ 712 709). (see Figure A).

- S.7 Two sets of infrastructure are required to create the facility. The first is an extension of the existing INEOS Enterprises Limited brine and water infrastructure to allow the creation of the cavities and the continued supply of brine to its customers. The second is to allow the storage of gas and transfer to and from the Transco gas network. A significant amount of the proposed development is located below ground, which after the initial construction period has very little surface impact.
- S.8 The project will comprise the following key components: –

### **Brine and water infrastructure**

- A new underground water pipeline and new underground brine pipeline from the Solution Mining Compound, running north to the existing pipeline, saturator and pumphouse infrastructure in the Hulse Lane area.
  - A new underground brine pipeline from the Solution Mining Compound north east to the existing infrastructure.
  - A Solution Mining Compound where it is proposed to house the majority of the solution mining equipment. This will be located approximately 250m west of Stublach Grange Farm, close to the proposed new access road and other infrastructure in the area. The compound will have an area of approximately 0.6ha and is shown on Figure B. The proposed location of the compound is well away from any neighbouring properties and already partially screened by trees and hedgerows. Much of the equipment will be housed in brick buildings designed to give the appearance of Cheshire farm buildings; some ancillary equipment will be located outside.
  - To control the shape of the proposed cavities it is necessary to use an inert blanket of nitrogen in the top of the cavity. The nitrogen will be provided from either a local store of liquid nitrogen with a vaporiser or from a small nitrogen production unit, situated in the Solution Mining Compound.
- S.9 It is proposed to solution mine 28 cavities each having its own wellhead. Each wellhead will be situated in a secure compound of approximately 15m by 20m. Each wellhead compound will be screened by additional landscape planting where necessary. Weak brine booster pumps will also be located in approximately half of the wellhead compounds. The location of

the individual cavities is shown on Figure B. INEOS Enterprises Limited owns all the mineral rights and the majority of the land within the application area.

### **Gas Storage Facility**

- S.10 When the cavities have reached the required size, the solution mining wellhead and ancillary equipment will be removed and replaced with the gas wellhead and ancillary equipment within the same compound.

### **Gas Compressor Station**

- S.11 It is proposed to locate the Gas Compressor Station at the former Stublach Grange Farm, in the centre of the proposed gas storage area, thus minimising pipeline distances and disturbance during construction. The proposed site has an area of approximately 3.4ha and is shown on Figure B. The farm is owned by INEOS Enterprises Limited and has been vacant for about a year
- S.12 The Gas Compressor Station will consist of four gas compressors powered by electric drives. Electric drives have been selected in preference to gas turbine drives as they are more efficient, have a higher flexibility and no emissions to air. The compressors will be housed in buildings to minimise noise. Initial studies by Scottish Power Manweb have indicated that sufficient power is available from the grid to supply these machines.
- S.13 Other process plant equipment required at the Gas Compressor Station includes gas fired water heaters to heat the gas following pressure letdown; gas metering, to measure the flow of gas through the facility and gas drying and filtration, to condition the gas from the cavities. The gas has to be dried before export to the National Transmission System (NTS), this is typically done by molecular sieve adsorption columns. The regeneration system for the dryers will include gas fired heaters and air fan coolers. The Gas Compressor Station will also have ancillary plant and buildings such as a control room and electrical switchhouse.
- S.14 An antifreeze, typically glycol or methanol will be used to prevent the build-up of methane hydrate / ice at the wellhead. It may be stored locally at individual wellheads or piped from a central store at the Gas Compressor Station. The antifreeze will also be removed at the Gas Compressor Station.

- S.15 The site is approximately 400m from its nearest neighbour, a tenant farm and more than 1000m from any significant residential areas in the villages of Lach Dennis and Byley. The farm is in a remote location and generally not visible from the surrounding public roads and villages. The existing hedgerows and trees already provide landscaping and screening, and it is proposed that these will be enhanced with additional planting. Most of the existing farm buildings are not suitable for reuse, however, the existing farmhouse will be retained and used as offices. It is proposed to house many of the process plant items in single or two storey buildings to resemble traditional farm buildings. Certain plant items will need to be outside, these will be appropriately painted and screened to minimise their visual impact.
- S.16 An underground pipeline will be installed to connect the Gas Compressor Station to the NTS that runs adjacent to King Street.

### **Gas Connection Compound**

- S.17 At the NTS connection point, a small above ground installation approximately 25m by 25m is required for pigging and control equipment. The siting of this will depend on the NTS connection point.

### **Electrical supply**

- S.18 The Gas Compressor Station and the Solution Mining Compound will have a total power requirement of approximately 60 MW. This power supply will be sourced from an existing SP MANWEB substation at Lostock Hollows. An additional compound of approximately 0.15ha will be constructed adjacent to the existing substation on INEOS Enterprises Limited land to house transformers and switchgear. Two buried cables will be installed to take power from Lostock Hollows to a new electrical compound of approximately 0.25ha in area that will be constructed immediately north of the Solution Mining Compound and will contain two switch houses, transformers and power factor correction equipment.

### **Site roads**

- S.19 A site road network is required to allow the wellhead compounds to be constructed, allow general access for normal operation and maintenance and provide access to the proposed Gas Compressor Station for construction and operation. The roads will be constructed in a

phased manner, as each new brine borehole and wellhead is required. It is proposed to install a new main site road from an existing entrance on King Street (A530) to give improved access to the proposed central Solution Mining Compound area and Gas Compressor Station so that no HGV construction traffic is travelling through Byley village, Drakelow Lane and Middlewich Road. The road will continue through to Stublach Farm and Middlewich Road (B5081) to provide access for some light traffic and emergency access. All HGV traffic will be directed to enter via King Street.

### **Construction programme**

- S.20 The major construction phase of the project will be over an approximately 3 year period. It will commence with the construction of the solution mining infrastructure and the drilling of the initial phase of about 8 cavities. As soon as cavities have been drilled solution mining will start. It is expected that the first cavities will complete solution mining after about 2 years.
- S.21 Construction of the Gas Compressor Station and associated infrastructure will start after the initial solution mining infrastructure is completed and will take approximately 18 months.
- S.22 Approximately 4 cavities per year will be drilled from about year 3, there will be more minor construction activities associated with these, similar to the ongoing activities and current borehole and solution mining programme of INEOS Enterprises Limited.

### **Operation**

- S.23 During the solution mining of cavities, there are a number of operational and maintenance activities required that are the same as those currently performed by INEOS Enterprises Limited staff and contractors on the existing boreholes north of Lach Dennis. These activities will require access to the wellhead sites by various vehicles. Most activities are daytime only. The solution mining is a continuous (24hour) process operation but only produces minimal noise and impact.
- S.24 The operation of the Gas Compressor Station is a 24hour, continuous operation, although the compressors will not be required to operate continuously. Generally, maintenance activities will be daytime. The plant and wellheads will have security fences, cameras and low level security lighting as appropriate. The wellheads do not need to be continuously flood lit and the plant will not require continuous flood lighting at night. The Gas Storage Facility will

be continuously manned by operators who will be based at the Gas Compressor Station. The plant will require intermittent deliveries of certain process fluids such as methanol antifreeze, diesel and possibly liquid nitrogen and the removal of waste process fluids, but these will not generate excessive traffic movements.

### **Site decommissioning**

S.25 The Gas Storage Facility is a permanent development, which is expected to operate for a minimum period of 40 years. If at the end of this period, or should INEOS Enterprises Limited determine earlier that the cavities are no longer required for gas storage, the sites will be safely decommissioned and the cavities refilled with brine or water. All sites would be restored to an agreed level of use, unless the planning authority approves a further planning application for continued use or redevelopment at the time.

### **Health and Safety**

S.26 The Health and Safety of staff and people living and working in the vicinity of the Gas Storage Facility is of prime importance to INEOS Enterprises Limited. The INEOS Enterprises Limited Safety, Health and Environmental Policy will apply to all stages of the Project. This states three fundamental objectives:

- All its activities are conducted safely and with respect for the environment.
- The health of its employees, its customers and the public will be protected.
- Safety, Health and Environmental performance will meet contemporary requirements.

S.27 This project will be strictly regulated under the Control of Major Accident Hazards legislation (COMAH). The Health and Safety Executive (HSE) and the Environment Agency (EA) are the regulatory agencies. A requirement of COMAH is that INEOS Enterprises Limited submits a Pre-Construction Health and Safety Report to both the HSE and the EA. Following assessment of this report a second, more detailed Pre-Operation Report must be submitted. Operation of the plant cannot commence until these regulators have assessed this second report. Preliminary work on the Risk Assessment for these reports has already commenced and has been included in this Environmental Statement.

- S.28 The storage of gas in underground salt cavities is a well-proven and tested method of gas storage. The proposed gas storage project will store natural gas in 28 underground salt cavities specifically designed for this purpose. The cavities will be situated approximately 500m (~1700ft) underground and the gas will be stored at pressures up to 100 barg. The area chosen for this proposal has the right geology and is also in open farmland. This means that locations for the gas storage wellheads and Gas Compressor Station can be selected so that they are a safe distance from the nearest house.
- S.29 A detailed risk assessment has been carried out. It considered a wide range of possible events that might cause a serious incident. The worst conceivable incidents that were identified by the study were then modelled to determine their likely impact, even though they are extremely unlikely. The conclusion of the assessment was that equipment was sufficiently far away from properties and public roads such that even for the worst conceivable incidents, there should be no damage to residential property and no injury to residents or other members of the general public.
- S.30 Safety will be paramount during the design, construction and operation of the facility, many measures will be incorporated to reduce the risk of an incident occurring including:
- A full Hazard Study carried out during design to identify all possible incidents and to incorporate measures to reduce the risk.
  - The facility to be designed and constructed to meet or exceed all relevant engineering codes and standards.
  - Underground pipes to be designed and operated to the same standards as the Transco network, with separation distances from local houses in excess of recommendations.
  - Storage and Gas Compressor Station operated according to guidelines set out in the British Standards.
  - Downhole safety valves preventing gas loss in the case of wellhead decapitation.
  - Vehicle crash barriers around above ground gas pipework.
  - Closed circuit television and security fencing.
  - Instruments to detect leaks of natural gas .

- Plant and equipment capable of operating safely in flammable atmospheres, and control of ignition sources.
- Pressure relief valves for pipework and vessels.
- Emergency shut down and venting systems to minimise the amount of gas that could leak.
- Safety management plan and a safety work permit system to control maintenance activities.
- Emergency procedures, practiced with local emergency services.

S.31 The overall assessment of health and safety issues relating to the gas storage project has indicated that the potential effects identified in the risk assessment can be controlled and mitigated against. The control and mitigation measures can effectively reduce both the potential consequences and likelihood of incidents causing harm.

### **The UK need for gas storage**

S.32 Over 20 million people in the UK rely on gas for heating and cooking, and more than 25% of the UK's electricity supply is generated from gas. The demand for gas in the UK is predicted to continue to increase, however, UK reserves of gas from the supply from the North Sea are decreasing rapidly. In 2003 UK production exceeded UK demand, by 2015 only about 30% of the UK demand will come from UK production, the remainder will have to be imported from areas such as Norway, Russia and North Africa.

S.33 Gas demand is sensitive to the outside temperature, demand on a cold winter's day can be double that of a summer's day. Up to now this 'swing' in demand has been provided by fields in the southern North Sea, which have the capability to vary their output to satisfy the variation in demand. These fields will soon all be depleted. The imported supplies that are replacing them are much further away and much less able to increase supply to meet sudden high demands caused, for example, by cold weather.

S.34 Gas storage therefore, will have an increasingly vital role in maintaining the security and safety of the UK's energy supply. Storage facilities allow gas suppliers to ensure sufficient gas is available to meet demands when required. This can either be when demand exceeds

- supply capacity or when production or transportation is disrupted. Failure to ensure supply matches demand could result in supplies to electrical generation, industry and residential customers being interrupted.
- S.35 Gas storage also plays a key role in the competitive gas market to reduce prices to consumers. It gives gas shippers and suppliers the flexibility they need to manage variations in prices and demand, so that gas customers, and indirectly electricity customers, can benefit from greater competition and lower prices.
- S.36 The project is intended to enhance the security of supply of gas to the national market, a matter of national importance, increasing security of supply to assist the forecast supply-demand gap. In this regard, the project is fully consistent with national energy policy.
- S.37 Underground salt cavities are a safe and proven method for the storage and supply of natural gas, used in the UK and across Europe and offer many advantages over other storage methods. Cheshire is one of the few areas in the UK that has salt deposits suitable for the creation of gas storage salt cavities and it is the only area where there is an existing solution mining industry that can provide the water and a market for the brine produced. No additional water will be extracted nor brine discharged to the environment as a result of this development. In the other areas the salt extracted to produce cavities would have to be discharged into the sea, which is a waste of natural resources and of possible environmental concern.
- S.38 To date solution mining at Holford has been in the northern part of the Brinefield as the salt is closer to the surface and cheaper to mine. Many cavities have been created but these are not suitable for gas storage as they were mined for maximum salt extraction and are too large for gas storage. Three cavities were purpose mined for gas storage in the 1980s, one of these is used to store natural gas and two are used to store ethylene.
- S.39 For a large gas storage project the deeper salt in the south part of the Holford Brinefield is more suitable. The greater depth enables the gas cavities to operate at a higher pressure and so allows much more gas to be stored in each cavity. This reduces the number of cavities required, which is of lesser overall environmental impact and more cost effective.

## Main project alternatives considered

S.40 A full assessment of possible sites for the Gas Compressor Station has been carried out. This assessment concluded that the site of the existing Stublach Grange Farm that is owned by INEOS Enterprises Limited and has been empty for about 12 months is the best alternative. The farmhouse will be retained and used as offices. The environmental advantages of the site are:

- A remote location which is 400m from the nearest dwelling and over 700m from public roads or footpaths.
- Screened by existing trees and hedgerows.
- Close to the storage cavities and to the NTS (national gas transmission system), minimising the disruption from installing long gas pipelines.
- A new access road from King Street will mean that there will be no construction traffic travelling through the villages of Lach Dennis or Byley.
- Proximity to the solution mining infrastructure allows sharing of infrastructure and construction laydown areas so minimising the environmental disturbance.

## Environmental Impact Assessment methodology

S.41 The statutory framework for Environmental Impact Assessment (EIA) is provided by the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (hereafter referred to as the EIA Regulations). These regulations implement European Directive 85/337/EEC, amended by Directive 97/11/EC, and require that certain types of development are to be subject to EIA.

S.42 The applicant considers that the development falls within the description of development contained within the EIA Regulations, Schedule 2, Class 3 'Energy Industry' namely '(d) underground storage of combustible gases where the area of any new building, deposit or structure exceeds 500 square metres; or a new building, deposit or structure is to be sited within 100 metres of any controlled waters.'

S.43 The Environmental Statement (ES) sets out the findings of the EIA and provides a description of the development, details of existing environmental conditions and an assessment of the

likely environmental effects of the proposed scheme. This ES has been prepared in accordance with the EIA Regulations and DETR Circular 02/99 'Environmental Impact Assessment'.

### **Plans and Policy**

- S.44 The 'development plan' for the application site is made up of the adopted Vale Royal Borough Plan 2006 and the adopted Cheshire Structure Plan 2011. These provide general development considerations that should be addressed in development proposals.

### **Recognition of Cheshire's unique geology**

- S.45 The presence of salt caverns/halite deposits in Cheshire and the potential for the reuse of former minerals workings as storage facilities is recognised by both these plans.

### **Development guidance**

- S.46 In both the local and structure plans specific development guidelines/policies are set out, including the need for a full and proper assessment of ground stability in those areas prior to any form of development. The proposed development has taken account and been informed by this guidance wherever possible.
- S.47 Additional guidance has been taken from national 'Minerals Planning Guidance Notes'.

### **National importance of Gas Storage**

- S.48 On a national level the storage of gas is recognised to have strategic importance in the supply of energy in the United Kingdom, in order to add flexibility to the energy market. The recent Energy White Paper identified the need for stability in the Nation's energy supply and the provision of gas storage is stated to have a key role in providing this.

### **Socio-Economic Impacts**

- S.49 The term 'socio-economic' refers to matters relating to, or involving, economic and social factors. To identify and examine the likely main or significant impacts that might be caused by the proposed development on the host population and on the local and regional economies.

Various sources of information relating to population and the economy/economic activity at a District, County and Regional level have been inspected.

### **Effect on economic activity**

- S.50 INEOS Enterprises Limited and its sister company INEOS ChlorVinyls Limited at Runcorn are a major employer in Cheshire, and the proposed development will serve to enhance that role and create security in this and other INEOS sites in the County.
- S.51 The proposed development will create a number of jobs, initially during the construction phase and later once the site is in operation. It is anticipated that throughout the proposed three-year main construction programme, approximately 120 people will be directly employed by INEOS Enterprises Limited. Once the facility is operational it is likely that a constant staff total of 20 employees will be employed. In addition there will be opportunities for local people to be engaged in ongoing contracts relating to site maintenance and associated activities.
- S.52 It is considered that the development will have a beneficial effect upon local services, through the increased patronage of people employed at the site.

### **Effect on population**

- S.53 The development is considered too small to have a negative effect upon the balance of population in the area.

### **Effect on public use of the site**

- S.54 Although the vast majority of the site is in private ownership, it is recognised that a number of public rights of way exist that transect the site and that these are used frequently by members of the public. It may be necessary, during the construction phase of the development, to temporarily divert parts of these rights of way, in the interests of health and safety. Any disturbance will be kept to a minimum, and when the facility is operational these rights of way will remain open and unobstructed.

### **Need for mitigation**

- S.55 No specific mitigation measures are necessary in the field of socio-economic impacts and overall it is considered that the proposed development will have a beneficial effect in socio-economic terms.

### **Geology**

- S.56 The geology of the application is well established through a number of existing deep boreholes and this has demonstrated that the geological sequence comprises approximately 450m of the Wych/Byley Mudstone and superficial deposits of Glacial Till overlying the Northwick Halite Deposits. Underlying the Halite are c.300m of Bollin Mudstone and c.200m of Tarporley Silstone. Beneath the Mercia Mudstone Group is the Sherwood Sandstone Group.
- S.57 The salt deposits are an ideal geological media for the storage of gases and other hydrocarbons because of their geological and hydrogeological properties. The main benefits being that salt deposits are impervious to the migration of the gases from the caverns.

### **Hydrogeology**

- S.58 The hydrogeology of the project area comprises a layered sequence of aquifer units with groundwater bodies likely to be present within superficial deposits, the Byley mudstones and the Triassic mudstones. The majority of the potential impacts of the scheme relate to the potential for accidental spills at the surface and the construction of pipeline corridors across surface watercourses.
- S.59 Evidence would indicate that any contamination from previous land use is minimal and therefore any impact on groundwater is low.
- S.60 Potential contaminants should be controlled and contained on site using site specific risk assessments and construction management plans. Any construction across surface watercourses should be carried out using methods approved with the Environment Agency. If these mitigation measures are implemented the overall residual short term impacts should remain as low or neutral.

## Ecology

- S.61 The ecological investigations included a Phase I habitat survey to map the various habitats present, a desk study to ascertain what existing biological data was held for the area, and a protected species survey.
- S.62 The land is predominantly improved grassland on which dairy cattle and sheep are grazed, some fields are used for silage production, and a small number are used for arable crop production. The majority of the fields are therefore species poor, but are in the main bounded by intact stock-proof hedgerows, management of many of which has maintained the mature trees within them. Over 1200 mature trees are present in the survey along the several kilometres of hedgerow. Some of the older trees offer potential roost sites for bats.
- S.63 As is common in Cheshire most fields contain at least one marl pit, and approximately 100 ponds were mapped, some of which are known to support Great Crested Newts. All were assessed for their potential to support great crested newts.
- S.64 Three brooks run through the site and these were surveyed for water voles. No evidence of water voles was found.
- S.65 The proposals have taken account of the findings of the ecological surveys, and where practicable adverse effects have been avoided through design. For example, ponds (with their potential for great crested newts and lesser silver diving beetle) would be avoided and none would be lost to the development. All black poplars would be protected from damage during construction of the roads and pipeline installations. The farmhouse at Stublach Grange Farm, which has potential for roosting bats, would be retained.
- S.66 Where effects could not be avoided, mitigation measures form part of the proposals, and the assessment of effects takes into account such mitigation. For example, where construction works would be undertaken within 250m of any pond used by great crested newts, measures to protect the species during the works would be implemented under on Defra licence. The requirements for such mitigation would be confirmed by a rolling programme of amphibian surveys in the spring/summer ahead of each phase of the works. Whilst the works have been designed to avoid all known badger main setts, it is possible that subsidiary setts may be affected by the works, and even if the proposals were designed to avoid such of these which have currently been identified, over the period of the works there is the potential that badgers may excavate new setts. Confirmatory badger surveys would thus be

carried out in advance of each phase of the works, and where necessary, where engineering works would take place within 30m of a sett, the necessary measures to protect the badgers would be implemented under English Nature licence.

- S.67 Existing hedgerows would be enhanced and gapped-up to increase their value both for visual screening of the new wellheads and also to increase their value as wildlife corridors. Whilst the main farmhouse at Stublach Grange Farm would be retained, artificial bat boxes would be provided to offset the loss of the other farm buildings, which although not good roosting habitat, may provide resting sites for foraging bats. Similarly bird nest boxes would be provided to mitigate for the loss of mature trees and the out-buildings at Stublach Grange Farm. In the longer term, as existing trees at the site mature, and new trees planted as part of the project become established, these would also mitigate for the loss of existing trees.
- S.68 In the long term the overall effects would be beneficial to nature conservation, with the enhancement of existing features, creation of small woodland blocks, and mitigation for protected species during and after the construction process.

### **Landscape and visual appraisal**

- S.69 The landscape to be occupied by the proposed development is one of gently undulating farmland with a large network of hedgerows and hedgerow trees. The northern part of the development area already contains solution mining infrastructure. Although there are no specific landscape designations in the vicinity of the site, the landscape character, particularly in the southern part of the development area, would change as a result of the proposed development. Proposals would involve removal of hedgerows and tree planting and permanent loss and temporary disturbance to pasture land with the introduction of new built elements into the landscape. Intermittent views from within the area during the construction phase would include those from the ground and upper floor of some surrounding farmsteads and a public right of way looking towards the periphery of wellhead and pipeline developments. Open and slightly filtered views will exist from a single farmstead. The visual influence during the operational phase of the development would be significantly less than for the construction phase. Indeed, for many wellheads, their locations would not be visible from outside the boundaries of the field in which they are located. Open and slightly filtered views will remain from a single farmstead until mitigation planting has fully established.

S.70 As a result, the proposed development has incorporated substantial landscape mitigation measures. Proposed mitigation measures include the provision of gapping-up of existing hedgerows, new hedgerow planting and new tree planting. Screen planting would focus on areas of greater visual impact. This would include narrow belts of native planting along retained hedgerows, and the provision of new hedgerows, trees and woodland planting to enhance the landscape character of this part of the site. The layout of buildings would aim to minimise visual impacts and the buildings would be designed in a manner that would be sympathetic to the surrounding building types.

### **Transportation**

S.71 The potential increase in local road traffic as a result of the construction and operation of the proposed Stublach Gas Storage Project has been considered at four locations on the highway network, as detailed below:

- A556 roundabout junction with the A530 Griffiths Road/ King Street.
- A530 King Street in the proximity of the existing site access.
- A54 Holmes Chapel Road to the east of its junction with the B5309 Centurion Way.
- B5081 Middlewich Road in proximity to the Stublach Farm access.

S.72 Four time periods have been assessed, namely:

- AM Peak (08:00-09:00)
- PM Peak (17:00-18:00)
- Off-Peak (09:00-16:00)
- 12-Hour (07:00-19:00)

S.73 Surveyed traffic data has been factored to the year that construction is proposed to commence (2007) and the additional traffic flows associated with the identified committed developments in the vicinity of the site, namely the E.ON Gas Storage Project, have also been added to provide the assessment network.

- S.74 The main construction phase (that is the first 3 years of the project) would be the most intense in terms of traffic generation and has therefore been assessed within this report to represent a 'worst case' scenario. The traffic generated as a result of the development comprises a total of 30 HGV movements, 40 van movements, 75 single occupancy staff trips and 10 minibus staff trips per day (all 2-way).
- S.75 It is concluded that the traffic generation of the proposed Stublach Gas Storage Project would have a neutral (insignificant) effect on the adjacent road network and would not result in demonstrable harm. The maximum percentage impact would be 14% along the A530 during the 12-hour period, which represents an absolute 'worst case'. This impact is below the 30% threshold as stated in the Institute of Environmental Management and Assessment (IEMA) Guidelines and is therefore considered to be insignificant.
- S.76 After the main construction phase, construction and operational traffic would still take place but at a much-reduced level, therefore the operational effects would have a considerably lesser impact on the surrounding road network.
- S.77 In summary, the surrounding highway network can accommodate the traffic and transport effects of the construction of the Stublach Gas Storage development satisfactorily, with the impact being significantly reduced post construction.

### **Noise and vibration**

- S.78 Noise generated during the construction and operational phases of this project has been considered within this assessment. The assessment has principally involved the collation of existing baseline noise level data at potentially sensitive receptors around the site, and evaluating the operational and construction noise impacts at these selected receptors.
- S.79 Where information regarding the plant and equipment to be installed has been unavailable, a number of assumptions have been made and the appropriate predictive calculations carried out, to determine the level of mitigation likely to be required.
- S.80 The assessment has been based on the recommendations and guidelines given in BS 4142 'Method for Rating Industrial Noise affecting Mixed Residential and Industrial Areas', 1997, BS 5228: 'Noise and Vibration Control on Construction and Open Sites' (Part 1: 1997) and the Guidelines for Community Noise, World Health Organisation (WHO), 1999.

- S.81 The baseline conditions at all receptors were found to be generally low and typical of a predominantly rural environment, with the main noise sources being due to agricultural activities and distant traffic on the M6.
- S.82 Noise levels resulting from construction activities will vary and will be limited to specified daytime hours and days of the week by planning conditions. In the case of pipeline construction, significant levels of noise are likely to occur and will be audible at receivers but will generally occur for no more than a few days at a time in any given area as the process of building the pipeline infrastructure progresses. The longest construction period is associated with the development of the Gas Compressor Station.
- S.83 The exact specification of plant and building design has not been formalised at this stage in order to allow flexibility in the selection of appropriate technology. However this assessment has investigated the theoretical maximum noise levels to be emitted from plant and equipment within the Gas Compressor Station during normal operations. This will provide a basis for the selection of equipment and associated mitigation requirements including building wall design, in order that operational noise will not be audible above the existing background noise levels and therefore result in no significant impact. It is recommended that a sound power level of 93.9 dB(A) or 77 dB  $L_{Aeq}$  at 10m is achieved at the site boundary of the installation in order to ensure that operational noise levels do not compromise the existing background noise levels at the surrounding receptors.
- S.84 Ground borne vibrations generated during construction or operation are highly unlikely to affect local residents given the distances between residences and project installations. Local residents, however, will be given appropriate notice of any temporary construction activities which might increase background vibration levels. These activities will be conducted within hours specified via a planning condition.
- S.85 INEOS Enterprises Limited will take all practical measures to ensure that noise levels during construction and operation are kept to a minimum. Such measures will include the selection of appropriate equipment and least intrusive construction methods in relation to noise. All operational plant and machinery will be designed to meet stringent noise control specifications.

- S.86 Noise levels will be monitored both during construction and operation, at regular intervals specified by the Local Authority, to ensure levels are maintained within the specified limits to ensure that there will be no adverse effect on the amenity of local residents.

### **Air Quality**

- S.87 An assessment has been undertaken to determine the effect on local air quality associated with the Stublach Gas Storage Project proposals. The key local air quality issue associated with the project once operational will be emissions of NO<sub>x</sub> from the water and regeneration heaters within the Gas Compressor Station.
- S.88 The assessment identified that the most likely influence throughout the construction phase is associated with construction dust and traffic. The influence of dust generating activities and construction traffic emissions during construction has been considered qualitatively. With the implementation of standard good practice control measures, no significant adverse effects on air quality would arise.
- S.89 Atmospheric dispersion modelling results indicate that contributions from the Stublach Gas Storage Project during operation are unlikely to cause any breach of relevant long-term and short-term NO<sub>2</sub> air quality objectives/limit values. The significance of both long-term and short-term contributions and subsequent impact on ground level concentrations is considered neutral.
- S.90 Contributions to airbourne NO<sub>x</sub> concentrations at sensitive ecological receptors in the study area are considered insignificant and therefore contributions to deposition of NO<sub>x</sub> are also not considered to be of significance.
- S.91 Overall, the assessment has demonstrated that there would be no adverse effects on air quality resulting from the operation of the Stublach Gas Storage Project.

### **Archaeology and cultural heritage**

- S.92 An assessment was undertaken following consultation with appropriate authorities to determine the potential mitigation on archaeology and cultural heritage arising from the project. Data has been collected regarding the known and potential archaeological resource within the site and a 500m buffer from the site perimeter. The assessment identified no known archaeological remains within the application area, with the exception of the findspot

of a Bronze Age palstave (axe) in the western part of the site. The potential for significant unknown archaeological remains to exist within the site has been assessed as low. Three scheduled monuments and 17 Listed Buildings were identified within 500m of the site perimeter. Thirty sites of archaeological interest were recorded in total on the County Historic Environment Record.

- S.93 The development may affect areas of low archaeological potential within the environs of two sites recorded on the Cheshire Historic Environment Record (CHER). It will also cause damage or removal of field boundaries that constitute parish and/or township boundaries of probable pre-19<sup>th</sup> century origin.
- S.94 Impacts from construction within the site upon any potential unknown archaeological remains can be mitigated through the implementation of a programme of archaeological recording, for example as part of a targeted watching brief.
- S.95 Some designated features within 500m of the site boundary may experience indirect, visual effects upon settings. These are assessed as being minor or moderate. No specific mitigation is offered or considered practical or necessary for visual effects, beyond that designed into the landscaping proposals.

### **Management of construction impacts**

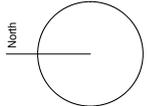
- S.96 The Stublach Gas Storage Project Code of Construction Practice (CoCP) explains how INEOS Enterprises Limited intends to manage the environmental effects of the construction activities of the proposed project.
- S.97 The CoCP sets out the strategy, standards, control measures and monitoring procedures that INEOS Enterprises Limited intend to observe to manage any adverse environmental effects of the construction process, to meet their own commitments to high standards and address the requirements and aspirations of the local authorities.
- S.98 The CoCP defines the specific commitments made by INEOS Enterprises Limited, both for general site management, including working hours, layout and site appearance, and health and safety, and specific environmental topics, including Noise and Vibration, Dust and Air Quality, Protection of Surface and Groundwater Resources, Waste Management, Ecology, Access and Traffic Management, Archaeology and Cultural Heritage, Landscape and Visual

Impact and Land Management. Specific commitments are also included on monitoring of noise and dust during the construction process.

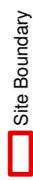
- S.99 The CoCP also defines how these commitments would be implemented through the Contractors' Construction Environmental Management Plans, and how all the stakeholders would be consulted during the construction process, through a robust liaison/consultation strategy.

## Figures

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Legend



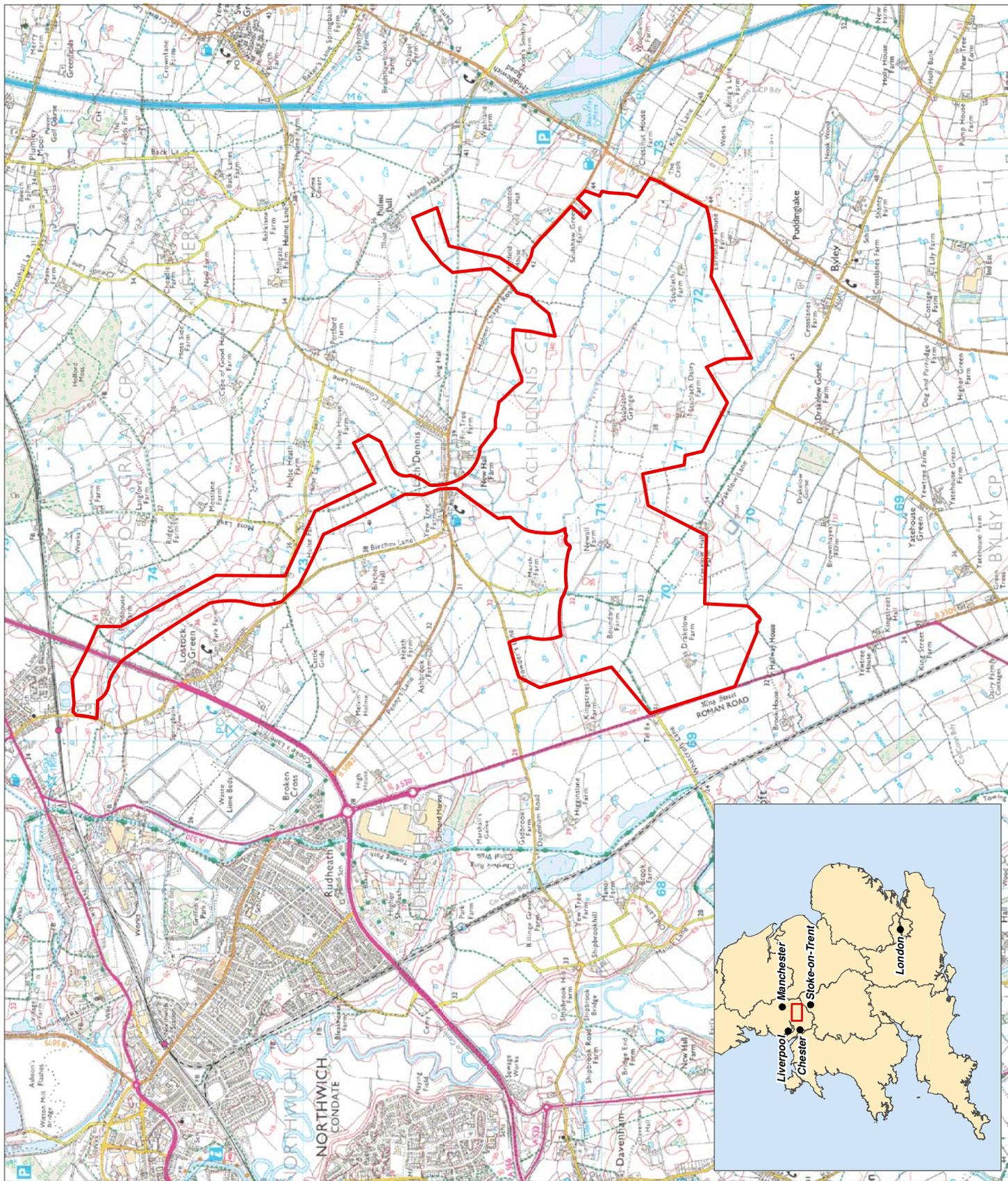
Site Boundary

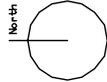
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# SITE LOCATION

## Figure "A"

01:52901\Tech\GIS\52900\01209 AP Site Location Fig A.mxd





**LEGEND**

	NEW SITE ROADS
	NEW UNDERGROUND PIPELINE ROUTES
	WELL-HEAD COMPOUND FENCE
	PLANNING APPLICATION BOUNDARY
	CABLE ROUTE

Scale: 1 : 20000

**GENERAL LAYOUT OF PROPOSED DEVELOPMENT**

Figure: "B"

Drawing No: 05-01-01/HOL/14/010

