

**Application by Keuper Gas Storage Limited (KGSL) for a Development Consent Order for  
Underground Gas Storage Facility at Holford Brinefield**

**Local Impact Report produced by Cheshire West and Chester Council**

**27 April 2016**



## INTRODUCTION

1. Keuper Gas Storage Limited (KGSL) has submitted an application for a Development Consent Order (DCO) for the construction of an underground Gas Storage Facility (GSF) known as the Keuper Gas Storage Project (KGSP). This involves the creation of underground caverns by solution mining of salt with associated above and below ground infrastructure.
2. Under the provisions of the Planning Act 2008 (as amended) (“The Act”) the proposal constitutes a Nationally Significant Infrastructure Project (NSIP) and the application will be determined by the Secretary of State for Energy and Climate Change (SoS) after consideration by the Examining Authority of Inspectors of the Planning Inspectorate (PINS).
3. Local Authorities in whose areas applications for NSIPs are submitted are invited to produce a Local Impact Report (LIR). The Act requires that PINS and the SoS must have regard to the LIR in determining applications for DCOs. The definition of an LIR in the Act is “a report in writing giving details of the likely impact of the proposed development on the authority’s area (or any part of that area)”. This LIR has been produced in line with PINS guidance (Advice Note One: Local Impact Reports).
4. At the time of writing, KGSL has not presented the Council with a draft Statement of Common Ground dealing with matters such as a description of the proposal, site description and surroundings, relevant planning history etc. The Council therefore sets out its position on these matters below before turning to the detail of its position on local impacts.

## THE PROPOSAL

5. The Council understands that the proposal is for an underground GSF which would comprise of 19 storage caverns designed to accommodate approximately 500 standard million cubic metres of natural gas. The total amount of gas stored on the site would be approximately 800,000 tonnes.
6. The caverns are formed through brine solution mining. Boreholes are drilled and pipes are laid through the rock strata located near the surface and into the salt layer below. Water is pumped through the pipes in order to dissolve the salt and the brine solution formed is then pumped away to form the caverns. Natural gas is drawn from the National Transmission System (NTS) during periods of low demand. Following pressure treatment, the gas is piped into the caverns where it is stored to be extracted and returned to the NTS at period of high demand. Individual caverns would measure up to 100 metres in diameter and would be up to 130 metres below the ground.
7. The proposal also consists of “associated infrastructure” required for the operation of the facility. The infrastructure listed below is located within the main site area. The application seeks approval for a maximum extent of deviation for the development. The heights indicated below represent the maximum extent proposed. Details of the preferred extent of the works have also been submitted as part of the application and widths and heights provided represent the preferred (rather than maximum) dimensions indicated.
  - 19 borehole drilling/wellhead compounds. The nature of the compounds would change as the project progresses through the drilling, solution mining and gas storage phases. During the initial drilling phase the compounds would include 35.7 metres high drilling rigs, cement silos, pumps, generators, mud tanks, storage and waste containers and demountable

buildings for site welfare. The rigs and associated infrastructure would be removed during the solution mining phase and the ground area covered by the compounds would be approximately 50 metres by 50 metres. A solution mining wellhead and associated instrumentation and meter housing would then be installed and 2.4 metre high security fencing would be erected around the compound perimeter. The solution mining wellheads and equipment would be replaced with similar gas storage wellheads and equipment during the conversion of the caverns to gas storage.

- A solution mining compound (SMC). The compound would cover an approximate ground area of 75 metres by 280 metres. It would comprise a brine de-gassing tank, a pump house, a switch room and an electrical compound. A brick electricity substation would be situated adjacent to the compound.
- A gas processing plant (GPP). The plant would cover a ground area of approximately 200 metres by 260 metres. The plant comprises various compressors, cooling and heating equipment and condensers housed in buildings which would measure up to 8.05 metres high. A cold vent tower with a height of 20 metres and inlet stacks and drying towers approximately 10 metres high would also form part of the compound. An office, control and maintenance building and an ancillary car park comprising 40 car parking spaces would be situated alongside the plant.
- A compound and connection to the NTS gas pipeline. The compound would measure approximately 55 metres by 45 metres. It would comprise of instrumentation and an equipment kiosk and a 3 metre high security fence would be erected around its perimeter.
- 2 gas marshalling compounds (GMC). Each would contain an underground pipework system with above ground valves and a control cabin. The compounds would be ringed by approximately 3 metre high security fencing.
- A network of buried pipelines and communication cables. The pipes would transport water, brine solution, natural gas and nitrogen between wellhead locations and their associated infrastructure and linking into existing networks beyond the application site boundaries. Other pipelines would carry 'towns' water to and sewage away from the offices and welfare buildings located across the main site.
- An electricity substation and associated underground and overground cabling. The substation would comprise above ground electrical equipment, a control building and an approximately 30 metre high electricity pylon. The total ground area covered by the compound would be approximately 50 metres by 75 metres. Security fencing approximately 3 metres high would be erected around the perimeter of the compound. The electricity infrastructure would involve the diversion of approximately 1,700 metres of existing aboveground electricity cabling.
- An internal site access road network. This would link the wellheads and the infrastructure and would involve the laying down of a new access road from an existing entrance serving the Stublach Gas Storage Facility (SGSF) from King Street (A530).
- 6 temporary construction laydown areas. The laydown areas would comprise demountable buildings for offices and welfare and car parking for up to 260 vehicles.

8. Works are also proposed at the existing Brine Purification Plant in Lostock where a new pumping tank would be installed and an existing redundant pumping station at Whitley would be refurbished and upgraded. A brine outfall would be installed outside the Borough boundaries in Halton.
9. The application also seeks authorisation to carry out works within and modifications to the highway along Drakelow Lane and Yatehouse Lane and to a restricted byway (Rudheath RB7) which crosses the site. The works would involve the laying of pipes and the formation of accesses to the sites internal road network. Associated powers connected with the temporary closing up of the parts of Yatehouse Lane, Drakelow Lane and Rudheath RB7 are also proposed.

## **SITE DESCRIPTION AND SURROUNDINGS**

### Main Site Area

10. The main site area comprises approximately 364 hectares and forms part of the "Holford Brinefield" (HB). The HB is an area of land located in the rural south-east of the Borough and is so-called because of the predominance of the brine solution mining which occurs there. Planning permission is in place for brine solution mining across much of the HB and is operated by a subsidiary company of INEOS.
11. The main site area is in the south of the HB. It is bounded by King Street (A550) to the west and the B5081 to the east. The nearest settlement is Byley and is located just beyond the eastern site boundary. Other nearby settlements are Lach Dennis to the north, Rudheath to the north-west, Bostock Green to the west and Middlewich (in the borough of Cheshire East) to the south.
12. The land within and surrounding the main site area is predominantly farmland laid out in fields separated by hedgerows. The Natural England Agricultural Land Classifications record the land within the main site area as being at Grades 3 or 4. A number of farmsteads are located across the main site area and on the surrounding land. Pipelines, gas monitoring wellheads and other infrastructure associated with the existing gas storage operations operated by E.ON and Storengy, as well as separate brine winning operations operated by INEOS, are also present within or adjacent to the main site area.
13. The topography of the site and its surroundings is broadly flat. Numerous small ponds are scattered across the site and a watercourse called Puddinglake Brook flows broadly east to west through its centre. A small area of woodland called Drakelow Gorse is located near the centre of the site and numerous individual trees are located within the network of field hedgerows that cross the site. Smaller groups of trees are found in some of the fields.
14. The surrounding area is generally sparsely populated. The site bounds small groups of residential properties which form Byley village to the east and the hamlet of Yatehouse Green to the south-west. As well as the farmsteads located within the site, there are further farmsteads and residential properties scattered throughout the surrounding area. The village of Lach Dennis is located approximately 800 metres to the north.
15. Other land uses in the surrounding area include an industrial estate to the south-east on Lily Lane, the Buchan concrete works on Kings Lane to the east and the gas storage facility infrastructure associated with the Holford Gas Storage Project (HGSP) and SGSP operations. The GPP associated with the SGSP operation immediately abuts the main site boundary to the north.

16. Two parcels of land are inset within the main site area boundaries. One contains Drakelow Moat, a medieval earthwork comprising a moated island and a series of fishponds ~~and~~ which is a designated scheduled monument. The other contains the farmstead at Drakelow Gorse Farm and the fields which immediately surround it.
17. Two roads cross the site. Drakelow Lane runs south-east to north-west from the B5081 and Yatehouse Lane runs south-west to north east from King Street. Yatehouse Lane intersects with Drakelow Lane within the main site area to the east of Drakelow Hall Farm. Northwest of its junction with Yatehouse Lane, Drakelow Lane continues to Drakelow Hall Farm and beyond as restricted byway Rudheath RB7. The byway becomes Lach Dennis RB6 north-west of Drakelow Hall Farm before crossing the northern site boundary and turning west to link with King Street as Rudheath RB8. Restricted byway Lach Dennis RB1 intersects with Lach Dennis RB6 just inside the site boundary and tracks north to connect with Crowders Lane.
18. The site is also crossed by a network of private roads which serve the SGSP and the HGSP. Access to the SGSP is from King Street and is located within the main site area.
19. The Whitley Pumping Station is a roughly triangular parcel of land located on the east side of Marsh Lane which (despite its name) is located within the parish of Dutton. The site forms part of the North Cheshire Green Belt. It is bounded to its south by a residential property called Newholme Farm and by agricultural fields to the north and west. A residential property called Marsh Lane Farm is located beyond the fields approximately 250 metres to the north.
20. The site is predominantly hard surfaced and contains a derelict brick building nears its eastern boundary, a valve chamber (which appears as a low level brick structure) and an electricity transformer compound. The site is currently overgrown. Dense vegetation, boundary hedgerows and buildings on Newholme Farm largely screen views into the site from Marsh Lane. The site includes a single vehicular access from Marsh Lane.

#### **RELEVANT PLANNING HISTORY**

21. A complete list of applications relating to the Holford Brinefield is outlined at page 14 of the Project Overview (document ref 8.1) submitted with the application. Relevant aspects of the site history and the history of some of the surrounding land insofar as it relates to underground GSPs and solution mining are expanded upon in the section below.
22. There are a number of existing planning consents dating from 1953 for solution mining of brine and associated waste disposal across much of the countryside lying to the east and southeast of Northwich. These consents were consolidated and amended by 2 Review of Mineral Permissions (ROMP) applications (References 4/32984 and 5/98/0192P). The ROMP consent covers some of the main site area but either does not cover or only partially covers the locations of proposed caverns H504, H507, H510 and H512-H519 which form part of this application. As such, these parts of the main site do not have planning permission for brine extraction.
23. In October 2001 Cheshire County Council (CCC) refused an application for planning permission submitted by Scottish Power UK for the formation through solution brine mining of up to 9 underground caverns for the storage of natural gas and associated infrastructure (refs APP/2001/0471 and 4/APP/2001/471 & 8/3). Planning permission was refused on the grounds that the scale and extent of the proposed development would be inappropriate within the open countryside and the development was contrary to Policy GEN3 of the Cheshire Replacement Structure Plan 2011 and Policy GS6 of the Vale Royal Borough Local Plan First Review 2001.

24. A revised application for 8 caverns was submitted by Scottish Power UK the following year (2002). The application was again refused by CCC. An appeal was lodged thereafter. The Appeal Inspector made his recommendations that the appeal be dismissed following a public inquiry held in November 2002.
25. The appeal was recovered by the relevant Secretary of State (SoS) for determination. Having regard to then current national planning policy guidance, the SoS weighed the impact of the proposed development on the open countryside against ~~against~~ the need for the proposal and concluded that sufficient justification for the proposal had been presented and that there would be only limited harm to the open countryside once proposed landscape mitigation was considered. The appeal was allowed on this basis.
26. The facility (which is referred to herein as “the HGSP”) has since been developed and is currently operated by E.ON from its control centre on the former RAF base east of the site and just north of the village of Byley on the eastern side of the B5081. The wider application site overlaps with the DCO limits with several associated gas monitoring wellhead compounds located within with the main site area of the current proposal.
27. In December 2005 INEOS Enterprises Limited applied for planning permission to CCC to create 28 caverns through solution mining for the storage of natural gas (ref 4/05/2102/FZ5/CCC). Planning permission was granted in November 2006. The planning permission has been partially implemented with solution mining, cavern formation and gas storage monitoring all in process to date. The facility is operated by Storengy (referred to herein as “the SGSF”). This application site also overlaps with the proposed DCO limits and, again, some of the wellhead compounds and associated infrastructure is located within the main site area of the current proposal. The GPP and operational centre is located on a compound adjacent to the northern boundary of the proposed DCO limits. A total of 10 caverns have been formed and are capable of operation with a further 10 proposed to be provided by 2017. No details of the phasing for the construction of the final 8 caverns have been provided.
28. In October 2007 an application for the creation of 10 gas storage caverns through solution mining and associated infrastructure was submitted for consideration to CCC by King Street Energy Ltd. The associated infrastructure proposed included a 58km pipeline from the Mersey Estuary for the supply of water and the disposal of brine (Wirral Metropolitan Borough Council granted planning permission for that part of the pipeline its boundaries). The application site is located north of the DCO limits (immediately adjacent to the land associated with the SGSF) and, unlike SGSP and HGSP, does not overlap it.
29. Planning permission was refused by CCC in December 2008 on the grounds that the proposal would represent the unsustainable use of mineral resources (salt) which was proposed to be treated as a waste product rather than a finite resource that should be put to put to beneficial use, the landscape impacts of the proposed infrastructure and the impact upon green belt arising from a proposed intermediary pumping station on the pipeline route. An appeal was lodged against the decision and heard at an Inquiry in July 2009.
30. The Inspector considered a number of issues in determining the appeal. The need for gas storage was considered to be well-established and significant weight was attached to this consideration. It was acknowledged that the proposal conflicted with regional and local planning policy in respect of its failure to make beneficial use of salt and to minimise production of mineral waste. In light of the limited availability of alternative sites for underground gas storage the Inspector

concluded that the treatment of brine as waste was justifiable in the context of the immediate need for such facilities and the important contribution the proposal would make nationally to gas storage capacity. The need was also deemed to amount to very special circumstances which justified the identified harm to the Green Belt and the impact on the landscape arising from the development could be adequately mitigated. The appeal was subsequently allowed and planning permission granted in September 2009.

31. The King Street planning permission has been implemented through the undertaking of drainage works and the laying out of roads. The development remains uncompleted and is considered likely to remain such as the site is located on the proposed route of HS2.
32. There is no planning history relating to Whitley Pumping Station although the Council's records indicate that the building has been in site for at least 40 years.

### **ASSESSMENT OF IMPACTS**

33. The following paragraphs deal with the Council's assessment of the likely impact of the proposal which would arise within its boundaries. As set out in the Relevant Planning History (above) the Council has local knowledge and experience of the type of development proposed and its constituent parts. The assessment is structured to reflect that of the Environmental Statement (ES) which has been submitted with the application. The assessment is principally concerned with the impact arising from that a part of the proposal on the Holford Brinefield. All the impacts arising from the refurbishment of Whitley Pumping Station are dealt with separately and together under one heading. The proposals at the Lostock Works would have a negligible impact given their scale and siting within the context of the existing plant and, as such, no further comments are made on this element of the proposal.

#### **Land and Surface Water Quality Impacts**

34. Agricultural activities dominate the historic land use of the main site area. Of particular importance in the context of land and surface water quality, is evidence of numerous historic ponds which are no longer present across the main site area and which are assumed to have been infilled with unknown materials. Additionally, at least one animal burial pit linked to the 1967 foot and mouth outbreak is known to exist in the vicinity of Drakelow Hall Farm. The ES advises that the exact location of the burial pit is known within a +/- 50 metres margin of error. Identified historical non-agricultural activities in the main site area include the presence of a wind pump and the use of some of the land for kennels. The applicant has not undertaken site investigation in relation to contaminated land on the assumption that the risk of historic contamination is low. However, for the reasons set out below, the Council believes that it will be necessary to provide for the unexpected encountering of land contamination in the requirements / planning obligation (the approach set out in the model 'land contamination' planning condition will suffice in the Council's view).
35. In addition to those activities identified within the ES, the archaeological reporting identifies a number of historic field names bearing relation to activities associated with brick-making. The Council considers that there may be additional contamination risk which may arise from this historic activity but which has not been specifically considered through the ES.
36. There are numerous activities which could potentially disturb sources and pathways of contamination. Most of the activity is associated with the construction phase (including drilling activities) and includes (but is not limited to) soil and other ground material excavation, traffic

movement and dust creation, disturbance of existing sources of contamination and potential leakage or spillages of motor oils or other industrial liquids arising from the use of plant and machinery. During operation and decommissioning the potential sources of contamination are predicted to be the same, although the risk of contamination is considered to be lower than during the construction phase. With mitigation, the ES concludes that the impacts of the proposal in terms of ground and surface water quality would be negligible. This assessment is on the basis that mitigation is undertaken but the mitigation measures have only been broadly outlined, with a proposal that a detailed scheme is controlled through the requirements of the DCO and via the submission of the Construction Environmental Management Plan.

37. With regards to the burial pits, the Council considers that there is a risk of contamination arising from the disinterment of pathogens. The ES states that the risk of disturbance of animal remains is low on the basis that there would not be significant ground disturbance in the locations of the burial pits. The Council has supervised disinterment of several historic burial pits in recent years and during these exercises it has been noted that the location of burial pits has not always been accurately recorded. The use of a +/- 50 metres criteria may therefore be inadequate and any monitoring exercise based on this assumption may result in the disturbance of remains and the associated risks of contamination taking place. Given the nature of the contaminants involved and given that the baseline soil quality is moderate-high, this could potentially lead to a significant adverse impact unless effective mitigation is required when contamination is encountered.

### **Heritage Impacts**

38. The site contains no nationally-designated heritage assets but it effectively surrounds the Drakelow Moat Scheduled Monument (SM). A number of non-designated heritage assets recorded as part of the Cheshire Historic Environment Record (CHER) are located within the proposed DCO limits and comprise principally of 18<sup>th</sup> and 19<sup>th</sup> century farmhouses. Several more non-designated assets which form part of the CHER are located within a 250 metre around the site. The Roman road which runs along King Street immediately adjacent to the DCO limits is also included within CHER. There are no listed buildings within the DCO limits but a Grade II Listed residential property called Rosebank House is located within the 250m buffer used to assess impact in the ES. Cartographic evidence indicates several historic hedgerows and historic ridges and furrows across the site. Desk based studies have also identified areas of potential archaeological significance across the site.
39. Direct impacts on heritage assets include the removal of 5 sections of historic hedgerow amounting to 270 metres in length. In addition, the construction works associated with the laying out of wellheads and underground pipelines would directly impact upon the remains of ridge and furrow at various locations across the site. Some areas of potential significance would also be directly affected by construction activity.
40. There would be no direct impact on Drakelow Moat SM which, as stated above, would be situated adjacent to but outside of the DCO limits. The setting of the moat would, however, be impacted. Views to and from the moat are largely screened by the network of field hedgerows which limits the extent of the visual setting of the SM. The deviation limits for underground pipelines and cabling and above ground infrastructure associated with wellhead H508 are the closest proposed works to the moat but the scale of these works would render their impact upon the setting of the SM negligible. The hedgerow network would not entirely screen the views from the SM of the tallest chimney stacks which form part of Gas Processing Plant to the west or the gas marshalling compound to the south east but these views would be heavily



filtered by screening. The overall impact upon the setting of the moat is therefore considered to be minor, but will still be required to be mitigated by landscaping.

41. Owing to the separation distances involved and the extent of existing screening the impact of the proposed development upon the setting of Rosebank House is considered to be negligible.
42. The proposal involves the undertaking of an archaeological watching brief relating to the works affecting the areas of ridge and furrow which is considered to be an appropriate approach commensurate with the significance of these assets. The mitigation also proposes further evaluation of those areas of archaeological potential which would be impacted by the proposal to be carried out in advance of the commencement of construction. Again, this is considered to be an appropriate approach.

### **Socio-Economic Impacts**

#### *Loss of Agricultural Land*

43. The majority of the site is used for the purposes of agriculture. Natural England's Agricultural Land Classification scores the site at grades 3 or 4. Best and Most Versatile Agricultural (BMV) land is taken to be that at grade 3a and above. The subdivision of grade 3 land into two subcategories (grades 3a and 3b) refers to a more recent classification the data for which has not been gathered in this area. As such, it cannot be ascertained that the proposal would not result in the loss of an amount of BMV agricultural land.
44. The total permanent loss of grade 3 agricultural land arising from the proposal would amount to 21.6 hectares. There would also be partial, temporary losses of land to the project during the construction phase with land being returned to agricultural use during and following occupation. The total amount of land lost for a temporary period would be 74 hectares. The wellhead compounds have been located primarily at the edges and corners of fields which will help to ensure that farming activities remain practical. No provision is presently made for remediation in the event of brine leakage which can render the affected land unsuitable for farming if left untreated; this needs to be the subject of a requirement / planning obligation.

#### *Employment Opportunities*

45. The total number of employees on the site will fluctuate across the different phases. The total is expected to average 120 across the construction period and peak at 300 during the year 4. The total number of employees would drop to approximately 30 during the operational phase and would rise significantly again during decommissioning. It is not anticipated that the additional employment will lead to any significant demographic change, increased burden on particular local services or facilities or on demand for housing which would otherwise need to be mitigated. Additionally, it is not anticipated that the proposal would have a negative impact on any existing employment opportunities or business operations (notwithstanding the impact on agricultural activity discussed at paragraphs 43-44).

#### *Public Rights of Way*

46. There are three restricted byways within the main assessment area but only one, Rudheath RB7, would be directly impacted by the proposed development. The proposal involves RB7 being crossed by underground pipelines in one location and by overhead power lines in another location.

47. During the construction phase there will likely be a requirement to undertake temporary diversion of RB7. The details of the diversion have not been provided and it is unclear how long a diversion would be required for. Given the nature of the works that have a bearing on this it is not considered likely that the diversion would be in place for a significant period of time and it is not considered that this would give rise to significant adverse impacts.

### **Ecology Impacts**

48. With regards the ecological assets located within the Borough, the proposed development has the potential to impact directly and indirectly upon protected species known to occur in the area, upon Biodiversity Action Plan (BAP) priority habitats as well as impacting upon the Local Wildlife Site (LWS) at Drakelow Gorse. Each of these matters is dealt with separately below.

#### Impact upon Habitat

49. The majority of the site comprises improved grassland with scattered areas of semi-improved grassland and arable. An area of semi-natural broadleaved woodland (Drakelow Gorse) and scattered smaller areas of tall ruderal, plantation broadleaved woodland and scrub as well as an extensive network of field hedgerow with individual trees and small copses are also present. There is a single watercourse (Puddinglake Brook) running through the site and numerous ponds are also present. Arable field margins (hedgerows), ponds and watercourses are identified as priority habitats within the UK Biodiversity Action Plan and as such regard must be had to ensuring adverse impacts are mitigated.
50. Approximately 2000 metres of hedgerow will be lost as a result of the proposal. The loss would be phased across the project and the majority of hedgerow removed would subsequently be replanted. Supplementary planting is also proposed and across the site overall which would lead to a net increase in hedgerow habitat of 461 metres across the site. The applicant has identified those hedgerows defined as 'important' as per the Hedgerows Regulations 1997 and stated that their loss would be minimised. The extent of the loss has not been clearly identified, however, and it is unclear whether replacement hedgerows would be of equivalent value. It is not necessarily the case that a net increase in the amount of hedgerow would equate to no loss of biodiversity value and details of how much important hedgerow will be lost is required in order to undertake a robust assessment of this matter.
51. No ponds would be lost as a result of the proposed development and as such there would be no direct impact upon this habitat.
52. The watercourse would be retained but would be subject to culverting where infrastructure crosses it at 3 separate locations. It is not considered that this would result in significant adverse impacts.
53. Accidental/unexpected brine leakage does have the potential to adversely affect habitat; as above, a requirement needs to be in place that ensures effective mitigation/compensation.

#### Impact upon Protected Species

54. The following protected species have been identified as being potentially impacted by the proposed development. Those labelled (E) benefit from protection European level and those labelled (N) benefit from protection at national level.

- Great Crested Newts (GCNs) (E)
- Bats (E)
- Common Otters (E)
- Badgers (N)
- Breeding Birds (Including Barn Owls which are afforded special status within the relevant regulations) (N)
- Lesser Silver Water Beetle (N)

55. It should be noted that other UK protected species including water vole and reptiles were also subject to survey but no evidence was found of their presence.
56. The Council notes that a 'Letter of No Impediment' has been secured from Natural England in respect of GCN. However, it is not clear that similar consideration has been given to other protected species. The Council would have expected to see a comprehensive Statement of Common Ground with Natural England in this regard.

#### *Great Crested Newts*

57. A total of 29 ponds across the site have been identified as supporting GCN populations with a further pond not surveyed because of a lack of access permission assumed to also support populations. The distribution of those ponds with GCN presence suggests a meta-population structure where individual specimens move between spatially separated populations. A total of 10 populations (3 of medium size and 7 of small size) have been identified on this basis.
58. No ponds would be lost as a result of the proposed development but there would be a permanent loss of terrestrial habitat arising from the laying out of infrastructure. Where underground pipelines are laid down then there would also be a temporary loss of habitat (approximately 1 year) before the associated trenches are infilled. The information provided by the applicant does not make clear the extent of potential severance of migration routes used by GCN across the site and without this information it is not possible to robustly assess the impact the development would have upon the meta-populations.
59. The loss of terrestrial habitat is considered to be limited in the context of the total amount of similar habitat available within the site its vicinity. The potential fragmentation of the meta-populations through the temporary or permanent loss of migration routes would have a more significant impact upon the overall population. Mitigation which relates to specific areas of habitat has not been proposed although general mitigation measures are laid out. These measures include reasonable avoidance measures (RAMs) where work is carried out within 500 metre of a pond supporting GCN, the reinstatement of terrestrial habitat and new planting adjacent to infrastructure and the establishment of hibernacula and refuges.
60. Enhancement by way of the habitat improvement at 36 ponds across the site is also proposed although again specific details of this have not been provided. Full details of mitigation and enhancement have been submitted as part of a draft mitigation licence application to Naturally England (NE). This approach is in line with NE guidance and should the proposals be accepted by NE would enable them to issue a 'Letter of No Impediment' (LONI). The scheme of mitigation has not, however, been submitted as part of the DCO application.

### *Bats*

61. A minimum of 5 bat species have been identified on the site. Roosting potential was found to be present at a significant proportion of the trees which were surveyed and a total of 6 trees were found to sustain active roosts. All of the trees would be retained as part of the current proposals but 5 of these trees are located within 20 metres of proposed infrastructure and therefore the development is considered to have the potential to lead to disturbance of the roosts during both the construction and operational phases of the proposal.
62. The proposal also involves the removal of some of the hedgerows which are frequently used by some of the bat species identified as commuting routes and for foraging. Where hedgerow is lost it would not fragment commuting routes and the overall increase in hedgerow and tree planting would mitigate the loss of existing hedgerow. Only one significant section (approximately 300 metres long) of hedgerow would be lost but this is remote from the nearest roosts.
63. Mitigation measures focus on the planting of replacement hedgerows and trees. The net increase in trees and hedgerows would be significant and is considered that this would represent adequate compensation for the loss of habitat arising from the development.
64. No mitigation measures are put forward in relation to the potential disturbance to roosting bats. None of the roosts identified are classed as 'main' roosts and are thought to be used on a sporadic and opportunistic basis. On this basis, and given the significant number of trees with potential for bat roosting across the site, the ES concludes that the loss of the roosts would not have a significant adverse impact. However, this does not address the potential for disturbance on roosts and habitat which are occupied during the construction period when noisy activity or lighting could potentially result in an offence occurring.

### *Otters*

65. Surveys undertaken along Puddinglake Brook (hereafter referred to as 'the brook') found little suitable habitat capable of supporting otter populations. Some evidence that the brook had previously been used as commuting route was identified through the survey but there was no evidence of regular use by otters. It is proposed that otters may occasionally use the brook to access ponds dotted across the site for seasonal food sources, specifically hatching amphibians during spring.
66. The proposed internal road infrastructure would cross the brook at three separate locations at which points the brook would be culverted. The culverting and the noise associated with general construction activities have the potential to cause disturbance to otters which are present and may lead them to abandon the brook. In addition, the construction infrastructure close to the banks involves the digging of trenches which would have the potential to cause injury or death to otters using the route.
67. Although the risk of otters being present at the brook at any one time is low, the relative scarcity of otters in the vicinity, the nature of the impact and the degree of protection they are afforded by legislation means that without mitigation a moderate adverse impact is predicted. General mitigation measures are proposed and these include restricting construction works on crossings to outside February to June; designing culverting to allow otters access; erecting protective fencing in appropriate locations around areas of retained habitat; securing trenches and

provided access ramps as escape routes overnight; ensuring construction laydown areas are not placed in close proximity to the brook.

### *Badgers*

68. There are two badger setts located within the site referred to hereafter as Sett 1 and Sett 2. Sett 1 is located at the [REDACTED]. On the basis of site investigations the sett was considered to be an outlier sett. Sett 2 is located to the southeast of [REDACTED]. The sett was seen to be occupied during the survey and is considered to be a subsidiary sett. Further evidence of badger activity was noted across the site.
69. Sett 1 will not be directly affected by the proposal and is located approximately 160 metres away from the nearest proposed infrastructure. As such, indirect impacts arising from noise and disturbance are likely to be minimal.
70. Sett 2 is located approximately 30 metres away from a proposed pipeline and owing to its proximity there is a significant risk of disturbance arising from related construction activity. Mitigation measures are limited to the temporary closing of the sett for which a licence is required from Natural England under the Habitat Regulations. The applicant has provided an LONI issued by NE but has not to date submitted the details of the proposed mitigation for consideration as part of the DCO process.
71. Further mitigation is proposed in relation to general badger foraging and commuting activity on the site. This includes erecting protective fencing around exposed trenches and the temporary capping of exposed open pipes.

### *Breeding/Overwintering Birds*

72. A total of 59 species of birds were recorded through survey of which 26 were recorded as breeding or probably breeding on the site, 22 were recorded as possibly breeding on the site and 10 were considered to be not be breeding. Of the species identified a total of 10 are listed as UK BAP priority species, 8 are listed as high conservation concern and 17 are listed as moderate conservation concern. Three of the species – kingfisher, barn owl and peregrine falcon – are listed at Schedule 1 of the Wildlife and Countryside Act 1981 and thus benefitting from special protection relating to disturbance of nests. Of these only barn owls are recorded as breeding on the site and are discussed separately at paragraphs 75-76. Breeding birds tended to be congregated in hedgerows and trees rather than within open fields. The notable exceptions to this were 6 pairs of lapwing which were recorded breeding in an arable field adjacent to the south west edge of the site.
73. Three site walkovers during the winter months identified a total of 46 overwintering bird species. The recorded species include 10 which are listed as being of high conservation concern, including Fieldfare and Redwing which are listed within Schedule 1 of the Wildlife and Countryside Act 1981 and 8 which are listed as UK BAP priority species. A further 10 are listed as being of moderate conservation concern of which 2 are listed as UK BAP priority species. Bird numbers were generally recorded at low levels and any impacts arising from the development would be insignificant. The exception to this was starlings of which large flocks were recorded. Starlings are listed as of high conservation concern and are a UK BAP priority species.
74. Breeding birds on the site tend to nest within hedgerows and trees and the proposal could have direct impact upon these species arising from hedgerow removal. This could be adequately

mitigated by ensuring that where hedgerow removal is proposed this is done outside of the breeding season which runs from March to September. Where there is no alternative to hedgerow removal during bird breeding season then the hedgerow to be removed could be subject to survey to ensure that no breeding birds are disturbed as a result. The proposal involves the replacement and gapping up of a greater length of hedgerow than would be permanently lost and there would be a significant net increase in trees planted which would adequately mitigate any loss of breeding bird habitat.

75. Whilst most of the birds recorded would be adequately safeguarded against significant adverse impact through the precautionary measures outlined above, the lapwing recorded utilise arable and pastoral fields for breeding. The field on which the nests were recorded is situated outside but immediately adjacent to the DCO site limits and, as such, would be undeveloped. The proposal would, however, still result in the permanent loss of breeding habitat owing to normal farm rotation and the impact this has upon local distribution of lapwing. On the basis of the availability of alternative habitat in the vicinity, the loss of habitat is not considered to be significant within the ES and on this basis no specific mitigation has been proposed by the applicant. However, given the high conservation value of the species, the permanent loss of habitat is considered to constitute an adverse impact.
76. No specific mitigation measures are proposed in relation to overwintering birds on the basis that the proposal would result in only limited habitat loss and similar habitat is widely available in the vicinity. General mitigation measures such as replacing habitat which is temporarily lost during the construction period at the earliest possible opportunity. The applicant has stated that noise and disturbance arising from construction and operational activities would be mitigated by current noise sources of nearby roads and agricultural activity. The only major road in the vicinity is located at the far western edge of the site area (King Street). Most of the farming activity on the site is pastoral which is unlikely to generate noise and disturbance comparable with the proposed construction and operational activities. It is considered that noise and disturbance arising from construction activities would likely have an adverse impact upon overwintering birds, particularly in respect of starlings which have been recorded on the site in large numbers.

#### *Barns Owls*

77. There are three barn owl nesting boxes located within the site. At the time of survey one of the boxes was confirmed as being occupied, presumably by a breeding pair. The occupied box is located near the southwestern corner of the site. The ES assumes that the two other two boxes are unoccupied on the basis that there were no signs of use. It is unclear whether a survey was carried out on the boxes. One of the two boxes is located near to the occupied box and the other is located in the north of the site near to Stublach Dairy Farm.
78. The occupied box is located approximately 175 metres away from proposed location of one of the wellhead compounds. At this distance the impact upon the nests from construction activity would be minimal although mitigation is proposed by way of limiting piling activity to during the day. The two presumed unoccupied boxes are located 26 metres and 47 metres away from proposed infrastructure and should they become occupied would be impacted by noise and disturbance arising from associated construction activity. It is proposed that the boxes are closed prior to construction to prevent this from occurring. Notwithstanding the lack of clarity on whether the boxes are indeed unoccupied, surveying of the boxes would clearly need to take place prior to them being closed in order to safeguard against a potential adverse impact.

### Designated Sites

79. The only European-level designated site located within the Borough and within a 10 km radius of the site is the Midland Meres and Mosses Phase 2 Ramsar site part of which is located approximately 9 km to the west at Abbots Moss. The site is designated as a Special Area of Conservation (SAC). The site will not be directly impacted by the proposal and on the basis of the separation distance and the nature of the development it is not considered that there would be any indirect impact on the site arising from the proposal.
80. There are 3 nationally designated Sites of Special Scientific Interest (SSSIs) within a 10km radius at Abbots Moss, Pettypool Brook Valley and Witton Lime Beds. The nearest of these is at Witton Lime Beds approximately 5km to the north. Again there would be no direct impacts on the SSSIs arising from the proposal and the separation distance is sufficient to negate indirect impact.
81. The applicant has identified a total of 6 local wildlife sites (LWSs) within 2 km of the main site area. The nearest of those identified is Boundary Farm Park which is located approximately 100 metres north of the main site area. The nearest proposed infrastructure to the would be the gas processing planting and would be 600 metres away from the LWS which would be sufficient to limit indirect impacts to a level which would not be considered significantly adverse. The applicant has failed to identify the recent designation of Drakelow Gorse as an LSW and subsequently has failed to have regard to the impact of the proposal on this designation. The infrastructure related to the GMC and SMC are located in very close proximity to the edges of the LSW and it is possible that the proposal would result in adverse impacts.
82. The proposed brine discharge outfall is located outside of the Borough but in close proximity to the Mersey Estuary RAMSAR and Special Protection Area and the Mersey Estuary SSSI both of which are partially located within the Borough boundaries. The Council is satisfied that the development would not have a significant adverse impact in respect of these sites.

### **Noise Impacts**

83. Noise is likely to be generated through a number sources associated with the project during the construction and operational phases. The main site area is located in relatively remote part of the Borough but there are scattered residential properties both within and adjacent to the site. A total of 13 noise sensitive receptors (NSRs) have been identified in the ES. Five of the NSRs are within the main site area; the remainder are located in the surrounding area.
84. Robustly assessing the impact of activity on NSRs is problematic because the exact construction and operational plant to be utilised and which will affect the total amount of noise generated has yet to be determined. As such, a worst case scenario approach has been adopted and the applicant has confirmed that final plant and equipment selections will be selected with regard to adherence to the parameters used. Similarly, the ES states that hours of construction have yet to be finalised and a worst case scenario of 07:00-19:00 hours has been selected for the purposes of the assessment as it assumed that most construction would be during daylight hours. The significant exception is the drilling activity required to form the caverns which would take place across a 24 hour period for up to one month per cavern.
85. The assessment of construction impacts of noise within the ES has utilised the relevant standards outlined in British Standard BS 5228 "Code of Practice for Noise and Vibration Control on Construction and Open Sites: Part 1 - Noise, BSI 2009", which assesses significant impacts arising from noise with regards to threshold ratings. It noted, however, that the most recent

version of the standard is British Standard BS5228:2009 + A12014 “Code of Practice for Noise and Vibration Control on Construction and Open Sites: Part 1 – Noise. The Council has referred to the 2009 document in its assessment. For the purposes of the ES, construction noise has been broken down into separate activities of wellhead construction, GPP construction, SMC construction, pipeline construction and borehole drilling.

86. General (non-drilling related) construction noise has been assessed as being significantly above rating levels at NSRs in many cases, most extensively in relation to pipeline construction but also in relation to wellhead construction and the construction of the SMC. The ES predicts that mitigation measures would reduce levels to below the adopted rating criterion in most instances. Exceedance of the adopted rating criterion would remain at Brownhayes Farm and at Stublach Dairy Farm even once mitigation is factored.
87. Drilling related noise has been assessed using the same criteria and at all but one of the NSRs (Brook House) the ES predicts if left unmitigated there would be an exceedance of the rating levels. At 1 of the NSRs (Drakelow Gorse Farm) there would be an exceedance of between +5db and +10db and at 6 of the NSRs there would be an exceedance of +10db (Brownhayes Farm, Drakelow Hall Farm, Stublach Dairy Farm, Yatehouse Green, Farm/Yewtree Farm, Dog and Partridge Farm/Higher Green Farm and Crosslanes Farm). Once mitigated the ES predicts that there would only be exceedance of the rating level (+3db) at Stublach Dairy Farm.
88. The ES assumes a highly significant reduction in noise levels of 11db in relation to drilling activity at NSRs. The detail of how exactly this would be achieved has not been provided and the proposed approach is to design mitigation for each drilling location. Reference is made to screening in the first instance and if necessary the installation of noise insulation at NSRs where there would continue to be an exceedance of rating levels.
89. The ES has not assessed construction noise levels with reference to background noise levels. In relation to general construction activities the table below outlines the predicted impacts and the figure referenced is that for the construction activity for the highest predicted noise level for that NSR.

Daytime Noise Levels – Construction Noise (without drilling) vs Measured Daytime Noise Levels

NSR Name	Background Noise Level dBL <sub>A90</sub> *	Noise Level dBL <sub>Aeq</sub> *	BS5228 Noise Criterion dB L <sub>Aeq</sub>	Predicted Noise Levels	Exceedance of Background Noise Level dBL <sub>A90</sub>		Exceedance of Daytime - Noise Level dBL <sub>Aeq</sub>	
					Un-mitigated	Mitigated (assumed 10dB reduction)	Un-mitigated	Mitigated (assumed 10dB reduction)
1 Newall Farm	34	44	65	68	34	24	24	14
2 Boundary Farm	34	44	65	64	30	20	20	10
3 Drakelow Farm	34	44	65	67	33	23	23	13
4 Halfway House	34	44	65	73	39	29	29	19
5 Brook House	34	44	65	65	32	22	21	11
6 Yewtree House / Kingstreet Hall	34	44	65	64	30	20	20	10
7 Brownhayes Farm	34	44	65	76	42	32	32	22



8 Drakelow Hall Farm	<b>34</b>	44	65	71	37	27	27	17
9 Stublach Dairy Farm	<b>34</b>	44	65	77	43	33	33	23
10 Drakelow Gorse Farm	<b>34</b>	44	65	70	36	26	26	16
11 Yatehouse Green Farm/Yewtree Farm	<b>34</b>	44	65	70	36	26	26	16
12 Dog and Partridge Farm / Higher Green Farm	<b>34</b>	44	65	69	35	25	25	15
13 Crosslanes Farm	<b>34</b>	44	65	70	36	26	26	16

- Daytime LA90 taken from table A2.1 - Long Term Unattended Noise Monitoring Results – Technical Appendices

90. The table demonstrates that during construction there would be very significant increases in both measured background and daytime noise and da levels at NSRs.

91. The table below outlines the predicted increase above background noise levels in relation to drilling-related activity following mitigation (although it is acknowledged that in reality operational noise would also be present).

NSR Name	Background Noise Level dBL <sub>A90</sub>	BS5228 Night –Time Noise Criterion dB L <sub>Aeq</sub>	Predicted Noise Levels		Mitigated Exceedance of Background Noise Level dBL <sub>A90</sub>
			Unmitigated dB L <sub>Aeq,1 hour</sub>	Mitigated dB L <sub>Aeq,1hour</sub>	
1 Newall Farm	<b>36</b>	45	48	37	<b>+1</b>
2 Boundary Farm	<b>36</b>	45	49	38	<b>+2</b>
3 Drakelow Farm	<b>32</b>	45	47	36	<b>+4</b>
4 Halfway House	<b>32</b>	45	47	36	<b>+4</b>
5 Brook House	<b>32</b>	45	41	30	<b>- 2</b>
6 Yewtree House/ Kingstreet Hall	<b>32</b>	45	49	38	
7 Brownhayes Farm	<b>30</b>	45	55	44	<b>+14</b>
8 Drakelow Hall Farm	<b>31</b>	45	56	45	<b>+14</b>
9 Stublach Dairy Farm	<b>35</b>	45	59	48	<b>+13</b>
10 Drakelow Gorse Farm	<b>30</b>	45	54	43	<b>+13</b>
11 Yatehouse Green Farm/Yewtree Farm	<b>30</b>	45	56	45	<b>+15</b>
12 Dog and	<b>30</b>	45	56	45	<b>+15</b>

Partridge Farm / Higher Green Farm						
13 Crosslanes Farm	<b>30</b>	45	55	44	<b>+15</b>	

92. The table demonstrates that even with mitigation there would be increases in background noise levels at 7 of the NSRs as a result of drilling activity alone. The predicted increases at 7 NSRs are of such significance that they indicate noise levels above which complaints are deemed likely when using a BS4142 assessment.
93. For the purposes of the ES, noise generated by operational activities has been assumed to be non-tonal on the basis that plant and machinery will be selected with this as a requisite. The noise rating level within the ES has been selected accordingly.
94. In Tables 9.8 and 9.8 when comparing night-time background noise levels against predicted operational rating levels the reference time period is dB LAeq, 15 minutes (0700-1900), i.e. daytime operational noise; is this because daytime operational noise levels have been used to represent a worst case scenario, could this be confirmed and if not further clarification is needed as to why this reference has been used.
95. When comparing mitigated operational noise, including drilling noise, against existing background noise levels for day and night the table below shows the exceedances at many of the NSRs both day and night are again at such levels that complaints are deemed likely when using a BS4142 assessment.

NSR / Name	Background LA90 daytime	Background LA90 Night-Time	Night-time dB LAeq, 15 minutes (0700-1900)					Exceedance above background (dB)	
			Mitigated GPP	Mitigated SMC	Mitigated Total	Mitigated Drilling	Mitigated Total + Drilling	Daytime	Night-Time
1 Newall Farm	34	36	25	20	26	37	37	3	1
2 Boundary Farm	34	36	27	19	28	38	38	4	2
3 Drakelow Farm	34	32	33	19	33	36	38	4	6
4 Halfway House	34	32	32	19	32	36	38	4	6
5 Brook House	34	32	27	18	27	30	32	-2	0
6 Yewtree House / Kingstreet Hall	34	32	26	22	27	38	38	4	6
7 Brownhayes Farm	34	30	26	35	36	44	45	11	15
8 Drakelow Hall Farm	34	31	29	26	31	45	45	11	14

9 Stublach Dairy Farm	34	35	21	26	27	48	48	14	13
10 Drakelow Gorse Farm	34	30	21	31	32	43	43	9	13
11 Yatehouse Green Farm/Yewtree Farm	34	30	20	25	26	45	45	11	15
12 Dog and Partridge Farm / Higher Green Farm	34	30	11	20	21	45	45	11	15
13 Crosslanes Farm	34	30	16	21	22	44	44	10	14

96. The ES has been carried out on the basis that there is no overlap between the construction and operational phases although the predicted timetable indicates a considerable degree of overlap for these periods. The ES has not predicted the total cumulative impact of the sources likely to be operating at the same time, whether daytime or night-time but, from the tables above, it can be seen that when compared to existing noise levels there would likely be a degree of adverse impact arising from this.

#### **Transport/Highways Impacts**

97. Access to the site would be via an existing access from the A530 (King Street) which is used in connection with the SGSF. The A530 is well linked to the motorway and trunk road network from both the south and the north. Insofar as the highway network within the Borough is concerned, traffic approaching from the south would likely do so directly via the A530 which crosses into the Borough from Cheshire East just north of Middlewich. From the north traffic would reach the A530 approach via the A556 which links directly with the M6 and M56 to the east and with the M56 via the A553 to the west. The good connections between the site and the motorway and trunk road network mean that traffic travelling to and from the site is likely to utilise main roads and avoid routes more sensitive to increased traffic movements (especially HGV movements).

98. No buses operate along King Street and the nearest railway stations are located at Middlewich and Northwich. Access by bicycle would be possible but King Street is not considered to be conducive to access by bicycle. It is not a designated cycle route and is unlit. There is no pedestrian footpath along King Street which would all but negate pedestrian access to the site. The site is poorly served by public transport meaning that construction staff would be almost entirely reliant on private motor vehicles.

99. The construction stage of the development is forecast to last for 7 years. The operational life of the facility would be approximately 25 years with the facility becoming fully operational from year 10. Following the end of the life of the project process of decommissioning would take place. The traffic movements associated with the proposal would vary considerably within and across each of these phases.

100. Traffic movements would peak during the construction period, specifically during the first 4 years of the project when much of the associated infrastructure would be constructed. During this period it is estimated that there would be approximately 150-160 vehicle movements per

day comprising construction staff traffic (Light Goods Vehicles and cars) and Heavy Goods Vehicles (HGVs).

101. Movements of construction staff would account for the majority of the total vehicle movements. The number of staff onsite would peak at 300 during years 1-3 which would equate to approximately 300 vehicle movements into and out of the site per day. Having regard to the likely routing of vehicles described above, this would represent a maximum proportional increase in traffic levels of approximately 2% daily and 4.4% during peaks. Impacts on the highway network arising from this number of vehicles are considered to be negligible.
102. HGV movements would generally peak at 60 daily in and out movements. For short periods this may increase to 80 movements per day. Again, peak numbers of movements would occur between years 1-3 and would reduce significantly across the remainder of the construction period. Having regard to the proposed routing plan, the increase in vehicle movements would amount to a maximum proportionate increase in HGV movements of 7.9% across the day. Again, impacts on the highway network arising from this number of vehicles are considered to be negligible.
103. During the operational period the number of staff working on site would drop to approximately 35 and the site would be staffed on a shift pattern. HGV movements would all but cease during this period. In light of the limited number so movements the impact upon the highway network during the operational period would be negligible.
104. Assessment of the impact upon the highway network during the decommissioning phase is problematic given how far into the future predictions would need to be made. It is expected that the movements would significantly increase above the level experienced during the operational phase and would likely be comparable with the level experienced during construction. An increase above levels experienced during the construction period are still highly likely to be at a level where impact upon the highway network would be negligible assuming patterns of movements within the highway network do not alter significantly during the intervening period. It is not expected, therefore, that there would be a level of vehicle movements associated with decommissioning that would lead to a significant adverse highway impact.
105. Providing requirements / obligations are put in place, the Council is satisfied that adequate mitigation measures will be secured and delivered.

### **Landscape and Visual Impacts**

106. The main site area is not subject to any statutory landscape designations. It forms part of the Shropshire, Cheshire and Staffordshire Plain character area as defined in the Countryside Character Volume 5 (1999) and as East Lowland Plain within the Cheshire Landscape Character Assessment (2008).
107. The construction phase of the proposal would involve the temporary and phased introduction onto the site of drilling rigs measuring approximately 35 metres high. Drilling activity would take place continuously across a 24 hour period and it is assumed that the drilling laydown areas would need to be lit although confirmation of this and the details of any lighting required have not been submitted as part of the proposal. The applicant's indicative programme of construction suggests that drilling will take place across the first 2-8 years of the construction phase but that drilling rigs would only be required during the first 30 days of cavern formation.

On the basis that they do not remain on site after drilling is complete the drilling rigs would be a temporary addition to the landscape.

108. The solution mining compound is integral to the brine extraction process and would be a temporary feature which would need to be in place during the bulk of the construction period which will last approximately 10 years. Other structures proposed during the construction period include temporary (time period unspecified) de-gasser units which would measure up to 10 metres high, ancillary plant and structures required in association with drilling activities, brine wellhead compounds and temporary fencing.
109. Permanent structures proposed include those associated with gas processing and monitoring including the gas processing plant, the gas monitoring compounds, the NTS compound, the gas wellhead compounds (converted from the brine wellhead compounds), electricity pylons, the access road network, fencing and low-level lighting. Most of the infrastructure would be constructed near the start of the project within the first 4 years. As such, there is the potential for both construction phase and operational phase infrastructure to be present on the site at the same time.
110. The applicant has undertaken a Landscape and Visual Impact Assessment (LVIA) using a total of 16 viewpoints adjacent to or within the site as a baseline for the study. Landscape impact has been assessed for both construction and operational phases of the proposal. Broadly speaking the construction impacts are found to represent a more significant impact upon landscape character when compared with operational impacts with likely moderate impacts recorded at 5 of the visual receptors analysed and likely highly significant impacts recorded at the visual receptor at the private access road to Brownhayes Farm located off Yatehouse Lane near the centre of the main site area. With regards operational impacts, moderate significant impacts were also recorded at Brownhayes Farm with no highly significant impacts recorded at any other of the visual receptors.
111. The Council considers that the range of viewpoints selected is sufficient to broadly assess the landscape and visual impacts of the proposed development. There are some particular viewpoints which the Council consider would have been useful to formulate a more robust assessment. Specifically, the GPP will be most clearly visible from King Street to the north of the existing access to the Storengy GSF but this has not been considered as part of the LVIA. This notwithstanding, King Street is a fast, straight road and motorists views of the GPP would be indirect and fleeting. There is no footpath on this section of King Street. The overall sensitivity of the viewpoint to change would, therefore, unlikely be high. In this context, and despite the scale and proximity of the GPP to King Street, the Council considers it unlikely that the proposed development would give rise to significantly adverse impacts in views from this location.
112. The impact upon Brownhayes Farm arises principally from its proximity to the proposed location of wellhead H502 which would be sited approximately 50 metres to the north on the adjacent field. The solution mining compound and gas marshalling compounds would also be visible beyond the northern hedgerow of this especially through gaps created in the hedgerow, required to enable the construction of pipelines and the laying out of an access road, on the northern edge of the adjacent field. Mitigation is proposed by way of screening through the partial replacement of the hedgerow to be removed, the planting of a new hedgerow on the southern edge of the field and around the wellhead compound and the formation of earth bunds (It is not clear whether the bunds are proposed as temporary or permanent features (see discussion at paragraph 114). The proposal would have a significant adverse impact on landscape character in this location. The impact would be particularly pronounced during the

construction phase as some of the mitigation measures would not be implemented at this stage. During the operational phase, with the full range of mitigation measures implemented, the impacts would be significantly reduced. The infrastructure associated with wellhead H502 would remain partially visible above the hedgerow along the southern edge of the field.

113. The LVIA has also considered the visual and landscape impact of the proposal from a number of other viewpoints and concluded that there would be no significant impact arising from the development. In a number of instances there would be a moderate impact arising from the construction phase and in particular from the presence of drilling rigs. The temporary nature of these would mean that impacts would be less than adverse in these instances. In some cases the infrastructure would be visible but it is not considered that there would be significant adverse impacts arising from this owing to the siting and scale of the development and the screening provided by existing and proposed landscape features such as hedgerows and trees.
114. Cumulative impacts arising from the overlap between the construction and operational phases of the development do not appear to have been considered by the applicant. Where there is an overlap between the two phases there is likely to be a more significant landscape impact than is described in the ES in some of the viewpoints which have been assessed. The phasing of the development has not been outlined in sufficient detail to enable a full assessment of the likely cumulative effects to be carried out. It is assumed that any cumulative effects would be for relatively short periods of time before construction infrastructure is removed or relocated. On this basis, while there is the potential for more significant impacts to arise, it is not considered that this would amount to a substantial adverse impact upon landscape character.
115. Except where they connect to the proposed electricity substation, no details of above ground electricity connections, including details of pylons, have been provided as part of the application so it is not possible to fully assess the impact of these as part of the proposal.
116. The submitted landscaping plans identify numerous earthwork bunds which are to be formed from topsoil removed from the ground as part of the development. In some instances these would be temporary with the topsoil eventually being returned to the ground. Permanent bunds are proposed around the wellhead compounds and adjacent to the GPP. No details of the height of the bunds are provided and so it is difficult to assess their visual impact. The bunds do not appear to have been specifically considered through the LVIA (given that the heights of the bunds are unknown) and have not been incorporated into the visualisations. It is considered that the bunds have the potential to be visually intrusive owing to the prevailing topography of the site and its surroundings which is largely flat. As a consequence some of the bunds may lead to the compounds having a more significant impact on landscape character than appears to be the case on the submitted visualisations.
117. Providing requirements / obligations are put in place, the Council is satisfied that adequate mitigation measures will be secured and delivered by virtue of 'schemes to be agreed'.

## **Whitley Pumping Station**

### Transport/Highways Impacts

118. Highway impact would be limited to the construction phase of the development which is projected to last approximately 6 months. The expected peak number of construction workers at the site is expected to be 10 which for the purposes of this assessment has been assumed to equate to 20 vehicle movements to and from the site each day. HGV movements would be

limited to a maximum of 2 per day and there would be no deliveries on most days. It is not considered that this would be significant in the context of existing flows of traffic.

#### Visual and Landscape Impacts

119. Reference is made in the ES to a proposed construction laydown area which it is assumed would make provision for construction worker parking. No details of the siting or layout of the proposed construction laydown area have been submitted with the application and, as such, this matter cannot be fully assessed at present.

#### Noise Impacts

120. The ES has identified two NSRs - Newholme Farm and Marsh Lane Farm - which would potentially be affected by the proposal. The unmitigated noise impact would amount to an approximately +17db above baseline levels which would represent a major adverse impact. Mitigation by way of equipment housing and selection of low noise fans is therefore proposed and is predicted that this would reduce increases above baseline levels to a maximum of +1db. No further detail of the mitigation has been provided and it is therefore not possible for the Council to assess the robustness of the applicant's assessment and to conclude with a high degree of confidence that there would not be a significant adverse impact arising from the development.

#### Ecology impacts

121. The proposed external works amount to the installation of a surge vessel and its associated compound and piping. It is unclear to what extent the existing vegetation which has colonised the site would be cleared and no final landscaping plan of the site has been submitted. As such, the extent to which the proposed works would be screened is also not clear. This notwithstanding, the scale of the works is limited and it is unlikely that they would have a significant impact upon landscape character and visual amenity. The lack of information regarding the proposed construction laydown area prevents a full assessment of the overall impact of the proposal but assuming that this is a temporary feature it is not considered that this would lead to a significant adverse impact.

#### **Cumulative Impacts**

122. The ES identifies three projects which are considered to result in the potential for cumulative impacts namely the King Street GSF, the HS2 high speed railway line and a barn conversion at Drakelow Gorse Farm.
123. The main site area overlaps the SGSF application boundaries but has not been identified as having potential to give rise to cumulative impacts within the ES. The SGSF has only been partially implemented with a total of 10 caverns to be constructed during Phase 1 of the project. Phase 2 would consist of a further 10 caverns and construction is due to commence in 2017. The construction phase would overlap the construction period for KGSP and there is considered to be potential for significant cumulative impacts in relation to noise impacts, landscape impacts and traffic impacts from this. During the operational phase there is considered to be potential for significant cumulative impacts in respect of noise and landscape which will need to be considered in agreeing the various mitigation / compensation 'schemes' to be secured by requirement / planning obligations.