Introduction

Proposed Development Overview

ScottishPower Generation Ltd (SPGL) operates the existing Hatfield Moor underground gas storage facility in South Yorkshire. The Hatfield Moor reservoir and the Lindholme gas processing facility have been in operation since 1999 as a dedicated natural gas storage plant. SPGL is seeking planning permission for development to store natural gas (gas) in the existing Hatfield Moor and Hatfield West gas reservoirs; the drilling of wells and installation of gas pipelines; the continuation of gas extraction; the retention of all existing infrastructure and development of additional infrastructure at and around the Lindholme gas processing facility to provide over 50% additional gas storage capacity.

The Hatfield Moor and Hatfield West reservoirs are naturally occurring porous sandstone gas fields discovered in the early 1980s. These geological formations are located over 300 metres (m) below ground and have been storing naturally occurring gas for millions of years. Between 1986 and 2000, gas from the reservoirs was abstracted and the reservoirs were partially depleted. In 1999, the Hatfield Moor reservoir was converted to store gas from the national transmission system (NTS). An underground pipeline and the Lindholme gas processing facility were built to enable gas to be processed and treated during entry and exit from the reservoir.

Owing to the close proximity of the reservoirs and design of the existing processing plant at Lindholme, the Hatfield West reservoir could be developed with minimal additional plant and disruption to facilitate the dual processing of gas, utilising both reservoirs. A location plan highlighting the proposed Development is shown on page 3, Figure 1.

The Developer

ScottishPower is a leading UK generator of electricity with around 6.8GW of generating capacity and a proven track record in power generation, renewables and grid connection projects that compliment its gas storage operations.

Following the acquisition by Iberdrola in April 2007, and the subsequent acquisition of Energy East group in May 2008, ScottishPower is now part of one of the largest energy companies in the world, with a combined generating capacity of nearly 44GW and supplying almost 27 million customers world-wide.

ScottishPower has been involved in gas storage projects for over 10 years and has considerable experience in this area both as a trader and owner/operator.

Access and use of these storage facilities help ScottishPower to balance out customer demands and gas-fired power station demands, and enables additional gas to be held in reserve for periods of peak demand, such as cold snaps or supply shortages.

ScottishPower has built a strong reputation for being a good neighbour at all its existing operational sites and as a developer of new sites, including Hatfield Moor, and has a good track record of supporting local communities in a variety of ways.
This Document

This document is the Non-Technical Summary of an Environmental Statement (ES) that has been prepared for the proposed combined Hatfield Moor and Hatfield West Gas Storage Facility.

It summarises the findings of an environmental impact assessment (EIA) process undertaken for the proposed Development to meet the requirements of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999.

Copies of the ES and Planning Application can be inspected at:

Doncaster Metropolitan Borough Council offices
Danum House, St Sepulchre Gate
Doncaster DN1 1UB

Hatfield Village Hall
49 Cemetery Road
Hatfield Woodhouse
Doncaster DN7 6LY

Hatfield Library
High Street, Hatfield
Doncaster DN7 6RY

Electronic copies of this document can be found and downloaded for free at the following web address:

http://www.tas-hosting.co.uk/scottishpower

The full ES and supporting documentation can be obtained from:

RSK Environment Ltd
Spring Lodge
172 Chester Road
Helsby
Cheshire
WA6 0AR
Tel: +44 (0)1928 728150
Contact: Katie Barlow
Email: kbarlow@rsk.co.uk
www.rsk.co.uk.

Figure 1: Location plan
2 Requirement for environmental assessment

Town and Country Planning (EIA) Regulations 1999

The proposed Development falls within Schedule 2, Regulation 2(1), of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999, part 3(d) which refers to:

(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 100m of any controlled waters.

For Schedule 2 projects, the developer can opt to submit an ES voluntarily with the application, or the developer can request a screening opinion from the competent authority as to whether an EIA is required.

ScottishPower decided at the outset to undertake an EIA under the Town and Country Planning (EIA) Regulations 1999 to ensure that the proposed development has been fully assessed and where any significant impacts are identified they are mitigated as far as practicable. The process also ensured that all stakeholders and interested parties were fully informed from an early stage.

An ES is being submitted with an application for planning permission under the Town and Country Planning Act 1990 to the Minerals Planning Authority (Doncaster Metropolitan Borough Council).

Planning permission is being sought for development that includes the existing Hatfield Moor reservoir, the Lindholme gas processing facility, related infrastructure and pipelines, the Hatfield West reservoir and nearby land for infrastructure development.

There is a full description of the overall development in Section 4. For the period 2009 to 2024, the ES assesses the impacts of the proposed Development taking into account the existing Hatfield Moor operations as the baseline environment.

After 2024, the ES assesses the impacts of the combined Hatfield Moor and Hatfield West gas storage development assuming a baseline of a restored Hatfield Moor site in 2024.
Need for the development

Background

Over 20 million people in the UK rely on gas for heating and cooking. In addition, over 30% of all electricity generated in the UK is produced using gas. The UK’s use of gas for heating, cooking and production of electricity is likely to increase in future years.

Storage facilities allow gas operators and suppliers to ensure sufficient gas is available to meet most eventualities, such as when gas demand exceeds supply from offshore supplies or when production or transport is interrupted.

Failure to match gas supply with demand could result in residential customers, industrial customers and possibly electricity generators being cut off. Such interruptions and failures in the supply chain can have major safety and commercial implications for the UK.

The UK has been using North Sea and Irish Sea gas for more than 20 years. Early gas fields are nearing exhaustion and the UK became a net importer of gas in 2004, having become increasingly reliant on imported gas from sources such as Russia, Norway, North Africa and the Middle East.

When demand increases, production from offshore supplies can be stepped up, but this process often takes days. In contrast, gas supply from onshore underground storage facilities takes only a few hours. Imported gas supplies from further overseas are less flexible thereby increasing the need for gas storage in the UK.

UK Current Storage Capacity

The UK currently has a storage capacity of around 4.4 billion cubic metres (bcm). The largest storage facility, “Rough” (an offshore depleted reservoir), holds approximately 75% of this capacity. The remaining capacity is made up by other operational storage facilities, including the existing Hatfield Moor facility.

With storage capacity, ‘space’ is not the only consideration, the other key consideration is daily deliverability and the ability for the storage facility to empty and fill (cycle) several times during the year.

Facilities such as salt caverns are considered highly flexible and can cycle a number of times providing a virtual storage capacity greater than the actual physical working gas capacity available. In contrast, reservoir storage facilities such as Rough, Humbly Grove and Hatfield Moor are slightly less flexible on a daily basis but offer vital seasonal gas supplies, when demand exceeds supply.

The underground storage of gas is only possible in a limited number of areas with proven suitable geological structures, ideally in close proximity to the national transmission system (NTS).

Hatfield Moor and Hatfield West are two of only a very limited number of locations with suitable conditions, where natural gas can be safely stored in naturally occurring underground reservoirs and where access to the gas network is readily available.

Given the limited number of sites for gas storage in the UK and in order to provide security of supply in the energy market, it is essential that gas storage facilities such as Hatfield Moor and Hatfield West are developed.

The need for additional gas storage in the UK is strongly supported by the Government and by the industry regulator; the Office for Gas and Electricity Markets (Ofgem). A Ministerial Statement in May 2006, the Government’s 2006 Energy Review and the 2007 Energy White Paper have all specifically highlighted the increasing need for gas storage.
Proposed development

Environmental Setting

The proposed Development is located in the parish of Hatfield within the Metropolitan Borough of Doncaster in South Yorkshire.

The aboveground works associated with the proposed Development will be within the site of the existing Lindholme gas processing facility and an area of 40m x 30m on open land approximately 700m west of the processing facility, where one of the proposed wellheads will be located.

The surrounding area is largely rural and includes a number of scattered farms, rural dwellings, HM Prison Lindholme and a dog training school.

The nearest villages to the proposed aboveground works associated with the Development are the Lindholme estate and Hatfield Woodhouse, which are located approximately 1km and 2km respectively from the works area.

To the immediate east of the existing Lindholme gas processing facility is land designated for nature conservation including Hatfield Moor Special Area of Conservation (SAC), Thorne and Hatfield Moors Special Protection Area (SPA), Hatfield Moors Site of Special Scientific Interest (SSSI) and Humberhead Peatlands National Nature Reserve (NNR).

None of the proposed aboveground works associated with the Development encroach into the area designated for nature interest.

Field History

The Hatfield Moor and Hatfield West gas reservoirs are naturally occurring gas fields located in South Yorkshire. Both reservoirs are located within a fault controlled dip enclosure that forms two culminations (Hatfield West and Hatfield Moor) that make up the Hatfield Anticline.

The principal reservoir structure is Oaks Rock Sandstone and the structural crest of this lies over 300m below ground surface.

BP/Gas Council first identified the structures in the 1960s when searching for potential oil deposits. The Hatfield Moor gas field was discovered in 1981 while targeting potential oil-bearing formations.

Subsequently during the 1980s, further wells were drilled into the Hatfield Moor reservoir and in 1983 a single well was drilled into the Hatfield West reservoir.

Gas production from the reservoirs began in the mid 1980s. Initially, the Hatfield Moor reservoir supplied the Belton Brickworks (around 20km away) via a small gas treatment facility and connecting pipeline. In late 1994, a new gas processing plant was installed to process the Hatfield Moor reservoir gas and feed it into the British Gas local distribution system.

At the same time, gas supply to the Belton Brickworks was sourced from the adjacent Hatfield West reservoir, which continued until June 2000 when the associated pipeline was decommissioned.

In 1998, consent was applied for to convert the Hatfield Moor gas reservoir into a gas storage reservoir and for the installation of associated gas processing plant and pipelines to connect the facility to the National Transmission System (NTS).

The conversion from gas production to gas storage was approved by the (then) Department of Trade and Industry (DTI) as part of a revision to the original gas production licences.

Planning permission was granted by Doncaster Metropolitan Borough Council in January 1999. Gas injection/storage activities began in September 1999 and export operations commenced later that year.

In December 2006, ScottishPower purchased the Hatfield Moor wellhead site and production licences for the reservoirs from EOG.

ScottishPower operates the Hatfield Moor storage facility and Lindholme gas processing plant in addition to holding the rights to the Hatfield West reservoir.

Existing Hatfield Moor Gas Storage Facility

The existing Hatfield Moor gas storage facility comprises three main elements:
The existing Lindholme gas processing facility

Figure 2: Proposed site layout
Hatfield Moor gas storage reservoir and associated surface equipment including the three Hatfield Moor wellheads

Lindholme gas processing facility

Underground gas pipelines connecting the Hatfield Moor wellhead site with the Lindholme site and the Lindholme site with the NTS.

Currently all three wellheads at Hatfield Moors are used for injection, with only two being used for extraction.

In addition, an existing well at Hatfield West is currently suspended and sealed with a pair of retrievable plugs. The well is not operational at this time nor is it expected to be reinstated.

The National Grid local distribution zone (LDZ) equipment and existing pipelines between Hatfield Moor and Hatfield West complete the existing facilities.

Proposed Development Overview

The proposed Development will encompass both the existing Hatfield Moor facilities and the further development including Hatfield West reservoir and will comprise:

- Continued use of the existing Hatfield Moor reservoir for gas storage and extraction
- Retention of all existing infrastructure associated with Hatfield Moor
- Continuation of gas extraction at Hatfield Moor
- Use of the existing depleted Hatfield West gas reservoir for gas storage
- A single appraisal well to be drilled to ascertain the geological formation within the Hatfield West reservoir to enhance the design and planning of the drilling of the main production wells

- Two new Hatfield West production wells (and associated wellhead, wellhead equipment and piping manifolds) as follows:
  - Wellhead HW-02 located approximately 700m to the west of Lindholme gas processing facility
  - Wellhead HW-03 located adjacent to the existing Lindholme gas processing facility

- A new underground gas pipeline (approximately 700m in length) connecting wellhead HW-02 to Lindholme gas processing facility

- Modifications to the existing Lindholme gas processing facility including the addition of a second compressor, a short aboveground pipeline to HW-03, a pigging station, a new pressure letdown skid, new fiscal metering and associated pipe work and cable tie-ins.

- An additional office building within the existing Lindholme gas processing site.

The proposed location of each of the above elements including the existing aboveground development (associated with Hatfield Moor) including the Lindholme gas processing facility, Hatfield Moor well site and the associated gas pipelines are shown in Figure 2, page 7.

The majority of the proposed Hatfield West development will be underground with only a small amount of aboveground works.

Land Requirements

The Lindholme gas processing facility is approximately 200m x 80m (1.6ha). No additional land will be required for the engineering works and modifications required within the Lindholme site.

A temporary area approximately 55m x 65m (excluding a temporary car park for 15 cars) will be required at the HW-02 site. The permanent land required at HW-02 will reduce to 40m x 30m upon completion of the works.

A temporary area of approximately 90m x 50m will be required for a drilling construction compound and laydown adjacent to HW-03 for the purpose of car parking, laydown and office accommodation.
A permanent area of 50m x 80m will be required for HW-03; this will be located at the southern end of Lindholme and form part of the permanent Lindholme compound when completed.

The temporary land required for the gas pipeline will be a working corridor of 40m in width and along the length of the required pipeline (c.700m).

When the gas pipeline has been installed, the ground will be reinstated and returned to agricultural use. Visible markers (c.100mm x 30mm) are likely to be required to be installed to enable the pipeline to be identified on safety grounds.

**Construction Phase**

The project is expected to be constructed in 10 months. Boreholes will be drilled during the construction of the gas pipeline and engineering works at Lindholme.

The construction workforce can be split into three main activities:

- Gas plant infrastructure – Lindholme and gas pipeline
- Drilling works (HW-02 and HW-03)
- ScottishPower site supervision

Where possible, the gas plant and gas pipeline works will be carried out in parallel with the drilling works. A draft construction works programme and activities schedule has been agreed with Natural England.

The estimated permanent site construction team for this work will peak around 30 people. Drilling personnel will also peak at around 30 people for each drilling campaign.

In addition to the above resources for construction, ScottishPower will also have a permanent on-site presence through the construction and commissioning phase.

The site-based personnel will vary from two to six people (depending on construction activities being undertaken at the time). The personnel above would be in addition to the existing operational team.

The maximum personnel expected on site could therefore peak at 73 during construction, including the commissioning team.

**Operational Phase**

The existing Hatfield Moor gas storage facility (including Lindholme) was brought into operation in late 1999 and has an operating envelope of around 733 GWh (25M therms).

The proposed Hatfield West reservoir storage would result in an increase of around 381 GWh (13M therms), bringing the combined operating envelope to around 1114 GWh (38M therms).

The proposed Development will employ twelve people in total including one additional full-time operator and one additional part-time engineering technician when fully operational.

The site is operated 24 hours a day, 365 days a year and an operator is always present at site. The operations team is also supported by specialist contractors for carrying out planned and unplanned maintenance throughout the year.

The site would continue to be manned 24 hours a day and has the ability for remote monitoring. The main interaction the site has is with the ScottishPower gas trading team based in Glasgow.

The gas trading team determines the proposed operating regime of the facility subject to any limitations imposed by the operations team at site or physical constraints imposed by the reservoir conditions.

The site operates under a safety management system in line with all ScottishPower’s operational sites along with compliance with various regulations, including the Environmental Permitting (England and Wales) Regulations 2007 and Borehole Sites and Operations Regulations 1995.

Hatfield Moor has operated safely up to a maximum pressure of 650 psi (44.82 barg) for the past 10 years.

The Oaks Rock initial pressure was detailed and accepted in the EOG Gas Storage submission to the DTI in May 1999 when it was proposed that the maximum allowable reservoir pressure should not exceed this level. Similarly the Hatfield West reservoir would be operated up to its original pressure of 600 psi (41.36 barg).
Environmental impact assessment

EIA Process Overview

The EIA process provides a systematic analysis of the potential impacts of a proposed development in relation to the existing (baseline) environment.

The EIA process ensures that all the potential impacts associated with the design, construction and operation, during normal and abnormal conditions, are identified and assessed. Appropriate mitigation measures are then identified.

The assessment process for the proposed Development has been undertaken in accordance with the Town & Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (EIA Regulations) (as amended).

The process has comprised data gathering, scoping, assessment of impacts (including any indirect, secondary and cumulative impacts), development of mitigation and enhancement measures (where necessary) and identification of residual impacts.

Consultation responses have also been used to inform the EIA process. The EIA has also assessed a range of alternatives to gas storage as well as project-specific alternatives.

Terrestrial Ecology

An ecological impact assessment (EcIA) was undertaken to assess the ecological and nature conservation impacts that may arise from the proposed Development. Baseline information was derived from a desk-top study and field surveys to identify areas and species of nature conservation interest.

Designated Sites

As previously mentioned, a number of statutory designated sites are located adjacent to the existing Lindholme gas processing facility including Hatfield Moor SAC, Thorne and Hatfield Moors SPA, Hatfield Moors SSSI and Humberhead Peatlands NNR.

The proposed aboveground works do not encroach into any of the conservation areas and no direct impacts on designated sites are anticipated.

Seven non-statutory designated Sites of Scientific Interest (SSI, also known as local wildlife sites) are located within 2km of the proposed aboveground works.

No impacts are anticipated on non-statutory sites due to the distance from the proposed works (nearest site approximately 100m from the Old Oil Well Site, a designated SSI).

Habitats

Hedgerows: Breaching or removal of two hedgerows will be required during pipeline construction works. On completion of pipeline construction the breached hedgerows will be replanted using native species of local provenance, similar to that found before removal.

In addition, new hedgerow planting is proposed that will improve the structure of the habitat and provide opportunities for nesting birds.
Scrub: A small area of scrub to the south of the Lindholme gas processing facility will require removal for the proposed construction compound for wellhead HW-03. This is limited to approximately 50m x 20m.

On completion of construction, the scrub will be replanted using a native species of local provenance similar to that found before removal.

Grassland: The proposed pipeline will cross two field edges resulting in limited (working width 40m) temporary loss of grassland at the field boundaries. A small area of grassland will be permanently given up to the proposed wellhead HW-02.

Protected Species
Before construction, a pre-construction walkover survey will be undertaken to highlight any changes in the on-site ecology since the surveys were undertaken and to identify the presence of any protected species that may have moved onto the site.

Bats: As no trees that could potentially support roosting bats are to be affected, no impacts on roosting bats are anticipated. Potential short term minor impacts on foraging bats through the removal of small sections of hedgerow will be limited to one hedgerow bordering the arable fields and one hedgerow bordering the existing Lindholme site to the west.

To mitigate for the loss of a potential foraging route through hedgerow breaches, reinstatement of the hedgerows will be undertaken on completion of pipeline construction.

To improve the area for bats as part of habitat enhancement works, 25 bat boxes will be provided and erected in the surrounding area (subject to landowner and Natural England approval).

Ideally these could be erected in the SAC where suitable trees for bat boxes are present and suitable foraging is available but where natural roosting opportunities are limited.

Winter and Breeding Birds: Potential impacts from drilling and/or pipeline construction activities on wintering birds will be short term and reversible. The impact is assessed as being not significant owing to the abundance of similar foraging habitat in the surrounding locality.

Indirect impacts associated with noise and light disturbance are unlikely to be significant on either the proposed working area or designated sites, as any impacts will be temporary and there is further similar habitat available in the surrounding area.

There are no significant noise impacts associated with the operational phase.

The results of the RSK (2009) and Mott MacDonald breeding bird surveys confirmed that there is a diverse assemblage of breeding birds on and in the vicinity of the proposed aboveground works. This assemblage is typical of farmland/hedgerow habitats and is assessed as being of conservation importance of local value.

Impacts associated with drilling and/or pipeline construction will include nesting habitat loss and loss of foraging habitat. Following agreement with Natural England, limited construction works will be undertaken during the breeding season (May to August inclusive).

The impact on habitat loss is only considered significant at site level in the short-term. There will be a positive impact at the local level following supplementary hedgerow planting.
Nightjars are nocturnal species and are therefore very reliant on song to hold territories and attract mates.

**Nightjars:** Nightjars are known to breed on the adjacent NNR and SPA; this population is assessed as being of national importance. Nightjars are a nocturnal species and are therefore very reliant on song to hold territories and attract mates.

The closest recorded pair is approximately 300m from the proposed aboveground works; however, this nesting site is separated from the works area by a thick wooded shelterbelt and a body of water.

Following agreement with Natural England, no drilling operations at HW-03 or heavy construction works at the Lindholme site will be undertaken during the breeding season. Impacts are only considered significant at the site level and not at the breeding locations.

In addition, no significant negative impact on nightjars through construction lighting is anticipated.

Only limited additional lighting will be required for the operational stages of the Development. This lighting will be directional and shielded from the adjacent designated sites and therefore no significant impacts are anticipated.

Natural England has confirmed that there is no requirement for an Appropriate Assessment for the proposed Development, as no significant impacts are anticipated on the designated features of the SPA or SAC.

**Habitat Enhancement:** Habitat enhancement works will be incorporated into the scheme to mitigate for the breach in the hedgerow and to improve the site and general habitats surrounding the site for breeding and wintering bird species. This work will include:

- Re-instatement of the hedgerow breach with species similar to those removed
- Supplementary planting along the track bordering the hedgerow resulting in a double hedge along the length of the track
- Planting of a single hedge along one side of the track bordering the proposed wellhead HW-02. This will increase the amount of available hedgerow nesting and foraging habitat as well as constituting a landscape screen. This hedge will consist in the most part hawthorn (75%) and blackthorn (10%), with the remaining 15% being made up of mixed hedgerow plant species.

The existing Hatfield Moor gas storage facility has an existing Biodiversity Action Plan (BAP) that has been in place since 2005. The BAP will be amended to account for the proposed construction activities and the ongoing operation of the combined Hatfield Moor and Hatfield West facility.

The proposed habitat enhancement works, including bat boxes and new hedgerow planting, will be incorporated into the BAP.

**Land Use and Agriculture**

Land near the proposed aboveground works was utilised as an RAF station from the late 1930s. Land used for the airbase runways was restored for agricultural purposes from the early 1970s, and in 1985 a portion of the site was redeveloped as the HM Prison Lindholme.

The current land use in the vicinity of the footprint of the proposed aboveground works comprises land used for agricultural purposes (arable farming), together with the existing Lindholme gas processing facility site.
To the east of the existing Lindholme facility, the land is designated for its nature conservation interest, described earlier.

The proposed aboveground works comprise land to the south of the existing Lindholme facility that will accommodate wellhead HW-03 and additional equipment to supplement the existing Lindholme facility. This area of land is already designated for future development and comprises unused scrubland.

The proposed pipeline route and wellhead HW-02 are located within land currently used for agricultural purposes, with the pipeline crossing an existing farm track.

Impacts of the proposed Development upon land use and agriculture will be restricted to the footprint of the aboveground works; the underground gas storage reservoirs cause no such impact. Impacts will be limited to the temporary loss of approximately 3.61ha and the permanent loss of approximately 0.12ha of land currently farmed as arable land.

In terms of the continued operation of the Hatfield Moor and Hatfield West gas storage facility after 2024, impacts will be limited to the permanent loss of approximately 1.72ha of land, which could otherwise potentially be farmed.

Impacts on agricultural operations are not expected to be significant.

A key part of the process of minimising agricultural disruption during construction will involve liaison between ScottishPower and the affected landowner/tenant farmer throughout the design and construction phases. This will ensure that agricultural requirements during construction are agreed, such as maintaining access for farm machinery. In particular, the landowners/occupiers will be consulted regarding field land drainage matters. Field drainage will be reinstated to avoid the creation of wet areas and to ensure the soil structure and fertility is restored.

Any fences, sections of hedgerows, ditches and culverts that are removed or disturbed during pipeline construction will be fully reinstated as soon as possible after construction in consultation with the landowners/occupiers.

**Noise and Vibration**

An assessment of potential noise and vibration impacts during the construction and operational phases of the proposed Development has been undertaken in accordance with BS 5228 and BS 4142 assessment methodologies. The assessment addresses noise from plant and machinery, drilling operations, construction traffic and construction vibration.

The site is located in a semi-rural area. A number of noise sensitive receptors are in the vicinity of the proposed pipeline and site works located to the north, west and south.

In addition, the Hatfield Moors SAC/SPA/SSSI was also included as an ecological noise sensitive location. Daytime noise sources at the time of the baseline noise survey were noted to be birdsong, foliage, farm vehicles, occasional low-flying military aircraft, dogs barking and farm animals.

In the evening, local traffic, birds and birdsong were the major sources of noise. Local traffic on the busy A614 is deemed the dominant source of noise. Further away, road traffic noise from the M180 and the A1(M) also contribute to the prevailing noise climate.

Drilling of the wells will be short-term but continuous for 24 hours per day and will last for up to 40 days per well. The assessment indicates that noise from drilling during both the day-time and night-time will not be significant at any of the residential receptors.

During the construction of the pipeline, wellheads and additional plant at Lindholme, noise from construction equipment will not be dissimilar to noise from agricultural machinery. Standard mitigation measures will be implemented to minimise noise as far as possible.
To minimise impacts on breeding birds and specifically nightjar, no drilling operations at HW-03 or heavy construction works at the Lindholme site will be undertaken during the breeding bird season.

There will be no significant increase of background noise during the operational phase of the proposed Development.

Archaeology and Cultural Heritage

An assessment of features of interest relating to archaeology and cultural heritage has been undertaken to identify and evaluate the potential implications on the known and potential archaeological resource and built heritage associated with the proposed Development. As requested, through consultation with South Yorkshire Archaeology Service (SYAS), a geophysical survey was undertaken as part of the assessment.

The archaeology and cultural heritage assessment has highlighted two known archaeological sites within 2km of the proposed Development.

These sites are within the Lindholme-Hatfield Airbase where Iron Age/Roman field boundaries and fragmented double ditched trackways may exist.

The importance of both sites is low, being of local significance and the impact is minor since groundworks of the proposed Development will only partially affect the known heritage resources. The significance of the direct impact from the proposed Development is therefore none/slight.

A programme of trial trenching has been agreed with the County Archaeologist which will be targeted to sites identified by the desk-based assessment, field reconnaissance, aerial photograph analysis and geophysical survey.

It is proposed that as a mitigation measure for any unknown potential archaeological sites, construction works will be subject to an archaeological watching brief. This will include monitoring of topsoil stripping with respect to the pipeline.

Fieldwork will be in accordance with an approved written scheme of investigation to be developed in full consultation with SYAS.
Landscape and Visual

A landscape and visual assessment was undertaken for the proposed Development comprising information review and liaison with key consultees, fieldwork observations and photography and computer-based data processing and analysis.

The landscape and visual assessment has concluded that the proposed aboveground works will not give rise to any significant residual landscape and visual effects and will, in effect, provide some positive and beneficial effects owing to the enhancement of existing field boundaries and the provision of new hedgerow habitats and valuable landscape features.

There are no landscape designations on the proposed site of aboveground works. However, Hatfield Moors, located immediately to the east of the proposed aboveground works, has been highlighted as a potential area to be designated as an Area of Special Landscape Value.

Very few sensitive receptors are in proximity to the proposed development. From the majority of locations views of the existing Lindholme facility and the proposed aboveground works are screened effectively by adjacent and intervening vegetation.

Similarly from further afield, because of the flat to gently undulating nature of the topography and the filtering and screening effects of intervening mature hedgerow vegetation, hedgerow trees, woodland belts and coniferous hedges, views of the existing Lindholme facility and the proposed aboveground works are very limited.

Several mitigation measures will be implemented to minimise landscape and visual impacts. This will include new hedgerow planting along existing field tracks to the east, north and west of wellhead HW-02 and infill planting to those hedgerows directly affected by the pipeline construction works.

Additional planting in the form of locally prominent species such as hawthorn, blackthorn and rosa spp. will be used to augment the existing screening properties of the hedgerow vegetation in the fields surrounding the site and will serve to maintain and enhance the existing landscape character.

Surface Water and Flood Risk

An assessment of the proposed Development on surface water resources, drainage and flood risk has been undertaken and includes a flood risk assessment prepared in accordance with PPS25 and Flood Risk and the Interim Code of Practice for Sustainable Drainage.

Several mitigation measures will be implemented to reduce the potential impact of the proposed aboveground works on the water environment. These include the control and attenuation of rainfall run-off from the site during storm events.

These proposals will also add increased ecological variety and the opportunity to
enhance the wildlife habitat around the site. Impacts resulting from spillages of oils and operational compounds will be minimised by appropriate site management procedures.

In terms of flood risk, the main impacts would be to the plant itself and not the surrounding environment. Flood susceptible equipment will be raised where possible and site management procedures will be reviewed for shutting down ‘at risk’ plant following flood warnings.

**Soils, Geology and Hydrogeology**

An assessment of potential impacts of the proposed aboveground works on soils, shallow geology and hydrogeology has been undertaken as part of the EIA.

A range of mitigation measures will be implemented to ensure that potential impacts to soils, geology and hydrogeology during both construction and operation of the proposed Development are minimised. These will include control of run-off, controls on discharge of effluent, provision of refuelling areas for plant, appropriate land capacity for fuels stored on site and spill control and mitigation procedures.

**Air Quality**

An assessment of the potential impacts of the construction, commissioning and operation of the Development on the surrounding air quality and climate has been undertaken as part of the EIA.

The principal consideration for air quality from the proposed Development is nitrogen oxide (NO$_x$) and in particular nitrogen dioxide (NO$_2$). A secondary, less significant consideration is carbon monoxide (CO). Emissions of CO, while potentially being comparable in quantity to that of NO$_2$, are much less significant in the context of the air quality standards (the limit concentration value for CO being many times greater than that of NO$_2$).

Atmospheric dispersion modelling has been undertaken for NO$_2$ and CO to predict ground level concentrations as a result of the proposed Development. No exceedance of any of the air quality objectives designed to protect human health have been predicted against UK ambient air quality standards/objectives.

An assessment of predicted nitrogen deposition for nearby designated conservation sites was also undertaken. No critical nitrogen deposition load is predicted to be exceeded at any site designated for its ecological importance.

Acid deposition represents the mix of air pollutants that together lead to the acidification of soils and freshwaters. No critical acid deposition load is predicted to be exceeded at any site designated for its ecological importance.

Air quality impacts resulting from the additional road traffic generated during the operational phase of the proposed Development have been quantified using ADMS-Roads.

The assessment identified that none of the air quality objectives protective of human health are likely to be exceeded and the incremental increase in key pollutant concentrations during construction and operational phases of the proposed Development will be insignificant.

**Socio-economics**

A socio-economic assessment has been undertaken as part of the EIA to assess the indicators of economic activity, employment/unemployment and recreation.

Recreational facilities near the proposed Development include several playing fields located to the south of the site in the village of Lindholme. Humberhead Peatlands National Nature Reserve is located immediately east of the existing Lindholme gas processing facility.

The nature reserve has a network of waymarked walks and a number of viewing...
platforms and hides occur within the reserve. The Peatlands Way, a 50-mile circular walk, passes through the reserve. The reserve offers a regular programme of guided walks, events and open days.

Two of the footpaths in the reserve (the Peatlands Way and the Red Bridge Trail) run parallel and adjacent to the eastern boundary of the Lindholme facility.

Woodhouse Grange Fisheries, located northwest of Lindholme, comprises six fishing lakes. Similarly, Tyram Fisheries, located south of Lindholme, comprises a number of fishing lakes catering to all standards of fishing.

The agricultural land to be affected during the construction of wellhead HW-02 and the associated pipeline is owned by Her Majesty’s Principal Secretary of State for the Home Department and farmed under contract by the Society of Ploughmen Limited.

There is a licence between these two parties, granting the Society of Ploughmen rights to hold ploughing matches and training events on the land.

The construction of wellhead HW-02 and the associated pipeline may cause temporary disruption to ploughing matches and/or training events during the period of construction. However, it is expected that disruption to ploughing matches and/or training events will not be significant. A key part of the process of minimising disruption will be liaison between ScottishPower, the landowner and the Society.

The proposed aboveground works do not directly affect any public rights of way, although a number of footpaths in the Humber Peatlands National Nature Reserve are in close proximity to the existing Lindholme site.

None of these footpaths will have to be closed or diverted as a result of the proposed aboveground works. All walks and rights of way are therefore unaffected by the Development.

It is expected that the construction phase of the proposed Hatfield West Development will employ an average of 37 people per month over the 10-month construction period. This is expected to have a direct temporary positive effect on the local economy in terms of the temporary creation of jobs and the use of local services and facilities by construction workers.

The short-term presence of temporary workers at the site is unlikely to necessitate the expansion of existing local retail outlets; however, it may provide increased local trading over the construction period.

In addition to the use of local services and facilities, there is the potential for indirect economic benefits to occur through the purchase/sourcing of supplies/materials in the wider area and the employment of local contractors where possible.

During operation the proposed Hatfield West Development may require up to 2 additional staff to support the new facilities in addition to the 10 staff already employed at the Lindholme site. The proposed Hatfield West Development will therefore have a minor beneficial impact on local employment levels and the local economy during operation.

Traffic and Transport

The EIA included an assessment of the predicted transport and traffic impacts of the proposed Development during the construction and operational phases.

As a result of the construction of the proposed Development, there will be a small predicted increase in traffic using the existing network of around 3 additional vehicles on the M180 West (both eastbound and westbound) during the morning peak hour flow.

The small increase in traffic is less than the Highways Agency assessment criteria, which states that a significant impact is created by 30 additional two-way trips on the strategic highway network. As a result, the overall impact
of the construction of the proposed Development on traffic is not considered significant.

The full-time operation of the proposed Development will result in a small increase in traffic using the existing network, due to an additional one or two employees. However, this is anticipated to yield a negligible impact on the local road network.

Health and Safety

The storage of gas in underground depleted reservoirs is a well-proven and tested method of gas storage throughout the UK and worldwide. Doncaster Metropolitan Borough Council granted planning permission for the existing Hatfield Moor and Lindholme gas processing facility in January 1999 and the facility has now been successfully in operation for many years.

The ES addresses health and safety issues at the existing Hatfield Moor gas processing facility and outlines how health and safety issues will be considered for the combined Hatfield Moor and Hatfield West Development.

Extensive seismic surveying work was carried out during the 1980s to establish the structural forms of the Hatfield Moor and Hatfield West reservoirs.

Prior to ScottishPower acquiring the site in 2006 from Edinburgh Oil and Gas, RPS Energy was commissioned to undertake due diligence of the gas reservoir data of both Hatfield Moor and Hatfield West. RPS Energy derived the current storage boundaries using well-proven industry-standard mathematical modelling software.

A wide range of health and safety legislative requirements cover operation of the existing Hatfield Moor facility. There have been no major safety incidents on site that have necessitated the facility to be shutdown since operations began in 1999.

There have been no significant gas leaks, no fires and no requirement to instigate off-site emergency procedures.

The safety of the proposed Development takes into account the lessons learned from previous accidents and incidents on gas storage fields globally. The key safety learning points from these incidents are incorporated into the design, management, maintenance and operation of the facility in order to ensure safety can be further enhanced.

A range of regulations and standards related to safety will apply to the design, construction and operation of the proposed Development and compliance with such regulations is compulsory.

The Control of Major Accident Hazard (COMAH) Regulations (as amended) 1999 are the primary means by which the Health & Safety Executive (HSE) will control and monitor the ongoing safety of the Development.

COMAH requires the submission of a very detailed safety report demonstrating how safety is achieved in all aspects of design, operation and maintenance including the management of safety. HSE carry out regular visits to ensure that the safety reports accurately reflect the situation on the site.

Discussions have been held with representatives of the HSE to determine the key health and safety issues and the approach that is required to be taken to demonstrate that health and safety considerations have been fully taken into account in the design of the plant and that the relevant safety criteria will be met.

Guidance received from the HSE is being incorporated into the current proposals.

Environmental Management

The existing Hatfield Moor gas storage facility has an environmental management system (EMS) in place to ensure that all operations and activities at the facilities are assessed from an environmental point of view.

The environment is suitably protected before, during and after construction by ensuring that legislative and regulatory requirements are met.
The existing Hatfield Moors EMS will be updated to incorporate measures to protect the environment during construction and to reflect the interfaces with the operation of Hatfield West.

From the outset, the project has been designed to limit its environmental impact as far as possible and all contractors associated with the project will be expected to conduct their activities in such a way that any impact on the environment during construction is minimised.

In order to ensure that appropriate environmental management standards are maintained during construction, ScottishPower and its construction contractors will develop a Construction Environmental Management Plan (CEMP) for the project.

The CEMP will ensure that the environment is suitably protected before, during and after construction by ensuring that legislative and regulatory requirements are met.

The existing Hatfield Moors EMS, including the Environment Plan and associated procedures will be updated to reflect the interfaces with the operation of Hatfield West.

Ongoing Community Consultation

As part of the EIA, public information days were held during November 2008 and May 2009 as follows:

- **Friday 28 November 2008** – Lindholme Prison Learning Centre (12 p.m. to 7 p.m.)
- **Saturday 29 November 2008** – Hatfield Woodhouse Village Hall (10 a.m. to 4 p.m.)
- **Friday 8 May 2009** – Hatfield Woodhouse Village Hall (12 p.m. to 7 p.m.)
- **Saturday 9 May 2009** – Hatfield Woodhouse Village Hall (10 a.m. to 4 p.m.)

The information days provided an opportunity for local residents to view exhibition boards presenting background information on the Development and to talk with members of the project team.

Feedback sheets were made available at the information days to collate public comments. Comments received during the public information days have been used to inform the EIA process.

During the detailed design and construction phases of the proposed development ScottishPower will ensure that communication and consultation with all parties potentially affected by the development is maintained.