

PIPELINE CONSTRUCTION





Project Overview

The Hunter Gas Pipeline Pty Ltd (HGP) is a wholly owned subsidiary of Santos. The underground pipeline route passes close to the Narrabri Gas Project and Santos is working with infrastructure developers and owners to construct the pipeline and deliver much-needed gas to east coast domestic markets in the shortest timeframe possible. The underground pipeline connected to the locally produced gas, will provide the cheapest gas available for NSW families and businesses.

Santos continue to engage with directly affected landholders, local councils and state government agencies to obtain feedback and finalise the current pipeline alignment within the 200m approved corridor.

Once engineering design is completed and all approvals granted, the construction of the Hunter Gas Pipeline – Stage 1 Narrabri to Hexham will be undertaken within the final approved corridor, commonly referred to as a Right of Way (ROW).



Pipeline Design

Australia has a strong history of safe pipeline operation with over 42,000km of natural gas pipelines in operation across the country. To ensure the safety of landowners and the community, all gas transmission pipelines in Australia are designed, constructed, operated and maintained in strict accordance with the Australian Standard AS2885. This standard exists to ensure protection of the pipeline, which in turn ensures the safety of the community, protection of the environment and security of gas supply to users.

High pressure gas pipelines are frequently located in urban areas within close proximity to houses whilst still maintaining compliance with Australian standards and ensuring safe operation. Santos will design the pipeline in compliance with Australian standards and will maximise distances to residences within the approved 200m corridor where possible.



Pipeline Depth

In line with Australian standards, the pipeline will be buried for its entire length, typically to a depth of 900mm or greater, and therefore it will not be visible once constructed. Santos will design the pipeline to Australian Standards accommodates all reasonably foreseeable circumstances, including loads associated with farm machinery. Where landholders indicate that they need to traverse the easement with heavy machinery on a regular basis, we will ensure that the design of the pipeline is appropriate to accommodate the additional loads. This may involve additional burial depth, thicker walled pipe sections and/or dedicated heavy vehicle crossing points.

We are confident that we can accommodate all reasonable requirements for a full range of farm machinery and vehicles without impacting on a landholder's day-to-day operations. Additionally, normal agricultural production (including cropping) can recommence within the easement following construction.



Pipeline Construction

The pipeline is constructed to meet Australian standards using high strength steel which is coated with a fusion bonded epoxy, anti-corrosion coating, with a nominal 20 inch or 508mm diameter. A combination of open cut trenching, micro tunnelling, thrust boring and horizontal directional drilling methods will be used to cross watercourses, major road crossings and rail lines as required.



Construction Considerations

Santos will design the pipeline to meet Australian standards with consideration of the potential for pipeline buoyancy, erosion, stream migration and other events that could pose a risk to the pipeline over time. These risks will be addressed through a range of measures including careful selection of watercourse crossing locations, additional depth of cover, concrete coating of the pipeline and anchoring devices to ensure that the pipe is negatively buoyant. We will design the pipeline to protect the water supply in all communities along the pipeline route.



Above Ground Infrastructure

The pipeline will be built underground, however there will be a small number of surface facilities required along the pipeline, including:

- **Main line valves** at approximately 75km to 100km spacing located within small fenced compounds,
- **Offtake points** (including valves) will be provided at locations nominated by councils to support future natural gas supply opportunities within the Local Government Areas,
- **Scraper stations** at either end of the pipeline and at one or two intermediate locations,
- **Cathodic protection stations**, consisting of buried anode beds, adjacent to the pipeline which will form a key part of the corrosion management system.

These surface facilities will be co-located where possible.

In the early stages of construction, fences crossing the easement will be replaced with temporary construction gates to enable the pipeline construction process. We will work closely with landholders

to put in place suitable temporary arrangements to manage access and stock movement during construction. Following construction, fences will be reinstated to the former condition and to the satisfaction of the landowner.

Once a pipeline has been constructed to Australian standards, regulations dictate that identifiable markers or signage must be installed. These markers are designed to provide a visual warning regarding the location of the pipeline and are installed along the entire length of the easement.



Insurance

To ensure the safety of landowners and the community, all gas transmission pipelines in Australia are designed, constructed, operated and maintained in strict accordance with the Australian Standard AS2885.

Santos' proposed easement terms will include indemnification in the unlikely event of loss suffered or incurred by the landowner resulting from any damage to property or injury to or death of any person caused or contributed to by Santos or its Authorised Users.



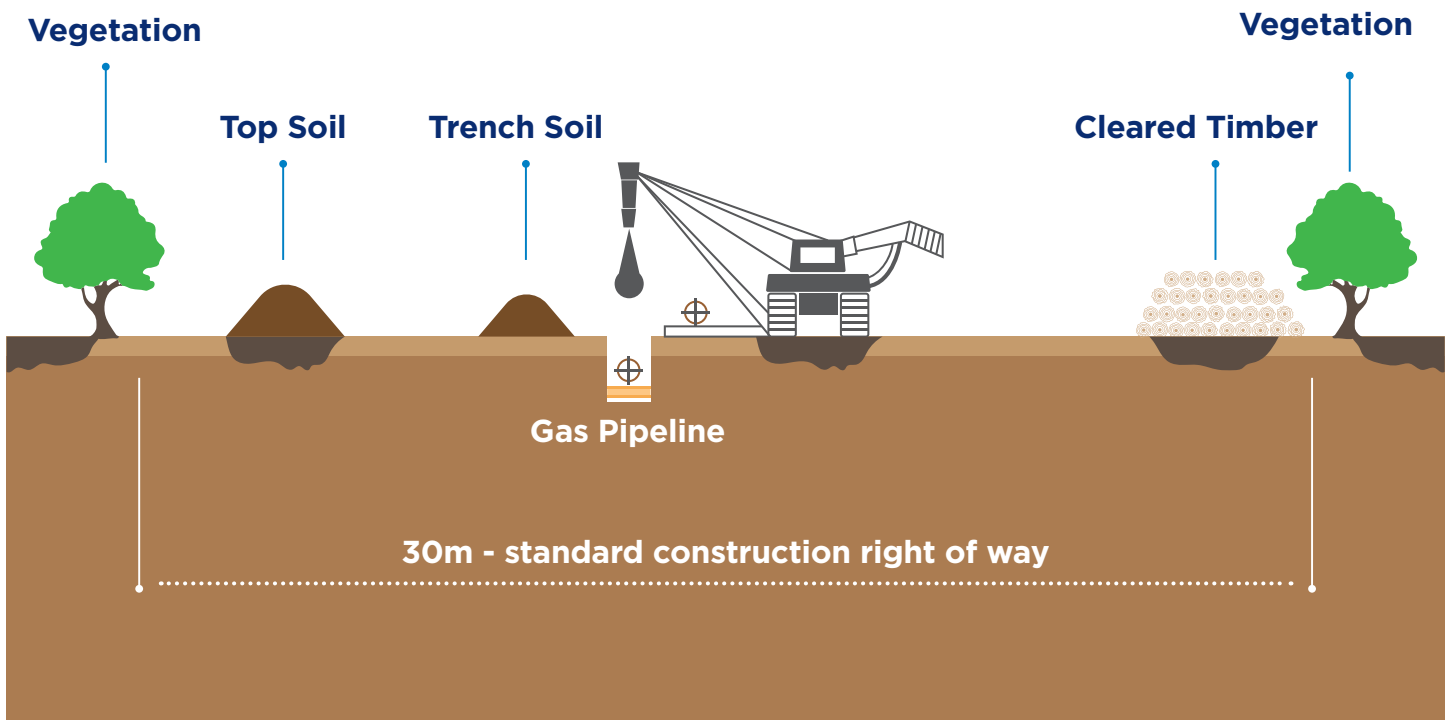
Biosecurity

Santos is committed to protecting the environment, land, and land use wherever Santos operates. Santos has a broad and deep knowledge of working with high valued and complex agribusiness, including Australian Certified Organic Standard properties.

Santos works with landholders to implement all practicable measures to prevent the introduction and spread of weeds, pest animals, and animal and plant diseases to minimise the risk of a biosecurity impact to a landholder's property.

The Hunter Gas Pipeline Biosecurity Protocol for the survey activity is available on the HGP website. Prior to construction commencement, this Protocol will be updated to address construction activity and will be made publicly available on the HGP website. Santos will engage with landholders to address specific biosecurity requirements on a case-by-case basis.

Typical pipeline construction footprint



Construction Process



1. Site surveys

Early site survey work is well progressed along the alignment. Survey activities include:

- Ecology surveys – flora, fauna, and aquatic ecology
- Soils and geology investigations
- Cultural heritage surveys
- Cadastral surveys
- Geotechnical surveys.



2. Landholder engagement and access

Santos is meeting with affected landholders to discuss and agree access to their properties during pipeline construction and ongoing operation. This detail is captured in the Farm Management Plan specific to each property.



3. ROW preparation - survey and fencing

The pipeline route is surveyed and fencing modified to facilitate access during construction and to ensure construction is limited to the agreed disturbance area.



4. Clear and grade

Graders, bulldozers and excavators are used to clear and prepare the easement for construction to commence. Top-soil and vegetation are stockpiled separately to assist in rehabilitation after the pipeline construction is complete. Environmental controls such as berms and contour banks will be installed.



5. Stringing

Pipes are transported to the easement using approved access routes and are laid alongside where the trench will be constructed.



6. Bending

Where required, specialised machinery is used to bend the pipe to match the topography and pipeline route.



7. Welding and non-destructive testing

Pipe sections are welded together by certified welders and tested to ensure quality.



8. Joint coating

The areas of weld are cleaned and pipe joints are coated to reduce the potential for corrosion.



9. Trenching

The trench will be excavated using specialised trenching machines and excavators, with the soil stockpiled for backfilling.



10. Lowering in pipe

Specialist equipment called side booms are used to lower the pipe into the trench. The pipe is then covered by fine grain material to protect the pipeline coating from damage during backfill.



11. Backfilling

The trench is backfilled with the excavated subsoil material. Care is taken to maintain separation between topsoil from subsoil during this process. The subsoils are compacted to limit settlement of the trench through the operational life of the pipeline. Any excess soil will not be removed from site unless previously agreed with landholder.



12. Hydrostatic testing

The entire pipeline is pressure tested using water to ensure it is fit for operation.



13. Restoration and signage

Once construction is complete areas are reinstated to match existing landforms which includes re-contouring and installation of permanent erosion and sediment control structures. Topsoil is re-spread over areas used for construction and rehabilitation is undertaken. Signs are placed at regular intervals to indicate the presence of the buried pipeline.

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