



Visual Impact Study

West Cliff Mine Surface Gas Drainage Project

Appin NSW

BHP Billiton – Illawarra Coal

17 July 2007

Prepared by:



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A R C H I T E C T S

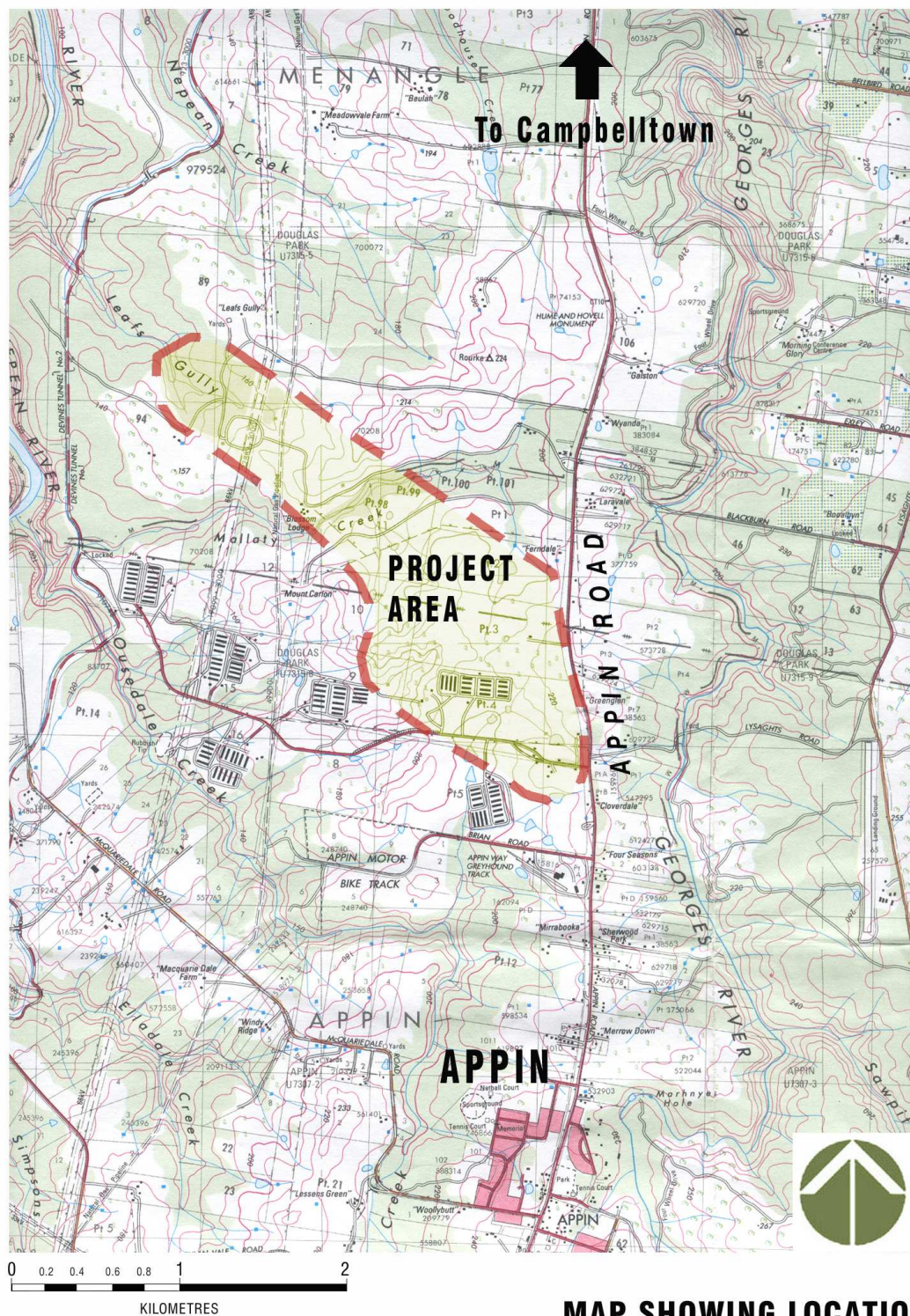
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MAP SHOWING LOCATION OF PROJECT

Figure 1: General Location of Project Site

West Cliff Mine – Surface Gas Drainage Project

Visual Impact Study

Introduction

This study was commissioned to assess the visual impact of proposed drilling compounds and gas drainage compounds on the countryside at Appin NSW.

Background

The West Cliff underground coal mining operations require drainage of methane gas from the coal seams as part of the coal mining activity. The gas is held in pockets within the seams and within previously mined area known as goafs. It has the potential to flow in significant quantities into the current working areas and cause a safety hazard.

The gas extraction is carried out by first drilling down from the surface to the coal seam approximately 500m below. The gas is later extracted (immediately after coal removal) via cased boreholes using extraction plant located on the surface. The gas is then flared or vented to the atmosphere.

The drilling compound in most cases is later used as the gas extraction plant compound. The compounds are a temporary establishment and move to various locations on the surface over the countryside above the coal mining activity being carried on underground. There are approximately 21 proposed temporary compound locations (see figure 2).

Location and Setting

The proposed works will be located in farmland approximately 15km south of Campbelltown and about 4- 5 kms north of Appin (see figure 1). The major farming industry in the area is cattle grazing and intensive chicken farming. The project area is located in a designated mine subsidence locality.

Description of Proposed Works

There are three stages to the proposed works:

- Drilling Stage
- Gas Extraction Stage
- Remediation

Drilling Stage

In the first stage a cyclone wire mesh compound approximately 30m x 40m is established. The ground within the compound is levelled as necessary to accommodate a truck mounted drilling rig, a drilling rod trailer, equipment storage, 4 compressors, a sediment pond and a portable WC. Drilling is carried out during daylight hours using compressed air. The holes are drilled ahead of mining to enable gas extraction to commence immediately the coal is removed in the mine below. The holes are drilled to a depth of approximately 500m. The height of the drilling mast is about 12m high. (See figure 5). The drilling phase takes approximately 6 weeks. (See figure 5)

Gas Extraction Stage

The drilling rig and associated equipment are moved from the compound and the following equipment is moved in: (See figures 3, 4 & 6)

- Mobile Goaf Gas Extraction Plant mounted on a truck-trailer and associated PVC piping)
- Diesel fuel tank
- Water tank
- 2 LMS Flare Units
- Portable WC
- Shipping Container used as a store

External to the compound is a remote vent stack, located at a distance of greater than 100 metres from the flare units. This stack is connected to the extraction plant by a 280mm diameter black PVC pipe.

The drained gas is flared (burnt) in the LMS flare units and excess gas is vented into the atmosphere via the remote stack.

The gas extraction stage takes about 6 weeks.

Remediation Stage

At the completion of the gas extraction stage the compound is disassembled and the ground is contoured to its original shape and seeded or planted to bring it back to its original condition. It takes about a week to pack up the site and approximately 3 to 6 months for revegetation.

General Observations

The drilling stage appears similar to a building construction site and the gas extraction stage has an industrial appearance because of the gas flaring stacks and to a lesser extent the methane vent stack.

Because of the topography of the land and the large acreage of land under private ownership the majority of the compounds will not be seen by the public. The remaining compounds are located in areas considered to be of high to low public exposure.

The compounds identified as high public exposure are those which can be seen from and are close to Appin Road and stand alone in grassland. Appin Road is a busy road and has more than 9000 vehicle movements per day.

The compounds identified as moderate public exposure are those that can be seen (but are distant) from Appin Road and are obscured by topography or vegetation or located near larger man made structures.

Those that are considered to be low public exposure are those that can be seen from Leaf Gully Road and further west. Leaf Gully Road is a no through road which is generally accessed by residents/farmers and their visitors. It is assumed that there is less than 200 vehicle movements per day in Leaf Gully Road

The compounds which have been identified as high public exposure in this study are as follows:

- CP08 – stands alone in an open field, approximately 500m from Appin Road
- CP10 – stands alone in an open field with a backdrop of trees. 250m from Appin Road
- CP12 – stands in an open field but with a large agricultural shed complex behind. 350m from Appin Road
- CP13 – stands in open field adjacent truck wash shed. Close to (250m) Appin Road but partly obscured from Appin Road because of truck wash shed, vegetation and roadside embankment.
- CP17 – stands alone in open field with distant backdrop of trees and houses. 150m from Appin Road

The visual impact of the above has been depicted by preparing photomontages of the proposed compounds as viewed from locations along Appin Road. See figures 7 – 11)

Comments

The matters to consider in visual impact assessment are:

- Reflection and colour
- Night Lighting
- Bulk and height
- Locality and Appropriateness within the locality
- Existing structures
- Potential loss of vegetation
- Associated structures such as signs, fencing and access tracks
- Permanent or Temporary structure

Reflection and Colour

The overall view of the rural landscape is generally pale yellow-green or straw coloured grasses with olive-green trees and shrubs, showing little colour intensity except for the backdrop of a blue sky on clear days.

The Drilling/Gas Drainage compounds potentially introduce bright or unnatural artificial colours associated with machinery, fencing, safety equipment and storage.

Night Lighting

The amount of operational, security or safety lighting can bring attention to structures in an otherwise dark background. During the gas drainage phase the gas drainage plant has a fluorescent light. However, along Appin Road, close to ,and further from, are a number of dwellings which are lit during the evening. Given the distances from Appin Road and Leaf Gully Road it is not considered that the fluorescent light will be visually intrusive but should be extinguished if not required operationally.

There is also the potential for the flared gas to show a blue flame and be noticeable at night, however the flaring is controlled in a way that contains the gas flame.

Bulk and Height

The bulk and height of the compound and structures is considered low to medium in terms of visual impact. The drilling rig tower used during the drilling stage about 12 metres high and 1 metre wide. During the gas drainage stage the flare stacks are 1.8 metres diameter and 8 metres high.

Locality and Appropriateness within the locality

The locality is a rural farming landscape. Structures of a non traditional farming type can stand out particularly if they bear an industrial appearance or are large in scale or height. The drilling phase is considered to be a visually acceptable activity in the landscape, as it would not be dissimilar in appearance to the earthworks or early construction phase of say, a dwelling or an agricultural shed.

The Gas Drainage phase introduces a potential industrial appearance into the landscape – particularly because of the 2 gas flaring stacks. However as there is no visible flame or other visible emissions the stacks could be mistaken at a distance for grain storage silos.

Existing structures.

There are a number of existing structures in the landscape which have visual prominence. Most noticeably are the large steel clad chicken farming shed clusters and to a lesser extent associated buildings including a truck wash shed located close to Appin Road. Running in a north-south direction about 2 kilometres to the west of Appin Road there are 330 kilovolt and

66 kilovolt power transmission lines. The towers for the 330kV lines stand approximately 45 metres high. The power lines cross through the north-west section of the project area. In terms of scale the proposed drilling and gas drainage compounds are relatively minor in scale in comparison to the large chicken farming sheds when viewed from Appin Road.

Potential Loss of Vegetation.

Compounds CP04, CP05, PA03 and PA02 appear to be located within or close to trees. These should be relocated where possible to prevent damage to existing trees. All the other compound are located in open or cleared farmland.

Associated structures such as signs, fencing and access tracks.

There are some minor safety and warning signs on equipment within the compounds that are not noticeable from a distance of greater than 30 metres. The existing flare stacks bear the manufacturer's name ("LMS") and this is not considered visually intrusive so much as the dominance of the metallic silver colour of the stacks themselves.

For safety and security reasons the compounds are fenced with relocatable cyclone wire fence sections with chained vehicular access gates. It is recommended that where the compounds can be seen from public roads that the exterior of the fence be covered in hessian or stone/beige coloured shade cloth to reduce the impact of the fence - and more importantly to screen the equipment contained within the compound.

Access tracks need to be constructed to allow truck access to and from the compounds. When the compounds are dismantled and where they are no longer needed the access tracks should be remediated and revegetated.

Permanent of Temporary Structures.

The most important matter to note about the compounds is that they are not permanent or long term structures but temporary structures with a duration of approximately 3 months. After which they are moved on and the site is then remediated (see figure 14).

Recommendations

To reduce the visual impact of the compounds the following measures are recommended:

- The red storage shipping container to be repainted grey green similar to Wattyl "Autumn Bushland" or "Espadrille" or similar
- Cover cyclone fence with hessian or sand/beige (not green) coloured shade cloth at least on sides facing a public road

- Repaint Flare stacks in a suitable high temperature paint from silver to a neutral colour for example similar to Wattyl "Seagrass"
- Spraygrass seed any disturbed surface area (other than necessary vehicle access tracks) external to the compound to reduce the amount of exposed soil.
- Extinguish any unnecessary lights or shield required service lights at night.
- Ensure that the night time flaring of gas does not burn at a rate which would make it visible.
- Relocate any proposed compound to avoid impact on trees.
- Keep the compound exterior clean and tidy.
- Remediate and revegetate the sites after the compounds are dismantled.

Summary

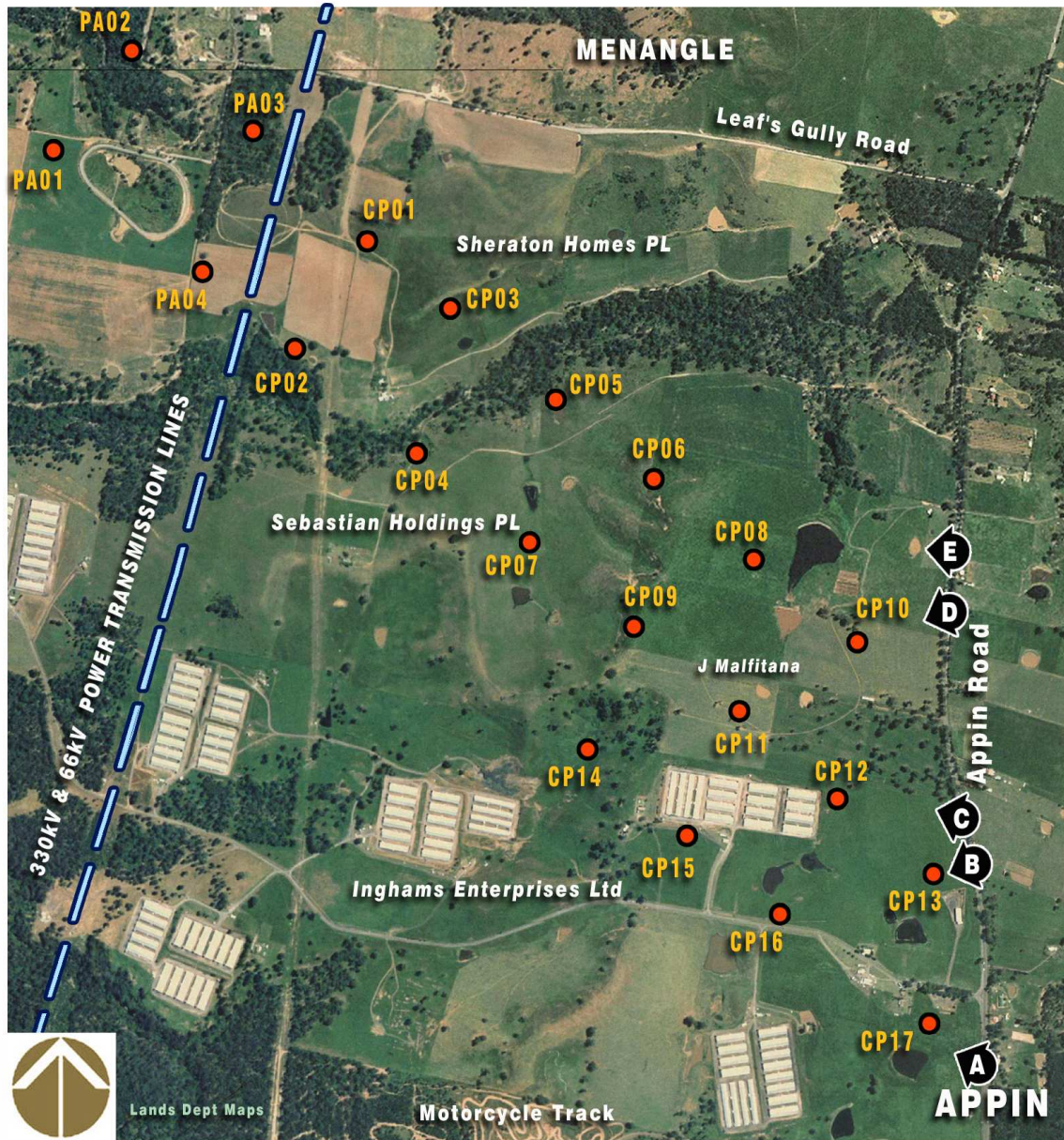
Given the existing circumstances above and by adopting the above recommendations, it is not likely that the proposed drilling/gas drainage compounds would be visually offensive to a general member of the public when viewed from the surrounding public roads.

Maurice Hayler



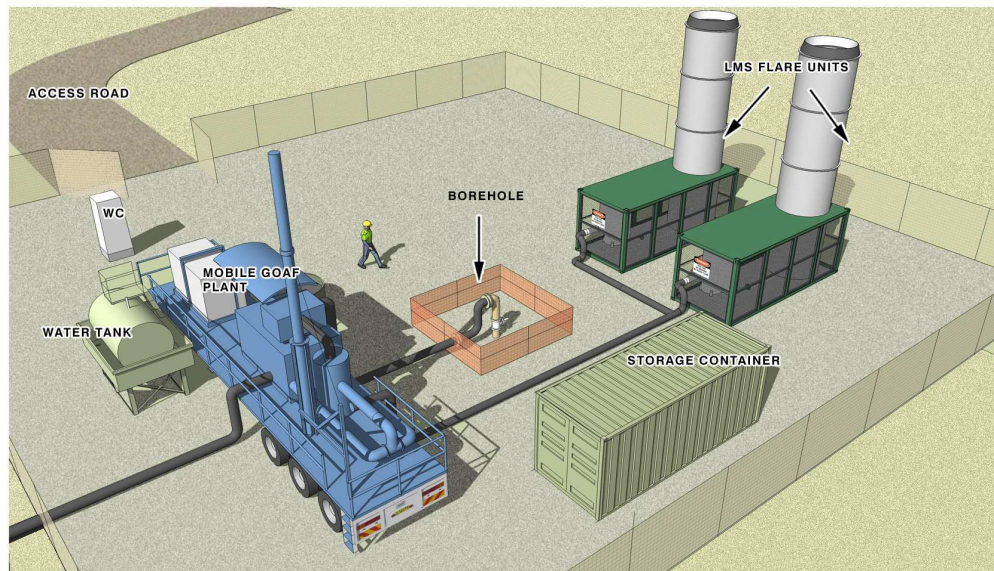
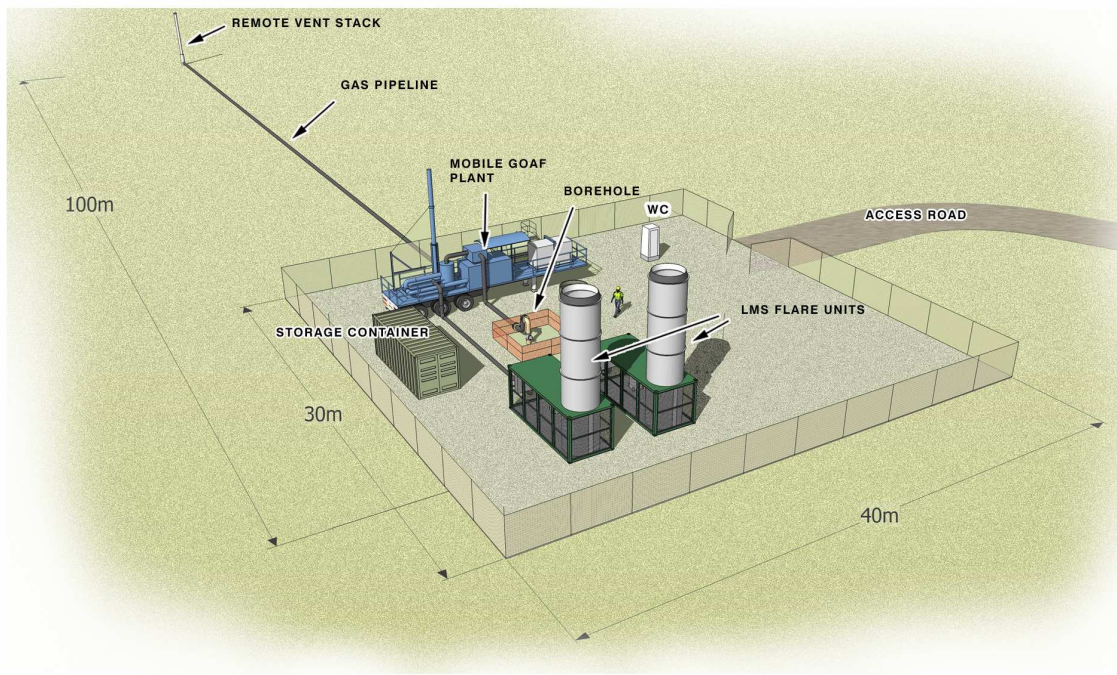
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AERIAL PHOTO SHOWING LOCATIONS OF PROPOSED DRILLING AND GAS DRAINAGE COMPOUNDS

Figure 2: Aerial Photo of Project Area



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SCHEMATIC 3D LAYOUT OF GAS DRAINAGE COMPOUND

Figure 3: Typical Layout of Gas Drainage Equipment

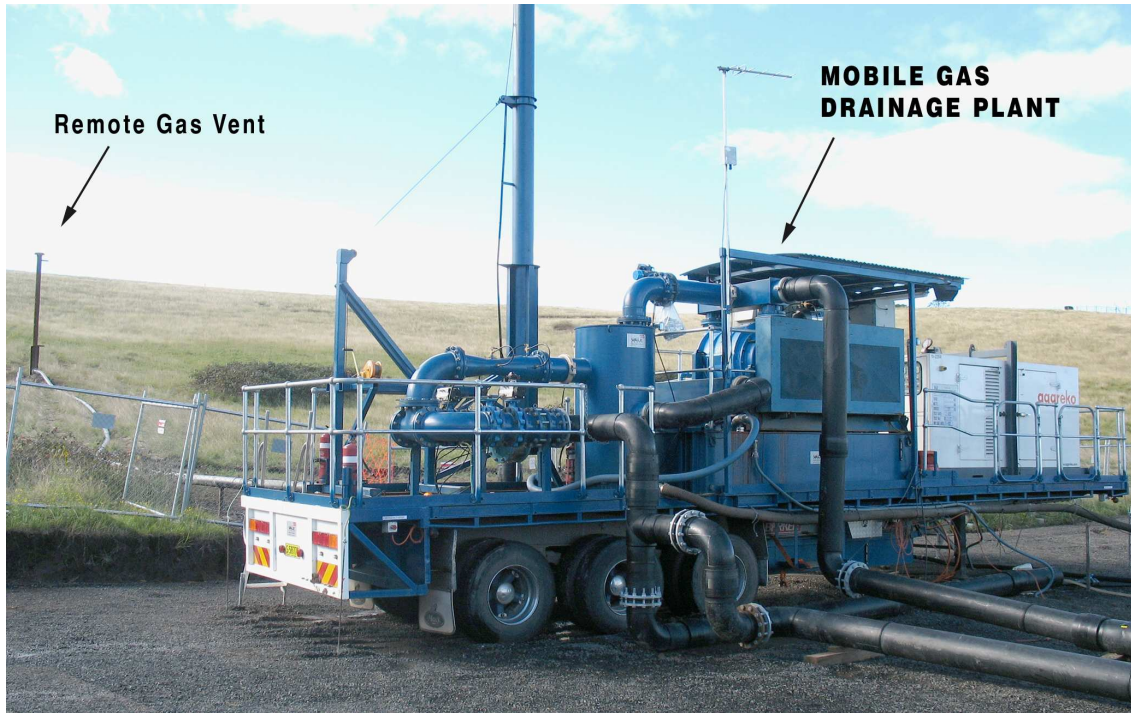


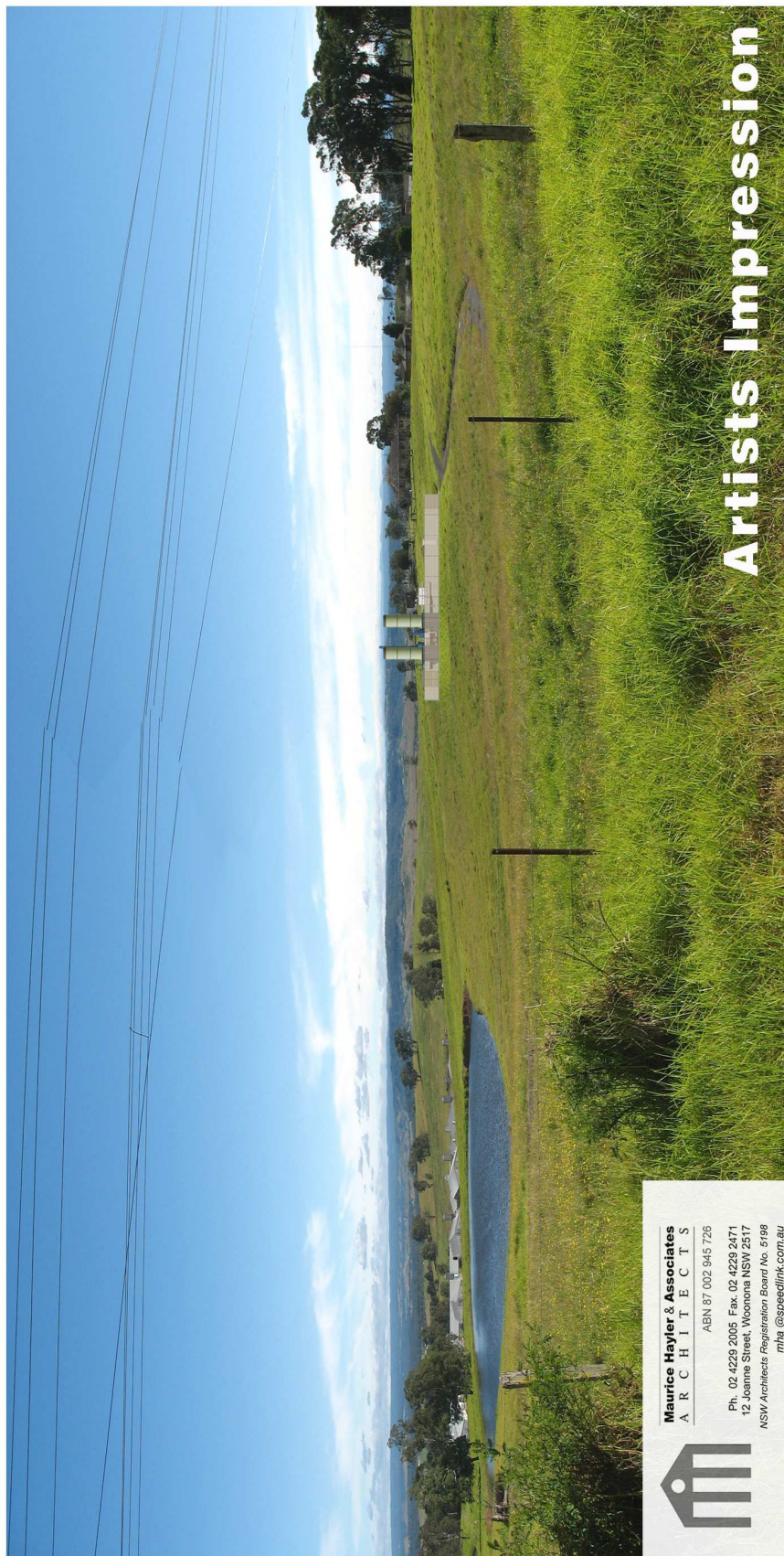
Figure 4: Photograph of trailer mounter Gas Drainage Plant



Figure 5: Photograph of Drilling Rig



Figure 6: Photograph of existing gas flare units



(NOTE: 2 PHOTOS JOINED TOGETHER)

A

PHOTOMONTAGE

**VIEW FROM APPIN ROAD OF
 PROPOSED CP17 COMPOUND**

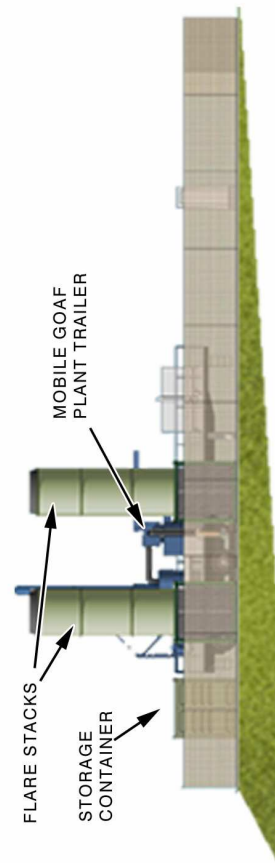


Figure 7: Artists Impression of Compound CP17



View from Appin Road



Top view zoomed for clarity



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PHOTOMONTAGE

B

**VIEW FROM APPIN ROAD OF
PROPOSED CP13 COMPOUND**

Figure 8: Artists Impression of Compound CP13



View from Appin Road



Top view zoomed for clarity



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PHOTOMONTAGE



**VIEW FROM APPIN ROAD OF
PROPOSED CP12 COMPOUND**

Figure 9: Artists Impression of Compound CP12



View from Appin Road



Top view zoomed for clarity



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PHOTOMONTAGE

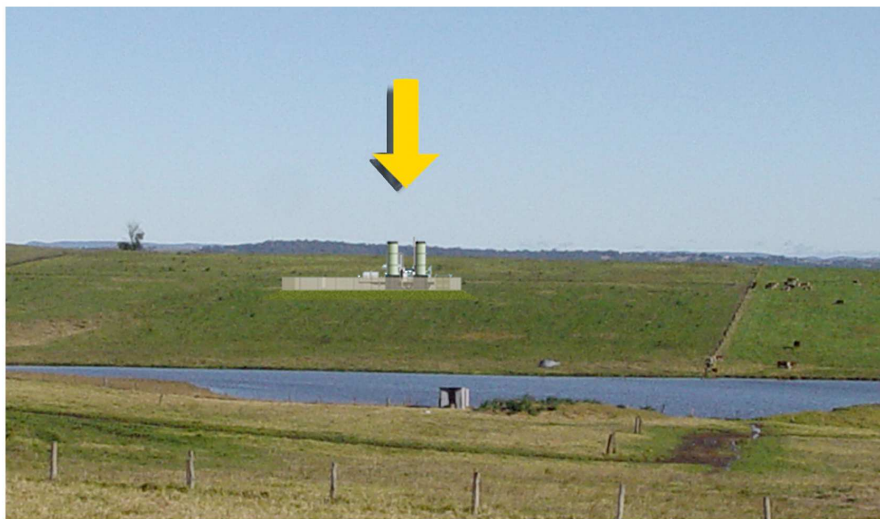


**VIEW FROM APPIN ROAD OF
PROPOSED CP10 COMPOUND**

Figure 10: Artists Impression of Compound CP10



View from Appin Road



Top view zoomed for clarity



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PHOTOMONTAGE



**VIEW FROM APPIN ROAD OF
PROPOSED CP08 COMPOUND**

Figure 11: Artists Impression of Compound CP08



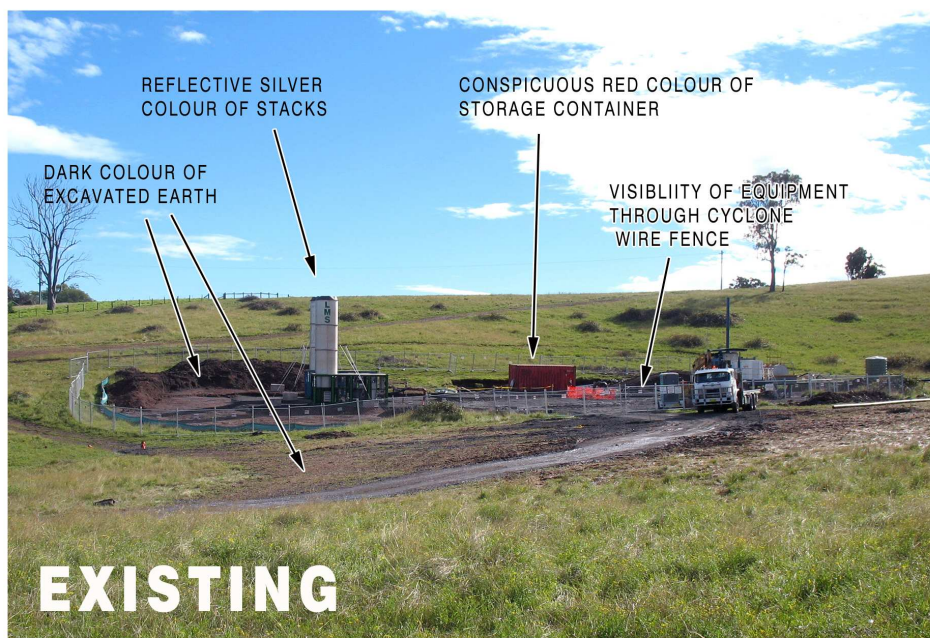
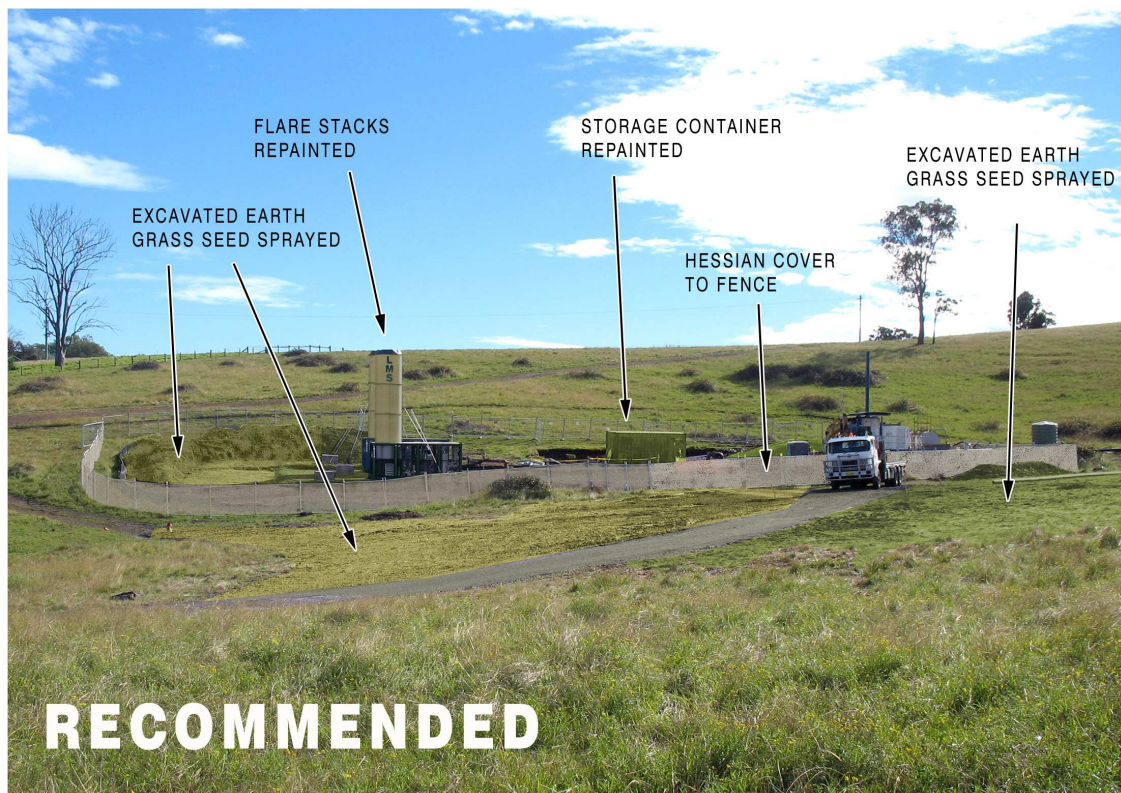
Photograph taken from Leafs Gully Road looking South: 330kV and 66kV powerlines. The 330kV powerline towers (on the left hand side of photo) are approximately 45 metres high



One of the 6 Inghams Enterprises PL chicken farming shed clusters - each cluster is located on an area approximately 400 x 100 metres

EXISTING LARGE STRUCTURES IN THE AREA

Figure 12: Existing large structures in the area



The top photograph shows an existing gas drainage plant compound and the lower photo shows an artists impression incorporating recommended visual improvements to help blend the proposed compounds into the landscape.



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Figure 13: Photograph of an existing Gas Drainage compound on the Inghams chicken farm (not seen from public roads) – showing improvements which could be made to the proposed compounds.



Photograph of former Drilling/Gas Drainage compound site after remediation.
(Located on the Inghams Enterprises PL chicken farm) (Camera Zoomed 4x)

EXAMPLE OF A REMEDIATED SITE

Figure 14: Photograph of a remediated Drilling/ Gas Drainage Compound site on Inghams chicken farm.