

SOIL ISSUES-DRAYTON SOUTH COAL MINE

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SOIL PRODUCTIVITY ISSUES

The soil issues associated with the extension of Drayton South Coal Mine are:

- 1) Presence of unstable sodic and saline soil
- 2) The excavation and stock piling of these unstable soils to be used for restoration and rehabilitation of the site after mining ceases
- 3) Loss of Biophysical Strategic Agricultural Land (BSAL)
- 4) Loss of major productive agricultural Class 3 and Class 4 land

PROBLEMS OF TOPSOIL DEPTH

ISSUE 1 and 2

In open-cut coal mining drag-lines are used to strip away soil and overburden and expose the coal layer.

- The depth of the topsoil at the site reported in the EIS is often very shallow.
- It would be almost impossible to precisely remove a 0.1 m layer without disturbing and inadvertently including potentially sodic subsoil.

TOPSOIL

- In open-cut coal mining drag-lines are used to strip away soil and overburden and expose the coal layer.
- Soil structure and organic matter necessary for vegetation growth are degraded even when the topsoil and subsoil are separated
- The depth of the topsoil reported in the EIS is often very shallow.
- It would be impossible for a dragline to precisely remove a 0.1 m layer without disturbing and inadvertently including potentially sodic subsoil.

SODIC SUBSOIL

Soil structure and organic matter necessary for vegetation growth are degraded even when the topsoil and subsoil are separated

*The subsoil is generally **saline, sodic**, disperses and has a tendency to slake when exposed to moisture. Such characteristics are evident through the presence of surface erosion, including gullying and rill formations and slumping'. (Page U-15 para 5).*

Sodic soils have a high level of sodium ions held on the soil clay particles

- Exposed sodic soil disperses on rain impact.
- The dispersed clay forms a stable floc that does not settle out.
- Cadmium and lead are heavy metals found in the chemical analysis of soil at the site. These contaminants will adhere to the soil clay particles and can be transported as dust or by overland runoff towards the Hunter River and other waterways.



AFFECT OF SODICITY

- Sodic soils also form surface crusting, and are hard setting when dry
- The crusting inhibits:
 - * seedling emergence so plant establishment is difficult especially for the small seeds of many pasture species
 - * water infiltration rate.
- In turn the surface sealing increases water runoff rate and erosion risk

Landscape problems associated with sodic soil



Salinity

- According to the EIS soil salinity is evident in the topsoil as well as some shallow subsoils within the mine void footprint
- **Saline soil has excessive salt in the soil solution**
- **Salinity**

*reduces the 'availability' the water.

*salts are highly soluble in both surface and groundwater and can be transported by overland flow and groundwater movement affecting the nearby waterways including the Hunter River



AFFECT OF SALINITY

Salinity

- Lack of water inhibits seed germination and growth resulting in bare surfaces and the increased risk of erosion and sediment movement into waterways
- Use of the mix of topsoil and saline sodic subsoil to recreate Endangered Ecological Communities (EEC) is highly problematic as the non-salt tolerant plants simply will not establish.



BSAL

ISSUE 3

- BSAL is land with a rare combination of natural resources highly suitable for agriculture
- These lands are naturally capable of sustaining high levels of productivity and require minimal management practices to maintain this high quality

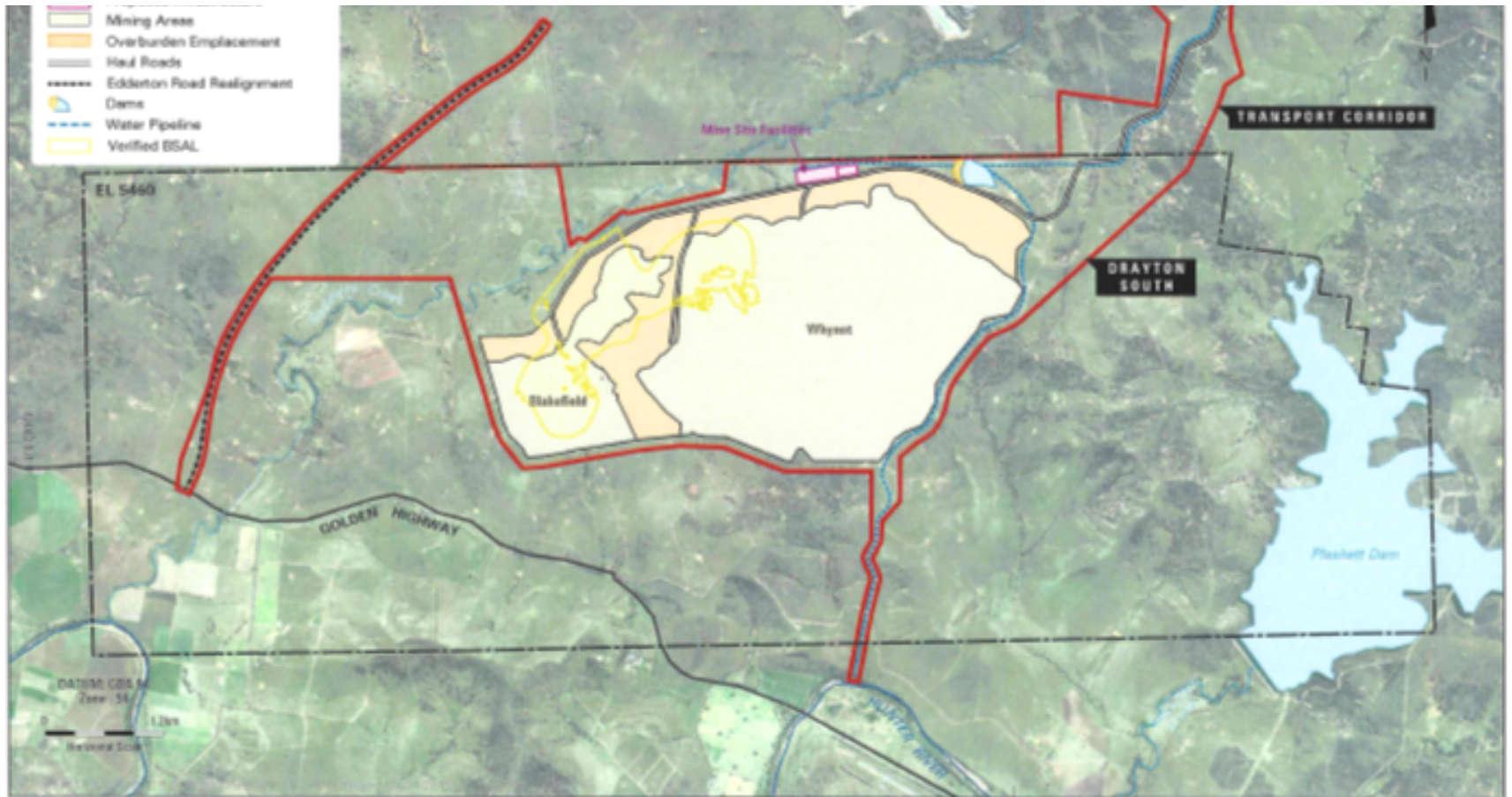
ASSESSMENT OF BSAL

- Assessment of BSAL should only be authorised by persons with appropriate qualifications for example Certified Professional Soil Scientist (CPSS) (NSW GOVT PROTOCOL FOR SITE VERIFICATION AND MAPPING OF BSAL)
- BSAL verification requires a specific sampling protocol and laboratory analysis of the samples

EIS AND LOSS OF BSAL

- The EIS shows the BSAL land as a light yellow outline, overlying the mine void. (See map of initially verified BSAL shown in the following slide (16) as Figure 3.
- Whereas in January 2015 218ha of BSAL were reported in SLR 2015a
- By May 2015 the BSAL and was 'shrunk' to 78 ha.(see page 4-4 and section 7.13.3 of the EIS SLR 2015b).

LOCATION OF BSAL



DRAYTON SOUTH COAL PROJECT

TOTAL LOSS OF BSAL

- The BSAL area was moved westward and away from the mine void footprint.

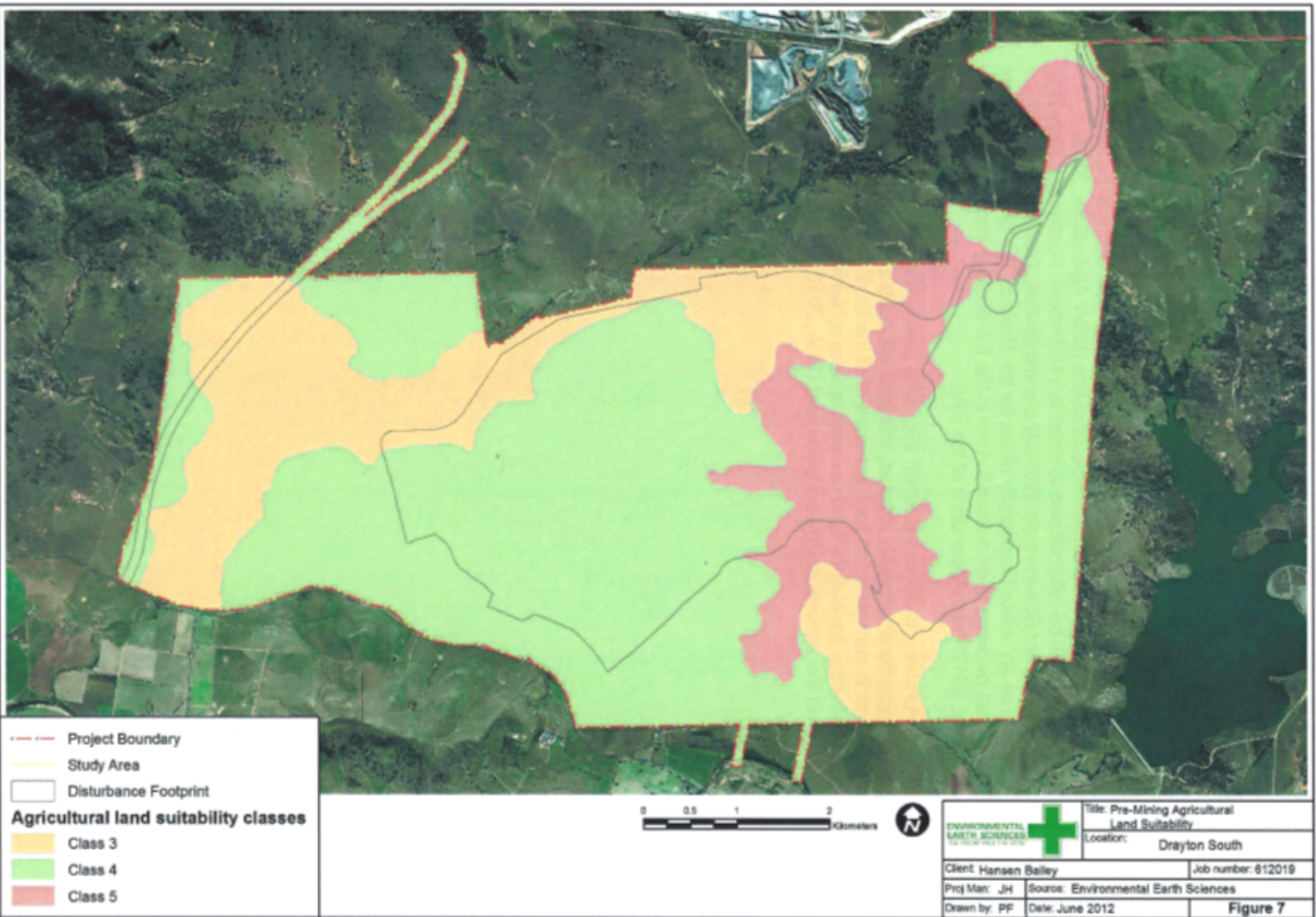
See figure 4 in appendix A 3.1 of the SLR (2015) report (figure 4 in current document).

- The remaining 78 ha were deemed without further laboratory investigations or additional soil pits to be not BSAL following an inspection by unidentified consultants and staff from Office of Agricultural Sustainability & Food Security (OAS&FS)

LOSS OF AGRICULTURAL LAND

ISSUE 4

- The EIS also demonstrates a major net loss of productive land from the area
- Based on data presented in Table T 15, there is a loss of 253 ha of class 3 land that *'is moderately productive and well suited for grazing or to crop cultivation with a pasture rotation'* (quoted from page T-41).
- Additionally there is a net loss of 122 ha of class 4 land. This land is *'suitable for grazing but not cultivation'* (quoted from page T-40).



NET LOSS OF PRODUCTIVE LAND

- Conversely, Class 5 land, which is '*unsuitable for agriculture or at best only light grazing*' (quoted from page T-40), increased by 379 ha.

Conclusions

- For Issues 1 and 2 (Topsoil and Subsoil)
- Significant time, commitment to biodiversity and land management strategies would be needed to reduce the affects of the adverse and variable soil properties described. Such measures are costly and are often not successful.
- It is highly unlikely that the excavated soils that have unstable sodic and saline properties can be used to rehabilitate and revegetate the area to pre mining conditions as suggested by the proponent.

Conclusions

- **The overall impact** on the region is the
 - *loss of highly agriculturally productive BSAL land
 - *a net loss of major productive land, diminishing food security
 - *increase in Class 5 land which is *'unsuitable for agriculture or at best only light grazing'*
 - *loss of landscape attributes necessary for critical industrial clusters and the visual features which attract and tourists expect to see when visiting the Hunter Valley.