2

Project Description

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2 PROJECT DESCRIPTION

2.1 INTRODUCTION

This section provides a description of the Grasstree Extension Project (the project), including the project setting, an overview of operations at the existing Grasstree Mine, and the project activities. The section also describes the interrelationships between Grasstree Mine and the German Creek mining complex, including use of the German Creek Coal Handling and Preparation Plant (CHPP), rejects and tailings storage areas, and mine water management system.

2.2 CURRENT OPERATIONS

2.2.1 German Creek Mining Complex

The northern boundary of the German Creek mining complex is located approximately 8 km south-west of Middlemount in Central Queensland (Figure 2-1) and commenced production in 1982. The German Creek mining complex comprises the following mining areas, across five mining leases (MLs):

Open cut mining areas at German Creek Mine, German Creek East Mine and Oak Park Mine (Figure 2-1). Oak Park Mine is an operational mine (although there is currently no active mining). Mining has ceased at the other open cut mines.

- Underground longwall mining areas at Central Colliery, Southern Colliery, Bundoora Mine, Grasstree Mine and Aquila Longwall Mine (Figure 2-1). Grasstree Mine is operational. The Aquila Longwall Mine has been approved but mining has not yet commenced. Longwall mining has been completed in the other mining areas.
- The Aquila Bord and Pillar Mine (Figure 2-1). The Aquila Bord and Pillar Mine has been under care and maintenance since 2013.

The German Creek mining complex includes existing mine infrastructure and facilities that service all of the active mining areas. Key infrastructure and facilities include:

- CHPP;
- Train Loadout;
- In-pit rejects and tailings storage areas; and
- Mine water management system including in-pit mine water storages, CHPP return water system and licensed mine water discharge system.

Coal from the adjacent Lake Lindsay Mine is also transported to the German Creek CHPP for processing, via an overland conveyor. However Lake Lindsay Mine is managed under a separate Environmental Authority (EA) and different joint venture parties.

2.2.2 Grasstree Mine

The Grasstree Mine is an underground longwall mine, which commenced production in 2006. The approved longwall mining area is shown in Figure 2-2 and is referred to as the approved Grasstree mining area in this Environmental Assessment Report (EAR).

The Grasstree Mine Infrastructure Area (MIA) contains the mine surface facilities (Figure 2-2). Key facilities in the MIA include:

- Mine access shaft;
- Administration buildings and car parks;
- Workshops, chemical stores, laydown storage area, refuelling facilities;
- Bathhouse;
- Potable water and sewage treatment plants;
- Sediment dams; and
- Gas fired power station (operated by EDL).

Coal from the underground workings is transferred to the surface via the Southern Colliery drift conveyor. The conveyor drift portal is located in the highwall of Pit A. The drift conveyor travels from the portal, up the Pit A ramp, to the Grasstree Run-Of-Mine (ROM) coal stockpile (Figure 2-2). Coal from the ROM coal stockpile is transferred through a breaker station, where it is sized and coarse rejects are removed. The coal is then loaded onto an overland conveyor for transport to the CHPP (Figure 2-2). The coarse rejects are trucked from the breaker station and placed in the Pit B open cut void.

ROM coal is washed at the CHPP. Product coal is transported from German Creek mining complex via an onsite rail loop and train loading facility (Figure 2-2). Product coal is railed to Central Queensland ports, including Dalrymple Bay Coal Terminal, for export.

Rejects and tailings produced from the washing of Grasstree coal at the CHPP are stored in the German Creek in-pit rejects and tailings storage areas (Section 2.7). Excess mine water from the dewatering of the Grasstree Mine underground workings is transferred to the German Creek mine water management system (Section 2.6).

2.3 PROJECT OVERVIEW

This section provides a brief introductory overview of the project. A detailed project description is provided in Section 2.5.

The project involves the extension of longwall mining in the German Creek coal seam at the Grasstree Mine. This will include five new longwall (LW) panels: LW911, LW912, LW808, LW809, and LW810 (Figure 2-3). Coal from the project longwall panels will be extracted using the same mining equipment and method currently used at Grasstree Mine. Mining in the project longwall panels will commence once longwall mining in the approved Grasstree mining area has been completed. The project will extend the life of Grasstree Mine by approximately three years. The project will provide access to approximately 22 Million tonnes (Mt) of high quality coking coal. Historically Grasstree Mine production has been up to 10 Million tonne per annum (Mtpa) ROM coal and the project will not increase the peak Grasstree Mine production rate.

The project will use the existing Grasstree Mine and German Creek mining complex infrastructure, with no upgrades of any existing infrastructure required for the project. New surface infrastructure for the project will be limited to infrastructure for gas drainage activities, underground access boreholes and other minor surface infrastructure associated with underground mining (including ventilation shafts, powerline and PED communication cables).

2.4 PROJECT SETTING

2.4.1 Location

The project longwall mining area is in the southern part of the German Creek mining complex, within the existing ML 1831 (Figure 2-4). The northern boundary of the German Creek mining complex is located approximately 8 km south-west of Middlemount (Figure 2-4).

The project longwall mining area is within Isaac Regional Council Local Government Area (LGA) (Figure 2-5).

2.4.2 Land Ownership

Land ownership within the project longwall mining area is shown in Figure 2-6 and described in Table 2-1. The project components are located within land owned by subsidiaries of Anglo American.

Table 2-1 Land Ownership and Land Use

FIGURE REF ID	LOT AND PLAN	REGISTERED OWNER	LAND TENURE	LAND USE
2	9 TT442	Anglo Coal (Capcoal Management) Pty Limited	Freehold	Mining activities Cattle grazing
3	2 SP184275	Anglo Coal (Capcoal Management) Pty Limited	Freehold	Mining activities Cattle grazing
4	B SP161034	Anglo Coal (Capcoal Management) Pty Limited	Freehold (Covenant)	German Creek Nature Refuge Mining activities Cattle grazing

There are no easements within the project longwall mining area.

2.4.3 Mining and Petroleum Tenements

The project longwall mining area is located within an existing German Creek mining complex ML (ML1831). There are no petroleum tenements over the project longwall mining area.

2.4.4 Land Use

The project longwall mining area is located within an existing German Creek mining complex ML and consequently coal mining and associated gas drainage are the primary land uses within the vicinity of the project longwall mining area. The eastern edge of the project longwall panels are located in areas that have been disturbed by previous seismic activities. Cattle grazing is also undertaken periodically within the project longwall mining area, although the cattle will be removed prior to mining in the project longwall mining area.

There is a covenant over land to the south of the project longwall mining area for the German Creek Nature Refuge (Property No. 4 on Figure 2-6). The covenant approval states that longwall mining is a permissible land use in the nature refuge and parts of the nature refuge have been previously subsided by approved longwall operations.

There are a number of coal mines in the region. Lake Lindsay Mine is an open cut mine adjoining the south-east of the German Creek mining complex and is operated by Anglo American (Figure 2-5). Foxleigh Mine (including Foxleigh Plains Mine), an open cut mine, is located 7.5 km to the east of the German Creek mining complex and is operated by Middlemount South (Figure 2-5). Oaky Creek Mine, an open cut and underground mine operated by

Glencore, is located directly to the south of the German Creek mining complex (Figure 2-5). Norwich Park Mine (open cut), owned by BHP Billiton Mitsubishi Alliance, is located directly to the north-west of the German Creek mining complex (Figure 2-5). Operations at Norwich Park Mine ceased in 2012. Middlemount Mine (open cut) is located directly to the north-east of the German Creek mining complex and is owned by a joint venture between Yancoal and Peabody Energy (Figure 2-5).

2.4.5 Natural Features

The local topography in the vicinity of the project longwall mining area transitions from an elevated desiccated plateau in the north to lower lying sandy plains in the south, east and west. Ground surface elevations range from 155 m Australian Height Datum (AHD) in the south-western part of the longwall mining area to 185 m AHD in the north and south of the project longwall mining area (Figure 2-7). The elevated terrain in the north of the project longwall mining area forms a subtle ridgeline that represents the local catchment boundary of German Creek and Little Parrot Creek. The entire project longwall mining area and the majority of the approved Grasstree mining area are located within these two local catchments.

The project longwall mining area includes areas previously cleared for grazing and seismic activities, and areas of remnant vegetation. The remnant vegetation comprises woodland to open forest communities interspersed with areas of Brigalow woodland.

2.4.6 Built Infrastructure

The only built infrastructure above the project longwall mining area is an overland conveyor which transports coal from Lake Lindsay Mine to the German Creek CHPP (Figure 2-4).

2.4.7 Climate

Temperature, relative humidity and wind speed data was collected from 1887 to 1992 at the (now decommissioned) Bureau of Meteorology (BoM) weather station at the Emerald Post Office, and rainfall data has been collected since 1968 at the BoM weather station at Talagai. The BoM stations at Talagai and Emerald are approximately 15 km and 70 km south of the German Creek mining complex, respectively. These weather stations are the closest long-term BoM meteorological stations to the project longwall mining area.

Central Queensland has a sub-tropical continental climate characterised by high variability in rainfall, temperature and evaporation. The region can experience droughts, floods, heatwaves and frosts. In general, winter days are warm and nights are cool, while summer days are hot and nights are warm. The seasonal average daily temperatures range between 34.8 °C in summer and 6.9 °C in winter. Rainfall is summer dominant with over 65% of the average annual rainfall occurring from November to February due to storms and tropical lows associated with cyclones. Winds are typically light / light to moderate, originating predominantly from the south-east.

2.4.8 Geology

The project is located on the north-western flank of the Bowen Basin, a sedimentary basin comprising Permian to Triassic age geology. The regional geology in the vicinity of the project longwall mining area is shown in Figure 2-8. The Triassic strata sub-crop at least 5 km east of the project longwall mining area and are not present within the project longwall mining area or its surrounds.

A veneer of more recent Tertiary and Quaternary age sediments typically overlie the Bowen Basin strata. The local surface geology is shown in Figure 2-9.

The relevant geology in the vicinity of the project longwall mining area includes:

- Quaternary alluvium associated with German Creek and Little Parrot Creek;
- A veneer of Tertiary sediments of the Duaringa Formation;
- Permian coal measures including the target German Creek Seam (GC seam).

The key geological units are described in the following sections.

Alluvium is absent from the project longwall mining area. Regionally, the distribution of alluvium is limited to localised deposits associated with ephemeral creeks. The German Creek alluvium is located to the south of the project longwall mining area and the Little Parrot Creek alluvium is located approximately 1.6 km north-east of the project longwall mining area (Figure 2-9). In these areas, the creeks are typically incised into the landscape exposing the underlying rock in the creek bed and banks. Where present, there is typically less than 5 m of alluvium in the creek beds. Floodplain alluvial deposits are localised to the inside of meander bends and areas where the creek is less incised. In these areas the floodplain alluvium typically ranges from a few centimetres to 4 m thick. Alluvium is not present outside this localised area of creek and floodplain deposits.

The Tertiary sediments comprise a heterogeneous profile of semi-consolidated sandstone, mudstone and other minor sediments. The Tertiary sediments are widely distributed over the northern portion of the project longwall mining area and its surrounds (Figure 2-9) where they form an elevated desiccated plateau. The Tertiary sediments are typically less than 40 m thick in these areas, thinning to the west and south as the landscape transitions to lower lying sandy plains. The Tertiary sediments have been superficially weathered resulting in the formation of a thin, heterogeneous layer of residual soils and weathered clays.

The Permian coal measures include the Rangal Coal Measures, the Burngrove Formation, the Fort Cooper Coal Measures (also known as the Fairhill Formation), the Macmillan Formation and the German Creek Formation. The coal measures comprise a sedimentary sequence with interbedded coal seams, including the target GC seam. The upper profile of the coal measures has been extensively and deeply weathered. The weathered coal measures outcrop at the surface across the southern portion of the project longwall mining area and much of the surrounding area, forming undulating sandy plains (Figure 2-9). In the northern portion of the project longwall mining area, the coal measures sub-crop under the Tertiary sediments and dip to the east. As the coal measures dip to the east, the depth of the GC seam increases from approximately 330 m in the south-western part of the project longwall mining area to a maximum depth of approximately 540 m at the north-eastern extent of the project longwall mining area (Figure 2-10).

2.5 PROJECT DESCRIPTION

2.5.1 Mining Activities

Overview of Longwall Mining

A longwall is a complex system of mining equipment that incorporates hydraulic roof supports (called ‘chocks’ or ‘shields’), coal cutting and coal transport equipment. Longwall mining involves extracting rectangular panels of coal, typically around 150 m to 400 m wide, up to 7 km long and 2 m to 5 m thick (Figure 2-11). Longwall panels are defined by access roadways that are constructed around the perimeter of each longwall panel. These roadways provide access for the installation of the longwall mining equipment, mine workers, and equipment and services.

Longwall mining involves a coal shearer travelling back and forth across the width of the longwall panel, starting from the furthest point progressively removing the coal from the panel back to the main headings (Figure 2-11). The shearer cuts the coal from the coalface on each pass and delivers the coal to a face conveyor that runs along the full width of the longwall. The face conveyor transports the coal from the coalface to another conveyor in an access roadway. Coal is then transported to the surface via a series of connecting underground conveyors.

The roof at the coalface is held up by a series of hydraulic roof supports (Figure 2-12). The supported section of roof provides space for the shearer, face conveyor and man access. After each shear of coal is removed, the face conveyor, hydraulic roof supports and the shearer are moved forward.

The roof immediately above the mined seam collapses into the void (called a 'goaf') that is left as the roof supports progressively retreat through the panel. As the roof material collapses into the goaf behind the roof supports, the fracturing and settlement of the rocks progresses through the overlying strata and results in the sagging and bending of the near surface rocks (Figure 2-12). This can result in the progressive formation of gentle trough-like depressions on the surface relative to the natural topography (called subsidence). The subsidence effect moves across the ground at approximately the same speed as the advance of the mining face, which is typically up to 100 m per week. The majority of subsidence occurs on the surface within three months of undermining and all subsidence is generally completed within 12 months. Subsidence is discussed further in Section 3 – Subsidence.

Longwall Layout

The conceptual Grasstree Extension Project longwall layout is shown in Figure 2-3. Modifications to the longwall layout may be necessary following more detailed mine planning assessment. However, any revised mine plans or schedules would not have any significant additional impacts beyond those presented in this environmental assessment.

Longwall mining will be undertaken in the German Creek seam. This is the same seam being currently mined at Grasstree Mine. The longwall panels will be approximately 340 m wide and will range from approximately 2.4 km to 3.3 km long. The extraction height will vary from 2.4 m to 2.6 m. The width of the proposed chain pillars (the coal left between the longwall panels) will be approximately 50 m. The target coal seam in the project longwall mining area is at a depth of between 330 m and 540 m.

The project longwall panels are located adjacent to the approved Grasstree Mine longwall panels (Figure 2-3).

Mine Access

The existing underground workings at Grasstree Mine are accessed by a man and materials shaft at the Grasstree MIA. Coal from Grasstree Mine is transported to the surface via the Southern Colliery drift conveyor. The project will utilise the existing Grasstree access shaft and conveyor drift.

Underground mine access roadways will be developed in the project longwall mining area to provide access to the project longwalls for mine workers, ventilation and equipment. These roadways will be developed within the coal seam and are typically in the order of 5 m wide and 2-3 m high. The roadways will be constructed using continuous miners (electric mining equipment used to excavate the roadways) and shuttle cars (electric mining equipment used to transport excavated material to the underground conveyor system).

Mining Equipment

The project longwall mining area is proposed to be developed and mined using existing equipment from the Grasstree Mine. All underground mining equipment, including the longwall, will be relocated into the project mining area once longwall mining in the approved Grasstree mining area is complete.

2.5.2 Surface Infrastructure

Existing Infrastructure

The project will make use of the existing mine infrastructure at Grasstree Mine and the German Creek mining complex (Section 2.2.2), including:

- Underground mine access shaft and drifts;
- Coal handling and transportation infrastructure, including conveyors, ROM coal stockpile, breaker station, CHPP, train loading facility, and rejects and tailings storage areas;

- Grasstree Mine surface facilities, including mine operations and administration buildings; employee facilities; warehouse; workshop and vehicle washdown, servicing and refuelling facilities; security, first aid and rescue facilities; sewage and potable water treatment facilities; and mine access road and car parks; and
- The German Creek mining complex water management system including in-pit mine water storages, CHPP return water system and licensed mine water discharge system.

The project does not involve any increase in the mine production rate and no upgrades to existing infrastructure are required for the project.

Project Infrastructure

Similar to the approved Grasstree Mine, the project will require the progressive construction of surface infrastructure for gas drainage activities, underground access boreholes and other minor surface infrastructure associated with underground mining. Gas drainage infrastructure (e.g. access tracks, boreholes, and gas pipelines) is required in order to pre and post drain the project longwall mining area to reduce the gas content to safe working levels. It is anticipated that it will be necessary to clear 60 m wide strips along the length and width of each longwall panel to enable the construction and installation of this infrastructure. The areas cleared for gas drainage will also be able to accommodate any minor surface infrastructure associated with underground mining, such as PED communication cables. The underground access boreholes will be required to be constructed beyond the gas drainage areas. Each underground access borehole will require an area of 100 m x 100 m to be cleared.

This infrastructure will be developed progressively, and will be installed approximately one year in advance of a longwall panel being mined to enable the pre-drainage of gas. The infrastructure will remain in place while the panel is being mined and will then be decommissioned following the completion of mining in each panel. Disturbed areas will then be rehabilitated. The location of the project infrastructure will therefore change over time as disturbed areas are rehabilitated and new areas are cleared.

2.5.3 Construction Activities

As noted in Section 2.5.2, the project involves an extension of the approved Grasstree Mine and does not require the construction of infrastructure, other than for gas drainage activities, underground access boreholes and minor surface infrastructure associated with underground mining. This temporary infrastructure will be developed (and decommissioned) on an ongoing basis over the life of the mine. There is consequently no distinct construction phase associated with the project.

2.5.4 Project Schedule

Mining within the project longwall mining area will commence after mining within the approved Grasstree mining area has been completed. Mining in the approved Grasstree mining area is currently scheduled to be completed in approximately 2020. At this time the longwall will be moved to the project longwall mining area. Development work for the project (e.g. construction of roadways and main headings) is scheduled to commence in 2019, a year before the longwall is installed.

Mining of the project longwall mining area is scheduled to take approximately three years. An indicative mine schedule, based on project years, is provided in Figure 2-13.

2.5.5 Project Workforce

The Grasstree Mine has a workforce of approximately 590 people. Approximately 30% of the Grasstree Mine workforce lives locally in Middlemount and the surrounding towns and approximately 70% of the Grasstree Mine workforce is housed in a non-resident worker accommodation camp located in Middlemount. The project will not give rise to any changes to the size of the existing Grasstree Mine workforce or Grasstree Mine workforce accommodation arrangements.

2.6 MINE WATER MANAGEMENT

2.6.1 Current Operations

Grasstree Mine has an established water management system (WMS) that manages all water supplies and demands associated with the operation of the mine. The Grasstree Mine WMS is operated in accordance with the Capcoal Water Management Plan, prepared as a requirement of the German Creek mining complex EA.

The existing Grasstree Mine WMS involves:

- The use of an external raw water supply to meet high quality water demands;
- The containment and reuse of water from the underground workings comprising groundwater inflow into the underground workings and excess water recycled from the underground raw water supply; and
- The containment and reuse of runoff from areas disturbed by the existing mine surface facilities, including the Grasstree MIA.

Raw water is supplied directly from Bundoora Dam or via an offtake from the Bingegang Weir water pipeline. Bundoora Dam is an existing embankment dam constructed on German Creek (Figure 2-2). It has a capacity of approximately 10,000 Megalitres (ML) and a significant catchment area of approximately 120 km^2. Raw water supplies underground mining, dust suppression and potable water demands.

Underground water is removed from the longwall mining areas to allow continuation of mining operations. Dewatering at Grasstree Mine currently generates approximately 1,200 Megalitres per annum (ML/a) of mine water. The mine water is pumped to a series of sediment dams in order to control suspended coal sediment and is collected in the Grasstree Decant Dam. The Grasstree Decant Dam is a small catch dam with negligible external catchment. The collected mine water is then transferred to the German Creek WMS for storage in dedicated open cut pit voids, reuse as water supply in the German Creek mining complex or discharge in accordance with the German Creek mining complex EA mine water discharge conditions.

Runoff from the existing Grasstree Mine MIA catchment (including workshops, fuel storages etc.) is collected in dedicated catch dams and transferred to the German Creek WMS for storage, reuse or discharge.

2.6.2 Project Mine Water Management

The project will not change the operation of the Grasstree Mine WMS. As noted in Section 2.5, no upgrades to existing infrastructure at the Grasstree Mine or German Creek mining complex are required as a result of the project, including no upgrades to the WMS. The underground raw water demand will not change as a result of the project and therefore the volume of excess water recycled from the underground water supply will remain unchanged.

The project longwall mining area is predicted to generate up to approximately 2,100 ML of groundwater inflows over the life of the project, with a peak groundwater inflow rate of approximately 1,300 ML/a. A significant proportion of the modelled groundwater inflow (approximately 40%) will be lost to surface wetting, evaporation and infiltration to the walls and floors. It is expected that residual groundwater inflows of up to 780 ML/a will require dewatering from the project longwall mining area along with the excess water recycled from the underground water supply. This is within the range of monitored dewatering rates recorded at the current Grasstree Mine operations. Consequently, the project will not increase the annual volume of mine water transferred to the German Creek WMS or require any modifications to the existing Grasstree Mine WMS.

The Grasstree Mine WMS will continue to be managed in accordance with the existing Capcoal Water Management Plan, including:

- Maintaining an up to date water balance model for the Grasstree Mine, and a detailed monthly water balance, to ensure that the WMS is operated to minimise the risk of unplanned discharges and to maximise the reuse of water. The water balance model considers all inputs to the system (i.e. captured runoff, groundwater inflows and raw water supply) and outputs (i.e. primarily water transfers to the German Creek mining complex, but also includes evaporation, runoff losses, etc.).
- Monitoring the water volumes in the key mine water storages, and transferring excess water to the German Creek WMS. Routine inspections of the pumps and pipelines to ensure that they continue to operate in acceptable ranges and that the design capacity of the water storage infrastructure is maintained.
- Undertaking regular inspections of drains to ensure that they are operating effectively and according to design.

2.7 MANAGEMENT OF REJECTS AND TAILINGS MATERIAL

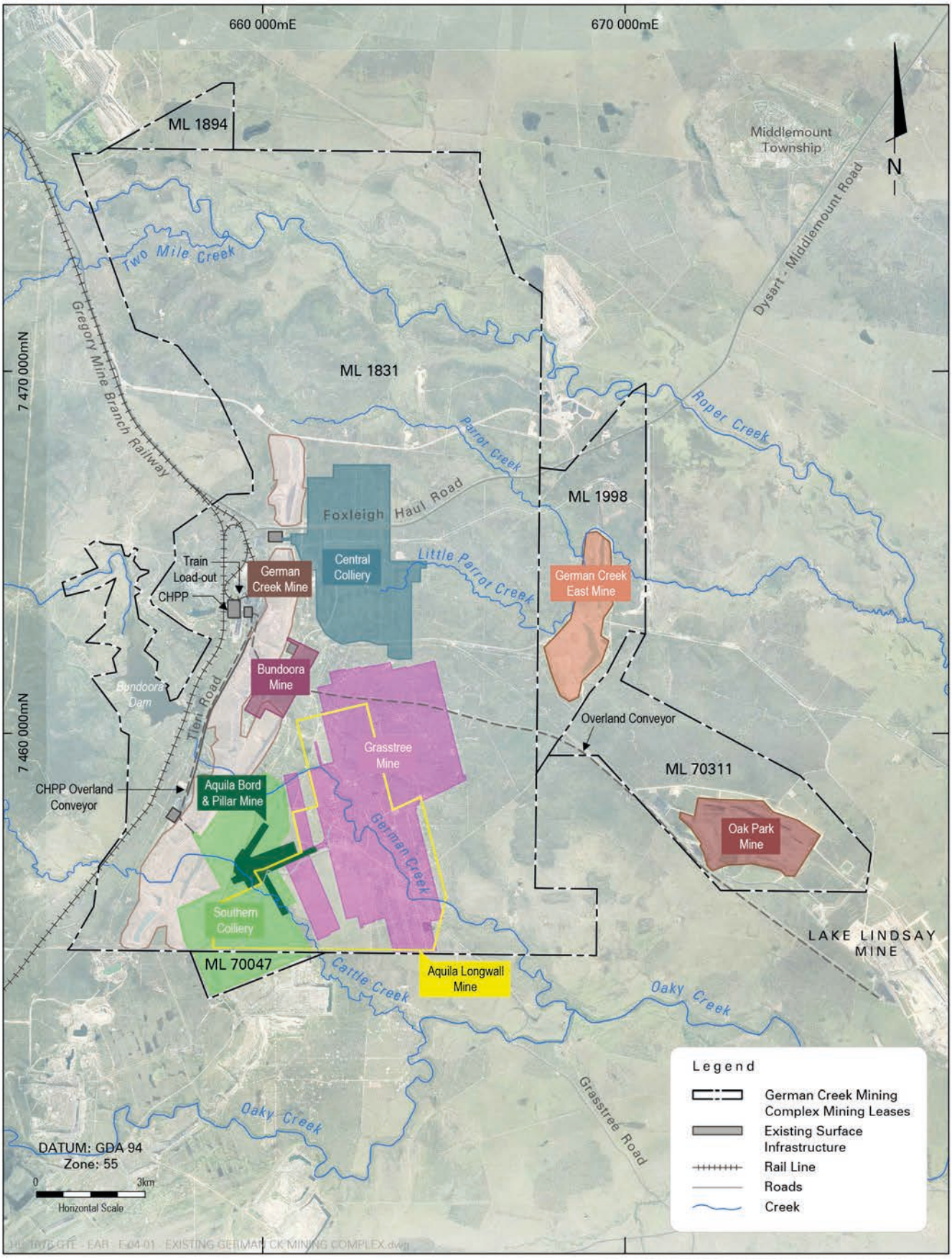
The screening, washing and dewatering processes of the CHPP produce fine and coarse reject (waste) material. Fine rejects (tailings) are pumped to the Pit C open cut void for storage (Figure 2-2). Tailings decant water and runoff from the in-pit storage are returned to the CHPP for make-up water supply. Coarse rejects are trucked from the CHPP using side tipper haul trucks and placed in the Pit B open cut void (Figure 2-2).

Tailings and rejects generated from coal extracted from the project longwall mining area will be stored in the existing approved in-pit storage facilities. Preliminary estimates indicate that the project will produce up to 4.4 Million cubic metres (Mm^3) of rejects and tailings over the life of the project. There is approximately 130 Mm^3 of available in-pit tailings and rejects storage areas at the German Creek mining complex.

2.8 SOCIO-ECONOMIC BENEFITS

The Grasstree Mine provides substantial economic benefits to the local region, Queensland and Australia. A total of approximately 590 people are employed at Grasstree Mine and 636 additional people are employed at the German Creek mining complex and Lake Lindsay. The Australian Government receives significant direct and indirect tax revenue from the mine, and the Queensland Government obtains substantial royalties from the mine. The project is important to the continued success of the Grasstree Mine because it provides access to an additional mining area which will extend the life of the mine and the associated socio-economic benefits.

FIGURES



GRASSTREE EXTENSION PROJECT

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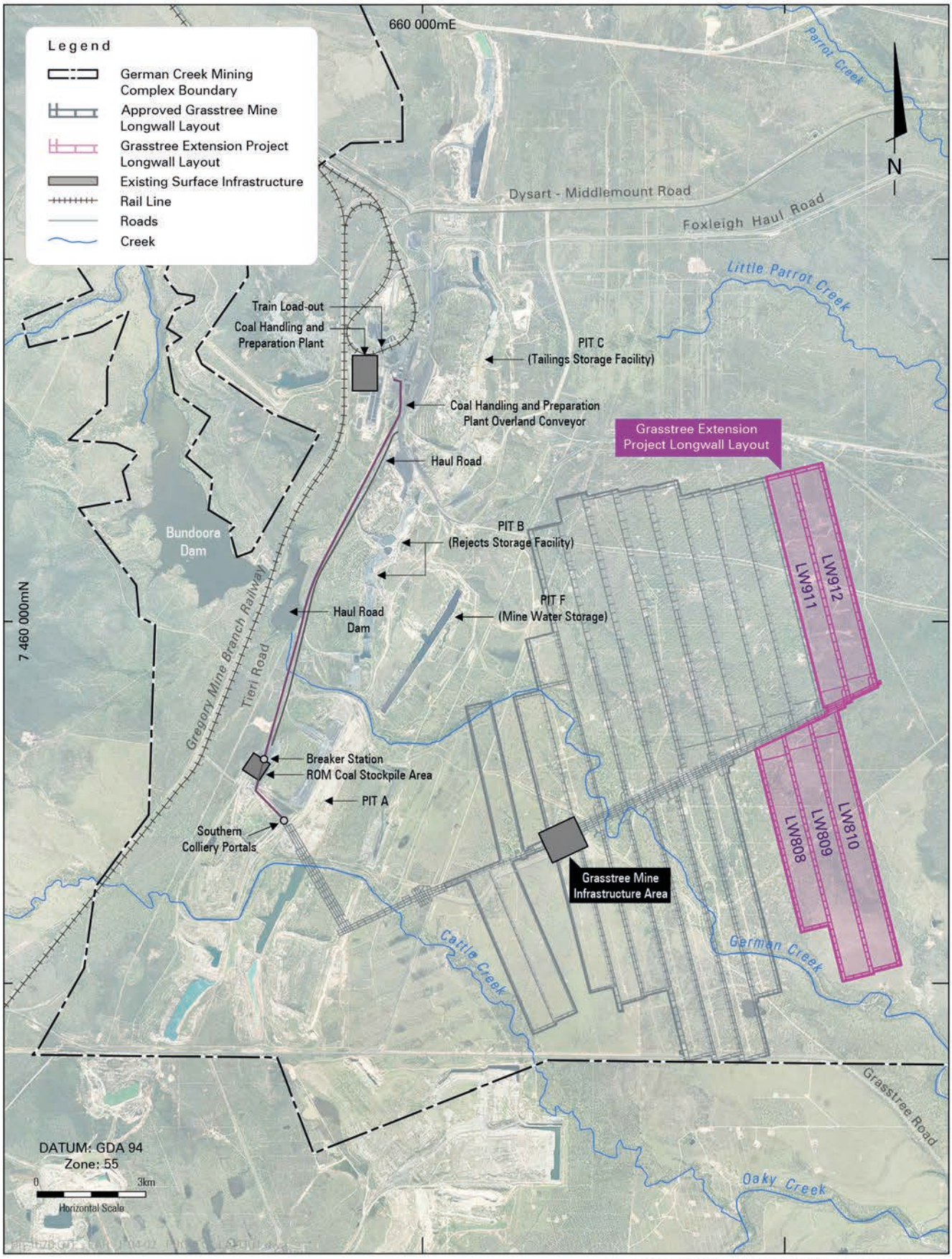
Existing German Creek Mining Complex

FIGURE 2-1



GRASSTREE EXTENSION PROJECT

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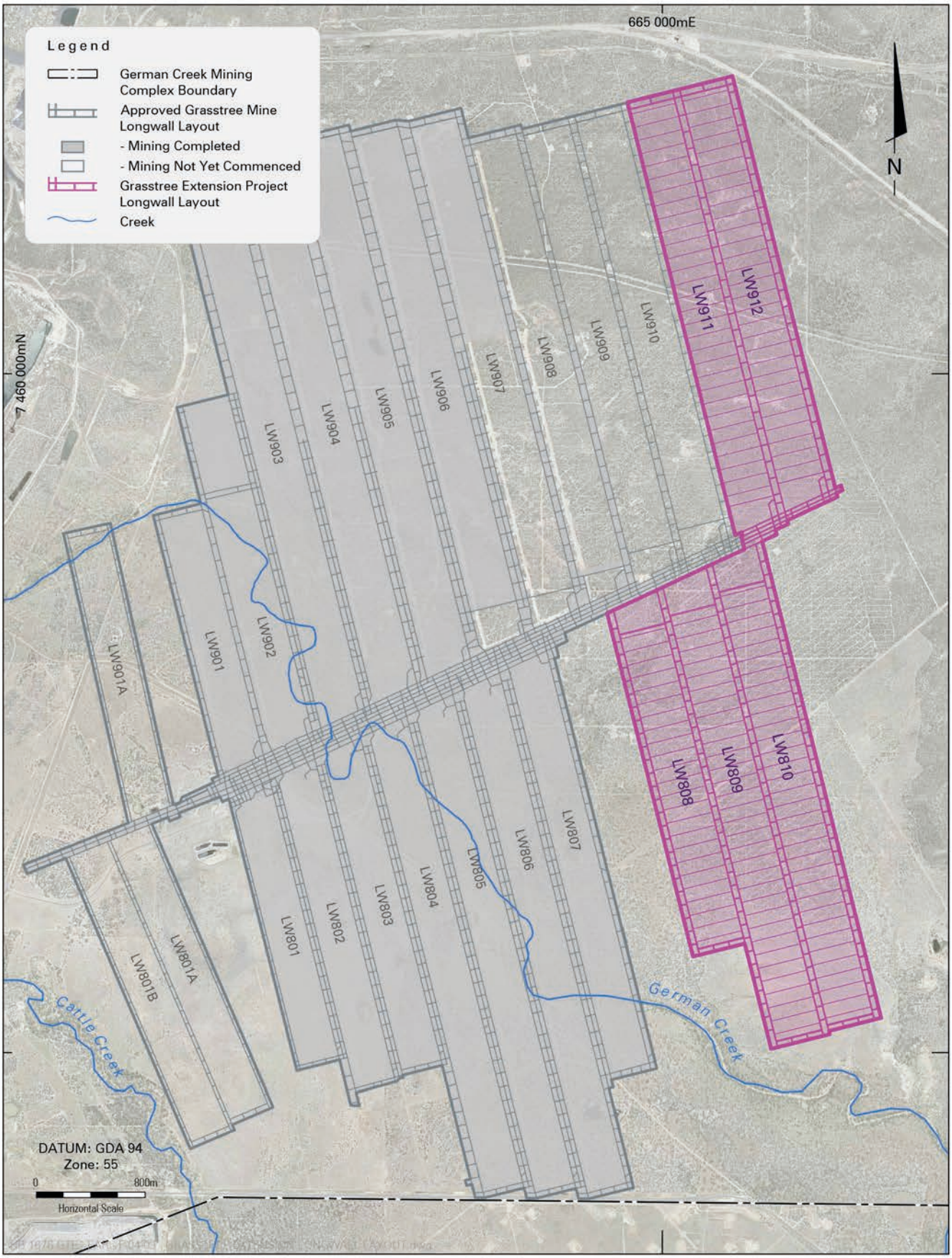
Project Layout

FIGURE 2-2



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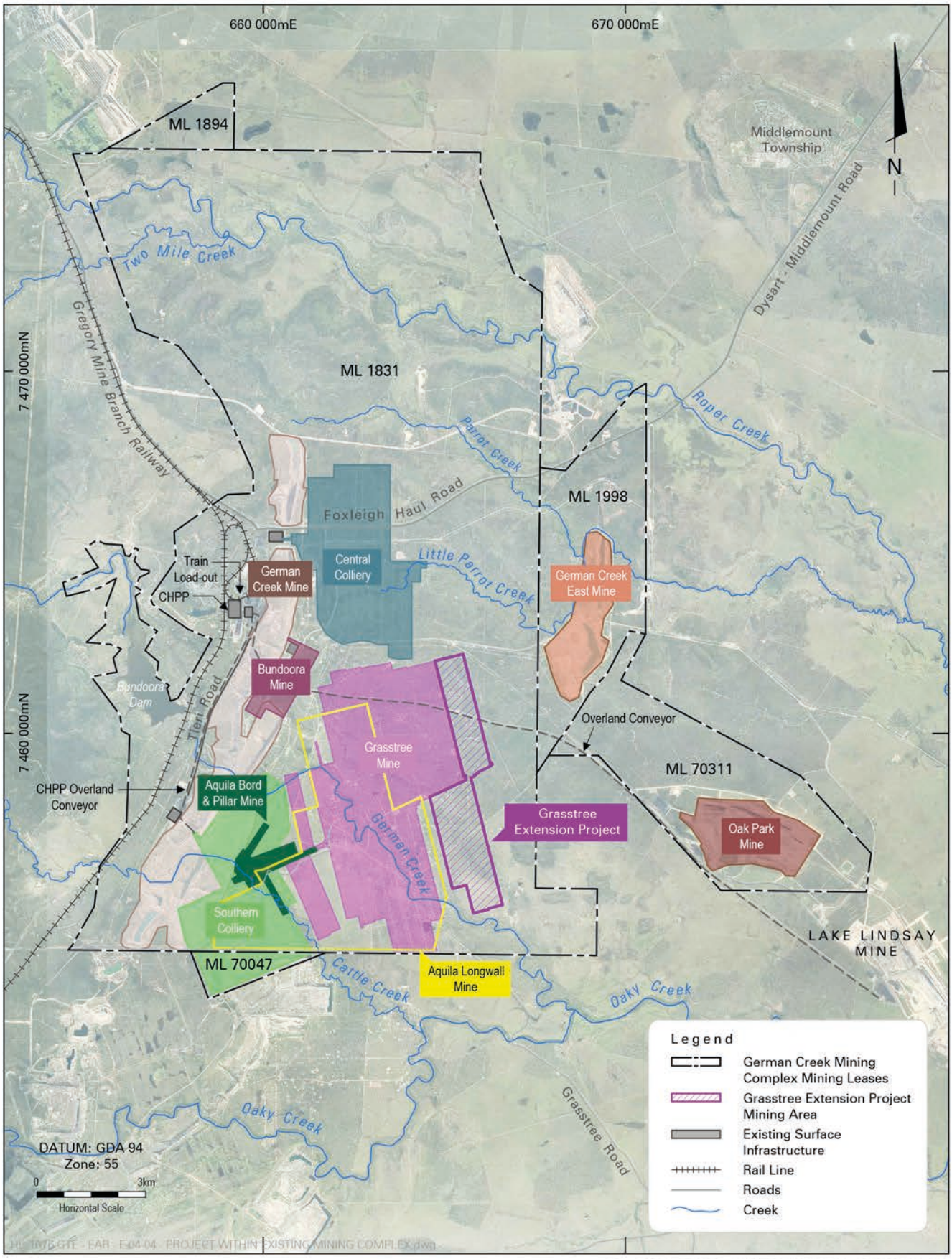
Grasstree Extension Longwall Layout

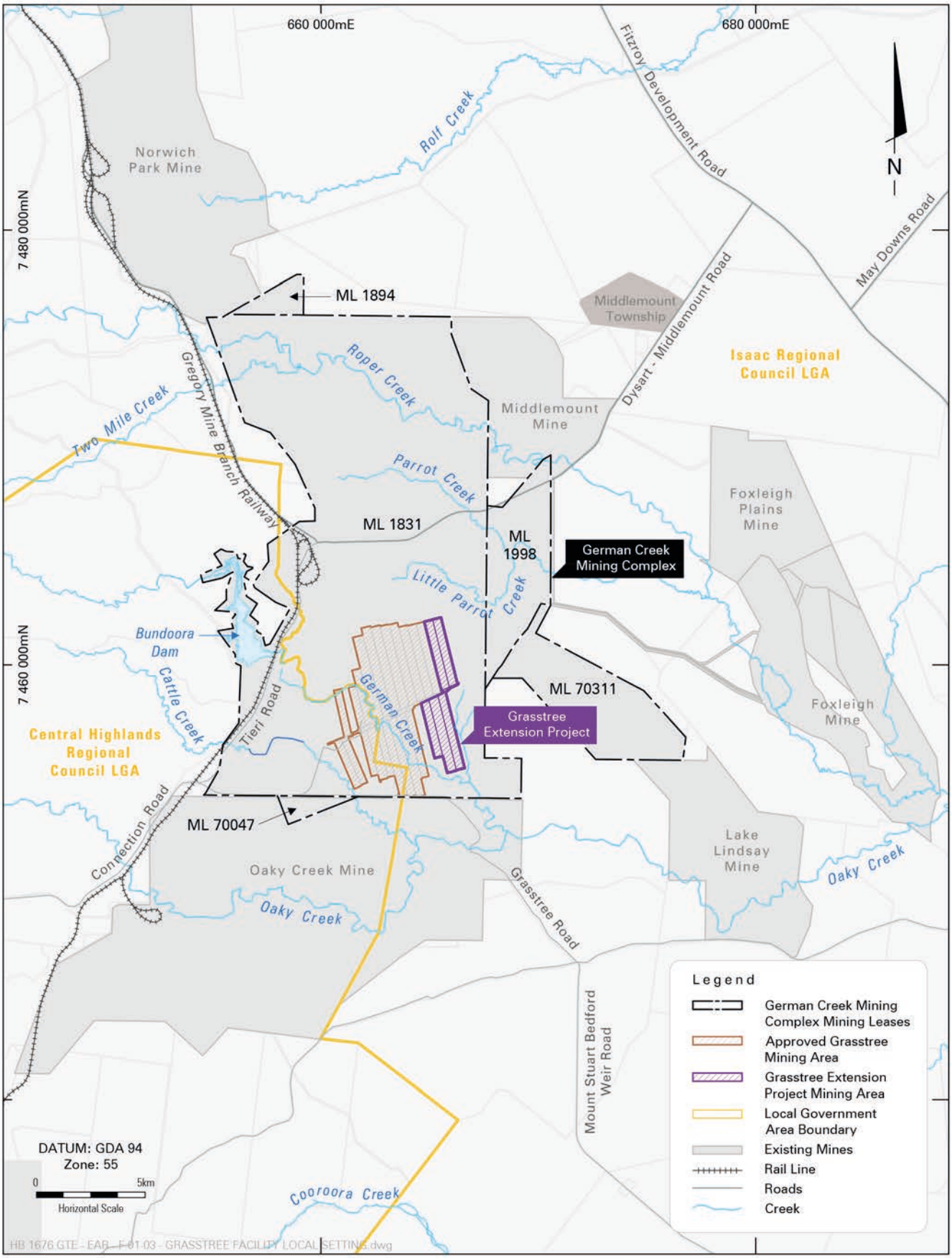
FIGURE 2-3



GRASSTREE EXTENSION PROJECT

The Project Within the Existing German Creek Mining Complex

FIGURE 2-4



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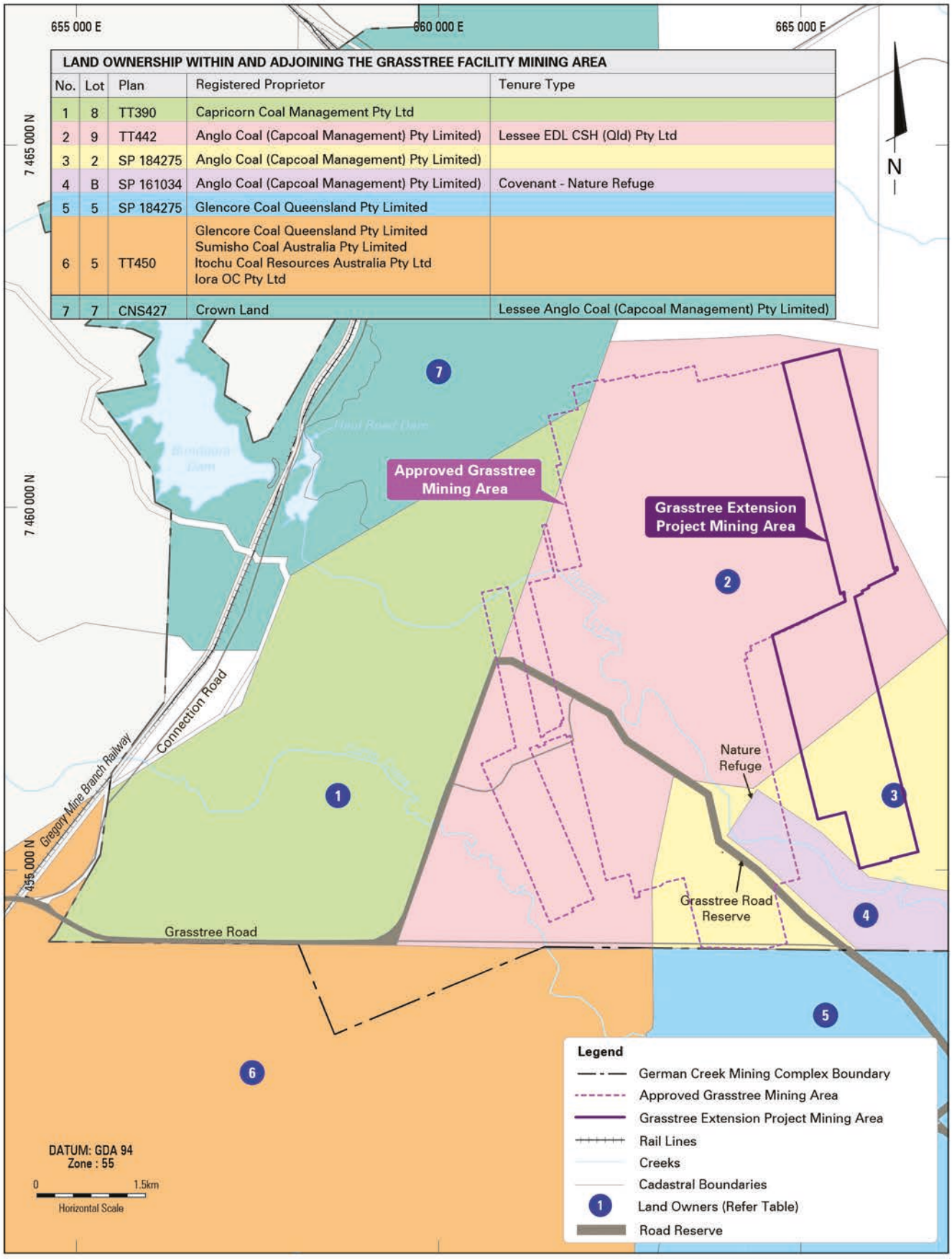
Local Setting

FIGURE 2-5



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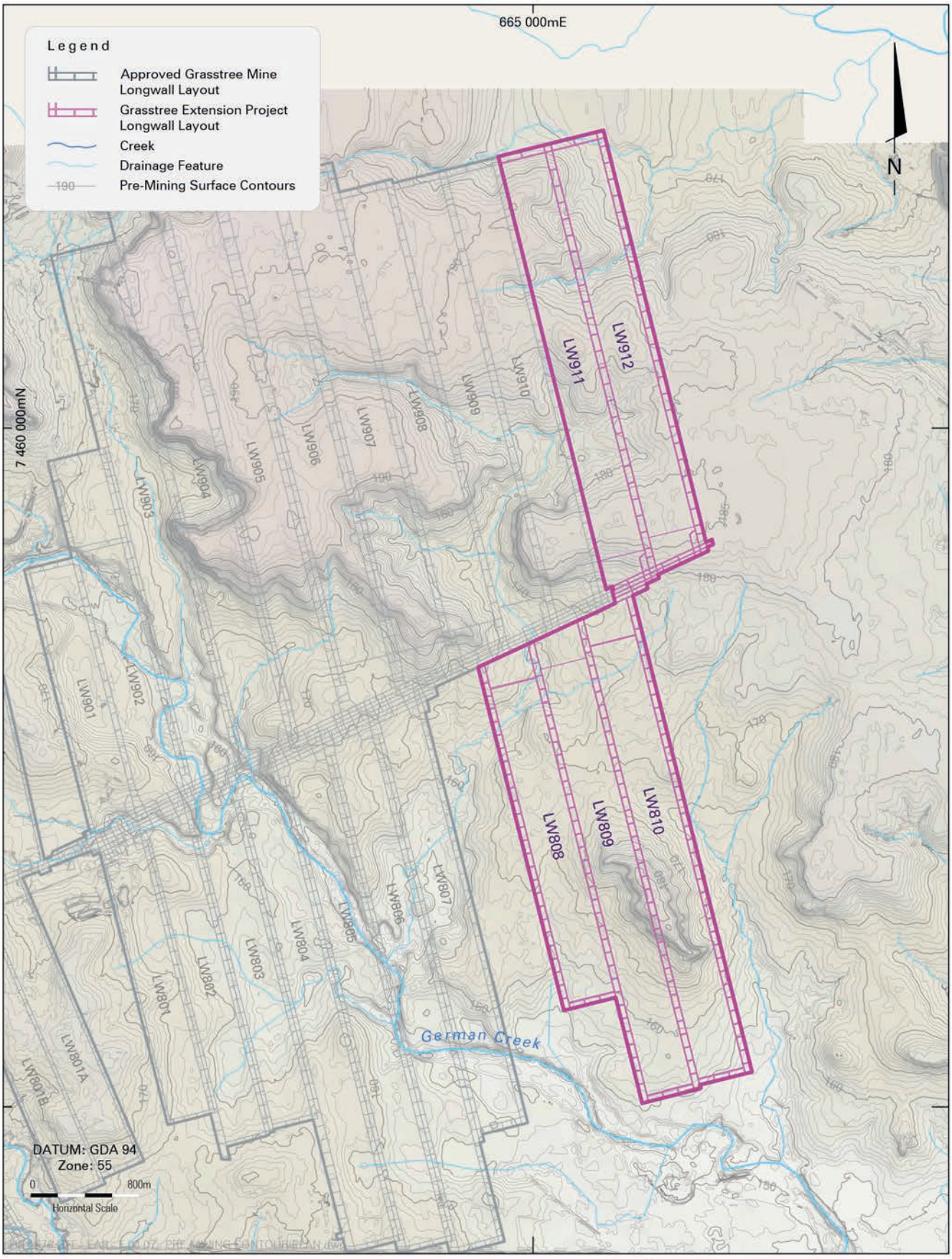
Land Ownership

FIGURE 2-6



GRASSTREE EXTENSION PROJECT

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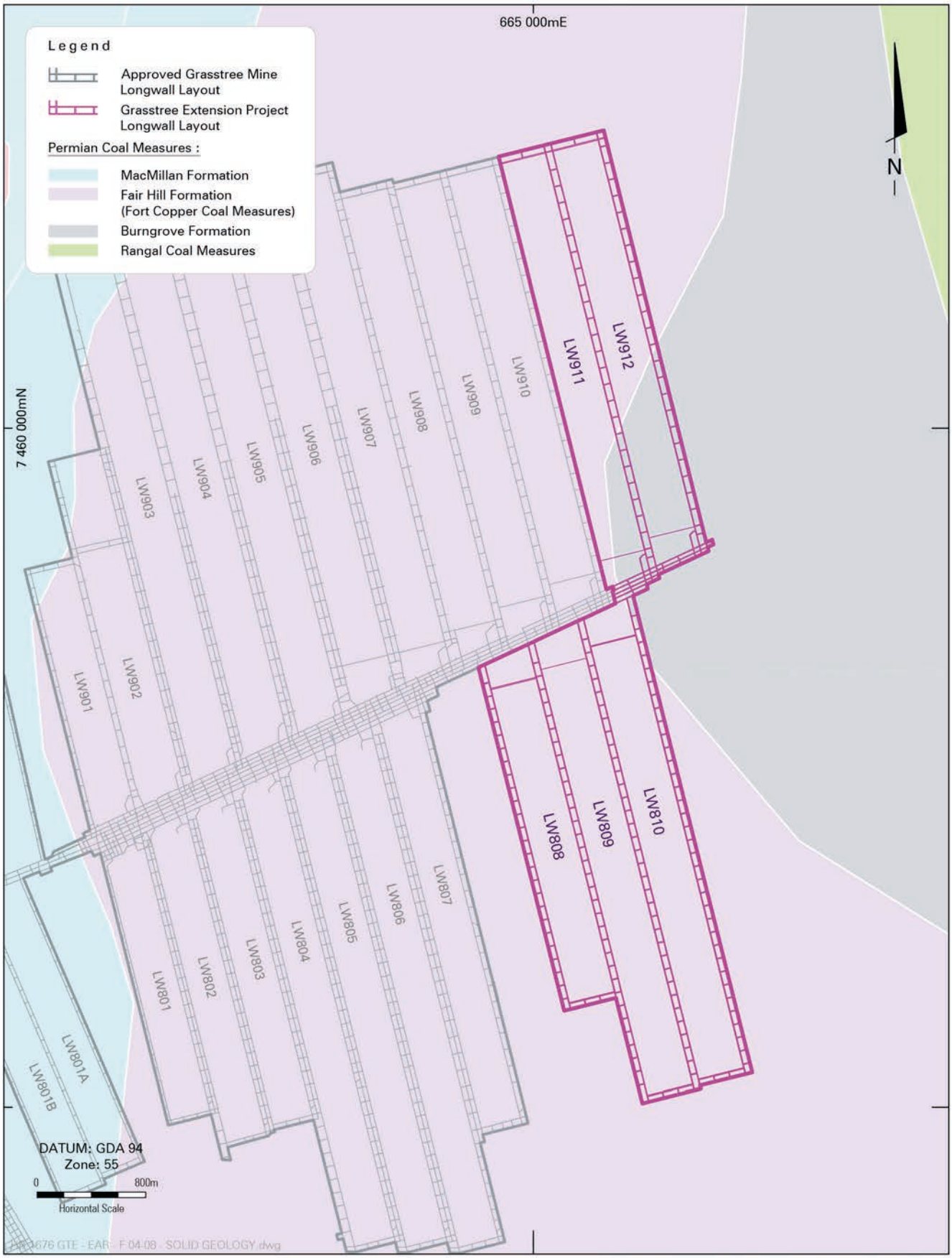
Pre-Mining Contour Plan

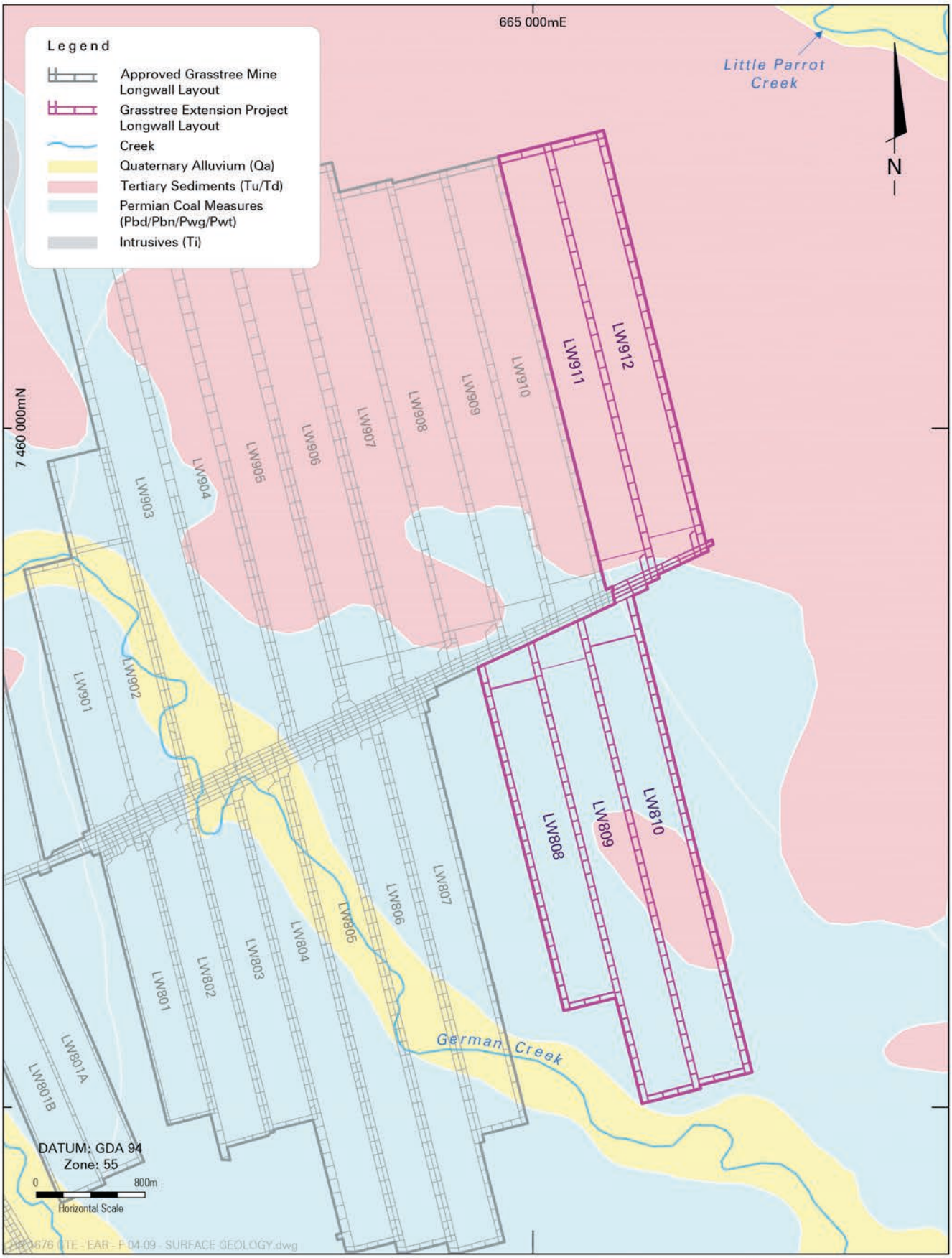
FIGURE 2-7



GRASSTREE EXTENSION PROJECT

Solid Geology of the Bowen Basin

FIGURE 2-8



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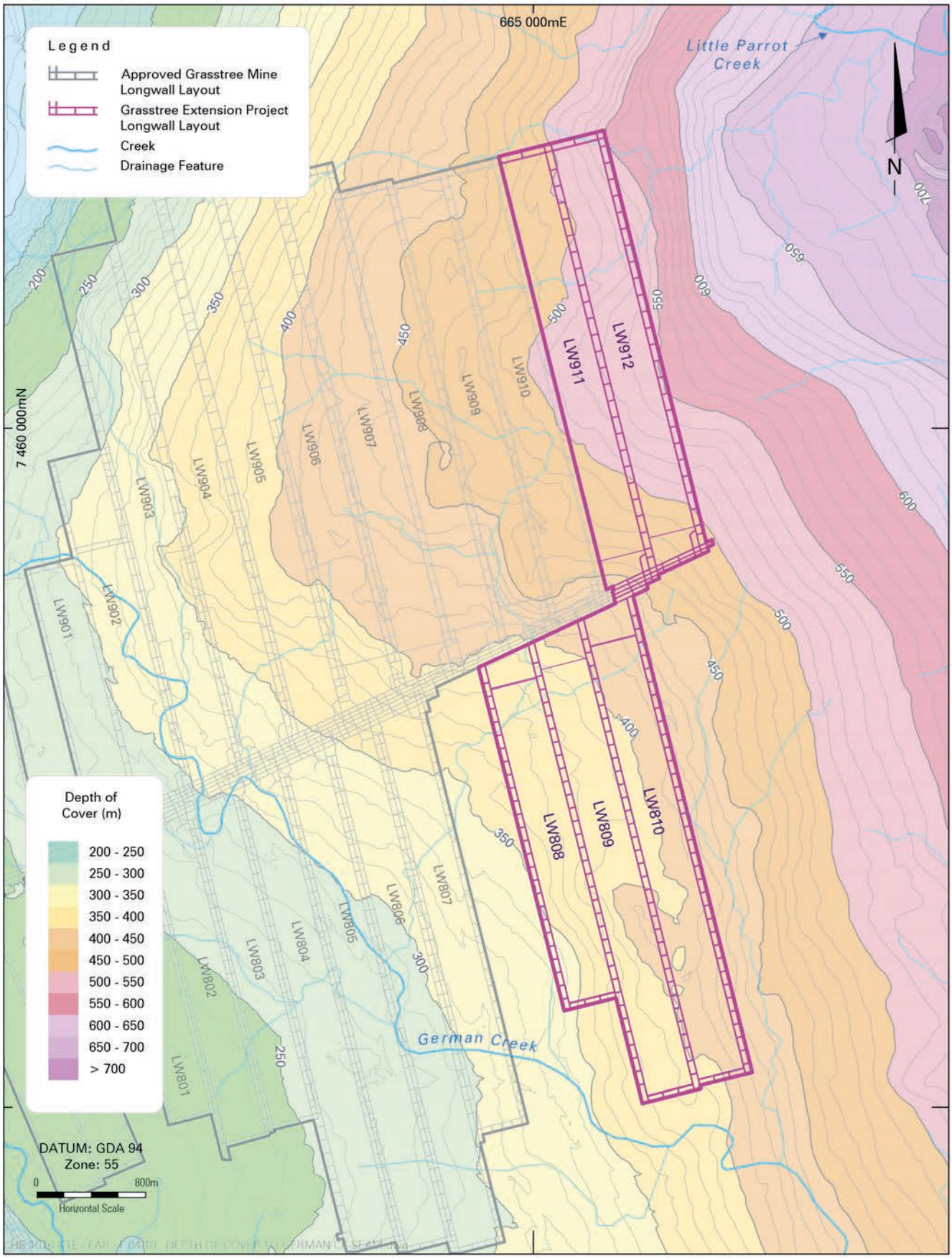
Surface Geology

FIGURE 2-9



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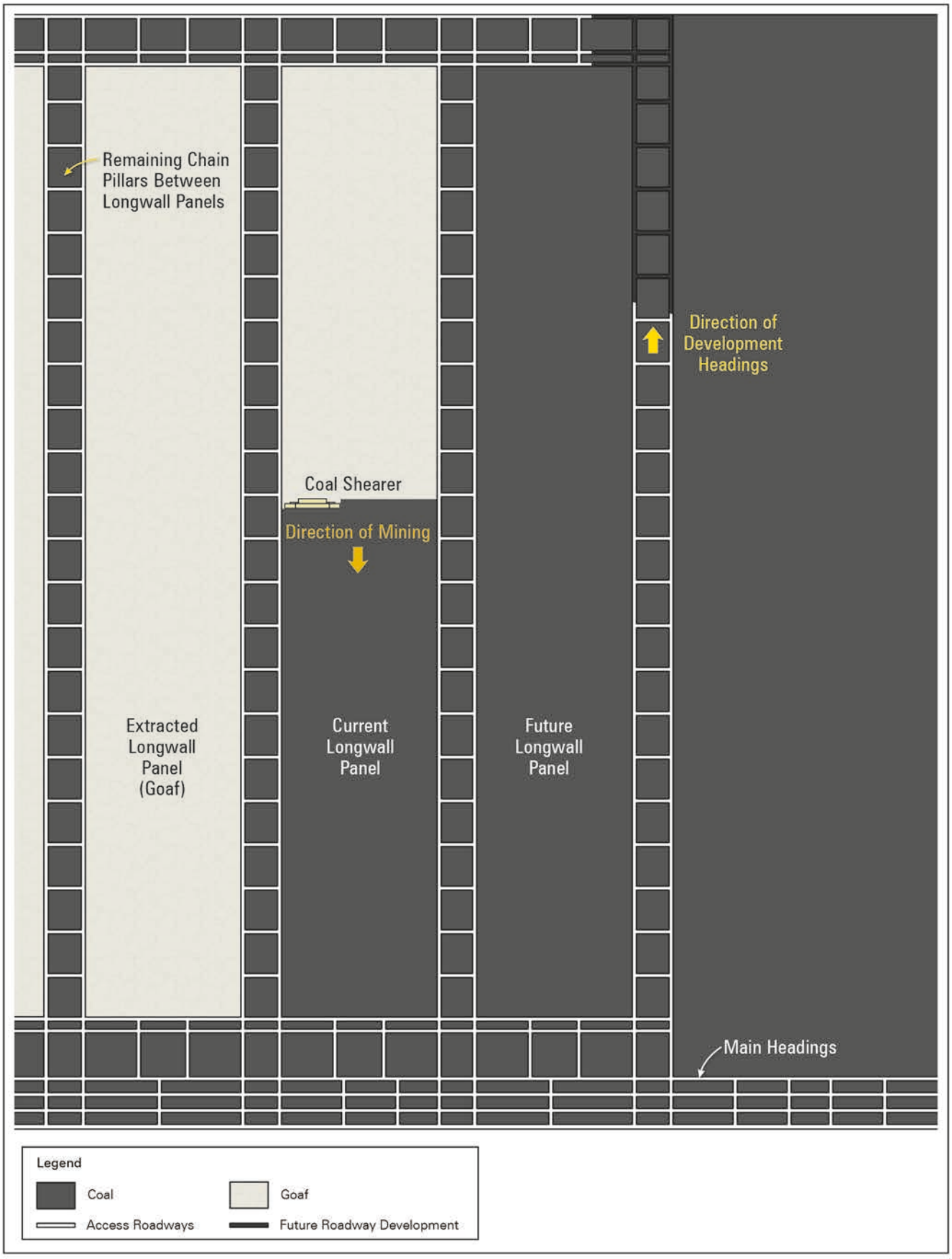
Depth of Cover to German Creek Seam

FIGURE 2-10



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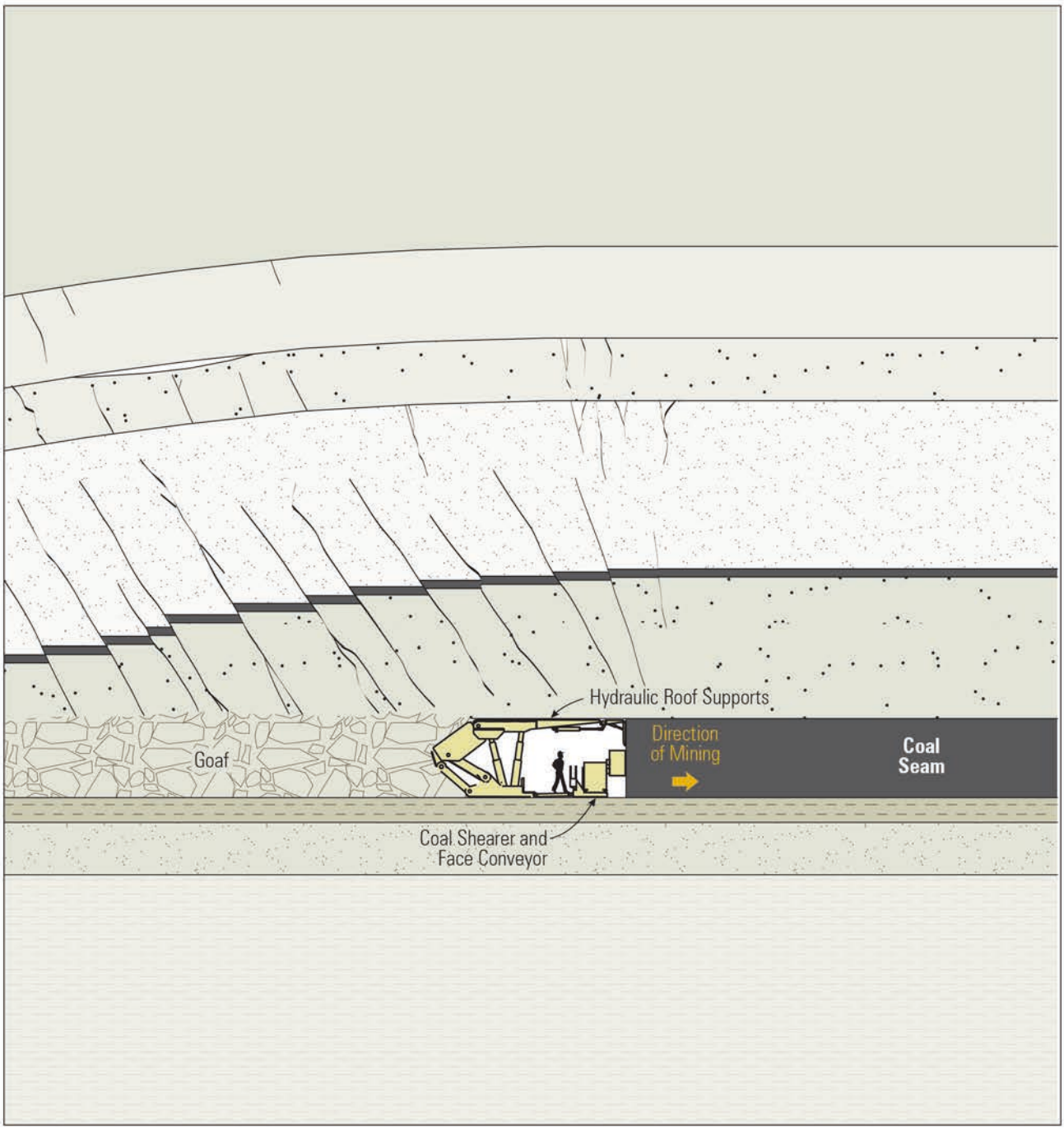
Typical Longwall Layout

FIGURE 2-11



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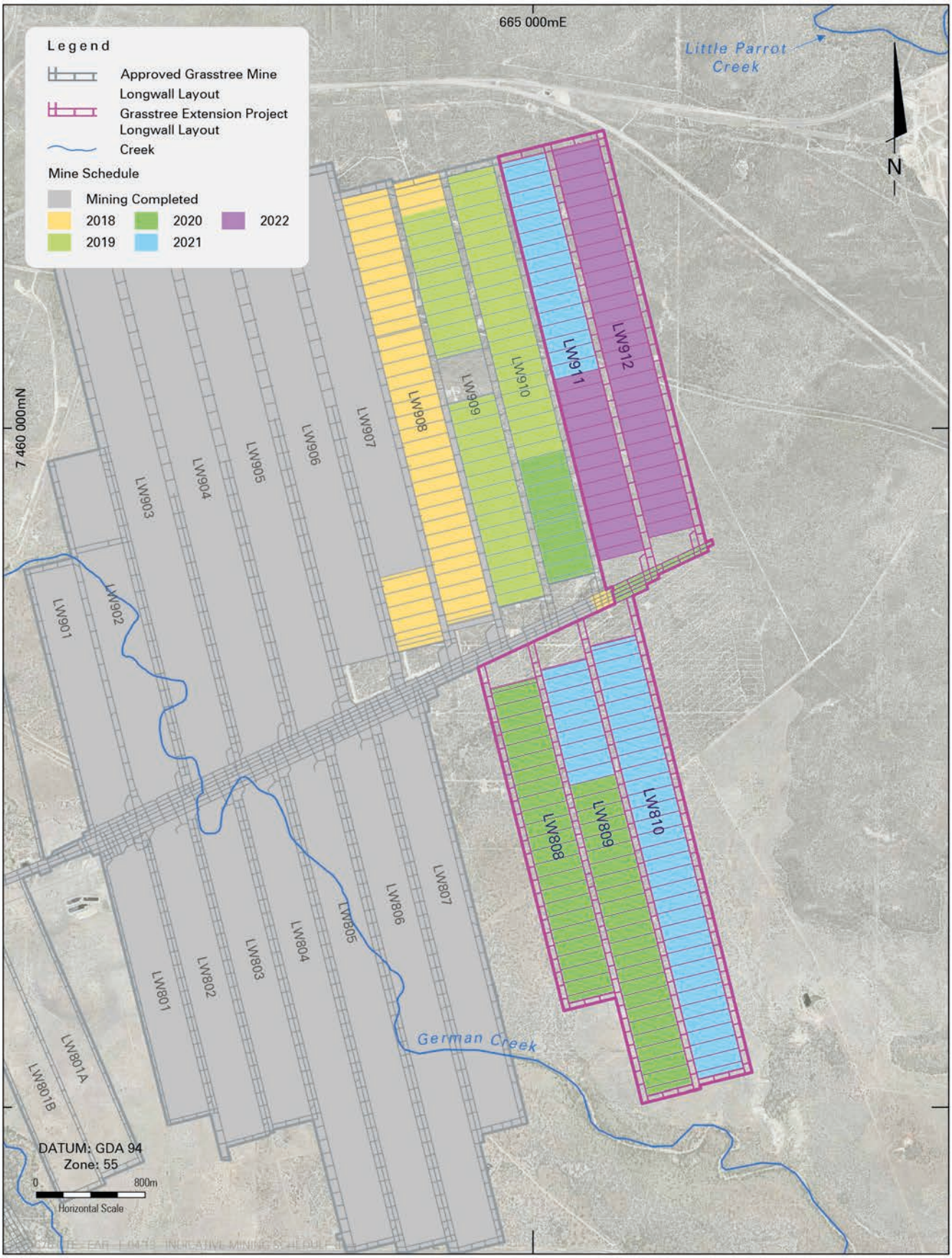
Cross Section Through Typical Longwall Face

FIGURE 2-12



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Indicative Mining Schedule

FIGURE 2-13