Mt Arthur Coal

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Section 2 – Description of the Existing Mt Arthur Coal Mine

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2 DESCRIPTION OF THE EXISTING MT ARTHUR COAL MINE

This section provides a description of the existing Mt Arthur Coal Mine. A history of the development of the Mt Arthur Coal mine is provided in Section 1.1.1.

2.1 MINING

Open Cut Operations

Open cut mining areas at the Mt Arthur Coal Mine consist of (Figure 2-1):

- the Northern Open Cut (formerly known as Mt Arthur North); and
- the Southern Open Cut (including the former Bayswater No. 2, Bayswater No. 3 and South Pit Extension areas).

Open cut mining at the Mt Arthur Coal Mine is conducted using a multi-bench multi-strip shovel and excavator operation, supported by a truck fleet to transport coal to on-site processing and transport facilities. This method provides optimal flexibility and efficiency in the staged extraction of the coal resource. Mining predominantly occurs in the Northern Open Cut, which is comprised of several sub-pits, namely Macleans Hill, Windmill, Huon, Calool and Roxburgh.

The Wittingham Coal Measures are currently mined by HVEC and attain a maximum thickness of greater than 600 m in the Northern Open Cut area and contain in excess of 20 coal seams, or seam groups. Coal is currently mined from the following seam groups:

- Glen Munro;
- Woodlands Hill;
- Arrowfield;
- Bowfield;
- Warkworth;
- Mt Arthur;
- Piecefield;
- Vaux;
- Bayswater;
- Wynn;
- Edderton;
- Clanricard;
- Bengalla;
- Edinglassie; and
- Ramrod Creek.

The approved mining rate at the Mt Arthur Coal Mine is up to 36 Mtpa of ROM coal, of which a maximum 32 Mtpa may be sourced from open cut mining. As outlined in the Consolidation Project EA the indicative mobile mining fleet for the currently approved open cut mining operations is outlined in Table 2-1.

Table 2-1
Indicative Mt Arthur Open Cut Mine Mobile Fleet*

Equipment	Number of Items	
	2016	2022
Electric Face Shovels	5	4
Excavators	18	16
Trucks	107	94
Graders	11	9
Bulldozers	28	24
Rubber Tyre Bulldozers	8	7
Watercarts	8	7
Drills	8	7

Source: HVEC (2009).
* Consistent with 2009 Consolidation Project EA.

All coal mining operations and associated activities at the Mt Arthur Coal Mine are undertaken 24 hours per day, seven days a week.

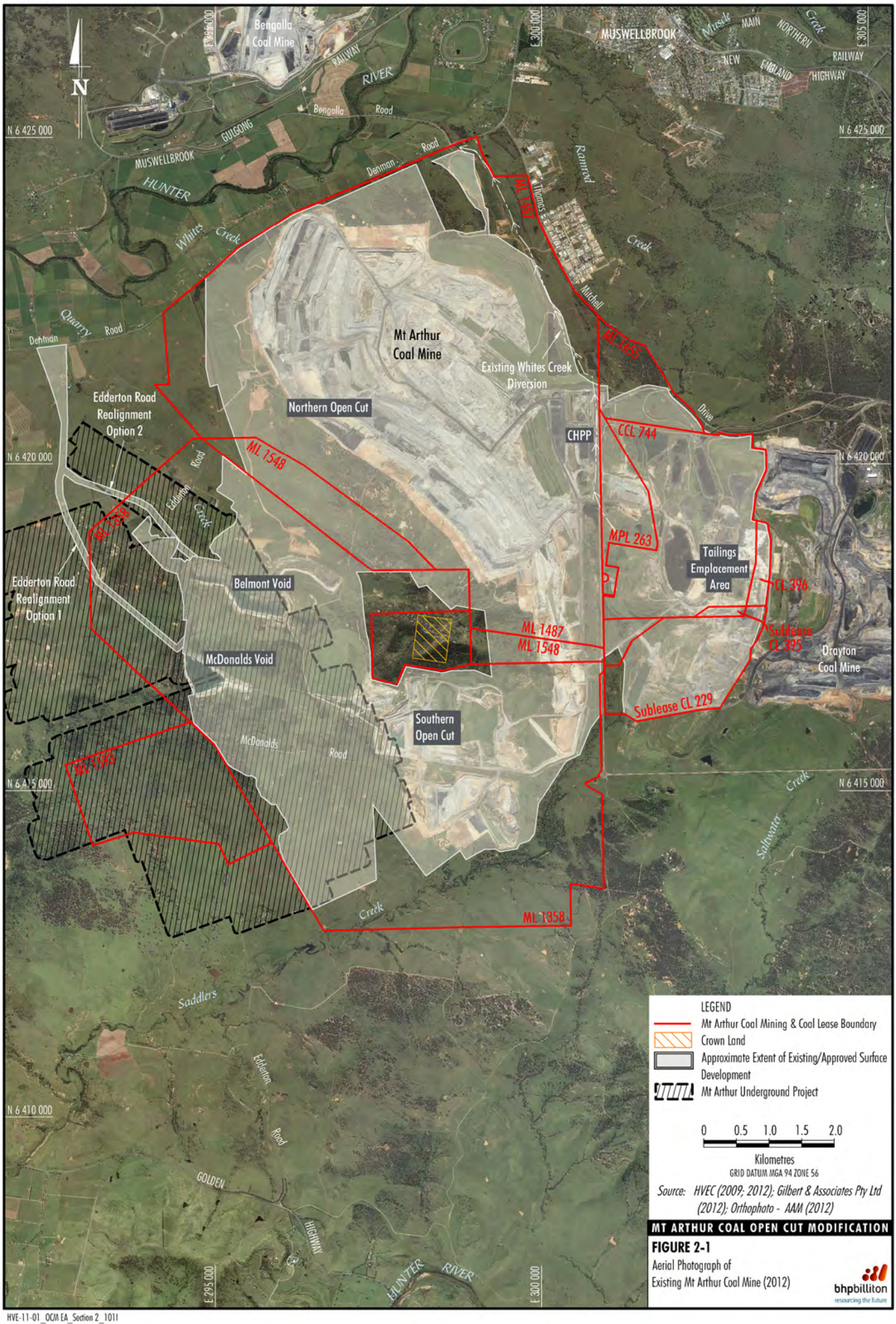
Figure 2-1 shows the existing/approved surface development areas.[1]

Underground Operations

The Mt Arthur Underground Project was approved in 2008. The Mt Arthur Underground Project comprises of longwall mining operations in five coal seams, with transport of ROM coal by conveyor for processing at the CHPP. A maximum of 8 Mtpa may be sourced from the underground mine.

An underground exploration adit was completed in 2009, however, no underground coal extraction currently occurs from the Mt Arthur Underground Project. Given that the focus of the Modification is on open cut activities, the underground mine is not discussed in detail in this EA. The approved extent of the Mt Arthur Underground Project is shown on Figure 2-1.

[1] Approved extent as approved in PA 09_0062. PA 09_0062 also describes the biodiversity offset and Aboriginal heritage management provisions relating to this disturbance.



MT ARTHUR COAL OPEN CUT MODIFICATION

FIGURE 2-1

Aerial Photograph of Existing Mt Arthur Coal Mine (2012)

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2.2 COAL PREPARATION PLANT AND RAIL LOADING FACILITIES

Coal Handling and Preparation Plant

The CHPP is approved to process up to 36 Mtpa of ROM coal from open cut and underground operations at the Mt Arthur Coal Mine to produce saleable thermal coal for export and domestic markets.

The CHPP is located approximately 2 km east of the Mt Arthur Coal Mine product coal loading facilities and is connected to these facilities via overland conveyors.

The CHPP generally comprises:

- coal breaking, coal crushing, sizing screens, classification cyclone, dense medium cyclones and spiral separation equipment;
- internal bypass system to minimise washing of coal (some coal seams are of sufficient quality that ROM coal requires crushing only);
- conveyors, transfer stations, bins, and associated monitoring and maintenance equipment;
- mechanical dewatering equipment (e.g. centrifuges);
- CHPP building enclosed on all four sides; and
- a disposal system for CHPP rejects (tailings and coarse rejects).

ROM Coal Pad

The existing ROM pad area comprises:

- stockpiling of ROM coal via haul truck;
- reclaim of stockpiled coal using front end loaders; and
- two ROM coal hoppers[2] (fitted with dust suppression systems), which deliver ROM coal to conveyors for transport to the CHPP.

Product Coal Handling

The existing product coal handling system comprises:

- conveyors transporting export product coal to a rail loading facility[3];
- conveyor transporting domestic product coal to Macquarie Generation's Bayswater Power Station; and
- product coal stockpiles.

Modifications and upgrades to this infrastructure approved under the Consolidation Project EA are ongoing.

Rail Loading Facility

Export product coal is loaded onto trains at the rail loading facility for transport to the Port of Newcastle via the Antiene Rail Spur and Main Northern Railway line.

The rail loading facility comprises:

- a product coal stockpile;
- a transfer station;
- conveyors transferring from stockpile reclaim transfer station to train loading bin;
- rail loading bin; and
- a rail loop and spur, which in turn connects to the Antiene Rail Spur and on to the Main Northern Railway.

The existing and approved rail haulage capacity is up to 27 Mtpa of product coal with a maximum of 24 rail movements per day.

2.3 TAILINGS AND COARSE REJECTS MANAGEMENT

All coarse rejects produced by the CHPP is co-disposed within the overburden emplacement areas or utilised in the construction of tailings dams, stockpiles or other infrastructure (HVEC, 2009).

Tailings (or fine rejects) are stored in the tailings emplacement area (Figure 2-1), which will be constructed in a series of stages up to a maximum height of 280 m AHD (HVEC, 2009).

Two rejects streams (coarse and fine) are produced by the CHPP. It is estimated that on average approximately 30 percent by weight of ROM coal feed to the CHPP becomes rejects, with 19 percent by weight of ROM coal feed becoming coarse and the remainder fine.

[2] A third ROM coal hopper is approved, however is not yet constructed.

[3] A second facility is approved, however is not yet constructed.

2.4 WATER SUPPLY AND WATER MANAGEMENT

Water management on-site is conducted in accordance with the *Site Water Management Plan* (BHP Billiton, 2012a). The key elements of site water supply and management are outlined below (HVEC, 2009):

- Tailings water will be reclaimed for re-use in the CHPP and for dust suppression.
- Water recovered from the open cut and underground operations will continue to be pumped to mine water storages and will also be used in the water management system.
- During abnormally wet periods leading to an excess of water being generated on-site (when the volume of water being held on-site is in excess of that required to ensure water supply security and there is an increased risk of disruption to mining as a result of excess water being held in open cut pits) water will be transferred to the Environmental Dam with a view to controlled release under the Hunter River Salinity Trading Scheme (HRSTS).
- Runoff from haul roads, hardstand and pre-strip areas will either be directed to existing mine water storages (where feasible) or will be captured in sediment retention storages sized to trap silt and other material which easily settle.
- Water in the sediment dams may be used for dust suppression around the mine. Sediment dams will be generally sized in accordance with the *Erosion and Sediment Control Plan* (BHP Billiton, 2012b).
- Runoff from workshop, industrial and vehicle refuelling areas, which has the highest potential to contain elevated hydrocarbons, will continue to be captured in downslope dams and recycled within the mine water management system. Treated effluent will continue to be recycled to the Main Dam via the existing wetland.
- Runoff from rehabilitated and revegetated areas will continue to be directed to mine water storages or be directed to sediment retention storages prior to being allowed to drain to local drainages. These areas will be allowed to free drain as the landform becomes stable.

As part of the existing operations, the Main Dam will be decommissioned, with existing pump and pipelines upgraded to compensate for this loss of on-site storage.

Whites Creek Diversion

Whites Creek was diverted as part of the development of the Northern Open Cut. This diversion was constructed to divert Whites Creek around the mine infrastructure area and overburden emplacement (Figure 2-1). The diversion comprises an open channel, pipe through the acoustic/visual bund north of the existing infrastructure area and culverts beneath site access roads.

The channel, pipe and culverts were designed for a one in 100 year average recurrence interval rainfall event (Dames and Moore, 2000a).

Low-Permeability Barrier

In order to manage potential impacts on Hunter River alluvials, HVEC has committed to the installation of a low permeability barrier, as described in the excerpt below (HVEC, 2009):

> *Mt Arthur Coal will continue to monitor hydro-geomorphological conditions and scrutinise for evidence of any groundwater ingress or endwall instability indicators as it progresses the previously approved mining towards the Hunter River Alluvials. Mining (other than that already approved in the MAN* [Mt Arthur North] *EIS) will not extend beyond a nominal 150 m buffer zone from the Hunter River Alluvials until agreement is reached with NOW regarding the installation of a lower permeability barrier along the point of connections of mining and the alluvium or other appropriate safeguards.*

Investigations in relation to the low permeability barrier to be installed south of Denman Road have commenced and consultation with NOW has been undertaken.

The potential for flooding in the Northern Open Cut was studied as part of the Consolidation Project EA (HVEC, 2009). Flood bund protection will be constructed in the vicinity of Denman Road where the topography is less than the 1955 peak flood level in the Hunter River (considered representative of a one in 100 year flood event in Muswellbrook) plus 0.5 m freeboard. The detailed design was submitted with the NSW Office of Water for approval in November 2012. The flood bund will be designed to protect against a one in 1,000 year average recurrence interval rainfall event.

2.5 GENERAL INFRASTRUCTURE

The existing and approved general infrastructure at the Mt Arthur Coal Mine:

- an access road located off Thomas Mitchell Drive;
- offices, stores, bathhouses, workshops and administration facility;
- a CHPP and noise bund constructed along the northern side of the CHPP;
- rail loop and rail spur;
- an electricity supply and distribution system;
- water reticulation systems; and
- water storages, retention basins and associated water management structures.

2.6 EDDERTON ROAD REALIGNMENTS

The northern part of Edderton Road will be realigned in approximately 2019. The two conceptual options are shown on Figure 2-1 and include realignment of both a portion of the Edderton Road and relocation of the Denman Road and Edderton Road intersection.

A southern section of Edderton Road has been approved to be realigned as part of the Bayswater No. 3 Coal Mine (Umwelt, 2008a). Although this realignment has not been constructed to date, the Mt Arthur Underground Project approval facilitates the required realignment prior to the commencement of mining in the Glen Munro seam (Umwelt, 2008a).

2.7 PRODUCT COAL TRAIN MOVEMENTS

Consistent with Condition 7(b) of Schedule 2 of Project Approval 09_0062, product coal train movements are limited to 24 movements (or passbys) per day (or 12 fully laden train departures). Additional movements can be accessed in accordance with an agreement with the Drayton Coal Mine (where a copy of the agreement has been provided to the Director-General of the DP&I).

2.8 WASTE MANAGEMENT

HVEC operates a total waste management system at the Mt Arthur Coal Mine which has been designed to minimise the generation of waste and maximise re-use and recycling (BHP Billiton, 2011a). This system categorises waste produced on-site, which allows for effective tracking and management of waste. Approximately 91 percent of all waste produced on-site was recycled in 2011 (BHP Billiton, 2011a). Recyclables are removed from site for separation and recovery by appropriate contractors.

Waste oils and greases are held in tanks in a bunded area and removed from site by licensed contractors (HVEC, 2009).

2.9 REHABILITATION

The key objectives of the Mt Arthur Coal Mine rehabilitation programme are (HVEC, 2009):

- achieving a land capability following the cessation of mining that is comparable to pre-mining land capability and considers stakeholders' interests;
- allowing for sustainable post-mining land use(s) to occur;
- establishing a clear set of indicators to be met;
- increasing areas of native vegetation and available fauna habitat;
- improving linkages between existing areas of remnant vegetation; and
- increasing the average percentage of native woodland to improve habitat value (i.e. at least 30 percent of rehabilitation areas will be returned to native woodland).

Section 5 provides a description of the rehabilitation principles and methodologies that apply to the existing operations.

2.10 WORKFORCE

At the end of 2012, the total workforce at the Mt Arthur Coal Mine (HVEC employees and contractors) was approximately 2,142 (BHP Billiton, 2012c). As described in the Consolidation Project EA, the total workforce required for peak production will be approximately 2,600 employees and contractors.

In addition, a workforce of approximately 240 personnel will be required during peak construction (HVEC, 2009).

2.11 ENVIRONMENTAL MONITORING AND MANAGEMENT

Mt Arthur Coal Environmental Management Strategy

HVEC has developed an Environmental Management Strategy (EMS) (BHP Billiton, 2012d) and has implemented a comprehensive EMS that provides a framework to facilitate compliance with legal and other requirements (including statutory approvals, BHP Billiton requirements and stakeholder expectations).

The objectives of the EMS are to meet the requirements of the Project Approval 09_0062, and to manage and minimise the impact of the Mt Arthur Coal Mine on the surrounding environment and community, as well as providing the community with an overview of the EMS in place at Mt Arthur Coal Mine (BHP Billiton, 2012d).

A number of management plans, monitoring program and strategies are sub-components of the EMS, including:

- Air Quality Management Plan;
- Air Quality Monitoring Program;
- Noise Management Plan;
- Noise Monitoring Program;
- Blast Management Plan;
- Blast Monitoring Program;
- Surface Water Monitoring Program;
- Site Water Management Plan;
- Site Water Balance;
- Erosion and Sediment Control Plan;
- Surface and Groundwater Response Plan;
- Groundwater Monitoring Program;
- European Heritage Management;
- Aboriginal Heritage Management Plan;
- Biodiversity Management Plan;
- Biodiversity Monitoring Program;
- Rehabilitation Management Plan;
- Rehabilitation Strategy;
- Biodiversity Offset Strategy;
- Blast Management Plan; and
- Blast Monitoring Program.

The performance of the EMS and its associated plans, program and documents are reported annually in the AEMR, in accordance with the Project Approval 09_0062, and in the Annual Return in accordance with EPL 11457.

Mt Arthur Coal Environmental Monitoring Program

A key component of the EMS is the Environmental Monitoring Program (EMP). The EMP allows HVEC to effectively manage and measure its environmental performance through a comprehensive monitoring system.

The Mt Arthur Coal Mine environmental monitoring system includes the following locations as shown on Figure 2-2:

- seven meteorological stations (including stations on real-time noise monitors);
- eight High Volume Air Samplers (HVASs), particulate matter less than 10 micrometres in size (PM_{10}), six real-time continuous dust monitors, 21 depositional dust gauges;
- four permanent continuous noise monitors, one mobile continuous noise monitor, eight quarterly attended noise monitoring locations;
- five blast monitors;
- 48 groundwater monitoring locations; and
- 22 surface water sampling points.

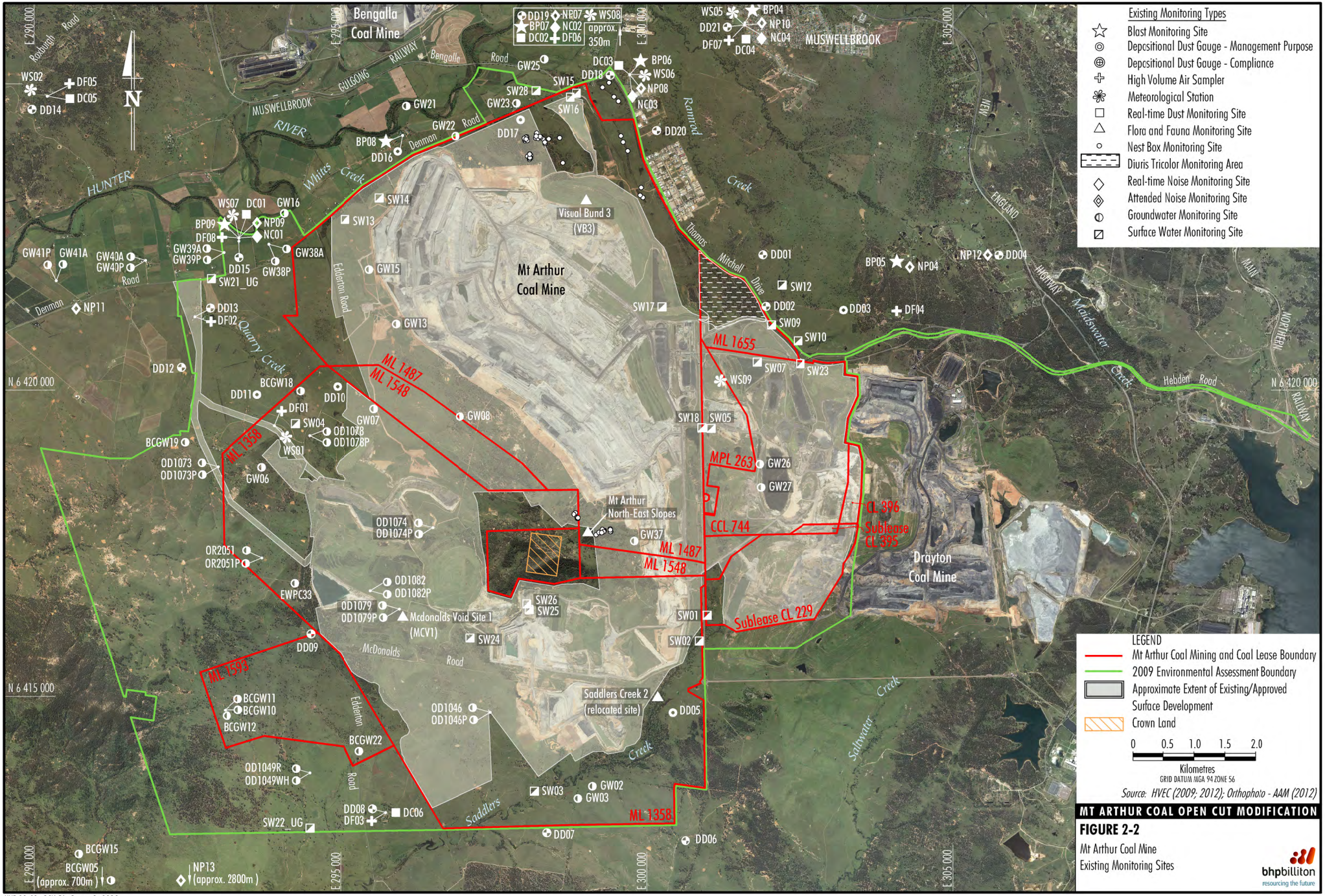
EMP monitoring results are published in the AEMR and are distributed to government agencies, employees, the CCC, and the local library via the BHP Billiton website (www.bhpbilliton.com/).

2.12 COMPLAINTS RECORD

A summary of the HVEC complaints record from January 2002 to December 2011 is provided on Figure 2-3.

As shown on Figure 2-3, the number of complaints generally decreased between 2003 and 2010. However in 2011, complaints increased sharply in comparison to the previous years to a total of 89, the highest since complaints have been recorded.

During this period, there was increased blasting activity in the northern portion of the Northern Open Cut, closest to neighbouring residents, which accounts for the increase in the number of complaints related to vibration, dust and fume impacts from blasting activities.



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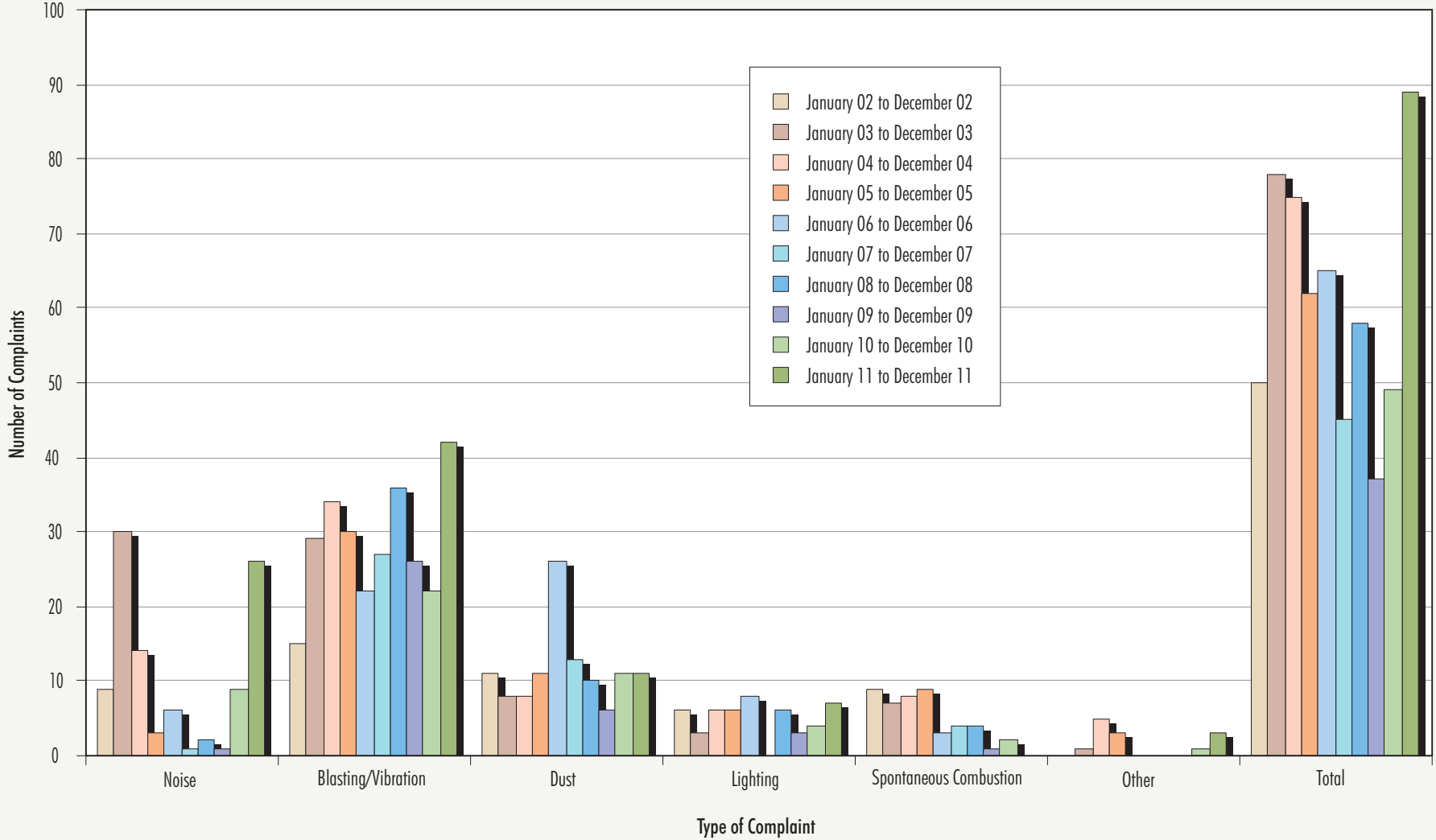

Source: HVEC (2012)

MT ARTHUR COAL OPEN CUT MODIFICATION

FIGURE 2-3

Mt Arthur Coal Mine Complaints Record
January 2002 - December 2011

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Blasting complaints contributed almost half of the total complaints for the 2002 to 2011 period.

Complaints Management

All complaints are investigated and a response is provided to the complainant. To minimise potential for recurrences, observations and learnings from complaint investigations are incorporated into mine planning and environmental management as appropriate.

2.13 KEY OPERATIONS IN THE VICINITY OF THE MT ARTHUR COAL MINE

Bengalla Coal Mine

Bengalla Mining Company Pty Limited owns the existing Bengalla Coal Mine, which is an open cut coal mine located 2 km north of the Mt Arthur Coal Mine (Figures 1-2 and 2-1).

Bengalla Coal Mine is approved to produce up to 10.7 Mtpa of ROM coal until the 27 June 2017 under its Development Application (DA 211/93), as modified in October 2011.

Drayton Coal Mine

Anglo Coal (Drayton Management) Pty Limited owns the existing Drayton Coal Mine, which is an open cut coal mine located east of the Mt Arthur Coal Mine (Figures 1-2 and 2-1).

Drayton Coal Mine is approved to produce up to 8 Mtpa of ROM coal until the end of December 2017 under its Project Approval (06_0202), as modified on 17 February 2012.

Mt Pleasant Coal Mine

Coal and Allied Operations Pty Ltd owns the existing Mt Pleasant Coal Mine, which is an open cut coal mine located 8 km north of the Mt Arthur Coal Mine (Figure 1-2). The Mt Pleasant Coal Mine has not commenced coal production.

Mt Pleasant Coal Mine is approved to produce up to 10.5 Mtpa of ROM coal until 22 December 2020 under its Development Consent (DA 92/97), as modified on 19 September 2011.

Mangoola Coal Project

Xstrata Mangoola Pty Limited owns the existing Mangoola Coal Project, which is an open cut coal mine located 10 km north-west of the Mt Arthur Coal Mine (Figure 1-2).

Mangoola Coal Project is approved to produce up to 10.5 Mtpa of ROM for 21 years under its Project Approval (06_0014), as modified on 23 February 2010.

Potential Projects

The following two Major Projects/State Significant Developments are proposed in the vicinity of the Mt Arthur Coal Mine:

- *Drayton South Coal Project* – Open cut and highwall mining operations extracting up to 7 Mtpa of ROM coal over 26 years. This Project was on exhibition during November and December 2012, however, was not determined at the time of writing.
- *Bengalla Continuation Project* - Open cut coal mining at up to 15 Mtpa ROM coal for 24 years continuing to utilise a dragline and truck/excavator fleet. DGRs have been provided.

At the time of writing, DGRs were available for Bengalla, however, no substantial assessment (i.e. EA or Environmental Impact Statement [EIS]) was available. The Drayton South Coal Project EA has been considered in this EA with respect to cumulative issues.

2.14 REHABILITATION

The rehabilitation concepts described for the existing Mt Arthur Coal Mine (Section 2.9) would remain for the Modification with the exception that the Saddlers Pit void would be backfilled as part of the final landform profiling for the Modification. This is discussed further in Section 5.

2.15 WORKFORCE

The Modification would facilitate the continuity of employment for the existing and approved workforce consisting of approximately 2,600 employees (i.e. no additional employment would be required).

Approximately 60 employees associated with the explosives facility and magazine would access the site via the new site entrance off Edderton Road, once this access is constructed and commissioned. These employees are part of the overall site employment total of 2,600.