DONALDSONCOAL

Part of the Yancoal Australia Group

ABN: 87 073 088 945

YANCOAL 兖煤澳大利亚有限公司

Rehabilitation Management Plan

Abel Underground Coal Mine

October 2023

DONALDSON COAL

PTY LTD

ABN: 87 073 088 945

Rehabilitation Management Plan

for the

Abel Underground Coal Mine

Prepared for:

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Ref No. 737/26 October 2023

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Summary Table

Name of Mine		Abel Underground Coal Mine - Rehabilitation Management Plan		
RMP Commencement Date		2 July 2022		
Mineral Authorities		ML1618	**Expiry Date**	20 December 2020 (renewal sought)
Name of Leaseholder		Donaldson Coal Pty Ltd		
Version	**Author**	**Purpose**	**Approved by**	**Date of Submission**
1	RWC / Donaldson Coal	New Document	Phillip Brown	1 August 2022
2	RWC / Donaldson Coal	Approval of ROBJ and FLRP	Phillip Brown	6 October 2023

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LIST OF ACRONYMS

AHD	Australian Height Datum
BTEX	benzene, toluene, ethylbenzene and xylene
DA	Development Application
DRE	Department of Resources and Energy
EIS	Environmental Impact Assessment
EPA	Environment Protection Authority
EPL	Environment Protection Licence
FMCU	Four Mile Creek Upstream
FPC	foliage projective cover
GSS	Global Soil Systems Pty Limited
GSSE	GSS Environmental Pty Limited
HEC	Hydro Engineering and Consulting
LTI	Lost Time Injury
ML	Mining Lease
NRAR	Natural Resources Access Regulator
NSW	New South Wales
PKK	PKK Environment & Infrastructure Pty Ltd
RMP	Rehabilitation Management Plan
ROM	Run of mine
RWC	R.W. Corkery & Co. Pty Limited
SLR	SLR Consulting Australia Pty Ltd
SMP	Subsidence Management Plan
t/ha	tonnes per hectare

1. INTRODUCTION TO MINING PROJECT

This Rehabilitation Management Plan (the "Plan") has been prepared by R.W. Corkery & Co. Pty Limited (RWC) in conjunction with Donaldson Coal Pty Limited (Donaldson Coal) for the Abel Underground Coal Mine (the "Abel Mine"). The Abel Mine is located approximately 23km northwest of Newcastle, NSW (the "Abel Mine Site") (**Figure 1**).

This Plan has been prepared in accordance with the following documents and guidelines.

- *Form and Way: Rehabilitation Management Plan for Large Mines* (July 2021).
- *Form and Way: Rehabilitation Objectives, Rehabilitation Completion Criteria and Final Landform and Rehabilitation Plan for Large Mines* (October 2022).
- *Guideline: Rehabilitation Risk Assessment* (July 2021)
- *Guideline: Rehabilitation Records* (July 2021).
- *Guideline: Rehabilitation Controls* (July 2021)
- *Guideline: Rehabilitation Objectives and Rehabilitation Completion Criteria* (January 2023)

1.1 HISTORY OF OPERATIONS

1.1.1 Development

The Abel Mine is owned and operated by Donaldson Coal, a wholly owned subsidiary of Yancoal Australia Limited. Donaldson Coal also owns and operates the Donaldson Open Cut Coal Mine (the Donaldson Mine), located in the direct vicinity of the surface infrastructure areas of the Abel Mine Site and to the north of the underground mining area (the Donaldson Mine Site); surface facilities associated with the Abel Mine are located within and/or integrated with the Donaldson Mine Site.

Following the grant of Project Approval 05_0136 in June 2007, the Company undertook construction and mining activities until the mine was placed in care and maintenance from 2 May 2016. Activities undertaken to date include the following:

i) Construction of surface infrastructure and facilities, including the administration offices, amenities, service and storage facilities and car parking area, within the surface infrastructure area.

ii) Initial mine construction involving the formation of three mining portals and underground roadways and construction of the ventilation, conveying and coal stockpiling systems.

iii) Coal recovery using bord and pillar methods including first and second workings.

iv) Processing of recovered coal at the Bloomfield Colliery CHPP and transportation via the Bloomfield Rail Loop and Spur and subsequently via the Main Northern Railway.

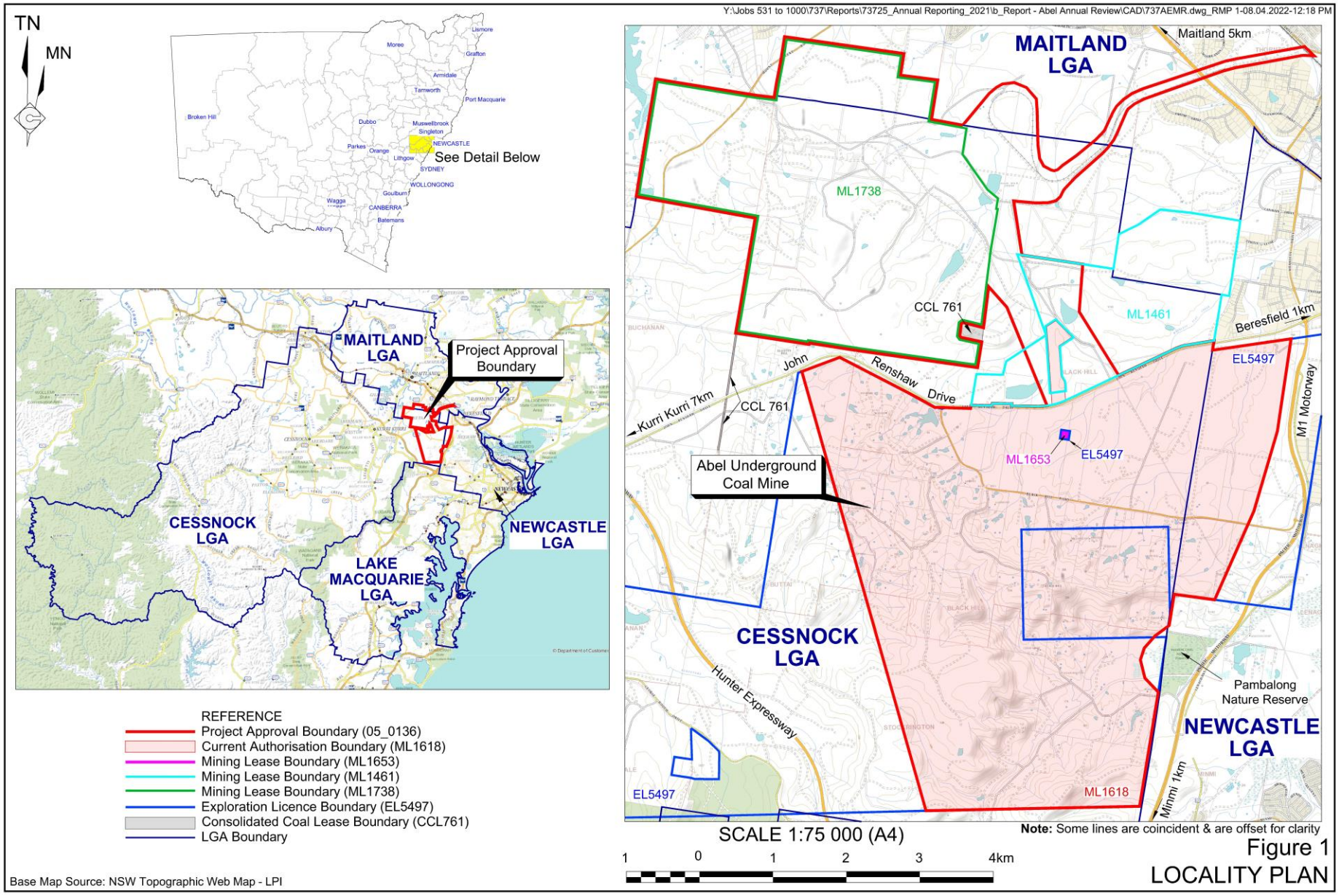

Figure 1
LOCALITY PLAN

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Several of the earlier activities relating to the mine, involving the formation of the box cut within which the surface facilities and ROM stockpiles are located, were undertaken as part of the approved Donaldson Open Cut Coal Mine.

Handling, processing, and rail load-out of coal was entirely contained at the Bloomfield Coal Handling and Preparation Plant. Subsequently, no tailings or coarse reject material (other than low-grade waste rock retained within the Open Cut Pits for direct disposal) were disposed of within the Abel or Donaldson Mine Sites.

1.2 CURRENT DEVELOPMENT CONSENTS, LEASES AND LICENCES

Table 1 presents the current development consents, approvals, leases and licences for the Abel Mine.

Table 1
Current Consents, Authorisations and Licenses

Approval/Lease/Licence	Issue Date	Expiry Date	Details / Comments
Project Approval			
Project Approval 05_0136	7 Jun 2007	31 Dec 2030	Granted by the (then) Minister for Planning and last modified on 4 December 2013.
Mining Authorisations*			
Mining Lease ML 1618	15 May 2008	15 May 2029	Granted by Department of Industry. Incorporates an area of 2 755ha with depth restrictions and surface exceptions.
Mining Lease ML 1653*	21 Jan 2011	21 Jan 2032	Granted by the Minister for Primary Industries. Incorporates 0.25ha of surface area wholly within the boundary of ML 1618 with depth restrictions and surface exceptions. Issued construction of ventilation shaft.
Exploration Authorisations*			
Exploration Licence 5497	22 Jul 1998	21 July 2019	Granted by Department of Industry for Minerals Group 9. Incorporates a surface area of 2 750ha.
Other Approvals & Licences			
Environment Protection Licence No. 12856	9 Jul 2008 (licence version date 21 Dec 2011)	Not applicable	Issued by the Environment Protection Authority (EPA). EPL 11080 (for the Donaldson Coal Mine) was surrendered during the reporting period, with EPL 12856 updated with consolidated conditions applicable to both the Donaldson Coal Mine and Abel Underground Coal Mine.
Water Supply Works Approval 20WA218986	1 Jul 2016	30/06/2019	Bore Licence 20BL171935 was issued for the interception and inflow of groundwater due to the underground mining operations. Following commencement of the *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016* in July 2016 20BL171935 was converted to a water supply works approval and water access licence with an allocation of 500ML/year.
Water Access Licence (WAL) 41525	1 Jul 2016	Continuing	
* See **Figure 1**			

It should be noted that ML 1618 associated with the Abel Mine partially overlaps with ML 1461 for the Donaldson Mine (see **Figure 1**), with surface and or depth restrictions applicable to the respective leases. For the purpose of this Plan, the responsibility of the rehabilitation of the section of overlap has been attributed to the Abel Mine give that this area is utilised principally for the Abel Mine operations.

1.3 LAND OWNERSHIP AND LAND USE

Details of land ownership on and in the vicinity of the Abel Mine and the boundaries of MLs 1618 and 1653 are shown in **Table 2** and **Figure 2**.

Table 2
Land Tenure

Page 1 of 3

ID	Lot Number	Plan Number	Controlling
1	1	858353	Freehold
2	942	817442	Freehold
3	84	755260	Freehold
4	83	755260	Freehold
5	940	1128727	Freehold
6	12	1182655	Freehold
7	79	755260	Freehold
8	5	250339	Freehold
9	4	877416	Freehold
10	72	755260	Freehold
11	89	755260	Freehold
12	2	250339	Freehold
13	1	219167	Freehold
14	1	124209	Freehold
15	2	124209	Freehold
16	1	189884	Freehold
17	1	951843	Freehold
18	1	957782	Freehold
19	24	1019282	Freehold
20	23	1019282	Freehold
21	1	156285	Freehold
22	1	250339	Freehold
23	84	629112	Freehold
24	91	828299	Freehold
25	25	1019282	Freehold
26	2	883324	LGA
27	81	627799	Freehold
28	83	629112	Freehold
29	11	877937	Freehold
30	1061	855759	Freehold
31	2	729939	Freehold
32	610	1035588	Freehold
33	1	119630	Freehold
34	4	285375	Freehold
35	22	801283	Freehold
36	2	602610	Freehold
37	1	285375	Freehold
101	9321	1091535	Freehold
102	109	1100314	Freehold
103	110	1100314	Freehold
104	131	1098413	Freehold
105	1221	1098397	Freehold
106	13	1097621	Freehold
107	813	1110632	Freehold
108	941	1128727	Freehold
109	1392	1126633	Freehold
110	111	1128130	Freehold
111	1	1154611	Freehold
112	12	1171866	Freehold
113	218	836874	Freehold
114	13	1072499	Freehold
115	24	1080823	Freehold
116	1	155446	Freehold
117	202	1188784	Freehold
118	2	877416	Freehold
119	1	536570	Freehold
120	812	1110632	Freehold
121	11	1195703	Freehold
122	52	1195977	Freehold
123	51	1195977	Freehold
124	23	1080823	Freehold
125	22	1080823	Freehold
126	141	1090136	Freehold
127	12	1195703	Freehold
128	32	1208965	Freehold
129	31	1208965	Freehold
130	2	1225048	Freehold
131	1	1260203	Freehold
132	82	627799	Freehold
133	119	1154904	Freehold
134	201	1188784	Freehold
135	2011	812939	Freehold
136	1	910932	Freehold
137	92	828299	Freehold

Table 2 (Cont'd)
Land Tenure

ID	Lot Number	Plan Number	Controlling
38	224	841899	Freehold
39	11	804925	Freehold
40	1	729939	Freehold
41	100	881099	Freehold
42	5	285375	Freehold
43	223	841899	Freehold
44	1	1003988	Freehold
45	3	877416	Freehold
46	3	285375	Freehold
47	12	877937	Freehold
48	1	877416	Freehold
49	21	801283	Freehold
50	2	1003988	Freehold
51	219	836874	Freehold
52	121	567150	Freehold
53	6	873821	Freehold
54	6	285375	Freehold
55	3	1003988	Freehold
56	12	804925	Freehold
57	2	285375	Freehold
58	118	755260	Freehold
59	103	755260	Freehold
60	101	755260	Freehold
61	2	123949	Freehold
62	1	123949	Freehold
63	1	34665	Freehold
64	8	1048112	Freehold
65	1	602610	Freehold
66	122	755260	Freehold
67	220	836874	Freehold
68	107	755260	Freehold
69	100	755260	Freehold
70	70	755260	Freehold
71	82	755260	Freehold
72	810	730001	Freehold
73	1	179002	Freehold
74	112	755260	Freehold
75	21	773883	Freehold
76	1	583620	Freehold
77	121	755260	Freehold
78	7	1048112	Freehold
79	2	449834	Freehold
138	2012	812939	Freehold
139	202	626192	Freehold
140	21	1043285	Freehold
141	951	600488	Freehold
142	1	359638	Freehold
143	1	726037	Freehold
144	680	545657	Freehold
145	952	600488	Freehold
146	2	214493	Freehold
147	1	228477	Freehold
148	685	619758	Freehold
149	22	1043285	Freehold
150	2	228477	Freehold
151	686	619758	Freehold
152	4	214493	Freehold
153	1A	228477	Freehold
154	11	528093	Freehold
155	3A	228477	Freehold
156	112	1035921	Freehold
157	2A	228477	Freehold
158	3	228477	Freehold
159	A	155698	Freehold
160	3	214493	Freehold
161	12	528093	Freehold
162	1	174428	Freehold
163	100	837562	Freehold
164	96	1160094	Freehold
165	201	1195993	Freehold
166	200	1195993	Freehold
167	12	1198600	Freehold
168	11	1198600	Freehold
169	3	1225048	Freehold
170	21	1195619	Freehold
171	101	837562	Freehold
172	2	1260203	Freehold
173	1	433355	CROWN
174	101	881099	Freehold
175	9	850020	Freehold
176	30	870411	Freehold
177	41	811191	Freehold
178	10	829154	Freehold
179	4	847676	Freehold

Table 2 (Cont'd)
Land Tenure

ID	Lot Number	Plan Number	Controlling
80	1	505578	Freehold
81	14	1059212	Freehold
82	1	503566	Freehold
83	1	123945	Freehold
84	611	1035588	Freehold
85	684	619758	Freehold
86	125	755260	Freehold
87	2	503566	Freehold
88	2	531623	Freehold
89	120	755260	Freehold
90	102	755260	Freehold
91	111	755260	Freehold
92	110	755260	Freehold
93	1062	855759	Freehold
94	116	755260	Freehold
95	683	619758	Freehold
96	104	755260	Freehold
97	113	755260	Freehold
98	2	951843	Freehold
99	105	755260	Freehold
100	142	1090747	Freehold
180	56	1158920	Freehold
181	55	1158920	Freehold
182	11	829154	Freehold
183	42	811191	Freehold
184	43	811191	Freehold
185	11	746684	Freehold
186	1	811514	Freehold
187	101	860867	Freehold
188	6	850020	Freehold
189	145	1143386	UNKNOWN
190	121	1154989	Freehold
191	57	1158920	Freehold

Source: NSW Department of Finance and Services

1.3.1 Land Ownership and Land Use Figure

Figures 2, **3** and **4** also show the key environmental features of the lands within and in the vicinity of the Abel Mine Site. In summary, the land in the immediate vicinity of the Abel Mine Site primarily consists of:

- mixed remnant and regrowth native vegetation;
- agricultural production and rural property;
- manufacturing and industry;
- transport and communication; and
- coal mining and production.

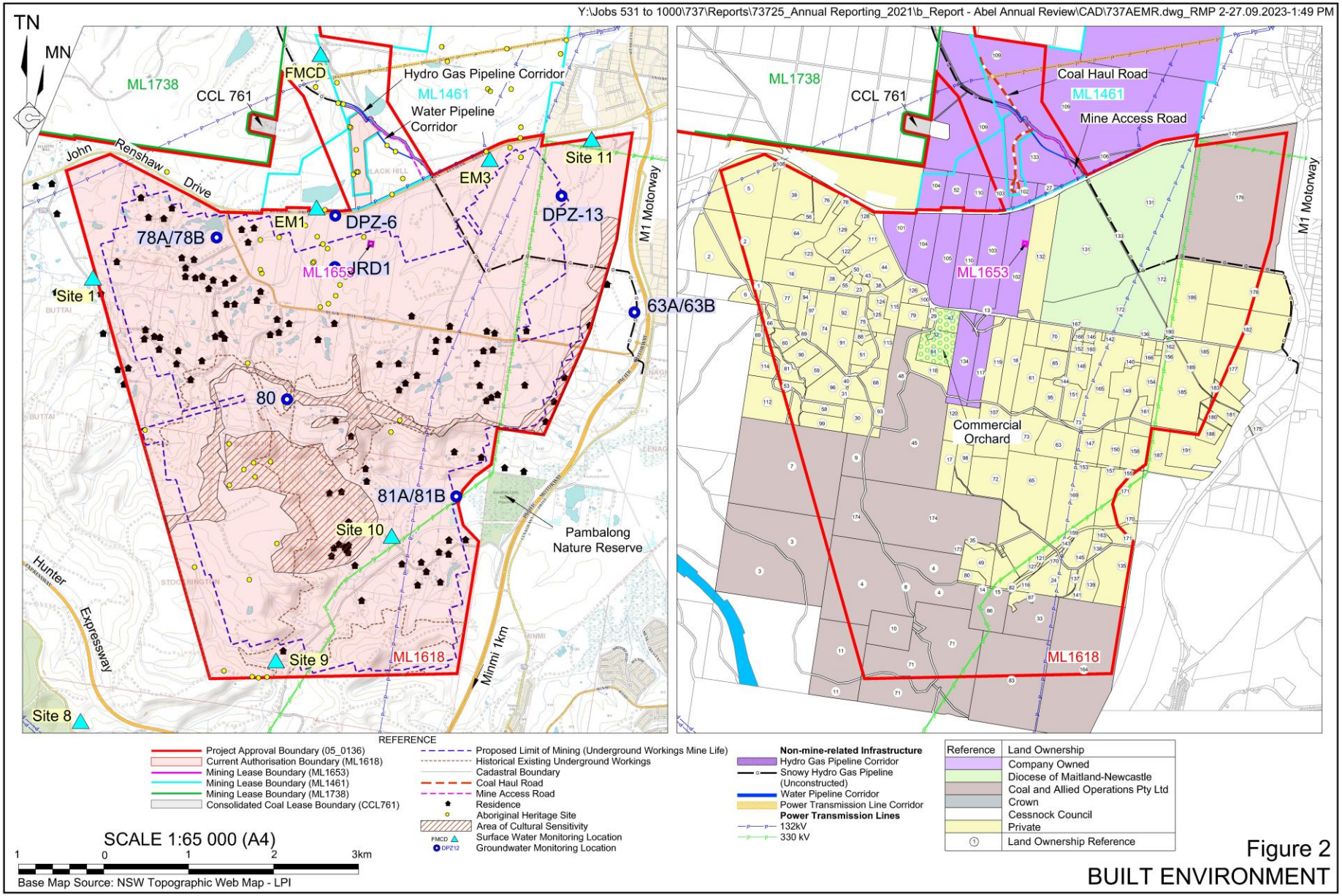

Figure 2
BUILT ENVIRONMENT

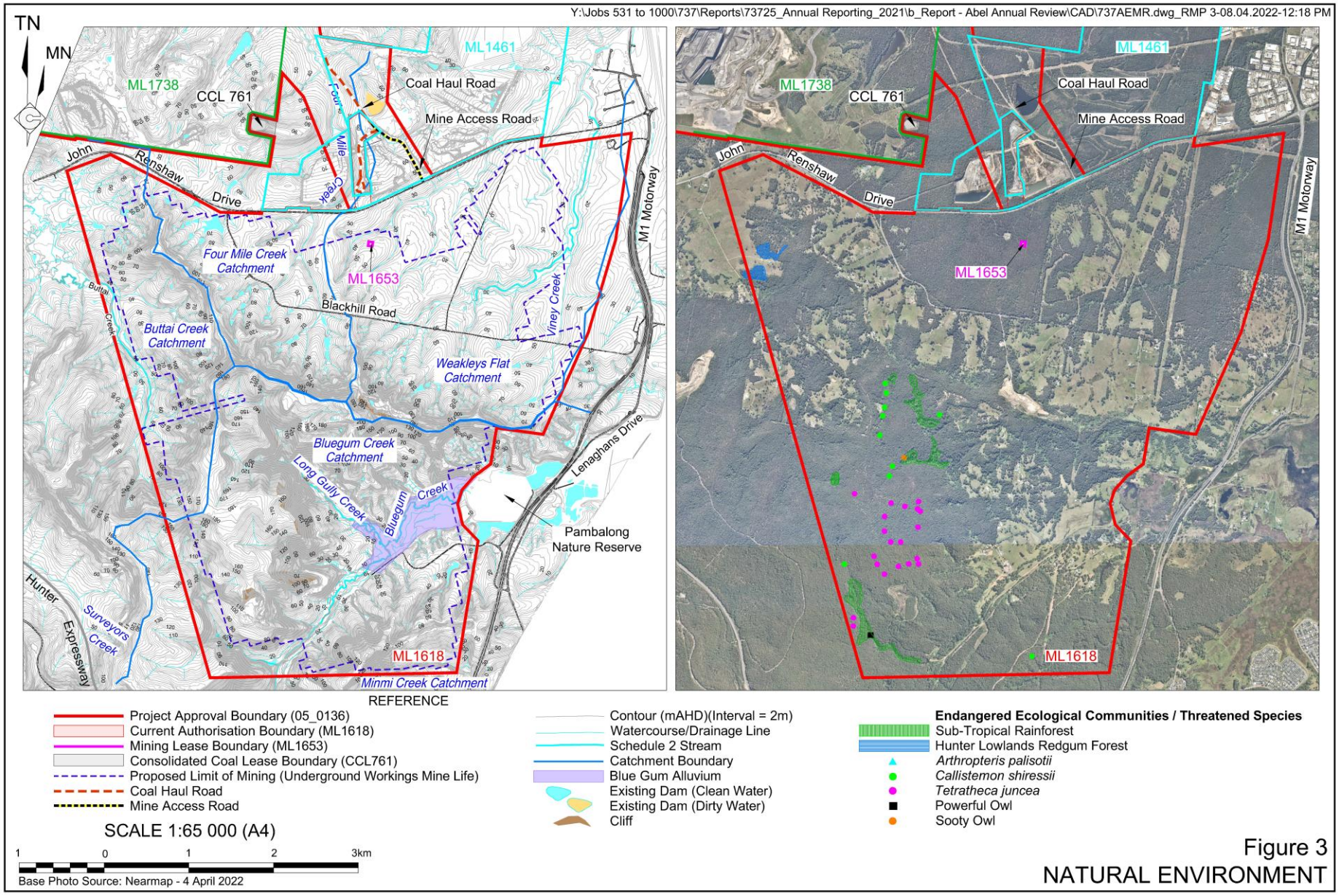

Figure 3
NATURAL ENVIRONMENT

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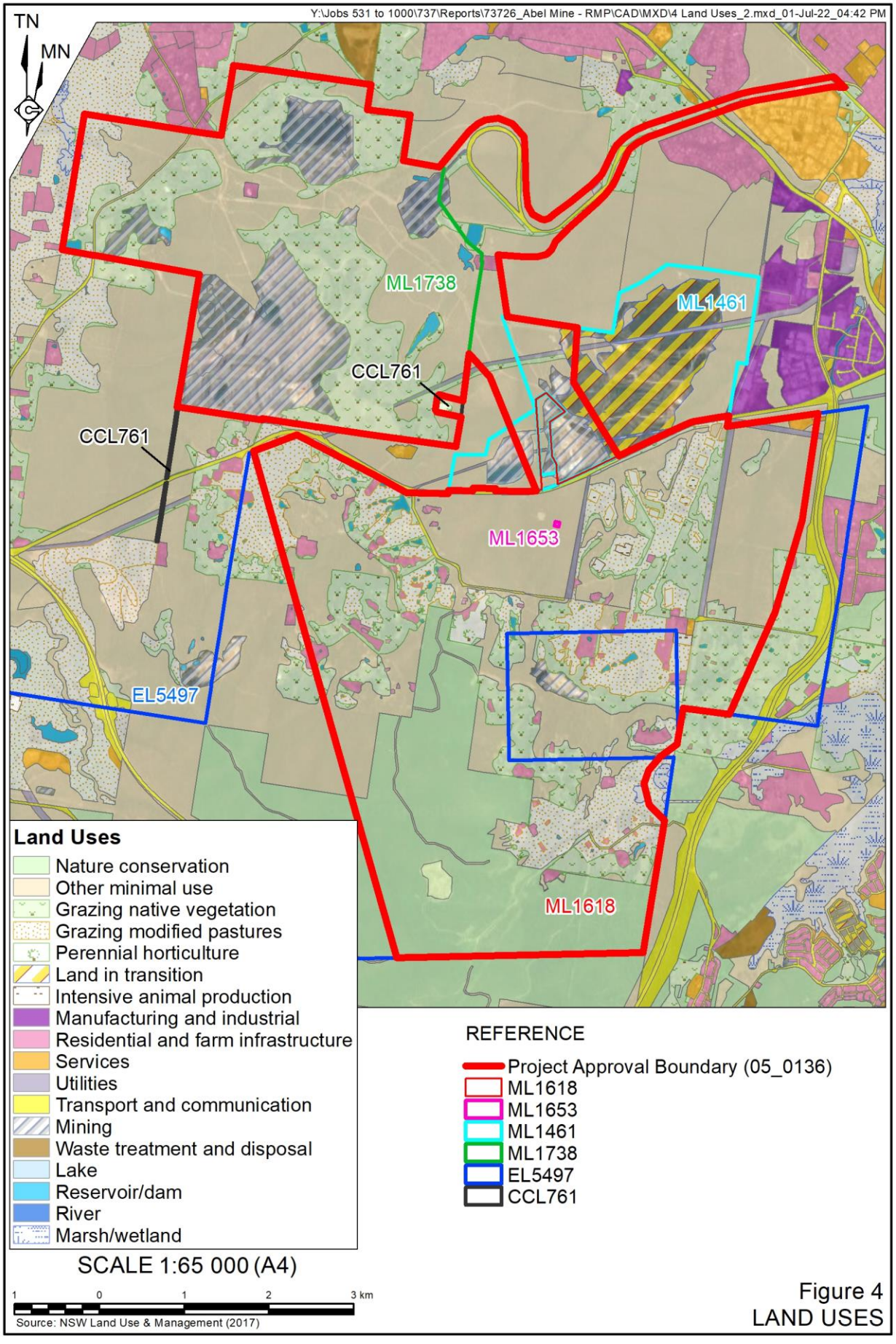


Figure 4
LAND USES

1.3.2 Historical Land Use

Previous mining activities by non-Company related ventures have also been undertaken within or near the Abel and Donaldson Mine Sites. The primary mining activities relate to the Stockrington No. 2 Colliery which mined the uppermost coal seam, the West Borehole Seam, in the southern section of the underground mine area until closure of the mine in the early 1980s. A number of smaller mines including the Black Hill Borehole, Blackhill Borehole No. 3, Buttai Borehole, Duckenfield, Duckenfield Old, Great Borehole, Hilltop Borehole, Linton Borehole, Mimi Open Cut, Mountain Borehole Underground, Mountain Borehole Open Cut, Rosewood Borehole, Stockrington, Stockrington Borehole, Taylors Borehole, Taylors Borehole No. 2 and Valley Borehole have also been undertaken within and surrounding the Abel and Donaldson Mine Sites.

1.3.3 Easements and Infrastructure

Service-related infrastructure that is owned, operated, and maintained by third parties, including associated easements are located within the Mine Site, as shown on **Figure 2**. This includes:

- Transmission Powerlines (Transgrid)
- Hunter Water Pipeline (Hunter Water Corporation)
- Snowy Hydro Gas Pipeline (Snowy Hydro Limited)

The following presents an overview of each of the above and a summary of rehabilitation-related accountabilities and responsibilities attributed to Donaldson Coal.

Transgrid Powerlines

The main Transgrid transmission powerline traverses the Donaldson Mine Site generally east to west for approximately 2.8km. The easement is approximately 40m wide, and covers approximately 8.7ha within the Donaldson Mine Site. Certain Mine-related infrastructure is located within the easement, such as sealed and unsealed roads and Rumbles Dam. Maintenance of vegetation within the easement is the responsibility of Transgrid.

Power to the Donaldson and Abel Mine Sites is via a buried powerline from the Beresfield substation along the Transgrid powerline easement and then aerial line between the main transmission line and John Renshaw Drive, where it connects to site at the Abel Substation.

The main Transgrid transmission powerline will not be impacted by rehabilitation of the Donaldson and Abel Mine Sites and is to be retained post-closure. During rehabilitation, Mine-related infrastructure not required for post-mining land use will be removed and associated disturbance will be rehabilitated generally in accordance with the surrounding easement land use. Maintenance of residual infrastructure will continue to be the remit of Transgrid.

Hunter Water Corporation Pipeline

A section of water pipeline owned by Hunter Water Corporation transects the Abel and Donaldson Mine Sites in the vicinity of the main access and haul road. Within the Abel and Donaldson Mine Sites and north of John Renshaw Drive, the pipeline is approximately 1.4km long, of which approximately 1.1km is above ground. The easement for the pipeline is

approximately 10m wide and covers approximately 1ha within the Abel and Donaldson Mine Sites is on land owned by Hunter Water Corporation. Certain Mine-related infrastructure is located within the easement, such as sealed and unsealed roads. Maintenance of vegetation within the easement is the responsibility of Hunter Water Corporation, except for in the vicinity of Mine-related infrastructure.

The Hunter Water Corporation Pipeline will not be impacted by rehabilitation of the Abel and Donaldson Mine Sites, and is to be retained post-closure. During rehabilitation, Mine-related infrastructure not required for post-mining land use will be removed and associated disturbance will be rehabilitated generally in accordance with the surrounding easement land use. Maintenance of residual infrastructure will continue to be the remit of Hunter Water Corporation.

Snowy Hydro Gas Pipeline

A section of the Snowy Hydro Gas Pipeline transects the Abel and Donaldson Mine Sites in vicinity of the Hunter Water Corporation Pipeline and main access and haul road[1]. Within the Abel and Donaldson Mine Sites north of John Renshaw Drive, the pipeline is approximately 1.4km long. The easement varies in width but is generally approximately 25m wide. Maintenance of vegetation within the easement is the responsibility of Snowy Hydro, except for in the vicinity of Mine-related infrastructure. South of John Renshaw Drive, the Snowy Hydro Gas Pipeline is located within the underground mining area of the Mine. However, surface disturbance within this area has generally only consisted of rehabilitation of subsidence zones. As such, no significant rehabilitation obligations remain within this area and is therefore not relevant to this RMP.

The Snowy Hydro Gas Pipeline will not be impacted by rehabilitation of the Abel and Donaldson Mine Sites, and is to be retained post-closure. During rehabilitation, Mine-related infrastructure not required for post-mining land use will be removed and associated disturbance will be rehabilitated generally in accordance with the surrounding easement land use. Maintenance of residual infrastructure will continue to be the remit of Snowy Hydro.

[1] Note: To be constructed

2. FINAL LAND USE

2.1 REGULATORY REQUIREMENTS FOR REHABILITATION

Regulatory requirements specifically affecting the progress towards the post mining land use are detailed in **Table 3**.

2.2 FINAL LAND USE OPTIONS ASSESSMENT

The final land use for the Abel and Donaldson Mine Sites is interconnected and has previously been assessed over the life of the Abel and Donaldson Mines. **Table 4** presents a summary of the final land use options that have been considered and/or proposed for the Abel and Donaldson Mine Sites. A summary of the consultation undertaken at the time of the options assessments or proposed final land use or landform is also provided.

In summary, the approved final land use comprises a mix of environmental conservation, final voids, water storage and retained infrastructure and is presented as the Final Landform and Rehabilitation Plan (see Section 5 and **Plans 1** and **2**). It is noted that the approved 2020 *Mining Operations Plan (Amendment B)* and attached *Closure Strategy for the West and Square Pits* report present a range of final land use and landform options for the West and Square Pits of the Donaldson Mine Site (see **Table 2**). For the purposes of this Plan, Donaldson Coal presents the previously approved Closure Option C as the Final Landform and Rehabilitation Plan. Notwithstanding, Donaldson Coal contends that any of the existing approved final land use options remain valid. Any material changes to the indicative preferred final land use and landform plan would be addressed in future revisions to this Plan and/or other rehabilitation planning documents.

2.3 FINAL LAND USE STATEMENT

The final land use for the Abel Mine Site is as follows.

- Nature Conservation:
  - Rehabilitated mixed species native plant communities commensurate with surrounding natural areas.
  - Variable water storage within the combined Abel Box Cut and West Pits would provide seasonable habitat for wildlife.
- Infrastructure:
  - Retained roads to support future land use and to provide safe access for long term maintenance.
- Final Voids:
  - Variable water storage within the combined Abel Box Cut and West Pit suitable for industrial use.

The final land use is shown on **Plan 1**.

Table 3
Regulatory Requirements for Rehabilitation

<table>
<tr><th>Consent</th><th>Condition No.</th><th>Requirement</th><th>Domain Area</th><th>Timing</th><th>RMP Section</th></tr>
<tr><td colspan="6">Approvals and Licences</td></tr>
<tr><td colspan="6">Project Approval(s)</td></tr>
<tr><td rowspan="3">Project Approval 05_0136</td><td>Biodiversity Offset</td><td>The Proponent shall develop and implement a Biodiversity Offset Strategy prior to the commencement of construction of the coal conveyor or the vegetation clearing described in the EA, whichever is sooner, in consultation with OEH, and to the satisfaction of the Director-General (Schedule 4 Condition 18).</td><td>Bushland Conservation Area</td><td>Prior to construction/ vegetation clearance.</td><td>6.2.1.3</td></tr>
<tr><td>Rehabilitation Objectives</td><td>The Proponent shall rehabilitate the site to the satisfaction of the Executive Director Mineral Resources. This rehabilitation must be generally consistent with the proposed rehabilitation strategy described in the EA and comply with the objectives in Table 12 (Schedule 4 Condition 27).
Table 12: Rehabilitation Objectives
<table>
<tr><th>Feature</th><th>Objective</th></tr>
<tr><td>• Mine site (as a whole).</td><td>• Safe, stable & non-polluting; and
• Final land use compatible with surrounding land uses.</td></tr>
<tr><td>• Surface infrastructure.</td><td>• To be decommissioned and removed, unless the Executive Director Mineral Resources agrees otherwise.</td></tr>
<tr><td>• Portals and ventilation shafts.</td><td>• To be decommissioned and made safe and stable; and
• Retain habitat for threatened species (eg bats), where practicable.</td></tr>
<tr><td>• Watercourses within project area.</td><td>• Hydraulically and geomorphologically stable.</td></tr>
<tr><td>• Cliffs.</td><td>• No additional risk to public safety compared to prior to mining.</td></tr>
<tr><td>• Other land affected by the project.</td><td>• Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of:
- local native plant species (unless the Executive Director Mineral Resources agrees otherwise); and
- a landform consistent with the surrounding environment .</td></tr>
<tr><td>• Built features damaged by mining operations.</td><td>• Repair to pre-mining condition or equivalent unless:
- the owner agrees otherwise; or
- the damage is fully restored, repaired or compensated under the Mine Subsidence Compensation Act 1961</td></tr>
<tr><td>• Community.</td><td>• Ensure public safety; and
• Minimise the adverse socio-economic effects associated with mine closure</td></tr>
</table></td><td>All domains</td><td>During operation and rehabilitations.</td><td>4</td></tr>
<tr><td>Progressive Rehabilitation</td><td>The Proponent shall carry out the rehabilitation of the site progressively, that is, as soon as reasonably practicable following disturbance (Schedule 4 Condition 28).</td><td>Mine Site</td><td>During operation and rehabilitation.</td><td>6.2</td></tr>
</table>

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Domain Area	Timing	RMP Section
Mining Leases (Standard Conditions of Mining Leases - Rehabilitation)					
ML 1618 / ML 1653	4	Must prevent or minimise harm to the environment (1) The holder of a mining lease must take all reasonable measures to prevent, or if that is not reasonably practicable, to minimise, harm to the environment caused by activities under the mining lease. (2) In this clause – ***harm*** to the environment has the same meaning as in the *Protection of the Environment Operations Act 1997*.	All domains	During operation and rehabilitation.	6.2
	5	**Rehabilitation to occur as soon as reasonably practicable after disturbance** The holder of a mining lease must rehabilitate land and water in the mining area that is disturbed by mining activities under the mining lease as soon as reasonably practicable after the disturbance occurs.			6.2
	6	**Rehabilitation must achieve final land use** (1) The holder of a mining lease must ensure that rehabilitation of the mining area achieves the final land use for the mining area. (2) The holder of a mining lease must ensure any planning approval has been obtained that is necessary to enable the holder to comply with subclause (1). (3) The holder of the mining lease must identify and record any reasonably foreseeable hazard that presents a risk to the holder's ability to comply with subclause (1). **Note –** clause 7 requires a rehabilitation risk assessment to be conducted whenever a hazard is identified under this subclause. (1) In this clause – ***final land use*** for the mining area means the final landform and final land uses to be achieved for the mining area – (a) as set out in the rehabilitation objectives statement and rehabilitation completion criteria statement, and (b) for a large mine – as spatially depicted in the final landform and rehabilitation plan, and (c) if the final land use for the mining area is required by a condition of development consent for activities under the mining lease – as stated in the condition.		During rehabilitation.	2, 3, 4.1

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Domain Area	Timing	RMP Section
Mining Leases (Standard Conditions of Mining Leases - Rehabilitation) (Cont'd)					
ML 1618 / ML 1653 (Cont'd)	6 (Cont'd)	**planning approval means** – (a) a development consent within the meaning of the Environmental Planning and Assessment Act 1979, or (b) an approval under that Act, Division 5.1.			
	7	**Rehabilitation risk assessment** (1) The holder of a mining lease must conduct a risk assessment (a ***rehabilitation risk assessment***) that – (a) identifies, assesses and evaluates the risks that need to be addressed to achieve the following in relation to the mining lease – (i) the rehabilitation objectives, (ii) the rehabilitation completion criteria, (iii) for large mines – the final land use as spatially depicted in the final landform and rehabilitation plan, and (a) identifies the measures that need to be implemented to eliminate, minimise or mitigate the risks. (2) The holder of the mining lease must implement the measures identified. (3) The holder of a mining lease must conduct a rehabilitation risk assessment – (a) for a large mine – before preparing a rehabilitation management plan, and (b) for a small mine – before preparing the rehabilitation outcome documents for the mine, and (c) whenever a hazard is identified under clause 6(3) – as soon as reasonably practicable after it is identified, and (d) whenever given a written direction to do so by the Secretary.		During construction, operation and rehabilitation.	3
	8	**Application of Division** This Division does not apply to a mining lease unless— (a) the security deposit required under the mining lease is greater than the minimum deposit prescribed under the Act, section 261BF in relation to that type of mining lease, or (b) the Secretary gives a written direction to the holder of the mining lease that this Division, or a provision of this Division, applies to the mining lease.			11

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Domain Area	Timing	RMP Section
Mining Leases (Standard Conditions of Mining Leases - Rehabilitation) (Cont'd)					
ML 1618 / ML 1653 (Cont'd)	9	**General requirements for documents** A document required to be prepared under this Division must— (a) be in a form approved by the Secretary and **Note—** The approved forms are available on the Department's website. (b) include any matter required to be included by the form, and (c) if required to be given to the Secretary—be given in a way approved by the Secretary.			All sections
	10	**Rehabilitation management plans for large mines** (1) The holder of a mining lease relating to a large mine must prepare a plan (a rehabilitation management plan) for the mining lease that includes the following— (a) a description of how the holder proposes to manage all aspects of the rehabilitation of the mining area, (b) a description of the steps and actions the holder proposes to take to comply with the conditions of the mining lease that relate to rehabilitation, (c) a summary of rehabilitation risk assessments conducted by the holder, (d) the risk control measures identified in the rehabilitation risk assessments, (d) the rehabilitation outcome documents for the mining lease, (e) a statement of the performance outcomes for the matters addressed by the rehabilitation outcome documents and the ways in which those outcomes are to be measured and monitored. (2) If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must include a proposed version of the document. (3) A rehabilitation management plan is not required to be given to the Secretary for approval. (4) The holder of the mining lease— (a) must implement the matters set out in the rehabilitation management plan, and (b) if the forward program specifies timeframes for the implementation of the matters—must implement the matters within those timeframes.			This Plan

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Domain Area	Timing	RMP Section
Mining Leases (Standard Conditions of Mining Leases - Rehabilitation) (Cont'd)					
ML 1618 / ML 1653 (Cont'd)	11	**Amendment of rehabilitation management plans** The holder of a mining lease must amend the rehabilitation management plan for the mining lease as follows— (a) to substitute the proposed version of a rehabilitation outcome document with the version approved by the Secretary—within 30 days after the document is approved, (b) as a consequence of an amendment made under clause 14 to a rehabilitation outcome document—within 30 days after the amendment is made, (c) to reflect any changes to the risk control measures in the prepared plan that are identified in a rehabilitation risk assessment—as soon as practicable after the rehabilitation risk assessment is conducted, (d) whenever given a written direction to do so by the Secretary—in accordance with the direction.			This Plan
	12	**Rehabilitation outcome documents** (1) The holder of a mining lease must prepare the following documents (***the rehabilitation outcome documents***) for the mining lease and give them to the Secretary for approval— (a) the ***rehabilitation objectives statement***, which sets out the rehabilitation objectives required to achieve the final land use for the mining area, (b) the ***rehabilitation completion criteria statement***, which sets out criteria, the completion of which will demonstrate the achievement of the rehabilitation objectives, (c) for a large mine, the ***final landform and rehabilitation plan***, showing a spatial depiction of the final land use. (2) If the final land use for the mining area is required by a condition of development consent for activities under the mining lease, the holder of the mining lease must ensure the rehabilitation outcome documents are consistent with that condition.			4, 5

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Domain Area	Timing	RMP Section
Mining Leases (Standard Conditions of Mining Leases - Rehabilitation) (Cont'd)					
ML 1618 / ML 1653 (Cont'd)	13	**Forward program and annual rehabilitation report** (1) The holder of a mining lease must prepare a program (a ***forward program***) for the mining lease that includes the following— (a) a schedule of mining activities for the mining area for the next 3 years, (b) a summary of the spatial progression of rehabilitation through its various phases for the next 3 years, a requirement that the rehabilitation of land and water disturbed by mining activities under the mining lease must occur as soon as reasonably practicable after the disturbance occurs. (2) The holder of a mining lease must prepare a report (an ***annual rehabilitation report***) for the mining lease that includes— (a) a description of the rehabilitation undertaken over the annual reporting period, (b) a report demonstrating the progress made through the phases of rehabilitation provided for in the forward program applying to the reporting period, (c) a report demonstrating progress made towards the achievement of the following— (i) the objectives set out in the rehabilitation objectives statement, (ii) the criteria set out in the rehabilitation completion criteria statement, (iii) for large mines—the final land use as spatially depicted in the final landform and rehabilitation plan. (3) If a rehabilitation outcome document has not been approved by the Secretary, the holder of the mining lease must rely on a proposed version of the document. (4) The holder of the mining lease must give the forward program and annual rehabilitation report to the Secretary. (5) In this clause— ***annual reporting period*** means each period of 12 months commencing on— (a) the date on which the mining lease is granted, or (b) if the Secretary approves another date in relation to the mining lease— the other date			10, 11

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Domain Area	Timing	RMP Section
Mining Leases (Standard Conditions of Mining Leases - Rehabilitation) (Cont'd)					
ML 1618 / ML 1653 (Cont'd)	14	**Amendment of rehabilitation outcome documents and forward program** (1) This clause applies to— (a) a rehabilitation outcome document if it has been approved by the Secretary, and (b) a forward program if it has been given to the Secretary. (2) The holder of a mining lease must not amend a document to which this clause applies that relates to the mining lease unless— (a) the Secretary gives the holder a written direction to do so, or (b) the Secretary, on written application by the holder, gives a written approval of the amendment. (3) The holder of the mining lease must amend the document in accordance with the Secretary's direction or approval. (4) Nothing in this clause prevents the holder of a mining lease preparing a draft amendment for submission to the Secretary for approval.			10, 11
	15	**Times at which documents must be prepared and given** (1) The holder of a mining lease must do the following before the end of the initial period— (a) prepare a rehabilitation management plan, and (b) prepare rehabilitation outcome documents and give them, other than the rehabilitation completion criteria statement, to the Secretary for approval, and (c) prepare a forward program and give it to the Secretary. (2) The holder of the mining lease must prepare a forward program and annual rehabilitation report and give them to the Secretary before— (a) 60 days after the last day of each annual reporting period, commencing with the annual reporting period in which the forward program was given to Secretary under subclause (1)(c), or (b) a later date approved by the Secretary. (3) A rehabilitation completion criteria statement relating to completion of rehabilitation during a period covered by a forward program must be given to the Secretary for approval when the forward program is required to be given to the Secretary.			This Plan

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Domain Area	Timing	RMP Section
Mining Leases (Standard Conditions of Mining Leases - Rehabilitation) (Cont'd)					
ML 1618 / ML 1653 (Cont'd)	15 (Cont'd)	(4) The holder of the mining lease must prepare updated rehabilitation outcome documents for the mining lease and give them to the Secretary for approval before— (a) 60 days after a development consent is modified following an application referred to in clause 20(1)(b), or (b) a later date approved by the Secretary. (5) A rehabilitation completion criteria statement is not required to be given to the Secretary under subclause (4) unless a rehabilitation completion criteria statement has already been given to the Secretary under subclause (3). (6) The Secretary may, by written notice, direct the holder of a mining lease to prepare, or give to the Secretary, a document required to be prepared under this Division at a time other than that specified in this clause. (7) The holder of the mining lease must comply with the direction. (8) In this clause— initial period means the period commencing when the mining lease is granted and ending— (a) 30 days, or other period approved by the Secretary, after this Division first applies to the mining lease, or (b) if this Division applies to the mining lease because of an increase in the required security deposit— (i) when the surface of the mining area is disturbed by activities under the mining lease, or (ii) at a later date approved by the Secretary.			

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Domain Area	Timing	RMP Section
Mining Leases (Standard Conditions of Mining Leases - Rehabilitation) (Cont'd)					
ML 1618 / ML 1653 (Cont'd)	16	**Certain documents to be publicly available** (1) This clause applies to the following documents— (a) a rehabilitation management plan, (b) a forward program, (c) an annual rehabilitation report. (2) The holder of a mining lease must make a document to which this clause applies publicly available by— (a) publishing it on its website in a prominent position, or (b) if the holder does not have a website— providing a copy of it to a person— (i) on the written request of a person, and (ii) without charge, and (iii) within 14 days after the request is received. (3) If a document is published on the website of the holder of the mining lease, the holder must ensure that it is published— (a) for a rehabilitation management plan—within 14 days after it is prepared or amended, or (b) for a forward program or an annual rehabilitation report—within 14 days after it is given to the Secretary or amended, (4) Personal information within the meaning of the *Privacy and Personal Information Protection Act 1998* is not required to be included in a document made available to a person under this clause.			Noted
	17	**Records demonstrating compliance** The holder of a mining lease must create and maintain records of all actions taken that demonstrate compliance with each of the conditions set out in this Part. **Note—** The Act, sections 163D and 163E provide for the form in which records must be kept and the period for which they must be retained.			7

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Domain Area	Timing	RMP Section
Mining Leases (Standard Conditions of Mining Leases - Rehabilitation) (Cont'd)					
ML 1618 / ML 1653 (Cont'd)	18	**Report on non-compliance** (1) The holder of a mining lease must provide the Minister with a written report detailing any non-compliance with— (a) a condition of the mining lease, or Note— The Act, section 364A contains provisions relating to the use and disclosure of information provided under this condition. (b) a requirement of the Act or this Regulation relating to activities under the mining lease. (2) The holder of the mining lease must provide the report within 7 days after becoming aware of the non-compliance. (3) The holder of the mining lease must ensure the report— (a) identifies the condition of the mining lease, or the requirement of the Act or this Regulation, to which the non-compliance relates, and (describes the non-compliance and specifies the date or dates on which, or the period during which, the non-compliance occurred, and (c) describes the causes or likely causes of the non-compliance, and (d) describes the action that has been taken, or will be taken, to mitigate the effects, and to prevent any recurrence, of the non-compliance.			7, 10, 11
Other Commitments to Rehabilitation					
Environmental (MOD 3) Assessment (Resource Strategies, 2012)	General Decommissioning and Rehabilitation	• Sealing of mine portals and ventilation shafts. • Removal of surface infrastructure (excepting roads and water management structures required for future land uses). • Reshaping of the ground surface to form a stable surface with embankments at a maximum of 10 degrees. • Construction of permanent surface water management structures such as contour banks, drains and settlement ponds. • Rock raking and ripping of roads and hardstand areas. • Spreading of soil and seed. (*EA Section 2.12*)	Infrastructure Areas	Decommissioning and Landform Establishment	6.2.2, 6.2.3, 6.2.3

Table 3 (Cont'd)
Regulatory Requirements for Rehabilitation

Consent	Condition No.	Requirement	Domain Area	Timing	RMP Section
Other Commitments to Rehabilitation (Cont'd)					
Environmental (MOD 3) Assessment (Resource Strategies, 2012) (Cont'd)	Subsidence Impacts	Remediation of subsidence impacts is to be undertaken in accordance with the Trigger Action Response Plans outlined within the Subsidence Management Plans to be prepared for the underground mining areas. (*EA Section 2.12*)	Underground Mining Area	Life of Mine	6.3
		Rehabilitation methods may include grouting of surface cracks in watercourses, dam walls, roads or general areas. (*EA Section 2.12*)			
	Square Pit	The Square Pit will be maintained as a void for water storage and / or tailings storage. The mine closure plan will be revised prior to the emplacement of any coarse rejects or tailings. (*EA Section 3.4*)	Donaldson Mine	Prior to relinquishment	6.2.3.4
		Should the Square Pit have been used for storage of groundwater inflows from the mine, it will be dewatered, with the water returned to the underground workings. (*EA Section 3.4*)			

Table 4
Summary of Final Land Use Options Assessments

Document or Plans Where Proposed / Considered	Final Land Use Option	Area[1]	Comments	Consultation
Integrated Mine Closure Plan (GSSE, 2008) – Appendix 5 of the *Landscape Management Plan* (GSSE, 2008)	Intermodal Freight Facility	General vicinity of Donaldson Open Cut Mine	Identified as part of the *Draft Lower Hunter Regional Strategy 2005*. Not considered further as would require re-disturbance of rehabilitated lands. In addition, backfilling operations did not include engineered compaction or other activities that would be required to support significant industrial development.	*Landscape Management Plan* (incorporating the Integrated Mine Closure Plan and Final Void Management Plan) prepared in consultation with Department of Water and Energy, Department of Environment and Climate Change, Maitland Council and Cessnock Council.
	Conservation	Bushland Conservation Area	The Bushland Conservation Area was established in 2001 and is required to be maintained until January 2037.As such, no other land use is permitted until at least 2037.	
	Water Storage	West and Square Pits[2]	Included uses such as wildlife habitat, recreational use, aquaculture, and other commercial uses.	
	Tailings Storage Facility	Square Pit	Identified as part of “Other Mining Uses”.	
	Domestic/ Commercial Waste Disposal	West and Square Pits[2]	Considered further in *Final Void Management Plan* (see below).	
Final Void Management Plan (GSSE, 2008) – Appendix 4 of the *Landscape Management Plan* (GSSE, 2008)	Backfilling	West and Square Pits[2]	Identifies that insufficient overburden is available to completely backfill pits, however, backfilling is to be undertaken to reduce the size of the pits as mining progresses.	
	Water Storage Area		Identifies that water quality likely to be unsuitable for human consumption due to salinity levels but may be suitable for recreational, aquaculture and industrial water use options. This use is identified as the preferred use.	
	Conservation		Identifies potential use for wetland or wildlife habitat, however, deep and steep-sided voids are generally not suited for this use without provision of safe ingress and egress points for wildlife.	
	Domestic/ Commercial Waste Disposal		Identifies potential use for waste disposal, however, the likely physical and chemical properties of waste and the volumes that would be disposed would present a potential leachate risk to local groundwater. The proximity to sensitive areas, such as Hexham Swamp would also need to be managed.	

Table 4 (Cont'd)
Summary of Final Land Use Options Assessments

Document or Plans Where Proposed / Considered	Final Land Use Option	Area[1]	Comments	Consultation
Rehabilitation Management Plan (v2, 2019)	Water Storage	Abel Box Cut (part of West Pit)	Identifies use as water storage with batters stabilised with local native plant species.	Department of Planning and Environment (30 April 2019) Cessnock Council (30 April 2019) Maitland Council (30 April 2019) Natural Resource Access Regulator (30 April 2019) Office of Environment and Heritage (30 April 2019) Resources Regulator (30 April 2019)
	Conservation	Remaining surface disturbance areas.	Identified as general rehabilitation objective for rehabilitated woodland areas.	
	Existing Land Use	Any areas impacted by subsidence (relevant to Abel Mine only).	Areas impacted by subsidence are returned to the existing land use within a timeframe agreed upon with the landholder.	
Mining Operations Plan (Amendment B) (2020) Appendix 1 - *Closure Strategy for the West and Square Pit* (2020)	Tailings Storage Facility (Variable fill level)	Square Pit	Part of the three approved final land use and landform options for the Square Pit. Final landform would be a void of variable depth based on amount of tailings and respective capping depths, with the remainder of the void left as water storage.	Resources Regulator (30 September 2020)
	Water Storage	West and Square Pit	Stabilised final voids for permanent water storage. General landform shaping methodologies outlined.	

Note 1: See **Figure 2**

Note 2: Previously referred to as Donaldson and Abel Open Cut Pits in earlier documents.

2.4 FINAL LAND USE AND MINING DOMAINS

2.4.1 Final Land Use Domains

Table 5 defines the final land use domains for the Abel Mine and **Plan 1** displays the final land use domains for the Abel Mine Site.

Table 5
Final Land Use Domains

Final Land Use Domain		Domain ID[1]	Domain Description
Native Ecosystem Area		A	Includes the majority of the current infrastructure area within the Abel Mine Site.
Infrastructure		I	Includes roadways to be retained to support final land use.
Final Void		J	Includes the combined Abel Box Cut and part of the West Pit within the mining area.
Other	Completed Underground Mine Workings	K	Includes the total extent of completed underground mine workings.
Note 1: See **Plan 1**			

2.4.2 Mining Domains

Table 6 defines the final land use domains for the Abel Mine and **Figure 5** displays the mining domains for the Abel Mine Site.

Table 6
Mining Domains

Mining Domain	Domain ID[1]	Domain Description
Infrastructure	1	Includes the buildings, structures, ventilation shafts, hardstand areas, and internal roadways.
Underground Mining Area (SMP)	6	Includes the authorised area of underground mining operations.
Note 1: See **Figure 5**		

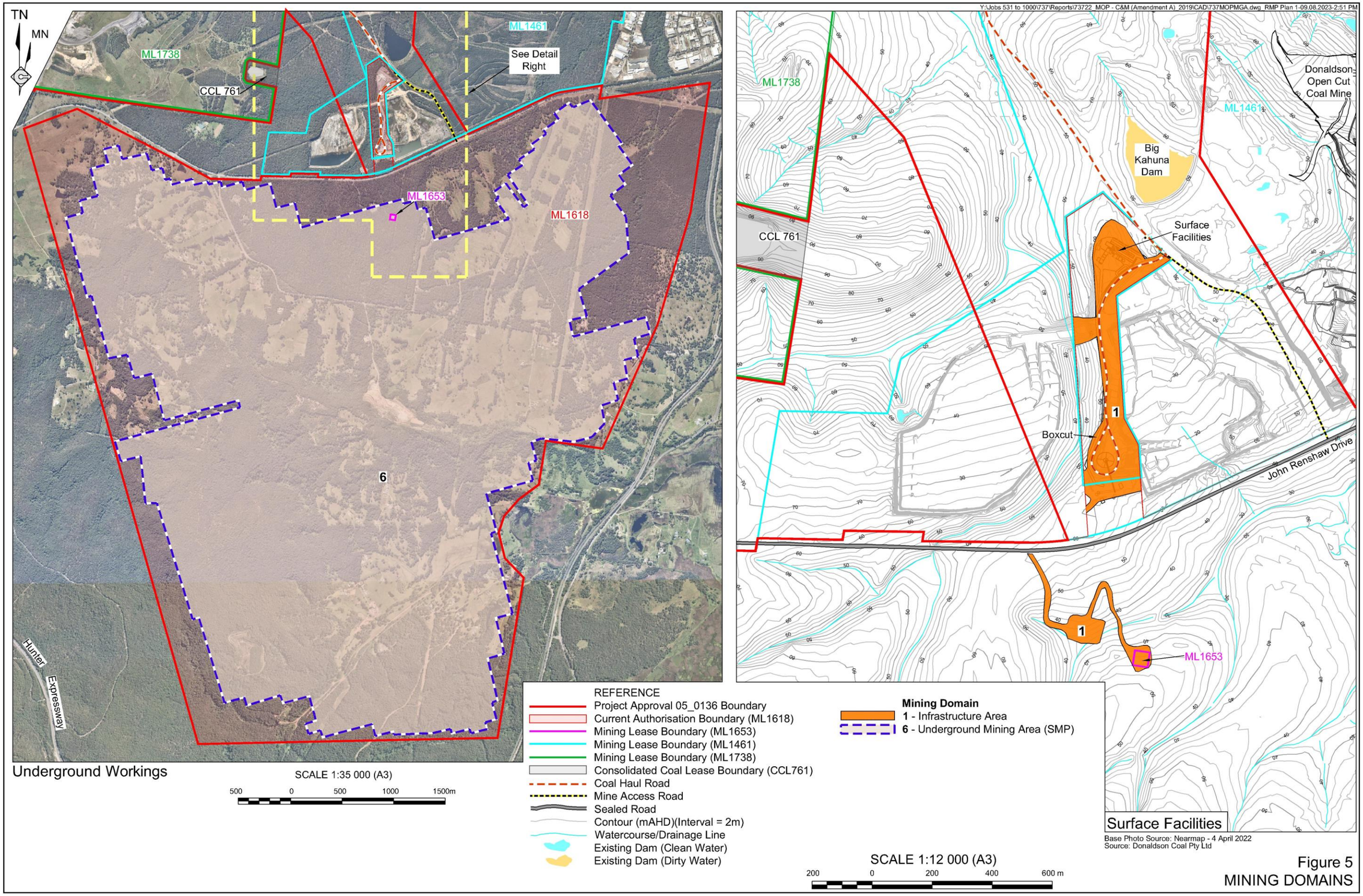


Figure 5
MINING DOMAINS

3. REHABILITATION RISK ASSESSMENT

The following presents an overview of the most recent rehabilitation risk assessment undertaken in accordance with Clause 7 of Schedule 8A of the *Mining Regulation 2016*.

The risk assessment was undertaken generally in accordance with *Australian Standards HB 203:2006, AS/NZS 4360:2004* and *AS/NZS ISO 31000:2018 Risk Management – Principles & Guidelines*. The risk assessment comprised of a review of the rehabilitation risk assessment undertaken in August 2020 as a part of the West and Square Pit Closure Strategy for Closure Option 2 (closure of Abel Mine with no resumption of mining). The review consisted of:

- revision of previously identified risks and risk controls in consideration of the proposed rehabilitation objectives and completion criteria;
- identification of previously identified risk controls that could be reasonably applied to the full Abel and Donaldson Mine Sites, where practicable; and
- identification of residual risks to rehabilitation for the remainder of the Abel and Donaldson Mine Sites (i.e. not the West and Square Pits) that would be required to be addressed as part of a comprehensive assessment.

Risks to achieving the rehabilitation objectives and rehabilitation completion criteria outlined in Section 4, as well as the final landform outlined in Section 5, were identified and assessed jointly by Donaldson Coal and R.W. Corkery & Co. Pty Limited during the preparation of this Plan. Site-specific threats to rehabilitation were assessed based on both the results of previous rehabilitation efforts, as well as observations of site-specific conditions and threats to rehabilitation observed during site inspections. This risk assessment was completed with consideration of existing controls as well as those risk controls outlined in this plan.

It should be noted that the following presents a summary of the most recent rehabilitation risk assessment undertaken for the combined Abel and Donaldson Mines Sites in accordance with the *Form and Way: Rehabilitation Management Plan for Large Mines* (July 2021).

For each identified risk to rehabilitation, potential adverse outcomes were identified and allocated a risk rating based on the potential consequences and likelihood of occurrence. **Table 7** presents the Donaldson Coal Risk Matrix for the consequence, likelihood and risk rating used during this analysis. Where risks were determined to be unacceptable, namely those risks classified as "Moderate" or above, a Trigger Action Response Plan has been developed and is presented in Section 10.

Table 8 presents the results of the risk analysis assuming the implementation of standard mitigation measures and those outlined within this Plan.

Table 7
Donaldson Coal Risk Matrix

Loss Type		Effect / Consequence				
		1 Insignificant	2 Minor	3 Moderate	4 Major	5 Catastrophic
(P) Harm to People		Slight injury or health effects report only (RO) or first aid injury (FAI)	Minor injury or health effects – medical treatment injury (MTI) or restricted work injury (RWI)	Serious bodily injury or health effects – lost time injury (LTI)	Single Fatality	Multiple fatalities
(E) Environmental Impact		Environmental nuisance – trivial or negligible, short term impact to area of low significance, minimal or no physical remediation required. No regulation. Cost < $1,000	Minor environmental harm – short term impact to area of limited local significance, limited physical remediation. Reportable Breach /Minor Non Compliance, potential warning notice, other notices (infringement / prosecution) unlikely. Costs $1K - $10K	Serious environmental harm – medium term impact to area of local conservation value, medium term physical remediation, actual community health impacts or significance or pollution or contamination Infringement Notice but Prosecution unlikely Costs $10k - $100k	Major environmental harm – long term reversible impacts to area of regional conservation significance, health statistics in community alter as a result of this incident or pollution or contamination Prosecution Costs $100k - $1M	Extreme environmental harm – irreversible impacts on environmental values of extreme & widespread areas, or those of national conservation significance, community fatalities or pollution or contamination Prosecution, License revoked Costs > $1M
(O) Asset Damage and Other Consequential Losses		Slight damage < $1M or < 1 day disruption to operation	Minor damage $1M - $5M or <1 week disruption to operation	Local damage $5M - $20M or <1 month disruption to operation	Major damage $20M -$100M or <6 months partial loss of operation	Extreme damage > $100M or 6 months Substantial or total loss of operation
(R) Impact on Reputation		Slight impact – Public awareness may exist but no public concern Isolated compliance failure – no brand damage	Limited impact – Some local public concern Intervention of regulating authority – minimal brand damage	Considerable impact - Regional public concern Major compliance failure involving fines – medium brand damage	National impact – National public concern Temporary withdrawal of license to operate – significant brand damage	International impact - International public attention Loss of shareholder confidence – irreparable brand damage
Likelihood	**Likelihood Examples (Guide)**	**Level of Risk**				
A (Almost Certain)	Likely that the unwanted event could occur several times per year at this location	11 (M)	16 (H)	20 (H)	23 (E)	25 (E)
B (Likely)	Likely that the unwanted event could occur several times per year in the Australian mining industry; or could happen annually	7 (M)	12 (M)	17 (H)	21 (E)	24 (E)
C (Possible)	The unwanted event could well have occurred in the Australian mining industry at some time in the past 10 years	4 (L)	8 (M)	13 (H)	18 (H)	22 (E)
D (Unlikely)	The unwanted event has happened in the Australian mining industry at some time; or could happen in 50 years	2 (L)	5 (L)	9 (M)	14 (H)	19 (H)
E (Rare)	The unwanted event has never been known to occur in the Australian mining industry; or is highly unlikely that it could ever occur	1 (L)	3 (L)	6 (M)	10 (M)	15 (H)

Table 8
Donaldson Coal Rehabilitation Risk Assessment

Risk Identification & Analysis								Risk Reduction Strategy		Residual Risk				
#	Location	Mining Domain	Final Land Use Domain	Spatial Reference	Risk Source	Potential Impact/Consequence	Loss Type	Existing Control	Additional Control / Action	Consequence	Likelihood	Target Risk	Risk Level	RMP Section
General														
1	All	All	All	-	Insufficient resourcing: • skills and experience of rehabilitation personnel. • funding for or prioritisation of rehabilitation activities. • ongoing maintenance of rehabilitation requirements.	Rehabilitation signoff not given by Regulator	(O) Asset Damage and Other	Existing rehabilitation success. Experienced environmental team. Yancoal corporate oversight and experience. Existing Environmental Management Strategy and associated Plans. Rehabilitation Cost Estimate.	Review budget provisions for rehabilitation of Abel and Donaldson Mine Sites Review RCE based on Closure Option 2 for West and Square Pits.	3	D	9	(M)	Section 7 and RCE/Forward Program
							(R) Impact on Reputation			2	D	5	(L)	
2	All	All	All	-	Lack of clearly defined responsibilities	Rehabilitation signoff not given by Regulator	(O) Asset Damage and Other	Mining Engineering Manager responsible for seeking approval for funding for closure, provision of resources for rehabilitation and managing rehabilitation activities. Environment and Community Superintendent responsible for design of technical closure plans. Yancoal Corporate Standard - Rehabilitation (Includes RACI matrix). Mining Operations Plans.	Responsibilities to be defined in Section 7 of the Rehabilitation Management Plans.	1	D	2	(L)	Section 7
Decommissioning														
3	All	All	All	-	Impacts on European heritage items	N/A - no European heritage items located within Abel and Donaldson Mine Sites.								
4	All	All	All	-	Impacts on Aboriginal heritage items: • Four Mile Creeks (Aboriginal Conservation Area) • Individual Aboriginal sites located surrounding active areas and above underground mining area	Inadvertent damage during rehabilitation activities. Prosecution	(E) Environmental Impact	Survey of area completed by Archaeologists and Mindaribba Local Aboriginal Land Council (MLALC) previously. Aboriginal Heritage Management Plan. Ground Disturbance Permit.	1. Survey of areas not previously surveyed by local Aboriginal group (MLALC). 2. Survey of areas not previously surveyed by Archaeologists. 3. Obtain Section 90 Permit if required to relocate any found Aboriginal artefacts.	2	D	5	(L)	Section 6.2.1.13
5	All	Infrastructure Area Active Mining Area (Open Cut Void) Water Management Area (Big Kahuna)	Native Ecosystem Water Storage Area Infrastructure Final Void	A1 A5 G3 J5 I1	Contamination resulting from storage and handling of hydrocarbons, resins, cement.	Contamination of waterways or land resulting in infringement notice	(E) Environmental Impact	Storage and handling of hydrocarbons in accordance with Australian Standards and Industry best practice. Pollution Incident Response Management Plan. Ongoing surface water monitoring program.	1. Phase 1 Contamination Study of high-risk infrastructure and storage areas. 2. Consider disposal options as a result of the Phase 1 Contamination Study in budget for Mine Closure and Rehabilitation.	3	D	9	(M)	Section 6.2.2.4
6	All	Infrastructure Areas Active Mining Area (Open Cut Void)	Native Ecosystem Infrastructure Final Void	A1 A5 J5 I1	Generation of waste products from demolition process.	Wastes not disposed of correctly (either at licensed disposal facility or in accordance with EPL and RMP) - infringement notice	(E) Environmental Impact	Reputable waste contract company engaged (licensed). Donaldson and Abel Waste Management Plan.	1. Determine disposal methods of waste products (either at licensed disposal facility or in accordance with EPL and Mine Closure Plan) and include in a Decommissioning Plan for Mine Closure.	2	D	5	(L)	Sections 6.2.1.5, 6.2.2.2, and 6.2.2.5

Table 8 (Cont'd)
Donaldson Rehabilitation Risk Assessment

Risk Identification & Analysis								Risk Reduction Strategy		Residual Risk				
#	Location	Mining Domain	Final Land Use Domain	Spatial Reference	Risk Source	Potential Impact/Consequence	Loss Type	Existing Control	Additional Control / Action	Consequence	Likelihood	Target Risk	Risk Level	RMP Section
Decommissioning (Cont'd)														
7	Donaldson	Active Mining Area (Open Cut Void)	Native Ecosystem Final Void	A5 J5	Groundwater accumulation in West Pit final void. Note: Seam is down-dip to South from West Pit (West Pit floor is below Lower Donaldson - water will migrate back to underground)	Unknown until water model review is completed	(E) Environmental Impact	Groundwater model undertaken for Abel EA includes Bloomfield and Abel groundwater results.	1. Review the existing water model to confirm final standing water level and potential for discharges. 2. Implement control requirements from water model review if potential for West Pit to discharge.	2	D	5	(L)	Section 6.2.3.4
8	Donaldson	Active Mining Area (Open Cut Void)	Native Ecosystem Final Void	A5 J5	Groundwater accumulation in Square Pit final void. Note: Potential for spill halfway along Eastern Wall in Square Pit (low point) and discharge in Four Mile Creek.	Unknown until water model review is completed	(E) Environmental Impact	Groundwater model undertaken for Abel EA includes Bloomfield and Abel groundwater results.	1. Review the existing water model to confirm final standing water level and potential for discharges. 2. Implement control requirements from water model review if potential for Square Pit to discharge.	2	D	5	(L)	Section 6.2.3.4
9	All	Active Mining Area (Open Cut Void)	Native Ecosystem Final Void	A5 J5	Adverse geotechnical and/or geochemical issues associated with process waste storage facilities (e.g. tailings, reject emplacements), overburden and waste rock dumps, etc.	N/A - No placement of tailings in either Square Pit or West Pit Voids under currently proposed Option 2.								
10	Abel	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Unauthorised access to underground workings.	Unauthorised access to underground by public following cessation of mining (no ventilation to underground workings)	(P) Harm to People	Current access is restricted via use of gates being locked on Portal Entrances.	1. Decommissioning Plan to include prevention of access to underground following cessation of mining (including sealing of portals). Current mining status until final sealing of 3 x Portals and 2 x Shafts.	4	E	10	(M)	Section 6.2.2.6
Landform Establishment														
11	Abel	Underground Mining Area	Variable	K6	Failure of service boreholes or gas well seals.	No gas wells currently in place for the underground workings. Failure of water service borehole could result in loss of potable water to underground workings.	(E) Environmental Impact	Inspection of active service boreholes to ensure water service remains function / does not leak.	1. Decommissioning Plan to include disconnection of any remaining water services to the underground workings.	1	D	2	(L)	Section 6.2.2.6
12	Abel	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Failure of mine seals: • 3 x Portals • 2 x Shafts	Unauthorised access to underground by public following cessation of mining (no ventilation to underground workings)	(P) Harm to People		1. Sealing of 3 portals and 2 shafts in accordance with applicable guidelines. 2. High Risk Activity Notification for Final Sealing.	4	E	10	(M)	Section 6.2.2.6
						Integrity of seals compromised by rehabilitation blasting activities - authorised access underground	(P) Harm to People		1. Decommissioning Plan to include prevention of access to underground following cessation of mining (including sealing of portals).	4	E	10	(M)	Section 6.2.2.6

Table 8 (Cont'd)
Donaldson Rehabilitation Risk Assessment

Risk Identification & Analysis								Risk Reduction Strategy		Residual Risk				
#	Location	Mining Domain	Final Land Use Domain	Spatial Reference	Risk Source	Potential Impact/Consequence	Loss Type	Existing Control	Additional Control / Action	Consequence	Likelihood	Target Risk	Risk Level	RMP Section
Landform Establishment (Cont'd)														
13	Donaldson	Active Mining Area (Open Cut Void)	Native Ecosystem Final Void	A5 J5	Instability of highwalls and low walls.	Landform failure - public safety	(P) Harm to People	Fencing and signage at property boundary and around the perimeter of the final voids. Bunding at top of highwalls. Design of rehabilitation blasting to minimise risk. Currently approved final slopes range from 10 degrees and 18 degrees.	1. Geotechnical/Final Landform Study to determine slope requirements for highwall to be long-term geotechnically stable (West Pit and Square Pit) based on final standing water level for Square Pit. 2. If outcomes of Geotechnical/Final Landform Study determine different slope requirements, update relevant Management Plans and RMP.	2	C	8	(M)	Section 6.2.3.4
						Rehabilitation signoff not given by Regulator	**(R) Impact on Reputation**	Fencing and signage at property boundary and around the perimeter of the final voids. Bunding at top of highwalls. Design of rehabilitation blasting to minimise risk.	1. Geotechnical/Final Landform Study to determine slope requirements for highwall to be long-term geotechnically stable (West Pit and Square Pit) based on final standing water level for Square Pit. 2. If outcomes of Geotechnical/Final Landform Study determine different slope requirements, update relevant Management Plans and RMP.	**2**	**D**	**5**	**(L)**	Section 6.2.3.4
14	All	Active Mining Area (Open Cut Void)	Native Ecosystem Final Void	A5 J5	Availability of suitable materials for capping of hazardous materials and impounded tailings/coarse reject materials	N/A - No placement of tailings in either Square Pit or West Pit Voids under currently proposed Option 2.								
15	All	Active Mining Area (Open Cut Void)	Native Ecosystem Final Void	A5 J5	Availability of suitable materials for capping of carbonaceous material and other unsuitable materials on final landform batters.	Exposed carbonaceous or other unsuitable material impact upon growth medium and ability to establish vegetative cover.	(E) Environmental Impact		1. A Rehabilitation Materials Balance Report to be prepared prior to commencement of final landform shaping.	4	E	10	(M)	Section 6.2.2.4
						Rehabilitation signoff not given by Regulator	(O) Asset Damage and Other			2	E	3	(L)	
16	All	All	All	-	Final landform instability (e.g. Steep slopes, erosion, etc.) affecting final land use capability.	Water quality impacts. Impact on ability to establish vegetative cover.	(E) Environmental Impact	Existing erosion and sediment control structures on completed rehabilitation areas.	1. Conduct Final Landform Study to determine appropriate slope and water/erosion control design and structures for areas yet to be rehabilitated.	2	D	5	(L)	Section 6.2.3.4
17	Abel	Underground Mining Area	Variable	K6	Final landform unsuitable for existing land use (e.g. Large rocks present affecting cultivation, settlement and surface subsidence leading to extended ponding etc.)	Subsidence impacts prevent or reduce existing land uses.	(E) Environmental Impact	Rehabilitation Management Plan. Subsidence Management Plan. Rehabilitation Monitoring. Mining operations ceased 2015.	1. Continued implementation of existing subsidence rehabilitation procedures.	1	C	4	(L)	Section 6.3
						Rehabilitation signoff not given by Regulator	(R) Impact on Reputation			1	C	4	(L)	

Table 8 (Cont'd)
Donaldson Rehabilitation Risk Assessment

Risk Identification & Analysis								Risk Reduction Strategy		Residual Risk				
#	Location	Mining Domain	Final Land Use Domain	Spatial Reference	Risk Source	Potential Impact/Consequence	Loss Type	Existing Control	Additional Control / Action	Consequence	Likelihood	Target Risk	Risk Level	RMP Section
Landform Establishment (Cont'd)														
18	All	Active Mining Area (Open Cut Void)	Native Ecosystem Final Void	A5 J5	Diversion of surface water runoff away from catchment areas.	Final voids (Square Pit and West Pit) fill and discharge - unknown consequence until water model review is completed.	(E) Environmental Impact	Donaldson and Abel Water Management Plan.	1. Review the existing water model to confirm final standing water level and potential for discharges. 2. Implement control requirements from model review if potential for West Pit or Square Pit to discharge.	2	D	5	(L)	Section 6.2.3.4
						Loss of water flow downstream due to capture of water in West Pit Void and Square Pit Void.	(E) Environmental Impact	Donaldson and Abel Water Management Plan.	1. Final Landform Design to include water management requirements (e.g. diversions, etc.) considering potential impacts on water flow downstream.	3	D	9	(M)	Section 6.2.3.4
19	All	Active Mining Area (Open Cut Void)	Native Ecosystem Final Void	A5 J5	Groundwater accumulation in voids.	Final void fills and discharges - unknown consequence until water model review is completed.	(E) Environmental Impact	Donaldson and Abel Water Management Plan.	1. Review the existing water model to confirm final standing water level and potential for discharges. 2. Implement control requirements from model review if potential for West Pit or Square Pit to discharge. 3. Maintain Groundwater Licence for Final Void/s.	2	D	5	(L)	Section 6.2.3.4
20	All	-	-	-	Watercourse diversion instability affecting riparian health.	N/A - no watercourse diversions in place or proposed.								
21	All	-	-	-	Water availability for dust suppression.	Inadequate water supply resulting in excess dust generation or requirement to stand down rehabilitation equipment.	(E) Environmental Impact	West Pit, Square Pit and Big Kahuna water available as required. Lack of water availability extremely unlikely. Chichester Hunter Water Main traverse property with existing connections for Abel and Donaldson operations.		2	E	3	(L)	Section 6.2.5.4

Table 8 (Cont'd)
Donaldson Rehabilitation Risk Assessment

Risk Identification & Analysis								Risk Reduction Strategy		Residual Risk				
#	Location	Mining Domain	Final Land Use Domain	Spatial Reference	Risk Source	Potential Impact/Consequence	Loss Type	Existing Control	Additional Control / Action	Consequence	Likelihood	Target Risk	Risk Level	RMP Section
Growth Medium Development														
22	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Adoption of inappropriate or inadequate rehabilitation techniques, including equipment fleet.	Impacts of establishing vegetation due to soil compaction.	(E) Environmental Impact	Current high standard of Rehabilitation on site (past experience of managing similar voids) - accepted as industry best practice. Site Environmental Team experienced in rehabilitation. Use of experienced rehabilitation contractors (external) - previously conducted rehabilitation on site. Use of experienced rehabilitation consultants (external) - industry recognised content/technical experts. Yancoal Corporate environmental team provide expertise. Yancoal Corporate Standards - Rehabilitation (in progress). Existing Environmental Management Strategy and associated Plans (available on Internet/Intelex). Fit for Purpose Equipment used for rehabilitation activities (consideration of weight, compaction, etc.)	1. Preparation of this Rehabilitation Management Plan. 2. Review equipment prior to and at commencement of rehabilitation works to ensure fit for purpose.	2	D	5	(L)	Section 6.2.4.4
23	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Subsoil and topsoil deficit for rehabilitation activities.	Suitable subsoil and topsoil material volume unavailable on site leading to inadequate depth of growth material.	(E) Environmental Impact		1. A Rehabilitation Materials Balance Report to be prepared prior to commencement of final landform shaping. 2. Source and budget any topsoil materials required.	2	D	5	(L)	Sections 6.2.1.1, 6.2.4.4
24	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Chemical properties of growth medium inadequate to support revegetation (e.g. Lack of organic matter, nutrient deficiency, lack of soil biota, adverse soil chemical properties).	Impacts of establishing vegetation due to soil chemical properties.	(E) Environmental Impact	Growth medium used successfully for existing Donaldson Coal Mine rehabilitation areas.	1. Undertake testing of growth medium to ensure suitable chemical properties / to calculate required rate of ameliorants (gypsum, fertiliser etc).	2	D	5	(L)	Section 6.2.4.1
Ecosystem and Land Use Establishment														
25	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Lack of availability and quality of seed resources, including genetic integrity.	Inability to establish preferred species	(E) Environmental Impact		1. Source seed resources sufficiently in advance of rehabilitation works to ensure supply.	2	E	3	(L)	Section 6.2.5.4

Table 8 (Cont'd)
Donaldson Rehabilitation Risk Assessment

Risk Identification & Analysis								Risk Reduction Strategy		Residual Risk				
#	Location	Mining Domain	Final Land Use Domain	Spatial Reference	Risk Source	Potential Impact/Consequence	Loss Type	Existing Control	Additional Control / Action	Consequence	Likelihood	Target Risk	Risk Level	RMP Section
Ecosystem and Land Use Establishment (Cont'd)														
26	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Weed and pest control: • weed introduction and control (or lack thereof) • Damage from fauna (e.g. kangaroos, feral goats, etc.) • Insects and plant disease.	Impacts on vegetation (establishing and ongoing) - completion criteria not met.	(E) Environmental Impact	Flora and Fauna Management Plan includes weed management. Annual Weed Management Program. Environmental Inspections. Rehabilitation Monitoring. Current high standard of Rehabilitation on site (past experience of managing similar voids) - accepted as industry best practice.		2	D	5	(L)	Section 6.2.5.6
27	All	Infrastructure Area	Infrastructure	I1	Lack of structural integrity of infrastructure to be retained in final landform.	Retained infrastructure not suitable for final land use.	(P) Harm to People	Ongoing use and maintenance of infrastructure.	1. Decommissioning Plan to include assessment for retained infrastructure (safety/access control bunding, fencing, access roads) to be retained. 2. Based on results of assessment, undertake any recommended repairs or revise retention options.	1	C	4	(L)	Section 6.2.2.3
						Rehabilitation signoff not given by Regulator.	(R) Impact on Reputation			1	C	4	(L)	
28	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Adoption of inappropriate or inadequate revegetation techniques.	Application of inappropriate species mix for respective domain area. Unnecessary compaction of growth medium. Inability to establish adequate vegetative cover.	(E) Environmental Impact	Current high standard of Rehabilitation on site (past experience of managing similar voids) - accepted as industry best practice. Site Environmental Team (experience in rehabilitation). Use of experienced rehabilitation contractors (external) - previously conducted rehabilitation on site. Use of experienced rehabilitation consultants (external) - industry recognised content/technical experts. Yancoal Corporate environmental team provide expertise. Yancoal Corporate Standards - Rehabilitation (in progress). Existing Environmental Management Strategy and associated Plans (available on Internet/Intelex). Fit for Purpose Equipment used for rehabilitation activities (consideration of weight, compaction, etc.) Direct seeding.		2	D	5	(L)	Sections 6.2.5.3, 6.2.4.4 and 6.2.5.5

Table 8 (Cont'd)
Donaldson Rehabilitation Risk Assessment

Risk Identification & Analysis								Risk Reduction Strategy		Residual Risk				
#	Location	Mining Domain	Final Land Use Domain	Spatial Reference	Risk Source	Potential Impact/Consequence	Loss Type	Existing Control	Additional Control / Action	Consequence	Likelihood	Target Risk	Risk Level	RMP Section
Ecosystem and Land Use Establishment (Cont'd)														
29	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Weather and climatic influences (e.g. Drought; intense rainfall events; bushfire; etc.)	Damage to vegetation due to fire, flood or drought.	(E) Environmental Impact	Bushfire Management Plan. Water Management Plan. Ability to obtain water from West Pit and Big Kahuna Dam. Rehabilitation Management Plan. Access to Hunter Water Pipeline. Local Rural Fire Service (established relationship with local RFS).	1. Review the existing water model to confirm final standing water level and potential for discharges.	2	C	8	(M)	Section 6.2.5.1
30	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Insufficient establishment of vegetative cover / projected foliage cover.	Impacts on vegetation (establishing and ongoing) - completion criteria not met. Inappropriate levels of erosion / soil loss.	(E) Environmental Impact	Flora and Fauna Management Plan includes weed management. Annual Weed Management Program. Environmental Inspections. Rehabilitation Monitoring. Current high standard of Rehabilitation on site (past experience of managing similar voids) - accepted as industry best practice. Rehabilitation Management Plan. Water available on site - Big Kahuna Dam.		2	D	5	(L)	Sections 6.2.5.5 and 8.2
31	All	Infrastructure Area Water Management Areas Active Mining Area (Open Cut Void)	Native Ecosystem Water Storage Area Final Void	A1 G3 A5 J5	Erosion and failure of drainage and water management/storage structures.	Impacts on water quality and potential discharge.	(E) Environmental Impact	Final Landform Design to include water management requirements (e.g. diversions, etc.). Rehabilitation Management Plan - includes erosion and sediment control. Environmental Inspections. Rehabilitation Monitoring. Donaldson and Abel Water Management Plan.	1. Ongoing inspection and maintenance of any Water Management structures required as part of final landform design. 2. Sediment Dam Investigation Report.	4	D	14	(H)	Sections 6.2.1.10 and 6.2.6.2
32	Abel	Underground Mining Area (SMP)	Other	K6	Overgrazing of pasture rehabilitation areas above underground workings (if impacted by subsidence).	Pasture cover establishment delayed.	(R) Impact on Reputation	Rehabilitation Management Plan. Subsidence Management Plan. Rehabilitation Monitoring.		1	C	4	(L)	Abel RMP
Ecosystem and Land Use Development														
33	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Weather and climatic influences (e.g. Drought; intense rainfall events; bushfire; etc.)	Damage to vegetation due to fire, flood or drought.	(E) Environmental Impact	Bushfire Management Plan. Water Management Plan. Ability to obtain water from West Pit and Big Kahuna Dam. Rehabilitation Management Plan - includes erosion and sediment controls. Access to Hunter Water Pipeline. Local Rural Fire Service (established relationship with local RFS).	1. Review the existing water model to confirm final standing water level and potential for discharges.	2	C	8	(M)	Sections 6.2.5.1 and 6.2.6.4

Table 8 (Cont'd)
Donaldson Rehabilitation Risk Assessment

Risk Identification & Analysis								Risk Reduction Strategy		Residual Risk				
#	Location	Mining Domain	Final Land Use Domain	Spatial Reference	Risk Source	Potential Impact/Consequence	Loss Type	Existing Control	Additional Control / Action	Consequence	Likelihood	Target Risk	Risk Level	RMP Section
Ecosystem and Land Use Development (Cont'd)														
34	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Vandalism to revegetation areas.	Damage to vegetation due to vandalism.	(E) Environmental Impact	Fencing and signage at property boundary. Environmental Inspections. Rehabilitation Monitoring.		2	C	8	(M)	Sections 6.2.6.4 and 6.2.6.5
35	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Inadvertent or unauthorised access.	Damage to vegetation due to inappropriate access.	(E) Environmental Impact	Fencing and signage at property boundary. Definition of retained access tracks. Weekly boundary inspections undertaken.		2	D	5	(L)	Sections 6.2.6.4 and 6.2.6.5
36					Post-closure water quality issues (e.g. high salinity, etc.)	Refer to #31 Erosion and Failure of Drainage and Water Management / Storage Structures, #18, #19 water Accumulation in Voids.								
37	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Insects and plant disease.	Refer to #26 Weed & Pest Control								
38	Abel	Underground Mining Area (SMP)	Variable	K6	Overgrazing of pasture rehabilitation areas above underground workings (if impacted by subsidence).	Pasture cover establishment delayed.	(R) Impact on Reputation	Rehabilitation Management Plan. Subsidence Management Plan. Rehabilitation Monitoring.		1	C	4	(L)	Abel RMP
39	All	All	-	-	Lack of resources for rehabilitation maintenance.	Refer to #1 General (Resourcing)								
40	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Inadvertent or unauthorised access.	Refer to #35 Inadvertent or unauthorised access.								
41	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Insufficient establishment of vegetative cover / projected foliage cover.	Completion criteria not met. Inappropriate levels of erosion / soil loss.	(E) Environmental Impact	Flora and Fauna Management Plan includes weed management. Annual Weed Management Program. Environmental Inspections. Rehabilitation Monitoring against completion criteria Current high standard of Rehabilitation on site (past experience of managing similar voids) - accepted as industry best practice. Rehabilitation Management Plan. Water available on site - Big Kahuna Dam. Completion criteria submitted to Resources Regulator.	1. If required, seek assessment and review by rehabilitation expert / ecologist and implement recommendations.	2	D	5	(L)	Section 6.2.6.4
						Rehabilitation signoff not given by Regulator	(R) Impact on Reputation			2	D	5	(L)	

Table 8 (Cont'd)
Donaldson Rehabilitation Risk Assessment

Risk Identification & Analysis								Risk Reduction Strategy		Residual Risk				
#	Location	Mining Domain	Final Land Use Domain	Spatial Reference	Risk Source	Potential Impact/Consequence	Loss Type	Existing Control	Additional Control / Action	Consequence	Likelihood	Target Risk	Risk Level	RMP Section
Ecosystem and Land Use Development (Cont'd)														
42	All	Infrastructure Area Active Mining Area (Open Cut Void)	Native Ecosystem	A1 A5	Ecosystem established is not self-sustaining / contains inappropriate species.	Completion criteria not met.	(E) Environmental Impact	Flora and Fauna Management Plan includes weed management. Annual Weed Management Program. Environmental Inspections. Rehabilitation Monitoring. Current high standard of Rehabilitation on site (past experience of managing similar voids) - accepted as industry best practice. Rehabilitation Management Plan. Completion Criteria submitted to Resources Regulator. Rehab inspections against Completion Criteria	1. If required, seek assessment and review by rehabilitation expert / ecologist and implement recommendations.	2	D	5	(L)	Section 6.2.6.4
						Rehabilitation signoff not given by Regulator	(R) Impact on Reputation			2	D	5	(L)	

4. REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

4.1 REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

Table 9 presents the approved rehabilitation objectives and rehabilitation completion criteria for individual final land use domains at the Abel Mine. Final land use domains are shown on **Plan 1** and current Mining Domains are shown on **Figure 5**.

Table 9
Rehabilitation Objectives and Rehabilitation Completion Criteria

Final Land Use Domain	Mining Domain	Spatial Reference[1]	Rehabilitation Objective Category	Proposed Rehabilitation Objective	Indicator(s)	Proposed Rehabilitation Completion Criteria	Validation Method
Native Ecosystem	Infrastructure	A1	Bushfire	The risk of bushfire and impacts to the community, environment and infrastructure has been addressed as part of rehabilitation	Appropriate bushfire hazard controls (where required) have been implemented on the advice from the NSW Rural Fire Service.	Bushfire controls implemented.	Statement provided and before/after photos.
Infrastructure	Infrastructure	I1					
Final Void	Active Mining Area (open cut void)	J5					
Native Ecosystem	Infrastructure	A1	Ecological rehabilitation	Vegetation structure of rehabilitated areas is recognisable as, or is trending towards, one or more of the modified native vegetation and plant communities of the analogue sites within the Bushland Conservation Area (Including Riparian Moist Forest, Smooth-barked Apple Forest, Spotted Gum - Ironbark Forest, Tall Moist Forest, Hunter Lowland Redgum Forest, and their derivatives)	Biomass metrics of plant growth forms recorded from 0.04 hectare fixed monitoring plots are characteristic of the target vegetation community (e.g. PCT), or an ongoing trend toward becoming characteristic is evident from the monitoring data	Foliage Projective Cover, Basal Area, and Total Stand Volume of native plant growth forms are characteristic of, or trending towards, the target vegetation community type(s).	Before and after photos, rehabilitation monitoring reports, independent ecological reports (where required) that validate rehabilitation completion criteria have been met.
Final Void	Active Mining Area (open cut void)	J5				For areas returned to native grassland, projected foliage cover is greater than or equal to 70%.	
						For areas returned to woodland the Total Foliage Projection Cover (including groundcover, shrubs and overstory) exceeds 150%.	
						For areas returned to woodland the total stand volume is within 20% of existing matured rehabilitation areas and/or analogue sites.	
						Relative abundance of native species is within 20% of existing matured rehabilitation areas and/or analogue sites.	
Native Ecosystem	Infrastructure	A1	Ecological rehabilitation	Vegetation composition of rehabilitated areas contains species that are commensurate with one or more of the modified native vegetation and plant communities of the analogue sites within the Bushland Conservation Area (Including Riparian Moist Forest, Smooth-barked Apple Forest, Spotted Gum - Ironbark Forest, Tall Moist Forest, Hunter Lowland Redgum Forest, and their derivatives)	Native plant species recorded from 0.04 hectare fixed monitoring plots are characteristic of the target vegetation community (e.g. target PCT)	Native plant species are characteristic of the target vegetation community(s) when compared to analogue sites.	Before and after photos, rehabilitation monitoring reports, independent ecological reports (where required) that validate rehabilitation completion criteria have been met.
Final Void	Active Mining Area (open cut void)	J5				At least 80% of species established are consistent with or complementary to surrounding local plant communities and represent >80% of the total projected foliage cover	
						Weed abundance within rehabilitated areas is <20% projected foliage cover or equivalent to or less than that observed at analogue sites.	
Native Ecosystem	Infrastructure	A1	Ecological rehabilitation	Native vertebrate fauna species assemblages are commensurate with or are trending towards surrounding analogue sites.	Vertebrate species recorded from 0.04 hectare fixed monitoring plots show evidence of habitat utilisation and occupation.	Similarity indices show fauna species assemblages within rehabilitation areas have at least 40% similarity (i.e. highly similar) to analogue sites.	Before and after photos, rehabilitation monitoring reports, independent ecological reports (where required) that validate rehabilitation completion criteria have been met.
Native Ecosystem	Infrastructure	A1	Ecological rehabilitation	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable	Indicators of nutrient cycling are suitable for sustaining the target vegetation community (e.g. PCT(s))	Litter cover is within 10th-90th percentile variation range of reference sites/data	Rehabilitation monitoring reports, independent soil reports (where required) that demonstrate long-term function of rehabilitated landform. Depending on the nature, scale and risks associated with a specific site, achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15+ years).

Table 9 (Cont'd)
Rehabilitation Objectives and Rehabilitation Completion Criteria

Final Land Use Domain	Mining Domain	Spatial Reference[1]	Rehabilitation Objective Category	Proposed Rehabilitation Objective	Indicator(s)	Proposed Rehabilitation Completion Criteria	Validation Method
Final Void	Active Mining Area (open cut void)	J5	Ecological rehabilitation (Cont'd)	Levels of ecosystem function have been established that demonstrate the rehabilitation is self-sustainable (Cont'd)	Evidence of plant regeneration from 0.04 hectare fixed monitoring plots or a walk over of the ecological rehabilitation area	Second generation individuals of trees are within the 10th-90th percentile variation range of reference sites/data approved by the consent authority	Before and after photos, rehabilitation monitoring reports, independent ecological reports (where required) that validate rehabilitation completion criteria have been met.
							Depending on the nature, scale and risks associated with a specific site, achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15+ years).
					Cover of exotic species within 0.04 hectare fixed monitoring plots is low	Foliage cover of 'high threat exotic' (HTE) weeds is within 10th-90th percentile variation range of reference sites/data or at a level that does not cause significant risk to rehabilitation.	Before and after photos, rehabilitation monitoring reports, independent ecological reports (where required) that demonstrate long-term stability of rehabilitated landform.
					Resilience demonstrated by the effects of drought and fire on composition, structure and other function attributes.	Resilience to drought and fire.	Rehabilitation monitoring reports, environmental monitoring records.
					Threats to rehabilitation.	Vertebrate pest species – presence and damage is recorded at a level that does not cause significant risk to rehabilitation.	Rehabilitation monitoring reports.
						Domesticated stock - presence and damage is recorded at a level that does not cause significant risk to rehabilitation.	
Final Void	Active Mining Area (open cut void)	J5	Groundwater	Groundwater quality is similar to, or better than the pre-disturbance groundwater quality or the range as predicted in pre-mining environmental assessment (or otherwise approved)	Water quality parameters selected from Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 and or Environment Protection Licence.	Water quality discharged from rehabilitated mining operation meet specifications in Environment Protection Licence and or ANZECC guidelines for specific environment.	Independent hydrological assessment report.
Final Void	Active Mining Area (open cut void)	J5	Groundwater	Groundwater levels are within the range predicted in pre-mining environmental assessment (or otherwise approved)	Groundwater quality both on and off a mining lease represent an acceptable level of change from a defined reference condition.	Groundwater levels, groundwater flow.	Water quality monitoring reports.
							Environment Protection Licence relinquished by Environment Protection Authority.
							Independent hydrological assessment report.
Final Void	Active Mining Area (open cut void)	J5	Land contamination	Final void design does not represent a potential source of pollution.	Measured – contamination levels in surface and groundwater surrounding emplacement for contaminants of concern associated with waste material emplaced.	Water quality discharged from rehabilitated mining operation meet specifications in Environment Protection Licence and or ANZECC guidelines for specific environment.	Independent hydrological assessment report.
Native Ecosystem	Infrastructure	A1	Land contamination	Areas are free from contaminants and hazardous materials.	Waste material and/or visible contamination areas on site surface.	There are no visible signs of contamination following the removal of plant, equipment and materials.	Statement provided and before/after photos.
Infrastructure	Infrastructure	I1				All rubbish/ waste materials removed from site.	
Final Void	Active Mining Area (open cut void)	J5			Soil testing for contaminants of concern as listed by Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999) applicable to land use type.	Contamination will be appropriately remediated so that appropriate guidelines for land use are met, e.g. Health Investigation Level of the National Environment Protection (Assessment of Site Contamination) Measure (1999).	Contamination Remediation Report prepared by Land Contamination Consultant
						Excess sludge/material has been removed from surface water dams.	Site Contamination Audit Report and Site Audit Statement prepared by EPA Accredited Auditor (where required).

Table 9 (Cont'd)
Rehabilitation Objectives and Rehabilitation Completion Criteria

Final Land Use Domain	Mining Domain	Spatial Reference[1]	Rehabilitation Objective Category	Proposed Rehabilitation Objective	Indicator(s)	Proposed Rehabilitation Completion Criteria	Validation Method
Native Ecosystem	Infrastructure	A1	Landform stability	Final landforms are safe, stable and non-polluting.	Highwall and low wall design	Final shaping of pit walls undertaken in accordance with approved design.	Single occurrence inspection and report, including photographs and final landform survey plan, prior to growth medium establishment.
Infrastructure	Infrastructure	I1			Visual evidence of erosion or landform instability	No evidence of active erosion or other landform instability (e.g. mass movement) that would require moderate or significant maintenance is observed.	Visual inspections undertaken on a regular basis until site relinquishment.
Final Void	Active Mining Area (open cut void)	J5					Final inspection report , with photographs, prepared as part of completion report.
					Access controls	Barriers are placed adjacent retained access road to prevent public access to potentially hazardous landforms or sensitive rehabilitation areas, if required.	Single occurrence relinquishment inspection and report, including photographs, following decommissioning.
Native Ecosystem	Infrastructure	A1		Final landform is stable in the long term and does not present a risk of environmental harm or safety risk to future land uses within and in the vicinity of the Mine Site	Visual - indicators of erosion and land instability.	Visual- minimal erosion that would not require moderate to significant ongoing management and maintenance works.	Before and after photos, rehabilitation monitoring reports, as- constructed surveys, erosion surveys, independent geotechnical reports (where required) and or erosion modelling reports (where required) that indicate long-term stability of rehabilitated landform. Depending on the nature, scale and risks associated with a specific site, stability will need to be evaluated over a number of years (e.g. 5 years).
Infrastructure	Infrastructure	I1			Visual - indicators that surface water management structure are functioning as designed.	Visual – no signs of land instability such as mass movement.	
Final Void	Active Mining Area (open cut void)	J5			Measured – erosion rates from field trials and or surveys on both target analogue sites (representative of final land use) and rehabilitated profiles (tonnes / ha).	Visual - no areas of active gully erosion.	
					Measured - Survey of rehabilitated landform to verify final landform construction in accordance with Final Landform and Rehabilitation Plan6.	Visual - no evidence of tunnel erosion.	
					Measured - survey of rehabilitated landform to specifically monitor settlement and/or material loss via erosion.	Visual – no evidence of active scour likely to compromise surface water management structure.	
					Modelled – long term erosional stability (e.g. Landform Evolution Modelling) to verify the long-term stability of rehabilitated landform.	Survey verifies final landform complies with final landform construction in accordance with Final Landform and Rehabilitation Plan.6	
					Modelled – long term geotechnical stability (e.g. stability analysis) to verify the long-term stability of rehabilitated landform.	Survey verifies that settlement and/or material loss is within predicted limits and will not compromise final landform drainage via differential settlement.	
						Erosion rate monitoring verifies that erosion levels are within the range of target analogue sites representative of final land use.	
						Significant surface water management structures (e.g. spillways, drop structures, major drains and creek diversions) have been constructed in accordance with hydrological design.	An engineering assessment undertaken by a suitably qualified person concludes that significant surface water management structures (e.g. spillways, drop structures, major drains and creek diversions) have been constructed in accordance with hydrological design.
						High risk landforms (such as steep slopes, high walls) have been constructed in accordance with geotechnical design.	An engineering assessment undertaken by a suitably qualified person concludes that high risk landforms (such as steep slopes, high walls) have been constructed in accordance with geotechnical design.

Table 9 (Cont'd)
Rehabilitation Objectives and Rehabilitation Completion Criteria

Final Land Use Domain	Mining Domain	Spatial Reference[1]	Rehabilitation Objective Category	Proposed Rehabilitation Objective	Indicator(s)	Proposed Rehabilitation Completion Criteria	Validation Method
Native Ecosystem	Infrastructure	A1	Removal of infrastructure	All infrastructure and services not required for the final land use are removed.	Removal of all services (power, water, communications) that have been connected on the site as part of the operation.	All utility infrastructure removed.	Statement provided, utility service disconnection record / notification.
Infrastructure	Infrastructure	I1			Heritage obligations (e.g. development consent under the Environmental Planning and Assessment Act 1979, approvals under the Heritage Act 1977, etc.) have been met (e.g. archival recording, building retention or building demolition with footings preserved).	Permits and approval documents issued.	Copy of any relevant approval documentation and archival reports/records.
Final Void	Active Mining Area (open cut void)	J5				All archival reports required are complete and submitted.	
					Removal of all plant, equipment and associated infrastructure including processing facilities, stockpile areas, rail infrastructure and loading facilities, underground hydrocarbon storage tanks, office complex, portable offices, exploration core samples, camp facilities, storage racks, samples.	Infrastructure removed.	As-constructed final landform plan, photos, decommissioning reports etc.
					Removal of all footings or removal to a certain depth (e.g. 0.5 metres).	Footings removed and or removed to specified depths to avoid exposure pathways to subsequent final land use.	Surveyed and marked on the as-constructed final landform plan.
					Removal of all water management infrastructure (including pumps, pipes and power).	Infrastructure removed.	Statement provided and before/after photos.
					All drill cores have been removed and taken either to an authorised storage or a disposal location.	Cores removed and relocated.	Statement provided, receipt records from storage or disposal location.
					Surveying and sealing of all drill holes, boreholes and gas wells in accordance with departmental guidelines and relevant standards.	Sealing completed and verified.	Engineering report/statement, plug and abandonment log, photos, as-constructed drawings, records of fill materials and concrete plugs, filling methods, etc.
					Surveying and sealing of all underground mine entries in accordance with departmental guidelines and relevant standards.	Sealing completed and verified by suitably qualified engineer.	Engineering report/statement, plug and abandonment log, photos, as-constructed drawings, records of fill materials and concrete plugs, filling methods, etc.

Table 9 (Cont'd)
Rehabilitation Objectives and Rehabilitation Completion Criteria

Final Land Use Domain	Mining Domain	Spatial Reference[1]	Rehabilitation Objective Category	Proposed Rehabilitation Objective	Indicator(s)	Proposed Rehabilitation Completion Criteria	Validation Method
Native Ecosystem	Infrastructure	A1	Retention of infrastructure	All infrastructure that is to remain as part of the final land use is safe and does not pose any hazard to the community.	Potential hazards (e.g. electrical, mechanical) have been effectively isolated and secured.	Hazards isolated and secured.	Statement provided by suitably qualified engineer.
Infrastructure	Infrastructure	I1		Retained infrastructure benefits from relevant development consent approvals and/or licences and/or binding agreements (as relevant).	Damage to access tracks has been repaired and stabilised.	Repairs complete.	As-constructed final landform plan, photos etc.
Final Void	Active Mining Area (open cut void)	J5			Where applicable, necessary approvals are in place (e.g. development consent under the Environmental Planning and Assessment Act 1979) where buildings and infrastructure are to be retained as part of final land use.	Permits and approval documents issued.	Copy of any relevant approvals.
					Heritage obligations as required under the Environmental Planning and Assessment Act 1979, Heritage Act 1977, etc. have been met (e.g. archival recording, building retention and restoration).	Permits and approval documents issued; archival reports (where required) complete and submitted.	Copy of any relevant approvals.
					The structural integrity of the infrastructure is suitable and safe for use as part of the intended final land use.	The structural integrity of the infrastructure has been inspected by a suitably qualified engineer and determined to be suitable and safe as part of the intended final land use.	Engineering report/statement, photos, risk assessment verifying modes of failure are adequately addressed to minimise risks to public safety or the environment.
					Infrastructure is in a condition (e.g. structural, electrical, other hazards) that is suitable for the intended final land use.	Formal acceptance from the subsequent landowner that infrastructure is in a condition that is suitable for the intended final land use in accordance with formal agreement.	Formal acceptance from landowner.
					If any underground pipelines or other infrastructure are to remain in situ, they do not pose a hazard for the intended final land use.	The location of the infrastructure has been marked on a plan and registered with the relevant local authority (e.g. local Council) and Dial Before You Dig.	Surveyed and marked on the as-constructed final landform plan.
						Formal acceptance from the subsequent landowner that underground infrastructure has been left in a condition that is suitable for the intended final land use in accordance with formal agreement.	Copy of notification to local Council and Dial Before You Dig
							Formal acceptance from landowner.
							Identified on an appropriate legal instrument associated with the land title.
Native Ecosystem	Infrastructure	A1	Surface water	Runoff water quality from the mine site is similar to, or better than the pre-disturbance runoff water quality or within accepted and approved criteria.	Water quality parameters selected from Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 and or Environment Protection Licence.	Water quality discharged from rehabilitated mining operation meet specifications in Environment Protection Licence and or ANZECC guidelines for specific environment.	Water quality monitoring reports.
Infrastructure	Infrastructure	I1					Environment Protection Licence relinquished by Environment Protection Authority.
Final Void	Active Mining Area (open cut void)	J5					Independent hydrological assessment report.
							Depending on the nature, scale and risks associated with a specific site, achievement of criteria may need to be evaluated over a number of years (e.g. 5 years to 15+ years).
Final Void	Active Mining Area (open cut void)	J5	Surface water	Minimisation of final void catchments.	Presence of water management infrastructure	Final void perimeter diversion bund(s) and other water management structures constructed to minimised catchment in accordance with Blue Book or other appropriate design criteria.	Single occurrence relinquishment inspection and report including photographs following decommissioning.
Final Void	Active Mining Area (open cut void)	J5	Water approvals	Structures that take or divert water such as final voids, dams, levees etc. are appropriately licensed (e.g. under the Water Management Act 2000) and, where required, ensure sufficient licence shares are held in the water source(s) to account for water take.	Final landform considers advice from relevant Government Agency whether sufficient licence shares are available in the water source to account for water stored in voids and dams in the proposed final landform.	Water approvals / licences are granted by relevant NSW Government Agency.	Confirmation from relevant Government Agency that relevant water approvals / licences are able to be granted.

4.2 REHABILITATION Objectives and Rehabilitation Completion Criteria – Stakeholder Consultation

Table 10 presents a summary of the consultation undertaken with relevant stakeholders with regards to the proposed rehabilitation objectives and completion criteria presented in this Plan. This table will be updated with each revision of this Plan to include details of further consultation with relevant and interested stakeholders.

Table 10
Community Consultation Activities

Page 1 of 3

Department of Planning and Environment
Form of Consultation: Letter (email transmission) dated 2 June 2022 Matters Subject to Consultation: Rehabilitation Objectives and Completion Criteria Outcomes: No response received
Resources Regulator
Form of Consultation: Letter (email transmission) dated 2 June 2022 Matters Subject to Consultation: Rehabilitation Objectives and Completion Criteria Outcomes: No response received
Mining, Exploration, and Geoscience
Form of Consultation: Letter (email transmission) dated 2 June 2022 Matters Subject to Consultation: Rehabilitation Objectives and Completion Criteria Outcomes: No response received
Department of Planning and Environment - Water
Form of Consultation: Letter (email transmission) dated 2 June 2022 Matters Subject to Consultation: Rehabilitation Objectives and Completion Criteria Outcomes: No response received
Water NSW
Form of Consultation: Letter (email transmission) dated 2 June 2022 Matters Subject to Consultation: Rehabilitation Objectives and Completion Criteria Outcomes: No response received
Environment Protection Authority
Form of Consultation: Letter (email transmission) dated 2 June 2022 Matters Subject to Consultation: Rehabilitation Objectives and Completion Criteria Outcomes: No response received
Maitland City Council
Form of Consultation: Letter (email transmission) dated 2 June 2022 Matters Subject to Consultation: Rehabilitation Objectives and Completion Criteria Outcomes: No response received
Cessnock City Council
Form of Consultation: Letter (email transmission) dated 2 June 2022 Matters Subject to Consultation: Rehabilitation Objectives and Completion Criteria Outcomes: No response received

Table 10 (Cont'd)
Community Consultation Activities

City of Newcastle Council

Form of Consultation: Letter (email transmission) dated 2 June 2022

Matters Subject to Consultation: Rehabilitation Objectives and Completion Criteria

Outcomes: The following ten items were recommended to be addressed within the RMP

1. Consider surrounding changing land uses and minimise any impact on the delivery of the Emerging Black Hill Precinct Catalyst Area as identified in the Greater Newcastle Metropolitan Plan 2036 and the Black Hill Employment Lands Concept Approval.

   The Beresfield-Black Hill Catalyst Area consists of the Beresfield Precinct and the Emerging Black Hill Precinct. These areas are located outside or adjacent of the boundary of ML1461 but within and in the vicinity of ML1618. It is noted that the Emerging Black Hill Precinct is as of yet undeveloped; however, the development of the Beresfield Precinct, as identified by the Greater Newcastle Metropolitan Plan 2036, has significantly progressed while directly adjoining the Donaldson Mine Site. Based on the above, Donaldson Coal considers that further development of these areas would not be inhibited by the presence of the rehabilitated Abel and Donaldson Mine Sites.

   In addition to the above, it is noted that underground mining operations as part of the Abel Mine have previously occurred within and in the vicinity of the Emerging Black Hill Precinct. Any subsidence impacts will continue to be managed in accordance with the existing approved subsidence management plans.

2. Consider Objective 1 '*Diversify the Hunter's mining, energy and industrial capacity*' of the Draft Hunter Regional Plan 2041, particularly the post-mining land use principles outlined under Strategy 1.1, Strategy 1.2 and Action 1.

   The Draft Hunter Regional Plan 2041 defines the Abel and Donaldson Mine Sites as being located within the National Pinch Point Regionally Significant Growth Area of the Greater Newcastle District Planning and Growth Area. Within the National Pinch Point District Planning and Growth Area, the Abel and Donaldson Mines are located within or in the vicinity of the Beresfield, Black Hill, Four Mile Creek and Stockrington Precincts. It is noted that the land uses within these areas are largely undefined or do not accurately reflect current land use (namely conservation and mining). The objectives for these precincts are provided on Page 75 of the Draft Hunter Regional Plan 2041.

   It should be noted that the design of the final voids would permit their use as industrial water supply. Furthermore, though not proposed as part of this Plan, where existing infrastructure areas are located, these areas will be rehabilitated in a manner in which future industrial developments would not be prevented. Notwithstanding, for the backfilled open cut mining areas, the approved backfilling was not designed to support industrial development, and therefore these areas are not considered to be suitable for such use. The establishment of native ecosystem areas however is consistent with the listed objectives regarding the conservation of high environmental value lands.

   Objective 1 relates to opportunities for developing mining-affected areas and in general discusses the potential for rehabilitation outcomes greater than returning lands to pre-mining land uses. It is noted that Objective 1 states: "there may be times and circumstances when land should be kept as agricultural or biodiversity lands to maintain the character of the local area". Furthermore, the establishment of biodiversity corridors in areas of existing vegetation is also discussed as part of Objective 1. The rehabilitated areas of the Donaldson Mine Site are almost wholly surrounded by significant areas of remnant and/or regrowth vegetation that have been protected and maintained since the opening of the Donaldson Mine. Donaldson Coal contends that the rehabilitation of disturbed areas to native ecosystems would meet those criteria. Apart from limited hardstand areas, no other significant infrastructure is located within the Abel and Donaldson Mine Site which would provide unique opportunities for re-development of industrial areas.

   *In light of the above, the rehabilitation of the Abel and Donaldson Mine Sites as biodiversity areas is generally in accordance with the land use principals outlined in Strategy 1.1, namely avoiding land use conflicts and maintaining/enhancing biodiversity corridors. Strategy 1.2 outlines stages at which consultation should be undertaken in regard to alternative land uses. This is addressed in this table and in **Table 4**. Action 1 relates to development applications involving non-permissible land uses and is therefore not considered to be relevant to this Plan.*

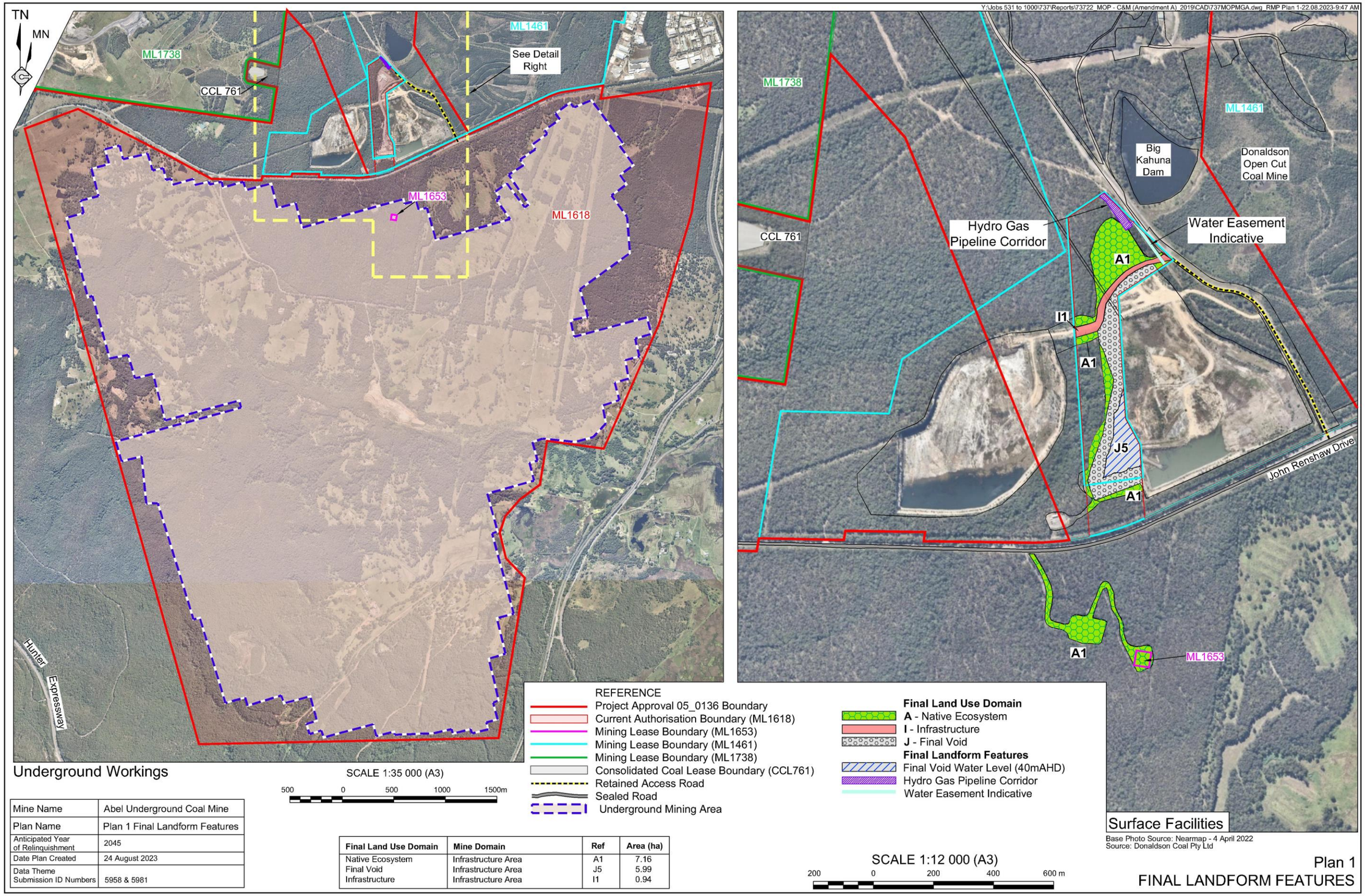
Table 10 (Cont'd)
Community Consultation Activities

City of Newcastle Council (Cont'd)
3. Identify all risks and mitigation measures to the Newcastle LGA regarding the rehabilitation of these mines. *Donaldson Coal contends that risks to the area within and in the vicinity of the Abel and Donaldson Mine sites has been considered at all times over the progressive development of the Abel and Donaldson Mines. The environmental management measures detailed in this Plan, other management plans, the development consents, and other licences and approvals are considered to be appropriate for the scale of impacts that have been predicted or experienced over the life of the mines. Based on the above, the risks to all surrounding areas are considered to have been adequately addressed.* 4. Address the potential for leaching contaminants into Beresfield through surface runoff and groundwater. *Potential impacts to water quality are actively monitored and managed in accordance with existing and approved management plans* 5. Identify whether these mines for part of a water catchment that runs into the Newcastle LGA. Consider water quality monitoring of downstream creeks during rehabilitation works to monitor environmental impacts. *The Weakleys Flat Creek Catchment (see **Figure** 3) runs into the Newcastle LGA. Surface water monitoring will continue to be undertaken during rehabilitation works (see Section 6.2.6.3).* 6. Ensure any road or road infrastructure retained is gated and locked to prevent public vehicle access. *Existing security measures will be retained to prevent public access (see Section 6.2.2.1)* 7. Ensure any roads remain as maintenance access only and rest with the landowners. Any future road dedications to the public or others to be part of planning or subdivision approvals. *Noted.* 8. Consider the Newcastle Bush Fire Risk Management Plan and any required bushfire management plans. Retain access for Rural Fire Service vehicles. *The Newcastle Bush Fire Management Plan will be considered as part of ongoing bush fire management. Existing emergency access will be retained.* 9. Use a nearby undisturbed reference ecosystem/location for the validation of the 'ecosystem and land use establishment and development phase'. Any fauna or flora data near the boundary of the Newcastle LGA should be reported to CN (preferably with shp. files). *The use of analogue sites is discussed in Section 8.1. All flora and fauna reporting will continue to be undertaken in accordance with the development consent.* 10. Investigate potential of linking rehabilitated lands to Stockton-Watagans biodiversity corridor. *The establishment and protection of biodiversity areas within the Abel and Donaldson Mine Sites would be consistent with any biodiversity and conservation related developments outside of the control of Donaldson Coal.*
Community Consultation Committee
Form of Consultation: Letter (email transmission) dated 2 June 2022 Matters Subject to Consultation: Rehabilitation Objectives and Completion Criteria Outcomes: No response received
Mindaribba Local Aboriginal Land Council
Form of Consultation: Letter (email transmission) dated 2 June 2022 Matters Subject to Consultation: Rehabilitation Objectives and Completion Criteria Outcomes: No response received
Awabakal Local Aboriginal Land Council
Form of Consultation: Letter (email transmission) dated 2 June 2022 Matters Subject to Consultation: Rehabilitation Objectives and Completion Criteria Outcomes: No response received

5. FINAL LANDFORM AND REHABILITATION PLAN

5.1 FINAL LANDFORM AND REHABILITATION PLAN – ELECTRONIC COPY

Plan 1 presents the final landform features for the Abel Mine Site and **Plan 2** presents the final landform contours for the Abel Mine Site.

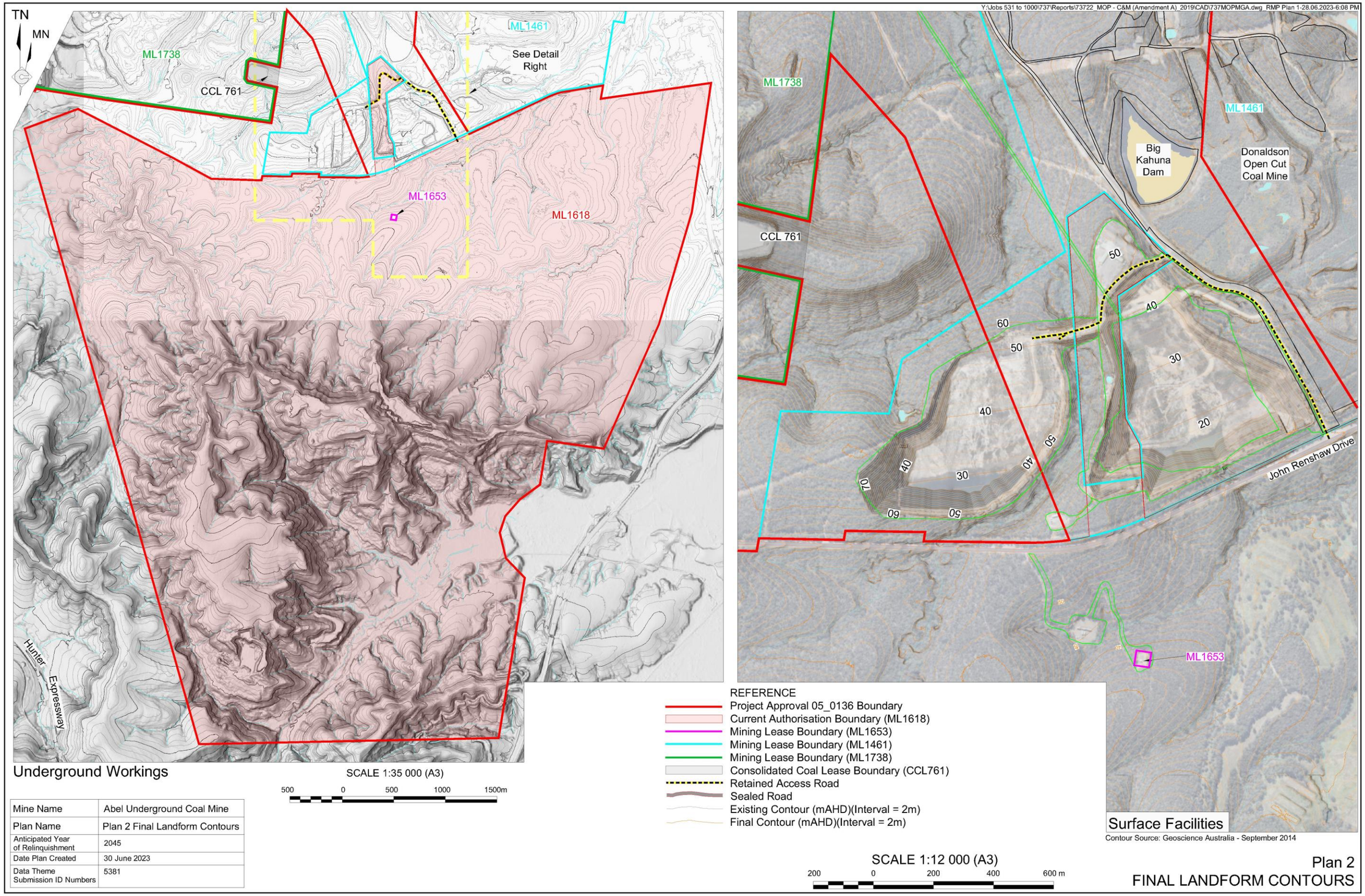


Mine Name	Abel Underground Coal Mine
Plan Name	Plan 1 Final Landform Features
Anticipated Year of Relinquishment	2045
Date Plan Created	24 August 2023
Data Theme Submission ID Numbers	5958 & 5981

Final Land Use Domain	Mine Domain	Ref	Area (ha)
Native Ecosystem	Infrastructure Area	A1	7.16
Final Void	Infrastructure Area	J5	5.99
Infrastructure	Infrastructure Area	I1	0.94

Base Photo Source: Nearmap - 4 April 2022
Source: Donaldson Coal Pty Ltd

Plan 1
FINAL LANDFORM FEATURES



Mine Name	Abel Underground Coal Mine
Plan Name	Plan 2 Final Landform Contours
Anticipated Year of Relinquishment	2045
Date Plan Created	30 June 2023
Data Theme Submission ID Numbers	5381

Plan 2
FINAL LANDFORM CONTOURS

6. REHABILITATION IMPLEMENTATION

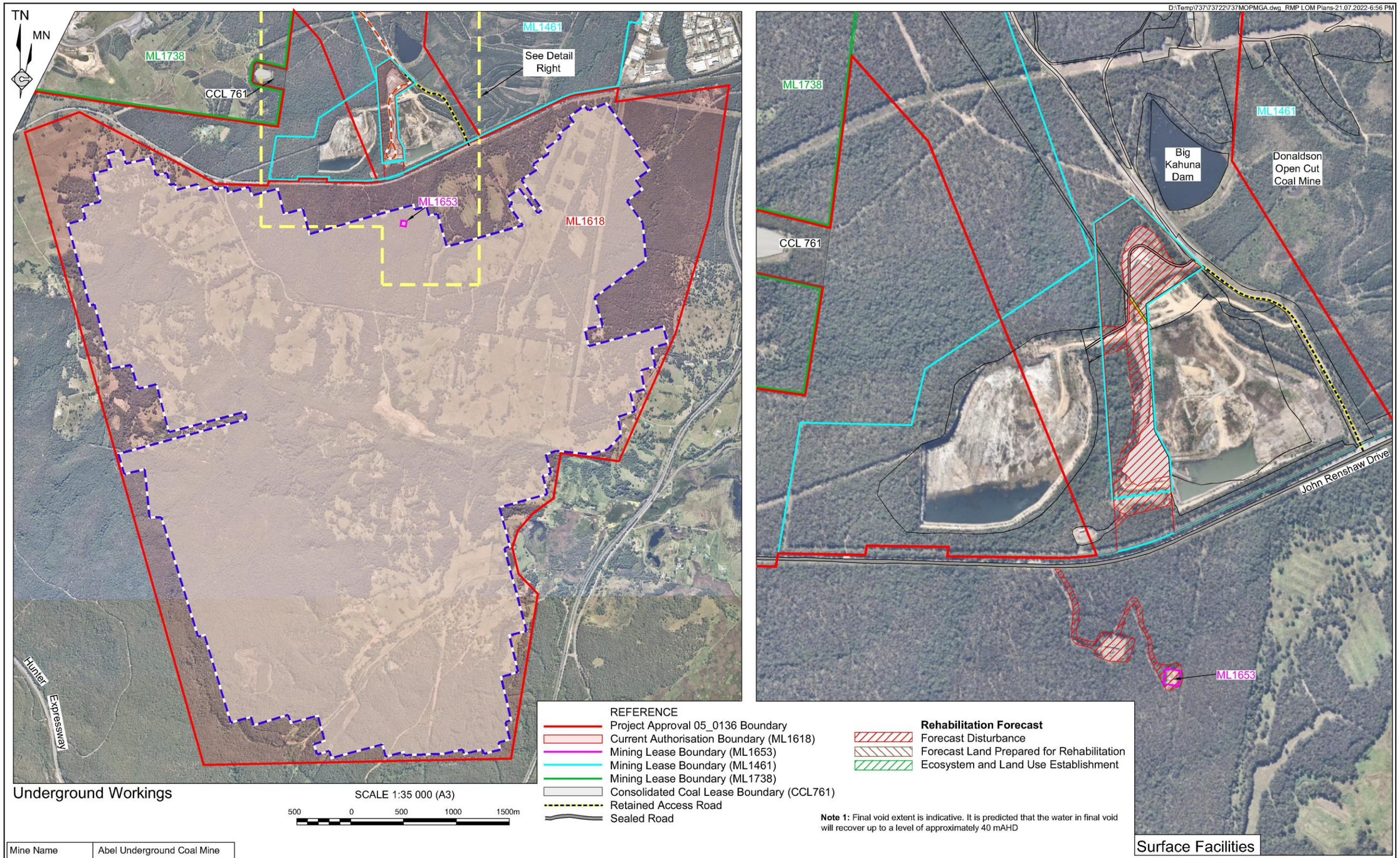
6.1 LIFE OF MINE REHABILITATION SCHEDULE

As discussed in Section 2.2, the approved final landforms for the Abel and Donaldson Mine Sites include scenarios for the resumption of underground mining operations within the Abel Mine which would potentially include the deposition of tailings within the Square Pit.

For the purpose of this Plan, Donaldson Coal has assumed that no further mining operations will occur. Notwithstanding the Abel and Donaldson Mines remain on Care and Maintenance until a final decision has been made on whether or not economic mining can recommence at the Abel Mine. At this stage mining operations at the Abel Mine are approved up to end December 2030. It is currently anticipated that, if mining operations have not recommenced, mine closure activities will be progressed for both the Donaldson and Abel Mines. Mine closure activities are expected to be completed within a 5-year period with these areas of the site remaining within the Ecosystem Establishment Phase for a further 5 to 10 years prior to reaching the Ecosystem Development and Relinquishment phases (i.e. estimated site relinquishment is December 2045).

During Care and Maintenance, the remaining 'operational' areas of the Abel and Donaldson Mines will not be available for rehabilitation and as such, opportunities for further progressive rehabilitation prior to closure of the Abel and Donaldson Mines are limited. However, during this time continued monitoring and completion of additional closure planning, including completion of a rehabilitation materials balance report (for capping material and growth medium) and updated water modelling, will be undertaken.

Figure 5 depicts the current extent of disturbance at the Abel Mine Site (i.e. the Mining Domains). Where practicable, disturbance activities associated with the Donaldson Mine are included in the RMP for the Donaldson Mine. **Plans 3** to **7** present the indicative rehabilitation schedule for the Abel Mine Site by depicting the status of disturbance / rehabilitated during each 4 to 5-yearly increment between the commencement of this Plan, Mine closure, and achievement of relinquishment.



Mine Name	Abel Underground Coal Mine
Plan Name	Plan 3 Life of Mine Schedule: 2022 to 2026
Anticipated Year of Relinquishment	2045
Date Plan Created	21 July 2022

Plan 3
LIFE OF MINE SCHEDULE: 2022 to 2026

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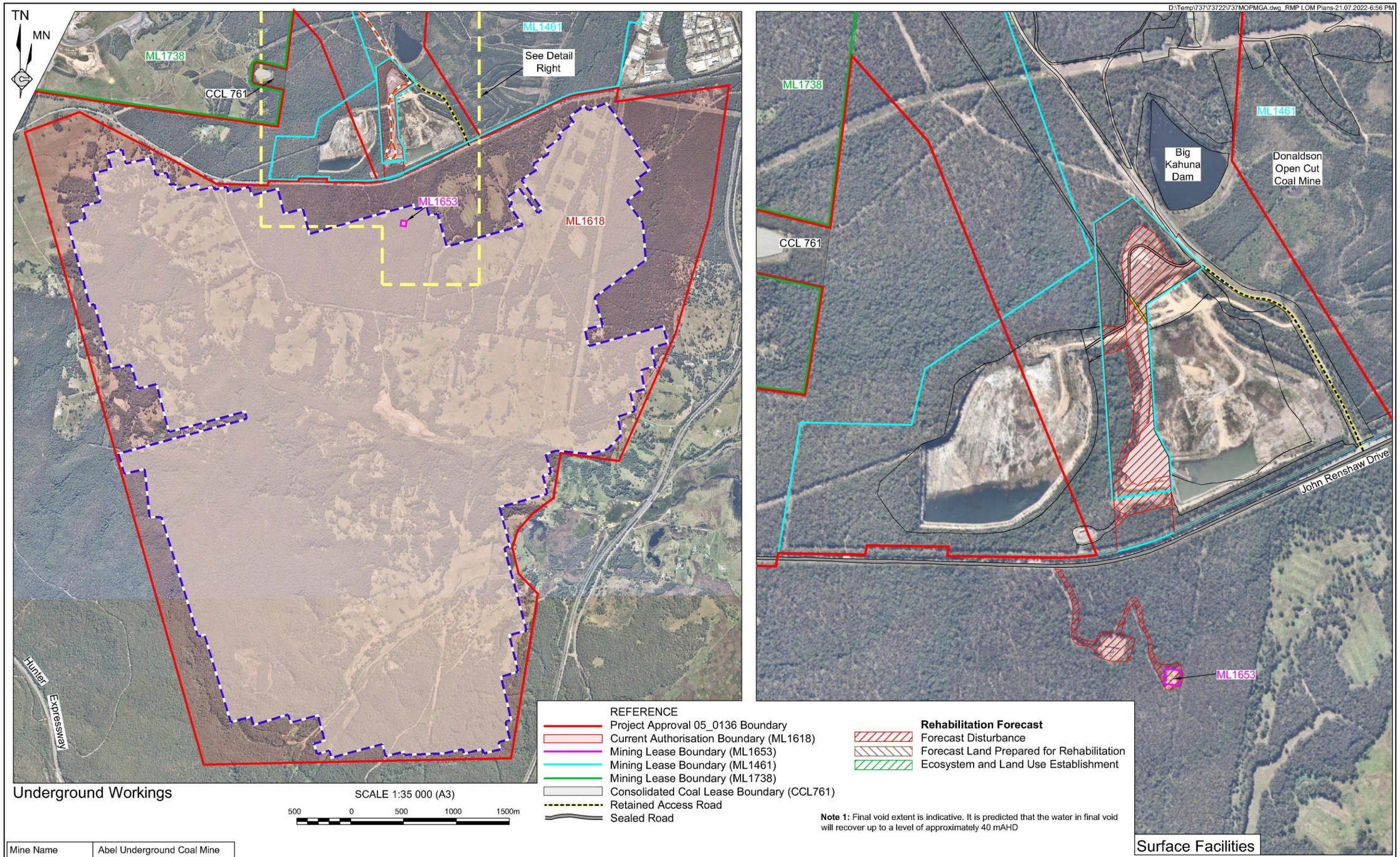
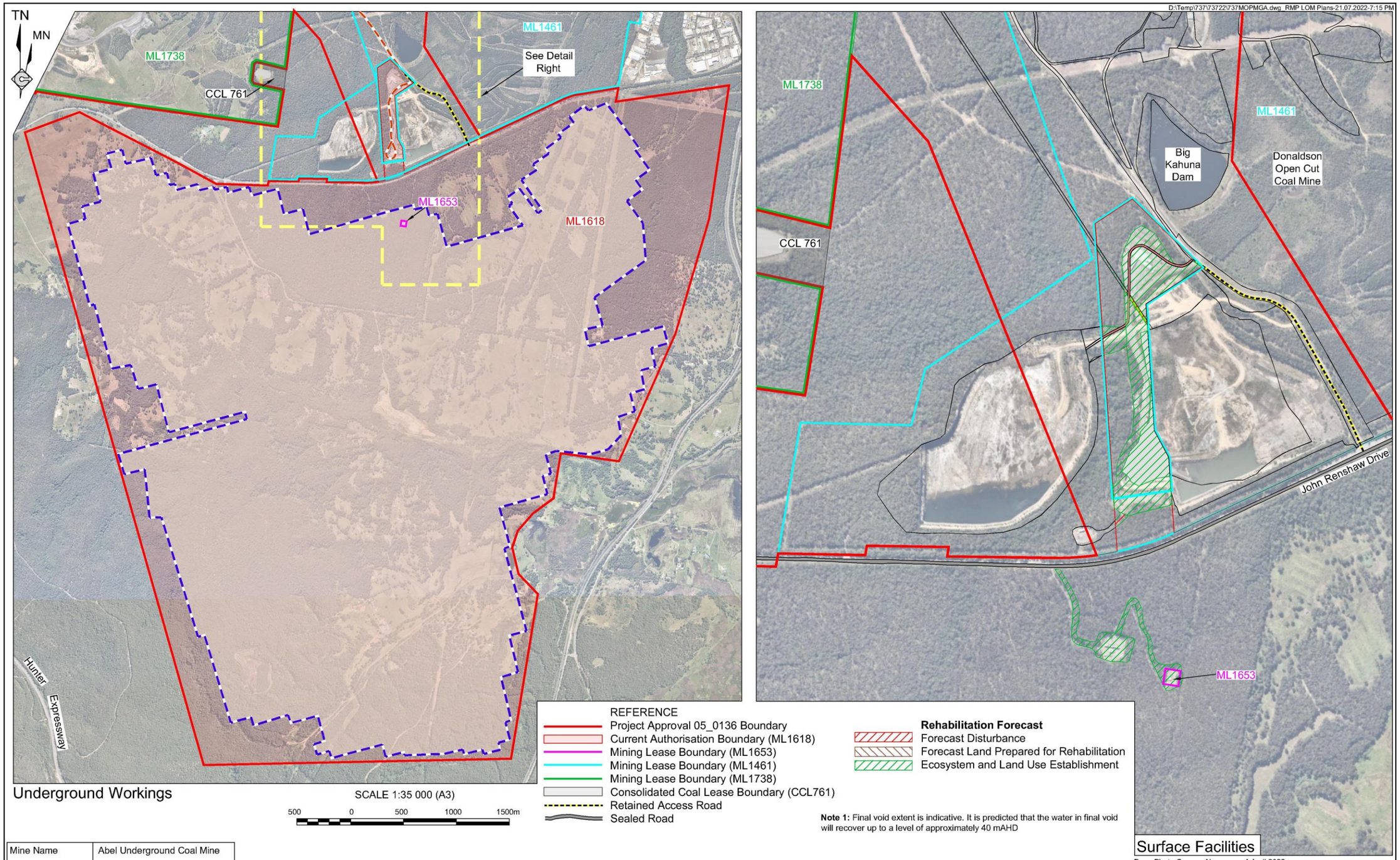


Mine Name	Abel Underground Coal Mine
Plan Name	Plan 4 Life of Mine Schedule: 2027 to 2030
Anticipated Year of Relinquishment	2045
Date Plan Created	21 July 2022

Plan 4
LIFE OF MINE SCHEDULE: 2027 to 2030



Mine Name	Abel Underground Coal Mine
Plan Name	Plan 5 Life of Mine Schedule: 2031 to 2035
Anticipated Year of Relinquishment	2045
Date Plan Created	21 July 2022

Plan 5
LIFE OF MINE SCHEDULE: 2031 to 2035

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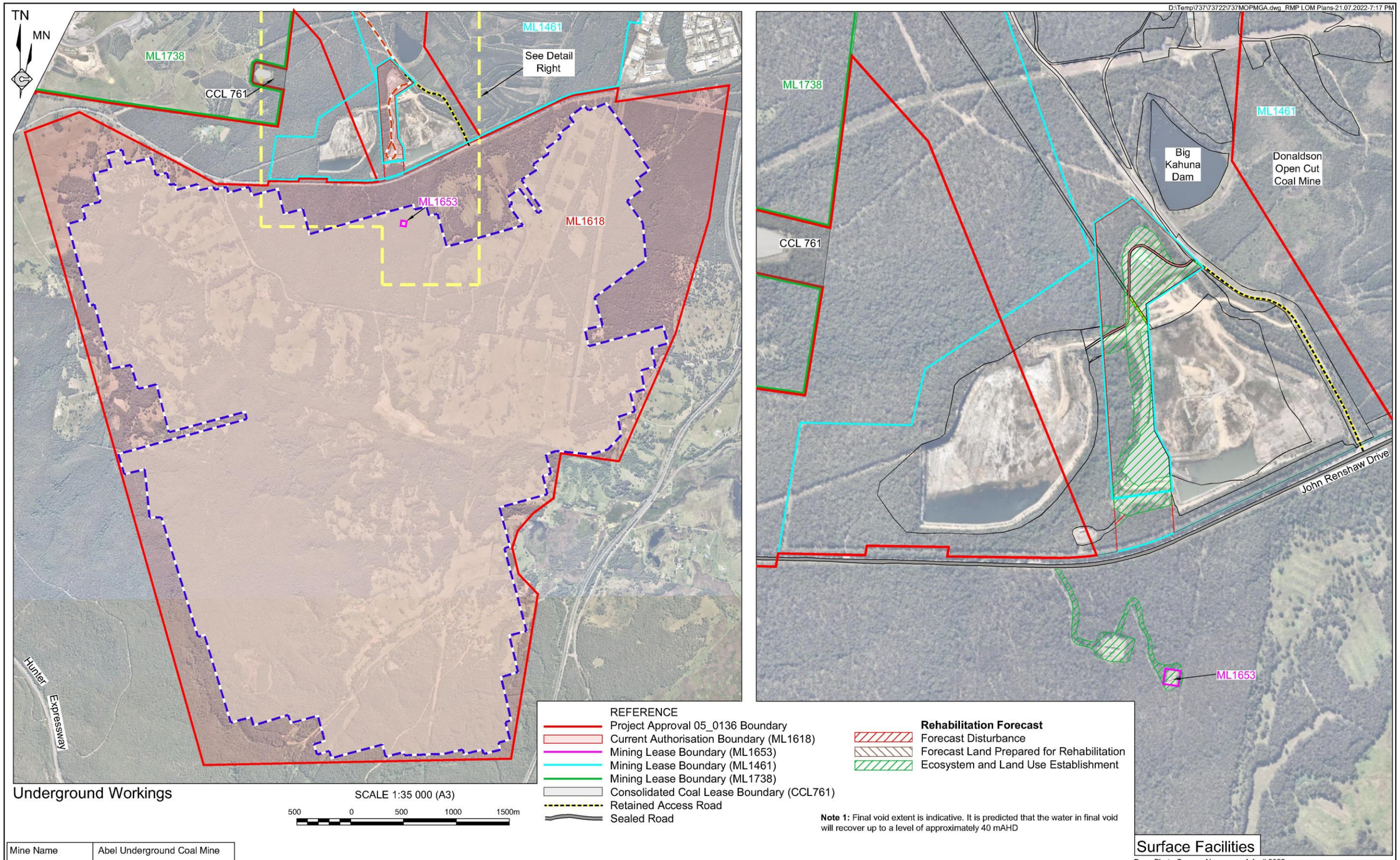
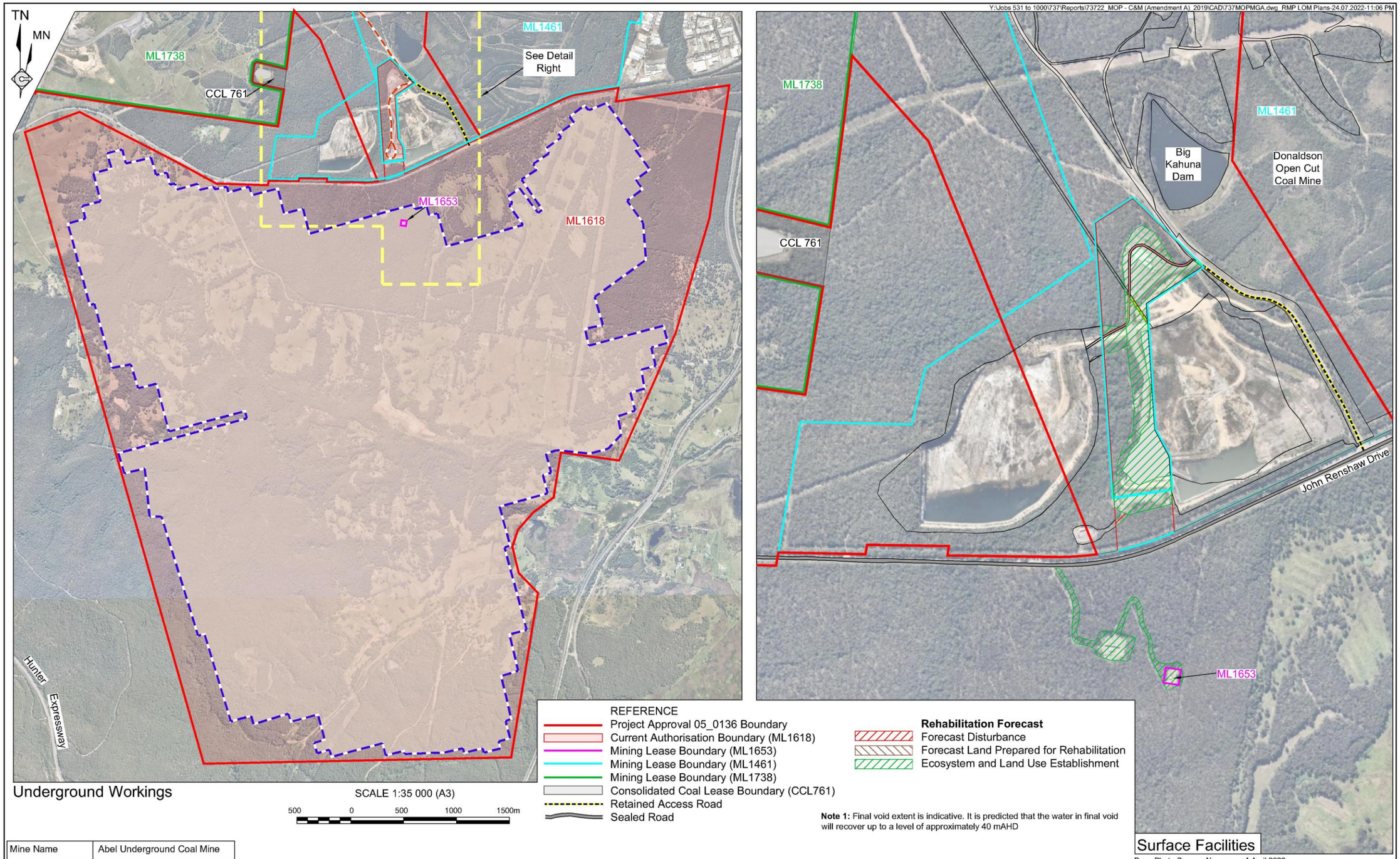


Mine Name	Abel Underground Coal Mine
Plan Name	Plan 6 Life of Mine Schedule: 2036 to 2040
Anticipated Year of Relinquishment	2045
Date Plan Created	21 July 2022

Plan 6
LIFE OF MINE SCHEDULE: 2036 to 2040



Mine Name	Abel Underground Coal Mine
Plan Name	Plan 7 Life of Mine Schedule: 2041 to 2045
Anticipated Year of Relinquishment	2045
Date Plan Created	21 July 2022

Base Photo Source: Nearmap - 4 April 2022
Source: Donaldson Coal Pty Ltd

Plan 7
LIFE OF MINE SCHEDULE: 2041 to 2045

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6.2 PHASES OF REHABILITATION AND GENERAL METHODOLOGIES

6.2.1 Active Mining Phase

6.2.1.1 Soils and Materials

Existing Environment

No soil assessments have been undertaken for the development of the Abel Mine. With the exception of the surface infrastructure associated with the ventilation areas within the Underground Mining Area mining domain, no significant soil disturbance or stripping activities have occurred. As identified in Section 1.1.1, development of surface infrastructure for the Abel Mine occurred primarily within previously disturbed areas of the Donaldson Mine Site.

The soils within the Donaldson Mine Site were assessed by Global Soil Systems Pty Limited (GSS, 1998) and described in the original *Environmental Impact Assessment* (EIS) for the Donaldson Mine (PKK, 1998) as consisting of four distinct horizons:

- brownish-black friable loam (topsoil);
- bleached, hardsetting sandy clay loam (topsoil);
- pedal bright reddish-brown mottled clay (subsoil); and
- mottled grey puggy clay (subsoil).

In addition to the above, the fertility of the soil was recorded as 'moderate' for the uppermost topsoil horizon and as 'low' for the remaining soils. The land within and in the general vicinity of the Donaldson Mine Site was classified as 'Class 4' and suitable for grazing in accordance with the (then) Department of Land and Water Conservation land capability classification system. The land within the Donaldson Mine Site was classified as having a 'low' to 'moderate' erosion hazard, and soil acidity was reported to be 'strongly' to 'very strongly' acidic with potential implications for fertility identified.

A further assessment was undertaken by GSS Environmental Pty Limited (GSS Environmental, 2004) as part of the *Statement of Environmental Effects: Modification to the Approved Mining Area at the Donaldson Open Cut Coal Mine, Beresfield* (Donaldson Coal, 2004) for the expansion of Donaldson Open Cut Pit. The results of that assessment identified that the soils within the (then) proposed expansion areas consisted of Yellow Duplex Soils of four distinct horizons:

- brown loam (topsoil);
- light yellowish brown sandy loam (topsoil);
- yellowish red light clay(subsoil); and
- yellowish red light clay with up to 40% mottling (subsoil).

Furthermore, GSS Environmental (2004) stated that the sub-soils were not considered suitable for stripping, stockpiling and re-spreading for use as a topdressing material for reshaped overburden. A maximum stripping depth of 0.5m was recommended in all areas where both topsoils were present, and 0.3m where only the uppermost layer was present. GSS Environmental (2004) classified the soils within the expansion area as Class 4 and suitable for

grazing. Notwithstanding, as the original vegetation cover was native woodland, GSS Environmental did not identify any significant issues that would prevent the restoration of the existing soil capability.

Ongoing Management

In general, stripped and salvaged topsoil from the advancing development of the open cuts (including the location of the Abel Box Cut) were directly relocated to areas undergoing progressing rehabilitation.

Minimal additional stripping of undisturbed soils is anticipated to be required as part of the remaining rehabilitation operations and would be limited to the perimeters of the West and Square Pits during landform shaping. In the event topsoil stripping occurs, topsoil management will be consistent with that during active mining.

The main aim of the management of the stockpiling or redistribution of topsoil is to ensure that topsoil from different topographical areas is stockpiled separately (where possible) or is redistributed immediately to areas of similar topography in the already mined, and regraded, areas. The immediate redistribution of topsoil is preferable for several reasons:

- to avoid double-handling;
- to avoid the need for additional disturbed land for stockpiling;
- to limit the reduction in the quality (in terms of resilience) of the native seed bank present in the soil, which arises when topsoil is stockpiled; and
- to limit the impact on soil quality.

If required, topsoil will be removed and stockpiled, or redistributed, according to different topographical areas (including riparian, ridgetop, slope and highly weed infested), where practicable. It is noted that topsoil will not be stripped when soil is too wet or too dry and where possible the stripping of topsoil will take place after the setting of seed.

Topsoil management will consider whether the topsoil has a large amount of weed seed in the soils seed bank. If the topsoil is deemed to carry a high proportion of weed seed, it will be preferable to manage this topsoil in an effort to reduce its weed propagule content and redistribute later. The main approach to the management of topsoil within the Abel Mine Site is to maximise its re-use in the rehabilitation works. For the majority of the Abel Mine Site, the re-use of topsoil will simply involve moving topsoil from one location to another. However, the management of weed-infested topsoil will be considered on a 'case-by-case' basis. Depending on the level of need for contaminated soils, treatment options may include targeted and regular application of herbicides or the partial/complete sterilisation of weed contaminated soils.

Requirements for Rehabilitation

Anticipated Remaining Requirements

To achieve the required depth of 150mm of topsoil for the remaining areas to be rehabilitated (approximately 11.2ha, see **Plan 1**), approximately 16 800m^3 of growth medium is anticipated to be required.

In addition to the above, due to the presence of carbonaceous material within the West and Square Pits, in order to achieve the relevant rehabilitation completion criteria inert capping material will be required. The volume of capping material required is yet to be calculated and will require further final void planning to be completed.

Existing Soil and Capping Material

Donaldson Coal anticipates that there is likely to be insufficient resources for use as growth medium and capping material available within the Abel and Donaldson Mine Sites. Prior to the landform establishment phase of rehabilitation, Donaldson Coal will undertake a formal survey of all known material stockpiles and develop a Rehabilitation Materials Balance. The Rehabilitation Materials Balance will be used to identify the volume and type of materials required for landform establishment and growth medium establishment, which may be sourced from off-site locations. Information on all material sourced from off-site will be recorded in the *Rehabilitation Quality Assurance Register*, including provenance, volume, and any known characteristics.

It should be noted that as part of the original *Environmental Assessment* the various amenity and acoustic bunds within the Donaldson Mine Site, to be largely constructed with suitable growth medium, were identified as potential sources of soil resource for rehabilitation. Notwithstanding the above, significant vegetation communities have subsequently developed on the remaining bunding within the Abel and Donaldson Mine Site. Hence, Donaldson Coal considers that disturbance of these areas would likely result in avoidable impacts to on-site biodiversity. In addition, the mature vegetation enhances the effectiveness of the visibility barriers from the viewpoint of vehicles on James Renshaw Drive.

6.2.1.2 Flora

Existing Environment

Assessment of the floral communities within and in the vicinity of the Abel Mine's surface infrastructure areas were largely conducted as part of the assessment for the Donaldson Mine (PPK, 1998). The pre-mining environment of the Donaldson Mine Site, including what is now associated with the Abel Mine Site, was typical of a highly disturbed area of mixed remnant and regrowth forests. The dominant vegetation type was described as 'open forest' with Spotted Gum (*Corymbia maculata*) dominating the canopy, with a diverse group of co-associate canopy species. The species mix was associated with the highly artificial nature of the disturbance regime, notably the fire regime, rather than any clear ecological pattern. Species assemblages of the mid-story and understory were also associated with significantly altered disturbance regimes. Exotic species were more associated with localised areas of illegal rubbish dumping and within heavily degraded areas.

An assessment of the underground mining area was undertaken as part of the original *Environmental Assessment* for the Abel Mine (Donaldson Coal, 2006) to address those areas potentially affected by subsidence impacts, including approximately 1 900ha of 'relatively undisturbed' vegetation and approximately 900ha of fragmented vegetation in a farmland mosaic. Vegetation communities were classified based on vegetation, floristic content, and structure. The potential for rare and/or threatened species to be present was also assessed. Seven distinct vegetation communities were identified of which three were identified as endangered ecological communities or preliminarily listed endangered ecological communities at the time of the assessment.

Ongoing Management

Minimal additional clearing of vegetation is anticipated to be required and would be limited to the perimeters of the West and Square Pits during landform shaping.

The ongoing management of flora and floral resources is undertaken in accordance with the existing and approved:

- *Donaldson Open Cut and Abel Underground Coal Mine: Flora and Fauna Management Plan – Care and Maintenance* (June 2019); and
- *Donaldson Open Cut and Abel Underground Coal Mine: Rehabilitation Management Plan* (March 2009).

In addition, regular monitoring of remnant and rehabilitated areas of the Donaldson and Abel Mine Sites has been undertaken since 2001.

Controls to be Implemented

Target Plant Communities

The target plant communities and vegetation types for the remaining rehabilitation of the Abel Mine Site is a mix of native woodland species, typical of the surrounding woodland landscape as similar to that used in existing rehabilitation efforts. Indicative target species are discussed in Section 6.2.5.3.

Material Sourcing

Seed material will preferably be collected from existing remnant and rehabilitated native vegetation to maintain local genetic integrity and to utilise plant species and communities that are adapted to the immediate and local ecological environment. Where plant material is not available in sufficient quality or quantity, or is not able to be collected without avoidable damage to existing plant communities, seed or tubestock material may be sourced from local commercial sources.

Revegetation Techniques

Revegetation will primarily consist of a combination of broadcast seeding and the use of tubestock. Where rapid establishment of groundcover species may be required, the use of Hydroseeding or equivalent techniques may be implemented.

Weed and Pest Management

Regular weed and pest species monitoring will continue to occur within and in the vicinity of the Abel Mine Site. Prior to the final rehabilitation of the Abel Mine Site, the regular monitoring and management programs will help to maintain the existing integrity of the surrounding bushland. Once the Ecosystem and Land Use Establishment phase of rehabilitation has been reached, the surrounding vegetation and plant communities will act as a passive source of flora species for the rehabilitated areas.

6.2.1.3 Fauna

Existing Environment

Several species identified as Vulnerable in accordance with the NSW *Biodiversity Conservation Act 2016* have been identified as occurring within the Abel and/or Donaldson Mine Site over the life of the Mine. Notwithstanding no specific requirements for the restoration of any given species is included in the Development Consent for the Abel Mine.

Ongoing Management

The following control measures have been employed at the Abel and Donaldson Mines to ensure a high level of conservation for the threatened fauna species found on the Abel and Donaldson Mine Sites.

- Establishment of the Bushland Conservation Area to conserve habitat.
- Ongoing survey and management protocols.
- Pre-clearing surveys by a qualified ecologist prior to any clearing activities.
- Routine annual quadrant monitoring.
- Installation of nest boxes in both the rehabilitated areas of the Donaldson Mine Site and the Bushland Conservation Area to replace natural tree hollows removed during clearing operations.
- Minimal clearance to only what is required.
- Ongoing and progressive rehabilitation of disturbed areas of the Donaldson Mine Site.

In general, the management of existing and rehabilitated fauna habitat within and in the vicinity of the Abel Mine Site is undertaken in accordance with the existing and approved:

- *Donaldson Open Cut and Abel Underground Coal Mine: Flora and Fauna Management Plan – Care and Maintenance* (June 2019); and
- *Donaldson Open Cut and Abel Underground Coal Mine: Rehabilitation Management Plan – Care and Maintenance* (June 2019).

Rehabilitation of Fauna

Criteria for rehabilitation success in relation to specific outcomes for native fauna as identified in Section 4.1 relate to the comparison of species assemblages between rehabilitated areas and analogue sites. Although multiple threatened species have been identified as occurring within the surrounding Bushland Conservation Area and within existing rehabilitation areas within the Donaldson Mine Site, no specific criteria exist or are proposed for any given or given number of species. In contrast, restoration success will be measured via similarity indices (i.e. number of shared species). Similarity indices are currently used to monitor rehabilitation performance in existing rehabilitation areas of the Donaldson Mine Site.

6.2.1.4 Rock/overburden emplacement

No further rock or overburden emplacement is anticipated to occur within the Abel and Donaldson Mine Sites.

6.2.1.5 Waste management

Ongoing Management

Non-production Waste Management

Ongoing management of non-production related waste material is undertaken in accordance with the existing and approved *Donaldson Coal Mine and Abel Underground Coal Mine: Waste Management Plan - Care and Maintenance* (June 2019) (the "*Waste Management Plan*"). The following presents an overview of the waste generation, handling and disposal practices detailed in the *Waste Management Plan* for all non-production wastes within the Abel and Donaldson Mine sites.

- Typical waste material generated comprises of:
  - greases, oils, filters, tyres and batteries from maintenance of vehicles and equipment (including maintenance of the idle mining fleet and equipment);
  - bulk scrap metal and plastics from consumables and maintenance;
  - general office wastes e.g. paper;
  - general waste generated by employees – e.g. food scraps, paper, cardboard, aluminium and steel cans;
  - wastewater and sewage from ablution facilities (bathhouses); and
  - drilling muds/tailings and wastewater from exploration drilling.
- Waste is managed as either "hazardous' or "non-hazardous' and 'recyclable' or 'non-recyclable'.
- Wastes are collected in various suitable waste reciprocals across the Abel and Donaldson Mine Sites. Handling and storage of all waste materials is undertaken in accordance with all relevant Australian Standards and/or industry best practice. Where practicable, waste materials are handled and stored separately to maximise potential recycling recovery.
- A monthly summary report is prepared by the licenced contractor for all waste material that is either removed off-site for processing, recycling, and/or disposal or contained on site (effluent). The summary report also includes records of the transport/disposal/treatment facility, including licence details, for all waste types.
- Waste-related statistics for the previous 5 years are reported annually in the *Abel Underground Coal Mine Annual Review.*

Contaminated Soils

Pollution events and associated contamination of land and water are currently managed in accordance with the *Donaldson Coal Mine and Abel Underground Coal Mine: Pollution Incident Response Management Plan* (July 2021).

Risk to Rehabilitation

In consideration of the waste management practices outlined above, the potential for waste-related risks to rehabilitation is considered to be low.

6.2.1.6 Geology and geochemistry

No environmental / geochemical constraints have been identified during the operation and existing rehabilitation of the Donaldson Mine Site. Furthermore, as no washing or other beneficiation beyond primary crushing with a feeder breaker has been undertaken within the Abel and Donaldson Mine Sites, no processing wastes have been generated or require management

6.2.1.7 Material prone to spontaneous combustion

The Upper and Lower Donaldson seams are considered to have a very low propensity for spontaneous combustion, with no history of spontaneous combustion. In June 2009 a study was undertaken to determine the spontaneous combustion potential of coal from the Donaldson Mine's Upper Donaldson Seam, 'C', 'D' and 'E' plies. Results indicate that the Upper Donaldson Seam and the 'C', 'D' and 'E' plies have a medium inherent spontaneous combustibility. The 'D' ply appears to be slightly more reactive and hence more prone to spontaneous combustion than the 'C' and 'E' plies.

In relation to rehabilitation, the following management measures have been undertaken to reduce the potential for spontaneous combustion to occur.

- Any accumulations of carbonaceous material or exposed coal seams within the West and Square Pits have been / will be buried under inert material.
- Where possible, any remaining coal spalling has been removed from the highwall.

No additional management measures will be required during the care and maintenance period.

6.2.1.8 Material prone to generating acid mine drainage

No Acid Mine Drainage issues have been identified or are expected to occur within the Abel and Donaldson Mine Sites.

6.2.1.9 Ore beneficiation waste management (reject and tailings disposal)

As identified in Section 1.1.1, no washing or other beneficiation beyond primary crushing with a feeder breaker has been undertaken within the Abel and Donaldson Mine Sites, no processing wastes have been generated or require management.

6.2.1.10 Erosion and sediment control

Existing Management

The existing surface water management infrastructure within the Abel and Donaldson Mine Sites is shown on **Figure 5**. In summary, no significant mining related water management infrastructure is located within the Abel Mine Site. Surface runoff from surface infrastructure areas (excluding south of John Renshaw Drive) drains as overland flow into the West Pit at which point it is managed as part of the Donaldson Mine. Information on the water management infrastructure of the Donaldson Mine Site is located in the RMP for the Donaldson Mine.

Ongoing Management

Erosion and sediment control within the Abel and Donaldson Mine Sites is undertaken in accordance with the existing and approved:

- *Donaldson Coal Mine Erosion and Sediment Control Plan* (April 2000); and
- *Abel Underground Coal Mine Water Management Plan – Care and Maintenance* (June 2019).

In addition to the above, consideration of the potential impacts of erosion and sedimentation on rehabilitation are discussed, including anticipated risks and management strategies, in the existing and approved *Donaldson Open Cut and Abel Underground Coal Mine: Landscape Management Plan* (March 2008) prepared by GSS Environmental Pty Limited and consisting of the:

- *Donaldson Open Cut and Abel Underground Coal Mine: Rehabilitation Management Plan* (March 2008)[2];
- *Donaldson Open Cut and Abel Underground Coal Mine: Final Void Management Plan* (March 2008); and
- *Donaldson Open Cut and Abel Underground Coal Mine: Integrated Mine Closure Plan* (March 2008).

Controls to be Implemented

Donaldson Coal will continue to manage erosion and sediment controls in accordance with approved management plans. In general, the rehabilitation of the West Pit will be managed as part of the rehabilitation of the Donaldson Mine Site.

6.2.1.11 Ongoing management of biological resources for use in rehabilitation

Stockpile Management

As described in Section 6.2.1.1, Donaldson Coal does not anticipate any further significant stripping and stockpiling of topsoil is likely to be required or to occur during the remaining life of the Mine. In addition, Donaldson Coal would in the first instance seek to immediately re-spread any stripped soils to minimise as far as practicable the need to handle and stockpile growth medium. Notwithstanding the following management practices would be undertaken in the event that any further stripping and/or stockpiling of topsoil and/or growth medium does occur.

[2] Superseded by *Donaldson Coal Mine and Abel Underground Coal Mine: Rehabilitation Management Plan – Care and Maintenance* (July 2019)

Where practicable, native vegetation will be stripped with soils to retained organic matter and the existing seedbank in-situ. Soils will be stockpiled to a maximum height of 3m where practicable to reduce incidences of compaction that may affect seed viability.

Regular monitoring of stockpiled material would be undertaken to monitor weed species presence and to identify the need for weed management or controls. Prior to salvaging stockpiled growth medium, weed species located on stockpiled material may be controlled using chemical or mechanical means.

Topsoil Depth

The existing rehabilitation of the Donaldson Mine Site has implemented a minimum topsoil depth of 100mm to 150mm. All remaining topsoil spreading will be to a minimum depth of 150mm.

Propagation of Seeds

As discussed in Section 6.2.5.4, seed will be collected from within and in the vicinity of the Abel and Donaldson Mine Sites, including from both remnant and rehabilitated areas. Donaldson Coal anticipates that seed collection and propagation will be undertaken by a suitably qualified contractor and supported by Donaldson Coal environmental staff and resources (i.e. management plans, flora monitoring records, etc.).

Habitat Structures

As discussed in Section 6.2.1.2, further significant clearing of vegetation or habitat is not anticipated to be required or to occur and therefore further opportunities for the salvaging of habitat structures are likely to be limited. Habitat structures/features salvages over the life of the Abel and Donaldson Mine were generally immediately able to be relocated within areas undergoing progressive rehabilitation. This would continue for any additional habitat structures identified during any additional clearing.

6.2.1.12 Mine subsidence

Existing Environment

The underground mining area is divided into four management units based on approved extraction areas and underground mine development. Each area has been progressively managed in accordance with existing and approved *Subsidence Management Plans* (Areas 1 to 3) or an *Extraction Plan* (Area 4). **Table 11** presents the location of all subsidence impact management information as part of existing and approved plans.

Table 11
Subsidence Management

Topic	Subsidence Management Plan Area 1	Subsidence Management Plan Area 2	Subsidence Management Plan Area 3	Extraction Plan Area 4
Incidences of Subsidence	N/A	N/A	Section 10	Section 3.4
Potential Subsidence Impacts	Section 5	Section 5	Section 8, Section 10, Section 11	Section 3.3 and Appendices
Management and Monitoring	Section 7, Section 8	Section 7, Section 8	Section 9, Section 10, Section 11	Section 5 and Appendices

In addition to the above, incidences of previous incidences of subsidence are detailed in the *Subsidence Management Plan End of Year Report*. Each Report details:

- occurrence and location of all extraction during the reporting period (Section 2 of the *Subsidence Management Plan End of Year Report*);
- a summary of all subsidence impacts observed during the reporting period (Section 5 of the *Subsidence Management Plan End of Year Report*); and
- a summary of the subsidence survey and analyses (Section 6 of the *Subsidence Management Plan End of Year Report*).

The management of subsidence impacts on various surface infrastructure is managed via a series of approved sub-plans for each major stakeholder and extraction area. Details of each plan is included in Section 4 of the *Subsidence Management Plan End of Year Report*.

Controls to be Implemented

It should be noted that as no underground mining has occurred within the Abel Mine Site since 2016, no further significant subsidence impacts are predicted to occur. Minor subsidence impacts will continue to be managed and rehabilitated in accordance with approved management plans.

6.2.1.13 Management of potential cultural and heritage issues

Existing Environment

A number of items of Aboriginal heritage significance have been identified within the surface infrastructure area and underground mine area of the Abel Mine Site. Through utilisation of Donaldson-related disturbance areas and historic assessments, development of the Abel Mine was able to proceed without significant and avoidable impacts to heritage items.

Ongoing Management

Management of Aboriginal heritage sites within and in the vicinity of the Abel Mine Site is undertaken in accordance with the existing and approved *Abel Underground Mine – Aboriginal Heritage Management Plan* (Revision 2.2, June 2019) (the "Aboriginal Heritage Management Plan").

All activities within the surface infrastructure area will be reviewed against the location of identified heritage items. In the event that impacts are required, the artefact will be managed in accordance with an approved *Aboriginal Heritage Management Plan*.

In the event that any items of Aboriginal heritage are identified, exploration activities will be relocated as necessary to avoid impact. In the event that the drill site or access track cannot be relocated, Donaldson will apply for an Aboriginal Heritage Impact Permit (AHIP). In the event that an item of Aboriginal heritage is identified during exploration activities, all works in the area would cease immediately and the area would be cordoned off and contact made with OEH. If human remains are discovered, contact would also be made with the NSW Police.

Controls to be Implemented

During final rehabilitation operation there exists the potential for impacts on known and unknown Aboriginal sites. Prior to decommissioning, Donaldson Coal would engage with suitably qualified heritage specialists to confirm the location of known sites within or in the vicinity of areas to be disturbed and/or rehabilitated. If any sites are identified as being located within areas to be disturbed, rehabilitation plans may be reviewed and the need for disturbance or other management controls will be reviewed. If any Aboriginal sites are required to be disturbed during rehabilitation, Donaldson Coal would manage the Aboriginal site in accordance with the approved *Aboriginal Heritage Management Plan*.

6.2.1.14 Exploration activities

No further surface exploration activities are anticipated to be required or to occur within the Abel Mine Site. Notwithstanding, if any further surface exploration activities are undertaken, the rehabilitation of drill sites would be undertaken generally as follows.

Decommissioning of drill sites would include the removal of all equipment and deposited material (including drilling muds). The drill holes would be rehabilitated in accordance with *EDG01 Borehole Sealing Requirements on Land Coal Exploration* (DRE, 2012) and, where necessary, revegetated with native species. Sediment fencing would be retained until the area of disturbance is stabilised and the risk of erosion is negligible. Rehabilitation would be consistent with the *Exploration Code of Practice: Rehabilitation (NSW Resources Regulator, 2022*)

6.2.2 Decommissioning

6.2.2.1 Site security

The principal public safety control for the Abel and Donaldson Mine Sites has been the fencing of the eastern, northern and southern boundaries of ML 1461 which includes the Abel Mine Site's surface infrastructure area together with additional fencing around the southern and western boundary of the Abel Box Cut. Signposting advising the public of the presence of the Abel and Donaldson Mines has also been placed at the entrance and around the fenced perimeter. The fences and signage are inspected on a weekly basis and repairs undertaken as required.

Controls to be Implemented

Safety Fencing

Additional security infrastructure (i.e. security fencing/signage and access controls/barriers) will be constructed as required around the perimeters of the retained West and Square Pit final voids and on retained access roads to prevent inadvertent public access.

Environmental Fencing

Areas of retained vegetation within the surrounding land owned by Donaldson Coal will be appropriately protected from human-induced impacts such as damage to vegetation from vehicles or trampling, increased rubbish dumping and alteration to normal fauna behaviour patterns. As appropriate, fencing will be used to protect existing vegetation from accidental disturbance and will clearly identify areas of vegetation to be retained. The type of fencing used will consider the need for facilitation of fauna movement.

Fencing will also be used as part of the revegetation strategy to control impacts such as grazing and to allow vegetation to regenerate naturally. This option will be used where active disturbance to the soil for replanting is not considered appropriate, such as in areas of archaeological significance or in other places where significant tree cover remains. In such cases, sensitive areas will be fenced to exclude stock and to allow native vegetation to establish.

6.2.2.2 Infrastructure to be removed or demolished

Table 12 presents the infrastructure and services located within the Abel Mine Site to be removed or demolished to achieve final land use.

As identified in previously approved management plans, prior to the decommissioning of the infrastructure and services identified in **Table 12** Donaldson Coal will undertake a detailed risk and engineering assessment, namely the *Decommissioning and Demolition Strategy*.

Table 12
Infrastructure to be Removed or Demolished

Page 1 of 2

Mining Domain[1]	Asset	Removal / Demolition Requirements
Infrastructure Area	Buildings and Fixed Plant: Workshop, Administration Office, Storage, Washroom, Lunchroom, Conveyor, Tanks.	All buildings, sheds and fixed plant will be removed from the Donaldson Mine Site. Where practicable, salvageable items (e.g. freestanding sheds) will be dismantled such that permits re-use off-site. Where practicable, materials recovered during demolition that are suitable for recycling will be salvaged and separated for recycling. All concrete footings and pads will be broken up and removed with waste material and disposed of on-site or at a licenced waste facility.
	Mining Infrastructure: Portals, ventilation shafts and fans.	Portals and shafts sealed in accordance with relevant guidelines.

Table 12 (Cont'd)
Infrastructure to be Removed or Demolished

Page 2 of 2

Mining Domain[1]	Asset	Removal / Demolition Requirements
Infrastructure Area (Cont'd)	Roads and Hardstand: Coal Haulage Road, Mine Access Road, other unsealed access roads and hardstand areas (e.g. carparking areas).	All roads to be retained to support final land use to be reduced in width as required. Gravel will be salvaged where practicable from hardstand areas and unsealed roads for use off-site or on-site disposal. Where roads are reduced/hardstand areas removed, once surface material is removed the land will be shaped and ripped to a minimum depth of 400mm.
	Services: Various power, water and communications infrastructure.	All services not required to support final land use would be disconnected and decommissioned.
Underground Mining Area	Surface infrastructure included in Infrastructure Area domain.	N/A
Note 1: See **Figure 5**		

Donaldson Coal will engage structural engineers and suitably qualified and experienced demolition experts to undertake an assessment of all infrastructure to be decommissioned and demolished within the Abel and Donaldson Mine Sites. The *Decommissioning and Demolition Strategy* will be prepared in accordance with *Australian Standard AS2601-2001: The Demolition of Structures* (or its latest version) to determine the appropriate demolition techniques, equipment required, and the optimal decommissioning sequencing. Principal activities required to develop the decommissioning and demolition strategy include the following.

- Site Investigations to assess infrastructure and services. Site investigations will include to locate and quantify above ground and buried services, locate and assess all chemical and hydrocarbon tanks and vessels, and identify contaminated materials. In addition, the results of the site investigations will be used to identify the need for any permits/approvals required for the removal and/or retention of any infrastructure.
- Structures Condition Assessment
  - Assess the structural condition of built structures and inform the demolition equipment and techniques required for removal of all buildings and fixed plant. The assessment will also identify opportunities for re-use and/or recycling infrastructure, plant and demolition materials.
  - Assess the structural condition of built structure and other infrastructure to be retained. In addition, the assessment will include a residual risk assessment for the retention of identified infrastructure to identify short- and long-term risks to public and environmental safety including potential modes of failure.

6.2.2.3 Buildings, structures and fixed plant to be retained

Plan 1 shows key infrastructure and structures to be retained as part of the final land use. Existing infrastructure and structures to be retained include the Site Access Road / Haul Road, internal access roads, and various access controls / barriers. The West Pit would be retained and rehabilitated as part of the Donaldson Mine Site. No fixed plant would be retained at the Abel Mine Site. In addition to the existing infrastructure to be retained, additional safety-related infrastructure identified in Section 6.2.2.1 would be installed by Donaldson Coal.

Short-term risks associated with the retention of nominated infrastructure and structures are relatively low as these features have primarily been retained for safety purposes (e.g. safety bunds, security fences) or to facilitate access to areas of the Donaldson and Abel Mine Site.

Long-term risks to public safety and the environment associated with retained infrastructure and structures would only occur in the absence of regular maintenance. Roads will need to be inspected following high intensity rainfall events to ensure that conditions remained suitable for safe access to publicly accessible areas. Failure of roads would potentially contribute to the generation of sediment laden water which may impact water quality within local watercourses. Security fencing and access controls will also need to be inspected regularly to ensure that entry to historic sites and final void areas by humans, fauna and vehicles remains effectively restricted. Failure of security fences and safety bunds would present a significant risk to public safety.

As part of the decommissioning and landform establishment phases of rehabilitation operations, structural and engineering assessments will be carried out as required prior to the relinquishment of retained and newly constructed infrastructure (see Section 6.2.2.2). Any necessary repair, replacement or re-design works recommended as part of these assessments will be carried out and assessed by a suitably qualified engineer before public access is permitted to the Abel Mine Site.

6.2.2.4 Management of carbonaceous/contaminated material

Existing Environment

Carbonaceous Material

Two principal sources of carbonaceous material are known to occur within the Donaldson and Abel Mine Sites. Exposed coal seams and minor quantities of material at the base of the pit walls within the open cuts. In addition, over the life of the Donaldson and Abel Mines, small spillages along the coal haulage routes are likely to have resulted in elevated amounts of carbonaceous material in these areas.

Contaminated Material

A contamination assessment for the Donaldson Mine's fuel farm and workshop was undertaken in 2013 by DLA Environmental Pty Limited. The assessment determined the location, depth and concentrations of a variety of contaminates, specifically total petroleum hydrocarbons, BTEX and heavy metals. The information was used to determine the extent of excavations required to remove contamination from these areas which was subsequently undertaken throughout 2013 and 2014. The excavated material was placed in a dedicated land farm area constructed in the West Pit. Fuel storage tanks and associated infrastructure were also relocated to the West Pit. Other contamination sources, such as oil drums, were removed from the Donaldson Mine Site.

Relatively minor levels of contamination are anticipated to have occurred over the life of the Abel Mine in the vicinity of workshop areas. Contaminated material would potentially be located within the Mine's dirty water management infrastructure, namely the sediments within the West Pit and the Big Kahuna Dam (of the Donaldson Mine Site). In addition, contamination may occur during the decommissioning and demolition of infrastructure.

Ongoing Management

As the Abel Mine is currently on care and maintenance, the potential for an event to result in significant contamination is considered to be low. Notwithstanding the above, ongoing management of potential contamination events would be undertaken in accordance with the most current version of the *Donaldson Coal Mine and Abel Underground Coal Mine Pollution Incident Response Management Plan*.

Controls to be Implemented

Contamination Assessment

During the decommissioning phase of rehabilitation and as part of the *Decommissioning and Demolition Strategy*, Donaldson Coal would undertake a contamination assessment to identify the occurrence of carbonaceous and/or contaminated materials within the Donaldson and Abel Mine Sites. The scope of the contamination assessment would include:

- a desktop assessment and site inspection to identify potential sources of carbonaceous/contaminated material and the possible environmental impacts they might present;
- review of the effectiveness of historical contaminated material handling;
- identification of material handling and management practices that may need to be implemented, including an assessment of on-site treatment or disposal options; and
- verification that carbonaceous/contaminated material management recommendations have been undertaken in accordance with any relevant approval, standards or regulations.

Anticipated Material Handling and Management

Carbonaceous material identified within or in the vicinity of coal haulage routes (spillage) will be collected and disposed of within the West and/or Square Pits. Material blasted during highwall shaping will be used to cover exposed coal seams and other carbonaceous material that may be located within the West and Square Pits. Where a deficit of capping material is predicted or identified, Donaldson Coal would seek suitable off-site sources of required materials.

Where hydrocarbon contaminants are identified and on-site remediation is practicable, remediation would be undertaken on site. Where it is not feasible to undertake remediation of contaminated materials at the Mine Site, contaminated materials will be transported to an appropriately licenced facility and remediated prior to being returned to site.

The identification, management and disposal of contaminated materials is likely to occur across multiple Mining Domains which may include varying phases of rehabilitation. Notwithstanding, excluding the sourcing of unknown amounts off-site capping material, Donaldson Coal does not anticipate significant impacts on rehabilitation scheduling.

6.2.2.5 Hazardous materials management

No hazardous materials are proposed to be retained following the cessation of rehabilitation operations. A hazardous materials audit of the Abel and Donaldson Mine Sites will be conducted by a suitably qualified expert as part of the *Decommissioning and Demolition Strategy* prior to the commencement of decommissioning activities to identify all potentially hazardous materials (e.g. asbestos) and any associated risks.

On-site hydrocarbons and storage will also be retained for use during rehabilitation operations before being removed. All remaining fuel and oil will be removed from site before storage and filling infrastructure is decommissioned and removed. Any soils or material that is identified as being contaminated by hydrocarbons will be removed and treated as outlined in Section 6.2.2.4.

All other hazardous materials identified at the Mine Site will either be disposed of within the Abel or Donaldson Mine Site or removed and disposed of at an appropriately licenced facility. Hazardous material types, volumes, removal methods, dates of associated removal works and contractors who completed those works, disposal methods (including the details of any off-site disposal facility) and any waste transportation records and receipts will be recorded in the *Rehabilitation Quality Assurance Register*.

6.2.2.6 Underground infrastructure

All underground infrastructure, equipment and materials will be removed or salvaged from underground operations where practical.

Services and infrastructure associated with all underground access points will be disconnected and removed prior to the sealing of access points, with temporary security fencing established during sealing works to prevent unauthorised access. Existing security fencing will be retained during and after underground access, ventilation shaft and active mining shaft sealing and decommissioning operations to prevent unauthorised access to underground workings.

Groundwater from underground workings is currently dewatered and stored within on site water storage collection and transferred to the Bloomfield Coal Handling and Processing Plant. Dewatering operations would cease, and all underground infrastructure would be removed where possible. Groundwater levels within the underground workings would be left to return to natural levels. No discharges of groundwater are proposed to occur; however, Donaldson Coal will undertake a review of the existing groundwater model prior to Mine closure to identify any residual risks relating to potential groundwater discharge. Groundwater monitoring will continue to be undertaken in accordance with approved management plans until relevant completion criteria are achieved.

6.2.3 Landform Establishment

6.2.3.1 Water management infrastructure

No water management infrastructure is located wholly within the Abel Mine Site. All water management infrastructure will be managed in accordance with the RMP for the Donaldson Mine Site.

6.2.3.2 Final landform construction: general requirements

As shown on **Plan 1**, the majority of the Abel Mine Site will be rehabilitated to achieve the appearance of vegetated natural landforms (as per existing rehabilitation of the Donaldson Mine Site), with the exception of the variable water heights (and subsequent vegetation extents) within the West Pits. In general, the majority of the Abel Mine Site, including the infrastructure to be retained or remain unvegetated, will remain not visible from publicly accessible areas due to existing visual amenity bunding and vegetation screens located along site boundaries and adjacent to public roadways.

Where practicable, the eastern, western and southern highwalls of the West Pit will be shaped to a maximum slope of 18° and the northern low wall will be graded to a maximum slope of 10° to achieve a more-natural slope and to provide a surface conducive to vegetation development and lower erosion potential. Shaping of the West Pit within the Abel Mine Site will be integrated with that for the Donaldson Mine Site.

Diversion bunds and other surface water management infrastructure in the vicinity of the final voids will be retained or constructed as required to minimise the total surface water catchment. In remaining areas of the rehabilitated Abel Mine Site, the current landform profile will remain as required and progressive revegetation will contribute to a subsequent reduction in erosion and sedimentation.

6.2.3.3 Final landform construction: reject emplacement areas and tailings dam

No reject emplacement areas or tailings dams are located within the Abel Mine Site.

6.2.3.4 Final landform construction: final voids, highwalls and low walls

Existing Environment

Final Voids

Two final voids are approved to be retained as part of the final landform of the Abel and Donaldson Mine Sites; the Square Pit and the West Pit (including the Abel Box Cut) (**Plan 1**). In addition, three approved final landform and land use options exist for the final voids reflecting variable levels of tailings storage (nil, partial and complete) within the Square Pit of the Donaldson Mine Site. As discussed in Section 6.2.3.3 for the purposes of this Plan, no placement of tailings within the Square Pit is anticipated to occur.

No specific conditions regarding final voids are detailed under the combined DA 98/01173 and 118/698/22. As no further surface development or extraction will occur during the remaining life of the Abel Mine, the resulting landforms will likely remain relatively unchanged, with exception of final shaping operations. However, if the storage of tailings within the Square Pit is undertaken at any point over the remaining life of the Abel Mine, this Plan will be updated to reflect this change.

The Square Pit is approximately 20m to 40m deep, with the top surface around the perimeter occurring generally between approximately 50m AHD and 70m AHD and the base of the pit occurring at approximately 30m AHD. The final volume of the Square Pit will depend on the final landform development yet to be undertaken. The anticipated equilibrium point for the final water level within the Square Pit is at approximately 40m AHD.

The West Pit (including the Abel Box Cut) is approximately 20m deep, with the top surface around the perimeter approximately 50m AHD with the base of the pit occurring at approximately 14m AHD to 20m AHD. The final volume of the West Pit will depend on the final landform development yet to be undertaken. The anticipated equilibrium point for the final water level within the West Pit is at approximately 40m AHD.

Ongoing Management and Investigations

Final Void Management Plan

The progressive development and planned rehabilitation of the final voids within the Donaldson and Abel Mine Sites has been managed in accordance with several iterations of various management plans.

Currently, the general planning and management for the rehabilitation of the final voids, including final land use options, is included in the existing and approved *Donaldson Open Cut and Abel Underground Coal Mine: Final Void Management Plan* (the "*Final Void Management Plan*"), presented as Appendix 4 of the *Donaldson Open Cut and Abel Underground Coal Mine: Landscape Management Plan* (GSS Environmental, 2008). The approved *Final Void Management Plan* states the following summary of rehabilitation methodologies for the final voids.

- *"The eastern, western and southern sides of the final void will be blasted and pushed using a dozer to a maximum slope of 18 degrees.*
- *The northern side will be blasted and regraded to a maximum of 10 degrees, with a permanent vehicle access and egress ramp constructed to allow access to the pit void for ongoing monitoring and management.*
- *During highwall dozer reshaping, water management structures such as contour banks, drains and drop structures will be established to divert as much of the surrounding catchment as possible away from the final void, to limit the amount of water that accumulates in the pit.*
- *Material blasted from the high walls will also be used to cover any exposed coal seams and other carbonaceous material that might be left at the end of mining.*
- *Due to the expected standing water at the bottom of the void, a safety berm and security fence will be provided around the void to prevent unauthorised access. The berm will be designed with a trench to prevent unauthorised vehicle access to the void."*

West and Square Pit Closure Strategy

Donaldson Coal prepared the *Closure Strategy for the West and Square Pits* (the "*Closure Strategy*") (Donaldson Coal, 2020), presented as part of the previously approved Mining Operations Plan and as **Appendix 1** of this Plan.

The *Closure Strategy* addresses the management of the West and Square Pits in the event that underground mining is either resumed at the Abel Mine or no more mining is undertaken prior to closure of the Mines. The *Closure Strategy* provides detailed rehabilitation objectives and completion criteria, as well as a comprehensive rehabilitation risk assessment for each of the

closure options for both the West and Square Pits. Furthermore, scenario-specific Trigger Action Response Plans, actions, and rehabilitation timelines are provided in detail. Where relevant, these elements have been reviewed, revised, and incorporated into the relevant sections of this Plan.

The *Closure Strategy* identifies a number of closure studies that will be undertaken as part of the rehabilitation of the West and Square Pits and the wider Abel and Donaldson Mine Sites, summarised as follows.

- Geotechnical Assessment

  The Geotechnical Assessment will confirm the final landform designs for the West and Square Pits, including a review of the final slopes of the final void walls regarding long-term stability and suitability.

- Water Model Review

  The Water Model Review will comprise a review of the existing groundwater model as described in the *Abel Upgrade Modification Groundwater Assessment* (RPS Aquaterra, 2012) to confirm the predicted groundwater inflows into the West and Square Pit final voids, including a review of groundwater licencing requirements.

  The review will also include consideration of surface water inputs and the potential for discharge to occur from the final voids.

- Contamination Assessment

  The Contamination Assessment, undertaken as part of the *Decommissioning and Demolition Strategy* (see Section 6.2.2.2), will assess the potential for the presence of and associated risks from contaminated material within the final voids.

6.2.3.5 Construction of creek/river diversion works

No creek or river diversion works are located within the Abel Mine Site.

6.2.4 Growth Medium Development

6.2.4.1 Geochemistry

Existing Environment

The geochemical properties of the soils of the Donaldson Mine Site are discussed in Sections 6.2.1.1 and 6.2.1.6. In summary, no significant geochemical constraints (e.g. saline soils, acid mine drainage, etc.) were identified during initial environmental assessments and mine planning, or have been identified as occurring as part of previous rehabilitation operations.

A recent investigation and reporting into Donaldson Mine Site surface water quality, namely the *Sediment Dam Investigations* report prepared by SLR Consulting Australia Pty Ltd (SLR, 2022), identified that the increased occurrence of naturally dispersive soils within and in the vicinity of the Donaldson Mine Site is associated with naturally elevated magnesium levels.

Controls to be Implemented

As discussed in Section 6.2.11, stockpiled growth medium within the Abel and Donaldson Mine Site will be subject to a formal survey of growth medium stockpiles to determine available volumes.

Prior to use in rehabilitation, stockpiled and/or imported material would be tested for geochemical properties to identify potential risks and opportunities for use in rehabilitated areas of the Abel Mine Site. Soil testing may also be undertaken for in-situ soils in existing rehabilitation areas and within analogue sites to establish appropriate completion criteria.

6.2.4.2 Amelioration

In accordance with the recommendations of the *Sediment Dam Investigation Report*, Donaldson Coal would, where practicable, apply ameliorative lime in areas where excessive occurrences of naturally dispersive soils are resulting in significant negative impacts to water quality within the Donaldson Mine Site.

Based on the results of soil testing, the addition of soil ameliorants such as fertiliser, lime, organic matter, etc., may be undertaken within the Abel Mine Site where required with caution applied to the use of phosphorous and nitrogen fertilisers.

6.2.4.3 Erosion and Sediment Controls

The erosion and sediment controls identified within the existing and approved *Abel Underground Coal Mine: Water Management Plan – Care and Maintenance* (June 2019) will continue to be implemented by Donaldson Coal during the growth medium development phase of rehabilitation.

During rehabilitation operations, all disturbed areas will be ripped prior to the application of topsoil in order to reduce compaction and encourage the integration of topsoil into underlying material. Growth medium spreading will aim to achieve a rough final surface in order to encourage the retention of seeds, infiltration of any rain and to minimise surface erosion. Water carts will be employed to lightly wet growth medium material prior to spreading in order to minimise dust generation. In areas which are vulnerable to wind erosion, polymer- or lignosulphonate-based dust suppressants may be applied following the application of growth medium to minimise the generation of particulate matter prior to vegetation establishment. Growth medium spreading will not be undertaken during excessively wet or windy conditions.

6.2.4.4 Material and Surface Management

In areas to be rehabilitated, where surfaces are observed or assumed to be compacted due to operational activities (i.e. laydown areas, roadways etc.), mechanical treatments such as deep-ripping will be implemented prior to the application of growth medium.

After surface preparation is complete, growth medium will be spread to a minimum depth of approximately 150mm where practicable. Growth medium spreading will aim to achieve a rough final surface in order to encourage the retention of seeds, infiltration of any rain and to minimise surface erosion.

In areas which are vulnerable to wind erosion, polymer- or lignosulphonate-based dust suppressants may be applied following the application of growth medium to minimise the generation of particulate matter prior to vegetation establishment. Growth medium spreading will not be undertaken during excessively wet or windy conditions.

6.2.4.5 Seasonal Considerations

Seasonal and local meteorological conditions will be monitored to identify conditions which may result in delaying vegetation establishment (e.g. extended drought conditions, periods of high rainfall, etc.). Land preparation and growth medium spreading activities will only be undertaken where conditions are predicted to be favourable (i.e. not unusually unfavourable) to the establishment of vegetation.

Sufficient water resources are also available within the existing water storage infrastructure of the Abel Mine Site for use in dust suppression.

6.2.4.6 Habitat Augmentation

Existing Environment

In general, habitat features that were salvaged during site clearing activities over the development of surface disturbance activities were immediately relocated to rehabilitation areas within the Donaldson Mine Site as part of progressive rehabilitation operations. No significant habitat resource stockpiles are present at the Abel Mine Site. As no further significant vegetation or site clearing operations are proposed or are required to occur, few opportunities to salvage additional habitat features remain.

Notwithstanding the above, the various water management infrastructure within the existing rehabilitation areas of the Donaldson Mine Site have been shown as part of ongoing rehabilitation monitoring to provide valuable habitat resources for fauna.

Ongoing Management

Donaldson Coal maintains 40 artificial nest boxes (24 terrestrial and 16 arboreal) within existing rehabilitation areas of the Donaldson Mine Site. Regular monitoring of the nest boxes is undertaken in accordance with the existing and approved *Donaldson Coal Mine and Abel Underground Coal Mine: Flora and Fauna Management Plan – Care and Maintenance* (July 2019).

Controls to be Implemented

No specific habitat augmentation relating to the use of pre-salvaged ‘natural’ habitat features is proposed as part of remaining rehabilitation operations.

However, once no longer required for operational purposes, the water within the West and Square Pits, and the Big Kahuna Dam, would likely provide additional habitat and resources for native flora and fauna.

6.2.4.7 Weed Control

Ongoing Management

The management of weed species in relation to selection, stockpiling and use of growth medium is discussed in Section 6.2.1.1 and 6.2.1.11.

Management of weed species is undertaken in accordance with the existing and approved *Donaldson Coal Mine and Abel Underground Coal Mine Flora and Fauna Management Plan – Care and Maintenance* (July 2019). The following presents a summary of the ongoing weed control programs and operations undertaken by Donaldson Coal.

- Regular weed control and monitoring programs targeting high-risk areas such as access roads.
- Inspection/cleaning of vehicles and machinery in dedicated washdown areas prior to entry into the Bushland Conservation Area, *Tetratheca juncea* Conservation Area, and to existing rehabilitation areas.
- Avoidance of known invasive species in site landscaping operations.
- Restriction of access to the Abel and Donaldson Mine Site to reduce as far as practicable the potential for illegal dumping of garden waste and other refuse in areas of native vegetation.

Reporting of annual weed species inspection and control programs is recorded in the *Annual Reviews* for the Abel and Donaldson Mines.

Controls to be Implemented

Ongoing weed inspection and control programs across the Abel and Donaldson Mine Sites will continue to be implemented throughout all phases of rehabilitation. Targeted inspection and control operations in the vicinity of areas where growth medium is to be applied may be undertaken if weed species presence or abundance is considered to be a potential risk to rehabilitation. This may include identification and monitoring of target or priority weed species communities and timing control operations based on phenological stage (i.e. during or prior to flowering).

6.2.5 Ecosystem and Land Use Establishment

6.2.5.1 Seasonal Considerations

In general, the local and regional climate for the Abel Mine Site is typical of the subtropical/temperate climate of the wider Newcastle region. As such, seasonal conditions are not considered to present a specific risk to rehabilitation.

Seasonal and local meteorological conditions will be monitored to identify conditions which may result in delaying vegetation establishment (e.g. extended drought conditions, periods of high rainfall, etc.). Vegetation establishment activities, including the application of hydromulch, direct seeding and/or broadcast seeding, will only occur where favourable climatic conditions are expected to occur.

Water resources are also available within existing water storage infrastructure of the Donaldson Mine Site for use in supplementary watering of establishing vegetation. Water within the West and Square Pits would only be used within the catchment of each void (i.e. where water would drain back into the void) to prevent discharge to surrounding land and waterways.

6.2.5.2 Revegetation Methodologies

Vegetation will largely be established by the following.

- Direct and/or broadcast seeding across relatively flat areas which are less susceptible to erosion or where relatively minor areas of vegetation are required to be established.
- Planting of tubestock to ensure target species establishment, including for species where seed propagation may be less effective.
- Hydroseeding in areas where safe access by rehabilitation practitioners or equipment cannot be provided, or areas that may be prone to erosion.
- Allowing natural revegetation to occur from existing seedbanks or from surrounding established native vegetation.

6.2.5.3 Target Plant Species

Table 13 presents an indicative and non-exhaustive list of native species that Donaldson Coal will use for revegetation of disturbed areas of the Abel and Donaldson Mine Sites.

Table 13
Species for Rehabilitation

Vegetation Strata	Scientific Name	Common Name
Groundcover	*Imperata cylindrica*	Bladey Grass
	Themeda australis	Kangaroo Grass
Understorey (Low Trees & Shrubs)	*Acacia linifolia*	Flax-leafed Wattle
	Acacia ulicifolia	Prickly Moses
Canopy (Large Trees)	*Allocasuarina torulosa*	Forest Oak
	Corymbia gummifera	Red Bloodwood
	Corymbia maculata	Spotted Gum
	Eucalyptus acmenoides	White Mahogany
	Eucalyptus crebra	Narrow-leaved Red Ironbark
	Eucalyptus fibrosa	Broad-leaved Ironbark
	Eucalyptus paniculata	Grey Ironbark
	Eucalyptus punctata	Grey Gum

As discussed in Section 6.2.1.2, the pre-mining environment within and in the vicinity of the Donaldson Mine Site was generally considered to be a degraded mix remnant and regrowth forest subject to, and largely formed by, a highly-altered disturbance regime compared to natural ecological function. As such, no specific target plant community exists for rehabilitation criteria.

In contrast, revegetation efforts will, as done for existing rehabilitation areas, focus on the establishment of a mixed native woodland community with species that naturally occur in the surrounding landscape. It is anticipated that the positive flow-on effects of continuing rehabilitation management operations, including pest and weed species monitoring and control will continue to benefit biodiversity values within and in the vicinity of the Abel and Donaldson Mine Sites, enhancing ecological resilience and maintaining an ecosystem capable of naturally regenerating a wide range of native species.

In areas that are identified as being prone to erosion, such as slopes >10°, rapid coloniser species including grasses may be used exclusively and at increased sowing density to ensure early stabilisation of growth medium. Where propagation material of target or native species may not be available at required volumes, sterile exotic pastoral species may be used to achieve target sowing rates. Natural recruitment of native species will be allowed to occur in these areas.

6.2.5.4 Propagation Material Handling

Native plant species seed will be collected from within and in the vicinity of the Abel and Donaldson Mine Site, including the Bushland Conservation Area and existing rehabilitation areas of the Donaldson Mine Site. As many native species flower and seed irregularly, seed collection may occur opportunistically or over an extended period of time. Where practicable, seed collection will be undertaken by or under the guidance of suitably qualified and experienced persons. Where the collection of seeds or other propagation material may result in risk of environmental harm (e.g. damage to existing vegetation, including existing rehabilitation), collection may be delayed or excluded from these areas. Where suitable species or sufficient quantities are unavailable, alternative local sources will be used.

6.2.5.5 Promotion of Vegetation Establishment

Hydroseeding and Straw Mulching

Techniques proposed for vegetative stabilisation of the infrastructure area batters include the use of hydroseeding and straw/bitumen (straw mulching).

Where practicable, the use of straw (or equivalent) mulching will be used to support revegetation. Straw will be applied at a rate of 5t/ha to achieve approximately 80% groundcover at a nominal thickness of 100mm to 200mm. The mulch will be fixed to the soil surface to avoid loss by wind or water. This will be achieved by applying a slow-breaking anionic bitumen emulsion with water in a 1:1 mixture at a rate of 2 litres/m^2.

The use of hydroseeding and straw mulching techniques negate the need for irrigation to promote germination and establishment of vegetation.

Fertiliser Application

The application of fertiliser may occur as part of revegetation operations. Fertiliser will either be applied directly to growth medium or as part of the mix used in hydroseeding.

6.2.5.6 Weed and Pest Control

Existing weed and pest control operations are discussed in Sections 6.2.1.2, 6.2.1.3 and 6.2.4.7.

Ongoing weed and pest inspection and control programs will continue to be implemented throughout all phases of rehabilitation. Targeted inspection and control operations in the vicinity of newly sewn or established vegetation. This may include identification and monitoring of target or priority weed species communities and timing control operations based on phenological stage (i.e. during or prior to flowering), as well as increased or additional pest control programs.

6.2.6 Ecosystem and Land Use Development

6.2.6.1 Weed and Pest Management and Monitoring Program

Annual weed and pest monitoring of the rehabilitated landforms of the Abel and Donaldson Mine Sites will continue until relinquishment. The results of the weed and pest monitoring program will be detailed in an *Annual Rehabilitation Report* together with a record of any specific control operations that have been undertaken. Monitoring frequency may be increased to include post-control monitoring if required.

6.2.6.2 Erosion and Drainage Controls

No water management infrastructure, including any permanent erosion and sediment controls are located wholly within the Abel Mine Site. The rehabilitation of the West Pit as a sediment basin during rehabilitation will be managed as part of the rehabilitation of the Donaldson Mine Site.

Notwithstanding the above, the results of all surface water monitoring related to the Abel Mine will be detailed in an *Annual Rehabilitation Report* together with a record of any specific management operations that have been undertaken.

Surface Water

Surface water monitoring has been ongoing since July 2000 in accordance with various revisions of approved Water Management Plans and other environmental monitoring programs and strategies. In addition, surface water monitoring is undertaken in accordance with EPL 12856.

The location of the water monitoring sites relevant to the Abel Mine Site are shown on **Figure 2** In summary, surface water monitoring sites specified for the Abel Mine are aimed at detecting indirect impacts such as from underground mining activities and activities in the surface infrastructure area. The mine's Water Management Plan (version dated June 2019) specifies surface water monitoring be undertaken at the following monitoring locations (see **Figure 2**).

- EM1 (previously referred to as Four Mile Creek Upstream or FMCU): monitoring commenced in July 2000 and mining in the Four Mile Creek Catchment commenced in July 2013.
- EM3: monitoring commenced in July 2000 and mining in the Weakleys Flat Creek Catchment commenced in July 2010.

- Site 1: monitoring commenced in June 2007 and mining has not been undertaken in the Buttai Creek Catchment.
- Site 9[3]: monitoring commenced in June 2007 and mining has not been undertaken in the Blue Gum Creek Catchment.
- Site 10: monitoring commenced in June 2007 and mining has not been undertaken in the Blue Gum Creek Catchment.
- Site 11: monitoring commenced in June 2007 and mining in the Viney Creek Catchment commenced in July 2010.

In addition to the above, surface water monitoring is undertaken for the Donaldson Mine at additional locations.

During the remaining rehabilitation of the Abel Mine Site, no additional surface water monitoring is anticipated to be required outside of existing monitoring programs. Based on rehabilitation progress against the proposed rehabilitation criteria, monitoring programs may be reviewed, revised and reduced in intensity and/or frequency prior to site relinquishment. The results of all monitoring will be detailed in an *Annual Rehabilitation Report* together with a record of any specific management actions (i.e. reviews) that have been undertaken.

Groundwater

Groundwater monitoring has been ongoing since June 2000 in accordance with various revisions of approved Water Management Plans and other environmental monitoring programs and strategies. In addition, groundwater monitoring is undertaken in accordance with EPL 12856.

There are six (6) current monitoring sites consisting of four (4) piezometers for groundwater level and three (3) bores for groundwater quality (pH, EC and TSS). The locations of monitoring sites are provided on **Figure 2**. In addition to the above, groundwater inflows are monitored through the recording of water volumes pumped from underground workings.

In addition to the above, groundwater monitoring is undertaken for the Donaldson Mine at additional locations.

During the remaining rehabilitation of the Abel Mine Site, no additional groundwater monitoring is anticipated to be required outside of existing monitoring programs. Based on rehabilitation progress against the proposed rehabilitation criteria, monitoring programs may be reviewed, revised and reduced in intensity and/or frequency prior to site relinquishment. The results of all monitoring will be detailed in an *Annual Rehabilitation Report* together with a record of any specific management actions (i.e. reviews) that have been undertaken.

Flora and Fauna

Monitoring of existing rehabilitation areas within the Donaldson Mine Site has been undertaken since 2008. Fauna and habitat monitoring aims to determine the effectiveness of the rehabilitation program in re-establishing pre-mining / natural biodiversity levels. Surveys are undertaken within a total of four monitoring plots, including one control plot, and four nesting box plots. Monitoring

[3] Site 9 has been inaccessible since January 2011 due to a road closure. Surrogate monitoring is undertaken at Site 8, located upstream of Site 9 and within the Blue Gum Creek Catchment (see **Figure 2**).

commenced in 2008. The flora monitoring includes one control plot in the remnant bushland (Plot 1) and nine monitoring plots in the rehabilitated areas of the Donaldson Mine Site (Plots 2 to 10). The plots have been progressively established as rehabilitation progressed and show a varying age of rehabilitation. The results of this monitoring are used to track rehabilitation progress against previously approved rehabilitation completion criteria.

Details on the flora and fauna monitoring program to be implemented by Donaldson Coal are provided in Section 8.1.

6.2.6.3 Revegetation Management and Monitoring

Vegetation establishment activities at the Abel Mine, including growth medium spreading and seeding operations, will occur only where favourable climatic conditions are expected to occur. Consequently, unfavourable meteorological conditions may result in extended delays to these rehabilitation conditions. In the event that extended unfavourable periods occur at the Abel Mine Site, rehabilitation schedules will be updated to prioritise other rehabilitation activities and opportunities to prepare additional areas for revegetation once favourable conditions return will be investigated.

Where rehabilitation monitoring identifies significant areas of germination failure, plant loss, damage to vegetation, the absence of target plant species or the presence of unsuitable plant species, Donaldson Coal may undertake remedial action which may include the following.

- Investigation into the potential causes of the phenomena, including consultation with suitably qualified persons, where required.
- Installation of temporary surface stabiliser (e.g. sterile groundcover, binding polymer) and/or temporary erosion and sediment controls.
- Consider alternative method of vegetation establishment (e.g. use of hydroseed)
- Undertake in-fill planting of target species to achieve as far as practicable target densities.
- Undertake targeted and short-term control strategies to remove un-suitable plant species.

6.2.6.4 Land Management and Infrastructure Maintenance

In general, ongoing management of infrastructure such as tracks, security infrastructure and stock fencing occur on an as-needed basis. Regular inspections are undertaken by Donaldson Coal personnel. Regular inspections will continue to occur until relinquishment. The results of ongoing monitoring will be detailed in an *Annual Rehabilitation Report* together with a record of any specific management operations that have been undertaken.

6.3 REHABILITATION OF AREAS AFFECTED BY SUBSIDENCE

As discussed in Section 6.2.1.12, the management of subsidence impacts is undertaken in accordance with existing and approved *Subsidence Management Plans* and/or *Extraction Plans*.

It should be noted that as no underground mining has occurred within the Abel Mine Site since 2016, no further significant subsidence impacts are predicted to occur. Minor subsidence impacts will continue to be managed and rehabilitated in accordance with approved management plans. In summary, principal subsidence impacts largely consist of surface cracking. Remediation of surface cracking generally involves:

- excavation to the base of the crack;
- compaction and refilling of the area; and
- reseeding with suitable species for rapid surface stabilization and the pre-existing land use (i.e. native and/or pastoral grasses).

In the event of significant cracking of exposed bedrock, cement based ground and crushed rock may be applied.

In general, rehabilitation of residual minor subsidence impacts that may occur over the remaining life of the Abel Mine are anticipated to be highly localised. Since the cessation of underground mining and the completion of all required subsidence surveys, monitoring of subsidence impacts and rehabilitation performance has generally consisted of visual monitoring and verbal communication with affected landholders. Donaldson Coal will continue to monitor subsidence impacts and associated rehabilitation until relinquishment.

7. REHABILITATION QUALITY ASSURANCE PROCESS

The following section details the rehabilitation quality assurance process for the Abel Mine that has been developed in consideration of *Guideline: Rehabilitation Controls (July 2021)* and the current status of rehabilitation of the Abel Mine Site.

Though still within the Active Mining phase of rehabilitation, the Abel Mine has been on Care and Maintenance since 2016. Therefore many of the risk controls outlined in *Guideline: Rehabilitation Controls* (e.g. baseline assessments and monitoring) have either been completed or form part of ongoing investigations to be undertaken during rehabilitation monitoring and maintenance. As such, **Appendix 2** presents a condensed risk control checklist containing items applicable to the remaining active mining and planned rehabilitation phases of the Abel Mine Site. The checklist is intended to be used as an indicative guide for rehabilitation operation managers and practitioners responsible for the rehabilitation of the Abel and Donaldson Mine Sites. It is noted that rehabilitation progress through the planned rehabilitation phases will not occur at the same rate across all mining and final land use domains identified in **Figure 5** and **Plan 1**. Therefore the quality assurance records of rehabilitation for each domain will be recorded as appropriate to the respective phase of rehabilitation for that domain. In some instances, validation and monitoring records that apply to all/multiple domains may occur following completion of the relevant phase for all domains.

As part of the rehabilitation quality assurance process, relevant records and documentation will be recorded in a Rehabilitation Quality Assurance Register and reported as part of the Annual Rehabilitation Report. The Rehabilitation Quality Assurance Register will, as a minimum, include a copy of the checklists presented in **Appendix 2** as well as a compliance register used to assess the status of compliance with requirements under relevant development consents, leases and licences. The Rehabilitation Quality Assurance Register will be maintained, reviewed and refined by the Operations Manager and Environment and Community Relations Superintendent to ensure that it is reflective of current rehabilitation progress, risk controls implemented at the Donaldson Mine Site and the outcomes of any updated rehabilitation risk assessments.

Table 14 outlines key responsibilities for Donaldson Coal personnel with regards to rehabilitation operations.

Table 14
Roles and Responsibilities for Rehabilitation Implementation

Role	Responsibilities
Operations Manager	Accountable for the overall environmental performance of the operations, including the outcomes of this Plan. Ensure that operations are compliant with the requirements of this Plan and applicable approvals. Provide necessary resources required to implement the rehabilitation process outlined within this Plan. Ensure employees are competent through training and awareness programs.
Environment and Community Relations Superintendent	Ensure the implementation of this Plan, including reporting of non-compliances, and subsequent implementation of the relevant action plan. Ensure that monitoring, report review and preparation are undertaken as outlined within this Plan and associated management plans. Report the progress of rehabilitation and monitoring in the relevant *Annual Rehabilitation Report*.
All employees	Follow direction provided by the Operations Manager and the Environment and Community Relations Superintendent. Ensure operations are consistent with the plans and objectives detailed in this Plan.

8. REHABILITATION MONITORING PROGRAM

8.1 ANALOGUE SITE BASELINE MONITORING

8.1.1 Existing Analogue Site Monitoring Programs

8.1.1.1 Bushland Conservation Area

Flora

Annual flora quadrat monitoring has been conducted in the Bushland Conservation Area since 2001. Nine 20m x 20m quadrats are monitored for species richness, density, floristic composition and biomass parameters. Quadrat monitoring occurs in late spring to early summer each year and aims to monitor the influence of mining activities on flora around the Donaldson Mine Site.

To date, a total of 305 flora species have been recorded across all survey events. Since commencement of monitoring the cumulative number of species steadily increased until 2009 and has since levelled and stabilised. This is consistent with expected ecological processes, weather patterns, and other variables.

Despite minor year-to-year fluctuations, all biomass variables examined (i.e. basal area, height, foliage projective cover (FPC), and stand volume) have also shown substantial increases over the last 20 years since the baseline survey in 2001. The regression analyses also confirmed that the relationship between time and increases in FPC and stand volume were highly significant indicating that the community biomass has increased substantially over time. Notwithstanding the significant increase since 2001, the FPC and stand volume parameters have remained relatively constant since the 2010 survey. The protection of the Bushland Conservation Area from a history of logging, clearing, frequent fire, firewood collection and rubbish dumping has likely contributed to the significant increase in biomass at all monitored sites since 2001.

Overall, the recorded trends are indicative of a dynamic plant community with high recruitment from the seed pool, normally an indicator of a healthy, regenerating native plant community. Overall, the results show that there have been no significant negative impacts on floristic diversity within the Donaldson Bushland Conservation Area over the last 20 years.

The results of the existing monitoring of the Bushland Conservation Area have been considered during the preparation of the proposed rehabilitation completion criteria for Native Ecosystem Areas domains as presented in Section 4.1. Where existing metrics have shown to be less-suitable as measures of rehabilitation success, these have been revised to develop more effective, meaningful and achievable completion criteria.

Fauna

Fauna monitoring within the Bushland Conservation Area has been conducted since 2001. Monitoring locations are consistent with the nine quadrats used for flora monitoring. Fauna monitoring techniques have included:

- terrestrial and arboreal mammal trapping;
- microbat trapping;
- microbat call detection;

- owl call playback;
- spotlighting;
- bird surveys;
- nest box monitoring; and
- opportunistic herpetofauna recording.

A total of 180 fauna species have been recorded since monitoring began in 2001, with a yearly average of 83 species as of 2021. Similarity analysis of faunal assemblages for all years (to 2021) indicates a similarity of 68%. Analysis of habitat preference (i.e. specialist vs. generalists) is also undertaken on an approximately 4 yearly basis. Variation is species assemblages has been associated with both on-site (mining) and off-site (surrounding development) operations. Notwithstanding the maturation of existing rehabilitation areas is predicted to positively impact on the surrounding Bushland Conservation Area. Nest box monitoring has shown successful results in regard to utilisation by various fauna species. However, nest box age and condition significantly affect utilisation rates with a 50% occupancy taking up to 4 years and peak occupancy being reached after 8 years.

The results of the existing monitoring of the Bushland Conservation Area have been considered during the preparation of the proposed rehabilitation completion criteria for Native Ecosystem Areas domains as presented in Section 4.1. Where existing metrics have shown to be less-suitable as measures of rehabilitation success, these have been revised to develop more effective, meaningful and achievable completion criteria.

8.1.1.2 Rehabilitation Monitoring

Monitoring of existing rehabilitation areas within the Donaldson Mine Site has been undertaken since 2009. Fauna and habitat monitoring aims to determine the effectiveness of the rehabilitation program in re-establishing pre-mining / natural biodiversity levels. Surveys are undertaken within a total of four monitoring plots, including one control plot, and four nesting box plots. The flora monitoring includes one control plot in the remnant bushland (Plot 1) and nine monitoring plots in the rehabilitated areas of the Donaldson Mine Site (Plots 2 to 10). In addition, an erosion monitoring transect has been defined at each plot. The plots have been progressively established as rehabilitation progressed and show a varying age of rehabilitation.

To date, the monitoring has found that several of the rehabilitated areas have already met the previously approved completion criteria and that all rehabilitated areas assessed are on track to meet the previously approved completion criteria.

The results of the existing rehabilitation monitoring have been considered during the preparation of the proposed rehabilitation completion criteria as presented in Section 4.1. Where existing metrics have shown to be less-suitable as measures of rehabilitation success, these have been revised to develop more effective, meaningful and achievable completion criteria.

8.1.2 Additional Analogue Sites

Once all rehabilitation areas have reached the Ecosystem and Land Use Establishment phase of rehabilitation, Donaldson Coal may consult with suitably qualified persons regarding the current effectiveness and/or suitability of the existing analogue sites to determine the need for the establishment of additional analogue sites to better monitor the progress of existing and future rehabilitation efforts. Any additional sites would be established by or under the guidance of suitably qualified persons and included in the *Annual Rehabilitation Report*.

8.2 REHABILITATION ESTABLISHMENT MONITORING

Rehabilitation establishment monitoring methods and associated parameters are included in **Table 9** in Section 4.1. In summary, the monitoring parameters associated with each of the proposed rehabilitation completion criteria have been developed in consideration of the results and information collected by Donaldson Coal since 2009. By comparing rehabilitation progress against both analogue sites within the Bushland Conservation Area and the extensive existing rehabilitation, Donaldson Coal will be able to track short term progress as well as assess long-term rehabilitation trajectory.

Rehabilitation establishment monitoring methods will generally be consistent with existing monitoring methods, namely the establishment of permanent monitoring quadrats located within the remaining areas to be rehabilitated.

The location and density of any additional permanent monitoring quadrats will be determined by or under the guidance of a suitably qualified person(s). It is anticipated that the establishment of permanent monitoring locations within each area to be rehabilitated will occur within 1 year of the completion of ecosystem establishment activities.

As each permanent monitoring location is established, information on target vegetation types, species mix used, sowing/planting densities, and soil amelioration including fertiliser applications will be recorded. Each site will be added to the formal rehabilitation monitoring regime at the time of the next site-wide monitoring event.

Prior to the initial formal survey, establishment monitoring will consist of the following.

- Photo monitoring of rehabilitated areas, including photos prior to seeding, immediately following seeding and at least quarterly until first formal survey is undertaken. Additional photo monitoring may be undertaken on an opportunistic basis or as directed by rehabilitation experts.
- Visual inspections, including photographs, following significant rainfall events to identify any signs of erosion and detail any follow up actions required (e.g. repairs, installation of additional erosion and sediment controls)
- Recording of all monitoring and inspection events, including the results of monitoring and any follow up activities, in accordance with the Rehabilitation Quality Assurance Register.

As indicated in **Table 9**, ecological monitoring frequency will be determined in consultation with a suitably qualified person(s) (i.e. an ecologist). The reduction of monitoring intensity and frequency has previously occurred as part of approved revisions of various environmental monitoring plans or the advice of independent specialist consultants. Donaldson Coal anticipates that monitoring frequency will largely reflect rehabilitation age, and monitoring frequency is likely to vary across the Abel Mine Site depending on observed rehabilitation progress.

The results of any rehabilitation establishment monitoring will be detailed in the respective *Annual Rehabilitation Report* together with a record of any specific management actions (i.e. reviews) that have been undertaken.

8.3 MEASURING PERFORMANCE AGAINST REHABILITATION OBJECTIVES AND REHABILITATION COMPLETION CRITERIA

Details of validation methods and indicators to be employed during monitoring to assess performance against the rehabilitation completion criteria for the Abel Mine Site are provided in Section 4.1 and **Table 9**.

Established ecological monitoring methodologies developed for the Donaldson Mine will be the foundation of long-term monitoring at the Abel Mine Site. As outlined in Section 8.2, the progressive establishment of additional permanent monitoring locations will be undertaken within 1 year following the completion of growth medium spreading and seed application activities. Subsequent monitoring events will be undertaken at a frequency determined by suitably qualified persons that reflects observed and predicted rehabilitation progress and success as measured against rehabilitation completion criteria listed in Section 4.1.

As detailed in Section 8.1, long-term analogue site monitoring within the Bushland Conservation Area has provided extensive information on the ecological performance of the surrounding ecological communities. This data will continue to be used to infer local and regional patterns in biodiversity and ecological function. Combined with the long-term data collected from the existing rehabilitation monitoring locations, Donaldson Coal will be able to infer rehabilitation performance against background processes (i.e. outside of the control of Donaldson Coal) and previous rehabilitation success.

The results of relevant rehabilitation monitoring parameters will be graphed and compared against target values to determine:

- the relative performance of rehabilitated areas compared to other rehabilitation monitoring sites within the Donaldson Mine Site and the established analogue sites;
- the rate of development towards target values, including a timeline for the achievement of target values and/or rehabilitation completion criteria; and
- whether additional controls, management measures or specialist assessments to identify issues and provide recommendations are required based on trigger values (see Section 10).

The Rehabilitation Quality Assurance Register will be used to record details of any additional management measures or risk controls implemented during the ecosystem development phase in response to the analysis of rehabilitation monitoring results. The result of all rehabilitation monitoring will be included in the respective *Annual Rehabilitation Report*.

9. REHABILITATION RESEARCH AND TRIALS

9.1 CURRENT REHABILITATION RESEARCH, MODELLING AND TRIALS

No specific or formal rehabilitation research, modelling, or trials are currently or have ever been undertaken by Donaldson Coal for the rehabilitation of the Abel Mine Site.

9.2 FUTURE REHABILITATION RESEARCH, MODELLING AND TRIALS

9.2.1 Research, Modelling and Trials

No future rehabilitation research, modelling or trials are proposed or are anticipated to be required for the remaining rehabilitation of the Abel Mine Site. Donaldson Coal has undertaken progressive rehabilitation of the Donaldson Mine Site since 2003 and as such has extensive experience in local rehabilitation operations. In addition, the proposed rehabilitation operations are considered to be widely understood and unlikely to present any significant challenges that may warrant specific rehabilitation research.

10. INTERVENTION AND ADAPTIVE MANAGEMENT

Table 15 presents the Trigger Action Response Plan for each of the rehabilitation threats and potential adverse outcomes identified in **Table 8** as having a risk rating of moderate or above and relating to the Donaldson Mine.

The results of ongoing rehabilitation monitoring will be continually reviewed and reported in the respective *Annual Rehabilitation Report* for the Donaldson Mine. Where rehabilitation monitoring outcomes suggest that rehabilitation methods outlined in this Plan may not support the realisation of rehabilitation completion criteria, this Plan will be updated to detail additional or alternative rehabilitation methods as required.

Table 15
Trigger Action Response Plan

Rehabilitation Risk	Potential Adverse Outcome	Trigger	Response
General			
Insufficient resourcing: • skills and experience of rehabilitation personnel. • funding for or prioritisation of rehabilitation activities. • ongoing maintenance of rehabilitation requirements.	Rehabilitation signoff not given by Regulator.	Significant unforeseen increase or additional rehabilitation cost identified not covered by current Rehabilitation Cost Estimate.	Revise Rehabilitation Cost Estimate. Review and revise rehabilitation schedule.
Active Mining Phase of Rehabilitation			
Contamination resulting from storage and handling of hydrocarbons, resins, cement.	Contamination of waterways or land resulting in infringement notice.	Opportunistic visual monitoring identifies potential or actual contamination of surface water.	Investigate potential source and extent of contamination to determine appropriate scale of response. Immediately if practicable isolate source of contamination.
		Surface water monitoring identifies contamination.	Remove contaminated material as far as practicable for disposal either on-site or off-site at appropriately licensed facility.
Decommissioning			
Instability of highwalls and low walls.	Landform failure – public safety.	Geotechnical assessment identifies potential or unacceptable risk of wall failure. Visual monitoring identifies potential or actual significant wall failure.	Inspect all Mine security infrastructure to ensure suitability while investigations are undertaken. Undertaken review of or additional geotechnical assessment to identify potential cause of failure and assess potential for additional failures. If required, undertaken additional stabilisation (e.g. shaping, buttressing, etc.) as recommended through geotechnical assessment / expert engineering advice.
Availability of suitable materials for capping of carbonaceous materials and other unsuitable materials on final landform batters.	Exposed carbonaceous or other unsuitable material impact upon growth medium and ability to establish vegetative cover.	Rehabilitation materials audit identifies likely deficiency in available capping materials.	Investigate potential additional on-site sources and off site sources for suitable capping material.
Landform Establishment			
Diversion of surface water runoff away from catchment areas.	Loss of water flow downstream due to capture of water in West and Square Pit final voids.	Downstream surface water monitoring identifies reduction in water levels after final landform establishment, including water diversion infrastructure, is complete.	Review water management system to confirm all run-on water is diverted back to natural catchments to the maximum extent possible. Review upstream water monitoring results to identify local or regional trends.
Ecosystem and Land Use Establishment			
Weather and climatic influences (e.g. drought, intense rainfall events, bush fire, etc.).	Damage to vegetation due to fire, flood, or drought.	Meteorological monitoring identifies potential or actual extreme or unseasonal climactic conditions coinciding with planned or ongoing rehabilitation operations.	Review and revise rehabilitation scheduling to identify potential proactive controls (e.g. watering of vulnerable vegetation, stabilising exposed surfaces, installation of temporary additional erosion and sediment controls, controlled burns, etc.). Undertake inspections of revegetated areas to identify potential extent of plant loss and, if required, undertake in-fill planting once favourable conditions return.
Erosion and failure of drainage and water management/storage structures.	Impacts on water quality and potential discharge.	Visual monitoring identifies signs of erosion of rehabilitated landforms.	Undertake inspection of rehabilitated areas to identify potential cause of erosion and suitability of existing erosion and sediment control infrastructure. In required, install additional temporary or permanent erosion and sediment control infrastructure and/or surface stabilising treatments.
		Visual monitoring identifies structural failure of water management/storage infrastructure.	Undertaken inspection and review of all water management/storage infrastructure within Mine Site to identify likely cause of failure and suitability for final land use. Undertaken necessary repairs under guidance of suitably qualified persons.
		Surface water monitoring identifies Mine-related impacts to surface water quality.	Undertake investigation to identify potential cause of surface water impacts and identify potential remedial management actions.
Ecosystem and Land Use Development			
Weather and climatic influences (e.g. drought, intense rainfall events, bush fire, etc.).	Damage to vegetation due to fire, flood, or drought.	Meteorological monitoring identifies potential or actual extreme or unseasonal climactic conditions coinciding with planned or ongoing rehabilitation operations.	Review and revise rehabilitation scheduling to identify potential proactive controls (e.g. watering of vulnerable vegetation, stabilising exposed surfaces, installation of temporary additional erosion and sediment controls, controlled burns, etc.). Undertake inspections of revegetated areas to identify potential extent of plant loss and, if required, undertake in-fill planting once favourable conditions return.
Vandalism to revegetation areas.	Damage to vegetation due to vandalism.	Visual inspections identify signs of unauthorised access to rehabilitation areas including damage to vegetation.	Undertake investigation including review/inspection of all security infrastructure. Undertake repairs to security infrastructure and, if necessary, install additional security measures to prevent and/or discourage public access. Undertake inspections of revegetated areas to identify potential extent of plant loss and, if required, undertake in-fill planting once site security is confirmed.

11. REVIEW, REVISION AND IMPLEMENTATION

Table 16 presents the triggers for reviewing this Plan. Following each review, this Plan will be revised if significant structural amendments are necessary. Additionally, further consultation with relevant stakeholders will be undertaken where revisions to this Plan result in changes to the proposed final land uses and final landforms, rehabilitation objectives, rehabilitation completion criteria and/or the rehabilitation schedule. Milestones as documented in this Plan will be updated in the *Annual Rehabilitation Report* and will trigger an update to this Plan in the event that a significant change in rehabilitation risks and/or proposed rehabilitation methodologies is identified.

Table 16
Rehabilitation Management Plan Review Triggers

Trigger	Review
Request from the Resources Regulator or other relevant government agency to review the Plan.	As required by any notice.
Modification of an existing development consent.	Within 3 months.
Modification of ML 1461.	Within 3 months.
Preparation of a revised Rehabilitation Risk Assessment.	As soon as practicable.
Update of the Rehabilitation Outcomes (objectives and/or criteria)	Within 30 days
Submission of each *Annual Rehabilitation Report* and Forward Program.	Within 3 month.
Finalisation of the *Rehabilitation Materials Balance Report.*	Within 3 months.
Receipt of a specialist consultant report prepared in response to a trigger outlined in Section 10.	Within 3 months.

In addition to reviews of this Plan as outlined in **Table 16**, a *Rehabilitation Quality Assurance Register* will be developed and regularly maintained to ensure that operational (i.e. Care and Maintenance operations) and rehabilitation activities at the Abel Mine Site are being conducted in accordance with this Plan. The *Rehabilitation Quality Assurance Register* will include the checklist presented as **Appendix 2** as well as a compliance register used to assess the status of compliance with requirements under relevant development consents, leases and licences. Additionally, the *Rehabilitation Quality Assurance Register* will include:

- records of any contaminated water or hazardous materials collected at the Abel Mine Site and disposed of off site;
- the latest map of contamination at the Donaldson Mine Site (once prepared); and
- details of any additional rehabilitation measures and/or risk controls implemented within individual subdomains during rehabilitation operations.

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