REHABILITATION MANAGEMENT PLAN

SITE: Millennium Coal Pty Ltd

DATE: June 2019

REF: MP-200-2019 Rehabilitation Plan - (Version 8)

Document Owner	Document Approver
Senior Environmental Advisor	Daryn Railey
General Description	
Millennium Rehabilitation Management Plan prepared in accordance with condition F5 of Environmental Authority EPML00819213.	
V8 Amendments - RMP updated to address Material Particulars relevant to the management of a void or rehabilitation of land identified in DES correspondence 11 January 2019.	

Contents

1. Introduction

The Rehabilitation Management Plan has been compiled in accordance with commitments made in the Millennium Mine Expansion Project and obligations in the Millennium Mine Environmental Authority (EA) EPML00819213.

Condition F5 of the Millennium Mine EA stipulates that Millennium Mine must complete an investigation into rehabilitation of disturbed areas and implement a Rehabilitation Management Plan. On acceptance of the criteria proposed in the Rehabilitation Management Plan, the criteria must be specified in the environmental authority. The Rehabilitation Management Plan must, at a minimum:

a) Map existing areas of rehabilitation;
b) Develop design objectives for rehabilitation of disturbed areas and post mining land uses across the mine;
c) Specify waste rock characteristics, soil analysis, soil separation for use on rehabilitation;
d) Detail rehabilitation methods applied to areas;
e) Contain landform design criteria including end of mine design;
f) Detail how landform design will be consistent with the surrounding topography;
g) Include figures of the final landform that illustrate contours, internal surface drainage patterns, appropriate drop structures and run-off retention features;
h) Include cross-sections of the final landform at appropriate intervals;
i) Identify success criteria for areas and itemise revegetation criteria;
j) Explain planned native vegetation rehabilitation areas and corridors;
k) Identify at least a minimum of three (3) reference and three (3) rehabilitation sites to be used to develop rehabilitation success criteria;
l) Describe rehabilitation indicators and the monitoring program to be used;
m) Develop a contingency plan for rehabilitation maintenance or redesign;
n) Describe end of mine landform design plan and post mining land uses across the mine;
o) Include a cost benefit analysis/triple bottom line assessment (or an alternative assessment method) of the proposed final landform design criteria and alternatives;
p) Propose Endangered Regional Ecosystems (ERE) management and offset protection; and
q) Identify and consider the potential for cumulative impacts on rehabilitation outcomes as a result of applying mine affected water with high electrical conductivity for dust suppression.

2. Legislation & Guidelines

The Queensland Department of Environment and Science (DES) require land disturbed by mining to be rehabilitated to achieve a stable landform and beneficial agreed uses. The three mandatory rehabilitation requirements stipulated by DEHP include landform stability, beneficial use, and protection of water quality. These elements are further defined as:

- Stable landform – includes both erosional and geotechnical stability. Erosional stability is typically achieved through the appropriate placement of spoil to a final landform design standard followed by adequate top-soiling, re-vegetation and surface water management. Geotechnical stability is typically achieved through the correct design of low wall and high wall slopes and batters and the correct placement of spoil materials during the mine life.
- Beneficial use – refers to the final land use being beneficial to the community from an ecological or agricultural perspective or a combination of the two. It may include stable native bush land or grazing land with no ongoing liability to the community.
- Preservation of downstream water quality – existing and future use of the downstream water is not to be compromised. Silt, salt and acid above acceptable levels are not to be released from spoil or final voids to groundwater or surface water.

3. Existing Areas of Rehabilitation

Millennium Mine, as at 31 December 2018, has rehabilitated a total of approximately 648Ha since operations have commenced, which consists of native and improved pasture grass on outer pit dump slopes and top of dumps (**Figure 1**). During 2018, a total of 428ha of rehabilitation was completed.

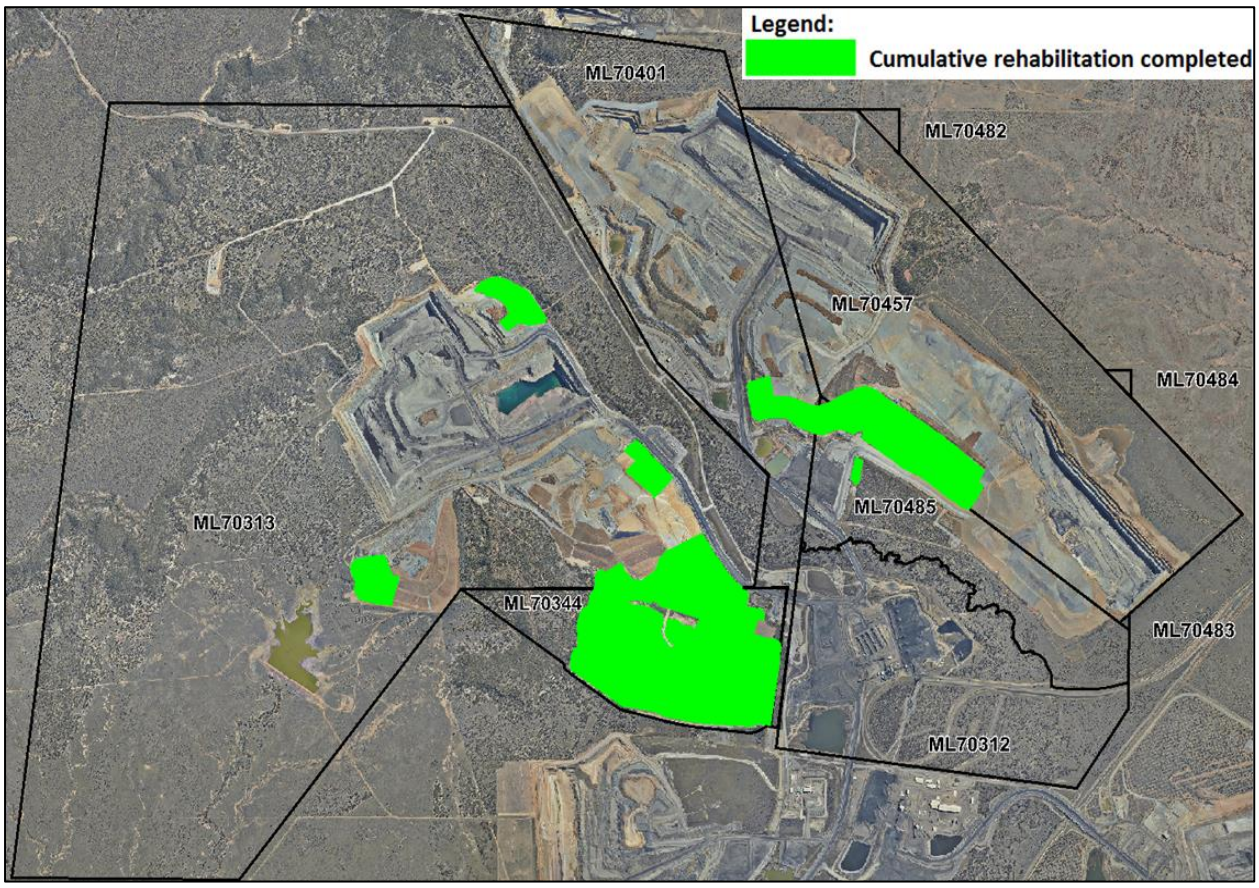


Figure 1: Millennium Mine Existing Rehabilitation

4. Design Goals and Objectives

Rehabilitation procedures have been designed to return the mine as closely as possible to the surrounding and pre-mining environment. Procedures for rehabilitation of disturbed areas will comply with the rehabilitation goals and objectives in relation to intergenerational equity, protection of biodiversity and maintenance of essential ecological processes. The four general rehabilitation goals require rehabilitation of areas disturbed by mining to result in sites that are:

- Safe to humans and wildlife;
- Non-polluting;
- Stable; and
- Able to sustain an agreed post mining land use, being cattle grazing.

Table 1: Rehabilitation Goals and Objectives

Disturbance Type	Rehabilitation Goals	Rehabilitation Objectives
All disturbance including – spoil dumps, voids, ramps, highwalls, haul roads and infrastructure.	Safe	All rehabilitation to be safe to all humans, livestock and wildlife.
	Non-Polluting	All potential contaminants to be contained on site.
	Stable	Landform design and construction to minimise the potential for erosion.
	Sustainable	Completion of rehabilitation to meet landform design criteria.

5. Post-Mining Land Use

Prior to the introduction of mining, the land was used for cattle farming/grazing, with much of the area having been substantially cleared and seeded with improved pasture species, namely Buffel and Rhodes Grass. Rehabilitation of the Millennium Mine disturbance area will return a stable landform capable of uses similar to those that existed prior to mining. The exception will be areas occupied by highwalls and end walls, and the zone around these features that is required to safeguard against access to the steep slopes, which is approximately 15m from the highwall crest (i.e. abandonment bund). These areas will have no productive use at the time of mining lease surrender. Low walls below the original ground level will support scattered native vegetation; however, there is currently no productive post-mining land use proposed for these areas.

The nominated post-mine land use for the site is a mosaic of native bushland and grazing. The mosaic will, where possible, link remnant native vegetation and aim to restore and enhance conservation values. In terms of soil conservation and agricultural land suitability, the proposed impacts are considered manageable and the proposed post-mining land use of low to moderate density cattle grazing is considered achievable. In order to sustain the desired land use without degradation, it is important that the land (post-mining) only be used in accordance with the limits of the agricultural suitability class. Soil conservation practices such as stocking rate control and establishment or re-establishment of permanent pasture are proposed for rehabilitated areas where the proposed post mining land use is grazing.

The overriding principle is to maintain the most beneficial future use of land that can be sustained in view of the range of limiting factors. The proposed post-mining grazing land will provide and sustain a sufficient bulk of forage to sustain livestock during average and above average seasonal conditions, with lesser stocking rates likely in response to drought conditions.

The suitability of cattle grazing on the Project site is mostly limited by nutrient deficiencies within the soil. Water erosion and poor water (quality and quantity) availability, primarily due to the shallow nature of the soil, are also considered limiting factors within some soils. The Project site is classified as Beef Grazing Land Suitability Classes 2 and 3. The land is suitable for beef grazing and has minor to moderate limitations. The distribution of these land suitability classes is provided in **Figure 2**.

The post-mining landform will be constructed and rehabilitated to ensure that a similar proportion of land suitability classification as the pre-mining landscape is attained (**Table 2**). The optimal final landform design to achieve the best business and post-mining land use outcome is described in **Table 3** as a decision matrix, which incorporates the business decision criteria that are utilised to develop each final landform scenario.

Table 2: Disturbance and Rehabilitation Type

Description	Residual Void (including highwalls)[5]	Spoil Dumps (External Batters)[1]	Spoil Dumps (Internal Batters)[2]	Runoff/Supply Dams	Riparian Zones (New Chum Creek)[3]	Roads[4]
Surface Area (Ha)	389					
Pre-mine Land Use	Grazing	Grazing	Grazing	Grazing	Grazing	Grazing
Post-mine Land Use	Water storage / Native Bushland	Grazing / Native Bushland	Grazing / Native Bushland	Water storage	Native Bushland	Grazing/Stock Vehicle Access
Post-mine Capability Classification	Class 3 or 4 grazing land	Class 2 or 3 grazing land	Class 3 or 4 grazing land	N/A	Class 2 grazing land	Class 3 or 4 grazing land

[1] All batters/slopes above natural ground level that are topsoiled and rehabilitated
[2] All batters/slopes below natural ground level that are topsoiled and rehabilitated
[3] 100m either side of New Chum Creek
[4] 10 - 12m stock vehicle access track remain post closure
[5] Condition F3 of the EA, and its associated Tables 17 and 18, provide for a Projected Surface Area of the final voids, ramps, high walls and low walls at 281 ha. This Projected Surface Area is noted within the EA as being based on conceptual design details i.e. those prepared at the time of the Project's Environmental Impact Statement (December 2010). The 281 ha was therefore a forecast final void area at that time and the EA allows for this area to be modified subject to the outcomes of ongoing research and experience gathered during the life of the mine.

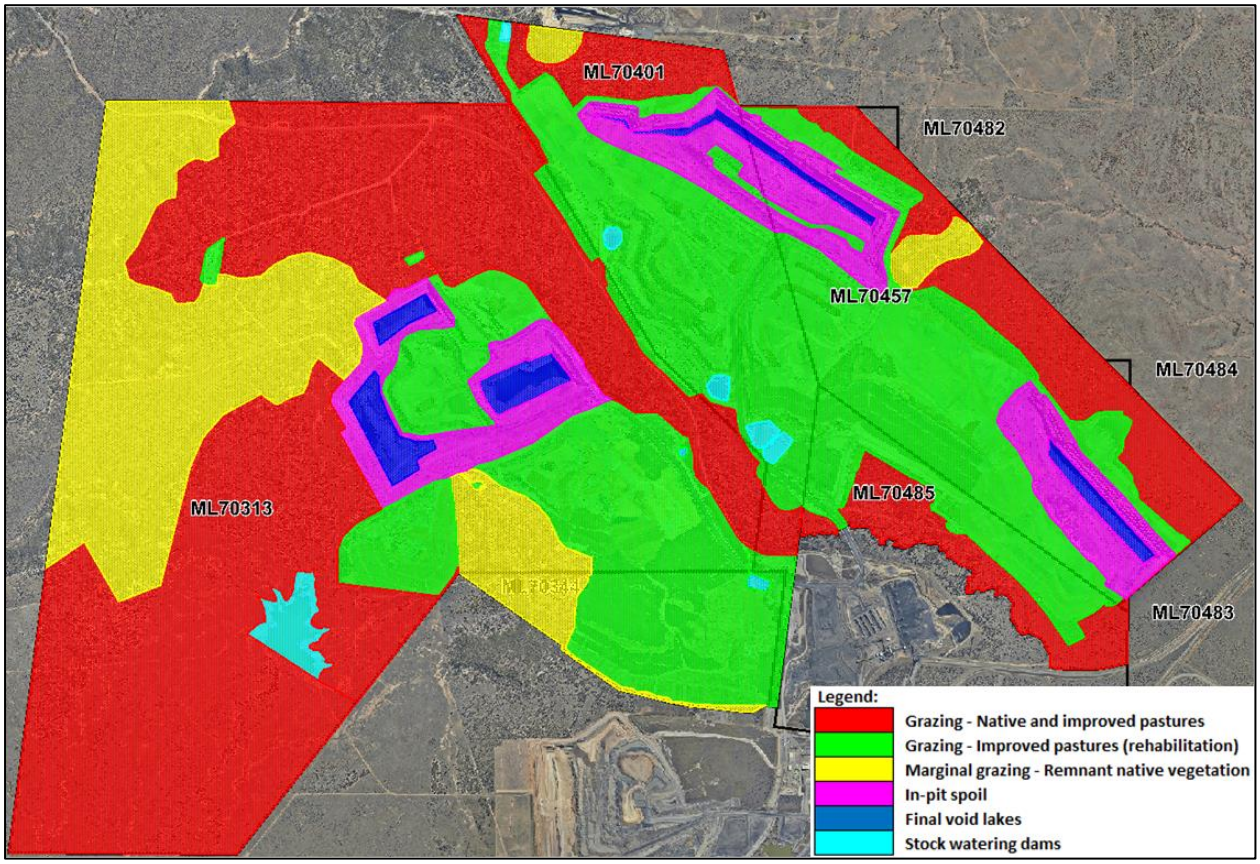


Figure 2: Millennium Mine Grazing Suitability

Table 3: Millennium Mine Final Landform Decision Matrix

		Millennium Mine Final Landform Scenario Decision Matrix																					
		Final Landform Scenario 1		Final Landform Scenario 2		Final Landform Scenario 3		Final Landform Scenario 4		Final Landform Scenario 5		Final Landform Scenario 6		Final Landform Scenario 7		Final Landform Scenario 8		Final Landform Scenario 9		Final Landform Scenario 10		Final Landform Scenario 11	
Mine Plan Factors	Importance (0 - 10)	Rating (0 to 5)	Score	Rating (0 to 5)	Score	Rating (0 to 5)	Score	Rating (0 to 5)	Score	Rating (0 to 5)	Score	Rating (0 to 5)	Score	Rating (0 to 5)	Score	Rating (0 to 5)	Score	Rating (0 to 5)	Score	Rating (0 to 5)	Score	Rating (0 to 5)	Score
Spoil Reprofiling Volume (m3)	9	1	9	1	9	1	9	1	9	1	9	1	9	0	0	0	0	1	9	0	0	4	36
Spoil Reprofiling Cost ($)	9	4	36	4	36	1	9	1	9	1	9	1	9	0	0	0	0	1	9	0	0	4	36
Reprofiling Push Distance (m)	7	1	7	0	0	1	7	1	7	1	7	0	0	0	0	0	0	1	7	3	21	3	21
Final Void Area (Ha)	8	3	24	3	24	4	32	3	24	0	0	0	0	1	8	0	0	3	24	3	24	3	24
Usable In-Pit Area (Ha)	8	0	0	0	0	0	0	4	32	5	40	5	40	3	24	3	24	2	16	3	24	3	24
Void Area Less Usable Area (Ha)	8	0	0	0	0	0	0	4	32	5	40	4	32	3	24	2	16	2	16	3	24	3	24
	Total Score		76		69		57		113		105		90		56		40		81		93		165

Legend:

Rating - 0 (poor outcme) to 5 (very good outcome)

Importance - 0 (unimportant) to 10 (very important)

Table 3 presents six mine planning factors that were assessed when evaluating final landform options. The first three factors displayed within Table 4 address technical and economic factors that were considered when evaluating each landform scenario. Volumes and push distances determine the cost of completing bulk earthworks. Mine planning personnel seek to optimise these factors using modelling software and are guided by parameters set out in the site's Environmental Authority. The design scenarios were also informed by geotechnical advice on the stability of proposed slopes and hydrology studies that informed the final pit lake level and volume once equilibrium is reached.

Iterations of the final landform scenarios also considered economic factors by seeking to maximise the area of usable land after completion of mining activities. This consideration included ensuring that where feasible, out of pit and in-pit areas are shaped and re-vegetated to pasture to support grazing as the intended post-mining land use. The area of usable land below original ground level is inconsequential given the size of the property holdings of the underlying land holder (Winchester Downs), of which Millennium occupies a small area and the inherently low grazing productivity of land in the region.

The various options to configure the final voids presented limited potential to influence environmental outcomes. Key considerations in the design were to minimise the area of land occupied by final voids in addition to increasing in-pit useable land and to ensure that the pit lakes acted as permanent sinks, thus avoiding the potential for outflow of saline water from the pit lakes entering the downstream catchments. Altering the final grades for low walls and high walls to achieve additional land with more moderate grades, other than in areas identified as having potential for grazing, was not contemplated in the options analysis described in Table 4 as flattening slope angles would require disturbance of previously undisturbed or rehabilitated ground with little or no benefit to compensate for loss of usable areas adjoining the pit voids. Altering the pit shell area to achieve lesser slope angles would also increase the catchment area of the pit lake with a corresponding reduction in the overland flow of clean water into the downstream catchments. This may have an adverse environmental or economic impact on the downstream catchments and grazing operations.

The minor variations between differing landform options that were evaluated at Millennium has little or no influence on social outcomes. The area occupied by the Millennium Mine is part of the extensive Winchester Downs land holdings. Upon Mining Lease surrender the land will be re-incorporated Winchester Downs operations and managed to graze beef cattle. The region is sparsely populated, and the principle land use activities are mining and cattle grazing. Proposed landform options have been discussed with the Winchester Downs manager as the options analysis evolved and no concerns have been raised to date.

6. Waste Rock Characteristics, Soil Analysis & Soil Separation

6.1 Waste Rock Characteristics

Analysis of overburden and inter-burden has shown this material to be relatively benign with no limitation to use in final landform development and revegetation. The overburden and inter-burden rocks were found to be generally not acid forming material and are therefore not expected to pose a risk of acid mine drainage.

During mining, the groundwater of strata coal presents a pH between 6.5 and 7.5, with low sulphate content, demonstrating neutral water quality content and limited acid generation potential. Water of the pH within the pit voids is generally between 6 and 8.34 (neutral to slightly alkaline) and 334 mg/L for sulphur. This alkaline water quality demonstrates the low risk of acid generation potential. If acid mine drainage was occurring, the water within the pit void would have a low pH, high sulphur and metals content, none of which is present. The pH and salinity of this overburden material is therefore not restrictive for use in final landforms and revegetation.

Details of the Final Cover System are provided in the Post Closure Management Plan. In summary, tailings coal waste is emplaced within dedicated disposal cells that are designed within the advancing spoil dumps and coarse rejects are incorporated within the advancing spoil tip head. These tailings cells are encapsulated/ buried when the spoil dump is advanced vertically and/or the slope is reshaped during final land forming process. Ongoing maintenance of these encapsulated/buried tailings is unlikely to be required given the significant height and volume of spoil material used within each cell. However, ongoing lowwall monitoring and inspection will be completed on an annual basis during the rehabilitation phase if movement has been observed. Completion criteria to demonstrate stability are presented in the Final Void Management Plan.

6.2 Soil Analysis

Soils in the region were originally formed from sediments originating from exposed shale strata or from the old Tertiary weathered zone. The subsequent partial or complete removal of the old Tertiary land surface and deep weathered zone determines the major characteristics of soils and the land in general, resulting in a mixture of soil types. The Millennium mine includes remnants of the original Tertiary land surface and outcropping sandstone beds in the form of partially intact ridgelines. During field investigations sandstones were often encountered at shallow depth, a strong indication that many soils have been formed directly on sandstone and related sediments.

A total of ten (10) soil types were described in the survey. Overall, the soils of the project are either uniform; thin duplex Brigalow clays with quite coarse structured subsoils; or sandy duplex eucalypt plains. Some notable exceptions include localised areas of reddish brown sandy clays on sandstone and alluvial clay soils in the central portion of the mine, associated with New Chum Creek. The principal soil types are summarised in Table 3.

Table 3: Millennium Soil Types

Soil	Concept	Description
A1	**Riverine deep hard setting uniform to duplex sandy clays.**	**General -** Alluvial profile which is mostly a duplex soil with loamy sands generally extending in a range 15 – 40 cm over hard brown clay. **Soil Chemistry -** The surface soil is dominated by fine to coarse sand over alkaline clay subsoils which may be saline and sodic. Nutrient levels are very low, typical of duplex country in the region.
A2	**Alluvial – Uniform Brigalow clay drainage lines**	**General -** The surface is usually cracking and quite firm and the sandy clays may extend beyond 2 metres. The surface 30-40 cm layer is a light sandy clay which usually becomes coarser and heavier textured with depth. **Soil Chemistry -** Phosphorus is low, hence this soil will respond well to superphosphate application for pasture establishment. Levels of salt are increasing down the profile and are moderate by 40 cm and saline by 80 cm. Soil is slightly alkaline.
B1	**Red/brown uniform clay on weathered sandstone**	**General**- The surface 20 – 25 cm is firm to hard setting and sandy and is often very gravely and cobbled. Below lays stiff medium sandy clays which are neutral and red to brown coloured. **Soil Chemistry** – Nitrogen levels are quite good but phosphorus is low. Cation exchange is adequate and this soil will respond well to superphosphate application for pasture establishment.
B2	**Red/brown deeper uniform clay**	**General -** These soils are restricted to the southern portion of the MEP and comprise undulating plains up to 5 % slope of mostly cleared Brigalow, Blackbutt, Bauhinia and Currant Bush. The soil has a firm to hard setting sandy surface to 25 cm, which is often very gravely and cobbled. **Soil Chemistry -** The surface soil is reasonably fertile, non-sodic or saline to 80 cm. Subsoil horizons are also non saline or sodic. Mildly alkaline at surface, but increasing alkalinity with depth.
B3	**Gravely clay on ridgelines**	**General** -The soils are uniform non-cracking red brown clay and thin duplex with hard setting sandy clay surface. They are shallow and overlay weathering soft sandstone parent material. Occasional weathering sandstones outcrop on ridgelines. **Soil Chemistry** - The soil is reasonably fertile, non-saline to 80 cm and non-sodic throughout and non-dispersive. Soil is alkaline throughout.
B4	**Deep uniform Brigalow grey/ brown clay on level plains**	**General** - This is the better soil unit of the local area which is a generally non-cracking uniform friable grey/brown to red brown light textured clay on level to undulating plains. **Soil Chemistry** - Overall the soil has reasonable surface fertility. Phosphorus and nitrogen are low to just adequate and cation exchange capacity is high and reflected by very high calcium and magnesium. Organic matter levels are moderate in the surface.

		The profile becomes sodic and saline below about 50 cm and Ca:Mg ratios are good to 60 cm. Alkaline throughout.
B5	**Melon holed Brigalow clay lowlands**	**General -** The significant Gilgai (melon-hole) development dominates the surface landscape to the extent that it is very irregular. Approx. 50% or more of land surface is heavily melon-holed (typically 40-100 cm deep) with massive hard yellow brown to brown cracking clays. **Soil Chemistry -** Chemically, the 'puff' of the melon-hole is very saline and sodic by 30 cm depth and increasing with depth. Moderate salt on the surface. The highly alkaline subsoil conditions may impede plant take-up of key metals. Apart from very low phosphorus, the surface horizon has reasonable fertility.
E1	**Residuals (mesas)**	**General -** A number of remnants of the old Tertiary land surface remain in the form of elevated mesas. The land types in these areas varies from steep and very shallow skeletal loams in association with outcropping sandstone and silcrete rock on the margins to quite deep red gradational soils in localised areas of the larger remnant areas. **Soil Chemistry –** No analysis undertaken.
E2	**Deeper sandy duplex Eucalypt plains**	**General** – This sandy soil unit includes extensive areas of both cleared and remnant poplar box vegetation and regrowth. The soil is typical of many Poplar Box regimes in Central Queensland. Poor drainage is indicated by the presence of a thick bleached A2 horizon and heavy subsoil mottling at some sites. **Soil Chemistry** - The 20 cm depth of the sandy surface has low overall fertility but tends to set hard although Ca: Mg suggests reasonable physical conditions. Cation levels are low as are nitrogen, phosphate and organic matter.
E3	**Moderately thin sandy duplex soils**	**General –** The soil unit is older alluvial plains and occurs in local proximity to New Chum Creek. It is a contrast texture soil with variable Poplar Box dominance in association with Brigalow and Bauhinia and intergrades into upland uniform non cracking Brigalow clay. **Soil Chemistry –** Apart from low phosphorus the surface horizon has reasonable fertility and the major agricultural aspect limiting this soil is the proportion of fine sand which predisposes sealing. Nitrogen levels are usually good and cation exchange is adequate.

6.3 Soil Separation

Detailed site soil mapping has been completed prior to the commencement of mine construction. A Topsoil Management Plan (TMP) (see **Appendix A**) and an Erosion and Sediment Control Plan (ESCP) are also in place. The TMP specifically address's topsoil stripping, stockpiling (including specific locations), the development of topsoil inventories for the Project site, handling, re-spreading, amelioration and seedbed preparation.

The TMP includes detailed protocols for soil stripping, stockpiling, and handling. The following techniques will be adopted to prevent excessive soil deterioration:

- Topsoil will be maintained in a slightly moist condition during stripping. Material will not be stripped in either an excessively dry or wet condition;
- Stripped topsoil will be to a depth of 200mm (minimum) and placed directly onto re-graded overburden or other disturbed areas and spread immediately (if mining sequences, equipment scheduling and weather conditions permit) to avoid the requirement for stockpiling;
- Soil will be graded or pushed into windrows with excavators, graders or dozers for loading into rear dump trucks by front-end loaders. This is the preferred method as it minimises compression effects of the heavy equipment that is often necessary for economical transport of soil material;
- The surface of soil stockpiles will be left in as coarsely textured a condition as possible in order to promote infiltration and minimise erosion until vegetation is established, and to prevent anaerobic zones forming;
- Where possible, a maximum stockpile height of 3m will be recommended to prevents biological and structural degradation. Clayey soils will be stored in lower stockpiles for shorter periods of time compared to soils that have a coarser texture;
- Free-draining stockpiles will be created to minimise the formation of anaerobic zones. Stockpiles will be formed in a profile with batters graded to achieve slopes approaching 18°, where practicable; if long-term stockpiling is planned (i.e. greater than 12 months), stockpiles will be seeded and fertilised with improved pasture or native grass seed; and
- Prior to re-spreading stockpiled topsoil onto re-graded overburden or other disturbed areas (particularly onto designated tree seeding areas), an assessment of weed infestation on stockpiles will be undertaken to determine if individual stockpiles require herbicide application and / or scalping of weed species prior to topsoil spreading.

The recovery of logs, regrowth shrubs and trees will be completed and respread over reshaped slopes and final landforms as to provide a microhabitat for insects and reptiles, while increasing the structural integrity of the respread topsoil, which may mitigate against erosion and seed loss.

7. Rehabilitation Methods

The method of rehabilitation at Millennium Mine aims to achieve the rehabilitation objectives proposed by the Residual Void Management Plan's success criteria.

7.1 In Pit Lowwall Dump Slopes Below RL285

In pit lowwall dump slopes below natural ground level will be re-graded by dozers to provide a final landform design angle of 1 (v) : 3 (h) to the height of the modelled residual void high water mark. This will mitigate against erosion of spoil material compared to the as dumped angle of repose slope angle, which is steeper at 1:3.3. Regrading below the residual void high water mark will not occur given this spoil material will be covered with water.

These re-graded lowwall dumps will not be topsoiled or rehabilitated, but natural germination of tree and grass species will occur over time, which has been observed at Millennium Mine and other open cut mines within the Bowen Basin.

7.2 In Pit Lowwall Dump Slopes between RL305 and RL285

In pit lowwall dump slopes between RL305 and RL285 (i.e. generally above natural ground level) will be re-graded by dozers to provide a final landform design angle of between 1 (v) : 3 (h) and 1 (v) : 4 (h) which will mitigate against erosion and topsoil loss compared to the as dumped angle of repose slope angle. It will also provide a relatively flatter slope angle above ground and appear more fitting with the natural landscape and be more accessible to cattle.

Soil application will be achieved by:

- Spreading topsoil to a depth of approximately 200mm using dozer push and/or scrapers.

Fertiliser and seed application will be achieved by:

- Fertiliser will be applied using 1 tonne or 25kg bags using a rubber tyred tractor or small dozer (e.g. D8) at a rate of 400kg/ha; and
- Seed (improved pasture of Buffel, Katoombora Rhodes and Reclaimer Rhodes) will be applied using 24kg bags pre-mixed (8kg of each grass type) and applied at a rate of 24kg/ha.

Ripping and/or ripping and seeding of topsoil will be achieved by:

- When using a rubber tyred tractor, predominately on top of dumps and flat areas, ripping will be completed after fertiliser and seed have been applied by either a grader and/or dozer to a shallow depth of approximately 300 – 400mm; and
- When using a small dozer (e.g. D8) to apply fertiliser and seed, ripping will occur at the same time, but the depth of ripping on slopes/batters will be approximately 800 – 1,000mm to allow for greater water infiltration.

7.3 Top of Dumps

The top of dumps will be generally flat across RL305 and require minimal to no regrading.

Soil application will be achieved by:

- Spreading topsoil to a depth of approximately 150mm using dozer push and/or scrapers.

Fertiliser and seed application will be achieved by:

- Fertiliser will be applied using 1 tonne or 25kg bags using a rubber tyred tractor or small dozer (e.g. D8) at a rate of 400kg/ha; and
- Seed (improved pasture of Buffel, Katoombora Rhodes and Reclaimer Rhodes) will be applied using 24kg bags pre-mixed (8kg of each grass type) and applied at a rate of 24kg/ha.

Ripping and/or ripping and seeding of topsoil will be achieved by:

- When using a rubber tyred tractor, predominately on top of dumps and flat areas, ripping will be completed after fertiliser and seed have been applied by either a grader and/or dozer to a shallow depth of approximately 300 – 400mm.

8 Landform Design

The intent of rehabilitation is to return the land to as close as is reasonably possibly to its pre-disturbance condition, suitable for use by landholders and as habitat for flora and fauna. It is intended that all rehabilitation will be undertaken progressively during the life of the mine.

The final vegetated landform will resemble the existing undulating landscape, which comprises cleared grazing land and a number of existing above-ground mining operations that incorporate large spoil dumps. Further analysis on this is provided in Section 8.4 below.

8.1 Final Voids

Final voids have been left at the completion of truck and shovel mining at Millennium Mine, which ceased in September 2018. Where pit design allowed, strip and terrace mining, or a variation of these processes, has been used as to allow for open pits to be partially backfilled with waste rock during mining (e.g. Mavis E Pit). These areas will be reshaped (contoured), topsoil spread and direct seeded to encourage revegetation.

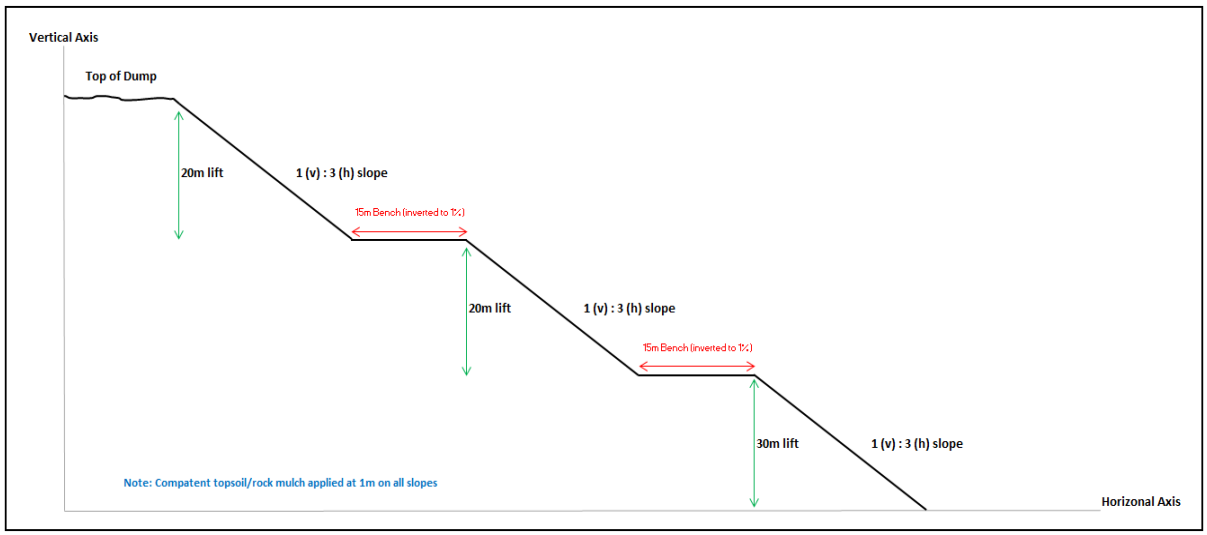


Figure 2: Example of 1:3 OoPD and Lowwall Landform Design with maximum batter parameters

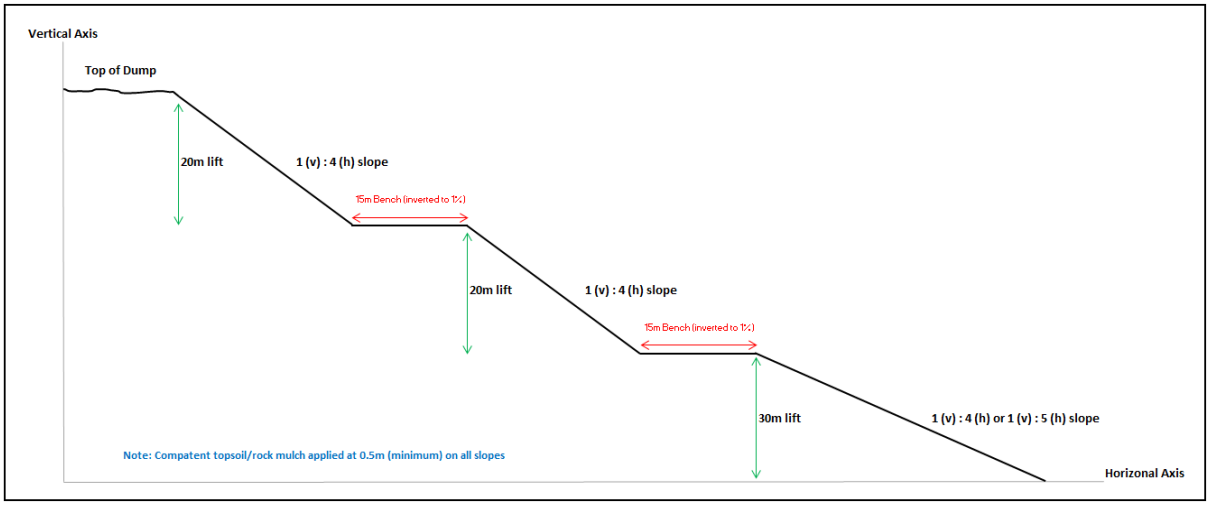


Figure 3: Example of 1:4 or 1:5 OoPD Landform Design with optimal batter parameters

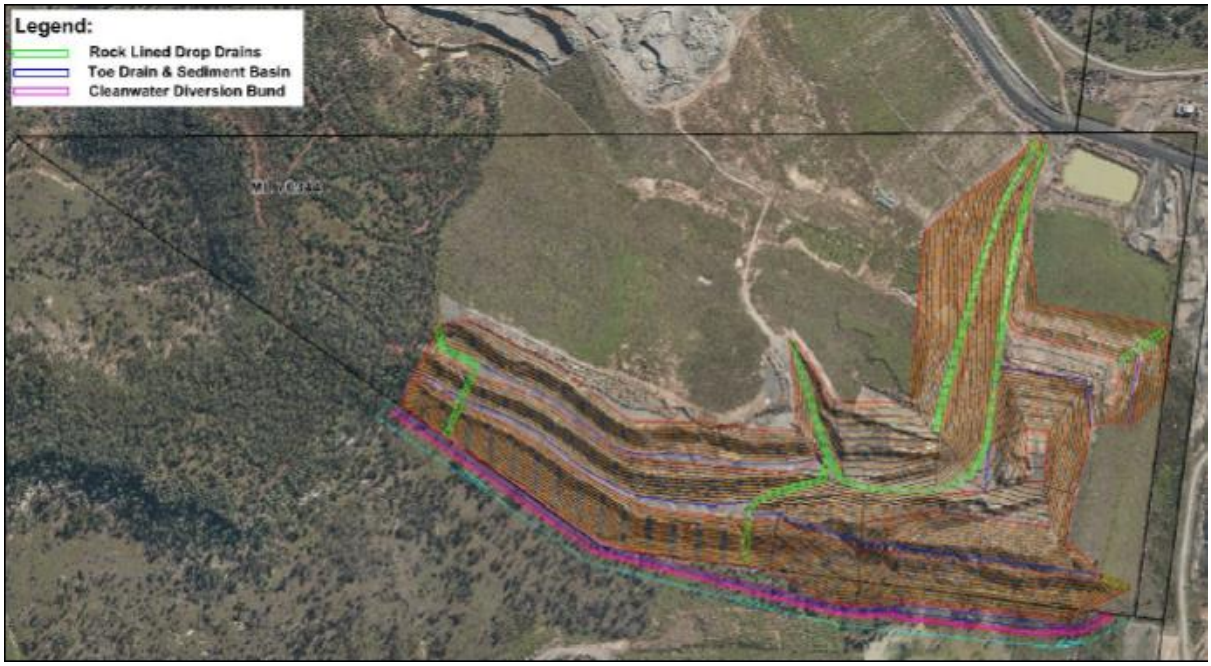


Figure 4: Example of Rehabilitated Landform with Contours, Internal Surface Drainage, Drop Structures and Runoff Retention Features

8.2 Infrastructure

All infrastructure areas, including haul roads, with a gradient of less than 5% will be graded, topsoiled (approximately 150mm depth) and seeded with improved pasture to mimic the pre-mining land uses. Areas that may contain potential contaminants will be rehabilitated in accordance with the relevant guidelines. Disturbed areas that will remaining post closure for use by the landowner will be retained and any areas not required will be rehabilitated to their specification. During the stakeholder engagement stage of the mine closure progress the retention of stock access tracks, which would be the retention of 10 -15m of the existing haul roads, has been requested to allow for the safe movement of cattle and vehicles around the property.

8.3 Surrounding Topography and Rehabilitation Design

Prior to mining, the surrounding topography that forms the Millennium Mine was dominated by steep sloped Mesas (or escarpments) to the north and southwest of Millennium Pit and the east of Mavis Pit surrounded by a flat to gently sloping eroded basin that has been heavily disturbed for cattle grazing.

The waste dumps will be limited to the height of the surrounding Mesas and the upper slopes will be seeded with a native tree and grass mix, which is representative of the existing vegetation and rocky surface. The middle and bottom slopes will be seeded with an improved pasture mix, which is representative of the existing vegetation and can support future low intensity cattle grazing. The use of topsoil/rock mulch on the outer slopes will replicate the existing topography, which consists of steep upper slopes that are covered in varying sized

rocks and have a medium density tree cover. The lower slopes are covered in varying sized rocks and have a low-density tree cover and high-density grass (improved pasture) cover.

8.4 Competent Rock Mulch

The effects of erosion due to runoff of rehabilitated out of pit dump (OoPD) slopes will largely depend on the provision of a durable/competent rock resource. A substantial source of cemented sandstone (Fort Cooper) remains within the Millennium Mine mining leases. Millennium has undertaken sufficient geological investigation to define this resource, which can be selectively used in close proximity to future rehabilitation areas, if required.

The use of this resource will potentially reduce future rehabilitation repair costs, increase the likelihood of reduced erosion and imitate the surrounding ridge lines. Use of durable/competent rock includes, but is not limited to:

- lining external spoil faces and batters that have been regraded to 1:3;
- lining diversion channels; and
- lining drainage structures, rock aprons and rock chutes in rehabilitation.

The application of rock mulch on steep slopes is best achieved by placing a row of topsoil as close to the crest as possible, then block tipping a row of competent rock behind the topsoil, before placing another row of topsoil behind the competent rock and dozer pushing the material down the slope. This method was completed on the Mountain Dump Eastern Slope in 2013/14, which had the best working surface when ripping, harrowing and seeding was completed. Incorporation of rock mulch provides a degree of rock armouring that reduces the potential for initiation of erosion via raindrop impact.

9 Revegetation

The revegetation strategy proposed for Millennium Mine seeks to compliment desirable post-mining land use objectives whilst maintaining effective erosion and weed controls. Revegetation activities will be scheduled to occur after the completion of reshaping, topsoiling and drainage works. Where possible, the timing of these works will enable a preferred seasonal sowing of pasture and tree seed in autumn or spring. On prepared surfaces, selected tree, shrub, pasture and grass species will be sown using direct seeding or tube stock planting, depending on the species, slope gradients and areas to be revegetated. Tree and shrub species will be established at a density and richness consistent with the nominated post-mine land use.

Fertiliser (e.g. Rustica Plus) application rate of up to 400kg/ha is recommended for all rehabilitation areas, but may be modified based on topsoil sampling and analysis. The composition and rate of fertiliser application may also be reviewed and refined where native vegetation is to be established.

9.1 Species Selection

The major post-mine land use goal for areas other than residual voids is to enable cattle grazing, which is a land use that is compatible with the surrounding district. The development of grazing as the preferred use has developed from stakeholder and land owner expectations, the current adjoining land use, and an expectation that successful and sustainable grazing use can be supported on the land upon completion of the rehabilitation program, as determined from data on topsoil quality and pasture development on rehabilitated overburden at the Millennium Mine.

Although it is the intent to maximise the area of rehabilitated land suitable for grazing, there will be areas of disturbance where a non-grazing outcome is the preferred post-mine objective. Grazing may be unsuitable due to limitations through restricted soil water availability, erosion susceptibility and poor soil fertility. Such areas will be prone to degradation from stocking pressure, particularly during drought conditions, and will include steeper outer batters, final voids, and riparian zones. These areas will be revegetated with a mixture of endemic tree, shrub and grassland species and returned to native bushland. Areas suitable for grazing will include improved pasture species that are already established on-site.

It is highlighted that, as grazing is the preferred final land use for some of the disturbance, rehabilitation to native bushland may need to include acceptance of Buffel grass encroaching into the final landform as well as native grass species (**Table 5**). The use of native trees/shrubs is likely to be concentrated on the top of dumps, which are generally flat, and will provide future stock shade. The underlying landowner's Property Manager has endorsed this strategy during the mine closure consultation process.

Table 5: Rehabilitation Species List and Application Rate

Scientific Name	Common Name	Application Rate
Native Trees and Shrubs		
Eucalyptus camaldulensis	River red gum	0.5kg/ha
Eucalyptus populnea	Poplar box	
Eucalyptus crebra	Narrow – Leaved ironbark	
Eucalyptus melanophloia	Silver – leaved ironbark	
Eucalyptus tereticornis	Forest red gum	
Eucalyptus cambageana	Dawson River Blackbutt	
Eucalyptus orgadophila	Mountain Coolibah	
Corymbia tessellaris	Moreton Bay Ash	
Corymbia erythrophloia	Red Bloodwood	
Corymbia dallachiana	Dallachy's Gum	
Acacia harpophylla	Brigalow	
Acacia cambagei	Gidgee	
Acacia catenulata	Bendee	
Acacia salicina	Sally wattle	
Acacia shirleyi	Lancewood	
Eremophila mitchellii	False sandalwood	
Atalaya hemiglauca	White wood	

Terminalia oblongata	Yellow wood	
Flindersia dissosperma	Leopardwood	
Bauhinia hookeri	White flowered bauhinia	
Bauhinia caronii	Red flowered bauhinia	
Carrisa ovata	Current bush	
Citrus glauca	Lime bush	

Scientific Name	Common Name	Application Rate
Native Grasses		
Astrebla lappacea	Curly mitchell grass	20kg/ha
Dicanthium sericeum	Queensland bluegrass	
Heteropogon contortus	Black speargrass	
Panicum decompositom	Native Millet	

Scientific Name	Common Name	Application Rate
Improved Pasture		
Cenchrus Ciliaris	Buffel grass	24kg/ha
Chloris gayana	Katambora rhodes	
Chloris gayana	Reclaimer rhodes	

10 Rehabilitation Indicators and Monitoring Program

Rehabilitation indicators will provide measurements of progress towards the rehabilitation objectives. The indicators will be relevant to the specific rehabilitation objectives and ultimately to the long-term sustainability of the rehabilitation. Monitoring of the indicators will commence prior to the establishment of rehabilitation and will continue until the application to surrender the area has been approved by the administering authority. Monitoring will assist in improving the validity of the completion criteria (**Table 6**).

Table 6: Rehabilitation Indicators and Completion Criteria

Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Nature of Completion Criteria
Safe	All rehabilitation to be safe to all humans, livestock and wildlife	- Soil Sampling - Erosion Assessment - Landform Design Survey	- Evidence in rehabilitation monitoring report of the chemical parameters of the soil profile. - Evidence of erosion and stability assessment included in the

Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Nature of Completion Criteria
		- Water Monitoring	rehabilitation monitoring report. - Survey required during rehabilitation process to ensure structures meet landform design parameters - Downstream water monitoring results to be used to determine effects of rehabilitation on water quality
Non-Polluting	All potential contaminants to be contained on site.	- Soil Sampling - Landform Design Survey - Water Monitoring	- Evidence in rehabilitation monitoring report of the chemical parameters of the soil profile. - Survey required during rehabilitation process to ensure structures met landform design parameters - Downstream water monitoring results to be used to determine effects of rehabilitation on water quality
Stable	Landform design and construction to minimise the potential for erosion	- Landform Design Survey - Erosion Assessment	- Survey required during rehabilitation process to ensure structures met landform design parameters

Rehabilitation Goal	Rehabilitation Objectives	Rehabilitation Indicators	Nature of Completion Criteria
			- Evidence of erosion and stability assessment included in the rehabilitation monitoring report.
Sustainable	Completion of rehabilitation to meet landform design criteria and end land use	- Vegetation type and density - Foliage cover - Erosion Assessment	- Evidence in rehabilitation report on vegetation type, density and foliage cover in accordance with the success criteria - Evidence in rehabilitation report on vegetation type, density and foliage cover in accordance with the success criteria - Evidence of erosion and stability assessment included in the rehabilitation monitoring report.

11 Success Criteria

Satisfaction and maintenance of the success criteria (as indicated by monitoring results) will demonstrate that the rehabilitated landscape is ready to be submitted for Mining Lease surrender and handed back to the underlying land owner in a productive and sustainable condition.

The success criteria include indicators for vegetation, fauna, soil, stability, land use and safety on a landform-type basis that reflects the nominated post-mine land use of bushland and grazing. For each element, standards that define rehabilitation success at mine closure are provided. Based on the generic indicators, each criterion will be further developed to be

specific, measurable, achievable, realistic and outcome based, and to reflect the principle of sustainable development. The further development of each criterion will be based on results of research, monitoring of progressive rehabilitation areas and risk assessments. The success criteria will be reviewed every 3 to 5 years with stakeholder participation to ensure the criteria remains realistic and achievable (**Table 7**).

Table 7: Disturbance Type and Success Criteria Targets

Disturbance Type	End land Use	Success Criteria
Spoil Dumps – External Slopes	Cattle grazing (improved pasture) and some native bushland	• Density (stem count) is not significantly less than 75% of the mean value recorded in the representative unmined plots • Crown cover or projective foliage cover (PFC) of the ecological dominant layer (EDL) is not significantly less than 75% of the mean value recorded in the representative unmined plots • Crown cover or projective foliage cover (PFC) of the understorey and or shrub layer (T2,T3, S1, S2 etc) is not significantly less than 75% of the mean value recorded in the representative unmined plots • Species composition of the ecological dominant layer is not significantly less than 75% of the mean value recorded in the representative unminded plots • Density of the ground cover is not significantly less than 65% of the mean value recorded in the representative unmined plots
Spoil Dumps – Top of Dumps	Cattle grazing (improved pasture) and some native bushland	• Density (stem count) is not significantly less than 75% of the mean value recorded in the representative unmined plots • Crown cover or projective foliage cover (PFC) of the ecological dominant layer (EDL) is not significantly less than 75% of the mean value recorded in the representative unmined plots • Crown cover or projective foliage cover (PFC) of the understorey and or shrub layer (T2,T3, S1, S2 etc) is not significantly less than 75% of the mean value recorded in the representative unmined plots • Species composition of the ecological dominant layer is not significantly less than 75% of the mean value recorded in the representative unminded plots

		• Density of the ground cover is not significantly less than 65% of the mean value recorded in the representative unmined plots
Voids, ramps and highwalls	Cattle grazing (improved pasture) and some native bushland	• Density (stem count) is not significantly less than 75% of the mean value recorded in the representative unmined plots • Crown cover or projective foliage cover (PFC) of the ecological dominant layer (EDL) is not significantly less than 75% of the mean value recorded in the representative unmined plots • Crown cover or projective foliage cover (PFC) of the understorey and or shrub layer (T2,T3, S1, S2 etc) is not significantly less than 75% of the mean value recorded in the representative unmined plots • Species composition of the ecological dominant layer is not significantly less than 75% of the mean value recorded in the representative unminded plots • Density of the ground cover is not significantly less than 65% of the mean value recorded in the representative unmined plots
Infrastructure including haul roads.	Cattle grazing (improved pasture)	• Species composition of the improved pasture is not significantly less than 75% of the mean value recorded in the representative unminded plots • Density of the ground cover is not significantly less than 65% of the mean value recorded in the representative unmined plots

12 Native Vegetation Rehabilitation and Corridors

Planned native vegetation rehabilitation areas are to be located in the areas presented in **Figure 2** above, using the species listed in **Table 5**.

Native bushland rehabilitation will ultimately connect with pre-existing corridors that have been maintained at Millennium. The New Chum Creek buffer, which runs North-west to South East through the mining leases, and the Mesa located in the western portion of ML70344 and central to ML70313, will provide the foundation for the establishment of corridors with successful native bushland rehabilitation (**Figure 4**). The sandstone escarpment in the North West of ML70313 and remaining natural gullies will also provide corridors for which rehabilitation will connect with. Native species established on the spoil dumps will coincide with endemic species found on the mining lease.

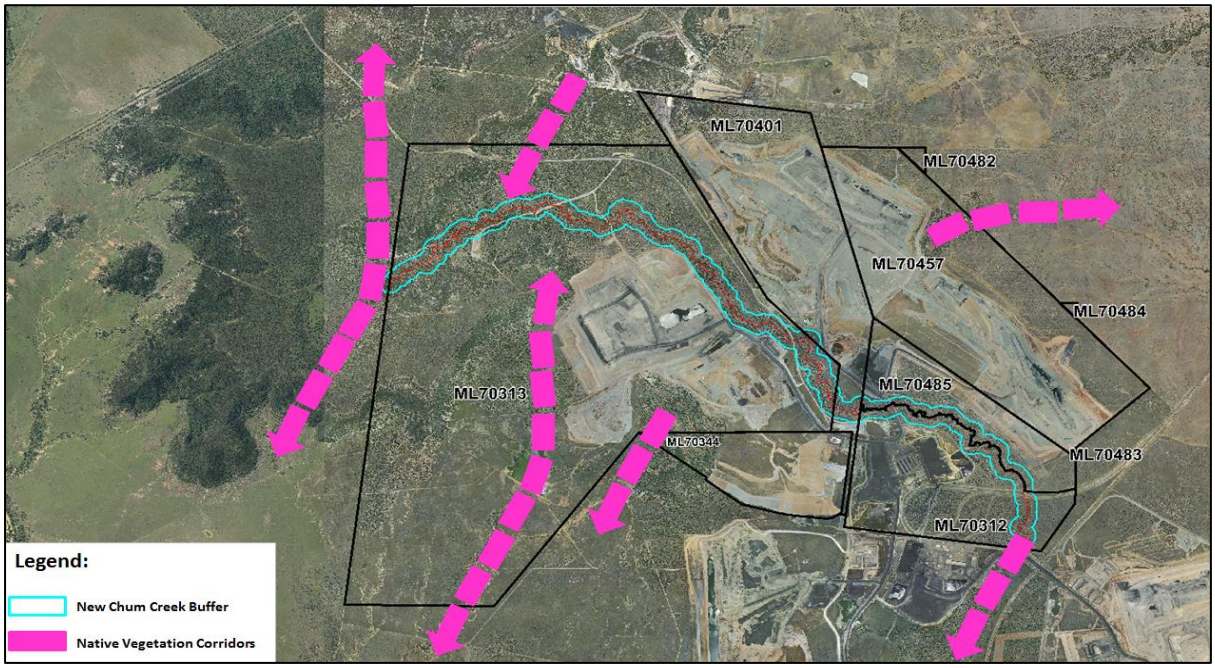


Figure 4: Native Vegetation Corridors

13 Reference Sites for Rehabilitation Monitoring

Three (3) reference sites (50m x 50m) have been identified surrounding Millennium Mine (Millennium Pit and Mavis Pit) that have not been impacted upon by mining operations and three (3) rehabilitation sites (50m x 50m) have been identified in Millennium Pit (Mountain Dump) that contain improved pasture and tree areas on OoPD slopes (**Figure 5**).

Reference sites have been selected on the basis of being representative of the land, soil and vegetation types to be used in the native bushland rehabilitation. For example, an *Acacia spp*. woodland on lateritic duri-crust (RE 11.7.2) which is found on the surrounding escarpments can be used as reference sites for rehabilitation on steep OoPD batters, noting that vegetation types must be similar. The locations of the reference sites will also be identified in areas that will not be affected by future mining activities.

Monitoring methodologies at all six rehabilitation reference sites is provided in section 5.6 of the Post Closure Management Plan.

Reference sites for grazing habitats are not required under the EA. Rehabilitation of this post-mining land use will have less risk of not meeting success criteria compared to rehabilitation of native woodland. However, by employing the detailed monitoring methodologies presented in the Post-Closure Management Plan, which provide data against which the success criteria in **Table 7** above can be assessed, the risks of success are fully controlled.

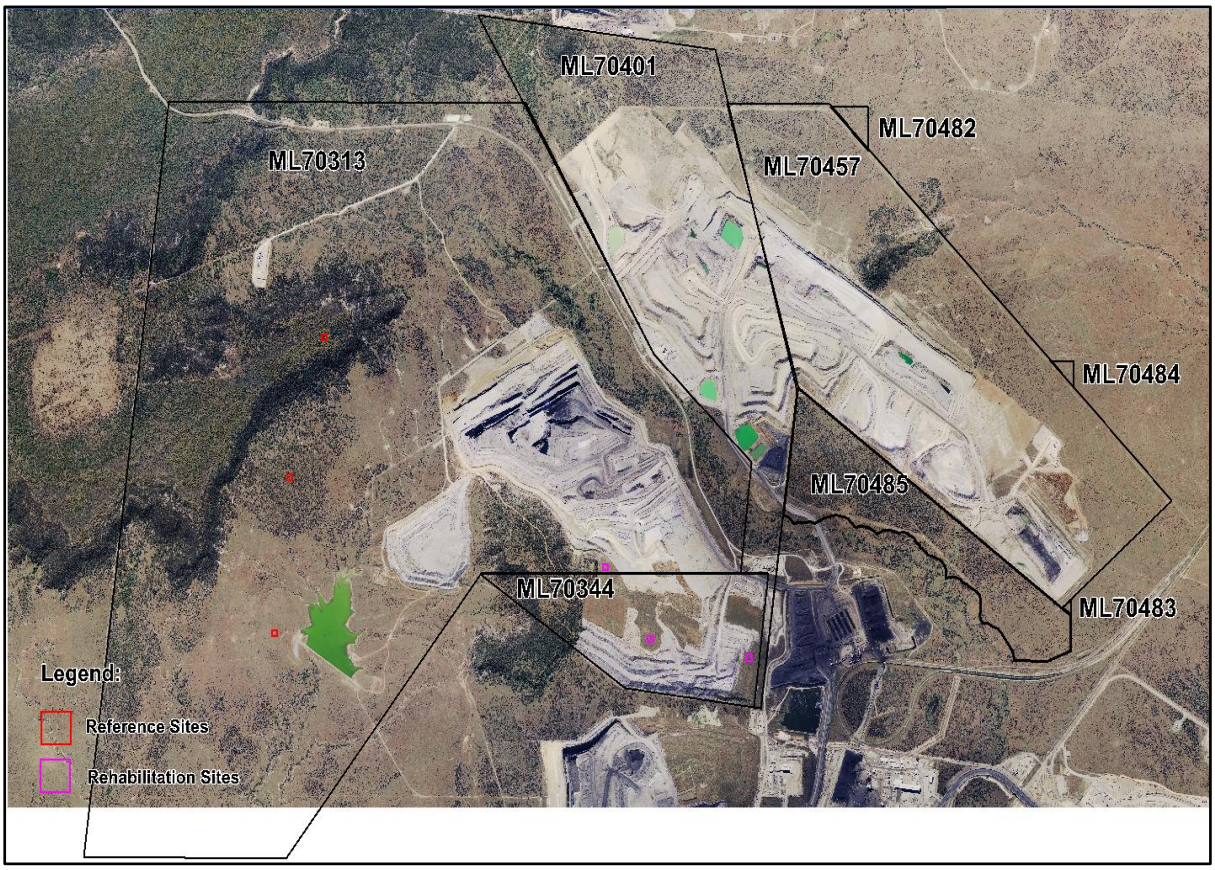


Figure 5: Reference Site and Rehabilitation Sites

14 Rehabilitation Maintenance and Redesign

Maintenance of rehabilitated areas will be undertaken where necessary and in response to results of the monitoring program. Operational maintenance and monitoring for rehabilitation works are set out in the Post Closure Management Plan. Maintenance of the site will continue until all lease conditions and completion criteria have been met. These activities may involve repair to surface water drainage structures, repair of any erosion areas or the reseeding of areas due to poor vegetation establishment. More specifically, where monitoring has identified erosion, weed invasion, and/or failure of revegetation, maintenance activities will be implemented to ensure regeneration progresses successfully and rapidly.

The current Rehabilitation Management Plan outlines management practices that will provide for a sustainable landform design. Monitoring is undertaken annually, and specific maintenance and repairs identified as part of the PCMP. In the event it is required, maintenance and repair of contingency controls listed below will be implemented:

- Slopes;
- Toe drains;
- Contour – regrade to bring back to design;
- Benches; and
- Vegetation growth

Rehabilitation redesign may be required based on the success of existing areas of rehabilitation and the updated dump design, which may result in varying applications of topsoil/rock mulch and/or tree and grass seed mixes. Any redesign will be consistent with the surrounding topography and vegetation communities.

15 Cost Benefit Analysis

The following presents a comparison of the environmental, social, financial and operating cost and benefits associated with the proposed final landform design criteria and alternatives. The commitment made by Millennium Mine is to rehabilitate areas back to as close as possible to its pre-disturbance condition and/or its optimal land use. This commitment was applied to all alternatives considered. Three scenarios were considered, as follows:

- Theoretical regarding of OoPD slopes to less than 10%;
- Approved EA Scenario - 1:3 batters and 1m rock mulching; and
- Actual rehabilitation scenario - 1:4 external batters with 0.2m topsoil.

Alternative rehabilitation techniques could include re-grading the OoPD slopes to less than 10% and seeding with improved pasture. Due to topographical features, narrow mining leases and protected vegetation areas, the area of land required to achieve slopes at less than 10% is not available. This would result in unnecessary environmental and social impacts due to land take. This option was not considered further.

To accommodate the limited amount of dump space with successful rehabilitation, steeper slope design on the OoPD's where incorporated into the final landform design. Potential cost savings in the reduction of plant hours from substantial regrading of batter slopes will be absorbed by the hauling and placing of competent rock.

The Millennium Mine EIS committed to 1:3 OoPD slopes on which Department of Environment and Science (DES) approved the Project EA. These slope angle requirements are included within the EA (Condition F3, Table 18). If Peabody had rehabilitated the land to 1:3 slopes on OoPD, this would have resulted in a final landform that was unlikely to achieve the post-mining land use. The landform would comprise steep slopes, stabilised with 1m of sandstone rock over the top of 200mm of topsoil, would have provided negligible growth medium for revegetation using pasture species. It would also have limited safe access by cattle across the slopes and therefore reduced the available final area available for grazing. This would leave the underlying landholder with less usable land.

A financial estimate has been developed for one (1) hectare of rehabilitation for both scenarios. Rate and units may change depending on the scale of rehabilitation.

From this comparison of financial, environmental, social and operating costs and benefits, it is clear that the actual rehabilitation scenario selected for adoption at Millennium is the best option because it will result in rehabilitated land that is safer, more stable, and enhance the potential productive final land use. It was also more operationally cost effective for Peabody during mining.

Table 8: Rehabilitation Cost Analysis

Rehabilitation per Hectare from 1 (v) : 3 (h) and 1 (v) : 4 (h)					
Item	**Description**	**Quantity**	**Unit**	**Rate ($/Unit)**	**Amount**
1 (v) : 3 (h)					
1	Profiling (dozer push 1:3 batters from angle of repose)	12,495	bcm/ha	$0.75	$9,371.25
2	Load, haul and spread 0.2m of topsoil from stockpile (0-500m)	2,000	lcm/ha	$4.00	$8,000
3	Load and haul Permian rock from in-pit to crest of batters	10,000	bcm/ha	$4.50	$45,000
4	Dozer push of Permian rock over 1:3 batters	10,000	bcm/ha	$1.20	$12,000
5	Ripping, seeding and fertilising batters (pasture grass)	1	Ha	$850	$850
				Total	**$75,221.25**
1 (v) : 4 (h)					
1	Profiling (dozer push 1:4 batters from angle of repose)	17,777	bcm/ha	$0.75	$13,332.75
2	Load, haul and spread topsoil from stockpile (0-500m)	2,000	lcm/ha	$4.00	$8,000
3	Ripping, seeding and fertilising batters (pasture grass)	1	Ha	$850	$850
				Total	**$22,182.75**

16 Endangered Regional Ecosystem Management and Offset Protection

The Commonwealth Government requires offsets for impacts to Matters of National Significance under the *EPBC Act* through the '*Draft Policy Statement: Use of environmental offsets under the Environmental Protection and Biodiversity Conservation Act 1999'*. The Millennium offsets strategy complies with this policy. At the State level, there are two separate legislative instruments relating to offsets. The *VM Act Policy for Vegetation Management Offsets 28 September 2007* is not applicable to mining activities. The *Environmental Protection Regulation 2008* (*EP Regulation*) has a draft policy ('*Policy for*

Biodiversity Offsets: Consultation Draft') which has been taken into consideration for Millenniums offsets. The final Offsets Program (December 2013) will ensure that the identified offsets are managed to maintain and enhance biodiversity values. The potential loss of terrestrial fauna habitat areas within the mining may be compensated by establishing environmental offsets in areas surrounding the mine on land owned by Peabody. Under the *EPBC Act,* these offsets must deliver a real conservation outcome, in that the habitat must be protected in perpetuity and actively managed for long-term conservation purposes. The currently identified offsets options meet *EPBC Act* requirements in that they:

- Have the same ecological community as the areas proposed for clearing;
- Are located within the same bioregion and the Millennium Mine site;
- Are strategically located to enhance connectivity to either a protected area, large areas of remnant vegetation or riparian corridors;
- Require the management of remnant vegetation and in some cases high value re-growth vegetation; and
- Provide habitat for EPBC Act listed threatened species and the NC Act listed Little Pied Bat.

Peabody engaged specialist companies to assist in the development of an offsets strategy to ultimately lead to an offsets arrangement that satisfies the interests of the Commonwealth and the State.

The process undertaken involved the following steps:

- Research of various databases, for the purpose of the MEP EIS, on flora and fauna found, or expected to occur, within the region.
- The outcomes of searches enabled a targeted survey program to be developed and completed on the expansion areas.
- The site specific survey enabled the communities to be identified with some contrast to the high level broad scale mapping.
- The expected impacts (clearing, encroachment or interference with natural corridors) were overlain on the mapped communities.
- A register of the impacted communities and their expected coverage was then calculated refining the offset obligations.
- A regional desktop review of similar vegetation communities was completed, targeting the species found onsite.
- These areas then led to a search of property tenure that resulted in a list of properties, landholders and aspects such as the scale of the property, tenure type and any overlying tenements.
- Three study areas were identified on a property owned by Peabody Energy Australia with ground-truthing surveys undertaken during June and July 2010.
- One of these areas was determined to contain suitable environmental values for use as an offset with remnant and high value and immature regrowth vegetation. The immature regrowth is between 2 and 4 metres in height and, with management, can be expected to reach mature status within the life of Millennium mine. The area will also provide a "bank" for other Peabody operations (Ecofund 2010). [Under a prior agreement, change of ownership on this property has occurred delaying the creation

of a vegetation offsets management plan as the new owner will need to agree to title changes and the plan implementation.

- Preliminary management options were also identified to assist in providing understanding to the landowner of what would be the expectation of a nature refuge located on their property. This would include fencing, grazing regime, fire management, pest and weed control, maintenance and management for approximately 15 years and annual reporting of compliance.

The steps taken by Millennium Mine include:

- If the landowner is interested in establishing a nature refuge, a presentation of an offsets package to SEWPAC would occur with expected negotiations over the inclusions and the boundaries (October 2013).
- Develop and lodge the offsets management plan (December 2013).

17 Potential impacts and mitigation strategies for using water with high electrical conductivity for dust suppression

Mine affected water is used for dust suppression of unsealed roads, road maintenance and mining activities. The direct use of mine affected water for dust suppression is a preferred management option.

The application of mine affected water to unsealed roads, road maintenance and mining activities has the potential to:

- Accumulate salt on the unsealed road surface and potential for salt to impact the surrounding environment via run-off or dust;
- Change the physical properties of the unsealed road surface, with potential for roads to become slippery when wet; and
- Increase dust generation, if mine affected water significantly alters soil particle sizes on the unsealed road surface.

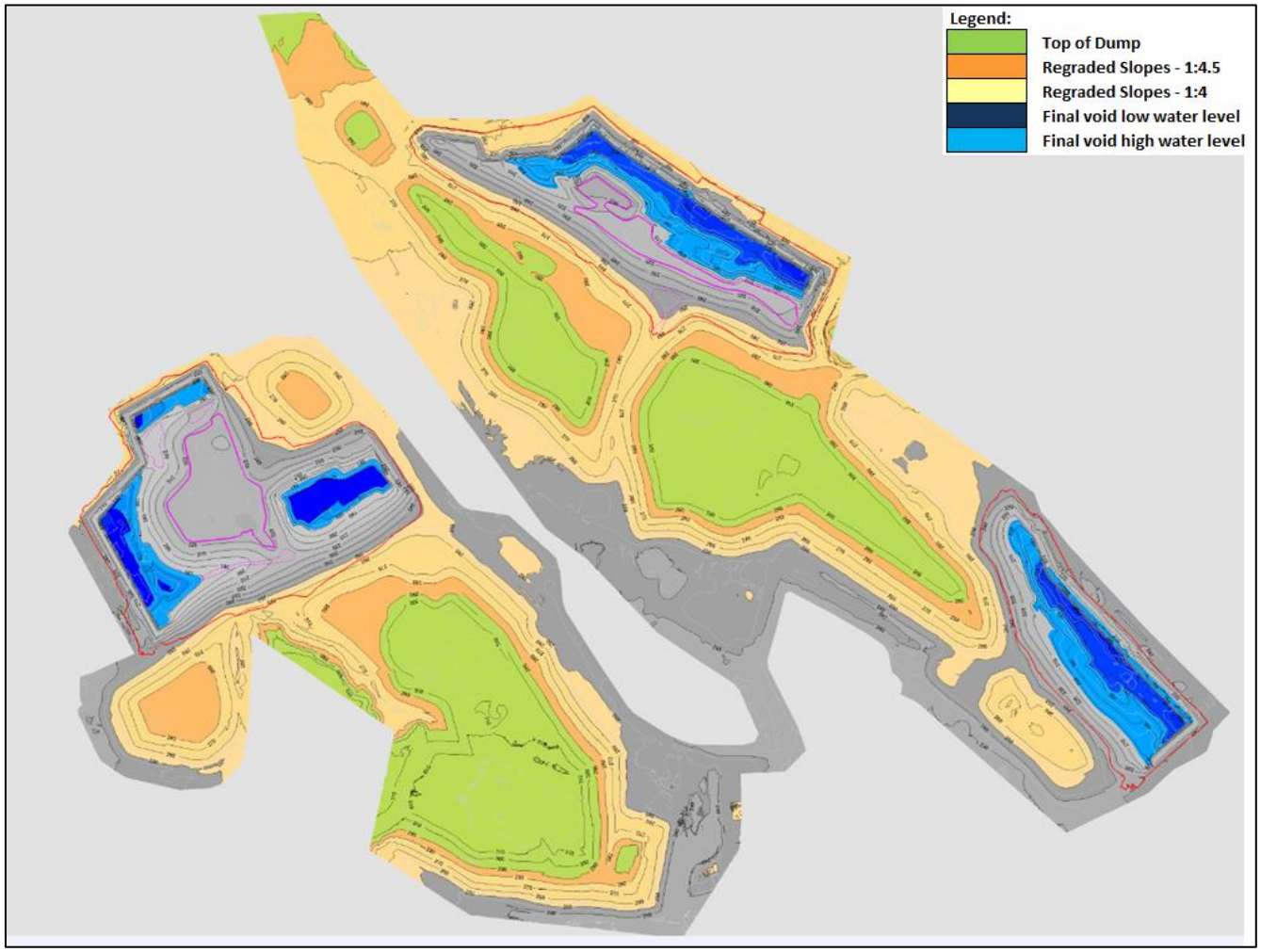
Observations from current dust suppression strategies indicate that:

- Very little runoff occurs during normal dust suppression or road maintenance /mining operation;
- There is no significant difference between salinity or other chemical constituents of road verge surface soils in areas with mine affected water applied compared with areas with no mine affected water applied. There is no evidence that the surface soil salinity in historically watered areas is different from the background; and
- There are no signs of salinity affecting road verge vegetation from dust suppression activities, which could potentially inhibit future rehabilitation.

Water quality at Millennium Mine is analysed as part of operations. From this analysis, it is determined that water quality on the site generally indicates that stored water is alkaline (pH 6–8) and slightly to moderately saline (EC 1,500–5,000 µS/cm), with higher salinity in the

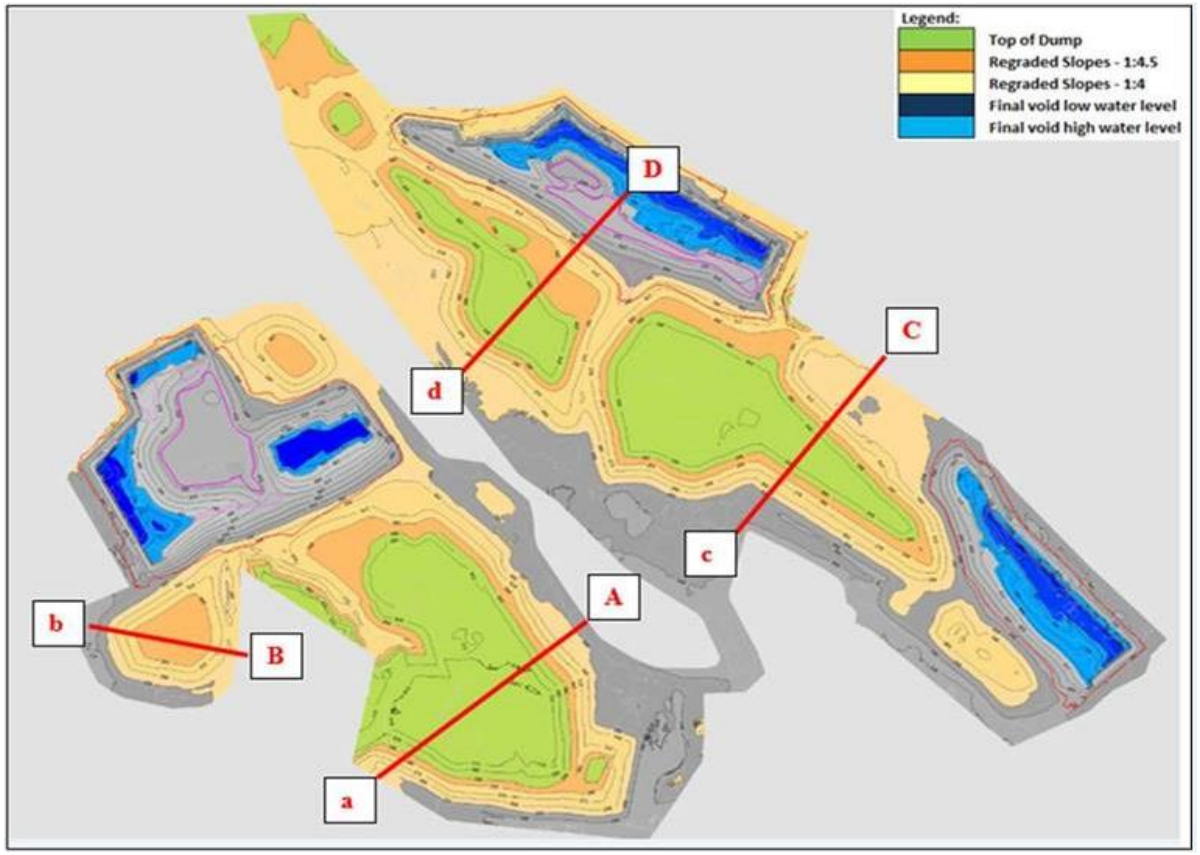
collected pit water due to naturally high groundwater EC levels and interaction with the overlying strata. It is therefore deemed that the majority of water held at Millennium Mine is suitable for dust suppression with no detrimental impacts on future rehabilitation. No additional rehabilitation measures are required for the rehabilitation of roads, where these are not being retained for the underlying landowner's future use.

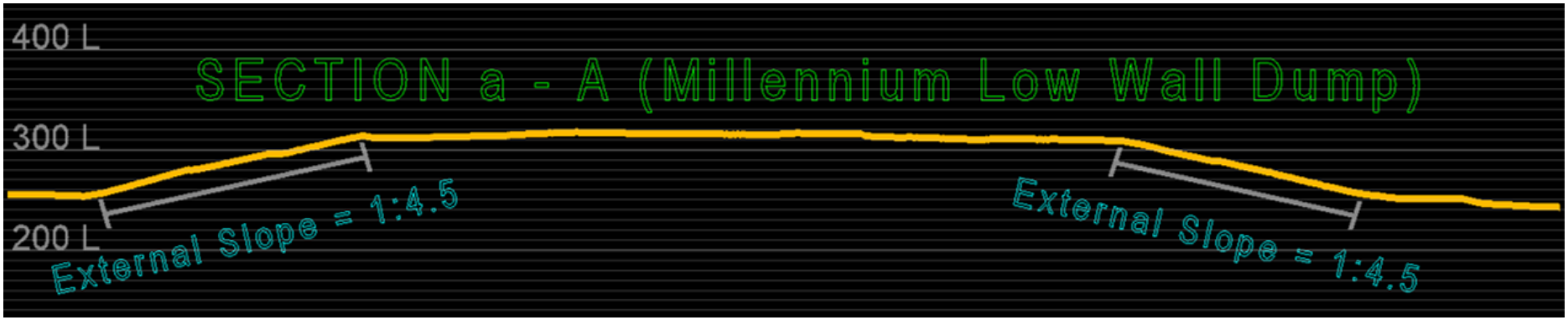
Appendix A - 2021 Final Landform Conceptual Overview

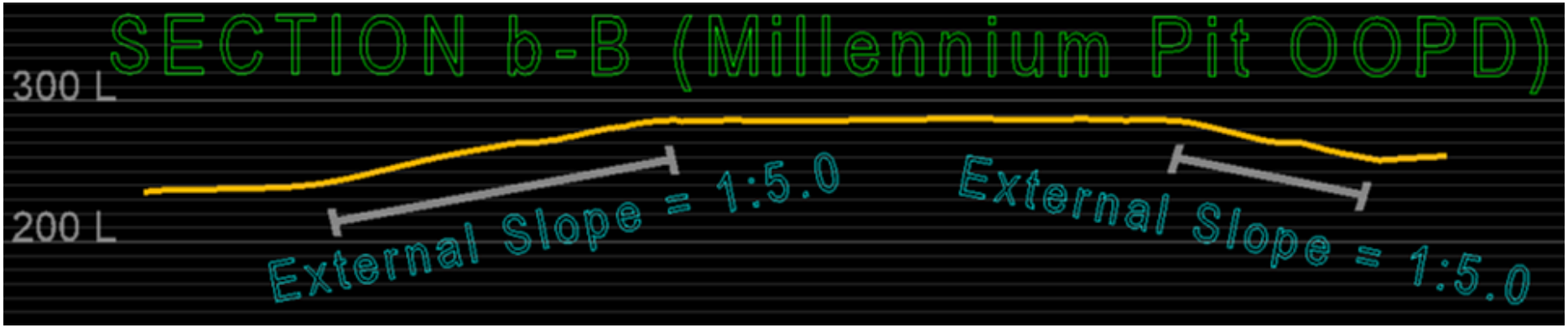


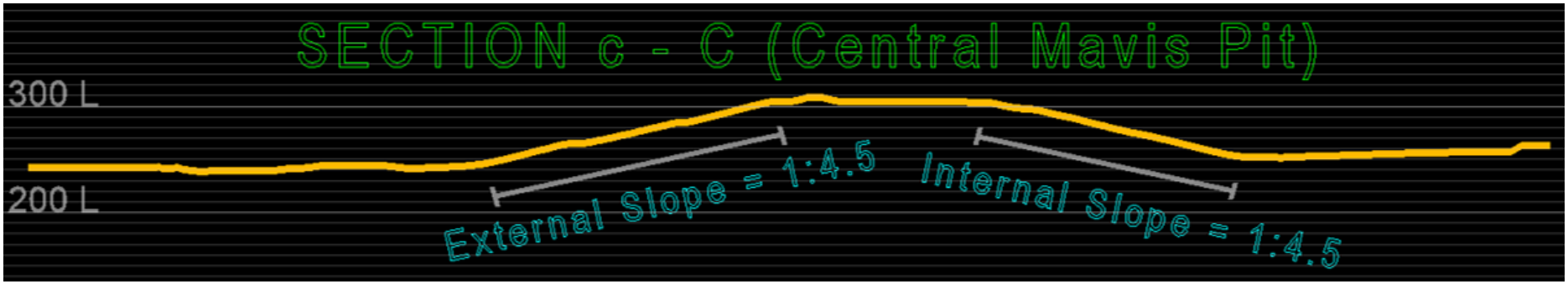
Appendix B - Topsoil Management Plan

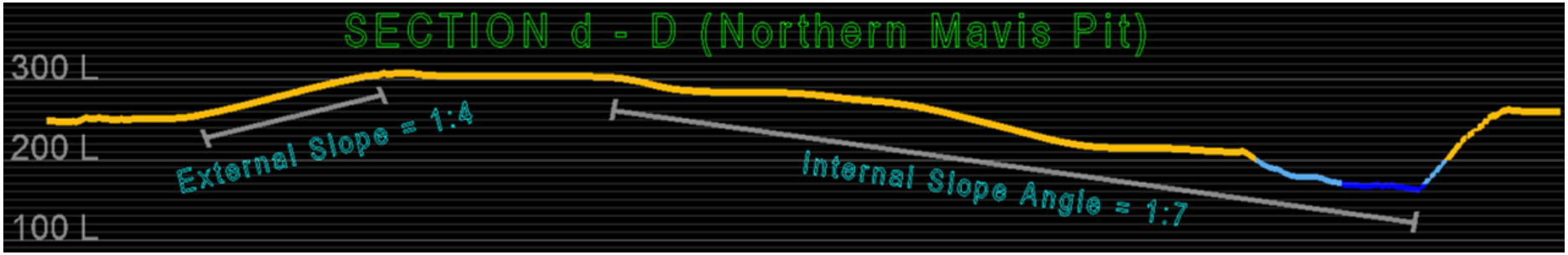
Appendix C - Final Landform (Scenario 11) Cross-Sections




400 L
SECTION a - A (Millennium Low Wall Dump)
300 L
200 L
External Slope = 1:4.5
External Slope = 1:4.5


SECTION b-B (Millennium Pit OOPD)
300 L
200 L
External Slope = 1:5.0
External Slope = 1:5.0


SECTION c - C (Central Mavis Pit)
300 L
200 L
External Slope = 1:4.5
Internal Slope = 1:4.5


SECTION d - D (Northern Mavis Pit)
300 L
200 L
100 L
External Slope = 1:4
Internal Slope Angle = 1:7