

Stockman Mine Response to EES



Victorian National Parks Association
2014

We have three main concerns.

- 1. Vegetation offsets are inadequate, especially for Montane Swamp Complex EVC*
- 2. The removal of many old, hollow bearing trees*
- 3. The tailings dam has no long-term viability*

For issues 1&2 we refer to GEG's submission for detail

'We are in the middle of a global extinction crisis, with rates of biodiversity loss up to 1,000 times above pre-human levels.'

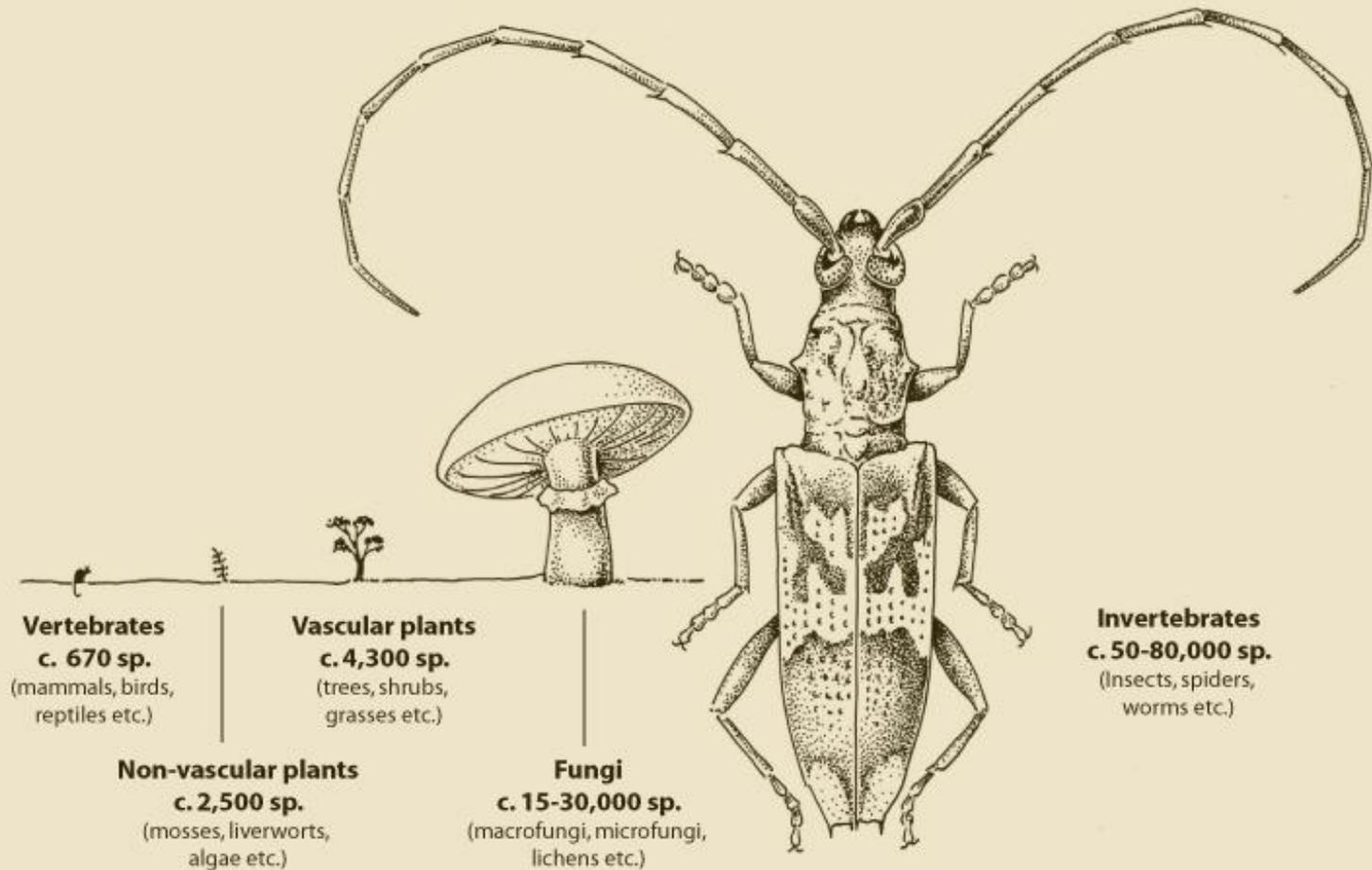
'This depletes our natural capital and undermines sustainability at a planetary, as well as local, scale.'

IUCN Director General Julia Marton-Lefèvre

Nov 2012

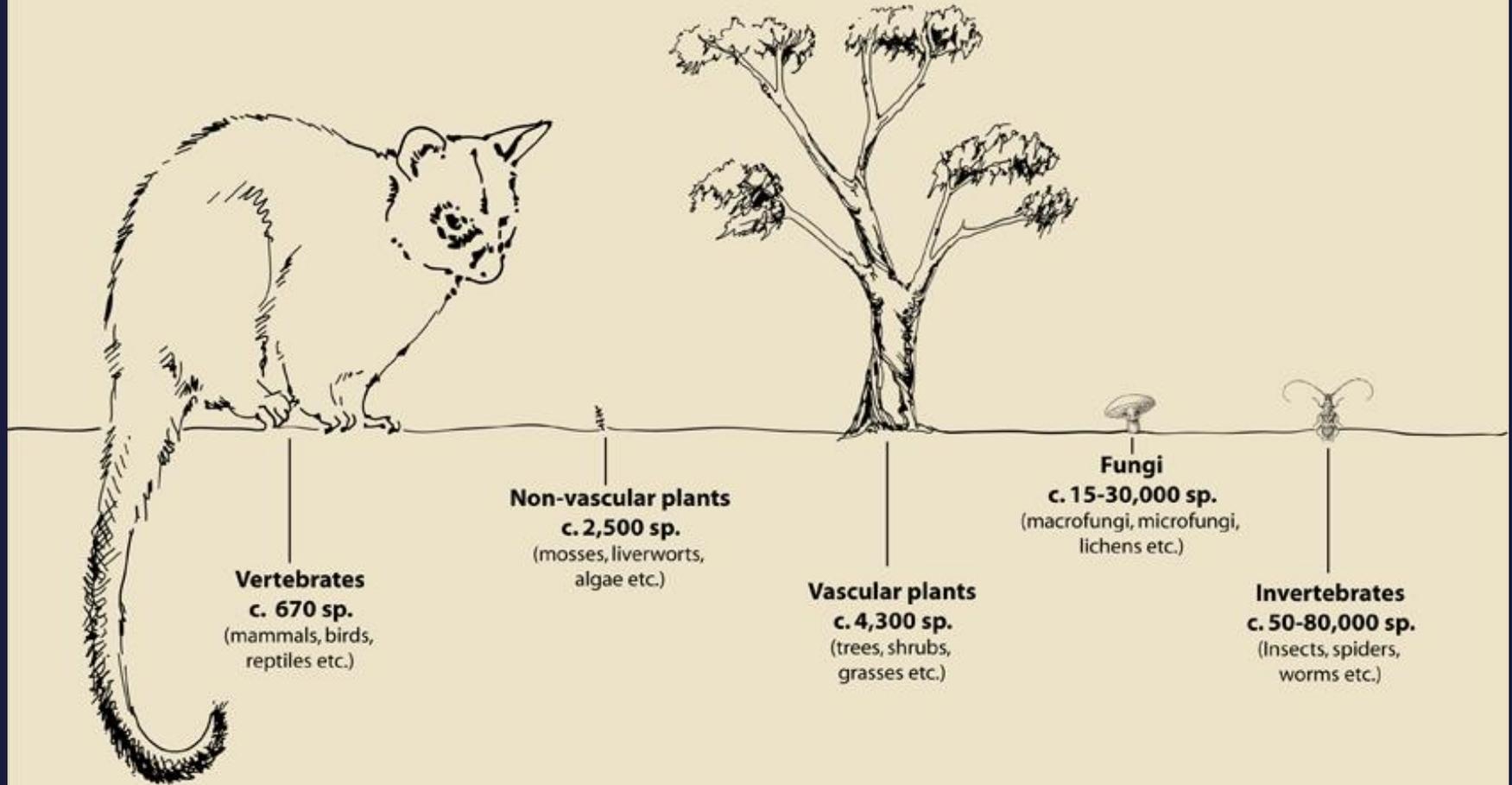
Relative numbers of native species in Victoria

Size approximates relative number of species. Total number of species possibly around 100,000.



Relative numbers of research papers

Size approximates relative number of papers. Total number of species possibly around 100,000.



Native vegetation offsets

Proposed vegetation offsets for the **Montane Swamp Complex** community are inadequate:

- they do not constitute a like-for-like exchange
- the 'trading' of a threatened community anywhere threatens protection of that community.

The proposed removal of some 0.36 ha of the Montane Swamp complex EVC may scrape past current (inadequate) legislative and regulatory provisions, but it is still a bad deal for Victoria's natural heritage.

Tree hollows

The proposed removal of some 4-600 large old trees poses a real problem for wildlife.

FFG objective:

“Manage parks and State forest to ensure that an appropriate level of hollow-bearing trees is restored and maintained in all forest types”

Action Statement no. 192, FFG listing as a Potentially Threatening Process:

“Loss of hollow-bearing trees from Victorian native forests and woodlands”

“Hollows are considered essential for 16 species of mammal and 44 species of bird in Victoria... including 14 mammals and birds considered threatened.

“Each species has its own requirements for type of hollow...

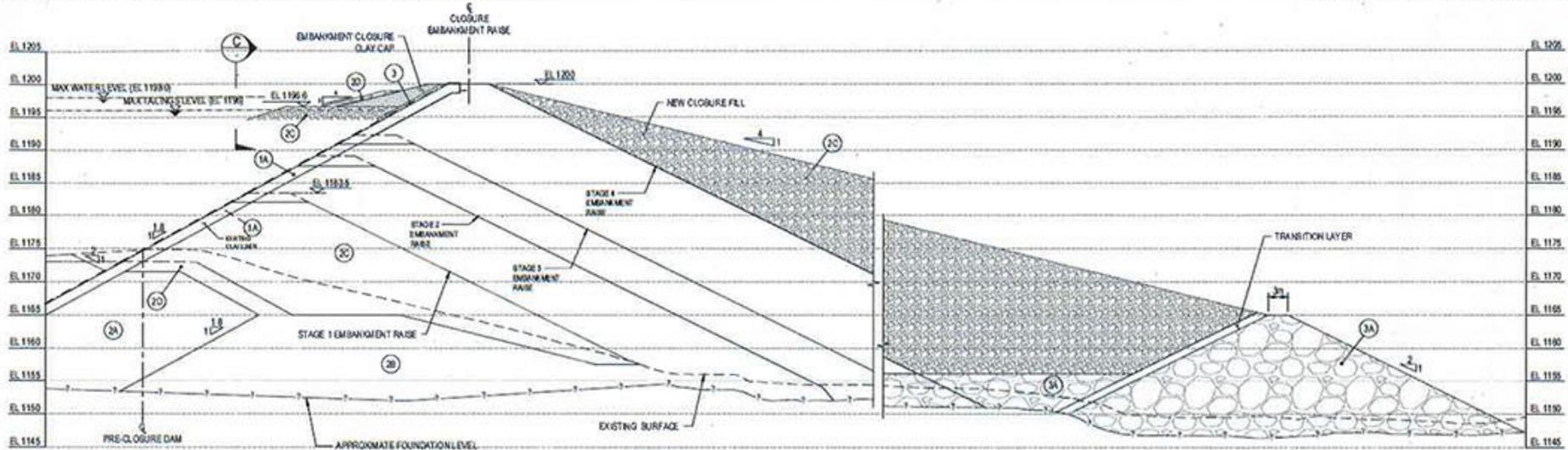
“...some species need several hollows in close proximity, to support a social community...”

FFG Action Statement no. 192: Loss of Hollow-Bearing Trees

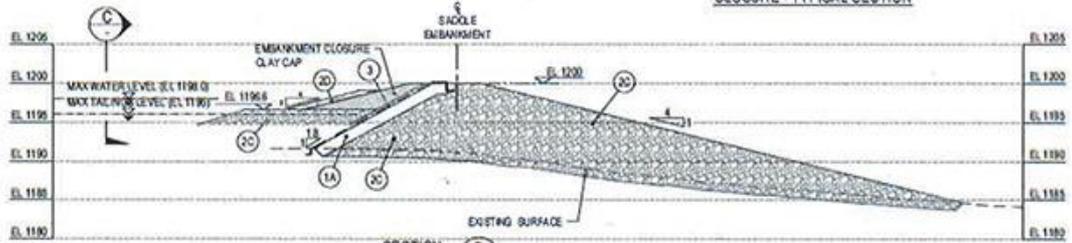
The tailings dam

There is minimal information available about its structure, short and long-term viability and maintenance:

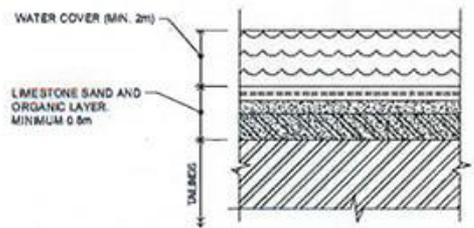
- Written descriptions in the EES (eg Appendix B3, section 3) are sketchy.
- Cross-section diagrams (without any details) are tucked away in Appendix A to Appendix B3.



SECTION A C119
SCALE 1:300
CLOSURE - TYPICAL SECTION



SECTION B C119
SCALE 1:300
SADDLE EMBANKMENT - TYPICAL SECTION



SECTION C
SCALE 1:300
TAILINGS CLOSURE

EMANKMENT LEGEND	
ZONE	DESCRIPTION
EXISTING DAM	1 CLAY AND RESIDUAL SOIL MIXTURE (GRAVELLY CLAY / CLAYEY GRAVEL). MAXIMUM SIZE 0.1m MAXIMUM SIZE 0.025m WITHIN 0.1m OF UPSTREAM FACE
	2A MIXTURE OF HW AND MW ROCK. HW CONTENT NOT TO EXCEED 25%. MAXIMUM SIZE 0.3m. NOT MORE THAN 10% TO BE MAXIMUM SIZE.
	2B MW, SF OR P ROCK. MAXIMUM SIZE 0.6m. NOT MORE THAN 10% WW TO BE MAXIMUM SIZE.
	2C RANDOM ROCK FILL, NON-COHE SIVE, MAX. SIZE 300mm

EMANKMENT LEGEND	
ZONE	DESCRIPTION
REINSTATEMENT WORKS	1A IMPERMEABLE CLAY OR RESIDUAL SOIL
	2C RANDOM ROCK FILL, NON-COHE SIVE, MAX. SIZE 300mm
	3 GRAVEL OR SAND, MAXIMUM PARTICLE SIZE OF 50mm, LESS THAN 15% PASSING THE 0.075mm SIEVE
	3A ROCK FILL, DURABLE AND HARD, MAX. SIZE 1m

NOTES:

1. THE GEOMETRY AND EMBANKMENT MATERIAL DESCRIPTIONS FOR THE EXISTING EMBANKMENT PRIOR TO CLOSURE IS BASED ON THE REPORT PREPARED BY SPA WILLIAMS AND ASSOCIATES, CONSULTING GEOTECHNICAL ENGINEERS, ENTITLED "BENAMARA TAILINGS STORAGE FACILITY REHABILITATION OPTIONS STUDY" (DECEMBER, 1999).
2. THE FOUNDATION LEVEL SHOWN IS INFERRED FROM THE REPORT MENTIONED ABOVE. ACTUAL FOUNDATION LEVELS MAY VARY DEPENDING ON SUBSURFACE CONDITIONS.
3. TECHNICAL SPECIFICATIONS GOVERNING THE MATERIAL PROPERTIES AND THE PLACEMENT REQUIREMENTS OF THE EARTHEN MATERIALS ARE TO BE PROVIDED DURING DETAILED DESIGN.



Rev	Drawn	App	Date	REVISION RECORD
C	LMH	DN	13.06.13	ISSUED WITH REPORT VERSIONS
B	LMH	DN	23.03.13	RESPONSE TO CLIENT COMMENTS
A	SB	DN	14.12.12	PRELIMINARY DESIGN

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Client: Independence Group

Project Title: STOCKMAN PROJECT
TAILINGS STORAGE FACILITY
PRELIMINARY DESIGN

Drawing Title: STAGE 4 (OPTIONAL) CLOSURE
EMBANKMENT MODIFICATIONS
AND SECTIONS

Drawn	GOA 94	Date	21/03/2013
Check		Date	

DRAFT



The tailings dam

- No assessment of condition of the original geomembrane
- No assessment of viability of connection between old and new membranes (connected 4 times as dam wall grows)
- Proposed geomembrane has a lifetime of 100-200 years (GHD report)
- Grout curtain at base of membrane has a life of only 20-80 years (GHD report)
- We can find no assessment of the methods or costs (or indeed the possibility!) of replacing the grout curtain and/or geomembrane.

The tailings dam

GHD's (Feb 2014) *Stockman Project Gap analysis – Post Closure Monitoring* lists 67 instances where information on the design or performance modelling of the tailings dam is either:

- missing or
- inadequate

No post-closure maintenance plan will be developed until 2 years into operations.

The tailings dam

GHD assumes failure of membrane and grout curtain at 200 years (the maximum life). GHD's solution, in the absence of any solution in the EES is:

A solar-powered 'seepage collection system' beneath the main embankment and the saddle dam embankment.

GHD's Stockman Project Gap analysis – Post Closure Monitoring p. 15

This, it appears, is planned to operate for 800+ years, or indeed, into perpetuity.

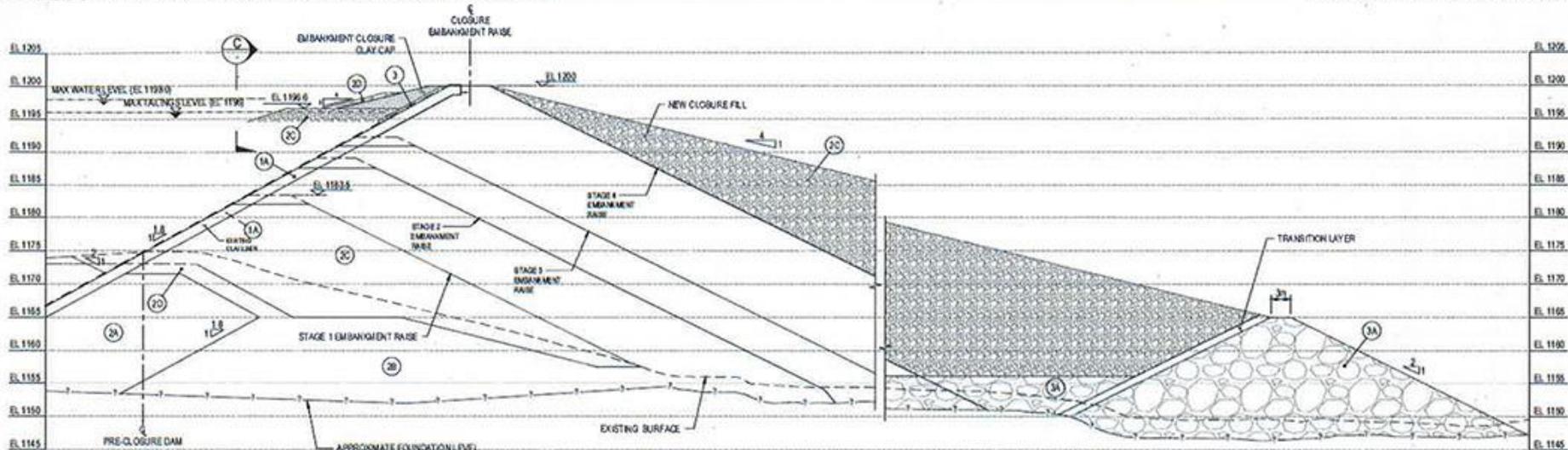


Erosion at
southern edge of
'Stockman' tailings dam.
June 2014

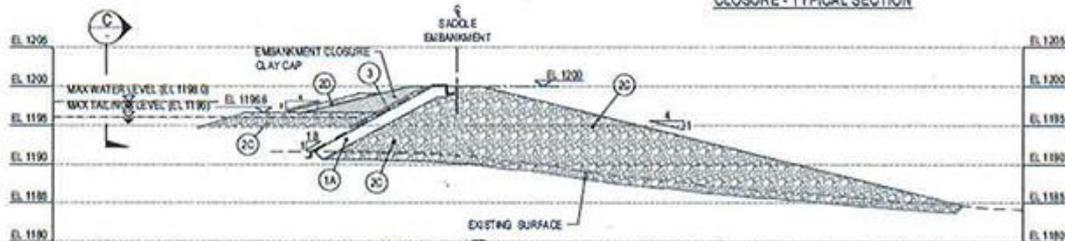
The tailings dam

Climate change impacts: fire, flood, drought

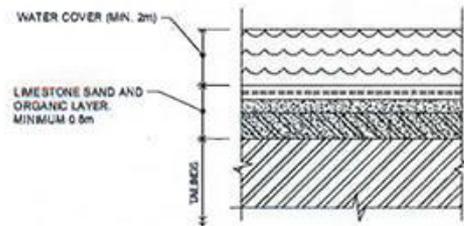
1. Unlikely that the dam will have sufficient water cover during 10 year drought .
2. No mention of the siltation of the dam, following fire and flood (only an assessment that revegetation and erosion maintenance will be required after fire every 10 years).



SECTION A C119
SCALE 1:300
CLOSURE - TYPICAL SECTION



SECTION B C119
SCALE 1:300
SADDLE EMBANKMENT - TYPICAL SECTION



SECTION C TAILINGS CLOSURE
NTS

EMANKMENT LEGEND	
ZONE	DESCRIPTION
EXISTING DAM	1 CLAY AND RESIDUAL SOIL MIXTURE (GRAVELLY CLAY / CLAYEY GRAVEL), MAXIMUM SIZE 0.1m MAXIMUM SIZE 0.025m WITHIN 0.1m OF UPSTREAM FACE
	2A MIXTURE OF HW AND MW ROCK, HW CONTENT NOT TO EXCEED 25%, MAXIMUM SIZE 0.3m, NOT MORE THAN 10% TO BE MAXIMUM SIZE
	2B MW, SF OR P ROCK, MAXIMUM SIZE 0.9m, NOT MORE THAN 10% WW TO BE MAXIMUM SIZE
	2C RANDOM ROCK FILL, NON-COESIVE, MAX. SIZE 300mm

EMANKMENT LEGEND	
ZONE	DESCRIPTION
REINSTATEMENT WORKS	1A IMPERMEABLE CLAY OR RESIDUAL SOIL
	2C RANDOM ROCK FILL, NON-COESIVE, MAX. SIZE 300mm
	3 GRAVEL OR SAND, MAXIMUM PARTICLE SIZE OF 50mm, LESS THAN 15% PASSING THE 0.075mm SIEVE
	3A ROCK FILL, DURABLE AND HARD, MAX. SIZE 1m

NOTES:

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3. TECHNICAL SPECIFICATIONS GOVERNING THE MATERIAL PROPERTIES AND THE PLACEMENT REQUIREMENTS OF THE EARTHEN MATERIALS ARE TO BE PROVIDED DURING DETAILED DESIGN.



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C	UM	DN	13.06.13	ISSUED WITH REPORT VERSIONS
B	UM	DN	23.03.13	RESPONSE TO CLIENT COMMENTS
A	UM	DN	14.12.12	PRELIMINARY DESIGN

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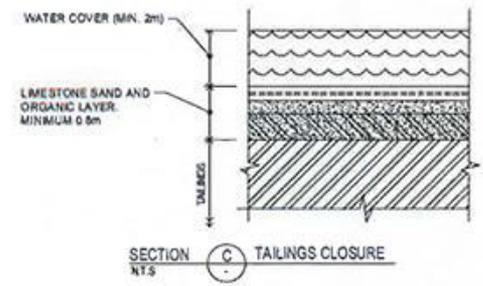
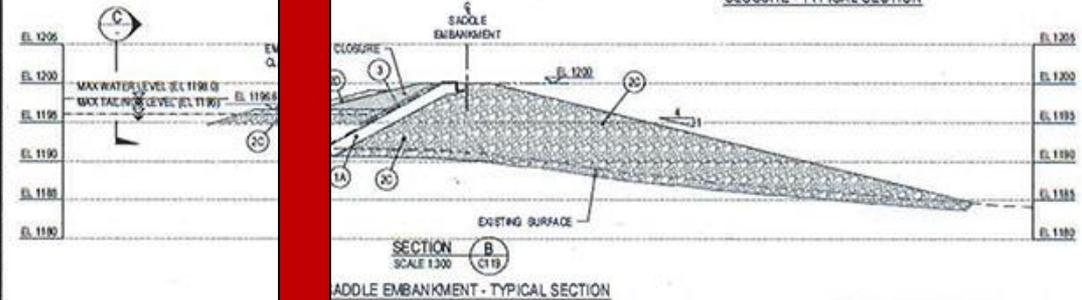
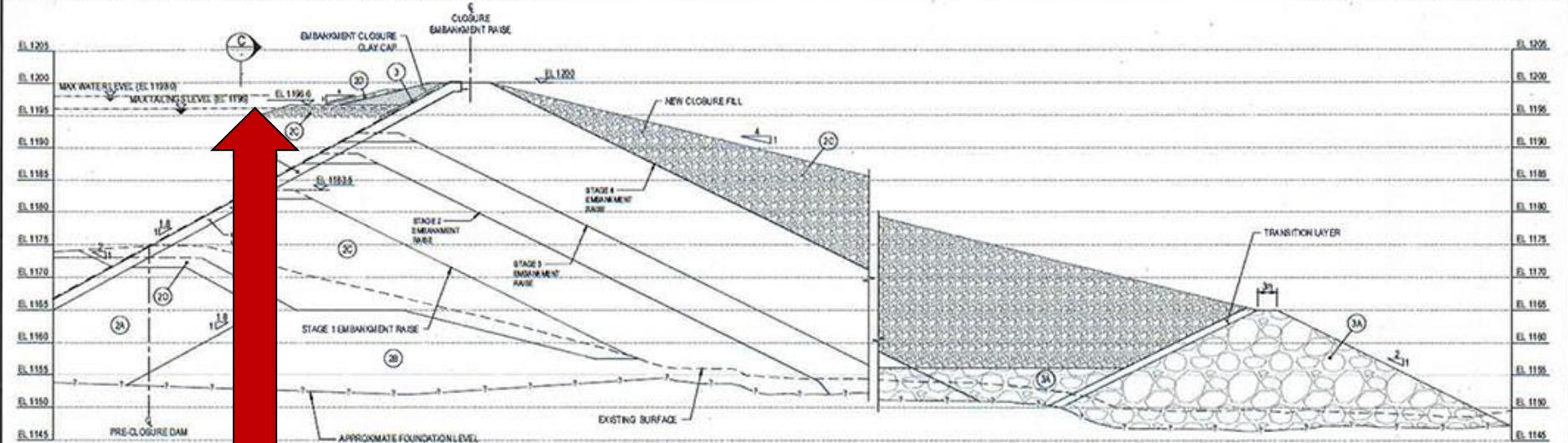
Client: Independence Group

Project Title: STOCKMAN PROJECT
TAILINGS STORAGE FACILITY
PRELIMINARY DESIGN

Drawing Title: STAGE 4 (OPTIONAL) CLOSURE
EMBANKMENT MODIFICATIONS
AND SECTIONS

Date: 04/04/13
Status: DRAFT





TAILINGS

EMBANKMENT LEGEND	
ZONE	DESCRIPTION
EXISTING DAM	1 CLAY AND RESIDUAL SOIL MIXTURE (GRAVELLY CLAY / CLAYEY GRAVEL). MAXIMUM SIZE 0.1m MAXIMUM SIZE 0.025m WITHIN 0.1m OF UPSTREAM FACE
	2A MIXTURE OF HW AND MW ROCK. HW CONTENT NOT TO EXCEED 20%. MAXIMUM SIZE 0.3m. NOT MORE THAN 10% TO BE MAXIMUM SIZE.
	2B MW, SF OR P ROCK. MAXIMUM SIZE 0.6m. NOT MORE THAN 10% WW TO BE MAXIMUM SIZE.
	2C MATERIAL NOT SPECIFIED

EMBANKMENT LEGEND	
ZONE	DESCRIPTION
REINSTATEMENT WORKS	1A IMPERMEABLE CLAY OR RESIDUAL SOIL
	2C RANDOM ROCK FILL, NON-COESIVE, MAX. SIZE 300mm
	3 GRAVEL OR SAND, MAXIMUM PARTICLE SIZE OF 50mm, LESS THAN 15% PASSING THE 0.075mm SIEVE
	3A ROCK FILL, DURABLE AND HARD, MAX. SIZE 1m

- NOTES:**
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 2. THE FOUNDATION LEVEL SHOWN IS INFERRED FROM THE REPORT MENTIONED ABOVE. ACTUAL FOUNDATION LEVELS MAY VARY DEPENDING ON SUBSURFACE CONDITIONS.
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- 0 0 6 12 18 24 30 1:300 (A1)
DIMENSIONS ARE IN METRES

Rev	Drawn	App	Date	REVISION RECORD
C	UMB	DN	13.06.13	ISSUED WITH REPORT VERSIONS
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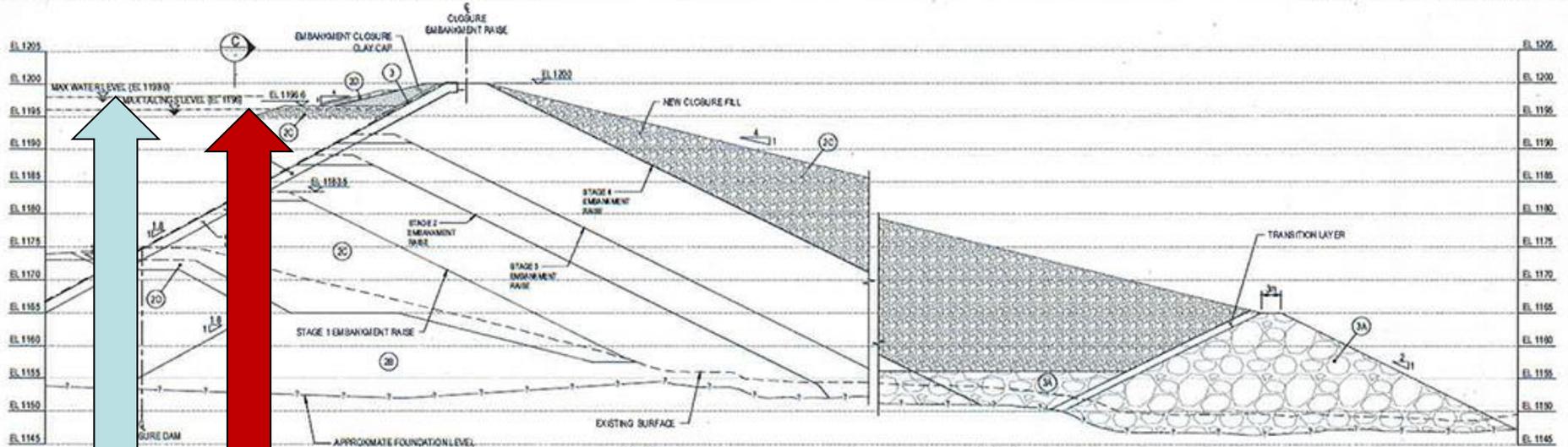
Client: **Independence Group**

Project Title: **STOCKMAN PROJECT TAILINGS STORAGE FACILITY PRELIMINARY DESIGN**

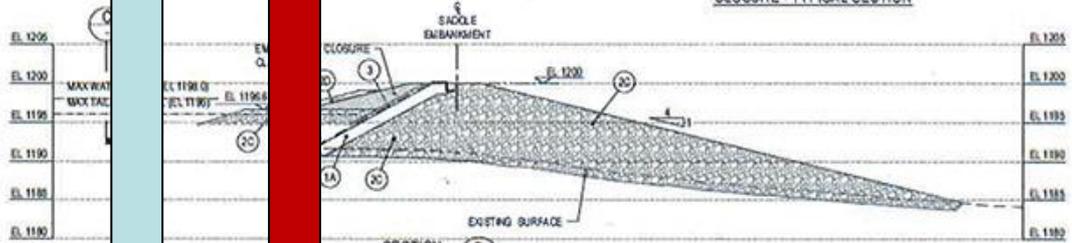
Drawing Title: **STAGE 4 (OPTIONAL) CLOSURE EMBANKMENT MODIFICATIONS AND SECTIONS**

Scale: GDA 94 Date: 21/05/2013

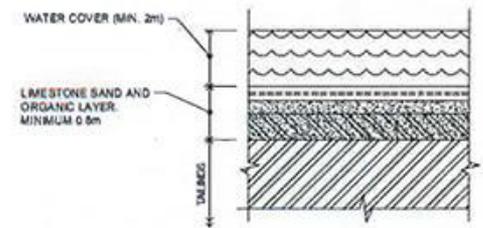
Status: **DRAFT**



SECTION A C119
SCALE 1:300
CLOSURE - TYPICAL SECTION



SECTION B C119
SCALE 1:300
SADDLE EMBANKMENT - TYPICAL SECTION



SECTION C
NTS
TAILINGS CLOSURE

WATER
TAILINGS

EM BANKMENT LEGEND	
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EM BANKMENT LEGEND	
ZONE	DESCRIPTION
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PRELIMINARY DESIGN

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Drawn	GOA 94	Date	21/05/2013
Check		Date	
DRAFT			

'Fire-prone mountainous regions, such as the Victorian Alps of south-eastern Australia, are especially vulnerable to post-fire flash floods.'

'Flash floods may occur immediately following a fire or be delayed by several weeks, and may be causally linked to the fire event through the hydrogeological response of catchments or fire-associated meteorological mechanisms.'

*On The Mechanisms Resulting Post-Fire Flash Floods:
A Case Study from Alpine Shire, Victoria. Lee Tryhorn et al.
5th Flood Management Conference Warrnambool 2007*



Flood after 2006 fire, Tamboritha Rd



Flood after 2006 fire, Tamboritha Rd



Flood after 2006 fire, Tamboritha Rd

'... runoff generated debris flows are an important process to be considered during post-fire risk assessment of hydrological hazards.'

Evidence of debris flow occurrence after wildfire in southeast Australia.

Peter Nyman et al.

EGU General Assembly 2010, Vienna, Austria

Below ground tailings

We see no evidence that adequate water cover can be maintained, in perpetuity, for the 50% of tailings in the proposed below ground facility.

In summary:

The VNPA sees significant damage to ecological systems from

- reducing the extent of the Montane Swamp Complex EVC*
- the removal of hundreds of old, hollow-bearing trees*

We also see catastrophic impacts to the Tambo River and Gippsland Lakes from the release of highly acidic material, due to the inevitable failure of long-term containment of the mine's tailings.

We believe:

- *the proposed Stockman mine should not proceed, and should not get approval under Victoria's Water Act (1989)*
- *The original tailings dam on the Benambra mine site should receive immediate attention to repair, as far as possible, its currently deteriorating condition.*

“... the consequences of an unplanned release remain significant.”

Stockman Project EES, chapter 15, p. 15-12.



Philip Ingamells for the
Victorian National Parks Association

www.vnpa.org.au