Bell Quarry Rehabilitation Project

Submissions Report

June 2019

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1. Introduction

1.1 Background

Bell Quarry Rehabilitation Project Pty Ltd (BQRP) seeks to rehabilitate Bell Quarry, approximately 10 kilometres east of Lithgow in NSW. The development application seeks to achieve the final rehabilitated landform via importation of virgin excavated natural material (VENM), excavated natural material (ENM) and other clean fill material (subject to a specific resource recovery exemptions) sourced from earthworks projects across Sydney and the local regional area (the Project).

The rehabilitation process will involve:

- Importation of approximately 1.2 million cubic metres of VENM, ENM and other clean fill material (subject to specific resource recovery exemptions)
- Vehicle haulage at a rate of up to 140,000 tonnes per annum (tpa)
- Emplacement and compaction of soil material within the existing quarry voids
- Shaping of fill to closely represent the pre-quarry landform and to allow surface water drainage across the final landform
- Development of a water management system to control surface water discharges throughout the rehabilitation program and from the final landform
- Revegetation of the site with locally endemic species to provide effective integration with the surrounding landscape.

Importing of material for the purpose of filling a quarry void, falls within the definition of a waste resource management facility under *State Environmental Planning Policy (Infrastructure) 2007* (Infrastructure SEPP). Waste or resource management facilities are permissible with consent in the applicable land zoning under Lithgow Local Environmental Plan 2014 (Lithgow LEP) pursuant to section 121(3) of *State Environmental Planning Policy (Infrastructure) 2007* and section 7(1)(b)(i) of *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007*.

It is recognised that because the site is located an environmentally sensitive area as defined by the *Environmental Planning and Assessment Regulations 2000* (Regs) it is designated development pursuant to clause 32(1)(4)(d)(ii) of Schedule 1 to the Regs and therefore the preparation of an Environmental Impact Statement (EIS) is required to accompany the Development Application (DA) for the Project.

1.2 Issues raised during public exhibition

A detailed EIS was prepared to accompany the development application and submitted to Council in October 2018. The DA and accompanying EIS were placed upon public exhibition for a period of 60 days from 19 January to 20 March, 2019.

During the notification period, Council have received 512 objections to the DA, a number of which are understood to have been form letters. It is noted that the NSW Office of Environment and Heritage (including the National Parks and Wildlife Service (NPWS) have provided a submission in support of the rehabilitation project including areas of the adjoining National Park which have been impacted by the historical extractive operations. A summary of the issues raised and a selection of the key submissions provided by government agencies and local councils was provided to the proponent to enable a response to the key issues raised and included as Appendix A. A selection of community submissions, with personal details redacted

for privacy reasons was also provided for additional context to the issues raise in the submissions.

This submissions report summarises the submissions made during public exhibition of the EIS have been included in Table 1-1. A response to the key issues is provided in the subsequent sections below.

Table 1-1 Summary of issues raised during EIS exhbition

Aspect	Issue
Approval pathway	Definition of clean fill and application of the Excavated Natural Material Order and Exemptions
	Consideration of the need for an Environment Protection Licence (EPL) and associated integrated development provisions
	Consideration of need for a referral under the Commonwealth *Environment Protection and Biodiversity Conservation Act (1999)*
Traffic Concerns	Number of trucks proposed to traverse main roads adding to congestion, safety and traffic noise
	Confusion between operating within the parameters of the existing quarry approvals and increase in traffic volumes on regional road network
	EIS has not taken into account truck movements throughout the entire Blue Mountains Area
	Size and capacity of Sandham Road to accept haulage trucks and associated concerns in regards to safety and public amenity
	Intersection of Sandham Road and Bells Line of road lacking sight vision
	Vibration effects from haulage vehicles to properties in Mount Victoria and suitability of Darling Causeway for haulage vehicles
	Noise from unloading of trucks at the site
	Concerns regarding management of truck movements, road safety and hours of operation
Flora and fauna	Potential impacts upon Commonwealth listed ecological community
	The site is naturally regenerating and does not require further rehabilitation. The Project is a major water source for wildlife.
	Potential impacts upon threatened fauna species located in the study area
	Project will impact upon endangered species of frogs, reptiles and birds which may potentially become extinct
	Risk of introduction of invasive species and weeds and weed control
	Erosion and sediment controls for the life of the quarry
	Protection of fish located in quarry void
	Adequacy of ecological survey for downstream catchments and the National Park
Water	Unacceptable water pollution risks associated with surface water discharges
	Unacceptable impacts to groundwater dependent ecosystems
	Soil leachates adversely altering the natural characteristics and ionic balance of water in the catchment
	Loss of fire fighting water from the quarry ponds
	Clarification of exceedance of ANZECC 2000 GVs
	Details of water monitoring regime
	Water balance to account for increase in rainfall/runoff during climate change

Aspect	Issue
	Downstream creek formation and erosion and impacts to geomorphology
Contamination	High risk of contamination of the Wollangambie, Colo and Hawkesbury Rivers and the World Heritage listed blue
	Regulation and monitoring of waste material
	Increase in toxic metals in the discharge
Social and economic	Loss of amenity to residents due to increase in noise and truck movements to the site and the regional road network
	Dust polluting drinking water, surrounding dwellings and villages on the regional road network eg. Bell, Hartley, Mount Victoria, Blackheath and Katoomba
	Loss of tourism and gateway to the World Heritage Wilderness Area and National Park
	Loss of income and employment to small business from traffic movements
	Property prices decreases due to noise and dust emissions
	Hours of operation and impacts upon the community
	Health impacts due to dust particles
	Security deposit to ensure social, environmental and economic damages
General	Alternative solutions such as rail haulage or other uses of the site
	Waste from Sydney being dumped within the Lithgow region
	Type of waste to be placed in the voids and on-site

2. Submissions response

2.1 Overview

The Bell Quarry Rehabilitation Project (Project) has been developed in recognition of the proximity of the site to sensitive environmental receivers including the Blue Mountains National Park and residential receivers.

The Project aims to achieve a positive environmental outcome through rehabilitating the site to a condition more closely representing the original landform and that of the adjoining national park. The Project will also maximise resource recovery through diversion of VENM, ENM and other clean fill materials (subject to specific resource recovery exemptions) away from landfill for beneficial reuse in site rehabilitation activities.

It is recognised that Council have received a high number of submissions highlighting legitimate concerns regarding a project of this nature. The applicant acknowledges there will be some disruption to local residents particularly those located along Sandham Road in Bell and Newnes Junction. The applicant will seek to work with the community throughout the life of the Project to ensure potential impacts are limited as far as practicable and proposes to establish a community consultative committee if development consent is granted to the Project. The applicant is also will to to enter into a Voluntary Planning Agreement with Lithgow City Council for works considered necessary to improve Sandham Road.

The proposed development is a permissible use of the site and has been designed to operate within the former operational parameters of the existing quarry consent. The EIS has also demonstrated how the development will achieve compliance with all legislative requirements and specific guidelines and standards relevant to the Project.

A number of submissions have highlighted potential environmental impacts based upon perceived risk for a project of this nature without consideration of the assessment that has been undertaken as part of the development application process. The majority of the issues raised in submissions were assessed in detail as part of the EIS and demonstrated to be acceptable in accordance with latest environmental guidelines and assessment methodologies. This response provides clarification to the issues raised and the further details of the assessment approach adopted as part of the EIS and should be read in conjunction with the original assessment contained in the EIS.

2.2 Approval pathway

2.2.1 Definition of clean fill

Issue

The EPA's submission stated that they provided input into the SEARs requesting clarification of clean fill and the application of any relevant exemptions and that this was not included in the EIS.

The submission infers that as the term "clean fill" is not defined in the *Protection of the Environment Operations Act 1997* (PoEO Act) and it is therefore characterised as waste triggering the need for an EPL in relation to application of waste to land under Clause 39 of Schedule 1 of the PoEO Act.

Response

The EPA's response was provided after the EIS was prepared in circumstances where the EPA was invited to a site briefing to discuss the rationale for the project and application of the

licencing framework in October 2017, along with representatives from other government agencies including OEH, NPWS, Lithgow City Council and Blue Mountain City Council.

Unfortunately, the EPA representative who had confirmed attendance phoned on the morning of the meeting and provided apologies and stated that they would wait for the EIS to be lodged.

The EIS was subsequently prepared and clearly states that all emplacement material will meet the definition of virgin excavated natural material (VENM), excavated natural material (ENM) and other clean fill material (subject to specific resource recovery exemptions) sourced from earthworks projects across Sydney and the local regional area.

It is noted that there is currently no site specific resource recovery order and associated exemption applicable to the site and any future exemption would need to be directly authorised by the EPA. The option was included in the description of the development to provide flexibility to the consent to accommodate other potentially exempt material if directly approved by the EPA and would be subject to the same limiting concentrations for emplacement material discussed below and any other requirements stipulated by the EPA. No waste will applied to the site that does comprise either VENM, ENM or is specifically authorised at some point in the future by a site specific resource recovery exemption. The Project description included in Chapter 4 of the EIS includes a specific section outlining the acceptance criteria for the project and includes definitions of VENM and ENM in accordance with the Protection of the Environment Operations Act (PoEO Act). It also includes a table of limiting concentrations for ENM in accordance with the ENM order which forms the acceptance criteria for all material imported to the site and has been reproduced in Table 2-1.

Table 2-1 Limiting concentrations in ENM as per the ENM order (EPA 2014b)

Chemicals and other attributes	Maximum average concentration for characterisation (mg/kg 'dry weight' unless otherwise specified)	Absolute maximum concentration (mg/kg 'dry weight' unless otherwise specified)
1. Mercury	0.5	1.0
2. Cadmium	0.5	1.0
3. Lead	50	100
4. Arsenic	20	40
5. Chromium (total)	75	150
6. Copper	100	200
7. Nickel	30	60
8. Zinc	150	300
9. Electrical Conductivity	1.5 dS/m	3 dS/m
10. pH *	5 to 9 pH units	4.5 to 10 pH units
11. Total PAHs	20	40
12. Benzo(a)pyrene	0.5	1.0
13. Benzene	NA	0.5
14. Toluene	NA	65
15. Ethyl-benzene	NA	25
16. Xylene	NA	15
17. TPH C10-C36	250	500
18. Rubber, plastic, bitumen, paper, cloth, paint and wood	0.05 %	0.10 %

* The ranges given for pH are for the minimum and maximum acceptable pH values in the excavated natural material.

The term “clean fill” is included in Division 23 of the State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP).

In accordance with Clause 121 (3) of the Infrastructure SEPP:

Development for the purpose of the recycling of construction and demolition material, or the disposal of virgin excavated natural material (as defined by the PoEO Act) ***or clean fill****, may be carried out by any person with consent on land on which development for the purpose of industries, extractive industries or mining may be carried out with consent under any environmental planning instrument.*

The policy recognises the enhanced rehabilitation outcomes that can be achieved through importation of clean fill to sites previously disturbed by extractive operations. The project is consistent with the aims and objectives of the policy and will allow for recycling and beneficial reuse of fill material.

Importing of VENM, ENM and other clean fill material for the purpose of site rehabilitation is considered permissible with consent in accordance with the Infrastructure SEPP. As stated above, for the purpose of this development application all “clean fill material” will meet the definition of either VENM, ENM or material permitted under a specific resource recovery order and associated exemption (where applied for and granted).

Issue

The EPA submission states that the use of resource recovery orders and exemptions must be genuine, fit for purpose and cause no harm to the environment and human health and that the application of the exemption at the Bell quarry site is not consistent with these objectives. They note that resource recovery orders and exemptions do not guarantee that material is suitable for use in a sensitive environment.

Concerns were raised that the ENM can have up to 2% by weight of non-natural material potentially sourced from excavated or quarried from areas contaminated with manufactured chemicals or with process residues as a result of industrial, commercial, mining or agricultural activities.

Response

The Protection of the Environment Operations (Waste) Regulation 2014 (2014 Waste Regulation) has introduced a series of resource recovery orders and resource recovery exemptions.

As stated by the EPA, ‘*resource recovery orders and resource recovery exemptions allow some wastes to be beneficially and safely re-used independent of the usual NSW laws that control applying waste to land. These orders are only appropriate if the reuse:*

- *is genuine, rather than a means of waste disposal*
- *is beneficial or fit-for-purpose, and*
- *will not cause harm to human health or the environment.*

There is considered to be a significant opportunity to achieve superior rehabilitation outcomes for the site through the beneficial reuse and diversion of VENM, ENM and other clean fill away from landfills for use in the site rehabilitation. This type of development is specifically contemplated by the Infrastructure SEPP by permitting disposal of VENM or clean fill on land on which development for the purpose of extractive industries or mining may be carried out with consent under an environmental planning instrument.

There are a number of other precedents for the approval of the use of VENM and ENM in the rehabilitation of former mining and extractive industries including:

- Wallerawang Power Station Ash Dam in Lithgow Local Government Area (LGA)
- Hornsby Quarry located in a similar sensitive environment in northern Sydney with proximity to national parks and protected areas
- Penrith Lakes Development adjacent to the Nepean River in Western Sydney.

The site will eventually be returned to a condition more closely representing the original landform and that of the adjoining Blue Mountains National Park. Consultation with the NPWS during EIS preparation indicated in principle support for the overall concept of the rehabilitation project. Lithgow Council referred the DA to the Office of Environment and Heritage (OEH) as part of its assessment process and the OEH stated in its letter dated 5 February 2019 that OEH and NPWS *support the rehabilitation of areas of the Blue Mountains National Park that have been impacted by the quarry's operations and the restoration of a stable landform.* Also in its correspondence the OEH stated that it intends to issue a licence under the *National Parks and Wildlife Act 1974* to enable the applicant to conduct the works, subject to a number of conditionsThe assessment has recognised that application of the resource recovery exemption does not guarantee suitability for use in a sensitive environment. Detailed environmental investigations have therefore been undertaken to demonstrate the Project will not cause harm to human health or the environment. This included modelling potential surface and ground water discharges with a variety of methodologies and conservative assumptions to demonstrate a minimal potential for harm to the receiving environment.

The definition of ENM containing at least 98% (by weight) of natural material is taken directly from the EPA's Excavated Natural Material Order 2014 (ENM Order), which sets the regulatory framework for which the project has been developed to operate within.

There is no intention to apply contaminated material to the site as required by the ENM order and all material will be required to undergo detailed sampling requirements by the generator prior to transport to site and keep written records for a period of six years. The ENM Order includes limits for chemicals and other attributes which occur naturally in soils for maximum average concentration and absolute maximum concentrations. These limits have been adopted as the acceptance requirements for material at the site and the records of material can be subject to audit. . The applicant is prepared to accept a condition in any consent requiring appropriate validation of imported fill to be submitted to Council on a regular basis and requiring the validation by certain methods as outlined in the ENM Order and Exemption or any further validation method Council may reasonably wish to impose.

The substance concentrations adopted in modelling the potential impacts associated with the Project adopted the maximum average concentrations of material permitted to be imported to the site. The modelling is considered conservative and representative of the worst case scenario for the emplacement of clean fill, with the majority of fill expected to fall considerably within these concentration limits.

Issue

Consideration of the need for an Environment Protection Licence (EPL) and associated integrated development provisions under the PoEO Act.

Response

The PoEO Act provides for an integrated system of licensing and contains a core list of activities requiring Environmental Protection Licences (EPL) from the EPA. These activities are called 'scheduled activities' and are listed in Schedule 1 of the PoEO Act. Application of waste to land

is considered to be a scheduled activity in accordance with Clause 39 of Schedule 1 of the PoEO Act

However, whilst the emplacement materials defined as waste under the PoEO Act, they are specifically exempt from licensing for application of waste to land under Clause 39 of Schedule 1 of the PoEO Act. The relevant clauses include:

- Clause 39 2(e) of Schedule 1 for VENM
- the ENM Exemption 2014 and subject to its requirements turns off the licensing requirements under Clause 39 of Schedule 1
- the details of any specific resource recovery exemption, if granted in the future.

The project meets all requirements for application of VENM and ENM exempt from licencing provisions under Clause 39 of Schedule 1 of the PoEO Act. Any other clean fill will only be permitted to the applied to the site if specifically authorised by the EPA through application of a site specific resource recovery exemption which will also be licence exempt. Any future site specific resource recovery order will also need to meet the limiting concentrations adopted as acceptance criteria for the project and used as the basis for considering the potential for environmental impacts to arise from the Project.

Further, the integrated provisions under the *Environmental Planning and Assessment Act 1979* are elective in that the applicant is not obliged to have an application for a licence under the PoEO Act assessed at the time of assessment of the DA. An application for a licence under the PoEO Act can be made by the applicant separately to the DA, if required.[1]

It is acknowledged that under section 120 of the PoEO Act, a person who pollutes waters is guilty of an offence and that sections 121 and 122 of the PoEO Act provides a defence against prosecution under section 120 where the pollution was regulated by a licence or regulation that was complied with fully.

The definition of water pollution in the PoEO Act sets out general and specific circumstances that constitute water pollution. At its broadest, this means a prohibition on placing anything in waters that changes their chemical, biological or physical nature or is of a prescribed nature, description or class that does not comply with any standard prescribed in respect of the matter.

The “EPA’s Licencing Fact Sheet – Using environment protection licensing to control water pollution” states that the EPA does not use licencing to regulate every potential pollutant that could be contained in a discharge such as:

- Those pollutants with little or no potential to be present at levels that pose a reasonable risk of harm to health or the environment.

The EPAs licencing fact sheet also includes a range of matters for considerations in exercising its licencing functions including

- the pollution that will be caused and its impact on the environment
- practical measures that can be taken to prevent, control, abate or mitigate the pollution and protect the environment from harm
- the environmental values of water affected by the proposed discharge
- practical measures that can be taken to restore or maintain those values.

The EPA Guidance states that the environmental values of a waterway are those that are relevant from the list of values set out in the *Australian and New Zealand Guidelines for Fresh*

[1] See *Maule v Liporoni & Anor* [2002] NSWLEC 25

and Marine Water Quality (ANZECC & ARMCANZ 2002). These guidelines are also used as a benchmark to assess the likely impact of pollution and the controls that should be placed on that pollution.

Prescribed matters for water pollution are included in Schedule 5 of the PoEO (General) Regulation. The prescribed matters include reference to chemical toxicants for which guidelines are prescribed in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC 2000).

The ANZECC Guidelines are also noted to be the benchmark document of the National Water Quality Management Strategy which provides a national framework for improving water quality in Australia's waterways and are considered the industry benchmark for protection of environmental values of waterways.

The ANZECC Guidelines were therefore adopted as the basis to assess the impact of the Project against defined objectives or values for the receiving waters in accordance with EPA guidance and industry practice. To ensure a conservative assessment, the strictest guideline values (GVs) for toxicants in fresh water at the 99 percent protection level, has been adopted in recognition of the high conservation value of the receiving environment. It is noted that the adopted GVs provides a higher level of protection to receiving waters than other nearby licensed premises in the catchment. This has been selected in accordance with the guiding principles of the ANZECC Guidelines for protection of environmental values which includes:

- where the environmental values are being achieved in a waterway they should be protected
- where the environmental values are not being achieved in a waterway, all activities should work towards their achievement over time.

The assessment has also considered discharges from the sediment basin at the site boundary and it recognised that ANZECC Guidelines apply to ambient water quality and are not intended to be applied to stormwater discharges or mixing zones associated with a release from a sediment basin.

The EPA guidance states the onus is on the proponent to identify the pollutant levels likely to result from a development and the proponent should fully understand the nature of the development.

The Project has utilised modelling using a number of industry recognised modelling packages to demonstrate general conformance with the ANZECC guidelines and discharges are not considered to constitute water pollution for the purposes of the PoEO Act. Further details of the water quality assessment are included in Section 2.5 of this submissions response,

Implementation of an ongoing monitoring program including a proactive review process, whereby water quality and quantity data from each emplacement stage will be collected and applied to confirm the modelled predictions for the subsequent stages to demonstrate expected ongoing conformance with ANZECC criteria.

The modelling demonstrated that the management control of limiting the exposed areas of emplaced ENM would successfully reduce the concentrations of potential substances in the receiving waterway to concentrations below the ANZECC (2000) GVs, whilst adopting the most conservative assumptions for leachability from the emplaced material.

It is worth noting that there are also numerous sites in NSW that accept VENM and ENM either without an EPL or without specific discharge limits for the control of water pollution as shown in Table 2-1. The EPLs relate to scheduled activities for former extractive industry or power generation operations and the water discharge limits are either limited to general compliance with Section 120 of the PoEO Act or include concentration limits orders of magnitudes above the ANZECC GVs adopted for the Project.

Table 2-2 Licence provisions for other sites accepting ENM and VENM

Site / EPL No.	EPL No.	PoEO Scheduled Actvity	Waste Types	Water discharge limits	Comment
Hornsby Quarry Rehabilitation	NA	EPL 1687 for extraction operations surrendered in 2003 No current EPL for VENM and ENM Placement	N/A, The rehabilitation project was approved on Jan 2016 and filling has been complete with up to 1.5 million cubic metres of VENM and/or ENM placed within the quarry.	Water discharge regulated under a groundwater licence with discharge limits stipulated for pH only.	The EIS for rehabilitation of the site contemplated discharges of water from the Quarry during filling and commented that an EPL may be required and would be confirmed with the EPA during the detailed design stage.
Wallerawang Power Station and ash repositories	766	Electricity generation with other ancillary activies	Excavated natural material, Virgin excavated natural material	Water concentrations limits for power station operations and general compliance with Section 120 of PoEO Act.	Concentration limits for discharge points to Coxs River to relate to power station operations and are downstream from VENM and ENM placement at Sawyers Swamp Ash Dam. Concentration limits are orders of magnitude above ANZECC GVs adopted for the project. Eg. 90 percentile concentration limit for Zinc is 0.1 mg/L in comparison to criteria for zinc adopted for the project of 0.0024 mg/L
Holt Land Rehabilitation Centre Kurnell	5658	Other Activities – Rehabilitation of a sand quarry	Virgin excavated natural material, potential acid sulfate soils, waste	General compliance with Section 120 of PoEO Act	Site is licenced for rehabilitation of a sand quarry with non-licence exempt material including potential acid sulfate soils. Limit conditions for waters is limited to general compliance with Section 120 of the PoEO Act.
Penrith Lakes Development	2956	EPL for extraction operations	VENM and ENM permitted to applied to land	Water concentrations limits for extractions operations and general compliance with Section 120 of PoEO Act.	Site has consent to receive VENM and ENM with no limits for acceptance of waste included on the licence. Concentration limits for discharge points to Nepean River relate to extraction activities are orders of magnitude above ANZECC GVs adopted for the project. Eg. Concentration limit for Zinc is 40 mg/L in comparison to criteria for zinc adopted for the project of 0.0024 mg/L

Where an EPL does not include specific concentration limits, the likely guidance that would be used to assess compliance with Section 120 of the PoEO Act is the ANZECC Guidelines (these are generally the most stringent in terms of protection of environmental values. The ANZECC Guidelines have been used as part of the assessment to consider the potential impacts to environmental values of the receiving waters arising from the Project.

It is noted that Section 120 of the PoEO Act applies to the project regardless if a licence to provide a defence against water pollution is sought. Modelling been demonstrated to have minimal potential to cause harm to health or the environment in accordance with the strictest GVs in the ANZECC Guidelines and the project is not considered to warrant a licence under Section 122 of the PoEO Act.

2.2.2 EPBC Act referral

Issue

Consideration of the need for a referral under the Commonwealth's EPBC Act.

Response

The EIS included detailed consideration of the need for a referral under the EPBC Act. The EPBC Act requires approval from the Commonwealth Minister for the Environment and Resources for actions that may have a significant impact on listed matters of national environmental significance (MNES). Of relevance to the Project, these include world heritage properties and Commonwealth listed threatened species and ecological communities.

The Project is considered an "action" which is broadly defined under the EPBC Act to include a project, development, undertaking, activity or series of activities. It is the responsibility of the applicant proposing to undertake an action to consider whether the Project is likely to have a significant impact on any MNES. If the applicant considers there is potential for significant impacts upon any matters protected under the EPBC Act, then a referral is required to be submitted to the Minister for the Environment.

The Project site is located adjacent to the Greater Blue Mountains Area which is also listed on the United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage List and is also listed as a national heritage place on the National Heritage List. Detailed consideration of the impact upon the world heritage, national heritage and other values of the Greater Blue Mountains has been undertaken in chapter 13 of the EIS.

The assessment of significance is based on the requirements of the EPBC Act Significant Impact Guidelines 1.1 – Matters of National Environmental Significance, which state that an action is likely to have a significant impact on the World Heritage values of a declared World Heritage property if there is a real chance or possibility that it will cause:

- one or more of the World Heritage values to be lost,
- one or more of the World Heritage values to be degraded or damaged, or
- one or more of the World Heritage values to be notably altered, modified, obscured or diminished.

The Greater Blue Mountains Area was inscribed on the World Heritage List because it satisfies two of the criteria for natural values of outstanding universal value. The two criteria for which the property is listed are criterion ix and criterion x

Criterion ix is defined in the Operational Guidelines for the Implementation of the World Heritage Convention (UNESCO 2015) as follows:

> *"…to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals."*

The Greater Blue Mountains World Heritage Area (GBMWHA) includes outstanding and representative examples of the evolution and adaptation of the genus *Eucalyptus* and eucalypt-dominated vegetation in a relatively small area of the Australian continent (UNESCO 2015). It is a centre of diversification for Australian scleromorphic flora, including significant aspects of eucalypt evolution and radiation (UNESCO 2015). The GBMWHA includes primitive species of outstanding significance to the evolution of the planet's plant life such as the Wollemi pine and the Blue Mountains pine (*Pherosphaera fitzgeraldii*). These are examples of ancient, relict species with Gondwanan affinities that have survived past climatic changes and demonstrate the highly unusual juxtaposition of Gondwanan taxa with the diverse scleromorphic flora (UNESCO 2015).

Criterion x is defined in the Operational Guidelines for the Implementation of the World Heritage Convention (UNESCO 2015) as follows:

> *"…to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation."*

The GBMWHA includes an outstanding diversity of habitats and plant communities and a significant proportion of the Australian continent's biodiversity, especially its scleromorphic flora, (UNESCO 2015). As described above, the GBMWHA includes primitive and relict species with Gondwanan affinities and supports many plants of conservation significance including 114 endemic species and 177 threatened species (UNESCO 2015). Habitat diversity has also resulted in an outstanding representation of Australian fauna with more than 400 vertebrate taxa recorded (of which 40 are threatened) including 52 native mammals, 265 bird species (one third of the Australian total), 63 reptile species and more than 30 frog species (UNESCO 2015).

A World Heritage property listed for natural values also needs to meet conditions of integrity, which is achieved for the GBMWHA through the network of eight protected areas covering an area of approximately one million hectares.

The Project will not result in direct impacts upon the GBMWHA as rehabilitation and emplacement activities will be restricted entirely to the existing disturbance footprint for the quarry and will therefore not directly impact upon any values of the adjoining protected areas. Rehabilitation of the site to achieve a landform that is contiguous with the surrounding landscape is considered complementary to the values of the area and as mentioned above is supported by OEH and the National Parks and Wildlife Service.

The proximity of the site results in the potential for indirect impacts relating to water resources, noise, air quality, visual and biodiversity. The potential indirect impacts were assessed in detail as part of the EIS and determined not likely to have a significant impact upon the world heritage values of GBMWHA. Accordingly a referral under the EPBC Act was considered not to be required.

Consideration of potential impacts upon listed threatened species and communities potentially impacted by the Project has been undertaken in Chapter 8 and Appendix D of the EIS. The EIS clearly identifies a patch of Prickly Tea-tree - sedge wet heath occurs along the drainage line approximately 200 metres downslope from the project area. This community is commensurate with the Newnes Plateau Shrub Swamp endangered ecological community (EEC) listed under

the *Threatened Species Conservation Act 1995* (TSC Act) (now Biodiversity Conservation Act) and with the Temperate Highland Peat Swamps on Sandstone EEC listed under the EPBC Act.

An assessment of significance was prepared for the Newnes Plateau Shrub Swamp located downstream of the site pursuant to section 5A of the EP&A Act (seven part test) and took into account the questions in the EPBC Act assessment of significance for ecological communities. The seven part test included assessment of abiotic changes (such as changes in surface and groundwater flows). Based on the consideration of the above factors the Project is not likely to have a significant negative effect on the local occurrence of Newnes Plateau Shrub Swamp as:

- there would be no clearing of the ecological community and no habitat would be removed as a result of the Project
- impacts to surface and groundwater flows and water quality within the catchment of the ecological community would be relatively minor and temporary
- the post-rehabilitation hydrological regime is expected to more closely match natural conditions than the current situation.

Further details of the water quality modelling undertaken to form the basis of the consideration of indirect impacts to the listed EEC are included in Chapter 7 and Appendix C of the EIS with clarification of the modelling approach included in Section 2.5 below.

To reiterate, a detailed assessment has been undertaken and it is considered that the Project will not likely have a significant impact on any matters of national environmental significance. Accordingly, the requirement to refer the Project under the *Environment Protection and Biodiversity Conservation Act 1999* is not triggered.

2.3 Traffic Concerns

Issue

A number of submissions raised issues regarding the number of truck movements on the wider road network and the associated impacts associated with congestion, increase in accidents, road damage and traffic noise.

Response

A traffic impact assessment was undertaken as part of the EIS with reference to *Guide to Traffic Generating Development* (Roads and Maritimes Services 2002). The guideline suggests a process and method to undertake the impact assessment and the guidelines stipulates that the operating characteristics need to be compared with agreed performance criteria.

The Project involves importation of material (as defined above) using truck and trailer combinations of up to 42.5 tonne capacity at a maximum rate of 140,000 tpa, to ensure the haulage for the rehabilitation works are equivalent in scale to the former quarry operations. The projected traffic generation is clearly articulated in Section 9.3.2 of the EIS and Section 4.2 of the Traffic Impact Assessment included in Appendix E of Volume 2.

It is acknowledged that the activities associated with the Project will result in minor increases to heavy vehicle movements through Bells Line of Road, Darling Causeway and the Great Western Highway and subsequently on Sandham Road.

It is estimated that haulage will occur for around 250 days per year accounting for wet days and reduced haulage on weekends with an average transport capacity of 30 tonne. The resulting traffic generated based on this assumption is an average of 37 heavy vehicle movements per day (19 truck deliveries), which is equivalent to the previous quarry operations.

It is likely that at some stages, haulage to site may occur in campaigns corresponding to generation of excess VENM and ENM from major construction projects throughout the region. This has potentially double the haulage movements for a restricted period of time and generate up to 74 heavy vehicle movements per day (38 truck deliveries). Any temporary increase in haulage during campaign operations would be followed by a period of reduced haulage to maintain the capacity of the site to accept 140,000 tpa.

To ensure a conservative assessment, two traffic generation scenarios have been considered as part of the traffic impact assessment:

- an average haulage – 19 truck deliveries or 37 heavy vehicle movements per day
- a worst case haulage – double average haulage - 38 truck deliveries - 74 heavy vehicle movements per day.

The haulage traffic represents a relatively small proportional increase to background traffic on the wider regional road network. The regional haulage network comprise designated heavy vehicle routes utilising major state and arterial roads whose primary purpose is the transport of people and freight between regions. The average percentage increase of between 1 and 3% in comparison to existing vehicle numbers is not expected to impact upon the safety of capacity of the road network.

The performance of the regional road network is largely dependent on the operating performance of key intersections, which are critical capacity control points. SIDRA intersection modelling software was used to assess the proposed peak hour operating performance of intersections on the surrounding road network at key intersections within proximity of the site including the intersection of Sandham Road / Bells Line of Road and the intersection of Darling Causeway / Bells Line of Road. The intersection modelling indicated there would be no change to the level of service of the most affected intersections with the average delay increasing by less than two seconds during AM and PM peak periods.

The Project is of a relatively small scale and involves considerably fewer truck movements than a similar State Significant Development Modification recently approved for transferring VENM and ENM from Sydney at a rate of up to 100 truck deliveries per day to the Wallerawang Ash Dam located to the west of Lithgow. An average of 19 truck deliveries per day is not expected to impact upon the capacity of the broader network as traffic is progressively distributed to different destinations from the site. It is also the applicant's intention to maximise back-loading through use of haulage trucks from other local extractive industries involved in transport of product to the Sydney Market. These trucks would be otherwise be returning to the local region empty and back-loading with material (as defined above) as part of the Project will not be adding trucks to the road network.

It is acknowledged that the vehicle haulage will result in a higher proportional increase to traffic volumes on Sandham Road based upon vehicle counts undertaken following the completion of active extraction operations at the site. The Project has been developed to limit haulage to within the maximum extraction volumes permitted during the operation of the quarry. The heavy vehicle movements will therefore be representative of the number of movements during the previous quarry operations, which currently remain permissible at the site.

The applicant will develop a driver code of conduct for the Project for transport operations on all public roads including Sandham Road. This will include specific requirements such as limiting the speed limit to 40 km/hr for all trucks on Sandham Road.

Additionally, the applicant intends to make an offer to enter into a planning agreement under section 7.4 of the EPA Act making provision for a monetary contribution to the relevant local government authorities for the upgrade of Sandham Road in order to address the public concerns regarding the current state of Sandham Road.

Issue

The EIS states that the application would operate truck movements as per the previous quarry approval, however traffic movements have increased over time.

Response

The Project involves importation of material (as defined above) at a maximum rate of 140,000 tpa, to ensure the haulage for the rehabilitation works are equivalent in scale to the former quarry operations. This was designed to minimise the impact of the proposed development in comparison to the extractive operations permissible under the existing consent.

Background traffic growth was taken into account as part of the traffic assessment and clearly articulated in Section 9.3.1 of the EIS and Section 4.1 of the Traffic Impact Assessment in Appendix E.

Roads and Maritime Services Traffic Volume viewer was used to determine traffic growth trends on Bells Line of Road (Traffic counter ID T0384). The Average Annual Daily Traffic volumes (AADT) have increased by 160 vehicles per day over the last three years, which equates to a background traffic growth rate of approximately two percent per year.

This growth rate has been applied to the existing traffic volumes on the local road network to calculate the opening year and future year horizon background traffic volumes as part of the impact assessment.

Issue

The EIS has not taken into account truck movements throughout the entire Blue Mountains Area.

Response

As stated above, the haulage traffic represents a relatively small proportional increase to background traffic on the wider regional road network. The regional haulage network comprise designated heavy vehicle routes utilising major state and arterial roads whose primary purpose is the transport of people and freight between regions. The average percentage increase of between 1 and 3% in comparison to existing vehicle numbers is not expected to impact upon the safety of capacity of the road network and will generally be accommodated within the typical daily fluctuations in traffic volumes on the road network.

Detailed intersection modelling of the most potentially affected intersections closer to the quarry site has been undertaken and demonstrated the Project will have a negligible impact upon intersection performance. The haulage operations will have less of an effect on the wider network as truck numbers will be lower as they disperse and travel to alternate destinations.

It is also the applicant's intention to maximise back-loading through use of haulage trucks from other local extractive industries involved in transport of product to the Sydney Market. These trucks would be otherwise be returning to the local region empty and back-loading with clean fill as part of the Project will not be adding trucks to the road network.

Issue

Increased traffic impacts upon Sandham Road including impacts upon other road users and use of unsealed sections of the road.

Response

Sandham Road is approved for the use of heavy vehicles up to the quarry entrance and has been used for truck haulage since the commencement of quarry operations in the 1960s. It is

acknowledged that Sandham Road is narrow in parts and presents a higher level of risk to the local community compared to when vehicles are travelling on the wider road network. This has been recognised in the EIS and addressed through application of management measures including:

- a heavy vehicle speed limit of 40 km/hour will be adopted for all trucks utilising Sandham Road
- heavy vehicles will have a maximum capacity of 42.5 tonnes
- a maximum of 37 truck deliveries per day (74 movements to or from site) will be permitted to haul emplacement material to the site
- all trucks hauling emplacement material should be covered before entering the public road network and should maintain a reasonable amount of vertical space between the top of the load and top of the trailer.

The EIS acknowledges a portion of the Sandham Road comprises and all weather gravel access road, although it is noted the road is sealed with a bitumen surface in proximity to residential receivers in Bell.

Responsibility for maintenance of the road lies with both Lithgow City Council and Blue Mountains City Council in the respective local government areas. The applicant acknowledges there will be a need to negotiate a suitable developer contribution or via a planning agreement under section 7.4 of the EP&A Act for use of Sandham Road.

The Applicant is willing to establish and facilitate a community consultation committee if development consent is granted, so that residents can identify and the Applicant can address any issues of concern throughout the life of the Project.

Issue

Suitability of Darling Causeway for additional trucks movements in terms of safety to other road users including cyclists and the potential for vibration from trucks to impact upon residents in Mount Victoria and cause damage to homes.

Response

Darling Causeway is an approved B-double route that currently receives moderate volumes of heavy vehicle traffic. Detailed traffic counts were undertaken to determine peak hour traffic volumes and showed that between 15 and 30% of existing traffic on Darling Causeway comprise heavy vehicles. The addition of up to 17 heavy vehicles per day will not significantly increase the level of heavy vehicle traffic or associated impacts to safety.

Roads and Maritime Services operates and maintains classified roads on the haulage routes and identifies parts of road network that have a road shoulder as being high difficulty on-road cycleways under their 'CyclewayFinder'. This includes sections of the Great Western Highway highway between Mount Victoria and Blackheath and the commencement of the Darling Causeway (Station Street). Roads and Maritime recommends that these sections of the highway should only be considered for use by experienced cyclists, as these routes are used by high volumes of cars, buses trucks etc.

The haulage vehicle are not expected to significantly contribute to vibration with potential to impact upon properties located at Mount Victoria or elsewhere along dedicated heavy vehicle routes. Vibration generated from heavy vehicles can vary based upon a number of factors including the type of vehicle and the road surface. While it may be possible to perceive vibration from a passing truck, the haulage vehicles are not expected to result in structural damage to any nearby residential or commercial properties.

Issue

Noise relating to loading and unloading of vehicles.

Response

A detailed noise assessment was undertaken as part of the EIS and reported in Chapter 11 and Appendix G of the EIS. The assessment was completed in accordance with the EPA's Noise Policy for Industry to assess emplacement activities such as unloading of vehicles at the site and the Road Noise Policy to assess the impact of noise generated by haulage vehicles travelling on public roads.

The modelling demonstrates the quarry operations will achieve compliance with project specific noise trigger levels for all stages of the Project.

2.4 Flora and fauna

Issue

The site is naturally regenerating with native flora and fauna and is currently inhabited by native fauna. The EIS also states that 33 threatened fauna species are located in the study area, what action will be taken to protect the species?

Response

The EIS noted that the Soil Conservation Service of NSW has prepared the Bell Sand Quarry Closure Review (2014) and implemented some limited improvements to ground cover and drainage at the site. There is however considered to be a significant opportunity to achieve superior rehabilitation outcomes through rehabilitation of the site to a condition closely representing the original landform and that of the adjoining Blue Mountains National Park. Revegetation of the site with locally endemic species will provide effective integration with the surrounding landscape.

A detailed biodiversity assessment was undertaken to consider the potential impact of the Project on ecological values. The results of the assessment are reported in Chapter 8 and Appendix D of the EIS and includes a particular emphasis on threatened ecological communities, populations and species protected under State and Commonwealth legislation.

The field surveys recorded one threatened species at the site and also identified habitat with potential to support threatened species dependent upon water courses or swamps for breeding were located along the watercourse downstream from the site.

The Project will not directly impact upon any threatened flora species or ecological communities by clearing of native vegetation or significantly impact upon habitat resources for native fauna. Tests of significance were undertaken to determine the potential for significant impacts upon threatened biota potentially impacted by the Project and concluded there would be no significant impacts associated with the project.

The surveys and assessment were undertaken by experienced ecologists accredited in undertaking assessments under the Framework for Biodiversity Assessment and the new Biodiversity Assessment Methodology. The assessment approach and methodology are clearly documented in the EIS.

Issue

The dumping of waste products in an area where endangered animals are located could lead to extinction.

Response

The EIS identifies that based upon database records and broad habitat requirements there is potential for 33 threatened fauna species to occur within the study area, which is largely reflective of the location adjacent to protected areas in the Blue Mountains National Park.

One threatened fauna species, the Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*) was recorded at the site. This is a wide ranging species that forages over forested and cleared areas. No roosting or breeding habitat is present in the project site.

Most threatened fauna species that may occur are highly mobile species, and would only occur in the project area on a transient basis if at all given the highly disturbed nature of the site. Lack of suitable hollows limits breeding habitat in the project area.

Species with the potential to be impacted by the proposal are those that are dependent on watercourses or swamps for breeding and include:

- Giant Dragonfly
- Giant Burrowing Frog
- Red-crowned Toadlet
- Littlejohn's Tree Frog
- Blue Mountains Water Skink.

The potential impacts of the species was assessed in accordance with approved assessment methodologies and the Project was determined to be unlikely to have a significant impact upon any of the species. The detailed assessments of significance are included as Appendix C of the Biodiversity Assessment included as Appendix D in Volume 3 of the EIS.

Issue

The proposal inadequately considers the risk of the introduction of invasive weeds and non-endemic species as well as impacts associated with erosion and sediment control over the life span of the Project. What measures will be undertaken for weed control.

Response

The potential for weed invasion, edge effects and the introduction of pests and pathogens was included in Section 8.3.2 of the EIS and Section 5.2.2 of the detailed Biodiversity Assessment included as Appendix D.

The site was identified as containing a number of weeds including English Broom which is a weed of national significance and a number of other environmental weeds including Pampas Grass (*Cortaderia selloana*), African Lovegrass (*Eragrostis curvula*), Common Centaury (*Centaurium erythraea*) and Lamb's Tongues (*Plantago lanceolate)*

Edge effects to the surrounding bushland were identified to have resulted from the previous extraction operations and the Project was considered to have limited potential for additional impacts as the rehabilitation activities will be restricted to the existing quarry footprint.

A detailed water management system has been developed to provide erosion and sediment control for each stage of the Project. All stages including the final rehabilitated landform will retain the existing sediment basin, which provides a final level of control prior to any water entering the drainage line representing the receiving waters for the Project.

Mitigation measures would be included in the Construction Environmental Management Plan (CEMP) to prevent the introduction or spread of disease that could potentially impact threatened

biota in the study area, which were strongly supported in the OEH submission. Relevant measures from the EIS will include:

- Develop a weed management plan to manage weeds during the construction phase of the Project, including the priority weeds in accordance with the Biosecurity Act.
- This would include the management and appropriate disposal of the weeds that are present within the Project area prior to commencement of earthworks and throughout the duration of the Project (to avoid mobilisation of weeds such as Pampas Grass and Broom into the adjacent National Park as a result of works).
- Vehicles and other equipment to be used on site should be cleaned to prevent the introduction of further exotic plant species or disease.
- Incorporate control measures in the design of the Project to limit the spread of weed propagules downstream of Project area. Sediment control devices, such as silt fences, would assist in reducing the potential for spreading weeds.
- Revegetation should utilise native over storey, mid storey and groundcover species that are representative of the native vegetation communities adjoining the Project area and local provenance seed.
- Exposed soil at final levels would be sown or planted immediately to help prevent colonisation by weeds
- Protocols to prevent introduction or spread of chytrid fungus should be implemented following Office of Environment and Heritage Hygiene protocol for the control of disease in frogs (DECCW, 2008).

In addition, recommendations contained in the OEH submission will be adopted to minimise the potential introduction of pathogens to the site and will include:

- No fill is to be imported from areas known to contain Phytophthora, Myrtle Rust or Chytrid fungus
- Samples of fill will be tested for pathogens at the point of origin, and results received prior to transporting to Bell Quarry. In the event that a positive result is returned, the fill will not be imported to the site
- A baseline study of pathogens at the site should be conducted and an ongoing monitoring and review program established.

Issue

The quarry is rehabilitating itself and the site has become a major water source for wildlife. Filling with foreign fill does not equate to returning it to its original state.

Response

There is considered to be a significant opportunity to achieve superior rehabilitation outcomes for the site. A final landform closely replicating the original topography was selected as the preferred alternative to best integrate with the adjoining protected areas within the Blue Mountains National Park and control surface run-off and drainage through the site. The rehabilitation works are supported by the OEH and NPWS who have confirmed that a licence is intended to be issued to the Applicant to allow the works to be carried out in the parts of the site that encroach into the Blue Mountains National Park.

Extensive modelling was undertaken to develop a final landform that replicates the original landform as accurately as possible. The modelling of the various landform options commenced with a survey of the site, including a bathymetric survey to estimate the location of the base of

the areas currently storing water, and hence calculate the volume of water being stored on the site.

Previous quarry plans and historical air photos were used as the basis to develop a three dimensional model of the landform surface using modelling software, 12D.

The existing quarry voids represent an artificial water body that does not provide significant habitat for threatened species likely to be located in the study area. The large voids have also altered flow patterns to sensitive downstream environments, which will be returned to be more representative of natural patterns following completion of the Project.

Issue

What action will be taken to protect fish located within the voids?

Response

No fish were identified in the voids during environmental investigations for the EIS and the potential for significant populations is considered low due to the lack of a defined channel for portions of the downstream drainage line and lack of fish passage to enable access from the downstream sediment basin to the quarry voids.

There is also no knowledge of any previous stocking of fish within the voids and no reason for this to occur given nature of the previous extraction operations.

If a population of fish within the void requires removal they will be managed in accordance with DPI guidelines.

2.5 Water

2.5.1 Introduction

A large proportion of comments received with relation to water questioned the predictions with relation to the quality of water discharged from the site. This included the methods used to predict the quality of water that has come into contact with emplaced material, and the translation of this into predicted discharge water quality for surface and groundwater.

Review of the above comments would benefit from the following summation of the relevant assessment methodology and outcomes. This summation is first presented on a conceptual basis and subsequently with respect to details and technical considerations.

Assessment Conceptualisation

VENM and ENM is soil and rock material with naturally occurring chemical substances which can leach from the emplaced material and could differ from the local geology. Where there is up to 2% of waste as stipulated in the ENM Order 2014 then the concentrations are limited in the order where the substances may not be naturally occurring. The ENM material proposed to be imported must be more than 98% by weight natural material with some potential for anthropogenic waste in it such as brick, tiles, asphalt, concrete, textiles like carpet, plasterboard, etc.

All substances in the solid state are able to dissolve to various extents into water. This occurs more readily for some substances than for others and is also a function of the contact time between the soils and water. When water comes into contact with emplaced materials, either in the form of surface water or groundwater, there is therefore a potential risk that the resulting water quality leaving the site would have been altered by coming into contact with this material. The contact of water and the emplaced material can be controlled by covering the emplaced

waste with soils which are local to the area and in a staged manner by revegetating the local cover soils to reduce rainfall infiltration into the emplaced material.

The approach adopted in the Water Resources Assessment included as Appendix C of the EIS takes this into account and is based on US EPA developed dissolution factors, referred to technically as the partition equation. The USEPA soil-water partition equation (USEPA 1996), is an industry standard equation for estimating the potential transfer of inorganic and organic substances in soils into the liquid state. The soil-water partition equations were calculated for inorganic and organic substances using the maximum average concentrations (or the absolute maximum concentrations, where no maximum average concentration exists) in the ENM Order which sets the acceptance criteria for emplacement material at the site. The partition equation presents an equilibrium where no further dissolution can take place and estimates the quality of water that comes into contact with the materials.

The assessment also considered that prior to discharge from the site this water then mixes with other water (such as runoff from areas without emplaced material and water in the void) before discharge to the receiving environment will occur).

These resulting predicted discharge concentrations were then compared to the *ANZECC, 2000* ambient water concentrations guideline values for environments of high conservation value. These guidelines are the industry benchmark for protection of environmental values of waterways (refer Section 2.2.1.)

A range of VENM and ENM samples were also collected with a purpose of evaluating the soil partition equation for a variety soil types from areas which may supply emplacement material to the Project. The source of the material is not confined to a single construction project, so the samples are considered a general representation of soils which meet the ENM Order.

Similar water quality to that of the leachate samples is not expected in runoff from emplaced ENM, as contact and interfacing times between the ENM and rainfall runoff will be lower than that of the ASLP tests, which involves tumbling the soil/rock sample with water for 18 hours.

The average leachate concentrations from the emplaced material was then modelled following mixing with run-off from other areas of the site in accordance with previous approach using the soil water partition equation (but instead using the ASLP leaching results) to determine an extremely conservative worse case representation of potential discharge water quality

The assessment also considered the risk of water that has mixed with the emplaced material being discharged to groundwater downstream, with potential subsequent impact on downstream groundwater receptors including ecosystems that are dependent on receiving groundwater. This involved firstly estimating (via geochemical modelling) for which substances natural groundwater discharge into the swamp could be at a greater concentration than existing swamp conditions. Then further analysis was undertaken to predict the likely concentrations of ENM substances at the swamp taking into account natural processes that reduce concentrations in groundwater.

Following the completion of the geochemical modelling, an additional analytical fate and transport model, coupled with a mass flux assessment, was completed as a further line of evidence to further predict the impacts on the down gradient swamp water quality.

Assessment Details

With relation to surface water discharges the details of the assessment undertaken are as follows:

- The characteristics of water that has come into contact with emplaced material was estimated based on the US EPA partition equation and the ENM Order maximum average concentrations. It is noted that there is conservatism in this method in assuming that

equilibrium is reached, where this is likely to not be the case in reality and that all emplacement material is representative of the average maximum concentration for substances included as acceptance criteria for the site.

- The water balance model informed the flow proportions assessment to quantify at the site discharge the total proportion of water that has come into contact with ENM for each stage of the development
- Utilising the above two items and geochemical (PHREEQC) modelling the actual quality of discharge water quality was predicted.
- Based on the above, exceedances of GVs was predicted only for pH and EC. pH was noted to be closer to GVs than the natural values observed during the site inspection and hence would not result in impact. EC was noted to be extremely conservative and restricted to the final stage of the development. Proactive monitoring and review of the performance against the model predictions for each stage of the Project will highlight any potential exceedances well before Stage 6 and appropriate adaptive management measures put in place to ensure there is no exceedance. This could involve covering the emplaced material (so it is not exposed) before rainfall with the same geological material (sandstone) as present at and around the site.
- Therefore, based on the US EPA partition equation and the ENM Order maximum average concentrations significant impacts to receiving waters were not predicted.
- To provide further assessment and conservatism, analysis of soil/rock leaching data was undertaken by selecting a range of soil types generally representative of the ENM Order compliant material. The results, were used to provide a conservative estimate of the maximum potential leachate concentrations from the samples which are not predicted to occur in practice.
- This water balance model was re-simulated with reduced emplacement areas, developed as a potential future mitigation measure as outlined in Section 6 of the assessment, to re-estimate the total proportion of water that has come into contact with ENM.
- Utilising the above two items and PHREEQC modelling the actual quality of discharge water was re-estimated.
- Based on the above, exceedances of GVs was predicted only for pH and Zinc. For zinc, the assessment cited additional sources noting that other chemical processes are likely to reduce zinc toxicity and the exceedance is reflective of background water quality.
- Therefore, it was concluded that even in the unexpected event that the actual site conditions match the highly conservative Soil/Water leaching results, the mitigation measure of reducing the exposed emplacement areas could be implemented such that no significant impacts to downstream water quality are anticipated.

Assessment was also undertaken with relation to predicted groundwater conditions and the potential impact on the nearest identified GDE, a swamp 200 m downstream of the site:

- PHREEQC modelling indicated that the concentration of groundwater discharge into the swamp may exceed the concentrations within the swamp only for Cu, Zn and Cd out of the selected representative analytes.
- Cu concentrations in the groundwater currently exceed the concentrations in the swamp and the Project is not expected to increase these concentrations in groundwater.
- The predicted concentration of zinc in groundwater discharge to the swamp (based on PHREEQC modelling) was found to be less than the GV after application of an attenuation

factor based on the ratio of the existing groundwater concentration to the existing swamp concentration.

- As a further line of evidence, fate and transport modelling was undertaken to assess the migration of zinc between the backfilled voids and the swamp when natural attenuation (adsorption) is considered. Overall, the lines of evidence from the modelling suggested that the Project will result in a very minor change (if any) to zinc concentrations in the swamp.
- Fate and transport modelling was undertaken for Cd to assess the migration of Cd between the backfilled voids and the swamp when natural attenuation (adsorption) is considered. As for zinc, the P20 model suggests that the concentration of Cd in groundwater discharge will approach the ENM leachate source concentration under steady state conditions, however this will take over 10,000 years to occur. Based on this steady state concentration, the mass flux assessment suggests that the Project will result in a very minor increase to the Cd concentration within the swamp under very conservative conditions of zero additional rainfall or surface water inputs.
- On the basis of the above the project is not anticipated to result in impacts on the identified GDE swamp downstream of the site.

2.5.2 Leaching characterisation

Issues were raised with relation to estimation of characteristics of water that has come into contact with the emplaced material. These have subsequent implications for the items with relation to both surface and groundwater quality as discussed in Sections 2.5.3 and 2.5.4.

Issue

A submission states that whilst the EIS provides indicative soils to be emplaced it does not appear to have made a similar assessment of the soils in the site vicinity, therefore not allowing comparison.

Response

Review of the soils for emplacement is undertaken to inform the assessment of potential runoff quality. This is then used to inform modelling that is compared to ANZECC GVs for impact assessment. Existing void and downstream water quality sampling is also undertaken and considered in the assessment.

These methods are considered more conservative than comparison of similarity to soils in the site vicinity. This is on the basis that:

- The leachate prediction methods adopted (partition equation and soil/rock sampling) is likely to overestimate concentrations in the fact that it represents contact times which are unlikely to occur for much of the actual water on site
- If this was adopted for the existing soils it may provide an artificially high baseline concentration and therefore not reflective of the potential to increase concentrations in comparison to the background.
- This is not represented in the adopted method of comparison to guideline values.

The surface and groundwater quality sampling undertaken also provides an indication of the existing soil:water interaction characteristics.

Overall the assessment is considered conservative and representative of the reasonable worse case discharges from the site.

Issue

A submission noted that Soil/rock sampling was limited in nature and not a detailed investigation of each source site. They also noted there was a wide variability in the soil leachate tested, and that some of these leachates would alter characteristics and ionic balance of downstream waters.

Response

The source sites are not confirmed for the duration of the Project and the sampling was intended as a representation of the range of soil that is sought to be permitted to be imported under the ENM order.

Soil/rock leachate sampling is not anticipated to be the most representative method of estimating likely leachate quality. It was included in the assessment as general review of the accuracy of the partition equation method and therefore one sample for a selection of soil types is considered appropriate.

The leachate results are not directly indicative of discharge water quality as the ASLP tests involves tumbling the sample with water for 18 hours to generate the maximum potential leachable fraction, which would not be represented in actual site processes. Discharge quality is also a function of the proportion of rainfall and run-off coming into contact with emplaced material compared to run-off from surrounding natural of rehabilitated surfaces which is best assessed through the combined consideration of leaching properties and volumetric assessment of mixing proportions, as undertaken in the assessment.

Note that direct comparison of ASLP results to applicable trigger values considered a conservative approach as it does not account for natural attenuation processes including adsorption, precipitation, catchment dilution and secondary mineral formation.

Issue

The EPA stated they consider it likely that soil leachates will adversely alter natural characteristics of water draining to downstream systems.

Response

This statement is an implied perception rather than a specific comment on the assessment and conclusions presented in the EIS. Predicted discharge results are presented in Table 5-6 of the water resources assessment for the most representative estimation method. The only predicted exceedances of GVs are for pH and EC with analysis of these exceedances as outlined in the reporting predicting no significant impact. pH was noted to be closer to GVs than values observed during the site inspection and reflective of the slightly acidic nature of water in the catchment. EC was noted as being extremely conservative and restricted to the final stage of the development. Proactive monitoring and review of the performance against the model predictions for each stage of the Project (and confirming the predictions for the future stages) as required as part of the CEMP,will highlight any potential exceedances well before Stage 6 and appropriate adaptive management measures put in place to ensure there is no exceedance assessment limits.

Table 5-10 presents discharge quality predictions for a less representative and more conservative estimation method and exceedances only with relation to pH and Zinc are predicted. Likewise, analysis of these exceedances as outlined in the reporting (and discussed above) predict no significant impact to receiving water quality.

Issue

A submission noted that ADE (2017) identified that their study was limited and conservative assumptions into the input of the model.

Response

The purpose of the ADE study was the provide further assessment and analysis of the potential soil characteristics and maximum leachable fraction of potential pollutants from sites considered representative of the areas which may supply ENM to the Project.

Results of the soil/rock testing of the nine samples indicated there were no exceedances of the ENM order maximum average concentrations, with the exception of pH for the Glenorie and Lucas Heights samples, which had pH values lower than the minimum average pH as per the ENM order. The pH of these samples however, was not lower than the absolute minimum pH (4.5 pH units).

It is noted that leachate results are not representative of the quality of runoff from the tested material, due to the contact time and agitation involved in the ASLP, which involves tumbling the sample with water for 18 hours. The results, however, were used for this purpose to provide a conservative estimate of the maximum potential leachate concentrations in runoff from the samples.

The statement 'potentially prohibitive to the project' was in relation to potential soil screening levels without allowing for any mixing with other catchment run-off within the site prior to discharge. This was completed at any early stage of the assessment during development of the staging sequence and water management system and is not related to the potential discharge water quality from the site.

Detailed modelling was subsequently undertaken using the highly conservative leaching data from the ASLP tests and demonstrated minimal potential to impact upon receiving waters. This was achieved by limiting the area of exposed emplacement material in accordance with Section 5.2.2 of the Water Resources Assessment.

All inputs into the model are considered conservative and reflective of a reasonable worse case for anticipated discharge water quality from the site.

2.5.3 Surface water discharge quality

Issue

Issues were raised in the submissions with relation to the adequacy of assessment of downstream ecology with respect to surface water.

Response

As outlined in Section 2.5.1 the assessment predicted that the quality of discharge waters would not result in significant impacts downstream. This was undertaken using conservative assumptions and multiple modelling techniques in recognition of the sensitive nature of the receiving environment.

Detailed biodiversity investigations were also undertaken to understand the baseline ecology of the receiving environment and reported in Chapter 8 and Appendix D of the EIS.

As such, the level of assessment of the downstream environment is considered appropriate.

Issue

OEH noted that the EIS identified a downstream swamp, proposing for it to receive discharge, pumped out water and leachate from the material (via groundwater), with there being no current licensed discharge location.

Response

As outlined in Section 2.5.1 the assessment predicted that the quality of discharge waters would not result in significant impacts downstream. On this basis, and because the Project is exempt from the need for a licence under the POEO Act, a licensed discharge location is considered to not be required as discussed in 2.2.1.

Issue

The submissions highlight items which are stated to be inconsistencies in the reporting with relation to water quality guideline values and predicted water quality including:

1. Inconsistency between the statement in the assessment of no exceedances of ANZECC (2000) GVs and table 7.10 for pH and EC
2. Inconsistency between Table 7.14 metal concentrations and EIS statements.

Response

Responses are provided below with relation to the above two items

1. Page 76 of the EIS introduces Table 7-10 and provides discussion on the pH and EC exceedances, which are therefore included in the impact assessment undertaken (pH is noted to be closer to the GV than those observed onsite and is reflective of the slightly acidic natural catchment conditions. EC is noted to be an extremely conservative estimate and will be monitored throughout the progression of the Project). Page 76 does state there are no exceedances of the ANZECC (2000) GVs with relation to Table 7-10, but this is stated as being for metals.
2. It should be noted that Table 7.14 of the EIS is with relation to groundwater modelling. The analysis demonstrates that simulated concentrations of the existing groundwater seeping into the swamp at 200 m from the site boundary under existing conditions (SIM 1) exceeds actual concentrations in the tributary (sampled in March 2017) for Cu, Ni, Zn and Hg. This suggests that metal attenuation along the migration pathway and within the swamp is greater than initially simulated by the model. Attenuation factors were then calculated and included in the geochemical model and highlighted there was only potential for a very minor exceedance for Cadmium based upon the most conservative ASLP leachability analysis. To further investigate the potential for exceedance a fate and transport groundwater model was undertaken and demonstrates that the development would have negligible potential to increase the concentration of Cadmium. Assuming no rainfall over one year the concentration would increase by approximately 0.3% of the respective guideline value and meet ANZECC Guidelines

Issue

Submission states that the water resources assessment fails to discuss the following with relation to impact assessment of predicted water quality:

1. The zinc measurement for W1 being between 95% and 99% ANZECC species protection
2. The zinc measurement for W3 (0.019 mg/L) was influenced by Clarence Colliery discharge

3. The zinc measurements for soil leachates ranged from 0.03 mg/L to 0.484 mg/L
4. That Table 5-9 identifies a range of other leachate results with exceedances of the GVs
5. That only one leachate sample has been measured for each soil type
6. That soils tested may not be representative of the worse soils to be emplaced

Response

With relation to item 1, the GVs discussed in the Water Resources Assessment are with relation to the 99% values and therefore the implication that a value between the 95% and 99% value is a “minor exceedance”, as stated in the assessment, is reasonable. The value being between the two percentiles could be explicitly stated in this context with no significant change to the outcome of the discussion.

With relation to item 2, the discussion refers to Table 4-1. The title of this table is “Water quality data for the Wollangambe River upstream and downstream of the Clarence Colliery discharge”. It is therefore apparent from the table that the second column of observations (which contains the 0.019 mg/L observation) is with relation to a location downstream of the colliery. Therefore, this consideration is already clear in the reporting, and the discussion provided is with relation to the other location W1 for which the discussion is valid.

With relation to items 3 and 4, the leachate results are not directly indicative of discharge water quality. This is predicted in the assessment on Table 5-6 based on the USEPA partition equation and Table 5-10 assuming average leachate water quality from soil/rock sampling. Predictions made using the USEPA partition equation are considered to be more representative of the likely quality of the site discharge as the soil/rock sampling involves tumbling the sample with water for 18 hours, which would not be represented in actual site processes. Comparison of undiluted ASLP leachate to ANZECC criteria is noted to be overly conservative within the industry and dilution factors of between 10 and 100 is generally applied to ASLP results when considering environmental significance. With relation to item 5 and 6, as noted above leachate sampling is not anticipated to be the most representative method of estimating likely leachate quality. It was included in the assessment as general review of the accuracy of the partition equation method and therefore one sample for a selection of soil types is considered appropriate.

The soil partition equation adopted from Allison and Allison (2005) were based upon a review of 240 articles and reports involving a comparison of 1170 individual leachate values. The partition equation modelling was based upon the average maximum concentrations able to brought to site in accordance with the ENM Order and is considered to represent a reasonable worse case scenario for discharge water quality.

Issue

Lithgow Council questioned what the discharge monitoring program would be over the life of the Project would be.

Response

Section 7.3.3 of the EIS and Section 6.1.2 of the Water Resources Assessment provide the proposed monitoring program which includes the site discharge. This includes monitoring prior to rehabilitation, during active filling and post closure. The EIS proposed that the site discharge, the downstream tributary, and a reference site on the tributary to the north of the site be monitored monthly (during discharge) and the pit water monthly and runoff from clean fill and other areas monthly (when there is rainfall) or as otherwise agreed with the appropriate authority and following whole of site rehabilitation for a period agreed with the determining authority via a post closure monitoring plan for the following parameters:

- **Physicochemical parameters**: pH, EC, turbidity, TSS, TDS, O&G.
- **Cations:** sodium, calcium, potassium, magnesium.
- **Anions:** alkalinity, sulfate, chloride.
- **Metals (dissolved)**: aluminium, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, nickel, zinc
- **Nutrients**: ammonia, nitrate, nitrite, NO_x, TKN, TN, TP, RP
- **Organic compounds:** BTEX, naphthalene, benzo(a) pyrene, TPH (C10-C36)**.**

The monitoring program would be further refined if required through the review of the potential for impacts of the emplacement of VENM and ENM to be undertaken every two years as proposed in the Water Resources Assessment.

Issue

Blue Mountains Council state that the potential impact of importation of material has predominately been assessed through modelling in terms of heavy metals and contaminates. However, they state that importation of higher levels of nutrients and sediments could result in downstream impacts.

Response

Potential impacts with relation to nutrients are discussed in Section 5.4.2 of the Water Resources Assessment including the consideration that it is likely that biotic uptake and decomposition would reduce these concentrations substantially prior to discharge from the site.

With relation to sediment a low impact flocculant is proposed to be used for site discharges where required to satisfy the applicable ANZECC guideline value for dewatering activities.

2.5.4 Groundwater dependent ecosystems and receivers

Issue

A number of comments were made in the submissions asking whether a lining system is proposed or stating that one should be proposed or considered

Response

The site is proposed to only receive clean fill classified as ENM/VENM or a specific resource recovery order. As outlined in Section 2.5.1 an assessment was undertaken predicting that the quality of discharge waters (including groundwater) would result in negligible impacts to the downstream environment associated with the slightly different properties of emplacement material arising from different geologies. This assessment did not rely on the mitigation measure of providing a lining system, which is considered to be unnecessary given the nature of the emplacement material.

Issue

OEH notes the presence of the Prickly Tea-tree sedge wet heath swamp downstream of the site suggests there is a groundwater source that maintains the swamp in this location. They state the EIS has not appropriately identified and assessed this swamp as a GDE.

Response

As outlined in Section 2.5.1 the Water Resources Assessment has considered and assessed this swamp as a GDE. It is noted that groundwater assessment used both geochemical modelling and fate and transport modelling approaches to assess potential risks to the GDE and

each approach demonstrated a negligible potential for impacts upon water quality within the GDE.

Issue

Submission highlights potential for drawdown and interruption to groundwater flow as the void is emptied and the potential to impact on Newnes junction, Dargan and Bell bore water supplies.

Response

The Water Resources Assessment included a search of the NSW Bore Database revealing two registered bores within a 1 km radius of the site. These bores lie to the north west and north of the site, and are therefore not in the direction of groundwater flow from the Site. The closest registered bore (GW103734) is approximately 600 m from the site and was not predicted to be impacted by the proposal.

Using the Dupuit-Forcheimer equation (used to predict groundwater inflows into the void), the radius of groundwater drawdown due to dewatering of the voids was predicted. Based on a conservative scenario of complete and simultaneous dewatering of both the north and south voids, and using the higher hydraulic conductivity value of 6 x 10^{-7} m/s, a radius of drawdown of 460 m was calculated. While this will not occur in reality with progressive dewatering proposed to be undertaken over extended periods, it suggests there will be no potential to impact upon groundwater supplies of registered bores in the region.

2.5.5 Fire-fighting water

Issue

Lithgow, Hawkesbury and Blue Mountains Councils noted the loss of water previously used for firefighting should the voids be filled.

Response

It is understood that water in the voids was used opportunistically to assist with bushfire response in previous fires. The site will be progressively dewatered based upon the staging plan provided in the EIS and water will still be available for fire-fighting purposes until Stage 5 when the final void is dewatered. The applicant is supportive of the site continuing to provide emergency fire-fighting water until this stage.

It is noted that any large standing water in proximity to bush fires is used as part of fire fighting efforts and there is no obligation for any individual property owner to maintain water for this purpose.

2.5.6 Downstream creek formation and morphology

Issue

Lithgow Council notes that the downstream creek formation and erosion should be assessed in more detail.

Blue Mountains Council noted that flows are unlikely to mimic the original flow patterns and that limited details on volumes of frequency of flows has been provided.

Response

The level of detail with relation to assessment of downstream creek formation and erosion was determined based on the results of the flow duration assessment undertaken, as documented in Section 4.3 and 5.3 of the Water Resources Assessment (results are attached as Appendix B). In particular, the flow duration assessment found that after rehabilitation flows will be restored to

natural conditions as closely as possible to pre-quarrying conditions and will be significantly closer to natural conditions than is currently the case. The OEH has also acknowledged that the assessment also stipulated that during the Project operational period dewatering rates should be regularly varied to minimise the impacts with the more constant average discharge rates likely to occur during operation. Furthermore, as can be seen from the flow duration results pumped discharge flows are only a small fraction of rainfall derived natural and existing flows during heavy rainfall periods.

On the basis of the above the level of detail for the downstream creak formation assessment is considered appropriate.

Issue

A submission states that the assessment did not discuss the proposed pump out rates from the void and stated that discharge from the site only occurs when the balance of rainwater, groundwater and evaporation result in an overflow.

Response

The Water Resources Assessment frequently refers to pumping and clearly states that pumped dewatering of the voids is necessary. Results of the water balance are presented (attached as Appendix C) and include pumping volumes. The results of the flow duration assessment are presented (attached as Appendix B) showing the full range of site discharge (pumping plus overflow) flows predicted for each of the stages.

The statement that discharge occurs when the balance of rainwater, groundwater and evaporation result in an overflow is in the Water Resources assessment under a subheading of Section 4 which is titled “Existing Conditions”. Therefore, this statement refers to current baseline conditions, not proposed operations during the Project.

Issue

The previous EPL for the extraction phase allowed for a discharge point at the overflow from the sediment dam at the north-east corner of the site. OEH stated that very little discussion of previous operations under the EPL was provided.

Response

Due to the hydrogeological setting, during the historical extractive phase dewatering was likely to have been required to keep the voids dry for extraction. This would have required pumping and subsequent discharge via the discharge point.

The Water Resources Assessment, specifically the flow duration assessment, assessed the natural, existing, proposed operational and rehabilitated stages. During the historical extraction stage discharges would have been most similar to the proposed operational stage due to pumped dewatering discharge occurring in both these situations. Therefore, potential impacts on downstream environments due to proposed activities are most conservatively assessed through comparison to existing and natural conditions, rather than considering the occurrence of historical pumped discharge as a risk reduction with relation to proposed pumped discharge activities.

2.5.7 Water Modelling

Issue

Lithgow Council stated that the water balance has not considered the increase in rainfall/runoff due to climate change.

Response

The water balance represents over 100 years of historical rainfall data compared to a Project timeframe of 15 years. Whilst the modelled timeframe does not directly consider climate change impacts, the much longer dataset compared to the Project timeframe is anticipated to implicitly represent future changes due to climate change. For example, according to NSW OEH Climate Change Regional Maps, annual and seasonal changes in rainfall at the site region (comparing between 1990-2009 and 2020-2039) are anticipated to be less than 5%, other than for autumn where an increase over 10% is predicted. This compares to the highest EIS modelled rainfall year being over 100% greater than the average modelled rainfall year, indicating that (for the timeframe of the Project) variation due to climate change is of a minor impact compared to existing variation in the climate system represented in the modelling.

Furthermore, a key outcome of the assessment is with relation to the predicted relative difference between existing, natural and operational stages. As the modelling assumptions are common to the different stages any implications of assumptions are significantly less for this assessment.

Issue

OEH noted that the water resources assessment relies primarily on modelling to assess flow characteristics, with little empirical data used and no flow data collected on the Wollangambe Tributary. It was questioned whether the model was “detailed” as claimed in the EIS.

Response

The water balance modelling undertaken to assess flow characteristics is detailed in that it considers multiple water transfers throughout the site for each of the voids and models the evolution of the voids over the Project life by representing each of the stages (refer Appendix C). Furthermore, it models this site evolution for a number of different potential climate ‘realisations’.

The modelling does use empirical data for selection of runoff parameters based on Boughton and Chiew, 2003. This reference provides analysis of streamflow data and translates it into usable form for implementation in the widely used Australian Water Balance Model framework. It is correct that runoff data was not collected specific for this assessment. However, the assessment was required to assess a wide range of climatic conditions that can be represented only via a long climate data series of several decades. If new data were to be collected for this assessment the length of the data series collected would be insufficiently short to be effectively utilised to calibrate a model to a long series of rainfall data.

Furthermore, a key outcome of the assessment is with relation to the predicted relative difference between existing, natural and operational stages. As the modelling assumptions are common to the different stages any implications of assumptions are significantly less for this assessment.

2.6 Contamination

Issue

A high risk of contamination of the Wollangambie, Colo and Hawkesbury Rivers and contamination risk to the World Heritage listed Blue Mountains National Park and swamp land

Response

A detailed water resources assessment has been undertaken using multiple assessment approaches to ensure all risks to receiving waters were appropriately identified and assessed.

The Project is restricted to emplacement of “clean fill” and includes acceptance criteria for material imported to the site in accordance with the ENM Order. The Project has utilised modelling using a number of industry recognised modelling methodologies to demonstrate general conformance with the ANZECC guidelines in the immediate receiving waters at the point of discharge from the site.

The potential for any impacts to be considered to the broader catchment is negligible given compliance in the immediate receiving waters and the increasing contribution of run-off from other sources as the size of the catchment area increases.

Issue

Submissions noted that no public assurance of the control of the waste material has been received.

Response

Assurance will be provided through application of the ENM Order monitoring requirements, which will be maintained throughout the duration of the Project including specific requirements with relation to the frequency of monitoring and the number of samples required for stockpiles of particular volume, and the number of samples required for given areas of in-situ material. The ENM Order also include specific guidance with relation to testing analytes and procedures and a requirement to maintain records for a period of six years. Records of the testing will be provided to Council upon request.

Compliance with the ENM Order forms the acceptance criteria at the site and can be subject to audit by regulators.

Issue

Submissions raised concerns with relation to increase in metals discharged compared with natural levels and subsequent downstream impacts.

Response

The ANZECC Guidelines have been adopted as the basis to assess the impact of the Project against defined objectives or values for the receiving waters in accordance with EPA guidance and industry practice. To ensure a conservative assessment, the strictest guideline values (GVs) for toxicants in fresh water at the 99 percent protection level, has been adopted in recognition of the high conservation value of the receiving environment.

The assessment has also considered discharges from the sediment basin at the site boundary and it recognised that ANZECC Guidelines apply to ambient water quality and are not intended to be applied to stormwater discharges or mixing zones associated with a release from a sediment basin.

The most representative modelling (partion- equation) indicates there is not expected to be any exceedances of the ANZECC (2000) GVs for metals predicted for any stage for the Project.

Issue

Unburnt diesel particulates blowing out of exhaust pipes from trucks will leave residue on outdoor furniture and park benches

Response

All haulage vehicle will be appropriately serviced and maintained in accordance with RMS requirements. Further as noted earlier, the applicant's intention is to maximise back-loading through use of haulage trucks from other local extractive industries involved in transport of

product to the Sydney Market in an effort to reduce truck movements through Lithgow and surrounding areas which will also reduce diesel emissions and particulates.

Issue

Table 7.14 relating to metal concentrations shows exceedance whereas the EIS states there isn't any. Clarification also to the zinc concentration in the swamp and rainfall levels

Response

Table 7.14 in the EIS related to groundwater modelling. The analysis demonstrates that simulated concentrations of the existing groundwater quality in the pits seeping into the swamp at 200 m from the site boundary under existing conditions (SIM 1) exceeds actual concentrations in the tributary (sampled in March 2017) for Cu, Ni, Zn and Hg. This suggests that metal attenuation along the migration pathway and within the swamp is greater than initially simulated by the model. Attenuation factors were then calculated and included in the geochemical model and highlighted there was only potential for a very minor exceedance for Cadmium based upon the most conservative ASLP leachability analysis.

To further investigate the potential for exceedance a fate and transport groundwater model was undertaken to predict the potential impacts associated with either zinc or cadmium. The assessment suggests that the Project will result in a very minor increase to the zinc concentration within the swamp under very conservative conditions of zero additional rainfall or surface water inputs. The concentration of zinc in the swamp would increase by 0.00053 mg/L over one year due to groundwater discharge, assuming no additional surface water inputs or rainfall inputs to the swamp which would reduce the effect of groundwater seepage. This increase in concentration is approximately 22% of the GV concentration of 0.0024 mg/L.

The concentration of cadmium in the swamp would increase by $1.9x10^{-08}$ mg/L over one year due to groundwater discharge, assuming no additional surface water inputs or rainfall inputs to the swamp. This increase in concentration is approximately 0.3% of the GV concentration of 0.00006 mg/L.

Overall, there is considered negligible potential to increase metal concentrations in groundwater at the nearest receiver as a result of the Project.

2.7 Social and Economic Impacts

Issue

Loss of amenity to residents due to an increase in noise (from machinery and truck movements) and air pollution. Dust would pollute drinking water as well as surrounding residential dwellings and nearby villages.

Response

Detailed noise and air quality modelling was undertaken in accordance with EPA policies and guidelines as part of the EIS. The modelling indicated compliance at all nearby receivers for both emplacement activities within the quarry site and use of Sandham Road as a haulage route.

The modelled dust emissions from the Project fall considerably below EPA Guideline limits and are not considered to have potential to significantly affect rainwater tank supplies at any residential property.

All trucks delivering material to the site will have loads covered to prevent dust or spillage of material and will not significantly impact upon nearby receivers. All haulage roads are approved for use by heavy vehicles.

The Applicant is willing to establish and facilitate a community consultation committee so that residents can voice any issues that may arise throughout the life of the Project which can then be efficiently considered and dealt with by the Applicant in a consultative way.

Issue

Loss of tourism and activities within proximity to a World Heritage Wilderness area and a gateway to the National Park.

Response

The Bell Quarry site adjoins a relatively remote section of the 1.03 million ha Greater Blue Mountains World Heritage Area (GBMWHA). The site is located in an area with a long history of extractive industries and is bordered by an approved Kaolin Clay Mine and in close proximity to Clarence Colliery and the Hanson Quarry. The site has limited visibility from surrounding areas as a result of the steep to undulating landform and dense vegetation and is not visible from any key tourist destinations or sensitive areas such as walking trails that are regularly utilised by visitors of the national park.

The Project has been designed to operate within the capacity limits of the previous quarry operations and there is no evidence to suggest a loss in tourism or activities in the Blue Mountains National Park or surrounding locality.

Issue

Loss of income and employment to small businesses in the vicinity of the site due to excessive noise from truck movements.

Response

The site has operated as an extractive industry since the 1960s and is in close proximity to other mining and extractive industries. Detailed air and noise modelling has been undertaken as part of the assessment and demonstrates the Project will comply with all respective EPA criteria.

The Project is of equivalent scale to the previous extraction operations and will result in a relatively low number of truck movements equating to an average of 19 truck deliveries per day.

The scale and location of the development is considered to have no significant impacts on small businesses (if any) in the locality however the Applicant submits that the establishment of a community consultation committee will assist in addressing any issues that may arise throughout the life of the Project. The Applicant intends to work with the community into the future to ensure that the Project is managed in such a way that reduces as much as possible the amenity impact on local residents and small businesses in the vicinity of the Project.

Issue

Property prices will be decreased due to noise and dust impacts.

Response

The site has operated as an extractive industry since the 1960s and is in close proximity to other mining and extractive industries.

Projects of this kind are specifically contemplated by the relevant environmental planning instruments in these zones and detailed air and noise modelling has been undertaken as part of the assessment which demonstrates the Project will comply with all respective EPA criteria.

Further, an upgrade to Sandham Road which the Applicant proposes through developer contributions in a planning agreement, will be beneficial to and contribute to the amenity of the

residents that use Sandham Road which in turn may increase the saleability of the properties that are accessible along Sandham Road.

Lastly, while not under-estimating the genuine concern voiced in these comments, the impact on land values of legitimate development should not be a prime consideration for consent authorities in assessing the planning merit of a proposal unless that impact extends to the widest community, which is not the case in this application.

Issue

Submissions queried the hours of operation in comparison to industry standards and for all activities associated with the Project.

Response

Operation hours for the proposed rehabilitation works will be in accordance with Table 2-3. Rehabilitation activities and haulage to the site will be restricted to the hour of 7.00 am to 6.00 pm Monday to Friday and 7.00 am to 1.00 pm on Saturdays. Minor site preparation activities involving the use of a grader and roller to prepare the site for haulage vehicles is proposed between 6.00 am and 7.00 am Monday to Saturday.

Table 2-3 Operating hours

Activity	Day of week	Time	Assessment period
Rehabilitation related activities and transport of materials	Monday-Friday	7:00 am to 6:00 pm	Day
	Saturday	7:00 am to 1:00 pm	Day
	Sunday and Public Holidays	None	-
Preparation of ground on-site for haul trucks	Monday-Friday	6:00 am to 7:00 am	Night
	Saturday	6:00 am to 7:00 am	Night
	Sunday and Public Holidays	None	-

The hours of operation are reflective of the relatively small scale of the development and will be restricted primarily to the day period specified in the Noise Policy for Industry, with minor site preparation activities between 6.00 am and 7.00 am. Dewatering will be restricted to the operating hours for the rehabilitation activities and only small pumps will be required which will not result in a major contribution to noise from the site.

The hours are more confined than many equivalent extraction or resource operations which are permitted to operate 24 hours.

The Project also represents a considerable reduction to the operating hours approved in the existing consent for the quarry operations at the site, where operating hours were permissible from 4.30 am – 10 pm Monday to Friday and 4.30 am – 12 noon Saturday for product transport.

Issue

Health impacts due to dust particles and diesel fumes

Response

Detailed air quality modelling was undertaken as part of the EIS and demonstrated compliance with EPA Guidelines at all nearby receivers.

Issue

The application does not stipulate a security deposit to ensure social, environmental and economic damages are addressed in the long term

Response

The Project is a rehabilitation project and is restricted to the emplacement of clean fill within the existing quarry voids. The EIS has undertaken a detailed assessment and demonstrated there is minimal environmental risks associated with the proposed activities.

It is in the applicant's interest to continue to sustainably rehabilitate the site to maximise the beneficial reuse of the emplacement material so there is no driver to leave the rehabilitation process partially complete. Final rehabilitation with native species will be undertaken progressively for each stage and a pro-active review process will be undertaken at the completion of each stage to confirm model predictions in terms of site discharges.

There is considered to be minimal requirement for a security deposit for a project of this nature.

2.8 General

Issue

Alternative solutions such as rail or other uses of the site.

Response

The Project is of relatively small scale and the haulage operations will operate on approved heavy vehicle roads and have minimal effect on the capacity of the road network.

Use of rail would require multiple handling of emplacement material for transport from a source location to a rail hub and then subsequently from the nearest rail unloader from the site. It is also noted that there is no heavy vehicle haulage permissible on Sandham Road beyond the site towards the Clarence Rail loop so transport to the site would be economically prohibitive and unlikely to be viable.

Issue

Waste from Sydney and other localities being dumped in Lithgow. Council has a position of opposing the acceptance of waste from outside the local government area and as there are other open cut mines in the Lithgow Area this could be seen as the "thin end of the wedge" that encourages further proposals.

Response

The Project is limited to the placement of clean fill that meets the definition of VENM, ENM and other clean fill material that may be subject to specific resource recovery exemptions. Whilst technically the emplacement materials can be defined as waste, they are specifically exempt from licensing and other regulations relating to waste due the low level of risk associated with the material.

It is noted that a modification to the SSD consent for the Wallerawang Power Station has recently been approved by the Minister for Planning (with support of Lithgow City Council) for rehabilitation of the Sawyers Swamp Creek Ash Dam with VENM and ENM from Sydney. The submissions response for this modification approval also suggests landfill sites in Lithgow LGA have been capped and rehabilitated by importing VENM and ENM indicting this is currently and has previously been considered acceptable with the LGA.

The use of VENM and ENM is also approved for use as part of the rehabilitation of numerous quarries in the Sydney region including the Penrith Lakes development and the Hornsby Quarry and is seen as a genuine beneficial use of material that would otherwise be required to go to landfill.

3. References

ANZECC and ARMCANZ (2000) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality. National Water Quality Management Strategy,* Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, October 2000.

EPA (2014). *Waste Classification Guidelines. Part 2: Immobilisation of waste*. Sydney.

EPA (2014) *Resource Recovery Order under Part 9, Clause 93 of the Protection of the environment Operations (Waste) Regulation 2014, The excavated natural material order 2014.* NSW Environment Protection Authority.

USEPA (1996) *Soil screening guidance: technical background document, second edition.* United States Environmental Protection Agency.

UNESCO (2015) Operational Guidelines for the implementation of world Heritage Conservation.

Appendices

Appendix A – Submissions summary

Lithgow CITY COUNCIL

Surrounded by Nature · Steeped in History

DA294/18:LGS
Economic Development & Environment

16 April 2019

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Dear Sir/Madam

DA294/18 – Proposed Rehabilitation of Bell Quarry - Lot 23 DP 751631 - Newnes Forest Road Clarence NSW 2790

Reference is made to the above application and to Council's previous information letters dated 4 December 2018, 25 January 2019 and 12 February 2019.

In addition to Council's previous letters and to enable adequate assessment of your proposal the following matters need to be addressed:

The EPA has reviewed the EIS and has identified that:

- No clarification has been provided on 'clean fill' and any relevant exemptions,
- An environmental protection license would be required, therefore the EPA considered the Project to be 'integrated development'
- The environmental impacts of the project have not been fully identified, however sufficient information has been provided for the EPA to consider that the Project poses an unacceptable water pollution risk to the Greater Blue Mountains World Heritage Area, including the Wollangambe River/Colo River.

Further details of the EPA's review are included in Attachment 1 and Attachment 2. The EPA acknowledges the assistance of the Office of Environment and Heritage (OEH) in its review of the proposal.

Since the EPA considers that the Project poses an unacceptable risk of water pollution to a World Heritage Area and declared wild river catchment, the EPA does not support the Project and recommends that the Project be refused.

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The EPA also notes that, despite its potential impacts on a World Heritage Area and endangered ecological communities, the Project does not appear to have been referred to the Commonwealth as a matter of significance.

Attached for your reference is a full copy of the EPA's response, submissions from Lithgow Council, Hawkesbury Council and Blue Mountains Council.

During the notification period Council received 512 objections. The main concerns are summarised below:

1. Traffic Concerns
   - Number of trucks that are proposed to transverse to the Main Roads, adding to congestion, increase road facilities/accidents, road damage and an increase in traffic noise.
   - The EIS states that the application would operate truck movements as per the previous quarry approval. However, traffic volumes have increased overtime.
   - The EIS has not taken into account truck movements throughout the entire Blue Mountains area.
   - Increase traffic impacts to Sandham Road as the road is not large enough for vehicles to pass, school buses (twice daily), emergency vehicles and trucks. The narrowness of this road raises concerns for public safety to residents, bush walkers, 4WD and motor bike enthusiasts. Sandham Road is unsuitable for the proposed increased traffic movements. Sandham Road is also partially unsealed that would potentially lead to sedimentation runoff into the hydrology of the National Park.
   - The intersection off Sandham Road lacks sight vision onto Bells Line of Road.
   - The vibration of trucks would impact residents in Mount Victoria and could cause damage to homes.
   - The causeway from Mount Victoria is already unsuited to additional truck traffic. It is relatively narrow with many corners. The road is unsafe and the development would potentially be increasing to these impacts. Cyclist using the causeway would be impacted upon with safety concerns.
   - Noise relating to loading and unloading of vehicles.
   - Concerns are raised to the management of truck movements, road safety and hours of operation.

2. Flora and Fauna Impacts
   - The site is naturally revegetating with native flora and fauna and is currently inhabited by native fauna. The EIS also states that 33 threatened fauna species are located in the study area, what action will be taken to protect the species?

- The dumping of waste products in an area where endangered animals live such as The Giant Dragonfly, Giant Burrowing Frog, Red-crowned Toadlet, Littlejohn's Tree Frog, Blue Mountains Water Skink, the Powerful Owl and other endangered species such as frogs, reptiles and birds. These animals would be become extinct.

- The proposal inadequately considers the risk of the introduction of invasive weeds and non-endemic species, as well as impacts of erosion and sediment control over the life span of the project.

- What measures will be undertaken for weed control?
- The Quarry is currently rehabilitating itself. While the topography has changed because of the quarry, it is becoming a significant water source for wildlife. Filling it with foreign fill does not equate to returning it to its original state.

- What action will be taken to protect the fish located within the voids?

3. Water
   - The loss of access to over 600,000,000 litres of fire fighting water from the quarry ponds. The water from the quarry was used during the 2013 State Mine Fire by fire trucks and helicopters to save properties and businesses due to no reticulated water or fire hydrants in the area.

   - The proposal has an inadequate ecological survey, particularly in terms for the potential for downstream impacts on catchments and the National Park.

   - The information within the EIS states the at there are to be no excess of the ANZECC (2000) GVs but table 7.10 water modelling results for the site discharge show excesses of pH and EC.

   - What form of quality monitoring on the site of water discharge and leachate will be taken and how often over the 15 years of the project?

   - The EIS has not taken into account the water balance relating to the increase in rainfall/runoff due to climate change.

   - Groundwater flow as the void is emptied, may cause issues with the Newnes Junction, Dargan and Bell bore water supply and actions taken to ensure the supply to residents.

   - The downstream creek formation and erosion should be addressed in more detail.

4. Contamination
   - The high risk of contamination of the Wollangambie, Colo and Hawkesbury Rivers. Also contamination risk to the World Heritage Blue Mountains National Park and swamp land. This would destroy native flora.

- No public assurance that waste material can be controlled and monitored. It is proposed that the site will be filled with virgin excavated natural materials and excavated natural materials plus other clean fill material. Concerns are raised to what may be actually contained in the fill materials and what testing would be undertaken to ensure there are no pollutants, asbestos or chemicals in the fill that would put the National Park at risk with the run-off.

- Increase in toxic metals in the discharge compared with the 'natural levels', the downstream impacts of those metals on aquatic species.

- Unburnt diesel particulates blowing out of exhaust pipes from trucks that are not properly maintained will leave residue on outdoor dining areas and park benches.

- Table 7.14 relating to metal concentrations shows exceedances whereas the EIS states there isn't any. Clarification also to zinc concentration in the swamp and rainfall levels.

5. Social and Economic Impacts
   - Loss of amenity to residents due to an increase in noise (from machinery and truck movements) and air pollution. Dust would pollute drinking water as well as surrounding residentially dwellings and villages along the Great Western Highway (such as; Bell, Hartley, Mount Victoria, Blackheath, katoomba).

   - Loss of tourism and activities within proximity to a World Heritage Wilderness Area. As this presents the gateway to the National Park.

   - Loss of income and employment to small businesses in the vicinity due to excessive traffic caused by excessive traffic caused by trucks creating noise, diesel fumes, particulates and dust impacts. This would not just be short term effects but it would also have major long term financial impacts.

   - Property prices would be decreased due to dust and noise impacts.

   - The proposal is for a six days per week operation, this is beyond the usual industry hours and would impact weekend trading for many businesses and tourism specifically within the Blue Mountains area.

   - The operating hours for all activities of the development.

   - Hours of operation of the dewatering of pumps.

   - Health Impacts due to dust particles and diesel fumes.

   - The application does not stipulate a security deposit to ensure social, environmental and economic damages are addressed in the long term.

6. General
   - Alternate solutions such as rail instead of road use or other uses for the site.
   - Waste from Sydney and other localities being dumped within the Lithgow Region. If the material proposed to be used as fill then why not reuse it in various ways in Sydney.
   - What type of waste will be placed in the voids and on the site.

Council recommends that you provide a response to each of the above concerns.

All requested further information listed above shall be submitted to Council, organised, complete and in full (not separately) within the ensuing twenty-one (21) day period. In the event you are not able to meet this time frame or wish further clarification in respect to the above matters, it is requested that you contact Miss Lauren Stevens between 8.15am and 11.00am Monday to Fridays on 6354 9999. In the absence of owners consent the Joint Regional Planning Panel will have no ability to entertain the application which will ultimately lead to its refusal.

Alternatively, you may request in writing that the application be withdrawn and a percentage of the Application Fee would be refunded.

Yours Sincerely

L. C. Stevens

Lauren Stevens
DEVELOPMENT PLANNER

Our reference: SF17/45272; DOC19/29180-04
Contact: Ms Alex McGuirk; (02) 6333 3807

The General Manager
Lithgow City Council
PO Box 19
LITHGOW NSW 2790

Attention: Ms Lauren Stevens

20 March 2019

Dear Ms Stevens,

BELL QUARRY REHABILITATION DA294/18
INTEGRATED DEVELOPMENT APPLICATION – RECOMMENDED REFUSAL

I refer to the designated development application, DA294/18, including the environmental impact statement (the EIS; GHD, August 2018), for the proposed rehabilitation project at the former Bell sand quarry (the Premises) referred to the NSW Environment Protection Authority (the EPA) by Lithgow City Council (the Council) on 9 January 2019 (the Project).

The Project proposes to receive 2.2 million tonnes of waste at the Premises at up to 140,000 tonnes per year from earthworks projects across Sydney and the local regional area and apply that waste to existing quarry voids. The waste proposed to be applied to land is a combination of virgin excavated natural material (VENM), excavated natural material (ENM) and other "clean fill" material.

The Premises is located adjacent to the Blue Mountains National Park / Greater Blue Mountains Area, which is included on the UNESCO World Heritage List and the National Heritage List. The Premises intersects an unnamed ephemeral tributary to the Wollongambe River, which is within the catchment of the declared wild river known as the Colo River, Greater Blue Mountains World Heritage Area.

The EPA provided input to the Secretary's Environmental Assessment Requirements (the SEARs) for the Project on 8 November 2016 (see Appendix A to the EIS). The EPA noted that it would:

- Require clarification on "clean fill" and any relevant exemptions,
- Review the EIS to determine if the Project requires an environment protection licence, and
- Review the EIS to determine if environmental impacts have been identified and adequately addressed.

The EPA has reviewed the EIS and has identified that:

- No clarification has been provided on "clean fill" and any relevant exemptions,
- An environment protection licence would be required, therefore the EPA considers the Project to be "integrated development",
- The environmental impacts of the Project have not been fully identified, however sufficient information has been provided for the EPA to consider that the Project poses an unacceptable water pollution risk to the Greater Blue Mountains World Heritage Area, including the Wollangambe River / Colo River.

PO Box 1388 Bathurst NSW 2795
Level 102, 346 Panorama Avenue Bathurst NSW 2795
Tel: (02) 63 333800
ABN 30 841 387 271
www.epa.nsw.gov.au

Further details of the EPA's review are included in Attachment 1 and Attachment 2. The EPA acknowledges the assistance of the Office of Environment and Heritage (OEH) in its review of the proposal.

Since the EPA considers that the Project poses an unacceptable risk of water pollution to a World Heritage Area and a declared wild river catchment, the EPA does not support the Project and recommends that the Project be refused.

Should you have any further enquiries in relation to this matter, please contact Ms Alex McGuirk at the Central West (Bathurst) Office of the EPA by telephoning (02) 6333 3807 or by emailing central.west@epa.nsw.gov.au.

Yours sincerely

DR SANDRA JONES
Manager Regional Operations – Central West
Environment Protection Authority

Attachment 1. General Comments

The EPA has reviewed the proposal and has identified that the proposed disposal of up to 2.2 million tonnes of "waste" at a Premises with surface water and groundwater connectivity to the Greater Blue Mountains World Heritage Area represents an unacceptable water pollution risk as set out below.

"*Integrated development*" is established in Division 4.8 of the *Environmental Planning and Assessment Act* 1979. Development that requires an environment protection licence is integrated development and requires the consent authority to obtain the EPA's general terms of approval (GTA). Rather than issue GTA, the EPA is issuing a recommendation that the consent authority refuse the Project.

Relevant terms used below are taken from the *Protection of the Environment Operations Act* 1997 (the Act), the *Protection of the Environment Operations Waste Regulation* 2014 (the Waste Regulation) and resource recovery orders and exemptions issued under the Waste Regulation. Relevant terms include:

- "*waste*" defined in the Dictionary to the Act and
  - "*virgin excavated natural material*" defined in Clause 50 of Schedule 1 to the Act
  - "*excavated natural material*" as per the "*excavated natural material order 2014*" (the ENM Order) and the "*excavated natural material exemption 2014*" (the ENM Exemption),
  - "*clean fill*" is undefined and is therefore considered by the EPA to be "waste".
- "*waste disposal (application to land)*" requires an environment protection licence as per Clause 39 of Schedule 1 to the Act,
- "*miscellaneous licensed discharge to waters*" requires an environment protection licence as per sections 122 and 43(d) of the Act,
- "*waters*" and "*water pollution*" defined in the Dictionary to the Act
- "*prohibition of pollution of waters*" established by section 120 of the Act.

Integrated development: waste disposal ("clean fill")

Nothing in the EIS identifies what materials constitute "clean fill". As such, the EPA considers, that this material should be defined as waste. The application of waste to land requires an environment protection licence. The EIS has not identified the range or concentrations of contaminants in "clean fill". The EPA considers that contaminants in "clean fill" will potentially pollute the land and the downstream environment.

Integrated development: miscellaneous licensed discharge to waters

Nothing in the EIS identifies any water treatment of the existing water in the quarry voids, or of the leachates associated with filling the quarry voids with waste. The discharge of pollutants to waters is an offence, unless authorised by an environment protection licence.

Unacceptable water pollution risk: ENM leachates

In order to use resource recovery orders and exemptions, the EPA's guidance material states they must be genuine, fit for purpose and cause no harm to the environment and human health.
https://www.epa.nsw.gov.au/publications/wasteregulation/150107-order-exemptions-factsheet

The EPA does not consider that using the ENM Exemption to fill Bell Quarry is consistent with these requirements. The EIS states that ENM can have up to 2% (by weight) of non-natural material potentially sourced from excavated, or quarried from areas contaminated with manufactured chemicals, or with process residues, as a result of industrial commercial, mining or agricultural activities. Such material should not be used as fill adjacent to a World Heritage Area and a declared wild river.

It is important that the consent authority consider the notes included in the ENM Order, as resource recovery orders and exemptions do not guarantee that material is suitable for use in an environmentally sensitive location such as Bell Quarry. Attachment 2 contains further details of the concerns with the use of the product ENM. Additionally, clause 2.1 of the Order states:

"The requirements in this order apply, as relevant, to any person who supplies excavated natural material, that has been generated, processed or recovered by the person."

Therefore, the onus on deciding if the material meets the Order sits with the supplier of the material, not the owner, operator or the proponent. The ENM Order includes on page 9, the following notes:

In gazetting or otherwise issuing this order, the EPA is not in any way endorsing the supply or use of this substance or guaranteeing that the substance will confer benefit.

The conditions set out in this order are designed to minimise the risk of potential harm to the environment, human health or agriculture, although neither this order nor the accompanying exemption guarantee that the environment, human health or agriculture will not be harmed.

Unacceptable environmental impact: groundwater dependent ecosystems

Nothing in the EIS identifies any controls to stop any pollutants present in the fill material from mixing with and polluting the groundwater within the quarry. Once mobilised within groundwater, nothing in the EIS identifies any measures to stop pollutants within groundwater from moving from the quarry and downstream into the Wollangambe River.

The EIS identifies a groundwater dependent ecosystem, being the prickly tea-tree – sedge wet heath swamp which is listed as an endangered ecological community under the *Biodiversity Conservation* Act 2016 (NSW; formerly the *Threatened Species Conservation* Act 1997), as potentially impacted by the Project.

OEH mapping further identifies a groundwater dependent ecosystem, being the temperate highland peat swamp on sandstone which is listed as an endangered ecological community under the *Environment Protection and Biodiversity Conservation* Act 1999 (Commonwealth), as potentially impacted by the Project.

The EPA notes that, despite its potential impacts on a World Heritage Area and endangered ecological communities, the Project does not appear to have been referred to the Commonwealth as a matter of national environmental significance.

The EPA considers it likely that some of the soil leachates will adversely alter the natural characteristics and ionic balance of water draining into the Greater Blue Mountains World Heritage Area and the Colo River, Greater Blue Mountains World Heritage Area. As such, the EPA does not support the Project and recommends that the Project be refused.

Attachment 2. Response from EPA referral to Scientific Division, Office of Environment and Heritage

Environmental Impact Statement (EIS) for the proposed Bell Quarry Rehabilitation (Lithgow DA294/18) - Comments

On 11 February 2019, the NSW EPA wrote to OEH SD requesting a review of the environmental impact statement (EIS) for the proposed Bell quarry rehabilitation (Lithgow DA294/18), especially the Water Resources Assessment (Appendix C).
The EPA identified that:
The proposed Bell quarry rehabilitation involves receiving 2.2 million tonnes of waste (at up to 140,000 tonnes per year) from earthworks projects and applying that waste to existing voids at a former sand quarry (the Quarry). The waste is described as virgin excavated natural material (VENM), excavated natural material (ENM) and other "clean fill" material.
The Quarry is located adjacent to the Blue Mountains National Park which forms part of the Greater Blue Mountains Area listed on both the UNESCO World Heritage List and the National Heritage List. The existing voids are located on an unnamed ephemeral tributary to the Wollangambe River, which forms part of the Colo sub-catchment of a declared wild river known as the Colo River, Greater Blue Mountains World Heritage Area.
The Quarry received development consent in 1994 under the approvals framework for mining and quarrying that predated the Planning Act. The surrender of the environment protection licence for the Quarry (EPL 3218 for extractive activities) was approved by the EPA on 24 October 2014 on the basis that the site had been rehabilitated consistent with the development consent (DA 108/94; consent issued 21 November 1994) which provided that the existing voids would be retained as a permanent water source for native fauna and a supplementary water source during bushfires.
The EPA had reviewed the EIS and was concerned that the Water Resources Assessment (Volume 2, Appendix C) did not adequately assess the environmental impacts.
These comments have been prepared to assist the EPA in their consideration of the proposed Bell Quarry Rehabilitation project.

Summary

The proposed Bell quarry rehabilitation involves receiving 2.2 million tonnes of waste (at up to 140,000 tonnes per year) from earthworks projects and applying that waste to existing voids at a former sand quarry (Bell Quarry). The major issues identified in the EIS for the Project are:

- The emplacement material may consist primarily of ENM with up to 2% (by weight) of *non-natural* material potentially sourced from *excavated or quarried from areas from contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities.*

- It is unclear how the 2% (by weight) of *non-natural material* could either be measured, assessed or enforced in terms of the excavated material to be placed at the site.

- ADE (2017) identified that the study was limited by the lack of knowledge of the proposed materials to be imported into the quarry and conservative assumptions into the input of the model.

- The soil/rock sampling undertaken was stated to be limited in nature and was not considered to constitute detailed site investigation of each source site, or each soil/rock landscape/formation (ADE 2017).

- There is no mention in the EIS of installing an impervious membrane (liner) to prevent leachate moving into groundwater. It is therefore likely that leachate will migrate off-site and into the World Heritage Area.

- There was wide variability in the soil leachates tested, depending largely on where they were sourced. Some of these soil leachates could potentially alter the natural characteristics and ionic balance of water draining into the World Heritage Area and Wollangambe River.

- The EIS identified proposed discharges into a tributary of the Wollangambe. It identified a swamp located on the tributary approximately 200m downstream of where the discharge is proposed. The tributary (and its connected swamp) is proposed to receive pumped out water from the quarry pits, any leachate from the material that is emplaced in the pits[1] and overland flow once the area is rehabilitated. The tributary and swamp are in the GBMWHA. There is currently no licensed discharge location for the site.

- The Biodiversity Impact Assessment identified the *Prickly Tea-tree - sedge wet heath* swamp below the quarry discharge location as a Newnes Plateau Shrub Swamp (EEC under the TSC Act) and Temperate Highland Peat Swamps on Sandstone (EEC under the EPBC Act). As the project potentially impacts on the WHA and EPBC listed THPSS, the proposal should have been forwarded to the Commonwealth for assessment.

- The existence of the swamp in the headwaters of the drainage line downstream of Bell Quarry strongly suggests that there is a groundwater source which helps support/maintain the swamp in this location.

- The Water Resources Assessment Section of the EIS has not clearly defined the downstream swamp as a GDE; it has not assessed the level of groundwater dependence for the swamp and the likely pathways (e.g. disruption of groundwater connections, reduction in groundwater quality) by which the project might impact on the swamp; and it does not consider issues surrounding water discharge rates or their effect on geomorphic stability for the swamp. It has therefore not appropriately assessed the risk the project will have on the THPS swamp. Further investigations into the hydrological characteristics of the swamp are needed.

- The Water Resources Assessment Section has primarily used modelling to assess flow characteristics and impacts for the proposal. It is noted that very little empirical data have been collected to either calibrate or validate the model. It is also noted that no 'natural' flow data has been collected in the Wollangambe Tributary likely to receive pumped water, leachate into groundwater and run-off from the final landform for the project. The model therefore appears not to have been appropriately calibrated or validated for local conditions.

- The surface headwaters of the Newnes Plateau and surrounding areas of the GBMWHA generally have excellent water quality with very low concentrations of dissolved and total salts and very low concentrations of most metals, metalloids and non-metallic inorganics (excepting iron and aluminium). It is likely that leachate from the emplacement area, water pumped out from the pits over the life of the project and runoff from the final landform will affect the water quality within the WHA.

Waterways that mainly flow through relatively undisturbed national parks, World Heritage Areas or wetlands of outstanding ecological significance are designated as being of 'high conservation value' (DEC 2006). Strict licence conditions would be needed to ensure discharges from the site are consistent with ANZECC recommendations for the protection of high conservation/ ecological value systems. If the project is considered for approval it is recommended that an impervious membrane (liner) is installed in the quarry pits to prevent any leachate moving into groundwater in the area and then into the GBMWHA.

[1] Which subsequently moves into groundwater aquifers that subsequently drain to the tributary and swamp.

Background

Bell Quarry is located on Sandham Road in Newnes Junction approximately 10 kilometres east of Lithgow, NSW. It is immediately adjacent to the Greater Blue Mountains World Heritage Area (GBMWHA) and within the upper reaches of the Wollangambe River catchment (Figure 1). The EIS states:

- Extraction operations commenced in 1967 and operated under existing use rights until 1994, when a Development Application (DA) was lodged with Lithgow City Council to provide for the continued operation of the quarry.
- Extraction operations continued at the site in accordance with DA 108/94 issued by Lithgow City Council and an Environment Protection Licence (EPL) for extractive operations issued by the NSW Environment Protection Authority (EPA). Active quarry operations at the site have now ceased and the EPL No. 3218 for the operation of the quarry was surrendered to the EPA on the 24th October, 2014.
- The former Bell Quarry has been purchased and Bell Quarry Rehabilitation Project Pty Ltd (BQRP) are seeking to rehabilitate the site through the importation of virgin excavated natural material (VENM), excavated natural material (ENM) and other clean fill material (subject to specific resource recovery exemptions) sourced from earthworks projects across Sydney and the local regional area (the Project).
- Rehabilitation of the site will involve emplacement of clean fill within the existing footprint to enable the site to be returned to a condition closely representing the original landform and that of the adjoining Blue Mountains National Park.
- It is estimated that approximately 1.2 million cubic metres of fill material would be required to fill the site and return it to be representative of the original landform characteristics.

The EIS also states:

> *An ephemeral tributary of the Wollangambe River runs in a north-easterly direction through the project site, with its headwaters in the vicinity of the rail line upstream of the site. The quarry now contains three large voids which are partially filled with water through a combination of surface water run-off and groundwater seepage. Water is discharged from the site through an established sediment basin on the eastern edge of the site and discharges into an unnamed tributary within the Blue Mountains National Park.*
>
> *The tributary passes through a swamp where flows are predominantly subsurface under baseflow conditions and continues for approximately 1.5 kilometres before the confluence with the Wollangambe River. The Wollangambe River winds eastwards through narrow canyons and is one of four major tributaries of the Colo River.*

It appears that this tributary (and its connected swamp within the GBMWHA) is proposed to receive pumped out water from the quarry pits, any leachate from the material that is emplaced in the pits[2] and overland flow once the area is rehabilitated. The operation of the proposed land fill site has the potential to have an adverse impact on the values of the adjacent World Heritage Area.

[2] Which subsequently moves into groundwater aquifers that subsequently drain to the tributary and swamp. See the discussion on groundwater connectivity with Newnes Plateau Swamps later in the comments.

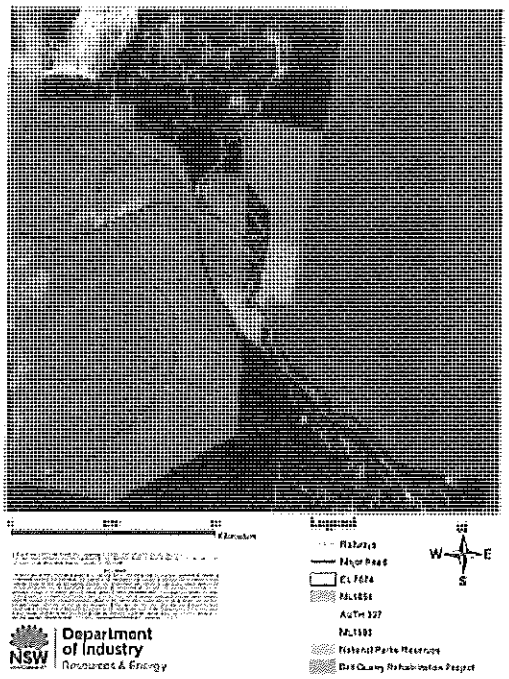

Figure 1. Bell Quarry Rehabilitation Project Area relative to GBMWHA.

Emplacement Material

According to the EIS, the PoEO Act defines virgin excavated natural material (VENM) as 'natural' material (such as clay, gravel, sand, soil or rock fines):

a. that has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities, and
b. that does not contain any sulfidic ores or soils or any other waste.

According to the EIS, excavated natural material (ENM) refers to naturally occurring rock and soil (including but not limited to materials such as sandstone, shale, clay and soil) that has:

a. been excavated from the ground, and
b. contains at least 98% (by weight) natural material, and
c. does not meet the definition of Virgin Excavated Natural Material in the Act.

Excavated natural material (ENM) does not include material located in a hotspot; that has been processed; or that contains asbestos, Acid Sulfate Soils (ASS), Potential Acid Sulfate soils (PASS) or sulfidic ores.

It is unclear what other "clean fill" material is defined to be.

The fact that the proposal is primarily aiming to emplace ENM as opposed to higher quality VENM is a major concern given the location of Bell Quarry immediately adjacent to a World Heritage Area. The emplacement of up to 2% of *non-natural* material potentially sourced from *excavated or quarried from areas from contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial, mining or agricultural activities* is a serious issue that may impact on the values of the World Heritage Area.

There is no mention in the EIS of installing an impervious membrane (liner) to prevent leachate moving into groundwater and then into the GBMWHA. It is unclear how the 2% (by weight) non-natural material could either be measured, assessed or enforced in terms of the excavated material to be placed at the site.

The EIS also states:

> *All emplacement material brought to the site will be clean fill and meet the acceptance criteria for bringing material to the site in line with the ENM Resource Recovery Order. Detailed water quality modelling demonstrates that both surface water discharges and groundwater are expected to have minimal potential to impact upon the immediate receiving waters in the downstream tributary and swamp located approximately 200 metres from the site.*

Whilst the EIS claims to have undertaken *detailed water quality modelling*, it is noted that very little local data has actually been collected to either calibrate or verify the model or its predictions.

Geology of the Bells Quarry area

Extensive deposits of deeply weathered, soft and friable sandstone exist on the Newnes Plateau and adjacent highland areas in the western Blue Mountains of New South Wales. These deposits occur in Narrabeen Group sediments belonging mainly to the Banks Wall sandstone of the upper Grose sub-group (Pecover 1986). It is these deposits that quarries, including Bell Quarry, have typically targeted. Stratigraphically in this area, the Triassic Burralow Formation usually overlies the Banks Wall Sandstones (McHugh 2014), however it is difficult to determine from the EIS whether the upper geological sequences around Bell Quarry also includes sandstones or claystone's of the Burralow formation[3].

The EIS states:

> *The NSW 1:250,000 geological series sheet S1 56-5 (1966) indicates that the soil landscape in the project area is underlain by bedrock of the Banks Wall Formation, a prominent Triassic Sandstone Unit of Early Triassic Age. It is described by Corkery (1994) as comprising friable medium-grained to pebbly quartzose sandstone with extensive thin limonite (hydrated iron oxide) concentrations or bands, with frequent thin lenses and interbeds of claystone and fine grained sandstone. The claystone generally occurs in thin lenses < 0.5 metres thick. The sandstone is highly weathered with the weather extending to depths in excess of 60 metres below ground level in places (Corkery 1994).*
>
> *Clay-rich friable sandstone was the primary resource extracted from the project area during previous quarrying activities. The friable sandstone generally comprised 4.75 mm to 0.0625 mm size fractions containing 99% silica with minor quantities of iron oxide. Clay constituted approximately 17% of the total material excavated (Corkery 1994).*

The Triassic Burralow Formation consists of medium- to coarse-grained sandstones interbedded with frequent sequences of fine-grained, clay-rich sandstones, siltstones, shales and claystones (McHugh 2014). These latter fine-grained units can be several metres in thickness and their presence differentiates the Burralow Formation from the underlying Banks Wall Sandstone. The base of the Burralow Formation was defined by McHugh (2014) as the base of the lowermost significant fine-grained, clay-rich unit above the more sandstone-rich lithology of the Banks Wall Sandstone.

The dominant lithology of the Banks Wall Sandstone is medium- to coarse-grained sandstone, with the formation having an average thickness of just under 100 metres. The steep-sided cliff faces of the surrounding areas usually consist of the massive sandstones of the Banks Wall Sandstone.

Whilst the EIS provides indicative soils that might be emplaced in the abandoned Bell Quarry pits, it does not appear to have made a similar assessment of the soils in the immediate area of Bells Quarry. This makes it very difficult to compare soil types proposed to be placed in the quarry pits and understand how they differ from soils that occur naturally in the vicinity of Bells Quarry.

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[3] Which is considered a serious deficiency in describing the geology of the area in the EIS.

ADE (2017) identified that the study was limited by the lack of knowledge of the proposed materials to be imported into the quarry and conservative assumptions into the input of the model. This was stated to result in conservative (i.e. low) SSLs, which were identified to be ***potentially prohibitive to the project***. As such, further metrics regarding the potentially imported material, for example the chemical reactivity of soils from various landscape groups when interacting with water within the quarry, was considered warranted.

ADE was engaged by Chalouhi to collect and test soil/rock samples representative of natural materials with the greater Sydney region. The objective of works issued to ADE by the Chalouhi was to collect soil samples from various landscape groups within the Sydney region, analysis of background quality and condition of pooled water within the quarry, and assessment of the leaching characteristics of the collected soils when subject to water derived from within the quarry. The soils tested are described in Table 1 below.

Table 1 - Summary of source sites and samples collected from various soil landscapes or rock formations.

Landscape	Address	Depth (m BGL)	Soil Description	Date
Ashfield Shale	6-14 Walker Street, Rhodes NSW	2.0	Weathered SHALE, dark grey, brittle with ironstone bands, dry.	09.11.2017
Glenorie	2-4 Lodge Street, Hornsby NSW	2.0	Silty CLAY (CL), medium plasticity, light grey / light brown with trace sub-angular shale fragments, moist.	13.11.2017
Blacktown	490 Twelfth Avenue, Rossmore NSW	0.5	Silty CLAY (CH), high plasticity, medium red mottled light grey, moist.	13.11.2017
South Creek	490 Twelfth Avenue, Rossmore NSW	0.5	Silty SAND (SM), fine grained, well sorted, light brown / light orange, moist.	15.11.2017
Lucas Heights	250 Railway Parade, Kogarah NSW	2.0	Clayey SAND (SC), fine grained, well sorted, medium / high plasticity, dark red / light grey with sub angular iron coated gravels, moist.	16.11.2017
Hawkesbury Sandstone	457-459 Pacific Highway, Asquith NSW	7.0	SANDSTONE, medium / coarse grained, well graded, light orange / dark yellow with dark red ironstone bands, dry.	16.11.2017
Disturbed Terrain	Governor Macquarie Drive, Warwick Farm NSW	2.0	Silty SAND (SM), fine grained, well graded, dark brown / medium orange, moist.	16.11.2017
Faulconbridge	12 Tenth Street, Warragamba NSW	0.5	Silty SAND (SM), medium grained, well graded, dark brown, moist.	16.11.2017
Tuggerah	18 Huntley Street, Alexandria NSW	3.5	SAND (SW), fine grained, well sorted, light orange / light brown, moist.	16.11.2017

The soil/rock sampling undertaken was stated to be limited in nature and was not considered to constitute detailed site investigation of each source site, or each soil/rock landscape/formation (ADE 2017). If the soil characteristics provided in the EIS are analysed using Principal Components Analysis, then the South Creek and Blacktown soils are quite different to the majority of other soil types tested, being relatively higher in terms of zinc, nickel and copper. It is possible that localised soils in the vicinity of Bell Quarry might be more similar to Hawkesbury sandstone, but seeing as the local geology is primarily Narrabeen Sandstones and/or Burralow Formation sandstone and shales, there are still likely to be differences. It is considered a deficiency of the EIS that local soils were not also analysed to provide a comparison to the soil types proposed for emplacement in the pits. Leachates from the tested soils are discussed further below (in the Water Quality Section).

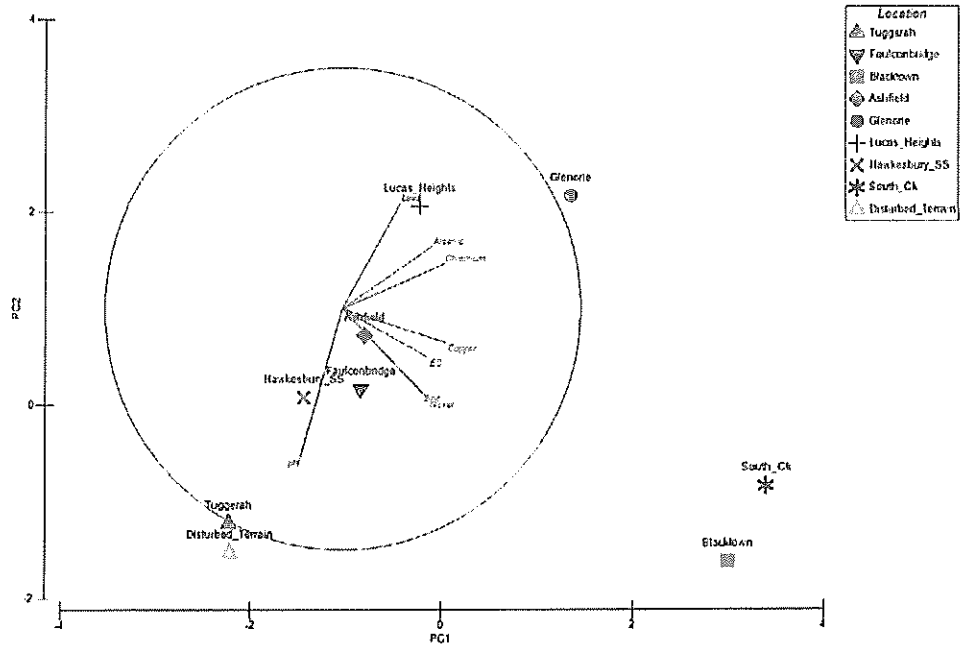


Figure 2. Principal Components Analysis of Selected Soil Types tested in the EIS. Points closer together are more similar in their soil components than points/sites further apart. Vectors indicate increasing values of individual contaminants in the direction of the lines.

Quarry Pit and Surroundings

The existing quarry pit contains a number of water-filled voids (see Figures 3 & 4). The EIS identified that:

Due to the depths of the site voids, seepage of groundwater into the voids results in the surface water and groundwater environments at the site being interrelated. Groundwater from upstream of the site influences the water quality and quantity in the voids, and likewise, any impact on the quality of the surface water at the site is predicted to influence the groundwater quality downstream.

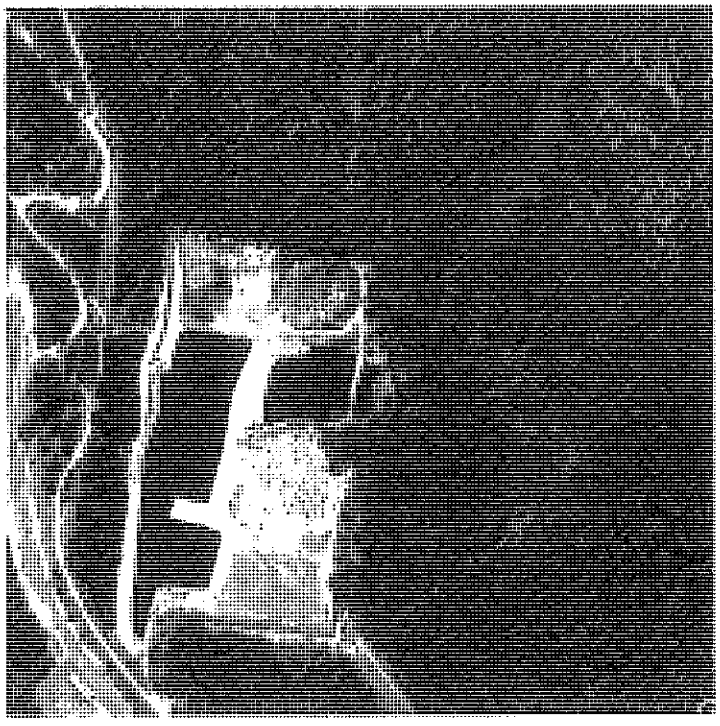


Figure 3. Google Image of Bell Quarry Pits.

Figure 4. Photographs of Bell Quarry Pits. Source: OEH

According to the EIS,

> *An ephemeral tributary of the Wollangambe River runs in a north-easterly direction from the project site. The quarry intersected this tributary's catchment, which has its headwaters in the vicinity of the rail line upstream of the site. Surface flows from this area of the catchment now enter the site at the western edge of the north void, where some erosion from high flow events is evident.*
>
> *Approximately 200 metres downstream of the water-filled voids the drainage line enters a swamp (see Figure 2), where under dry weather conditions, flows are predominantly subsurface. The swamp occupies the majority of the drainage line upstream of the confluence with a similar tributary, which runs to the north of the site. Downstream of this confluence the tributary enters a meandering reach which is somewhat confined by sandstone outcropping, which continues for approximately 1.5 kilometres before the confluence with the Wollangambe River.*

It appears the drainage line to the swamp was previously the site of an EPL discharge under EPL3218 (see details below). The description of the licensed discharge point on EPL3218 was as an '*Overflow from north east corner of sedimentation dam'.* It is, however, unclear how often overflows (if any) have occurred in the past or what the quality of the water was when overflows occurred. Current water quality in the pit appears relatively good (similar to water quality measured in streams on the Newnes Plateau – see Water Quality Section below). Very little if any discussion of the previous operations under EPL3218 have been described in the EIS. For example, it would have been beneficial for information on prior EPL discharges and quality to have been documented in the EIS.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Discharge to waters Discharge quality monitoring	Discharge to waters Discharge quality monitoring	Overflow from north east corner of sedimentation dam (known as Cell 2) shown as Discharge Point 1 on drawing titled " Figure 3.1 Proposed Quarry Layout - Year 5" dated 6 October 1992

POINT 1

Pollutant	Units of Measure	50 percentile concentration limit	90 percentile concentration limit	3DGM concentration limit	100 percentile concentration limit
Oil and Grease	milligrams per litre				5
pH	pH				6-8.5
Total suspended solids	milligrams per litre				30

Groundwater Dependent Ecosystem Assessment

Figure 4-2 of the Water Resources Assessment Section of the EIS (GHD 2018a) is stated to show the BoM (2017) Groundwater Dependent Ecosystems in the vicinity of Bell Quarry (see Figure 5 below). GHD (2018a) states:

> *The Wollangambe River is mapped as an "Aquatic" GDE downstream of the confluence of the tributary which receives runoff from the site. This is the only mapped GDE which could potentially be affected by the Project, as none of the terrestrial GDEs identified are in the same catchment as the site. While not a mapped GDE, a swamp downstream of the site has been assessed to be representative of a Newnes Plateau Shrub Swamp by the biodiversity assessment undertaken as part of this EIS (GHD 2018). This swamp is considered a sensitive receptor for the purpose of the WRA.*

In contrast, the Biodiversity Impact Assessment, GHD (2018b) states:

> *No groundwater-dependent ecosystems (GDEs) are mapped in the study area on the national atlas. Sydney Peppermint - Silver-top Ash Shrubby Woodland is identified as being a low potential GDE (BOM 2017). Hanging and upland swamps in the Blue Mountains are identified as being high probability groundwater dependent wetland communities (Kuginis et al 2012). As such,* ***the Prickly Tea-tree - sedge wet heath downstream of the Project area is likely to be a GDE***[4]*.*

This swamp (and another close by) have been mapped by OEH (Vegetation of the Western Blue Mountains and Wollemi; see Figure 6). They are also mapped as part of the Temperate Highland Peat Swamp on Sandstone (THPSS) community (Fryirs et al 2019; see Figure 7). The THPSS community is listed as an Endangered Ecological Community (EEC) under the Commonwealth's EPBC Act.

[4] Bold emphasis added.

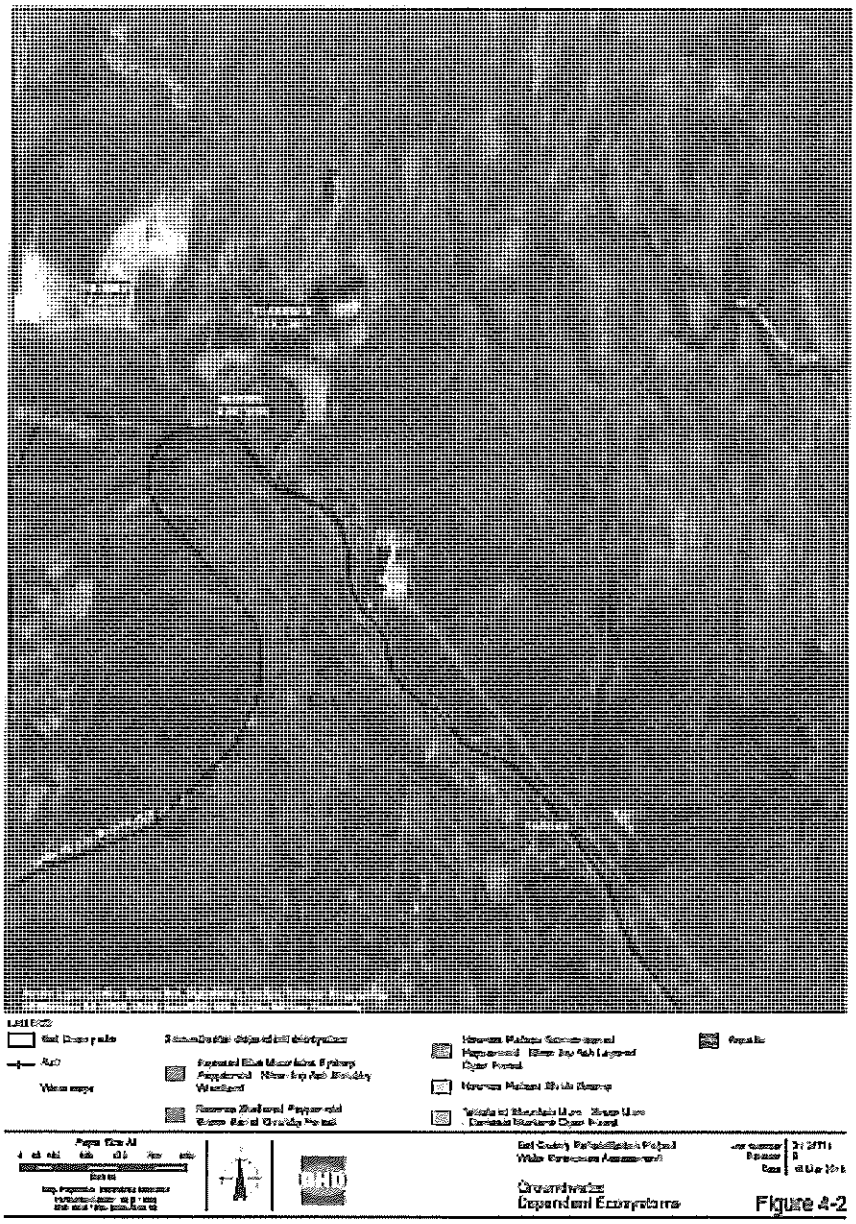


Figure 5. EIS depiction of Groundwater Dependent Ecosystems in the vicinity of Bell Quarry.

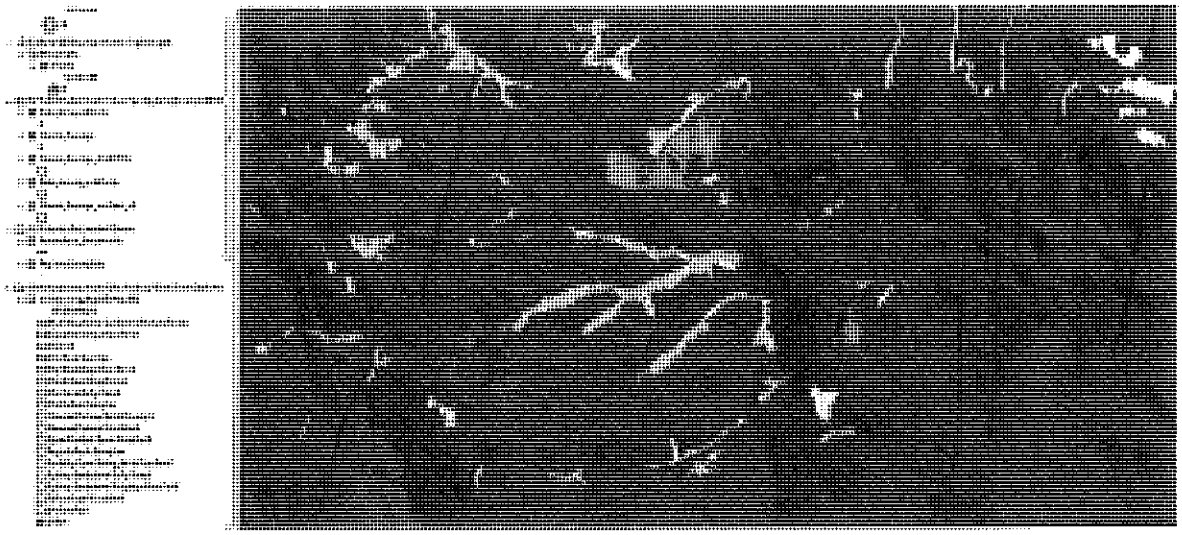


Figure 6. Swamps mapped by OEH in the vicinity of Bell Quarry (Vegetation layers for the Western Blue Mountains & Wollemi)

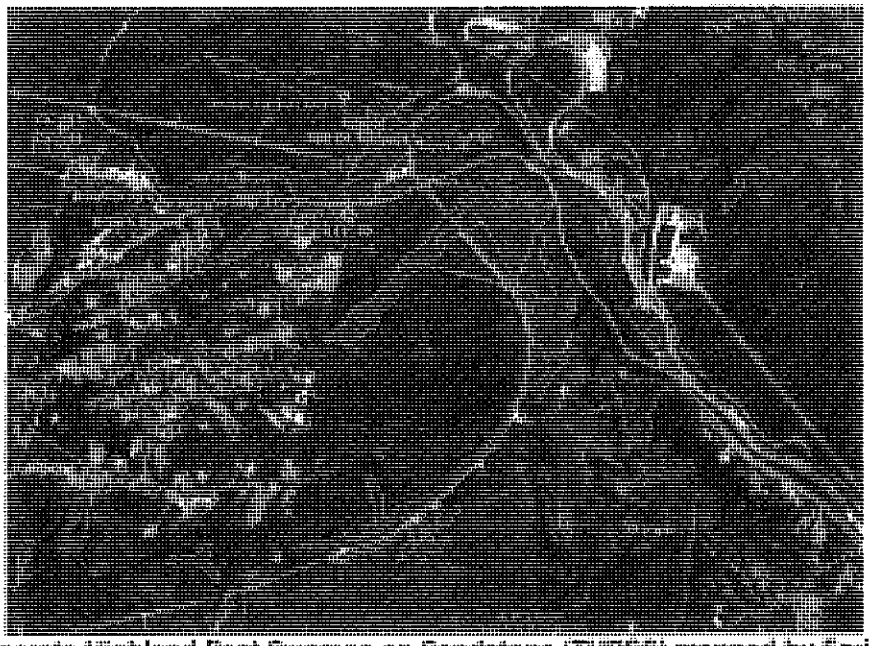


Figure 7. EPBC Temperate Highland Peat Swamps on Sandstone (THPSS) mapped by Fryirs et al 2019 near Bell Quarry.

As identified in GHD (2018b):

> *An action that 'has, will have or is likely to have a significant impact on a matter of national environmental significance' is deemed to be a 'controlled action' and may not be undertaken without prior approval from the Australian Minister for the Environment.*

The EPBC Act identifies MNES[5] as:

- *World heritage properties*
- *National heritage places*
- *Wetlands of international importance (Ramsar wetlands)*
- *Threatened species and ecological communities*
- *Migratory species*

[5] Matter of national environmental significance.

- *Commonwealth marine areas*
- *The Great Barrier Reef Marine Park*
- *Nuclear actions (including uranium mining)*
- *A water resource, in relation to coal seam gas development and large coal mining development.*

GHD (2018b) identified the *Prickly Tea-tree - sedge wet heath* swamp as a Newnes Plateau Shrub Swamp (EEC under the TSC Act) and Temperate Highland Peat Swamps on Sandstone (EEC under the EPBC Act). As the project potentially impacts on the WHA and EPBC listed THPSS, the proposal should have been forwarded to the Commonwealth for assessment. This does not appear to have occurred.

The Commonwealth's Independent Expert Scientific Committee have recently released an Information Guidelines explanatory note for Assessing groundwater-dependent ecosystems (Doody et al 2019). http://www.iesc.environment.gov.au/system/files/resources/422b5f66-dfba-4e89-adda-b169fe408fe1/files/information-guidelines-explanatory-note-assessing-groundwater-dependent-ecosystems.pdf

The IESC defined a logical sequence of steps to prepare an appropriate environmental impact assessment for GDEs. These steps were:
1. Define the likely area of impact of the proposed project (including the disturbance footprint of surface infrastructure and the extent of groundwater depressurisation).
2. Use a desktop assessment of reports, maps, databases and other resources to list potential GDEs in the project impact area, and make a preliminary assessment of possible risks to these GDEs from each stage of the proposed project.
3. Apply conceptual models and other tools described in the explanatory note to assess the level of groundwater dependence for each GDE and the likely pathways (e.g. disruption of groundwater connections, reduction in groundwater quality) by which the project might impact on GDEs.
4. Determine baseline ecological condition and ecosystem value of each GDE, including GDEs to be used as control or reference sites to assess changes over time that are not associated with the project. Field surveys will be needed to obtain site-specific data that can be supplemented with information from remote sensing and other techniques.
5. Conduct a systematic risk assessment to estimate the likelihood and consequences of potential impacts on GDEs arising from the proposed project, including cumulative impacts. Tools such as the GDE Risk Matrix and the associated matrix of management options are useful here.
6. Using the risk assessment and other information from the preceding steps, specify options to avoid or mitigate impacts on GDEs and establish a monitoring plan to assess the effectiveness of mitigation.

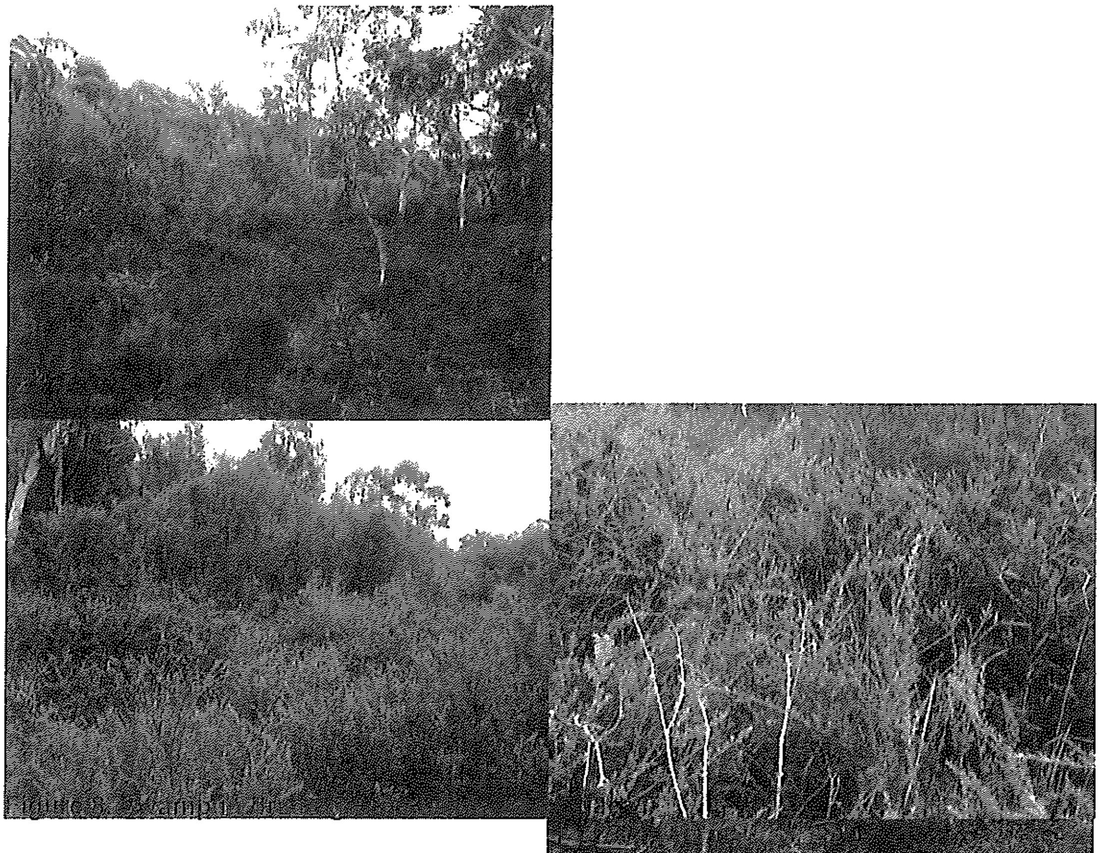
The Water Resources Assessment Section of the EIS (GHD 2018a) has not clearly defined the downstream swamp as a GDE[6] (Figure 5) and has not appropriately assessed the risk the project will have on the THPS swamp. It has not assessed the level of groundwater dependence for the swamp and the likely pathways (e.g. disruption of groundwater connections, reduction in groundwater quality) by which the project might impact on the GDE. This is considered a significant deficiency in the EIS and one that should be corrected before any development is approved.

Swamp Downstream of Bells Quarry

As identified in the previous Section, GHD (2018b) identified the swamp as a *Prickly Tea-tree - sedge wet heath* swamp part of the Newnes Plateau Shrub Swamp (EEC under the TSC Act) and Temperate Highland Peat Swamps on Sandstone (EEC under the EPBC Act) community. The swamp was stated to be in moderate/good condition (GHD 2018b). A site visit by OEH SD (10/03/2019) also identified the swamp as being in relatively good condition dominated by tea-tree (*Leptospermum* sp) shrubs growing to

[6] Simply calling it a *sensitive receptor.* It is unclear in the EIS how a *sensitive receptor* is defined or how it has been treated in the GDE assessment. Alteration of groundwater flows and quality to GDEs could have a significant impact on the GDE.

approximately 2.5m in height (see Figure 8). This swamp is somewhat different to the nearby Newnes Plateau and Dargan Creek swamps. Given the potential for the project to impact on this swamp, further baseline ecological condition and ecosystem value data for the swamp should have been collected and presented in the EIS, especially if the operation of the Project could potentially cause an impact to this swamp in the future.



McHugh (2011, 2013) studied the upper st[illegible]ases, in particular the Burralow Formation, and identified both a lithological and topographic link between the presence of the Burralow Formation and the occurrence of the Newnes Plateau Hanging Swamps (NPHS) and Newnes Plateau Shrub Swamps (NPSS). Several of the claystone horizons, together with clay-rich, fine-to-medium grained sandstones and shales were found to be acting as aquitards, or semi-permeable layers within the stratigraphic sequence of the Burralow Formation. These aquitards decrease the hydraulic gradient of rainwater and groundwater movement percolating through the weathered and semi-weathered strata of the Burralow Formation and form a permanent water source for the formation and maintenance of the hanging swamps. In total, McHugh identified seven units, designated YS1 to YS6, which were capable of sustaining the hanging swamps in the area, provided the topographic conditions were amenable to the formation of a hanging swamp.

The above discussion of the linkage between well-drained sandstone, clay layers and swamps is of importance to the swamp immediately downstream of Bell Quarry since it is likely to receive:

- Pumped water from the pits
- Leachate infiltrating into groundwater aquifers from the pits
- Runoff from the final landform

The EIS states:

> *A detailed assessment of the potential impacts of the project on water resources has been undertaken as part of this EIS. The project will restore the flow regime to be representative of*

natural run-off conditions from before the commencement of extractive operations. During the rehabilitation activities there will be a temporarily reduction to the frequency of low flows and more frequent moderate flows for stages requiring dewatering. The changes to the flow regime are relatively minor and are not anticipated to significantly impact upon downstream geomorphological processes due to the natural stream profile and thick and well established vegetation in the immediate receiving waters.

Given the low level of sampling and empirical data on flows and water quality[7] provided for the area, the claim that a *detailed assessment* has been undertaken is highly questionable. As identified above, the EIS also claims to have undertaken *detailed water quality modelling*, but it is noted that very little data has actually been used to either calibrate or verify the model or its predictions. As a result, the model outputs are likely to largely reflect the architecture and underlying assumptions used in the model. Since a number of important assumptions (eg groundwater connectivity) have not been explored or detailed, the veracity of the model, its assumptions and its conclusions need further explanation and justification.

The existence of the swamp in the headwaters of the drainage line downstream of Bell Quarry strongly suggests that there is a groundwater source which helps support/maintain the swamp in this location. Further investigations into the hydrological characteristics of the swamp are obviously needed. Since the swamp has also been identified as being part of the EPBC listed THPSS EEC, the proposal should also have been forwarded to the Commonwealth Government for assessment.

Discharge, Flow and Water Quality

GHD (2018a) used a water balance model (GoldSIM software package) using a daily timestep and historical meteorological data to assess flow characteristics for the proposal. It is noted that very little empirical data have been collected to either calibrate or validate the model. It is also noted that no 'natural' flow data has been collected in the Wollangambe Tributary likely to receive pumped water, leachate into groundwater and run-off from the final landform for the project. The model therefore appears not to have been calibrated or validated for local conditions.

GHD (2018a) stated that the discharge from the site only occurs when the balance of rainwater, groundwater flow and evaporation are such that the voids are full and overflowing. However, it is proposed that water in the quarry pits is to be de-watered, with water directed to the downstream tributary at the location of a previous licensed discharge. ADE (2017) identified that the licence was surrendered on 1 October 2014[8], so there is currently no licensed discharge location for the site. GHD (2018a) did not discuss the pump out rates in the EIS, however if flow rates to the tributary are too high, then there is significant potential to destabilise sediments in the downstream swamp. If an erosional nick-point is established in the swamp, it could lead to the loss of the swamp in its entirety through erosion and gullying. The EIS does not consider issues surrounding discharge rates or their effect on geomorphic stability for the swamp.

ADE (2017) also identified that:

- *The modelling completed thus far has indicated that emplacement of Excavated Natural Material (ENM), as defined under the NSW Environmental Protection Agency's (NSW EPA's) 'Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 – The excavated natural material order 2014', could result in the discharge of water from the Quarry to Wollangambe River with Contaminants of Potential Concern (CoPC) above adopted guideline values (GVs) for protection of aquatic species.*

[7] Largely one-off sampling.

[8] Elsewhere in the EIS it was stated as 24th October 2014

- *The study was limited by the lack of knowledge of the proposed materials proposed to be imported into the quarry and conservative assumptions into the input of the model. This resulted in conservative (i.e. low) SSLs, which were identified to be potentially prohibitive to the project.*

- *Further metrics regarding the potentially imported material, for example the chemical reactivity of soils from various landscape groups when interacting with water within the quarry, was considered warranted.*

To assess the leaching potential of the collected soil samples when subject to water within Bell Quarry, Australian Standard Leaching Potential (ASLP) tests were undertaken on soil/rock samples using water sampled from within the quarry as the solvent/reagent. It was noted that using water derived from the quarry as the reagent/solvent was not a NATA accredited test, under ALS Global's NATA accreditation. Nevertheless, the leachate tests provide an opportunity to assess what leachate quality might be generated from the soil types tested[9].

If the leachate characteristics provided in the EIS are analysed using Principal Components Analysis then the South Creek and Blacktown leachates are quite different to the majority of other soil leachates, quarry pit water samples and stream water samples from the Bell Quarry location (see Figure 9). The Blacktown soil leachate was relatively high in terms of zinc, nickel, copper and Total Nitrogen. The South Creek soil leachate was relatively high in terms of Sodium, Chloride, Arsenic and EC. Groundwater (locations MB02 & MB03) was relatively higher in total alkalinity, total phosphorus, reactive phosphorus and pH.

As identified in OEH (2015), the surface headwaters of the Newnes Plateau generally have excellent water quality with very low concentrations of dissolved and total salts and very low concentrations of most metals, metalloids and non-metallic inorganics (excepting iron and aluminium). This high quality is also evident in measurements for water quality from samples taken in the quarry pits and streams of the area; and presented[10] in the EIS. There is quite wide variability in the soil leachates, depending on where they were sourced. Some of these soil leachates could potentially alter the natural characteristics and ionic balance of water draining to the World Heritage Area and Wollangambe River.

In relation to water quality GHD (2018a) states:

- *Table 5-10 indicates that no exceedances of the ANZECC (2000) GVs are predicted at the site discharge assuming the average leachate water quality, with the exceptions of pH and zinc;* and
- *It is also noted that the minor exceedances were at or below the zinc concentration observed by OEH (2015) in the Wollangambe River at a point upstream of the Clarence Colliery (refer Table 4-1). As such, the predicted zinc concentrations presented in Table 5-10 are expected to not have any adverse impact in the receiving environment if they were to result from run-off from the site.*

[9] It remains possible that the soils tested in the EIS could be much better/cleaner than the full range of other soils which may find their way into the quarry pit voids.

[10] But not statistically compared. Note too this was largely based on a single grab sample on one occasion at each site.

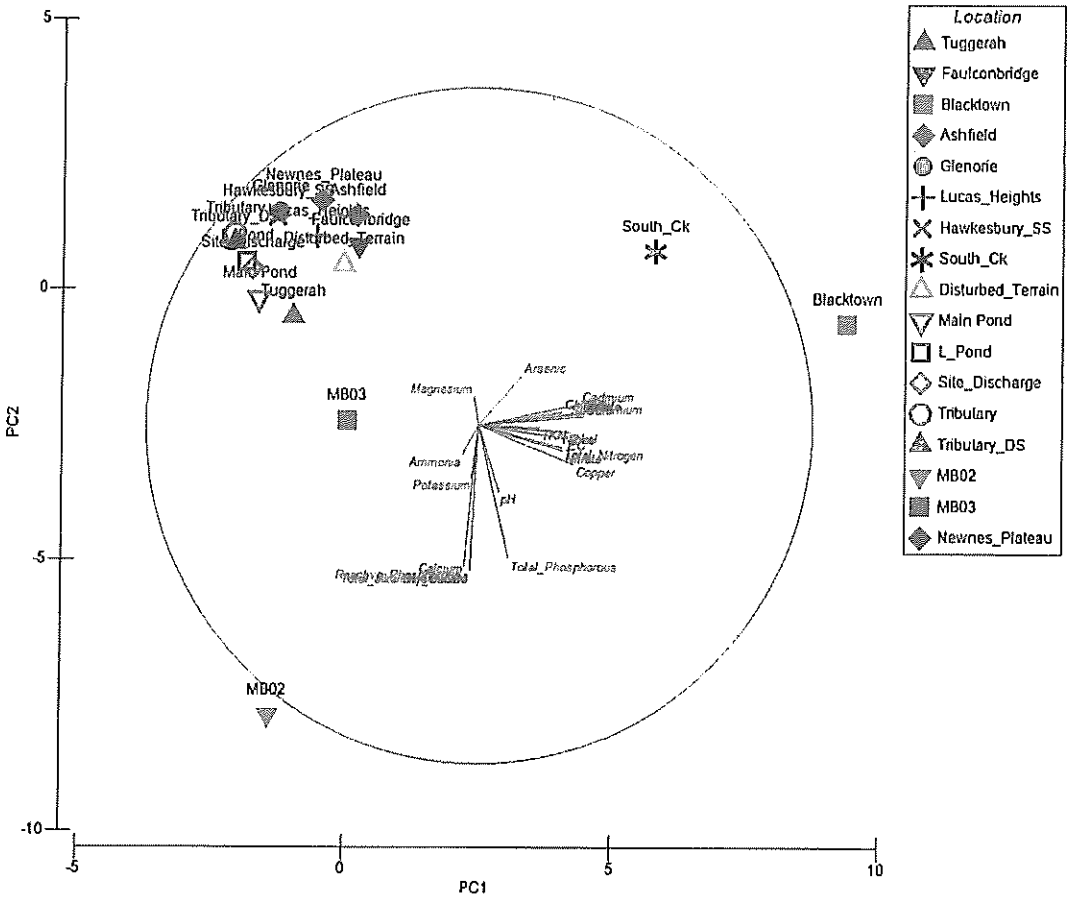


Figure 9. Principal Components Analysis of Selected Soil Leachates, quarry pit water samples and stream water samples[11]. Points closer together are more similar in their soil components than points/sites further apart. Vectors indicate increasing values of individual contaminants in the direction of the lines.

What GHD (2018a) fail to discuss in this context is that:

- the zinc measurement for W1 (0.0056 mg/L) was in between ANZECC levels to protect 95% and 99% of species
- the zinc measurement for W3 (0.019 mg/L) was influenced by the Clarence Colliery discharge[12]
- the zinc measurements for soil leachates ranged from a minimum of 0.03 mg/L (Tuggerah Soil Type) to a maximum of 0.484 mg/L (Blacktown Soil Type)[13]
- Table 5-9 identifies a range of other leachate results with exceedances of the ANZECC (2000) GVs.
- Only one leachate sample has been measured for each soil type (ie no replication)
- The soils tested may not be representative of the 'worst' soils likely to be emplaced in the quarry pits.

If the project is considered for approval it is recommended that an impervious membrane (liner) is installed in the quarry pits to prevent leachate moving into groundwater in the area and then into the GBMWHA.

References

ADE (2017) Letter to Chalouhi Pty Ltd (Chalouhi) RE: Soil and water sampling - Bell Quarry Rehabilitation Project, Blue Mountains NSW. ADE Consulting Group Pty Ltd. 6th December 2017

[11] Newnes Plateau sample based on 80th percentiles for streams on the Newnes Plateau (see OEH 2015).

[12] There are recent plans to remove this discharge from the Wollangambe River.

[13] All much higher than (5 to 86 times) the W1 zinc level.

DEC (2006), *Using the ANZECC Guidelines and Water Quality Objectives in NSW*, DEC 2006/290, Department of Environment and Conservation NSW, Sydney, www.environment.nsw.gov.au/resources/water/anzeccandwqos06290.pdf

Doody TM, Hancock PJ, Pritchard JL 2019. *Information Guidelines explanatory note: Assessing groundwater-dependent ecosystems.* Report prepared for the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development through the Department of the Environment and Energy, Commonwealth of Australia 2019.

Fryirs, K.A., Farebrother, W. & Hose, G.C. (2019) Understanding the spatial distribution and physical attributes of upland swamps in the Sydney Basin as a template for their conservation and management, Australian Geographer, 50:1, 91-110, DOI: 10.1080/00049182.2018.1449710
[See also https://datasets.seed.nsw.gov.au/dataset/temperate-highland-peat-swamps-on-sandstone-thpss-vegetation-maps-vis-ids-4480-to-4485]

GHD 2018a Bell Quarry Rehabilitation Project Water Resources Assessment. August 2018

GHD 2018b Bell Quarry Rehabilitation Project Biodiversity Impact Assessment July 2018

McHugh, E.A. 2014. The Geology of the Shrub Swamps within Angus Place, Springvale and the Springvale Mine Extension Project Areas. September 2014.

OEH 2015. Clarence Colliery Discharge Investigation. OEH 2015/0171 April 2015 ISBN 978 1 74359 934 1

Pecover, S.R. 1986. Construction and industrial sand resources of the Newnes Plateau New South Wales Department of Mineral Resources 120 p.

Martin Krogh
Principal Scientist Major Assessments
Office of Environment and Heritage
14 March 2019

Your Ref: Bell Quarry Rehabilitation Project DA 294/18
Our Ref:

20 March 2019

General Manager
Lithgow City Council
180 Mort Street
LITHGOW NSW 2790

Dear Mr Faulkner,

Hawkesbury City Council Submission to Development Application DA294/18 - Bell Quarry Rehabilitation Project - Clarence – Lithgow

Hawkesbury City Council at its Ordinary Meeting on 12 March 2019 considered a Notice of Motion regarding the proposed Development Application for the Bell Quarry Rehabilitation Project at Clarence within the Lithgow Local Government Area. Council discussed the possible effects that the proposal could have on residents of the Hawkesbury.

A copy of the Notice of Motion is attached, but concerns raised in the Notice of Motion relate to mine rehabilitation being environmentally risky with the potential to introduce contaminated fill. The Blue Mountains World Heritage National Park adjoins the Bell Quarry and the Wollangambe River is also located downstream of the subject site. The Wollangambe River is part of a sub catchment of the Colo River, which is a declared 'Wild River' that traverses through the Hawkesbury Local Government Area. Contaminants from fill have the potential to leach into these National Parks and waterways resulting in adverse environmental impacts on waterways within the Hawkesbury.

It is considered that, the appropriateness of fill material proposed to be used on the site needs to be established:

- Will the fill material support the revegetation of the site with locally endemic species i.e. does the fill material match the geology of the locality?
- How will it be ensured that the fill material is not contaminated?
- How will it be ensured that the fill material will not contribute in the importation of weed species into the locality?

It was considered that foreign fill cannot return a site to its original condition and this project should more correctly be viewed as a spoil dumping ground for infrastructure projects in the Sydney Metropolitan area. Council also considered that bush care would provide better rehabilitation and could allow the site to be used as a possible tourist asset.

The Notice of Motion highlighted that it was understood that Rural Fire Services are concerned that filling in this quarry is a retrograde move. The Notice of Motion stated that the quarry currently holds approximately 850 million litres of water used by the Rural Fire Services and National Parks and Wildlife Service in bushfire fighting operations. This was critical in saving Bell in the 2013 bush fires.

Concerns are also raised in relation to an increase in the number of large trucks and their trailers traversing Bells Line of Road and other arterial roads through the Hawkesbury Local Government Area, carrying up to 42 tonnes of fill material each, over the next 15 years if approved.

It is understood that it is estimated that the development will generate an average of 30 vehicle movements per day. However the application identifies that importation of fill to the subject site may be undertaken in campaigns, dependant on the availability of fill material. In this regard, the Application does not give an indication as to the likely maximum truck movements that could occur in a day.

In addition, consideration should be given to the impacts of increased truck movements on the amenity of residential properties, villages and townships along the parts of Bells Line of Road located within the Hawkesbury Local Government Area. Increased noise, increased truck movements, road safety and the time of day in which these trucks will be utilising the road will have an impact on the amenity and character of Hawkesbury's rural communities in particular.

Following discussion on the above concerns, at its Ordinary Meeting on 12 March 2019, Council resolved as follows:

That Council:

1. *Notes that:*

   a) *The development Application including Environmental Impact Statement for Bell Quarry Rehabilitation Project at Clarence (DA 294/18) is now on exhibition with Lithgow Council until 20 March 2019,*

   b) *The impact of the proposed project on Hawkesbury residents will be high, with Bells Line of Road carrying 40% of truck movements, in particular that 2.2 million tonnes of fill from Sydney and Central West development projects is proposed to be transported using the Great Western Highway, Darling Causeway and Bells Line of Road, generating an average 74 truck movements a day for around 15 years.*

2. *Make a submission on the Development Application for Bell Quarry Rehabilitation Project identifying the likely impacts of the DA on Bells Line of Road users and residents, local roads and other relevant impacts including:*

   a) *Impacts on the natural environment*

   b) *Hydrology*

   c) *Bushfire management*

   d) *The desirability of managing waste product within the area that it is created, rather than transporting it by road to an out of region location.*

Accordingly, Hawkesbury City Council requests that Lithgow City Council and the Western Regional Joint Regional Planning Panel take these matters into consideration during the assessment process of DA294/18 for the Rehabilitation of the Bell Quarry at Clarence within the Lithgow City Council Local Government Area.

Thankyou for the opportunity to lodge a submission in respect of this Development Application.

Yours sincerely

Andrew Kearns
Manager Strategic Planning

Enc – Copy of Hawkesbury City Council Notice of Motion – Ordinary Meeting 12 March 2019

Item: 044 NM2 - Bell Quarry Rehabilitation Project - (79351,138885)

Submitted by: Councillor Ross

NOTICE OF MOTION: Bell Quarry Rehabilitation Project

That Council:

1. Notes that:

   a) The Development Application including Environmental Impact Statement for Bell Quarry Rehabilitation Project at Clarence [DA294/18] is now on exhibition with Lithgow Council until 20 March 2019,

   b) The impact of the proposed project on Hawkesbury residents will be high, with Bells Line of Road carrying 40% of truck movements, in particular that 2.2 million tonnes of fill from Sydney and Central West development projects is proposed to be transported using the Great Western Highway, Darling Causeway and Bells Line of Road, generating an average 74 truck movements a day for around 15 years.

2. Make a submission on the Development Application for Bell Quarry Rehabilitation Project identifying the likely impacts of the DA on Bells Line of Road users and residents, local roads and other relevant impacts including:

   a) Impacts on the natural environment
   b) Hydrology
   c) Bushfire management
   d) The desirability of managing waste product within the area that it is created, rather than transporting it by road to an out of region location

3. Notify properties fronting the Bells Line of Road, BLORCAG, Hawkesbury Environment Network, the NRDCAA, Kurrajong Forum, and other known stakeholder groups informing them of the DA and the submissions process.

BACKGROUND:

The Bell Quarry Rehabilitation proposal proposes to source 2.2 million tonnes of Sydney fill from infrastructure projects to the old Bell Quarry in Clarence in Lithgow LGA. The application will be considered by a regional planning panel following public exhibition.

Most of the fill will be trucked up Bell's Line of Road and the Great Western Highway through Hawkesbury and Blue Mountains Local Government Area, before going down the narrow mostly unsealed Sandham Rd through Bell. Truck movement figures given in the EIS vary from 34 to 74 movements per day, six days a week for 15 years.

Mine rehabilitation is environmentally risky and can introduce contaminated fill which could then leach into National Parks and the Wollangambe and thence Hawkesbury-Nepean River systems, and introduce weeds along road sides at the fill site. Foreign fill cannot return a site to its original condition and this

project should more correctly be viewed as a spoil dumping ground for infrastructure projects in Sydney. Bush care would provide better rehabilitation and could allow the site to be used as a tourist asset.

Rural Fire Services are concerned that filling in this quarry is a retrograde move. The quarry currently holds 850 million litres of water used by the RFS and NPSW in bushfire fighting, which was critical in saving Bell in the 2013 fire.

Blue Mountains and Lithgow Councils have both unanimously voted to oppose the DA.

ATTACHMENTS:

There are no supporting documents for this report.

oooO END OF NOTICE OF MOTION Oooo

Reference: 19-09

Lithgow CITY COUNCIL

Surrounded by Nature · Steeped in History

11 March 2019

Western Regional Planning Panel
C/- Lithgow City Council
PO BOX 19
Lithgow NSW 2790

To Whom it May Concern

DA294/18 - Proposed Rehabilitation of Bell Quarry - Off Sandham Road Newnes Junction

I refer to the above-mentioned development application which will be determined by the Western Regional Planning Panel. At its ordinary meeting of 25 February 2019 the Council resolved to lodge a submission to the Planning panel to reject the application.

In consideration of presentations by members of the public during Council's public forum and debate by Councillors on the matter there are a number of concerns that brought Council to its decision to seek rejection of the proposal. These include, but are not limited to:

- Amenity, traffic and safety Impacts associated with heavy vehicle movements both locally and through the Blue Mountains.
- Various amenity impacts such as noise and dust particularly relating to residents in the vicinity of the proposal and along the transport route.
- The existing water bodies at the site have been used in helicopter operations combating bushfires in the area. There is significant concern as to the potential loss of this valuable resource.
- The rehabilitation of the quarry has occurred. Therefore, this proposal cannot be said to be rehabilitation but rather waste disposal.
- If the waste material is of good quality it would be better utilised in other activities such as construction and not dumped as a waste product.

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Tel: (02) 6354 9999 Fax: (02) 63514259
Web: www.lithgow.nsw.gov.au Email: council@lithgow.nsw.gov.au

Finally, Lithgow City Council has a long-standing position of opposing the acceptance of waste from outside the Lithgow Local Government Area. As there may be other open cut and mining voids in the Lithgow local government area, Council would be concerned that this could be seen as the 'thin edge of the wedge' that encourages further proposals. The potential negative impacts on tourism and reputational damage to the Local Government area are of great concern.

Thank you for the opportunity to make a submission on this proposal and I trust that Council's concerns will be given strong consideration in the determination of this matter.

Yours sincerely

Graeme Faulkner
GENERAL MANAGER

29 March 2019

Office of the General Manager
Reference File: F09766 - 19/40080

Mr Ray Thompson
Mayor
Lithgow City Council
PO Box 19
LITHGOW NSW 2790

Dear Mr Thompson,

SUBJECT **Development Application No. DA294/18 – Lot 23 DP 751631 – off Sandham Road, NEWNES JUNCTION NSW 2790 - Submission**

Blue Mountains City Council wishes to express its opposition to the proposed rehabilitation of the Bell Quarry.

It is the Council's understanding that the Lithgow City Council opposes this development application and that the EPA are also proposing to make a submission, in which it will highlight its objections to the proposal.

At the Ordinary meeting of the 26 March 2019, the Council resolved (inter alia):

1. *That the Council acknowledges and thanks Lithgow City Council for extending the deadline to allow a formal submission to be adopted by Council;*
3. *That the Council endorses the formal submission contained in Attachment 1, which opposes the Development Application No. DA294/18 – Lot 23 DP 751631 – off Sandham Road NEWNES JUNCTION NSW 2790;*
4. *That the Council writes under the signature of the General Manager to Lithgow Council Mayor Ray Thompson and General Manager Graeme Faulkner, NSW Minister for Planning Anthony Roberts MP, Blue Mountains MP Trish Doyle, and Greens NSW spokesperson on Environment, Transport and Roads and Ports Cate Faehrmann MLC noting Council's concerns about the impact of the proposed rehabilitation, including trucking of 1.5 million tonnes of landfill which will be transport across the Blue Mountains LGA from Sydney to Bell, and any other matters as identified by Council's investigations; and*
5. *That the Council receives a briefing on the determination of the Regional Planning Panel.*

[Min No. 92]

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E/ council@bmcc.nsw.gov.au/ DX 8305 Katoomba www.bmcc.nsw.gov.au
ABN 52 699 520 223

The comments in this submission, as endorsed by the Council, relates to the review of the following documents:

- *Development Application No. DA294/18*
- *Bell Quarry Rehabilitation EIS Master Volume 1-3*

In addition to the above documents, Council has engaged with local communities and environmental organisations with relevant comments and concerns.

Priority Areas of Concern
Five priority areas of concern that have been identified to focus the council's response to this development, as detailed as follows:

Nature Environment
Council rejects the statement in the EIS that *"The project would not result in any significant environmental impacts and will result in environmental benefits by restoring the landform of the quarry to similar to the original, while ensuring beneficial reuse of ENM and VENM clean fill materials and avoiding their disposal in landfill".*

Council has considerable concern on the potential impacts on downstream high value natural assets such as the GBMWHA which is immediately adjacent the Bell Quarry and the iconic Wollangambe River, which is a sub catchment of the declared Wild River, the Colo River. Given the environmentally sensitive environment the development should only be approved if the proponent can definitively demonstrate that there will be no adverse impact on the downstream and adjacent natural assets over the life of the project and beyond under all environmental conditions including the increasingly severe and erratic climate conditions predicted under climate change including more frequent and intense storm events.

The risk of contamination of the GBMWHA by mining and extractive industries has been demonstrated by the recent catastrophic collapse of a coal tailing dam after heavy rainfall at the Clarence colliery and the subsequent pollution of the Wollangambe River. The project is bordering the GBMWHA and within the catchment of the Colo Wild River and any impacts or failures of protective systems will have a direct impact on these natural assets without the benefit of any buffering.

The potential impacts of the importation of VENM, ENM and "other clean fill material" into the voids has predominately been assessed through the modelling of the chemical composition of leachate from the site in terms of heavy metals and contaminates. However the importation of significant amounts of higher nutrient non-sandstone based materials such as shale based soils from the Cumberland plain into a low nutrient sandstone environment could increase the nutrient composition of the discharging water as well as the increased discharge of finer clay sediments in suspension leading to possible algal blooms in the voids and downstream riparian environments. Any increased nutrients and sediments would also facilitate weed invasion into the vegetation communities such as the downstream Newnes Plateau Shrub Swamp community and riparian communities which are adapted to low nutrient sandstone influenced conditions.

There is also the risk of the inadvertent importation of weed propagules in the fill material leading to the establishment of new weed population on the border of the GBMWHA. These may be exotic species or non-endemic native species. If the fill

consists of higher nutrient soils it is also likely to facilitate their establishment. Consideration should be made to ensure that the final capping to a depth of 3-5 m is of a sandstone material of a composition analogous to the existing geology if it is to support native endemic plantings. There is also the risk of importing diseases such as Phytophthora or Cheered fungus etc.

Hydrology

The hydrology of the study area is already substantially modified by the existing quarry. The proposal would alter the landform through placement of fill and modify surface water flows.

The dewatering process for the voids with the predicted increase of moderate flow events during dewatering event is likely to have a deleterious effect on the downstream Newnes Plateau Shrub Swamp. Limited details of the proposed volumes or the frequency of flows have been provided but they are unlikely to mimic the original flow patterns which typically consist predominately of subsurface groundwater flows rather than concentrated surface flows. The channelisation of Newnes Plateau Shrub Swamps by mine dewatering on the Newnes Plateau is a salient example of the consequences of altering the natural hydrology of swamp systems.

Bush Fire Management

The site is designated as bushfire prone due to the presence of bushfire prone land within and adjoining the site. It is noted that the project will be developed in accordance with the aims and objectives of Planning for Bush Fire Protection (NSWRFS 2016) and pose minimal risk to the safety of workers at the site or the surrounding environment.

The current water reserves in the quarry are currently accessed for firefighting and mitigation purposes. The filling of the voids will represent a loss of a valuable firefighting resource for aerial firefighting operations.

Transport & Road Impacts

The proposal, to transport excess excavated materials, an estimated 140,000tpa for 15 years, from the Sydney basin infrastructure projects would have a profound impact on road safety and local road infrastructure. Haulage to the site will be undertaken using "truck and trailers" with a capacity of around 30 tonnes and will result in approximately 9400 vehicle movements per year or 30 individual trips per day. Whilst this is an approximation across the proposed life span it is detailed in the EIS that haulage may be undertaken in campaigns, based upon the supply of VENM and ENM from major construction projects. This means that the daily movements could exponentially increase at any time in response to excavation activities in Sydney.

Council rejects the statement in the EIS *"The haulage traffic represents a relatively small proportional increase to background traffic on the wider regional road network. The minor increases to traffic are not considered to impact upon the safety or capacity of the road network"*. To base the increase movements on the regional/state network is not reflective of the movements that would occur on Sandham Road, which in most parts is an unsealed road which current experiences very low heavy vehicle movements.

The EIS does not address the impact on cyclists along the proposed haulage routes. Cycling has a strong tourism and transport focus with sections of the highway

between the quarry and Katoomba in particular being hazardous with no shoulder or dedicated cycle lane provided. Also of concern is the interaction of truck traffic with tourism traffic on the GWH. There is considerable collateral around this high priority tourism resource.

Council notes that the Great Western Highway is classified as a State Road and under the care and control of Roads and Maritime Services (RMS). Any additional maintenance as a result of the additional truck movements is therefore the concern of RMS, the Council is extremely concerned that additional maintenance is put in place to ensure the current standards are maintained. The use of Harley Avenue, a regional road which is maintained by the Council will be impacted by the increase in heavy vehicle numbers. Additional funding will need to be provided to maintain this connection between the state road networks.

Drive Neighbourly Agreement – 'Respect...Our Code on Blue Mountains Roads'
Such is the Council's concern with the movement of freight and bulk materials across the Blue Mountains, it initiated its own high profile campaign. The 'Respect...Our Code On Blue Mountains Road' initiative arose out of the 2016 "Blue Mountains Heavy Vehicle Drive Neighbourly Agreement" and is endorsed by community groups, major industry participants and government agencies, including the Australian Trucking Association, Road Freight NSW, the region's main heavy vehicle operators, Roads and Maritime Services and NSW Police.

At the core of the Respect initiative is promoting road safety (including implementation of advanced heavy vehicle safety technology), and reducing the impact of HV emissions and noise on residential areas.

The Respect program will reinforce good driver behaviour, especially:

- Keeping appropriate distances between vehicles
- Overtaking with care
- Observing designated speed limits
- Making sufficient allowance for slowing down and stopping
- Exercising caution in reduced visibility conditions
- Considering cyclists and pedestrians
- Convoying.

Reducing heavy vehicle emissions and noise – especially exhaust brakes – is also a key focus of the campaign. Working with the industry, engine brake noise close to residential areas in the Blue Mountains will be minimised by:

- Installing special mufflers to reduce engine brake noise
- Ensuring exhaust systems are in good operating condition
- Turning off noisy engine brakes in built-up areas.

In the event that development approval was granted, the proponent should seek to have all haulage contractors partner with the Council on this Agreement and their support for the delivery of the "Respect...Our Code on Blue Mountains Roads" Heavy Vehicle Drive Neighbourly Agreement.

Residential Amenity
Dust, noise and vibration will certainly be generated by haulage vehicles travelling along Sandham Road through Bell which is used for access to the site. The impact on Bell residents will be severe. The impacts on Mt Victoria from additional heavy vehicle movements along Station Road and west along the Great Western Highway

will certainly be affected in similar ways, together with adverse impacts upon pedestrian and cyclist safety. The proposed route through Mt Victoria is the main pedestrian and cycle access route for children, other residents and visitors, travelling to school or accessing the shops and main park in the village. Similarly Blackheath will suffer from added heavy vehicles movements through its single lane town centre which is a tourism precinct.

Summary

Council and community has a strong vested interest in the proposed rehabilitation of the Bell Quarry. The impacts from the project, detailed in this submission, are submitted for consideration as part of the assessment process. It identifies the range of concerns the Bell Quarry DA if approved, would have on the residents and environs of the Blue Mountains and Lithgow LGA's especially relating to the World Heritage Listed Greater Blue Mountains Area.

Council representatives will attend the Regional Panel meeting and make representations to the meeting in relation to this matter.

If you require further information, please contact Andy Turner, Director City & Community Outcomes, on 4780 5000 or aturner@bmcc.nsw.gov.au.

Yours faithfully,

ROSEMARY DILLON
General Manager

NSW GOVERNMENT | Department of Industry

Our reference: DOC19/053078
LOC No: 603295

Letter to Applicant
(consent granted)

Steve Pearson
Phone:02 6391 4317
steve.pearson@crownland.nsw.gov.au

18 March 2019

Adam Stipcevic – HWL Ebsworth Lawyers Pty Ltd
(For Peter Chalouhi – Bell Quarry Rehabilitation Project Pty Ltd)
Level 14 Australia Square, 264-278 George St
Sydney NSW 2000

Dear Adam,

Consent for development comprising:	Rehabilitation Works at Bell Quarry including encroachment onto adjoining Crown Reserve 40760
Crown Land	Lots 7031 and 7032 both DP1066257
Crown reserve	Reserve 40760 for Village purposes
Parish	Clwydd
County	Cook

Consent is granted by the Minister for Lands and Forestry to the lodgement of applications for approval under the *Crown Lands Management Act 2016* and other associated applications required under other legislation, for the development proposal described above.

The Land Owner Consent is granted conditional to the following:

1. Land Owner Consent will expire after a period of 12 months from the date of this letter if not acted on within that time. Extensions of this consent may be sought
2. You are required to forward a copy of the approved DA to the NSW Department of Industry - Lands and Water ("the Department") after approval and prior to commencing works.
3. You are required to ensure that the approval provided is consistent with this Land Owner Consent.
4. You must apply to the Department for authority to occupy the Crown land. Crown land cannot be occupied prior to this authority being granted.
5. The Land Owner Consent is restricted to the works detailed on the plans provided by you and retained by the Department in CM9 Container 16/08983#01

Land Owner Consent is granted in accordance with the following:

- Land Owner Consent is given without prejudice so that consideration of the proposed development may proceed under the *Environmental Planning and Assessment Act 1979* and any other relevant legislation;
- The grant of this Land Owner Consent does not guarantee that any subsequent authority to occupy will be granted;
- Land Owner Consent does not imply the concurrence of the Minister for Lands and Forestry for the proposed development and does not provide authorisation under the *Crown Lands Management Act 2016* for this proposal;
- The issue of Land Owner Consent does not prevent the Department from making any submission commenting on, supporting or opposing an application;

Steve Pearson
Phone:02 6391 4317
steve.pearson@crownland.nsw.gov.au

- The Minister reserves the right to issue Land Owner Consent for the lodgement of applications for any other development proposals on the subject land concurrent with this Land Owner Consent;
- Any changes made to the proposal, including those imposed by the consent authority, must be consistent with the Land Owner Consent and therefore if modifications are made to the proposed development details must be provided to the Department for approval;
- Land Owner Consent also allows application to any other approval authority necessary for this development proposal.

This letter should be submitted to the relevant consent or approval authority in conjunction with the development application and/or any other application. You are responsible for identifying and obtaining all other consents, approvals and permits required under NSW and Commonwealth laws from other agencies for the proposed development.

It is important that you understand your obligations relating to Condition 3. If any alterations are made to the application (whether in the course of assessment, by conditions of consent, or otherwise), it is your responsibility to ensure the amended or modified development remains consistent with this Land Owner Consent. If there is any inconsistency or uncertainty you are required to contact the Department before undertaking the development to ensure that the Department consents to the changes. A subsequent LOC application may incur additional application fees.

It is advised that the Department will provide Lithgow City Council a copy of this Land Owner Consent and will request that Lithgow City Council notify the Department of the subsequent development application, for potential comment, as part of any public notification procedure.

Authority to occupy Crown land in this instance refers to the right under the *Crown Lands Management Act 2016 t*o either use or manage the land. If development consent is granted you must make an application with the Department of Industry – Lands and Water and obtain a licence over the reserve prior to undertaking any works on Crown land and prior to any use of Sandham Road where located on R40760 (see Red line in Figure 1 below) to access the site with fill material. It is recommended you make an application as soon as practicable after you obtain development approval.

During the assessment of your proposal it was also noted that native title does not appear to have been extinguished on the subject land and that the proposal will require notification under the *Native Title Act 1993 (Cth)* in order to afford any claimants or potential claimants procedural rights. (Note - the Native Title claim NSD857/2017 Warrabinga -Wiradjuri #7 covers the area of this proposal). This can be undertaken by the Department when your licence application is lodged.

For further information, please contact Steve Pearson via the details given in the letter head.

Yours sincerely

SPearson

Steve Pearson
Senior NRM Officer
Department of Industry – Crown Lands and Water, Orange

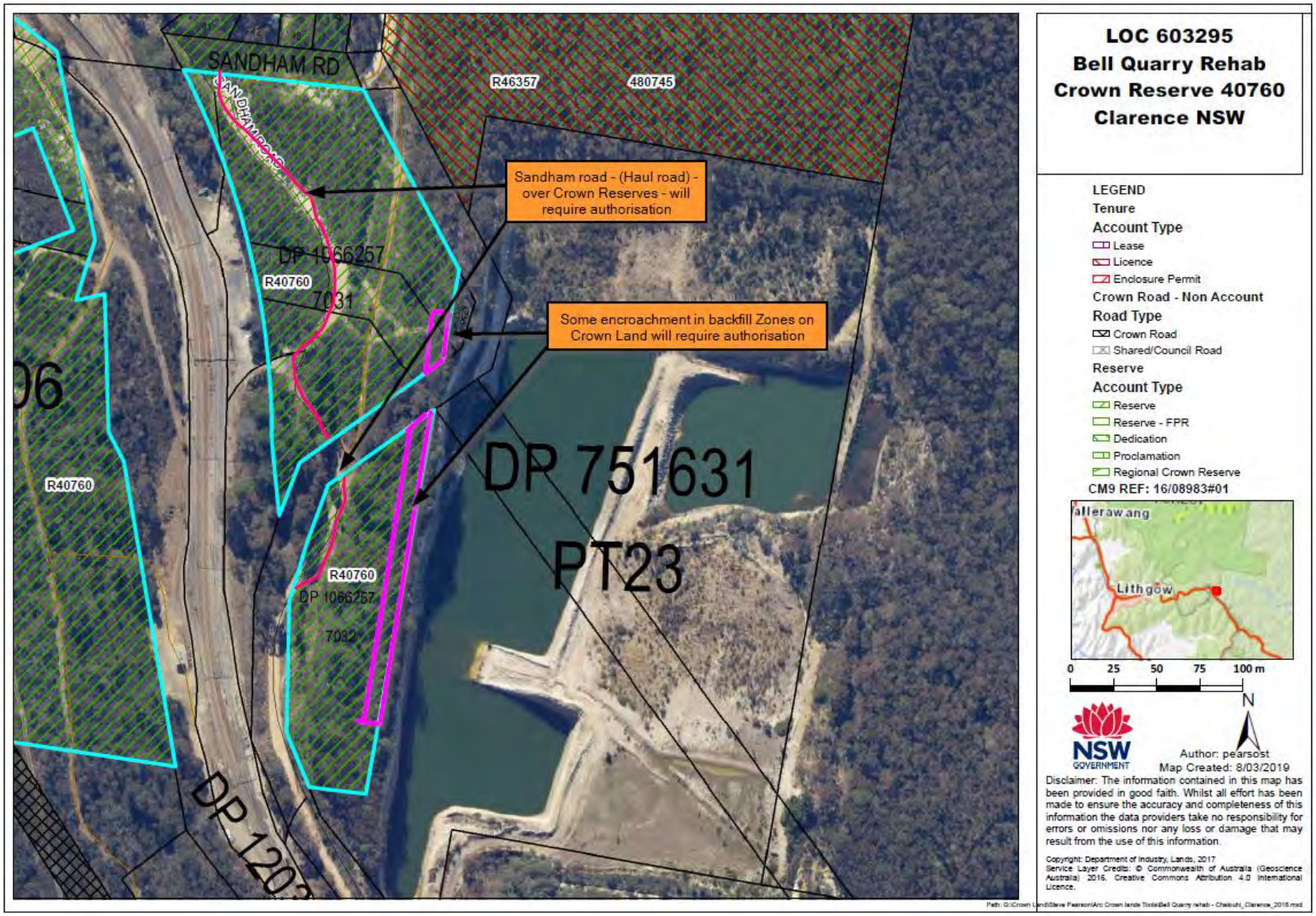


Figure 1: Location of proposed works (pink) and Access Road (Red line) over Crown Reserve 40760 Lots 7031-2 DP1066257

DOC19/59313
DA294/18

Ms Lauren Stevens
Lithgow City Council
council@lithgow.nsw.gov.au

Dear Ms Stevens

Bell Quarry rehabilitation project – DA 294/18

Thank you for your email of 9 January 2019 seeking comment from the Office of Environment and Heritage (OEH) on the Bell Quarry rehabilitation project.

OEH notes that, as the development application for the project has been lodged prior to 25 February 2019, the project is a pending or interim planning application under the *Biodiversity Conservation (Savings and Transitional) Regulation 2017* and the requirements of the *Biodiversity Conservation Act 2016* do not apply.

Work within the Blue Mountains National Park

The project encroaches into the Blue Mountains National Park. OEH, including the National Parks and Wildlife Service (NPWS), supports the rehabilitation of areas of the park that have been impacted by the quarry's operations, and the restoration of a stable landform.

We intend to issue a licence under the *National Parks and Wildlife Act 1974* to enable the proponent to conduct these works. Licence conditions are currently being determined by NPWS and will be negotiated with the proponent.

OEH advises that it is not necessary for the NPWS licence to be in place before Council approves development consent for the project provided a condition requiring the NPWS licence is included in the development consent.

If you have any questions regarding the NPWS licence, please contact Vanessa Richardson, Acting Area Manager, Upper Mountains Area on 4787 3109 or email vanessa.richardson@environment.nsw.gov.au

Recommendation

1. If Council approves the project, a condition be included in the development consent requiring a licence from the National Parks and Wildlife Service for works within the Blue Mountains National Park.

Introduction of pathogens to the site

OEH is concerned about the potential for the project to introduce pests and pathogens to the Blue Mountains National Park. This is of particular concern given the proximity of the endangered Newnes Plateau Shrub Swamp directly downstream of the site, and that the works will impact on the Greater Blue Mountains World Heritage Area.

The biodiversity assessment supporting the development application includes some consideration of Phytophthora (*Phytopthora cinnamomi*), Myrtle Rust (*Uredo rangelii*) and Chytrid fungus (*Batrachochytrium dendrobatides*). Mitigation measures include washing of vehicles. However, there is no consideration of the potential to import these pathogens to the site within the fill being used to fill the quarry voids.

OEH considers that no fill should be imported from areas known to contain Phytophthora, Myrtle Rust or Chytrid fungus. In addition, samples of fill should be tested at the point of origin for these pathogens. No fill returning positive results for pathogens should be transported to Bell Quarry.

In addition, a baseline study of these pathogens at the site is required, and an ongoing monitoring program established.

Recommendations

2. No fill is to be imported from areas known to contain Phytophthora, Myrtle Rust or Chytrid fungus
3. Samples of fill should be tested at point of origin, and results received, prior to transporting to Bell Quarry. In the event that a positive result is returned, the fill should not be imported to Bell Quarry.
4. A baseline study of pathogens at the site should be conducted, and an ongoing monitoring and review program established.

Monitoring and adaptive management

Water is discharged from the site through an established sediment basin on the eastern edge. This discharges into an unnamed tributary, passing through a Newnes Plateau Shrub Swamp, within the Blue Mountains National Park.

The project will alter flow regimes until the voids have been dewatered, after which it is anticipated that flows will be restored so that they are closer to natural conditions than is currently the case.

OEH considers that adequate monitoring, review and adaptive management are essential to ensure that surface and groundwater quality and levels do not negatively impact on biota. Similarly, monitoring of pathogens is also required at the project site.

The water resources assessment supporting the development application indicates that site discharge, the downstream tributary, and a reference site will be monitored monthly (during discharge), the pit water will be monitored monthly, and runoff from clean fill and other areas will be monitored monthly (when there is rainfall).

Ground water quality will be compared to baseline groundwater monitoring events (representing a minimum of two post summer and two post winter periods). Ongoing groundwater monitoring will then be undertaken annually, or more frequently should the baseline indicate variability in the groundwater quality or levels at the site.

However, a review of the impacts of fill material on water quality, volumes and levels is to be undertaken only every two years (and at least for each rehabilitation stage) over the approximately fifteen-year life of the project. OEH does not consider two-yearly reviews to be frequent enough to ensure action can be taken if detrimental impacts occur.

Adequate monitoring and review is required for all components of the project, including (but not limited to):

- Surface and groundwater levels and quality
- Pathogens

- Weeds
- Revegetation of rehabilitated areas

A detailed monitoring plan, incorporating a trigger, action, response plan (TARP), should be included as part of the Construction Environment Management Plan (CEMP)

Recommendation

5. A detailed monitoring plan, incorporating a TARP, be developed for the project which addresses all potentially detrimental impacts (including surface and ground water levels and quality, pathogens, weeds and rehabilitation).

Mitigation of impacts

OEH strongly supports the mitigation measures outlined in section 7.3 of the biodiversity assessment. Please note that this includes management and disposal of the weeds that are present in the project area (especially Pampas Grass and Broom) prior to commencement of earthworks and throughout the duration of the project.

The use of local provenance seed and seedlings for revegetation is also an important mitigation measure.

OEH requests that we be consulted during the preparation of the CEMP, particularly regarding the flora and fauna management sub-plan.

Recommendation

6. All mitigation measures in section 7 of the Biodiversity Impact Assessment should be implemented
7. OEH to be consulted during the preparation of the CEMP

Boundary survey and fencing

A site survey to exactly locate the eastern boundary of Bell Quarry is required. The site should then be fenced along the boundary with Blue Mountains National Park so that land tenure can be identified on-site.

Recommendation

8. The boundary between Bell Quarry and Blue Mountains National Park is to be surveyed and fenced in consultation with NPWS.

If you have any queries, please contact Liz Mazzer, Conservation Planning Officer on 6883 5325 or email liz.mazzer@environment.nsw.gov.au.

Yours sincerely

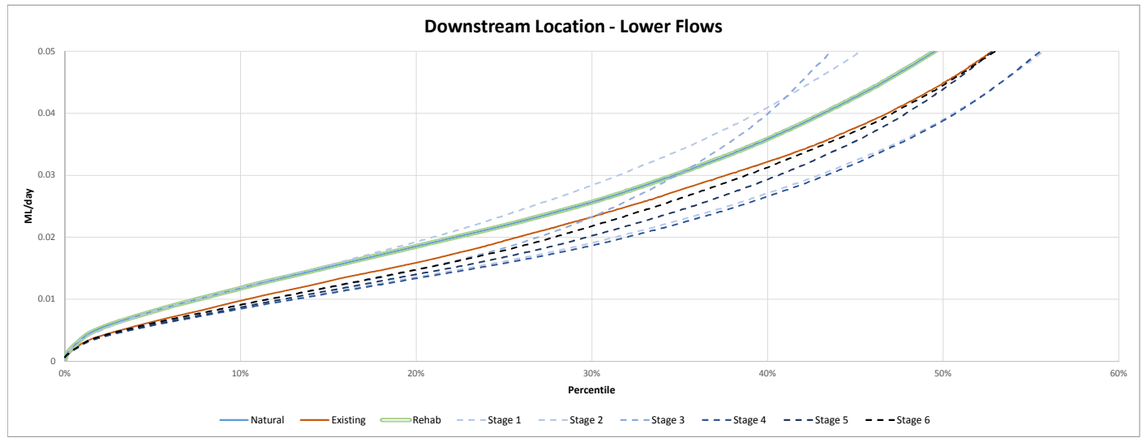
SAMANTHA WYNN
Senior Team Leader Planning, North West
Conservation and Regional Delivery

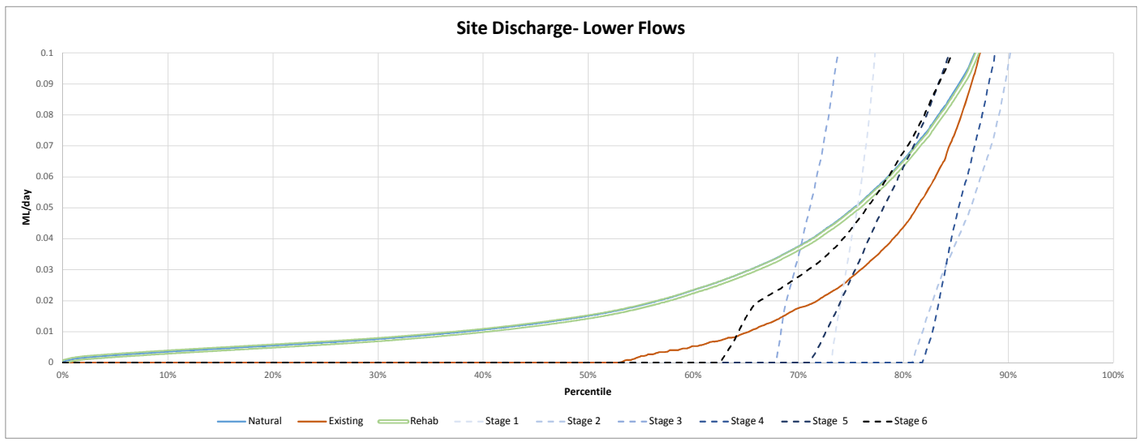
5 February 2019

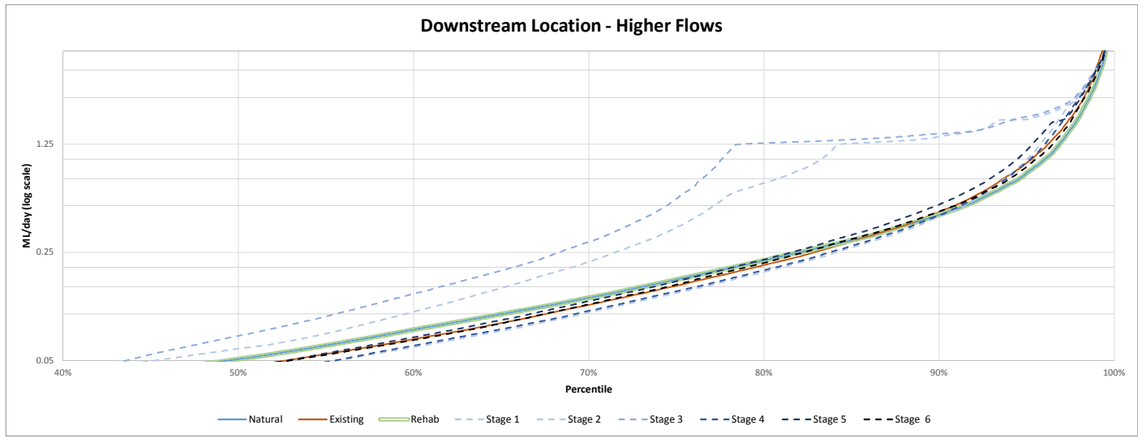
Contact officer: LIZ MAZZER
6883 5325

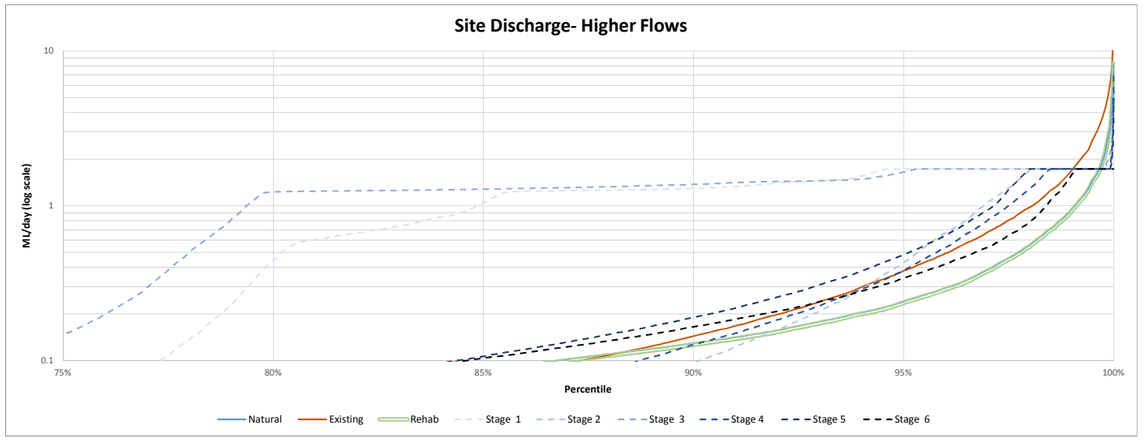
Appendix B – Flow Duration Results

Figure 5-2: Flow Duration Results

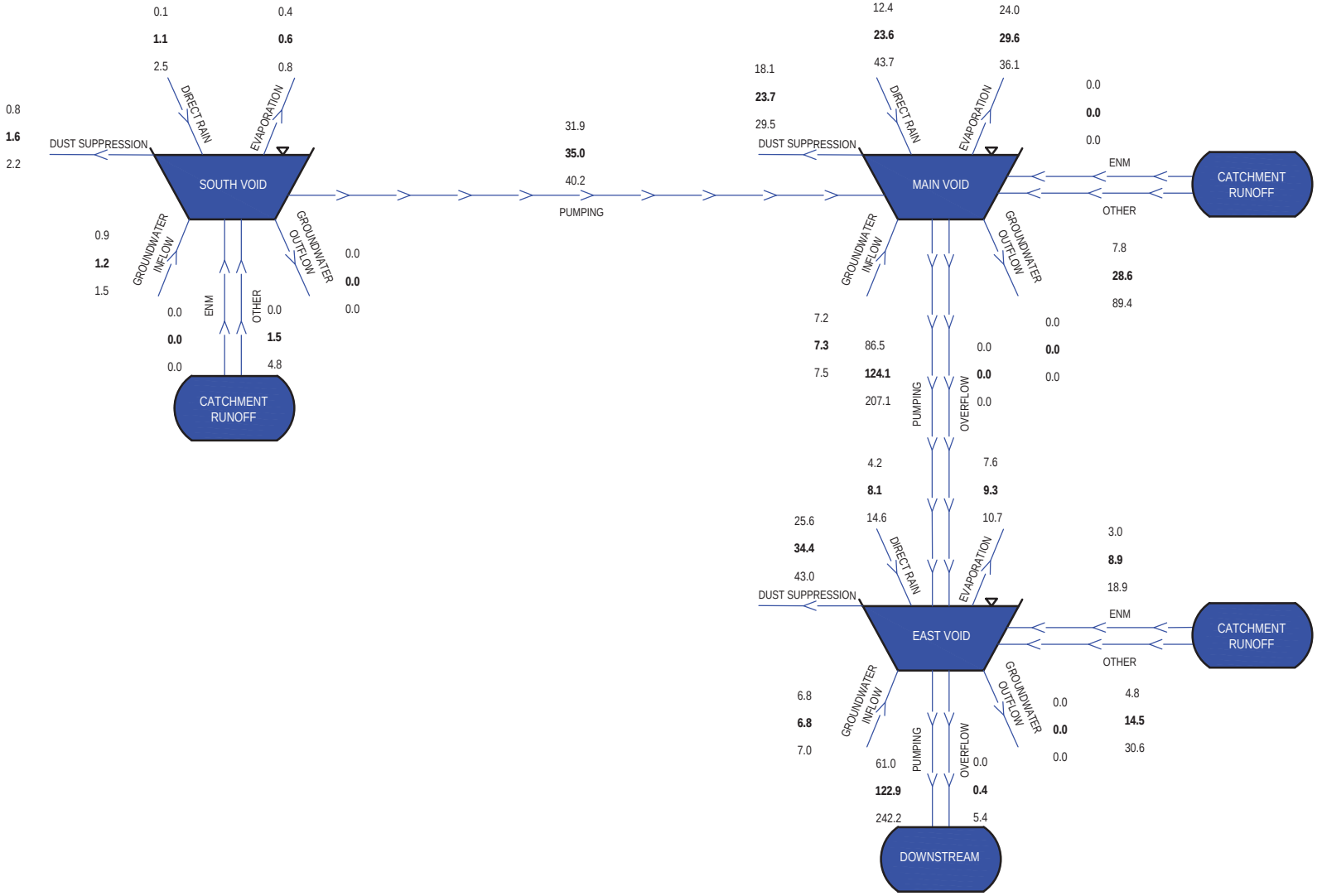








Appendix C – Detailed Water Balance Results



LEGEND

MINIMUM (ML)
AVERAGE (ML)
MAXIMUM (ML)

FLOWS INDICATE TOTAL FLOW VOLUME OVER PHASE FOR RANGE OF POTENTIAL CLIMATE CONDITIONS

CHALOUHI
BELL QUARRY REHABILITATION

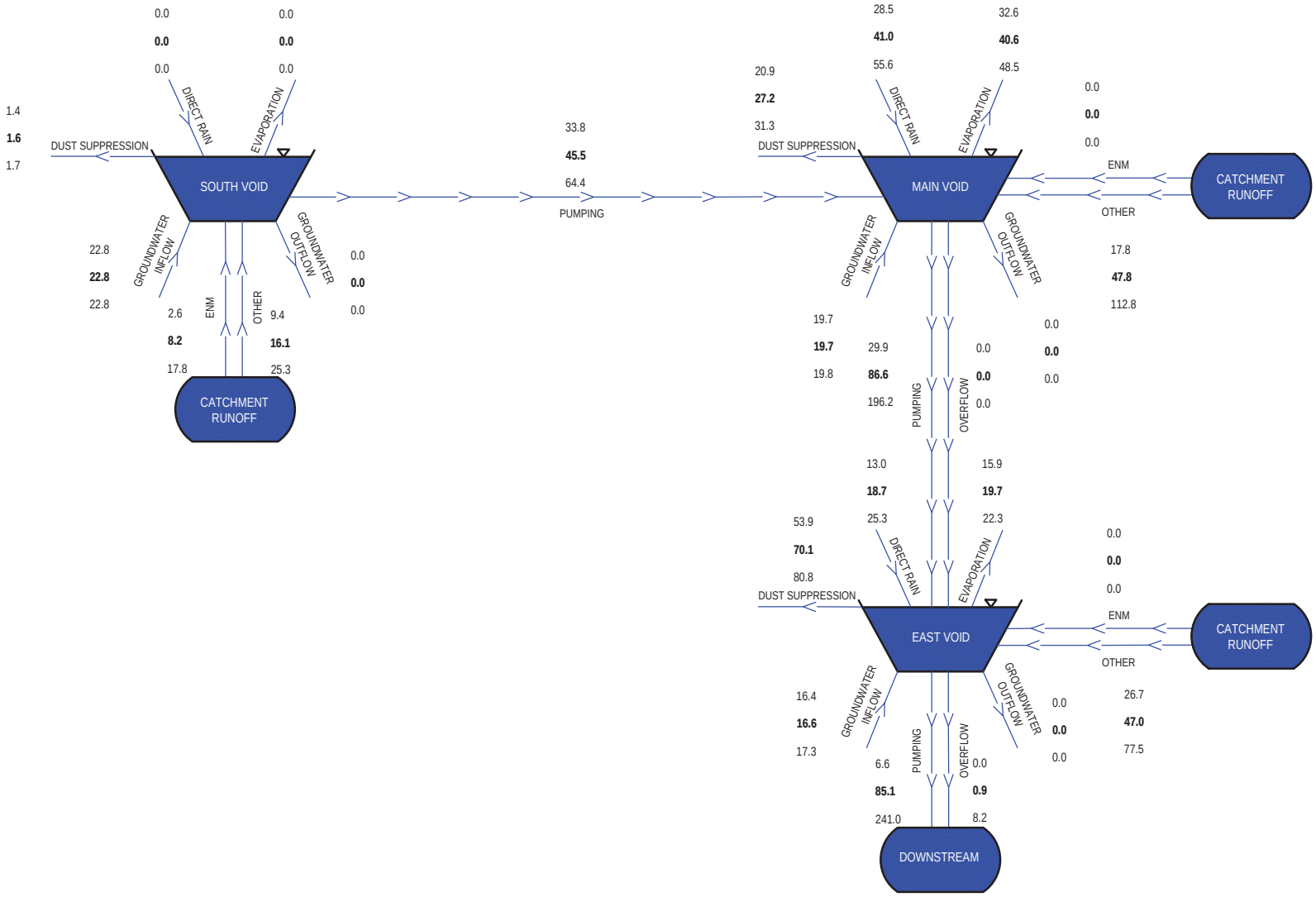
WATER BALANCE RESULTS
STAGE 1

Job Number 21-25774
Revision A
Date FEB 2018

Figure 5-1-1

230 Harbour Drive Coffs Harbour NSW 2450 Australia **T** 61 2 6650 5600 **F** 61 2 6650 5601 **E** cfsmail@ghd.com **W** www.ghd.com

Plot Date: 20 February 2018 - 2:24 PM Plotted by: Steve Young Cad File No: N:\AU\Sydney\Projects\21\25774\Tech\Surface Water\Water Balance\21-25774-Bell Quarry Water Cycle Schematic-FIG_01.dwg



LEGEND

MINIMUM (ML)	FLOWS INDICATE TOTAL FLOW VOLUME OVER PHASE FOR RANGE OF POTENTIAL CLIMATE CONDITIONS
AVERAGE (ML)	
MAXIMUM (ML)	

CHALOUHI
BELL QUARRY REHABILITATION

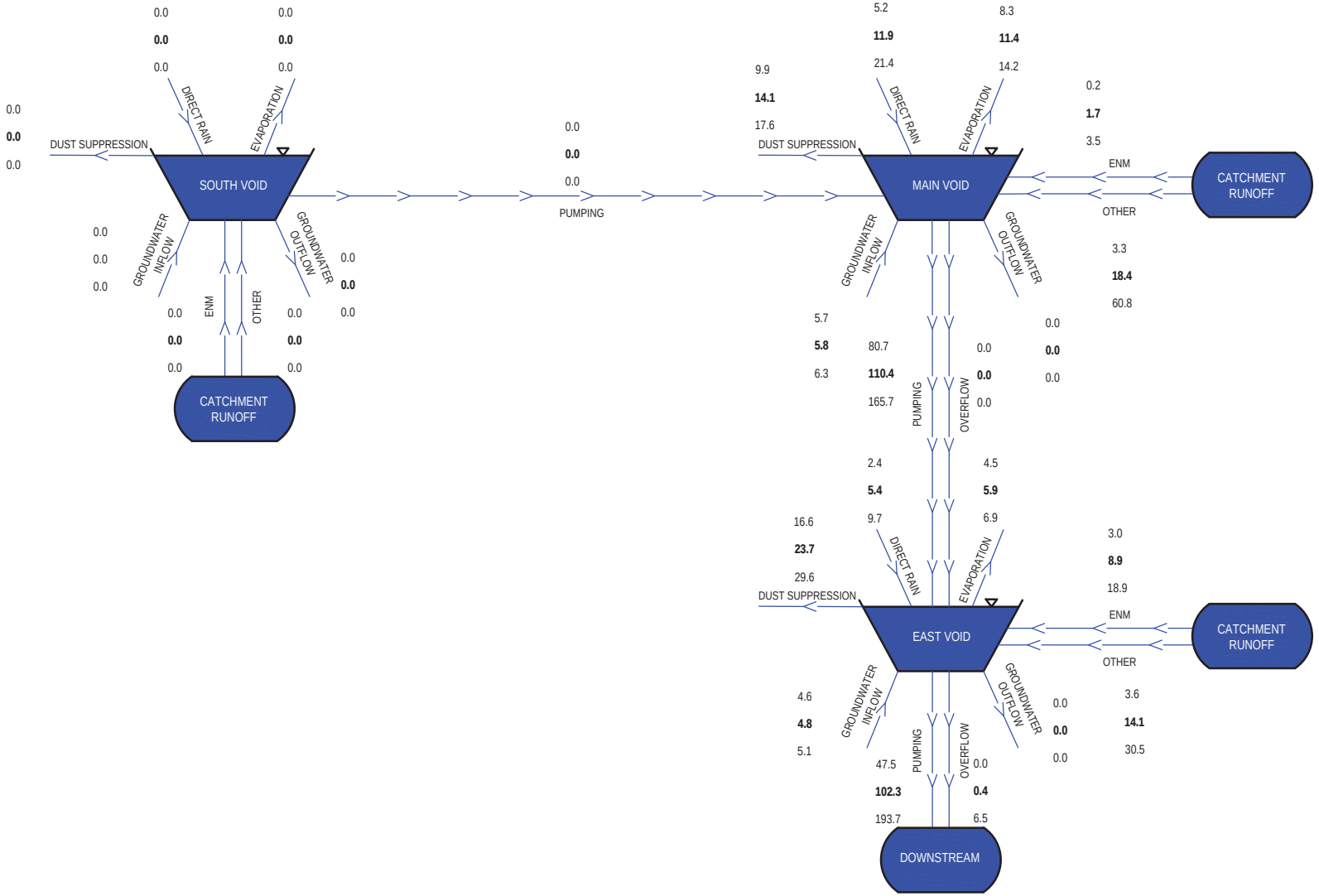
WATER BALANCE RESULTS
STAGE 2

Job Number 21-25774
Revision A
Date FEB 2018

Figure 5-1-2

230 Harbour Drive Coffs Harbour NSW 2450 Australia **T** 61 2 6650 5600 **F** 61 2 6650 5601 **E** cfsmail@ghd.com **W** www.ghd.com

Plot Date: 20 February 2018 - 2:25 PM Plotted by: Steve Young Cad File No: N:\AU\Sydney\Projects\21\25774\Tech\Surface Water\Water Balance\21-25774-Bell Quarry Water Cycle Schematic-FIG_01.dwg



LEGEND

MINIMUM (ML)	FLOWS INDICATE TOTAL FLOW VOLUME OVER PHASE FOR RANGE OF POTENTIAL CLIMATE CONDITIONS
AVERAGE (ML)	
MAXIMUM (ML)	

CHALOUHI
BELL QUARRY REHABILITATION

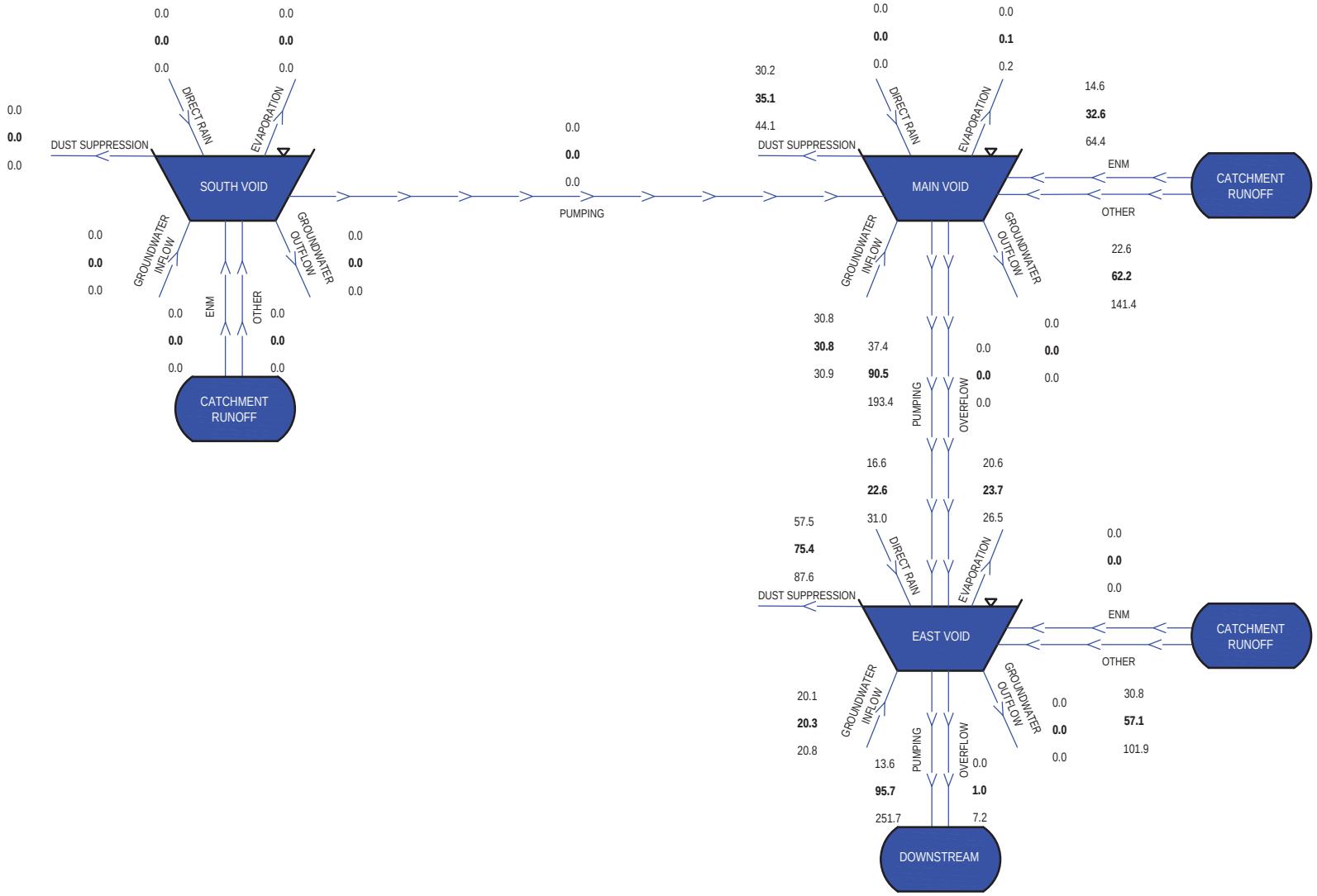
WATER CYCLE RESULTS
STAGE 3

Job Number 21-25774
Revision A
Date FEB 2018

Figure 5-1-3

230 Harbour Drive Coffs Harbour NSW 2450 Australia **T** 61 2 6650 5600 **F** 61 2 6650 5601 **E** cfsmail@ghd.com **W** www.ghd.com

Plot Date: 20 February 2018 - 2:25 PM Plotted by: Steve Young Cad File No: N:\AU\Sydney\Projects\21\25774\Tech\Surface Water\Water Balance\21-25774-Bell Quarry Water Cycle Schematic-FIG_01.dwg



LEGEND

MINIMUM (ML)	FLOWS INDICATE TOTAL FLOW VOLUME OVER PHASE FOR RANGE OF POTENTIAL CLIMATE CONDITIONS
AVERAGE (ML)	
MAXIMUM (ML)	

CHALOUHI
BELL QUARRY REHABILITATION

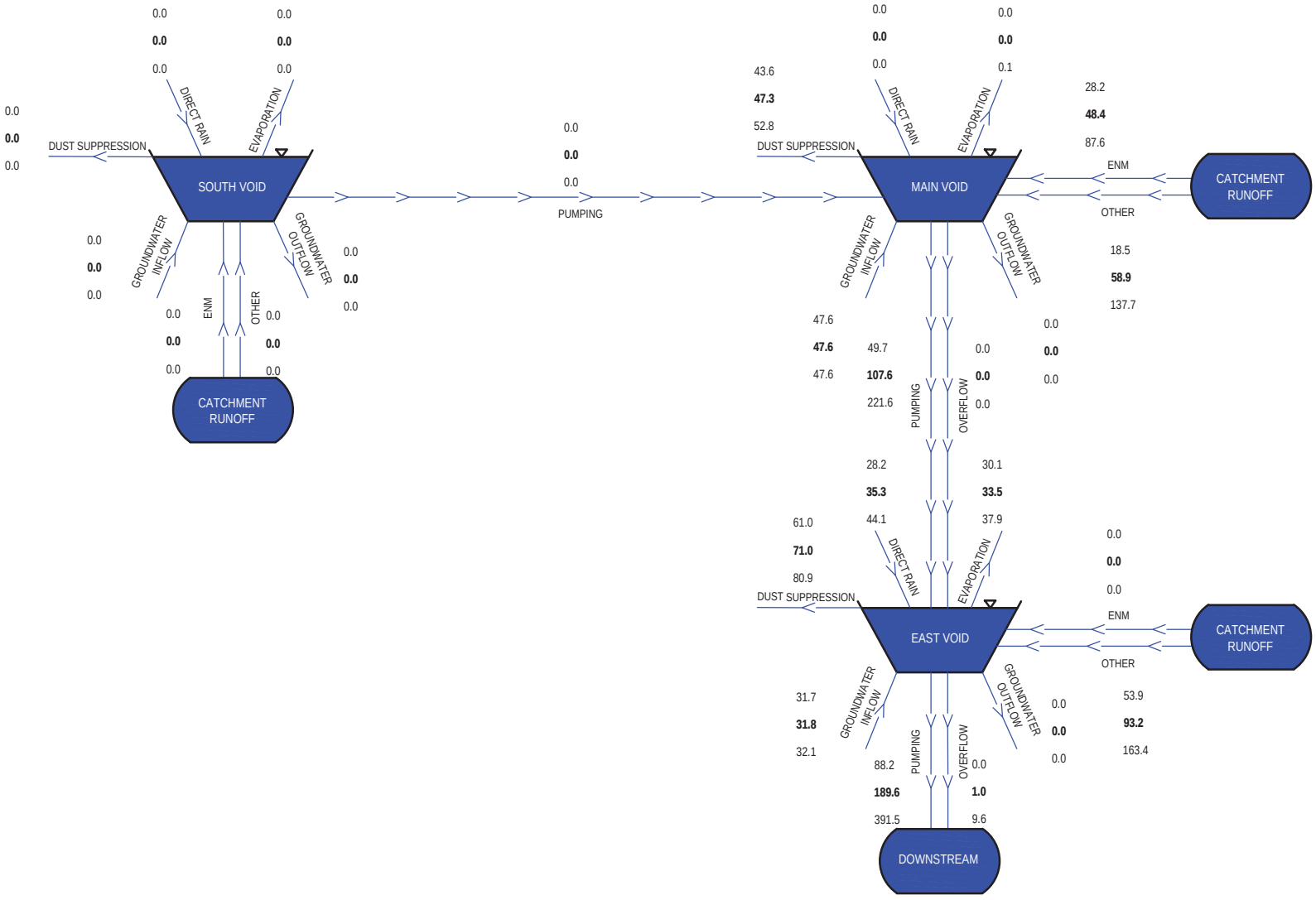
WATER BALANCE RESULTS
STAGE 4

Job Number 21-25774
Revision A
Date FEB 2018

Figure 5-1-4

230 Harbour Drive Coffs Harbour NSW 2450 Australia **T** 61 2 6650 5600 **F** 61 2 6650 5601 **E** cfsmail@ghd.com **W** www.ghd.com

Plot Date: 20 February 2018 - 2:26 PM Plotted by: Steve Young Cad File No: N:\AU\Sydney\Projects\21\25774\Tech\Surface Water\Water Balance\21-25774-Bell Quarry Water Cycle Schematic-FIG_01.dwg



LEGEND

MINIMUM (ML)
AVERAGE (ML)
MAXIMUM (ML)

FLOWS INDICATE TOTAL FLOW VOLUME OVER PHASE FOR RANGE OF POTENTIAL CLIMATE CONDITIONS

CHALOUHI
BELL QUARRY REHABILITATION

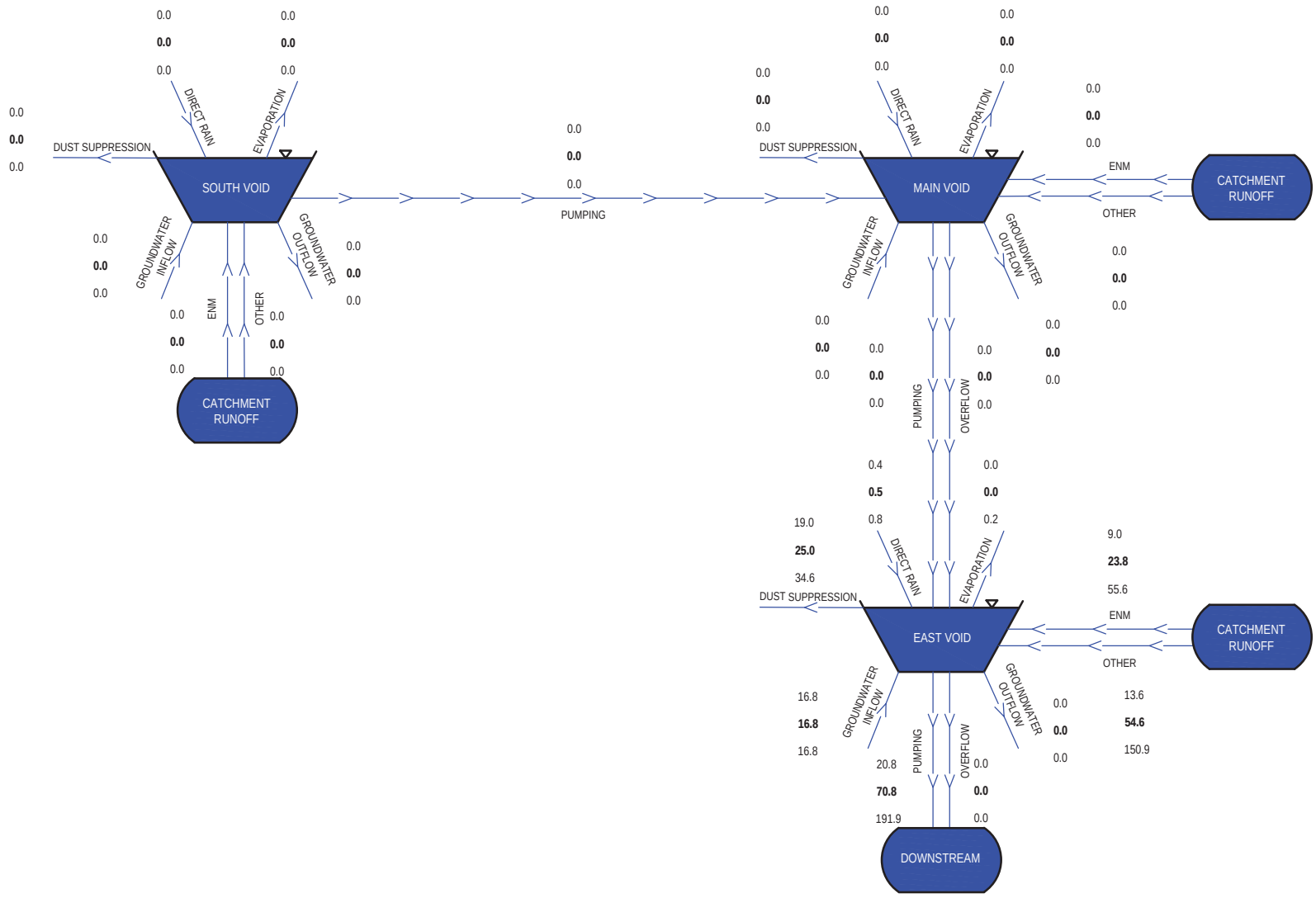
WATER BALANCE RESULTS
STAGE 5

Job Number 21-25774
Revision A
Date FEB 2018

Figure 5-1-5

230 Harbour Drive Coffs Harbour NSW 2450 Australia **T** 61 2 6650 5600 **F** 61 2 6650 5601 **E** cfsmail@ghd.com **W** www.ghd.com

Plot Date: 20 February 2018 - 2:26 PM Plotted by: Steve Young Cad File No: N:\AU\Sydney\Projects\21\25774\Tech\Surface Water\Water Balance\21-25774-Bell Quarry Water Cycle Schematic-FIG_01.dwg



LEGEND

MINIMUM (ML)	FLOWS INDICATE TOTAL FLOW VOLUME OVER PHASE FOR RANGE OF POTENTIAL CLIMATE CONDITIONS
AVERAGE (ML)	
MAXIMUM (ML)	

CHALOUHI
BELL QUARRY REHABILITATION

WATER BALANCE RESULTS
STAGE 6

Job Number 21-25774
Revision A
Date FEB 2018

Figure 5-1-6

230 Harbour Drive Coffs Harbour NSW 2450 Australia **T** 61 2 6650 5600 **F** 61 2 6650 5601 **E** cfsmail@ghd.com **W** www.ghd.com

Plot Date: 20 February 2018 - 2:27 PM Plotted by: Steve Young Cad File No: N:\AU\Sydney\Projects\21\25774\Tech\Surface Water\Water Balance\21-25774-Bell Quarry Water Cycle Schematic-FIG_01.dwg

GHD

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T: 61 2 9239 7100 E: sydmail@ghd.com

2125774-86815/https://projects.ghd.com/oc/Sydney/bellquarryrehabilita/Delivery/Documents/Bell Quarry Rehabilitation Project Submissions Report_Final.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	K Rosen	A Dixon	On file	K Rosen	On file	12/06/2019

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