4.3 Noise Management Plan

4.3.1 Objective

The activity will be operated in a way that protects the environmental values of the acoustic environment.

4.3.2 Purpose

This Noise Management Plan has been prepared to control potential nuisance impacts that may occur as a result of noise associated with the site operations.

The EP Act and the associated *Environmental Protection (Noise) Policy 2019* provide the legislation and regulatory controls for management of noise in relation to protection of EVs.

4.3.3 Performance Targets

- No environmental nuisance complaints relating to the site operations.
- Site operations shall comply with the noise criteria specified in the EA.

4.3.4 Management Strategies

- Hours of operation are to be:
  - 6:00am to 6:00pm Monday to Friday
  - 7.00am to 5:00pm Saturdays
  - Blasting activities only to occur between 9:00am to 5:00pm Monday to Friday, except in an emergency.
  - No operations on Sundays or Public Holidays.
- Mobile plant (e.g., front-end loaders, dozers, haul trucks, excavators) are to be fitted with broadband reversing alarms where possible to mitigate potential nuisance from tonal characteristics.
- Stockpile areas should be designed to allow forward-in, forward-out movement of road haulage trucks to avoid a requirement for external trucks to reverse on-site.
- Ensure a site layout that enables product delivery and handling in such a way that reduces the need for reversing.
- Fixed engines, pumps and compressors are to be enclosed where practicable.
- Ensure all site equipment, machinery and vehicles are serviced in accordance with the original equipment manufacturers' specifications as a minimum.
- Ensure all modern mobile plant (e.g., front-end loaders, excavators, off-road trucks) is fitted with effective exhaust silencers.
- Equipment and machinery are to be shut down when not in use.
- Unnecessary revving of mobile or stationary motors and engines is to be avoided.
- Ensure that equipment at the site is used for the intended purpose.
- Ensure that any extraneous noises are rectified.
- Maintain haul roads and hardstand surfaces in good condition (e.g., free of potholes, rills and product spillages) and with suitable grades.
- Avoid the use of compression braking on product delivery trucks entering the site.

4.3 Noise Management Plan

4.3.5 Monitoring

The Quarry Manager must:

- Ensure regular surveillance of the site to qualitatively assess noise generation from the operations.
- Initiate noise monitoring if requested by the administering authority, or as otherwise deemed necessary, to investigate a noise complaint.

Any monitoring must be in accordance with the most recent version of the administering authority's *Noise Measurement Manual* (DES 2020a). When required by the administering authority, noise monitoring must be undertaken, and the results notified within 14 days to the administering authority. Monitoring must include:

- $L_{A10, adj, 10 mins}$
- $L_{A1, adj, 10 mins}$
- The level and frequency of occurrence of impulsive or tonal noise
- Atmospheric conditions including wind speed and direction
- Effects due to extraneous factors such as traffic noise
- Location, date and time of recording.

4.3.6 Contingency Plan

Any complaint received in relation to noise impacts is to be managed by the Quarry Manager in accordance with **Section 2.3 -**

Compliant Recording and Response.

Should the outcomes of noise monitoring undertaken upon the request of the administering authority determine an exceedance of the specified limits, the administering authority notification is to be carried out in accordance with **Section 2.4 - Incident Response Procedure**, and corrective action is to be identified and undertaken.

Where necessary, advice should be sought from a suitably qualified person as to whether additional management measures are required to minimise noise. Additional noise monitoring must be undertaken where necessary to determine the effectiveness of the additional management strategies.

4.4 Blasting Management Plan

4.4.1 Objective

The activity will be operated in a way that protects the environmental values of the acoustic environment.

4.4.2 Purpose

Blasting will be required to fragment rock to a manageable size that can be transported and fed into the on-site crushing and screening plant.

Blasting practice has the potential to generate excessive noise and vibration impacts that may cause nuisance for sensitive receptors.

Section 440ZB of the EP Act provides the legislation for blasting.

4.4.3 Performance Targets

Blasting activities must not exceed the limits for peak particle velocity and air blast specified in the EA (extracted as **Table 8 – Blasting Limits** for reference) when measured at any sensitive place or commercial place.

Table 8 – Blasting Limits

Blasting criteria	Blasting limits
Airblast overpressure	115 dB (Linear) Peak for 4 out of 5 consecutive blasts.
Ground vibration peak particle velocity	• For vibrations of more than 35 Hz-not more than twenty five (25) millimetres per second ground vibration, peak particle velocity; and • For vibrations of not more than 35 Hz-not more than ten (10) millimetres per second ground vibration, peak particle velocity.

4.4.4 Management Strategies

All blast management at the site must be carried out in accordance with the *Bromelton North Quarry: Blast Management Plan* (Groundwork Plus 2022b).

4.4.5 Monitoring

Monitoring of blasting activities must be undertaken by a suitably qualified person in accordance with the administering authority's guideline *Noise and Vibration from Blasting* (DES 2022) and the relevant *AS 2187.2-2006 Explosives - Storage and use - Use of explosives* (or most recent version) (Standards Australia 2006). Refer to the *Bromelton North Quarry: Blast Management Plan* (Groundwork Plus 2022) for information relation to methods and frequency of blast monitoring to be implemented at the site.

4.4 Blasting Management Plan

4.4.6 Contingency Plan

Any compliant received regarding nuisance associated with blasting at a sensitive receptor must be managed by the Quarry Manager in accordance with **Section 2.3 -**

Compliant Recording and Response.

In the event that blast monitoring determines an exceedance of the approved limits, the Quarry Manager is to notify the administering authority in accordance with **Section 2.4 - Incident Response Procedure**. Advice should be sought from a suitably qualified person as to whether additional management measures are required to minimise impacts from blast. Subsequent blasts are to be monitored to ensure effectiveness of any additional measures implemented.

Additional air quality monitoring should be undertaken as necessary to determine the effectiveness of any additional management strategies employed in response to exceedance of approved limits.

4.5 Waste Management Plan

4.5.1 Objective

Any waste generated, transported, or received as part of carrying out the activity is managed in a way that protects all environmental values.

4.5.2 Purpose

This Waste Management Plan has been prepared with reference to the conditions of approval to ensure wastes produced on-site are appropriately managed.

The type of wastes that may be generated at the site may include, but are not necessarily limited to the following:

- Regulated wastes (e.g., batteries, oil filters, waste oil/hydrocarbons and containers, oil/water emulsions and tyres).
- Scrap metal and used or faulty parts and equipment.
- General waste such as food waste, packaging and consumables.
- Green waste.

The *Waste Reduction and Recycling Act 2011* ('WRR Act') nominates a waste and resource management hierarchy in a preferred order of adoption. The hierarchy is as follows:

(a) AVOID unnecessary resource consumption
(b) REDUCE waste generation and disposal
(c) RE-USE waste resources without further manufacturing
(d) RECYCLE waste resources to make the same or different products
(e) RECOVER waste resources, including the recovery of energy
(f) TREAT waste before disposal, including reducing the hazardous nature of waste
(g) *DISPOSE of waste only if there is no viable alternative*.

4.5.3 Performance Targets

- Implement the WRR Act waste management hierarchy.
- Maintain a record of wastes requiring off-site disposal.
- Meet all legislated waste tracking requirements in accordance with the EP Reg.
- No unlawful disposal of wastes on or off-site.

4.5.4 Management Strategies

WASTE AVOIDANCE

Waste avoidance relates to preventing the generation of waste or reducing the amount of waste generated. Reasonable and practicable measures for achieving waste avoidance may include, but are not necessarily limited to:

- Input substitution (using recyclable materials instead of disposable materials, for example using oil delivered in recyclable steel drums instead of non-recyclable plastic containers).
- Increased efficiency in the use of raw materials, energy, water, or land (purchasing consumables in bulk (large containers) rather than in small quantities).

4.5 Waste Management Plan

- Improved maintenance and operation of equipment (keep equipment in good working order to reduce wear and overhaul).
- Undertaking an assessment of waste minimisation opportunities from time to time.

WASTE REUSE

Waste re-use refers to re-using waste, without first substantially changing its form. Reasonable and practicable measures for reusing waste may include, but are not necessarily limited to:

- Recovering and separating solvents, metals, oil, or components or contaminants and reusing separated solvents for degreasing plant and equipment.
- Applying waste processing fines to land in a way that gives agricultural and ecological benefits (using fine sediments in rehabilitation activities).
- Using overburden for constructing bunds and landforming.
- Reusing silt/sediment on-site to the maximum practicable extent.

WASTE RECYCLING

Waste recycling refers to treating waste that is no longer useable in its present form and using it to produce new products. Reasonable and practicable measures may include, but are not necessarily limited to:

- Recovering oils, greases, and lubricants for collection by a licensed oil recycling contractor, recovering, separating, and recycling packaging (including paper, cardboard, steel and recyclable plastics).
- Recycling used plant and equipment to the maximum practicable extent.
- Finding alternatives to disposal of non-recyclable materials (using conveyor belts for noise attenuation, mudflaps, ute tray liners).
- Providing suitable receptacles and storage areas for collection of materials for recycling.

ENERGY RECOVERY FROM WASTE

This refers to recovering and using energy generated from waste. Due to the scale of the operation, energy recovery is not considered viable.

WASTE DISPOSAL

This refers to disposing of waste which cannot otherwise be reused, recycled or used for energy recovery. Reasonable and practicable measures may include, but are not necessarily limited to:

- Regulated wastes must be transported and disposed of in accordance with the *Environmental Protection Regulation 2019*.
- Disposal to a licensed waste disposal facility (i.e., landfill or transfer station).

WASTE STORAGE

- Waste storage containers or areas are to be provided and located at safe and convenient locations at the site.

4.5 Waste Management Plan

- Any storage containers are to be identified with the type of wastes which may be disposed of in each container.
- Carry out a daily housekeeping and litter collection to ensure loose litter is contained and disposed of appropriately.
- Whenever possible use fencing, enclosures, cover and other physical barriers to prevent inadvertent transport of litters off-site.

REGULATED WASTE

Regulated wastes are defined in the EP Reg. Waste management areas must include a dedicated section for regulated wastes, which must be stored within sealed containers within a bunded area in accordance with Australian Standards and the following minimum requirements:

- All regulated wastes will be transported off-site by a suitably licensed commercial transporter with an ERA 57 Regulated Waste Transport (or equivalent) approval.
- To assist in the collection and transfer of regulated wastes, designated regulated waste bins, drums and skips must be used. Where possible these regulated waste storage containers should be located at the work location where the waste is being generated and then returned to the designated regulated waste storage areas for storage prior to offsite disposal or recycling.
- Dedicated regulated waste storage areas must be provided to prevent the mixing of regulated wastes with other stored material or with incompatible hazard classes. Wastes must only be deposited into designated areas within the applicable storage area.
- Storage areas for regulated wastes must be constructed in accordance with AS 1940-2004 or an equivalent Australian Standard.
- Any regulated waste stored at the site should be recorded in a Waste Management Register or similar.
- Where possible, regulated waste stores must be lockable to prevent access by unauthorised persons.
- As soon as practicable, remove and dispose of all regulated waste to a licensed waste disposal facility or recycling facility using a licenced contractor.

TRACKABLE WASTE

Certain regulated wastes as defined under Schedule 9 of the EP Reg are to be tracked in accordance with the requirements of Section 11 of the EP Reg. **Diagram 4 – Waste Tracking Requirements (Paper Based System)** provides an overview of the waste tracking requirements for each stakeholder in the transport and handling of trackable waste chain.

4.5.5 Monitoring

All site personnel shall be responsible for ensuring wastes are stored and removed from the site on a regular basis.

The Quarry Manager must:

- undertake ongoing visual inspections to ensure the waste management hierarchy is being effectively implemented.

4.5 Waste Management Plan

- undertake daily visual inspections of baled materials to identify and remedy any damage to covering materials.
- ensure that waste treatment measures are implemented at the site.
- ensure that waste receptacles are provided, and that temporary waste storage areas are signed; recycling bins are emptied when full and materials which may cause land contamination are not disposed of on the site.
- keep a record of regulated waste generated at the site, treatment and disposal methods, approved contractors for transporting and disposing of waste and the location of the facility for accepting the waste.

4.5.6 Contingency Plan

Where a non-compliance is identified, a review of the Waste Management Plan is to be undertaken to determine areas for improvement and additional staff training on waste management procedures and waste handling is to be undertaken.

Where Neilsens becomes aware that putrescible, trackable or regulated wastes have been inappropriately disposed of, or an incident occurs involving potential or actual environmental harm, the incident must be notified to the administering authority in accordance with **Section 2.4 - Incident Response Procedure**, and corrective action is to be identified and undertaken.

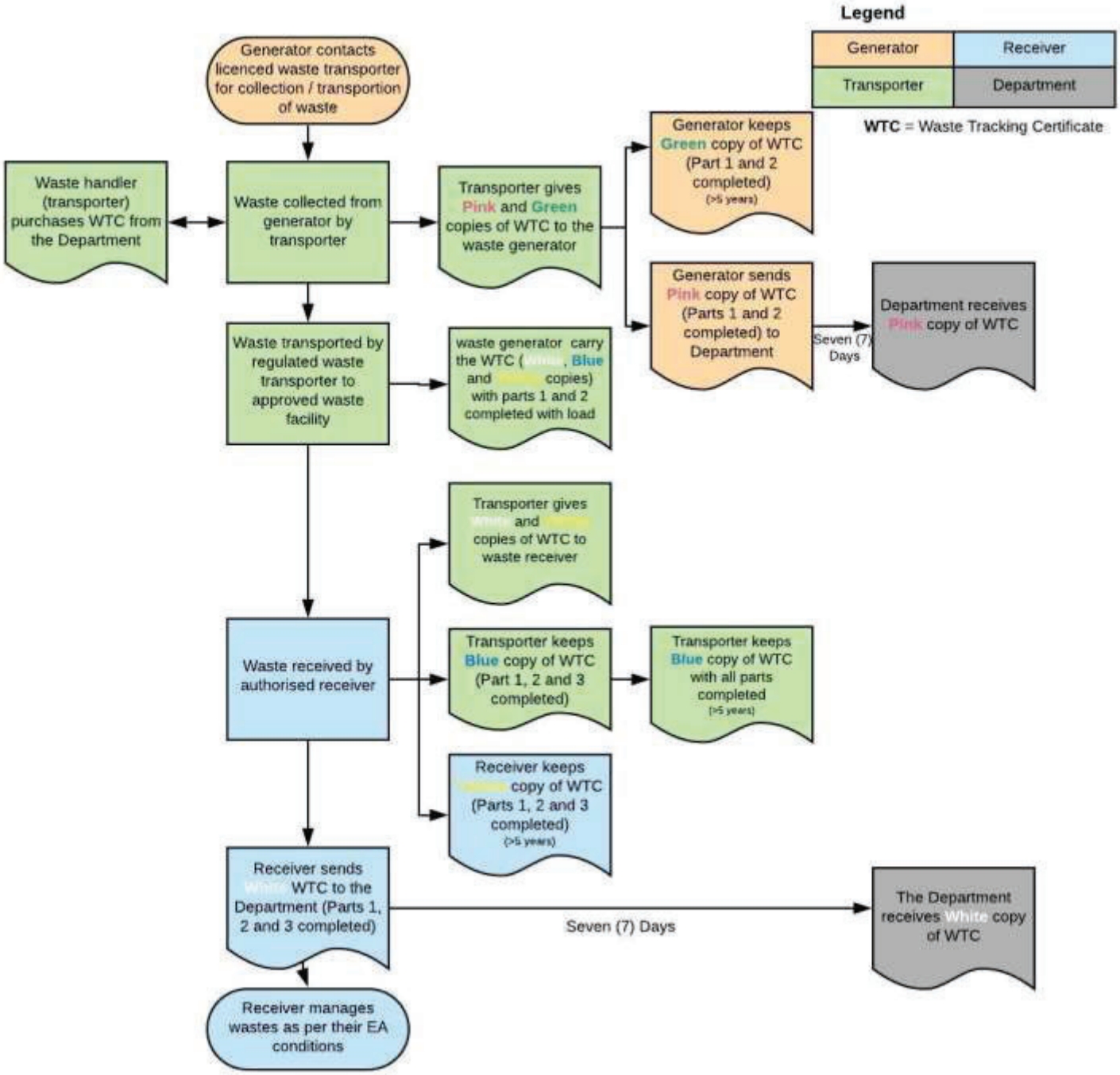

Diagram 4 – Waste Tracking Requirements (Paper Based System)

4.6 Rehabilitation Management Plan

4.6.1 Objective

The activity is operated in a way that protects the environmental values of land including soils, subsoils, landforms and associated flora and fauna.

4.6.2 Purpose

This Rehabilitation Management Plan has been prepared to assist with site rehabilitation.

4.6.3 Performance Targets

- Limit land disturbance to that which is necessary at any one time.
- Identify any land contamination and implement appropriate remediation or management where necessary.
- Land that has been disturbed for activities must be rehabilitated in a manner such that:
  - suitable native species of vegetation for the location are established and sustained for earthen surfaces.
  - potential for erosion is minimised.
  - the quality of water released from the site, including seepage, does not cause environmental harm.
  - potential for environmental nuisance caused by dust is minimised.
  - the water quality of any residual water body does not have potential to cause environmental harm.
  - the final landform is stable and protects public safety.
- Rehabilitation of disturbed areas must take place progressively as works are staged and new extraction areas are commenced.

4.6.4 Management Strategies

FINAL LANDFORM AND FINAL LAND USE DESCRIPTION

The final landform of the site is to demonstrate consideration for the zoning of the land and surrounding undisturbed areas. It is expected that the landform will comprise of vegetation terminal workings, with slower gradient areas returned to pasture for agricultural uses. Any stormwater management devices may be converted to clean water storages for livestock watering / farm water supply. The proposed Concept Rehabilitation Plan is included as **Attachment 3 – Conceptual Rehabilitation Plans**.

Terminal benches are to be battered to varying slopes depending upon the geotechnical properties of the substrate. Residual void batters are expected to have a face slope varying between 15^0 to 80^0, and the final overall batter slopes will be 45° to 58°, depending on the geotechnical properties of the substrate (to be guided by a suitably qualified person).

4.6 Rehabilitation Management Plan

PROGRESSIVE AND FINAL REHABILITATION METHODOLOGIES

Rehabilitation is to be undertaken progressively throughout the life of the operations and is to commence in each area as soon as practicable after it is no longer required for operational purposes. Progressive rehabilitation must take place as new areas of extraction are commenced.

Rehabilitation methodologies for the hard rock extraction areas are to generally include:

- The extraction area will be re-profiled and revegetated with native species on terminal benches, and pasture species on low gradient areas to support a rural end use.
- Battering terminal benches to stable slopes depending upon the geotechnical properties of the rock (to be informed by a suitably qualified person).
- Installing safety bunds and erosion and sediment controls.
- Covering the bench surfaces with available overburden and topsoil.
- Planting of endemic tree and shrub species on top of benches.
- Seeding of low gradient areas (slopes 0-6%) e.g., pit floor (NB. these areas are likely to be required for ongoing use until cessation of the pit development).

All areas subject to rehabilitation are to be subject to ongoing monitoring and maintenance until the vegetation is self-sustaining.

TOPSOIL AND SUBSOIL MANAGEMENT

The following measures should be implemented for topsoil and subsoil stripping:

- Materials should not be stripped when too wet or too dry.
- When stripped, materials should be used directly for rehabilitation to the maximum practicable extent or stockpiled and preserved for future use.
- Stockpiling of materials must not exceed a height of 2 to 3 m and should be shaped and revegetated to protect the soil from erosion and weed infestation.
- Stockpiles should be maintained in a free draining condition and long-term soil saturation should be avoided.
- Runoff waters external to the areas to be stripped should be diverted away from the working area.
- Stripping of topsoil should be limited to the minimum area necessary.

The following measures should be implemented for topsoil and subsoil spreading:

- Whenever possible, stripped materials should be directly placed on an area undergoing rehabilitation.
- Areas to be re-spread should be shaped prior to placing materials over the re-profiled surface.
- Equipment used to spread materials should be scheduled to avoid compaction.
- Before respreading the materials, loosen the underlying substrate to break up any compacted or surface sealing and to enable keying of the two (2) materials.
- On slopes less than 3(H):1(V), loosen lightly compacted substrate, ensuring all ripping operations occur along the contour.

4.6 Rehabilitation Management Plan

- Materials are to be removed from stockpiles in a manner that avoids vehicles travelling over the stockpiles.
- Materials are to be respread in the reverse sequence to its removal so that the original upper soil layer is returned to the surface to re-establish the entrapped seed content of the soil.
- Ensure all exposed substrates are covered with a minimum 300mm of suitable topsoil / subsoil to enable success of revegetation.
- After spreading materials, ensure the surface is left in a roughened state to assist moisture infiltration and inhibit soil erosion.
- Prior to any revegetation, cultivate any compacted or crusted topsoil surfaces (to a depth no greater than the depth of the materials to be spread).
- Spreading is to be immediately followed by revegetation unless inclement weather prevents and in any case within a reasonable time frame.
- If erosion occurs on treated surfaces, the area is to be re-spread with additional materials and revegetated.

SPECIES SELECTION

Table 9 – Species Suitable for Revegetation provides species that may be used for revegetation of terminal workings. This species list is indicative only, based on pre-clearing regional ecosystems mapped over the site. The species used may be any combination of these species, or more relevant alternative species as recommended by an ecologist, and should be selected at the time of revegetation based on availability at local suppliers.

Table 9 – Species Suitable for Revegetation

Final Landform Feature	Vegetation*
Terminal benches	• *Acacis sp.* (Wattle) • *Alphitona excelsa* (Red Ash) • *Angophora subvelutina* (Rouch-barked Apple) • *Aphananthe philippinesis* (Native Elm) • *Aristada sp.* (Wire Grass) • *Callistemon viminalis* (River Bottle Ash) • *Casuarina torulosa* (Forest She Oak) • *Erythrina vespoertillio* (Batwing Coral Tree) • *Eucalyptus crebra* (Narrow-Leaf Ironbark) • *Eucalyptus intermedia* (Pink Bloodwood) • *Eucalyptus maculate* (Spotted Gum) • *Eucalyptus melliodora* (Silver-Leaved Ironbark) • *Eucalyptus moluccana* (Grey Box) • *Eucalyptus tereticornis* (Forest Red Gum) • *Eucalyptus tessellaris* (Moreton Bay Ash) • *Ficus stephenocarpa* (Sandpaper Fig) • *Ficus virens* (White Fig) • *Ficus watkinsiana* (Green-Leaved Moreton Bay Fig) • *Jagera seudorhus* (Foam Bark) • *Lophostemon suaveolens* (Swamp Myrtle) • *Milia azedarach* (White Cedar) • *Notelaea longifolia* (Native Olive) • *Pittosporum revolutum* (Yellow Pittosporum)

4.6 Rehabilitation Management Plan

	• *Trema aspera* (Native Peach).
Low gradient areas (slopes 0-6%)	Pasture species that may include, but are not limited to: • Angleton grass (Dicanthium aristatum) • Buffel grass *(Cenchrus ciliaris)* • Creeping bluegrass *(Bothriochla insculpta)* • Forest bluegrass (B. bladhii subsp. glabra) • Indian bluegrass (B.Pertusa) • Pangola grass *(Digitaria spp.)* • Panics (P. maximum) • Perennial forage sorghum, 'Silk' sorghum *(Sorghum)* • Prairie grass *(Bromux wildenowii)* • Queensland bluegrass *(Dicanthium sericeum)* • Rhodes grass (*Chloris gayana*).

WEED AND PEST CONTROL

- Any materials (e.g., soil, mulch, straw) brought onto site for rehabilitation are to be inspected to ensure they are free from weeds and pests.
- Prior to the establishment of vegetation, a spraying campaign may be required to control weeds to prevent migration of weed species into areas under rehabilitation.
- Alternative methods for controlling both grass and weeds include manual weeding, burning, slashing, weed matting and mulching.
- Predation (e.g., grazing animals, birds and insects) are risks for revegetation. Depending on the situation, specific measures may be required to protect the works from predation such as fencing.

WATER BODIES

Water bodies are likely to remain within the final landform, created through the final extraction void and sediment basins utilised for stormwater management during the operational phase of the quarry.

Water bodies are to be converted to clean water storages where they are to be retained in the final landform. This can be achieved by:

- Cleaning sediment from the base of water storages.
- Battering slopes to achieve grades of no more than 3(H):1(V) where practicable.
- Ensuring that the water quality within these water storages is suitable for future use.

Neilsens are to engage a suitably qualified person to assess water quality of any residual water bodies at the site to ensure that the release parameters specified by the EA conditions, or other water quality objectives agreed with the administering authority.

4.6 Rehabilitation Management Plan

LAND CONTAMINATION

Prior to site closure, a contaminated land assessment by a suitably qualified person may be required. Assessment of site contamination, if required, is to be undertaken and managed in accordance with the following:

- *National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013)*
- *AS 4482.1-2005 - Guide to the sampling and investigation of potentially contaminated soil. Part 1 – Non-volatile and Semi-volatile compounds.*
- *AS 4482.2-2005 - Guide to the sampling and investigation of potentially contaminated soil. Part 2 – Volatile Compounds.*

Should it be identified that areas of the site have been contaminated through the operational activities, these areas are to be remediated, and validated as contaminant free, prior to site closure.

INFRASTRUCTURE

Infrastructure that is to remain on-site after the surrender of the approvals may only be retained where a landowner agreement has been provided to the administering authority which clearly itemises the infrastructure that will remain, and detail the condition it is to remain in. It is anticipated that the following infrastructure would be suitable for retention:

- Utilises and services (e.g., water, electricity, telecommunications, gas).
- Access tracks and roads.
- Water storages (rehabilitated).

Plant, equipment and buildings (including demountable and mobile infrastructure) should be removed from the final landform

A landowner's agreement should be prepared at cessation of the rehabilitation to confirm satisfaction with the rehabilitation site and for retention of any infrastructure within the landform.

KEY PERFORMANCE INDICATORS

The Key Performance Indicators ('KPIs') summarised in

Table 10 – Key Performance Indicators for Rehabilitation have been established to provide quantifiable measures for achieving the d performance targets for rehabilitation. Progressive and final rehabilitation will be deemed complete when the KPIs are achieved.

Each of the KPIs are assigned to Neilsens for completion; however, should the Neilsens require assistance to measure the achievement of these KPIs, they are to engage a suitably qualified person.

Table 10 – Key Performance Indicators for Rehabilitation

KPI Description	Measure(s)	Critical Timeframe
The final landform demonstrates consideration for the surrounding undisturbed areas and land zoning.	True / False.	Prior to lodgement of application for surrender.
Suitable species are to be utilised for revegetation in accordance with **Table 9 – Species Suitable for Revegetation**.	Species as per Table 9 – Species Suitable for Revegetation.	Prior to commencement of rehabilitation activities.
IECA (Australasia) (2010, p.5) state that 'at least 70% ground cover (combined plant and mulch) is considered necessary to provide a satisfactory level of erosion control'.	70% groundcover will be required at all sites to mitigate sediment mobilisation through erosion.	Assessment prior to any stormwater management device reduction or removal; and, Final assessment prior to surrender application.
Erosion rates of soil / sediment from disturbed areas associated with the extractive industry activities does not exceed natural rates experience for the locality.	Local erosion rate calculated and compared against actual site erosion rates.	Within three months of completion of each stage of the quarry (including at final stage).
Evidence that water quality of any residual water bodies complies with the water quality objectives of the EA or other agreed release parameters. Alternatively, water bodies are to be filled and stabilised with vegetation to create a clean, free-draining catchment.	Water quality objectives of EA conditions or other agreed Water Quality Objectives (e.g., Livestock Watering Guidelines).	Prior to lodgement of a surrender application for the EA.
Air quality of the final landform achieves levels consistent with adjacent undisturbed areas through establishment of the final landform.	Visual surveillance and complaints register review.	Prior to lodgement of a surrender application for the EA.
Review of geotechnical stability confirms that the site is stable and not subject to slumping.	Geotechnical assessment.	Prior to lodgement of a surrender application for the EA.
Assessment confirms the slope stability of final landforms.	Slope ratio, degree, or percentage.	Prior to lodgement of application for surrender.
Landowner statement(s) obtained for: • any retained items of extractive industry-related infrastructure; and • satisfaction with the rehabilitated final landform.	True / False.	Prior to lodgement of application for surrender.

4.6.5 Monitoring

Neilsens must undertake a monitoring and maintenance period following the rehabilitation phase and action any remedial measures to ensure the rehabilitated landform transition to a self-sustaining state.

The Quarry Manager or delegate must conduct regular inspections of any rehabilitated areas to ensure maintenance and repairs are carried out as necessary. Maintenance works may include fertilising, watering, repairs to barriers, guards and plant failure replacements, refer to **Table 11 – Maintenance Schedule for Revegetation**.

The monitoring and management program will review the ongoing success of the rehabilitation treatment. The Quarry Manager or delegate may engage a consultant to assist with any detailed monitoring or management of rehabilitation. The key parameters to be measured as part of the rehabilitation monitoring and management program will include:

- Landform stability.
- Erosion and sedimentation.
- Groundcover success (<70% desirable).
- Vegetation species composition and density.
- Water quality.
- Weed presence.

Final rehabilitated areas are to be visually monitored by the Quarry Manager or delegate and, where relevant, assessed by suitably qualified persons to determine the effectiveness of measures implemented.

Table 11 – Maintenance Schedule for Revegetation

Activity	Frequency
Weed Control	
Site Preparation (where necessary)	One (1) treatment at least two (2) weeks prior to seeding / planting.
Ongoing weed management	Biannually or as required.
Revegetation	
Monitor performance and conduct any necessary maintenance.	• One (1) month after seeding / seedling planting. • Three (3) months after seeding / seeding planting. • Six (6) months after seeding / seedling planting. • 12 months after seeding / seedling planting. **OR** • Following significant rainfall events (e.g., >25 mm).
Replace diseased or dead plants.	As necessary following maintenance inspections.
Fertilise (if applicable)	Two (2) months after topsoil spreading or seeding.
Apply mulch (if available)	One-off around tube stock plantings
Pasture management	
Slashing and fertilising	As required.

4.6.6 Contingency Plan

In the event that monitoring identifies failures in the rehabilitation implementation, the following contingency measures may be used, however; these will be adapted to the particular failure identified:

- Replacement of failed plantings to increase establishment / success rates.
- Use of fertilisers and soil ameliorants where necessary.
- Reprofiling or eroded or failed landforms.
- Application of additional topsoil where necessary to support vegetation growth.
- Impletion of additional erosion and sediment controls.
- Water quality improvements where necessary.

References

DES. (Department of Environment and Science). (1997). *Air Quality Sampling Manual.* Department of Environment: Brisbane, Qld.

DES. (Department of Environment and Science). (2014). *Guideline: Stormwater and environmentally relevant activities.* Accessed November 28, 2022 via https://environment.des.qld.gov.au/__data/assets/pdf_file/0028/89119/pr-gl-stormwater-guideline-era.pdf

DES. (Department of Environment and Sciences). (2018). *Monitoring and Sampling Manual: Environmental Protection (Water) Policy*. Accessed November 28, 2022 via https://environment.des.qld.gov.au/__data/assets/pdf_file/0031/89914/monitoring-sampling-manual-2018.pdf

DES (Department of Environment and Science). (2020a). *Noise Measurement Manual.* Accessed June November 28, 2022 via https://environment.des.qld.gov.au/licences-permits/pdf/noise-measurement-manual-em1107.pdf

DES. (Department of Environment and Sciences). (2020b) *Waste tracking guidelines*. Accessed June 28, 2021 via https://environment.des.qld.gov.au/waste/pdf/managing-wt-qld-overview.pdf

DES (Department of Environment and Science). (2022). *Guideline: Noise and vibration from blasting.* Accessed November 28, 2022 via https://environment.des.qld.gov.au/__data/assets/pdf_file/0028/89380/ts-gl-blasting-noise-and-vibration.pdf

EHP, (Department of Environment and Heritage Protection) (2013). *Queensland Water Quality Guidelines 2009*. Accessed October 13, 2022 via https://environment.des.qld.gov.au/__data/assets/pdf_file/0020/95150/water-quality-guidelines.pdf

IECA (International Erosion Control Association). (n.d.). *Example site-based Stormwater Quality Management Plan*. Accessed November 29, 2022 via https://www.austieca.com.au/documents/item/362

IECA (Australia), (2010). Revegetation: Erosion control techniques. *Best Practice Erosion and Sediment Control: Book 4*. Accessed via https://www.austieca.com.au/documents/item/226

The State of Queensland, (2022). *Queensland Globe*. Accessed via https://qldglobe.information.qld.gov.au/

Standards Australia, (1998). *AS 2659.1 – 1998: Guide to the use of sound measuring equipment – Portable sound level meters.* Standards Australia: Sydney, NSW.

Standards Australia. (2006). *AS 2187.2-Explosives - Storage and use - Use of explosives*. Standards Australia: Sydney, NSW.

Standards Australia, (2016). *AS 3580.10.1 Methods for sampling and analysis of ambient air— Determination of particulate matter— Deposited matter – Gravimetric method.* Standards Australia: Sydney, NSW.

Standards Australia, (2017). *AS 3580.9.9 Methods for sampling and analysis of ambient air— Determination of suspended particulate matter—PM_{10} low volume sampler—Gravimetric method*. Standards Australia: Sydney, NSW.

Standards Australia, (2015). *AS 3580.9.6 Methods for sampling and analysis of ambient air— Determination of suspended particulate matter—PM_{10} high volume sampler with size selective inlet – Gravimetric method*. Standards Australia: Sydney, NSW.

Standards Australia. (2017). AS *1940 - The storage and handling of flammable and combustible liquids.* Standards Australia: Sydney, NSW.

Standards Australia. (2018). *AS ISO 31000:2018 Risk management – Guidelines.* Standards Australia: Sydney, NSW

ATTACHMENTS

Attachment 1

Annual Environmental Performance Review

Annual Environmental Performance Review

Site:

Date:

Reviewer:

Approvals

1. Have there been any changes to the site approvals?
   Note: consider the Environmental Authority, Development Permit, etc.

   Yes ☐ No ☐

   If yes, provide details of the change (e.g. change to Environmental Authority condition, or Development Permit condition). Include the date / reference number of the current approvals relevant to the site activities.

   _____
   _____
   _____
   _____
   _____

Environmental Monitoring

2. Has all monitoring required under the Environmental Authority been carried out?

   Yes ☐ No ☐

   If no, provide details

   _____
   _____
   _____
   _____
   _____

3. Has all monitoring required under the Environmental Management Plan (EMP) been carried out?

   Note: Refer to Section 4. Environmental Management Plans for monitoring requirements.

   Yes ☐ No ☐

   If no, provide details

   _____
   _____
   _____

_____

_____

4. Were any exceedances of the approval limits recorded?

Yes ☐ No ☐

If yes, provide details.

_____

_____

_____

_____

_____

5. Was the exceedance reported to the administering authority?

Yes ☐ No ☐

Provide details of any notifications to the administering authority and actions taken to address the exceedance (if any).

_____

_____

_____

_____

_____

Complaints / Incidents

6. Have any complaints been received, or environmental incidents reported, over the previous 12 months?

Note: An environmental incident generally relates to an event which has caused, or threatens, serious or material environmental harm, consistent with the duty to notify of environmental harm under Division 2 of the *Environmental Protection Act 1994*.

Yes ☐ No ☐

If yes, briefly summarise the nature of the complaint and/or incident and any action taken to resolve the matter.

_____

_____

_____

_____

_____

Site Operations

7. Have there been any changes to the site operations over the previous 12 months?

Yes ☐ No ☐

If yes, provide details and determine if any change to the EMP or associated management documents are required.

_____

_____

_____

_____

_____

Proposed Measures for Improved Environmental Performance

8. Are any measures proposed to be implemented over the coming 12 months to improve the environmental performance of the site?

Note: Examples of measures may include; revised stormwater management measures, changes to fuel / chemical storage, etc.

Yes ☐ No ☐

If yes, provide details and determine if any change to the EMP or associated management documents are required.

_____

_____

_____

_____

_____

Attachment 2

Stormwater Management Plan

GROUNDWORK plus

BROMELTON NORTH QUARRY (PROPOSED EXTENSION)

STORMWATER MANAGEMENT PLAN

Prepared for: The Neilsen Group Pty Ltd

Date: 12 July 2023

File Reference: 740.800.001

DOCUMENT CONTROL

PROJECT / DETAILS REPORT

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FIGURES

Figure 1 Stormwater and ESC Plan (Drawing No. 740.DRG.484)

1 Introduction

1.1 Overview

Groundwork Plus have been engaged by The Neilsen Group Pty Ltd (**Neilsens**) to prepare a Stormwater Management Plan (**SMP**) for the existing Bromelton North Quarry located at 291 Sandy Creek Road, Bromelton, properly described as Lot 1 on RP98576 (the site).

The SMP is prepared to demonstrate adequate stormwater controls are in place for the quarry, and support a development application to alter the quarry footprint and to increase the annual extraction volumes from 400,000 to 800,000 tonnes per annum.

1.2 Site Details

The location details of the site for the activities are summarised in **Table 1 – Summary of Land**.

Table 1 – Summary of Land

Property Description	Lot 1 on RP98576
Address	291 Sandy Creek Road, Bromelton

1.3 Objectives of the SMP

The scope of this SMP includes the following items:

- Demonstrate existing stormwater controls are suitable for the quarry;
- Operational Management Procedures to support the DA sought; and
- Implementation and maintenance strategy for stormwater management measures and systems.

This SMP outlines the details and operational management procedures to be adopted in order to integrate stormwater management into daily operations. The objective of water management is to ensure that water resources are utilised efficiently on the site and the quality of water leaving the site does not impact on the environmental values downstream. The guiding principles for water management at the site include:

1. Runoff from clean catchments will be diverted around disturbed areas to the extent practicable;
2. Land disturbance will be minimised to the extent necessary;
3. Stormwater control elements will be installed prior to land disturbance and in a logical progression;
4. Water requirements will be collected on-site and recycled to the maximum practical extent; and
5. Visual monitoring and maintenance will be undertaken to confirm the effectiveness of water treatment systems, erosion and sediment control measures and also to program maintenance.

6. Commence rehabilitation of completed extraction areas as soon as practicable and in a progressive manner.

1.4 Operating Conditions

The site's existing EA (EPPR00540113) prescribes conditions relating to stormwater and water quality management which are summarised in **Table 2 – Proposed Surface Water Operating Conditions** and addressed in **Section 2 – Operational Procedures**.

Table 2 – Proposed Surface Water Operating Conditions

Condition Number	***Condition Details***
Agency Interest - Water	
WA1	*Contaminants must not be directly or indirectly released from the premises to which this environmental authority relates to any waters or the bed and banks of any waters except to a sewer as permitted or otherwise agreed from time to time by the relevant Local Government.*
WA2	*Except as otherwise provided by the conditions of this environmental authority, the environmentally relevant activity must be carried out by such practicable means necessary to prevent and/or minimise the release or likelihood of release of contaminated runoff from the premises to which this environmental authority relates to any stormwater drain or waters or the bed or banks of any such waters.* *"Contaminated runoff' for the purposes of this condition means stormwater and/or stormwater runoff that contains contaminants that may cause environmental harm.*
WA3	*All contaminated stormwater runoff from the stockpile(s) and the areas utilised for the operation of the stockpile(s) and processing areas must be collected and treated in the sediment ponds.*
WA4	*Erosion control and sediment control structures must be maintained at all times during the periods of operation or rehabilitation and checked, repaired or replaced as required after each rain event.*
WA5	*Diversion drains, appropriate drainage grades or equivalent must be installed to ensure surface waters from disturbed areas, including operational or trafficable areas, are diverted to the sediment control system(s).*
WA6	*All contaminated stormwater/wastewater runoff from the stockpiles and the areas utilised for the operation of the stockpiles must be directed to the sediment control system(s).*
WA7	*Drainage through and from all trafficable areas and production activities must be designed to minimise surface flow velocities.*

Condition Number	***Condition Details***
Agency Interest - Water	
WA8	*All sedimentation ponds used for the storage or treatment of contaminated stormwater / wastewater must be installed and maintained to prevent any discharge through the bed or banks of the pond to any waters (including groundwater).*
WA9	*Reasonable and practicable measures must be taken to prevent short-circuiting in sedimentation pond(s) and the sediment control system(s).* *Reasonable and practicable measures for ensuring that water does not short circuit within an individual pond include:* *(i) ensuring relatively uniform velocities through the pond; and* *(ii) ensuring that the pond inlet and outlet are located at opposite ends of the pond along the long axis; and* *(iii) ensuring that the ponds are periodically desludged to maintain efficiency in the settlement of solids; and* *(iv) ensuring that sufficient capacity is available within the pond system such that stormwater flows do not flush out settled solids; and* *(v) ensuring that there are no obstructions, such as vegetation, within the pond, that materially alters the velocities of water flowing through the different sections of the pond.*
WA10	*Sediment collected in sedimentation ponds must be removed whenever the volume of the basin is reduced by thirty percent (30%), or on other occasions as required by the administering authority, such as where sediments are contaminated, or where a build-up of sediments has occurred or may occur around the outlet structure.*

2 Operational Procedures

An overview of the proposed Operational Procedures for implementation at the site are summarised below. These are to be regularly reviewed and updated to reflect changes in quarrying practices.

Aspect	Details
Purpose	The Operational Procedures have been prepared to manage potential environmental impacts that may result from the operation in relation to stormwater management.
Risk Sources and Potential Impacts	Adverse impacts resulting from current and future operations may include the following: • Overtopping of clean water dams and/or sediment basins; • Overland flow from disturbed areas, including unsealed internal access and haulage roads; • Overland flow from topsoil, overburden, raw material and product stockpile areas; • Overland flows from storage and handling areas of oils, greases, fuels and other chemicals; • Wastewater from vehicle wash-down facility; • Construction and maintenance of carpark, roads and hardstands; • Spillage during handling of materials; and • Use and storage of oils, greases, fuels and other chemicals.
Performance Targets	The overarching performance targets for the site relating to site release and monitoring targets will be detailed in the site EA. The EA conditions are as outlined in **Section 1.4 – Operating Conditions**. The site can only release at the release points Release Point 1 and Release Point 2 as shown on **Figure 1 – Stormwater and ESC Plan**.
Responsibilities	The Quarry Manager will be primarily responsible for the implementation of this SMP.
Strategies/mitigation measures	***Sediment basin and clean water dam infrastructure*** The infrastructure required to manage the requirements of the EA conditions and associated performance targets are outlined in **Section 4 – Stormwater Quality Management,** comprising a number of sediment basins and associated drainage features. The sediment basins will be operated and maintained in accordance with **Section 4 – Stormwater Quality Management** and the requirements below:

- Freeboard must be maintained in each sediment basin and clean water dam prior to rainfall events occurring to ensure adequate capture volume is available to meet EA conditions;
- All releases from the site to waters must be carried out in accordance with the nominated EA water quality limits.

Diversion of clean surface water runoff

The site is subject to upstream surface water from external catchment areas. The quarry must monitor and divert upstream catchments away from site operations wherever practical.

Any drains or bunds proposed for diversion should have greater than 80% vegetation coverage where applicable or stabilised using an alternative material (rock lined, geofabric, erosion matting etc.).

This coverage is required to be in-place at all times. Seeding of the exposed areas using approved native grass species. The grass species will be required to have the following characteristics (as per IECA 2008):

- Plants with a fibrous root system.
- Plants that primarily grow horizontal rather than upright clumping plants.
- Leguminous plants.
- Non-invasive plants.

Oil separators, and Bunding of Fuels and Chemicals

Clearly designate storage areas and do not deviate from assigned bunded areas for storage of chemicals and fuels unless a suitable secondary bund is provided. Oil separators to be provided where necessary.

Storing and handling of hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids in accordance with the relevant legislative requirements and Australian Standards including but not limited to the provisions of:

- *AS 1692-2006* – Steel tanks for flammable and combustible liquids
- *AS 3780:2008* – The storage and handling of corrosive substances
- *AS 1940:2004* – The storage and handling of flammable and combustible liquid
- *AS 3833:2007* – Storage and handling of mixed classes of dangerous goods in packaged and intermediate bulk containers

	Stockpile areas Stockpiles must be: • Adequately protected from wind, rain, concentrated surface flow and excessive upslope stormwater surface flows. • Located to direct drainage water to sediment basin systems in event of surface water runoff. • Maintained in a moist state including by use of sprinklers to minimise the risk of movement by wind.
Auditing	Stormwater management reviews are required to be carried out on a periodic bases to assess the implementation of the management strategies.
Identification of Incident or Failure	Non-compliance with the performance criteria herein will be identified by: • Lack of monitoring at the frequencies indicated in the EA. • Stormwater in treatment system exceeds capacity after rainfall event due to insufficient freeboard. • Release of contaminants from the site. • Poor vegetation establishment • Poorly maintained, damaged or failed stormwater management devices
Corrective Action	The authorised representative shall be responsible for identification of incident or failure and completion of corrective actions. Following identification of incident or failure, the source/cause is to be immediately identified and rectified with records kept preventing future incidents occurring.
Internal Reporting	A copy of all incidents and complaints will be stored at the site within the incident and complaint register.
External Reporting	Reporting of non-compliance events including discharge of contaminants from the site are to be reported in accordance with EA requirements.

An inspection and maintenance program should be implemented as detailed in **Table 3 - Inspections and Maintenance of Erosion and Sediment Control Devices**. A summary schedule of the various inspections, performance criteria and responses that shall be performed on site is shown below.

Table 3 - Inspections and Maintenance of Erosion and Sediment Control Devices

Device	Minimum Frequency	Performance Criteria	Required Actions
Sediment Basins / Cleanwater Dams	Annually, prior to wet season	• adequate freeboard volume available, excess sediments removed prior to wet season (basin should not lose more than 30% capacity)	• captured water to be reused on site and treated as required for use in operations
Inspect drainage lines including catch drains, Contour drains and diversions	Annually, prior to wet season	• erosion in areas adjacent to water conveyancing structures	• eroded areas shall be rehabilitated / rip rapped as soon as practicable
		• overtopping of water conveyancing structures (i.e. clean water diversion drains) (identified by the scouring of the drain batters perpendicular to the direction of flow)	• eroded areas shall be repaired and stabilised
Waste containers	Weekly	• waste is stored in appropriate containers • waste receptacles labelled	• ensure waste material is stored and disposed of properly and in accordance with conditions of approval
Spill response stations	Weekly and following use	• equipment is properly maintained	• maintain equipment • replace used equipment
Maintenance / refuelling area	Weekly	• fuel, oil spills	• clean up fuel spills and investigate source
		• equipment maintenance	• maintain equipment maintenance records
		• fuel storage integrity maintained	• investigate and repair potential leaks

3 Site Based Stormwater Management

3.1 Stormwater Quantity Management Objective

In accordance with the DES Stormwater Guideline *Environmentally relevant activities*, stormwater runoff from disturbed areas for the proposed development, generated by (up to and including) a 24 hour storm event with an average recurrence interval of 1 in 5 years is proposed be retained on-site, or managed to remove contaminants before release.

Refer to **Figure 1 – Stormwater and ESC Plan** for catchment layouts, drainage features, site discharge points and details of the sediment basins to be constructed and operated at the site.

3.1.1 Hydrologic Modelling

Hydrologic modelling was undertaken using DRAINS (a computer simulation program by Watercom) as shown in **Diagram 1 – DRAINS Schematic**. Site-based rainfall polynomial coefficients were obtained using the Design Rainfall Data System 2016, available on the Bureau of Meteorology's website.

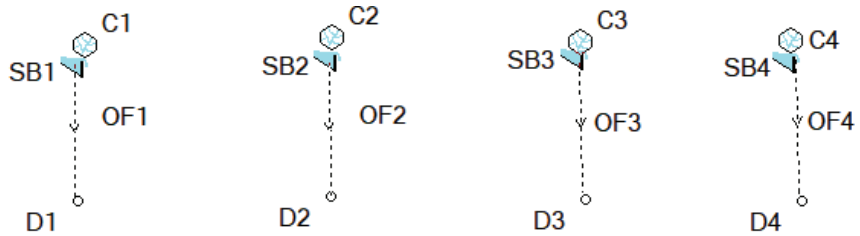


Diagram 1 – DRAINS Schematic

The IFD data is shown in **Table 4 – Intensity Frequency Duration (IFD) Data**. The existing case conditions were modelled and then compared to the future extension of the quarry footprint.

Table 4 – Intensity Frequency Duration (IFD) Data

Duration of Rainfall	Exceedance per Year (EY)						
	6EY	4EY	3EY	2EY	1EY	0.5EY	0.2EY
5 min	43.2	55.7	64.4	76.6	97	122	153
10 min	34.9	45.3	52.7	62.9	80.3	101	127
15 min	29.3	38.2	44.4	53.2	68.2	85.7	108
20 min	25.3	33.0	38.4	46.1	59.1	74.4	93.3
25 min	22.3	29.1	33.9	40.7	52.3	65.7	82.4
30 min	20.0	26.1	30.4	36.4	46.9	58.9	73.9
45 min	15.4	20.0	23.3	28.0	36.0	45.2	56.7
1.0 hour	12.6	16.4	19.0	22.8	29.4	36.9	46.3
1.5 hour	9.39	12.1	14.1	16.9	21.8	27.3	34.4
2.0 hour	7.58	9.78	11.4	13.6	17.6	22.0	27.8
3.0 hour	5.59	7.19	8.35	10.0	12.9	16.2	20.5
4.5 hour	4.14	5.31	6.16	7.39	9.58	12.0	15.3
6.0 hour	3.35	4.31	5.00	6.00	7.79	9.8	12.5
24 hour	1.31	1.69	1.97	2.38	3.15	4.01	5.27

3.1.2 Peak Discharge Results

Results of estimated peak discharge for the proposed future quarry development scenario is shown in **Table 5 – Peak Discharge Results.** Peak discharge was modelled on a 1 hour storm duration (deemed as critical storm) for each AEP event, as shown.

As shown, due to managing the sediment basins to retain the 1 in 5 year 24 hour duration event, there will be no discharge from the sediment basins, and subsequently the site discharge locations for all events up to and including the 1% AEP (1 in 100 year ARI) peak discharge event.

Table 5 – Peak Discharge Results (m3/s)

Discharge Location	Annual Exceedance Probability (AEP)					
	1%	2%	5%	10%	20%	50%
Sediment Basin SB1	0.0	0.0	0.0	0.0	0.0	0.0
Sediment Basin SB2	0.0	0.0	0.0	0.0	0.0	0.0
Sediment Basin SB3	0.0	0.0	0.0	0.0	0.0	0.0
Sediment Basin SB4	0.0	0.0	0.0	0.0	0.0	0.0

3.2 Stormwater Quality Management Objective

The site stormwater quality management objective is to comply with the EA conditions regarding site retention and quality release limits. In order to achieve compliance, the site must manage the sediment basins in accordance with the retention of the upper settling volumes prescribed below. The total upper settling storage requirements for sediment basins were estimated based on the following formula (DES 2014):

Vs = A *Cv * R (1 in 5; 24hr), where:

A = Catchment Area (m^2)

Cv = Coefficient of Discharge

R = Rainfall depth (m) from 24 hour storm, and ARI of 1 in 5 years

Table 6 – Sediment Basin Storage Requirements details the sediment basin storage requirements for each stage, based on a rainfall depth (R) of 0.126m, from an adopted average intensity of 5.27mm/h (Source: Bureau of Meteorology).

Table 6 – Sediment Basin Storage Requirements

Catchment ID	Catchment Area (Ha)	Upper Settling Volume (ML)	Sediment Storage Volume (ML)	Total Volume (ML)
C1	15.11	15.61	7.80	23.41
C2	11.02	9.96	4.98	14.95
C3	1.31	1.38	0.68	2.03
C4	18.45	19.05	9.53	28.58

Sediment basins are to be maintained in accordance with **Section 2 – Operational Procedures**, including ensuring that sediment collected in the basins are removed whenever the basin is reduced by 30%.

The primary method of de-silting the sediment control devices includes the emptying of all containing water from the device. All removed sediment would be allowed to dry to create a hardened clay resource. This resource is then collected and repurposed for other uses, including but not limited to the following:

- blended into final material products where suitable;
- used to make environmental controls (e.g., diversion bunds) on the site; and
- for site rehabilitation purposes as a fill/growth material.

3.3 Seqwater Performance Outcomes

The site falls within the Bromelton State Development Area (SDA) and the proposed development involves the State Interest for Water Quality, as specified in the State Planning Policy July 2017 (SPP). The SPP mapping shows the proposed development within the Water Resource Catchment and Water Supply Buffer Area for the Logan River, supplying the Beaudesert Water Treatment Plans and future Wyaralong Water Treatment Plant.

As such, the proposed development must comply with the Seqwater Development Guidelines: *Water Quality Management in Drinking Water Catchments 2017* (Seqwater Development Guidelines), as referenced in the SPP.

The relevant stormwater quality and quantity performance outcomes of the Seqwater Development Guidelines are shown below in **Table 7 – Seqwater Development Guidelines.** An outline of the proposed measures to address each of the performance outcomes has been identified.

Table 7 – Seqwater Development Guidelines

Performance Outcome	Acceptable Outcome	Proposed Measures
PO7 Manage stormwater at the construction phase to protect drinking water supply environmental values and facilitate the achievement of water quality objectives for receiving waters.	AO7.1 At the construction stage, an erosion and sediment control program (ESCP) demonstrates that stormwater achieves the design objectives listed in Table A of the SPP (appendix 2): Construction Phase – Stormwater management design objectives (all parts). OR AO7.2 An ESCP demonstrates how stormwater quality will be managed at the construction stage in accordance with an acceptable regional or local guideline so that target contaminants are treated to a design objective at least equivalent to Table A of the SPP (all parts). OR	Refer to **Figure 1 – Stormwater and ESC Plan** for proposed details of construction for the quarry stormwater quality and quantity controls including sediment basins, diversion drains and bunds. The ESC Plan complies with Table A of the SPP. Construction will be managed to protect drinking water supply Environmental Values and facilitate the Water Quality Objectives for the Logan River basin with construction erosion and sediment control measures consistent with the EA conditions and IECA guidelines.

Performance Outcome	Acceptable Outcome	Proposed Measures
	AO7.3 Stormwater run-off generated during construction is captured and transferred off-site or captured and treated to any applicable re-use standards and reused on-site.	Once operational, the site must maintain ongoing compliance with the EA conditions.
PO8 Manage stormwater during operational (post-construction) stages to protect drinking water supply environmental values and facilitate the achievement of water quality objectives for receiving waters.	AO8.1 Development does not involve an impervious area greater than 1,000m^2. OR AO8.2 Development is for reconfiguring a lot that; a. will not create more than two additional lots; or b. involves a land area less than 1000m2. OR AO8.3 Stormwater run-off generated during operation (post-construction) demonstrates a minimum reduction in mean annual load from unmitigated development that achieves the following stormwater management design objectives: • 85% reduction in total suspended solids; • 65% reduction in total phosphorus; • 45% reduction in total nitrogen; and • 95% reduction in gross pollutants. OR AO8.4 Stormwater run-off generated during operation is captured and transferred off-site or captured and treated to any applicable re-use standards and reused on-site.	Seqwater propose that release limits during large storm events should meet the Water Quality Objectives for drinking water quality outlined in the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 Schedule 1 for the Logan River. However, the site sediment basins will retain all water onsite up to and including the 1% AEP (1 in 100 year ARI) critical storm (refer Section 3.1.2). Therefore the site complies with AO8.4 with stormwater run-off being captured and treated in accordance with EA conditions and reused onsite for dust suppression and processing. The site release limits will comply with the EA conditions and this is deemed adequate for compliance with the Seqwater development guidelines.

4 Responsibilities

4.1 Monitoring Management Measures

The following management measures will be implemented during facility operations:

- The Quarry Manager or authorised representative is to regularly inspect the ESC management devices, particularly prior to forecasted wet weather and following major rainfall events to ensure that these devices are in good working order. All inspections are to be documented (including photos) and available on site at all times.
- The Quarry Manager shall carry out general surveillance to qualitatively assess any stormwater releases from site during discharge events.
- A surface water quality monitoring program may be implemented to assess performance from time to time. Any sampling conducted shall be undertaken by a suitability qualified person.

4.2 Auditing and Review

The effectiveness of the SMP will be reviewed as necessary (e.g. following a change in site operations) and at least once every year. The review shall take into account changes to site activities, available surface water monitoring results, any complaints, pollution incidents and any corrective actions taken.

4.3 Responsibility

The following details the responsibilities with regard to the ongoing management of stormwater at the site:

- The Quarry Manager will be responsible for the implementation of this SMP and for training of site personnel in their responsibilities in relation to this SMP.
- The Quarry Manager will be responsible for ensuring that all stormwater devices constructed on the Site have adequate free water storage capacity.
- All complaints pertaining to water quality received will be recorded in the complaints register/log maintained on-site.
- The Quarry Manager or a suitably qualified consultant will prepare water monitoring records if and when required by the regulatory authority.
- Records, including results of any monitoring program undertaken on-site, complaints or incidents will be kept on-site for a minimum of five (5) years.

4.4 Identification of Incident or Failure

An incident or failure may include, but not be limited to:

- Deterioration in surface water quality within waters discharged from site.
- Receipt of a stormwater quality release complaint.
- Not maintaining on-site stormwater controls or treatment devices.

Any identification of incident or failure will be recorded on site.

5 Environmental Incidents

The **Quarry Manager** will be responsible for ensuring that all employees at the Site are familiar with the procedure for incidents recording. Any employee becoming aware of an incident with actual or potential environmental implications, shall be reported to the **Quarry Manager**, or delegate immediately.

The **Quarry Manager** will notify upper management regarding any environmental incident. An Environmental Incident Report must be completed for all incidents.

Should reporting of an **environmental incident** to the relevant regulatory authority be required, this will be undertaken in accordance with the following.

When an environmental incident occurs, the **Quarry Manager** will notify administering authority via telephone and in writing.

The contact details of the administering authority are as follows:

Department of Environment and Science
Phone: 1300 130 372
Email: PollutionHotline@des.qld.gov.au

Following notification against this condition, an investigation and further reporting will be required, as per Section 6.1 and 6.2 below.

5.1 Investigation

All incidents should be investigated. The investigations should include:

- Determining what activities were being carried out at the time of the complaint/incident and any equipment involved.
- Identifying whether equipment or activities on-site were the cause of the incident or complaint.
- Determining what potential actions may be carried out to resolve the matter and/or minimise the likelihood of further impacts.

An assessment is to be conducted to determine what corrective actions are to be taken to remedy the matter and/or prevent a similar incident from occurring in the future. If monitoring is to be undertaken to investigate an incident or complaint these results should be supplied with the final report to the administering authority.

5.2 Responsibility

A written notice detailing the following information may need to be provided to the administering authority, following the initial notification**.** General information likely to be required for any further reporting to the administering authority may include the following:

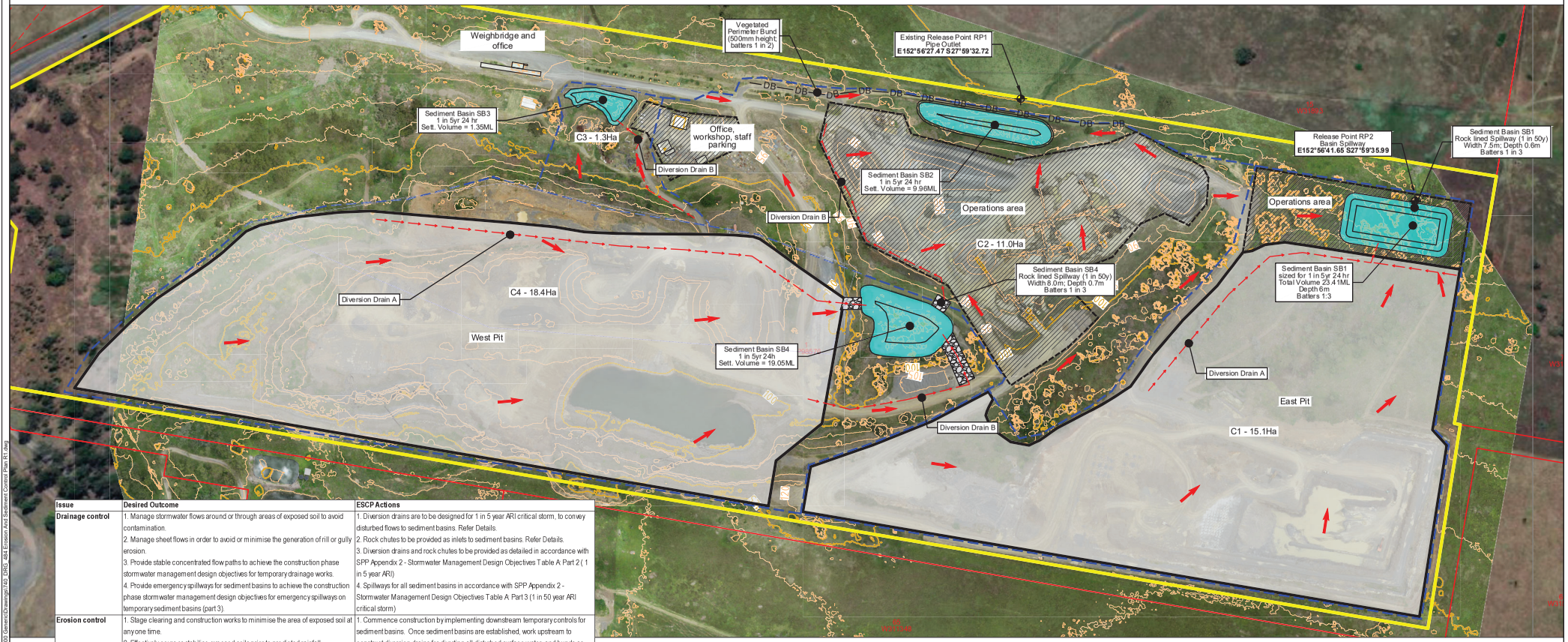
- The name of the operator.
- The name and telephone number of a designated contact person.
- A description of the event.
- The results of any monitoring performed in relation to the event.
- Actions taken to mitigate any environmental harm caused by the event.
- Proposed actions to prevent a recurrence of the event.

6 Conclusion

This SMP outlines the appropriate treatment measures and operational procedures to be adopted to integrate adequate stormwater management into daily operations and site activity. Specifically, this document has prepared to ensure that appropriate measures have been developed to meet the requirements of the site approval conditions, and support the extension to the quarry footprint.

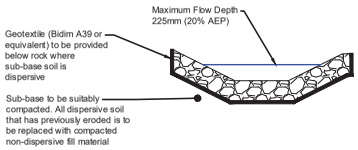
Operational procedures outlined in this SMP will assist to ensure compliance as a minimum standard.

FIGURES

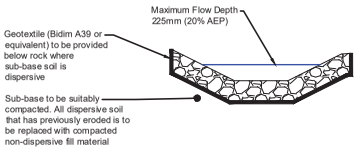


Issue	Desired Outcome	ESCP Actions
Drainage control	1. Manage stormwater flows around or through areas of exposed soil to avoid contamination. 2. Manage sheet flows in order to avoid or minimise the generation of rill or gully erosion. 3. Provide stable concentrated flow paths to achieve the construction phase stormwater management design objectives for temporary drainage works. 4. Provide emergency spillways for sediment basins to achieve the construction phase stormwater management design objectives for emergency spillways on temporary sediment basins (part 3).	1. Diversion drains are to be designed for 1 in 5 year ARI critical storm, to convey disturbed flows to sediment basins. Refer Details. 2. Rock chutes to be provided as inlets to sediment basins. Refer Details. 3. Diversion drains and rock chutes to be provided as detailed in accordance with SPP Appendix 2 - Stormwater Management Design Objectives Table A Part 2 (1 in 5 year ARI) 4. Spillways for all sediment basins in accordance with SPP Appendix 2 - Stormwater Management Design Objectives Table A Part 3 (1 in 50 year ARI critical storm)
Erosion control	1. Stage clearing and construction works to minimise the area of exposed soil at anyone time. 2. Effectively cover or stabilise exposed soils prior to predicted rainfall. 3. Prior to completion of works for the development, and prior to removal of sediment controls, all site surfaces must be effectively stabilised using methods which will achieve effective short-term stabilisation.	1. Commence construction by implementing downstream temporary controls for sediment basins. Once sediment basins are established, work upstream to construct diversion drains for diverting all disturbed surface water, and bunds as detailed to divert clean water around disturbed areas. 2. Exposed soils / overburden dumps are to be stabilised and vegetated where possible. 3. Sediment basins and diversion drains to remain operational for the life of the quarry.
Sediment control	1. Direct runoff from exposed site soils to sediment controls that are appropriate to the extent of disturbance and level of erosion risk. 2. All exposed areas greater than 2500 metres must be provided with sediment controls which are designed, implemented and maintained to a standard which would achieve at least 80% of the average annual runoff volume of the contributing catchment treated (i.e. 80% hydrological effectiveness) to 50mg/L Total Suspended Solids (TSS) or less, and pH in the range (6.5–8.5).	1. All runoff from exposed areas must be diverted as detailed to relevant sediment basins for treatment, reuse and/or discharge in accordance with the site EA 2. All disturbed areas of the quarry are treated by sediment basins sized to retain the 1 in 5 year ARI 24 hour duration rainfall event, in accordance with the DES Stormwater Guideline - Environmentally Relevant Activities. Treatment limits and discharge criteria are outlined in the quarry EA conditions. Refer Details.
Litter, hydrocarbons and other contaminants	1. Remove gross pollutants and litter. 2. Avoid the release of oil or visible sheen to released waters. 3. Dispose of waste containing contaminants at authorised facilities.	1. Site to be managed in accordance with EA
Waterway stability and flood flow management	1. Where measures are required to meet post-construction waterway stability objectives (specified in table B), these are either installed prior to land disturbance and are integrated with erosion and sediment controls, or equivalent alternative measures are implemented during construction. 2. Earthworks and the implementation of erosion and sediment controls are undertaken in ways which ensure flooding characteristics (including stormwater quantity characteristics) external to the development site are not worsened during construction for all events up to and including the 1 in 100 year ARI (1% AEP).	1. Table B objectives are not applicable. Quarry to be managed in accordance with water quality release and conditions in EA 2. Sediment basins onsite designed to retain the 1 in 5 year 24 hour duration event and result in non-worsening of release (quantity) for all events up to and including the 1 in 100 year ARI (1% AEP) critical storm.

State Planning Policy (SPP) Appendix 2 - Table A: Stormwater management design objectives



Detail A
Rock-lined Diversion Drain (Typical)
V_{MAX} = 1.4m/s
Width = 5.0m
Depth = 640mm
$Batters_{MAX}$ = 1 in 3
Rock Size = 150mm - 300mm



Detail B
Rock-lined Diversion Drain (Typical)
V_{MAX} = 1.03m/s
Width = 3.0m
Depth =340mm
$Batters_{MAX}$ = 1 in 3
Rock Size = 150mm - 200mm

REV	DESCRIPTION	DATE	BY
1	Altered pit design	05/10/22	MR

Data Sources:
Photography: Groundwork Plus RPA Survey. Captured 2021-12-23
Topography: Groundwork Plus RPA Survey. Captured 2021-12-23 UAV_DSM_1m
Cadastre: © The State of Queensland (DNRME) 2022
Ecosystem:
Other: Background Photography: © The State of Queensland (DNRME) 2019

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Legend:
- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Proposed Extraction Boundary
- Catchment
- Sediment Basin / Water Storage

PROJECT: Bromelton North Quarry

CLIENT: Neilsens Quality Gravels Pty Ltd

TITLE: Figure 1 - Stormwater and ESC Plan

GROUNDWORK plus
PH: +61 7 3871 0411
WWW.GROUNDWORK.COM.AU

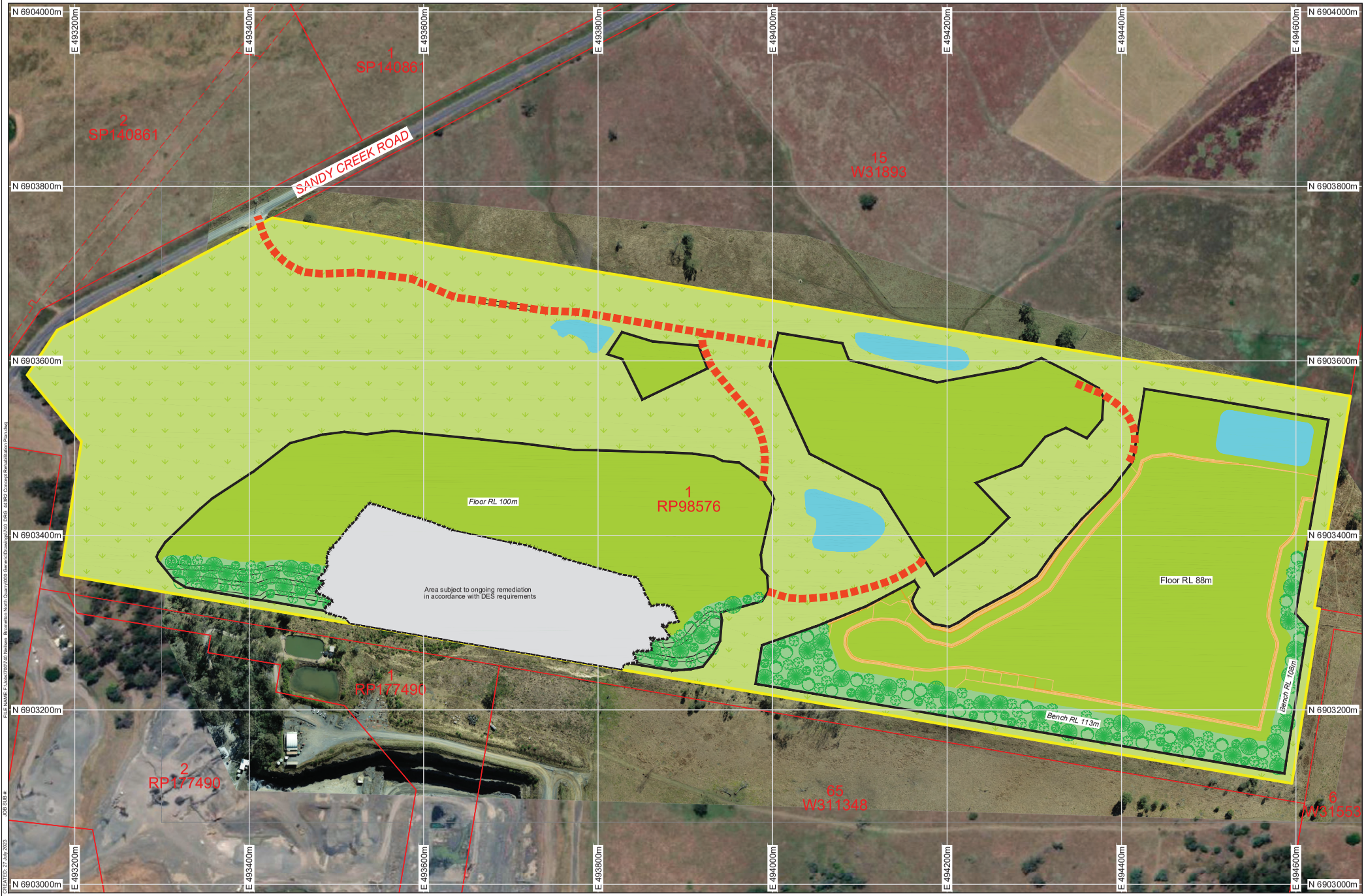
SCALE: 1:2,500 When Printed On A3 (0 – 50m)
DATE: 6 July 2023 | DRAWN: MR
PRINTED: 6 July 2023 | CHECKED: MB

DRAWING NUMBER: 740.DRG.484
REVISION: 1
DATUM: HORIZONTAL / VERTICAL / ZONE
MGA / AHD / 56

FILE NAME: F:\Jobs\700\740 Neilsen_Bromelton North Quarry\000 Generic\Drawings\740_DRG_484 Erosion And Sediment Control Plan R1.dwg
JOB SUB #:
CREATED: 6 July 2023

Attachment 3

Conceptual Rehabilitation Plans



REV	DESCRIPTION	DATE	BY
1	Altered pit design	04/10/22	MR
2	Sediment Basin & Remediation Area added	26/07/23	MR

Data Sources:
Photography: Groundwork Plus RPA Survey, Captured 2022-07-26
Topography:
Cadastre: © The State of Queensland (DNRME) 2022
Ecosystem:
Other: Background Photography: © The State of Queensland (DNRME) 2019

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Legend:

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Access Road
- Water Storage
- Pasture Area
- Remediation Area
- Native Ecosystem
- Pasture/Native Ecosystem

PROJECT: Bromelton North

CLIENT: Neilsens Quality Gravels Pty Ltd

TITLE: Concept Rehabilitation Plan

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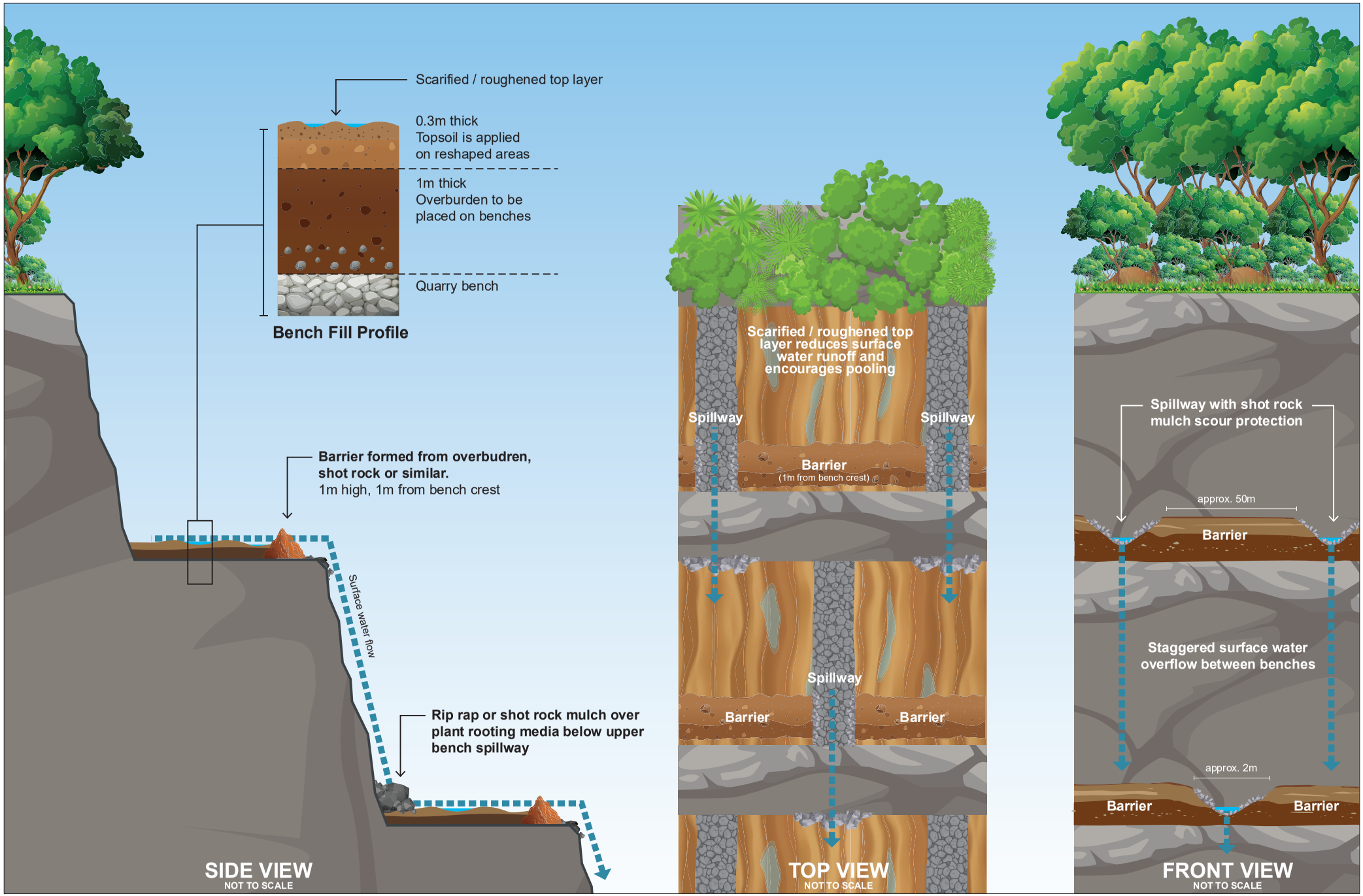
SCALE: 1:4,000 When Printed On A3 — 0 80m

DATE: 27 July 2023 | DRAWN: MR
PRINTED: 27 July 2023 | CHECKED: YD

DRAWING NUMBER: 740.DRG.443
REVISION: 2

DATUM: HORIZONTAL / VERTICAL / ZONE
MGA / AHD / 56

FILE NAME: F:\Jobs\700\740 Nielsen Bromelton North Quarry\000 General\Drawings\740 DRG 443R2 Concept Rehabilitation Plan.dwg
JOB SUB #:
CREATED: 27 July 2023



REV	DESCRIPTION	DATE	BY

Data Sources:
Photography:
Topography:
Cad.ustre:
Ecosystem:
Other:

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PROJECT: Bromelton North

CLIENT: Nielsens Quality Gravels Pty Ltd

TITLE: **Quarry Bench Rehabilitation Concept**

GROUNDWORK plus
PH: +61 7 3871 0411
WWW.GROUNDWORK.COM.AU

SCALE:	DRAWING NUMBER:	REVISION:
NOT TO SCALE	740.DRG.447	

DRAWN: JVivash
CHECKED: TSmith
DATUM: HORIZONTAL / VERTICAL / ZONE
/ /