RCA ref 10723-408.1 Response To Dept Of Planning
Client ref XXXXX

26 August 2016

Buttai Gravel Pty Ltd
P.O. Box 299
Wallsend

Attention: Adam Kelly

**RESPONSE MARTINS CREEK QUARRY DEPARTMENT OF PLANNING ADEQUACY ASSESSMENT OF EIS.**

Dear Adam

I have reviewed the request for additional information from Department of Planning dated 29 July 2016. I note a number of concerns expressed in respect of the Noise Impact Assessment and respond as follows.

**Item 1**

**Request**

Justification required for use of traffic noise affected background levels.

**Response**

This work was conducted is in accordance with Clause 3.1.3 of INP. Additional comment is provided at Section 5.1 of the amended report.

**Item 2**

**Request**

Additional detail is required to identify receiver properties and NAGs

**Response**

Receiver properties are identified in the noise contour plots and described in Section 4.2. Additional information and individual receiver identification is provided in an updated Section 4.2 and an updated map showing NAG areas (shaded) is provided in the updated report. Additional comment is provided as to the selection of NAGs.

**Item 3**

**Request**

Additional detail is required to identify receiver properties and NAGs.

**Response**

As for item 2

**Item 4**

**Request**

Current noise performance not adequately detailed.

**Response**

Current noise performance is described in Table 2, Table 3 and Table 11 and clearly shows that existing operations exceed the PSNL at some residences.

Additional information is provided in an updated Section 6.4 and higher resolution noise contour plots and an additional contour plot for existing conditions is also provided.

**Item 5**

**Request**

Derivation of PSNG in Table 7 is not in accordance with INP.

**Response**

The Project Specific Noise Goals are derived in Table 5 in accordance with INP. Table 7 is a listing of the proposed Consent / Licence limits based on what can be achieved after taking into account all reasonable and feasible mitigation. For clarity an additional Table has been added with the PSNLs only.

**Item 6**

**Request**

Predicted received noise levels are not adequately documented for individual receivers. Additional information is requested on the impacts at individual locations and on whether or not the PSNG are exceeded over more than 25% of any vacant land.

**Response**

Tables 13 to 17 clearly show that there is compliance with PSNGs (Table 5) for all of NAG 2 and NAG 3 under worst case conditions after the noise mitigation work is completed (from Year 5 onwards).

Additional information is provided for all individual receivers for each of the operational scenarios over each of the stages.

There is no requirement to assess vacant land against the PSNG. The requirement under the VLAMP is that the Maximum Noise levels of Table 2.1 of the INP not be exceeded for more than 25% of the area of vacant land.

The noise contour plots show there is no exceedance of the INP levels over adjacent vacant land, however additional information is provided to clarify this.

Additional information is provided in an updated Section 6.4 and higher resolution noise contour plots have been added at the start of Appendix B to show the worst case noise impacts over the two identified vacant lots, additional comment is also provided in 6.4.2.

**Item 7**

**Request**

Additional assessment required for potential for product despatch by road between 5:30 am and 7:00 am.

**Response**

Additional information is provided in an updated Section with respect to traffic noise impacts.

**Item 8**

**Request**

Clarification is required as to whether or not the noise mitigation is included in the modelling and additional commentary is required as the effects of these measures.

**Response**

Section 2 of the report states:-

> "*Six staged operational noise scenarios were modelled in three dimensions representing the progression of quarry operations over 25 years from the commencement of the expansion project. Each operational scenario is modelled to represent the worst case operating conditions assuming the application of reasonable and feasible mitigation as detailed later in this report."*

Section 6 of the report states:-

> *In all cases the results for the predicted received noise incorporate the specified noise treatments at each stage of the project."*

The noise mitigation is included in the noise models as the titles in Tables 11 to 16 and the Figures in Appendix B clearly state.

Also a comparison of the predicted received noise level in Table 10 with the subsequent Tables 13 - 17 clearly show the progressive reduction in noise for various operating scenarios.

Additional information is provided in an updated Section 6.4 to assist in clarifying this matter.

Also the noise contour plots have been reprinted without the background imagery and the Lot boundaries have been more clearly highlighted (Brown).

**Item 9**

**Request**

The impact of the additional rail movements on the network is not adequately assessed.

**Response**

Additional information is provided in an updated Section 5.5.

**Item 9**

**Request**

The updated SEARS seek and assessment under the NSW Interim Construction Noise Guide (ICNG).

**Response**

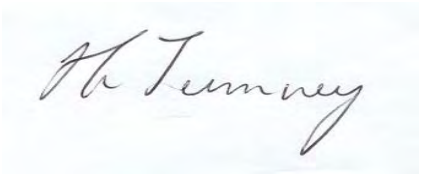
As noted in Section 2 of the report the ICNG specifically excludes its application to mines and quarries and is not an appropriate guideline for use in this assessment.

As also stated in Section 2 of the report the proposed construction activities will create no more sound emissions that the existing quarry operations and so no noise assessment was considered necessary.

In this case noise from the construction is part of normal operating noise since the majority of construction occurs as a consequence of the quarrying process using the similar or the same equipment in the same locations.

Yours Sincerely

RCA Acoustics



Ray Tumney BEng (Mech), MEnv Stud, MIEAust, MAAS.

Principal Acoustic Engineer

# ACOUSTIC ASSESSMENT

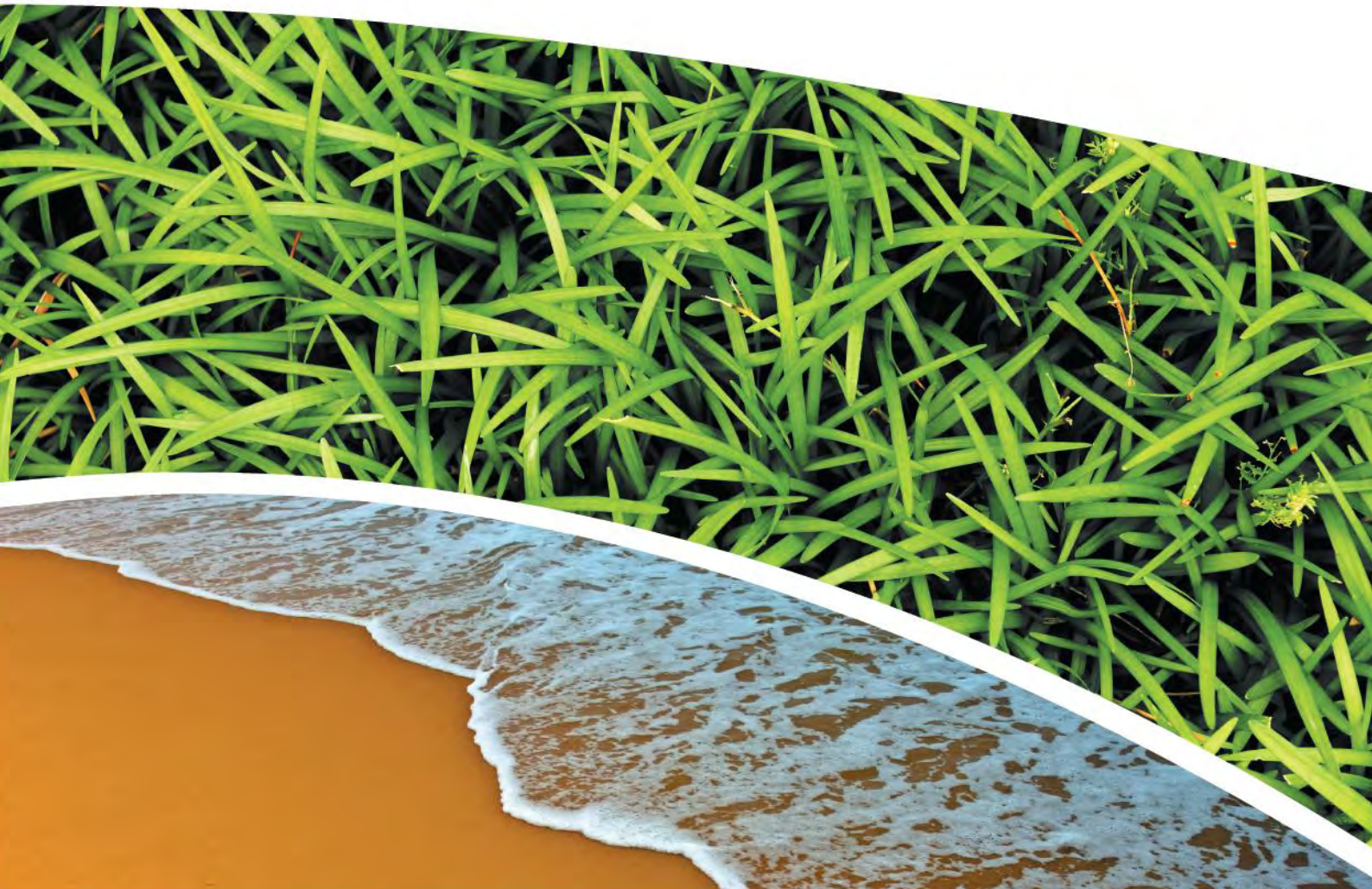
## NIA Martins Creek Quarry Expansion [Site]
## Prepared for Buttai Gravel Pty Ltd

**Prepared by RCA Australia**

**RCA ref 10723-404.9**

**August 2016**

RCA ACOUSTICS
SOUND • VIBRATION



**RCA AUSTRALIA**
ABN 53 063 515 711

92 Hill Street, CARRINGTON NSW 2294

Telephone: +61 2 4902 9200
Facsimile: +61 2 4902 9299
Email: administrator@rca.com.au
Internet: www.rca.com.au



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## CONTENTS

26 August 2016

Buttai Gravel Pty Ltd
C/- Site R&D

Attention: Mr Adam Kelly

**ACOUSTIC REPORT**
**PROPOSED EXPANSION**
**MARTINS CREEK QUARRY**

# 1 INTRODUCTION

## 1.1 MARTINS CREEK QUARRY EXPANSION PROJECT

### *1.1.1 PROJECT OVERVIEW*

Martins Creek Quarry (MCQ) is now managed and operated by Buttai Gravel Pty Ltd, who took over operations from State Rail in 2012. Since that time the quarry has operated under various approvals and an Environment Protection Licence Number 1378. Current output is in the order of 800,000 to 900,000 tonnes of high quality andesite rock which is extensively used in the construction industry and for the construction of roads and maintenance of rail lines.

The quarry commenced operations in 1915 and since that time, until it was taken over by Buttai Gravel, has been owned and operated by NSW State Government Rail Authorities.

The Martins Creek Quarry Expansion Project, which involves:

- extracting up to 1.5 million tonnes of hard rock material per annum;
- expanding into new extraction areas and clearing existing vegetation;
- increasing the hours of operation for:
  - quarrying to 6am to 6pm (Monday to Saturday);
  - processing to 6am to 10pm (Monday to Saturday);
  - mixing and binding to 4:30am to 10pm (Monday to Friday) and 4:30am to 6pm (Saturdays);

  - stockpiling, loading and dispatch of road transport to 5:30am to 7pm (Monday to Saturday); and
  - train loading to 24 hours per day, seven days per week;
- consolidating existing operations and approvals; and
- rehabilitating the site.

The project is to continue extraction of hard rock from the site by completing the extraction of the existing operational areas, expanding the operational area and then increasing the depth of extraction in the area where the current processing plant is located.

The expansion of the quarry is described as six (6) stages as set out in the Quarry Extraction Operations Plan prepared by VGT Ref 2049 _MC_ QMP R01.

The Quarry Expansion Project will continue to utilise the existing crushing and processing equipment for most of the remaining life of the resource until the final years of the project when the material will be extracted from beneath the location of the existing plant. At that time, the existing plant is considered to be at the end of its life and will be decommissioned and replaced with modular equipment that can be located on the floor of the quarry and relocated as the quarrying progresses.

In the earlier stages of the works, some of the existing infrastructure that is close to the residents in Station Street and Corey Street will be relocated and the areas will be rehabilitated.

#### *1.1.2 PROPOSED DEVELOPMENT*

The project seeks to continue existing operations to complete the extraction of material in existing areas in conjunction with expansion into the proposed new areas to maximise the utilisation of the resource. Mining methods are expected to remain the same as currently used with rock being broken by Drill and Blast techniques in the pit with Run of Mine (ROM) material being trucked to the crushing plant for further processing before being stockpiled and loaded on to road trucks or train for delivery to market.

The components of the proposed development comprise:

- extracting up to 1.5 million tonnes of hard rock material per annum;
- expanding into new extraction areas and clearing of vegetation;
- increasing the hours of operation:
  - for quarrying to 6am – 6pm (Monday to Saturday);
  - processing to 6am - 10pm (Monday to Saturday);
  - mixing and binding to 4:30am to 10pm (Monday to Friday) and 4:30am to 6pm (Saturdays);
  - stockpiling, loading and dispatch of road transport to 5:30am to 7pm (Monday to Saturday); and
  - train loading extended to 24 hours per day, seven days per week;
  - maintenance works retained at 24 hours per day, seven days per week;
- consolidating existing operations and approvals; and

- rehabilitating the site.

The operators are aware that there are a number of circumstances where the operation of the quarry and the associated transport operations generate a noise impact on the surrounding community, and the project has been designed to address as many of these as is reasonably possible by including the following activities in the project.

- Construction of a new access road to Dungog Road for product shipment.
- Discontinuation of product shipment via Station Street and Grace Avenue.
- Discontinuation of use and rehabilitation of the southern section of the existing operational area which is presently used for maintenance and product processing and stockpile.
- Relocation of maintenance facilities to within the existing processing area behind a noise barrier.
- Construction of noise barriers along haul roads and around the existing quarry production floor.
- Applying engineering noise treatments to existing quarry plant.

Details of the noise mitigation treatments are given in Section 7 of this report.

Figure 1 shows an extract from the LEP zoning maps and shows that the surrounding area is largely zoned RU1 Primary Production with the township of Martins Creek zoned Village ( RU5).

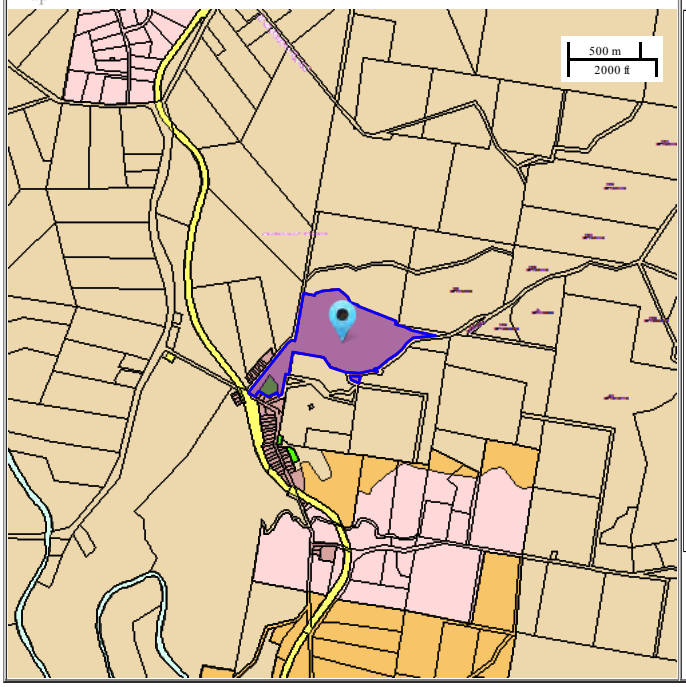
**Figure 1** *Extract from LEP*

MapInfo® Exponare

Pitney Bowes Software

Martins Creek

Map




Legend

DP 7532 Lot & DP

Property boundaries

Property Information

Road Names

LEP 2014

- B2 Local Centre
- B4 Mixed Use
- E1 National Parks and Nature Reserves
- E3 Environmental Management
- E4 Environmental Living
- IN1 General Industrial
- R1 General Residential
- R5 Large Lot Residential
- RE1 Public Recreation
- RE2 Private Recreation
- RU1 Primary Production
- RU3 Forestry
- RU5 Village
- SP2 Infrastructure
- W1 Natural Waterways

Rivers

Shire Boundary

None

Work Context: Planning
Scale = 1 : 27K
Coord Sys: MGA Zone 56 (GDA 94) [EPSG 28356]

Info Results

## Table: Property Enquiry [Count: 1]

| Lot | Section | Plan | Property street address | Area (sq m) | Area (Hectares) |
|---|---|---|---|---|---|
| 1 | | 1006375 | 0 Cory ST, MARTINS CREEK | 279453 | 27.95 |

| About This Map | Disclaimer |
|---|---|
| This map has been created for the purpose of showning basic locality information over Dungog Shire Council. Property boundary line network data is supplied by State Government. Any error should be reported to the GIS Section, Dungog Shire Council. | This map is a representation of the information currently held by Dungog Shire Council. While every effort has been made to ensure the accuracy of the procduct, Council accepts no responsibilityfor any errors or ommisions. Any feedback on ommisions or errors would be appreciated. |

Rural residential Lots surround the property with residential dwellings at various distances ranging between approximately 250 meters and 1300 metres.

The site location is shown on the map and aerial image of the surrounding area, in **Figure 2**. The quarry is located immediately adjacent to residences in Station Street and Corey Street Martins Creek and has rural residences on Dungog Road to the west, on Horns Crossing Road and Merchants Road to the north and on Merchants Road to the east.

The existing access and the main haulage route for the quarry is via Paterson Road to Dungog Road, Grace Avenue and Station Street where the route passes close to a number of residential dwellings on Station Street and Grace Avenue. The existing transport route also affects dwellings in the townships of Paterson, Bolwarra, and Lorne.

**Figure 2** *Project Overview*

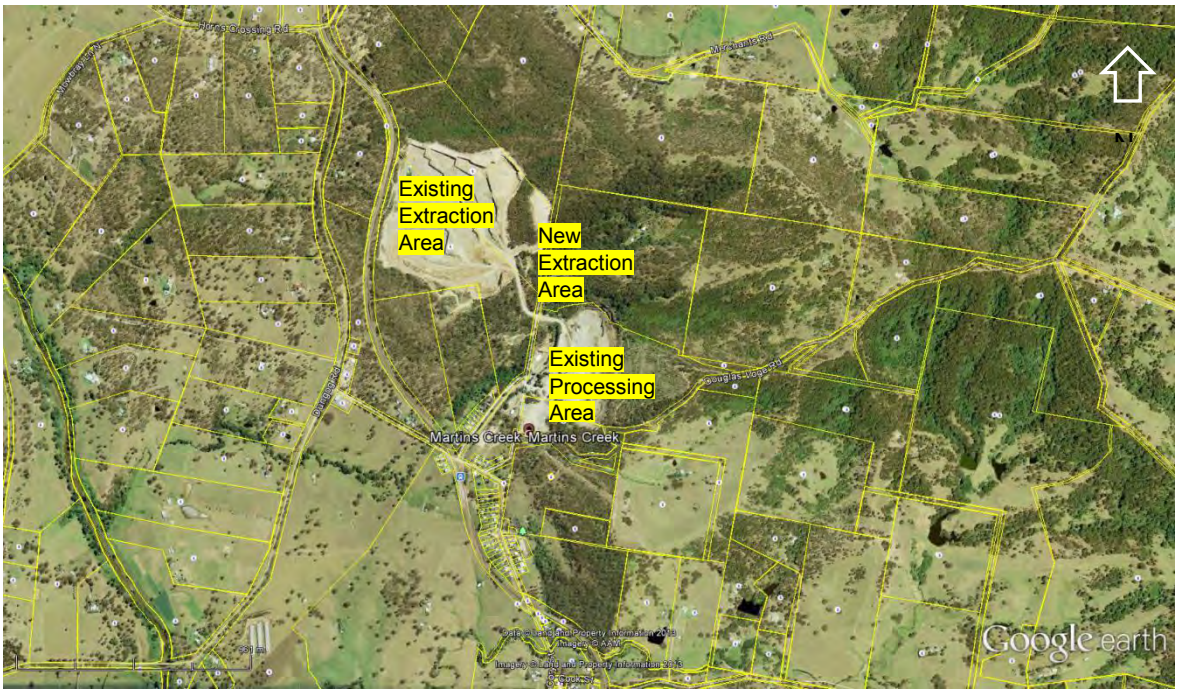



Figure 2 *Map indicating site location and surrounding area [Source: Google Earth with LPI "NSW Globe Overlay, The NSW Land and Property Information Division of the Department of Finance and Services, 2015]*

## 1.2 PURPOSE OF THE REPORT

### *1.2.1 SECRETARY'S ENVIRONMENTAL ASSESSMENT REQUIREMENTS*

The Martins Creek Expansion Project Environmental Impact Statement has been prepared in accordance with Division 4.1 Part 4 of the NSW Environmental Planning and Assessment Act 1979, which requires that the potential impacts of a development are investigated and assessed to enable their consideration as part of the decision making process.

In preparing this Environmental Noise Impact Assessment, The Secretary's Environmental Assessment Requirement (SEARS) issued for the Martins Creek Expansion Project (application number SSD 6612) have been addressed as required under Clause 75F of the EP&A Act.

The key matters with respect to sound and vibration in the SEARs are:

- Noise – a quantitative assessment of potential - construction, operational and off site transport noise impacts in accordance with the Interim Construction Noise Guideline, NSW Industrial Noise Policy and the NSW Road Noise Policy respectively; reasonable and feasible mitigation measures to minimise noise emissions; and monitoring and management measures, in particular real-time and attended noise monitoring.
- Blasting and Vibration - proposed hours, frequency, methods and impacts, and an assessment of the likely blasting impacts of the development on people, buildings, animals, infrastructure and significant natural features having regard to the relevant ANZECC guidelines.
- This report does not address blasting impacts which is covered in a separate report.

### *1.2.2 ENVIRONMENTAL NOISE ASSESSMENT OBJECTIVES*

The objectives of the Environmental Noise Assessment are to:

- Assess the potential noise impact associated with the expansion project including operational noise, low-frequency noise, sleep disturbance, road traffic noise and rail noise associated with the 24-hour rail loading operations.
- Determine suitable criteria for each element of potential noise impacts in accordance with current NSW policy and guidelines.
- Identify and assess all reasonable and feasible noise mitigation controls and management strategies.
- Propose noise monitoring and management strategies.

### *1.2.3 CONSTRUCTION NOISE*

The SEARs requests a Quantitative Noise Impact Assessment in accordance with the NSW Interim Construction Noise Guide (ICNG). Section 1.2 of the ICNG excludes its application to construction activity for mines and quarries and so it is not applicable to this project. In this case the construction activity generally comes about as a consequence of ongoing Quarry activity and the machinery and equipment used for any construction works will have no greater level of impact than for the existing and proposed operations. No specific construction noise assessment is considered necessary for this project.

## 2 METHODOLOGY

This noise impact assessment has been undertaken in accordance with NSW Regulatory guidelines including the NSW Industrial Noise Policy (INP) and the NSW Road Traffic Noise Policy.

The Interim Construction Noise Guide (ICNG) specifically excludes quarries and mining from its application, and so the ICNG is not applicable to this Noise Impact Assessment.

The noise impacts have been assessed using worst case meteorological conditions rather than using the cumulative distribution method and so the assessment is conservative in respect of the impacts under noise enhancing meteorology.

Low frequency noise is assessed using C-Weighted Minus A-Weighted sound levels as specified in the NSW INP with appropriate modifying factors applied as appropriate.

Road traffic noise impacts are assessed at specific locations on identified haulage routes serving the quarry. The assessment is based on the change in road traffic noise from the existing conditions likely to be generated as a result of the quarry expansion.

Six staged operational noise scenarios were modelled in three dimensions representing the progression of quarry operations over 25 years from the commencement of the expansion project. Each operational scenario is modelled to represent the worst case operating conditions assuming the application of reasonable and feasible mitigation as detailed later in this report. The modelled operational scenarios nominally represent the six stages described in the Quarry Extraction Operations Plan (VGT) and are based on worst case operating conditions for each stage.

The stages represent:

Stage 1 Continued extraction in existing footprint, plus the extension of the west pit. In this period, engineering noise control elements, including noise barriers around processing screens and noise bunds along the haul road will be constructed and the use of the southern portion of the existing processing area will be discontinued.

Stage 2 Continued extraction in the existing footprint plus a further extension of the west pit. Complete engineering noise controls to the remainder of the processing equipment and construct the noise bund to the south of the processing area.

Stage 3 Continued extraction in the existing footprint plus a further extension of the west pit to the north, east, and south.

Stage 4 Continued extraction expanded footprint.

Stage 5 Continued extraction expanded footprint.

Stage 6 Continued extraction expanded footprint plus expansion into existing processing area. Decommissioning of fixed processing plant in favour of modular plant located on the quarry floor.

The rail loading facility currently has irregular use and the intensity of use is driven by the demand for rail ballast supplied to rail operators for track maintenance. Rail ballast is usually delivered on a campaign basis to match the track possessions that allow for works to be conducted. Currently, rail loading only occurs during daytime hours.

The restriction of rail loading to daytime hours causes scheduling problems in respect of access to train paths and creates an inefficient use of the rail resources used for ballast transport.

MCQ is seeking the opportunity to extend the operating hours for the rail siding so as to improve the efficiency of the rail operations, thereby, improving the overall viability of the rail operations.

MCQ is seeking opportunities to expand the use of the rail siding and to ship more product via rail, however, this is dependent on market destinations being available for rail delivery and the availability of larger rail wagons to make expanded rail delivery viable.

MCQ advises that it will be desirable to extend the rail siding so as to be able to accommodate longer ballast trains with larger ballast wagons that are now preferred by rail operators. As a consequence, there will also be improvements in loading efficiencies and turnaround times.

If sufficient increase of the product volumes transported by rail can be achieved then, MCQ will expand the rail siding as shown in this application and add an additional loading point. However, the expansion of the siding will be dependent on a suitable increase market volumes and improved transport efficiencies.

To allow for a suitable increase in the amount of product shipped by rail, MCQ seeks to be able to operate the rail loader 24 hours per day and seven days per week so as to fit in with rail network constraints.

It is recognised that the community has expressed concern over some current rail activities. Rail activity is assessed on the basis of a single train loading event for A-weighted and Low-Frequency impact; as well as sleep disturbance.

The construction activities associated with the project include:

- construction of the new access road;
- modification of Haul roads to service new extraction areas;
- installation/construction of noise barriers;
- extension of the rail siding;
- acoustic treatment of existing plant.

None of the construction activities are considered likely to generate additional noise impacts over and above existing quarry activities and so no assessment of these activities is considered necessary.

### 2.1 POLICY AND GUIDELINES

Technical Policy and Guidelines relevant to this noise impact assessment are:

- NSW Industrial Noise Policy.
- Draft NSW Industrial Noise Policy.
- Voluntary Land Acquisition and Mitigation Policy for State Significant Mining, Petroleum, and Extractive Industry Developments.
- NSW Road Noise Policy.
- Rail Infrastructure Noise Guideline.

### 2.2 STUDY AREA AND IDENTIFICATION OF POTENTIALLY AFFECTED RECEIVERS

The study area for this assessment includes the following surrounding suburbs and localities:

- The immediately surrounding areas of Martins Creek and Vacy are assessed in respect of industrial noise impacts and road traffic noise impacts.
- The townships of Paterson and Bolwarra are assessed for road traffic noise impacts associated with additional road truck movements that may be generated by the quarry expansion.

Impact assessment for industrial noise is conducted for individual receiver locations within Noise Assessment Groups. Impact assessment for road traffic noise is conducted for noise assessment areas that represent a group of related receivers.

# 3 NOISE MODELLING METHODOLOGY

## 3.1 INDUSTRIAL NOISE LEVELS

Noise levels from defined industrial sources were predicted at each of the sensitive receivers using CadnaA computer noise modelling software implementing the CONCAWE sound propagation algorithm. The modeling takes into account geometric spreading, attenuation due to topographical and manmade barriers, atmospheric absorption, ground absorption and reflection, reflection from buildings and hard surface structures.

The historical wind information from the Bureau of Meteorology for the area indicates that the wind is not considered to be a feature of the area, as defined in the NSW Industrial Noise Policy. However, in order to provide a conservative assessment, noise levels are predicted for 3m/s source to receiver winds for all scenarios. The impacts of early morning temperature inversions are included in the assessment by setting F Class Stability conditions in the CONCAWE model for early morning activities, adiabatic drainage flows are not a feature of the area and so the temperature inversion conditions modeled are for calm conditions.

## 3.2 RAIL NOISE

### *3.2.1 RAIL NOISE ON THE SITE AND ACCESS SPUR LINE*

At this time it is unknown if the proposed rail siding extension will be economically viable as it is dependent on the development of expanded markets and improved operational efficiencies. Although the implementation of the rail siding extension is not certain the assessment of the rail noise impacts on the site has been undertaken assuming and increase in the operating hours for rail and extending the siding.

The Rail Infrastructure Noise Guide (RING) sets out protocols for the assessment of rail infrastructure that is on private property, or that leads from the rail network to rail infrastructure on private property.

The rail siding is predominantly with the property boundary of the site and under the RING is required to be assessed as an industrial noise source that is part of the premises.

There is a small section of connecting line that runs from the property boundary of the quarry across Corey Street to meet up with the main network. Since this short section of track is only used as part of train arrival and departure, its impact is considered negligible when compared with the operation of the trains on the siding. Therefore, for the purposes of this assessment, the short section of the track linking the siding to the network line is ignored.

The application of reasonable and feasible mitigation is only considered in light of the potential operating scenario with the siding extension.

### *3.2.2 RAIL NOISE IMPACTS ON THE RAIL NETWORK*

An assessment of the highest potential impact of additional rail traffic on the network due to additional ballast trains has been undertaken in accordance with Appendix 2 of the Rail

Infrastructure Noise Guide and based on the information in the report "Rail Logistics Options for Martins Creek Quarry" by Plateway Pty Ltd [4] (The Plateway Report) which details the existing rail network usage and the likely additional number of ballast trains that could be processed by the quarry if night time rail loading were to be approved.

The residences along the rail network are at greatly varying distances from the track and have greatly varying exposure to sound from the rail corridor due to localised topography. The assessment is therefore, limited to the townships of Martins Creek and Paterson where the offset distances typically range from 25 metres to 70 metres from the track. Dwellings on large rural Lots are may be many hundreds of metres from the track.

It is not considered practical to model the entire length of line transited by the ballast trains since there is limited information available on the rail activities across the network. To arrive at an estimate of the impacts a calibrated noise model was developed based on a representative location in Martins Creek.

The representative location was selected at the eastern end of Cook Street in Martins Creek and on the edge of the rail corridor with a full acoustic view of the track in both directions. A noise logger was placed at the edge of the corridor approximately 15 metre from the track and at a location that represents the exposure of the closest and worst affected dwellings along the corridor. There is one dwelling in Martins Creek that is approximately 15 metres from the track.

The noise levels of the rail traffic passing the survey point was measured over a period of two days and the trains classified as either freight or passenger depending on their acoustic signature. The measured data was used to determine the sound exposure levels of the rail traffic at the measurement point for each train type. The measured sound exposure levels were then used in conjunction with the rail traffic data from the Plateway report to determine the existing rail noise levels as $L_{Aeq\ 15\ hr}$ and $L_{Aeq\ 9hr}$ at the measurement point.

Noise levels at distances of 25 metres and 70 metres from the track were calculated assuming attenuation from a Line source of 3 dB per doubling of distance and ignoring the effects of topographic barriers, which are only present for some receivers, and ground absorption since the intervening ground type is not known for all receivers.

The additional trains on the networks that may result from the increase in rail ballast trains from MCQ were then added to the overall rail traffic and new SEL and $L_{Aeq}$ values were determined for the changed conditions. The noise levels from the new and old conditions at the assessment distances were compared with the RING trigger levels to determine the impact of the additional trains on residences that may be located close to the rail track along the corridor.

The change in noise level from the existing condition will be same all along the corridor irrespective of the location of the affected dwellings with respect to the track.

The assessment is a representative worst case assessment and can be applied along the corridor because the locations where the modelling does not properly account for topographic barriers will have a lower overall noise level but will have the same change in noise level as a consequence of an increase in train movements due to MCQ operations.

### 3.3 ROAD TRAFFIC NOISE

Increases in Road Traffic Noise due to quarry operations were determined using CoRTN adjusted to account for Australian conditions by the addition of correction factors to

account for traffic and façade reflections as appropriate. The baseline traffic conditions were obtained from data loggers placed at various locations to determine the existing noise level in conjunction with simultaneous traffic classification counters to determine traffic flow and vehicle type. In locations where there are significant levels of heavy transport movements, it is assumed that the 15 hour and 9 hour equivalent continuous sound level measured by the data logger is entirely due to the sound from traffic.

### 3.4 MINE PLAN DEVELOPMENT

The quarry is an existing and long standing operation that currently operates under an Environmental Protection Licence that does not contain limit conditions for day time noise emissions and only contains a provision that noise from night time maintenance should not be audible at nearby residences.

The Quarry has been operated by State Rail up until the time operations were taken over by Buttai Gravel Pty Ltd in 2012. During its operational time there has been no specific requirement in relation to the level of noise emissions from the quarry. Accordingly the existing situation does not reflect current best practice for noise control and the location, type and configuration of existing fixed plant does not readily lend itself to sound control engineering. Haul trucks and mobile plant can be better managed by diligent use of noise control barriers and bunds and by selecting the quietest equipment available on the market, and MCQ has already adopted this approach to its mobile plant. Stripping operations which, by their nature, use noisy equipment and occur in locations that are difficult to screen or shield do not lend themselves to noise control. However, these operations occur only infrequently and on a campaign basis for short periods.

The mine plan for the Quarry Expansion Project has been developed in conjunction with RCA Acoustics with a view to minimising noise impacts on the community from both the existing operations and the Quarry Expansion Project. The project development work started in early 2014 and used iterative progressive noise modelling to identify the best economically achievable acoustic outcomes for the development of the quarry expansion. The outcomes include a number of new engineering treatments and an overall mine plan specifically designed to minimise noise impacts.

As part of the development of this project, MCQ has instructed RCA Acoustics to quantify in detail the noise emissions from the current operations and equipment and determine the most effective, reasonable and feasible noise mitigation measures that can be applied to the quarry operations. To that end the mine extraction plans and future mine operations have been developed with a view to minimising noise emissions. The final result is slightly less efficient extraction which adds cost to the extraction process. However, it takes advantage of screening effects of the existing topography to minimise noise emissions to the neighbouring residents where possible.

As part of the mine plan development, it was determined that use of the existing southern stockpile area and maintenance areas would be discontinued and that those activities would be relocated to the existing main processing area. Noise barriers would be required along the southern part of the processing area, along the southern end of the haul road and along the rail spur. Noise reduction treatments would be required for the primary, secondary and tertiary crushers and this would involve additional cladding on both the primary and secondary crusher buildings. Noise reduction treatments would also be required for the processing screens, the rail loading screen and hopper and around the rail cars when they are being loaded.

It was recognised at an early stage that the heavy vehicle movements along Station Street/Grace Avenue Martins Creek, where the road is very close to the dwellings, was a significant concern for the community. MCQ had already introduced speed restrictions and additional road maintenance in response to community concern and the management practices adopted by MCQ to reduce traffic noise in the area means that the operation complies with the requirements of the NSW Road Noise Policy. MCQ identified that there would be significant community benefit from finding an alternate product despatch route out of the quarry and onto the major road network for heavy vehicle operations, thereby avoiding dwellings that are close to the road wherever possible. It was therefore decided that an alternative access road would be constructed which would take heavy vehicles directly to Dungog Road without travelling through the township of Martins Creek.

Buttai Gravel has advised that it is an essential part of the business that the tertiary processing plant, which consists of one crusher and the two processing screens be able to be operated in the evening as soon as possible. The tertiary plant produces much lower noise levels than the primary and secondary plant and is better screened from nearby residences. It is proposed that early in the expansion programme suitable treatments be applied to the tertiary plant so as to allow it to operate separately in the evening period.

# 4 ASSESSMENT CRITERIA

## 4.1 EXISTING ENVIRONMENT

The area surrounding Martins Creek Quarry is mostly rural residential with large Lot subdivisions and are zoned and RU1 Primary Production. The township of Martins Creek and the area immediately surrounding the quarry is Zone RU5 Village and is typical of a suburban environment. MCQ is the only significant source of industrial noise in the area which is typical of many quarry sites since their location is determined by the availability of a resource and cannot be selected on any other basis.

The other noise sources of note in the area are the North Coast rail line and Dungog Road, which are both significant transport routes for the area.

## 4.2 IDENTIFIED SENSITIVE RECEIVERS

### *4.2.1 RESIDENTIAL PROPERTIES*

**Table 1** identified the potentially affected receivers including vacant land that surround the project area.

**Table 1** *Identified Potentially Affected Noise Sensitive Receivers*

| ID | Address | Lot and DP | | Zoning | NAG |
|---|---|---|---|---|---|
| 1 | 23 Station St | 41/8156328 | | RU5 | 1 |
| 2 | 21 Station St | 9B/37561 | | RU5 | 1 |
| 3 | 17-19 Station St | 7B and 8B/37561 | | RU5 | 1 |
| 4 | 15 Station St | 6B/37561 | | RU5 | 1 |
| 5 | 13 Station St | 5B/37561 | | RU5 | 1 |
| 6 | 11 Station St | 4B/37561 | | RU5 | 1 |

| ID | Address | Lot and DP | | Zoning | NAG |
|---|---|---|---|---|---|
| 7 | 9 Station St | 3B/37561 | | RU5 | 1 |
| 8 | 7 Station St | 2B/37561 | | RU5 | 1 |
| 9 | 5 Station St | 1B/37561 | | RU5 | 1 |
| 10 | 3 Station St | 3/242210 | | | 1 |
| 11 | 1 Grave Ave | 1//DP1111965 | | | |
| 12 | 3 Grace Ave | 1/111965 | | RU1 | 1 |
| 13 | 29 Grace Ave | 2/242210 | | RU1 | 1 |
| 14 | 52 Grace Ave | 4//DP311086 | | RU5 | 1 |
| 15 | 54 Grace Ave | 6//DP545309 | | RU5 | 1 |
| 16 | 56 Grace Ave | 5//DP545309 | | RU5 | 1 |
| 17 | 58 Grace Ave | 1//DP311087 | | RU5 | 1 |
| 18 | 1 Cory St | 1//DP742731 | | RU5 | 1 |
| 19 | 3 Cory St | 1//DP778808 | | RU5 | 1 |
| 20 | 5 Cory St | 1//DP199194 | | RU5 | 1 |
| 21 | 9 Cory St | 175//DP46797 | | RU5 | 1 |
| 22 | 5 Douglas St | 1//DP193914 | | RU5 | 1 |
| 23 | 10 Vogels Rd<br>Vacant land No Residence | 102//DP882385 | | RU1 | 1 |
| 24 | 12 Vogels Rd | 1//DP304266 | | RU1 | 1 |
| 25 | 14 Vogels Rd | 51//DP752445 and 7//DP249026 and 1//DP1140076 | | RU1 | 1 |
| 26 | 159 Vogels Rd | 22//DP773220 and 126//DP752445 | | RU1 | 1 |
| 27 | 1 Black Rock Rd | 5//DP752445 | | RU1 | 1 |
| 28 | 127 Black Rock Rd | 12//DP738227 | | RU1 | 1 |
| 29 | 17 Merchants Rd | 131//DP827317 | | RU1 | 3 |
| 30 | 22 Merchants Rd | 112//DP702529 | | RU1 | 3 |
| 31 | 24 Merchants Rd | 111//DP702529 | | RU1 | 3 |
| 32 | 26 Merchants Rd | 113//DP702529 | | RU1 | 2 |
| 33 | 46 Merchants Rd | 114//DP702529 | | RU1 | 2 |
| 34 | 60 Merchants Rd | 7//DP242210 | | RU1 | 2 |
| 35 | 126 Merchants Rd | 4//DP250820 | | RU1 | 2 |
| 36 | 145 Merchants Rd | 18//DP752445 | | RU1 | 2 |
| 37 | 168 Merchants Rd | 43//DP752445 | | RU1 | 2 |
| 38 | 218 Merchants Rd | 52//DP775990 | | RU1 | 2 |
| 39 | 221 Merchants Rd | 123//DP752445<br>124//DP752445 | | RU1 | 2 |

| ID | Address | Lot and DP | | Zoning | NAG |
|---|---|---|---|---|---|
| 40 | 256 Dungog Rd | 2//DP1111965 | | RU1 | 3 |
| 41 | 279 Dungog Rd | 10//DP249257 | | RU1 | 3 |
| 42 | 281 Dungog Rd | 9//DP249257 | | RU1 | 3 |
| 43 | 303 Dungog Rd | 8//DP249257 | | RU1 | 3 |
| 44 | 333 Dungog Rd | 7//DP249257 | | RU1 | 3 |
| 45 | 338 Dungog Rd | 2//DP1171767 | | | 3 |
| 46 | 341 Dungog Rd | 61//DP845089 | | RU1 | 3 |
| 47 | 343 Dungog Rd | 62//DP845089 | | RU1 | 3 |
| 48 | 406 Dungog Rd | 8//DP242210 | | RU1 | 3 |
| 49 | 438 Dungog Rd Vacant Land | 9//DP242210 | | RU1 | 3 |
| 50 | 448 Dungog Rd | 100//DP850078 | | RU1 | 3 |
| 51 | 455 Dungog Rd | C//DP162949 | | RU1 | 3 |
| 52 | 462 Dungog Rd | 101//DP850078 | | RU1 | 3 |
| 53 | 9 Horns Crossing Rd | 63//DP845089 | | RU1 | 3 |
| 54 | 12 View St* | 32//DP712070 | | R1 | 3 |
| 55 | 97 Merchants Rd | 3//DP250820 | | RU1 | 3 |
| 56 | 24 Horns Crossing Rd | 2//DP710263 | | RU1 | 3 |

***Note** 12 View Street is used to represent the cluster of houses in View Street and the associated streets in the subdivision as it is the most affected property in that area.

The acoustic environment of the township of Martins Creek (NAG1) is dominated by sound from the existing quarry during the day from both quarry operations and traffic accessing the quarry. The residences on Merchants Road (NAG2) remain largely unaffected by the MCQ and the acoustic climate in that area is largely natural sounds along with some sound from agricultural activity. The residences on Dungog Road and in cluster of dwellings around View Street, Vacy (NAG3) experience some noise from the quarry particularly when crushing activities are occurring in the west pit, but otherwise remain largely unaffected by the operations at MCQ and the acoustic climate of the area is usually controlled by natural sounds and sound from traffic on Dungog Road and the North Coast rail line.

**Figure 3** shows the delineation of the Noise Assessment Groups (NAG). The boundary between NAG2 and NAG 3 is largely arbitrary and is based on the fact that residences in NAG 2 have lesser exposure to noise from MQC because of the topography of the area and are slightly less exposed to noise from the rail line and Dungog Road.

The acoustic climate for the evening and night time assessment periods is considered to be quite rural which is dominated by natural sounds interspersed with intermittent road and rail traffic noise.

#### *4.2.2 VACANT LAND POTENTIALLY AFFECTED BY THE DEVELOPMENT*

Two vacant Lots have been identified in the receiver groups. They are 438 Dungog Road and 10 Vogels Road. All other Lots have dwellings constructed on them.

The detailed noise contours in **Appendix B** show the worst case noise effects on each of the vacant Lots at any time during the project. In the case of 438 Dungog Road the assessed condition is when quarrying and stripping are taking place in the northern part of the extraction area and under source to receiver noise enhancing wind conditions. In the case of 10 Vogels Road it is when quarrying and stripping are taking place on the upper levels of the southern section of the extraction area and under source to receiver noise enhancing wind conditions.

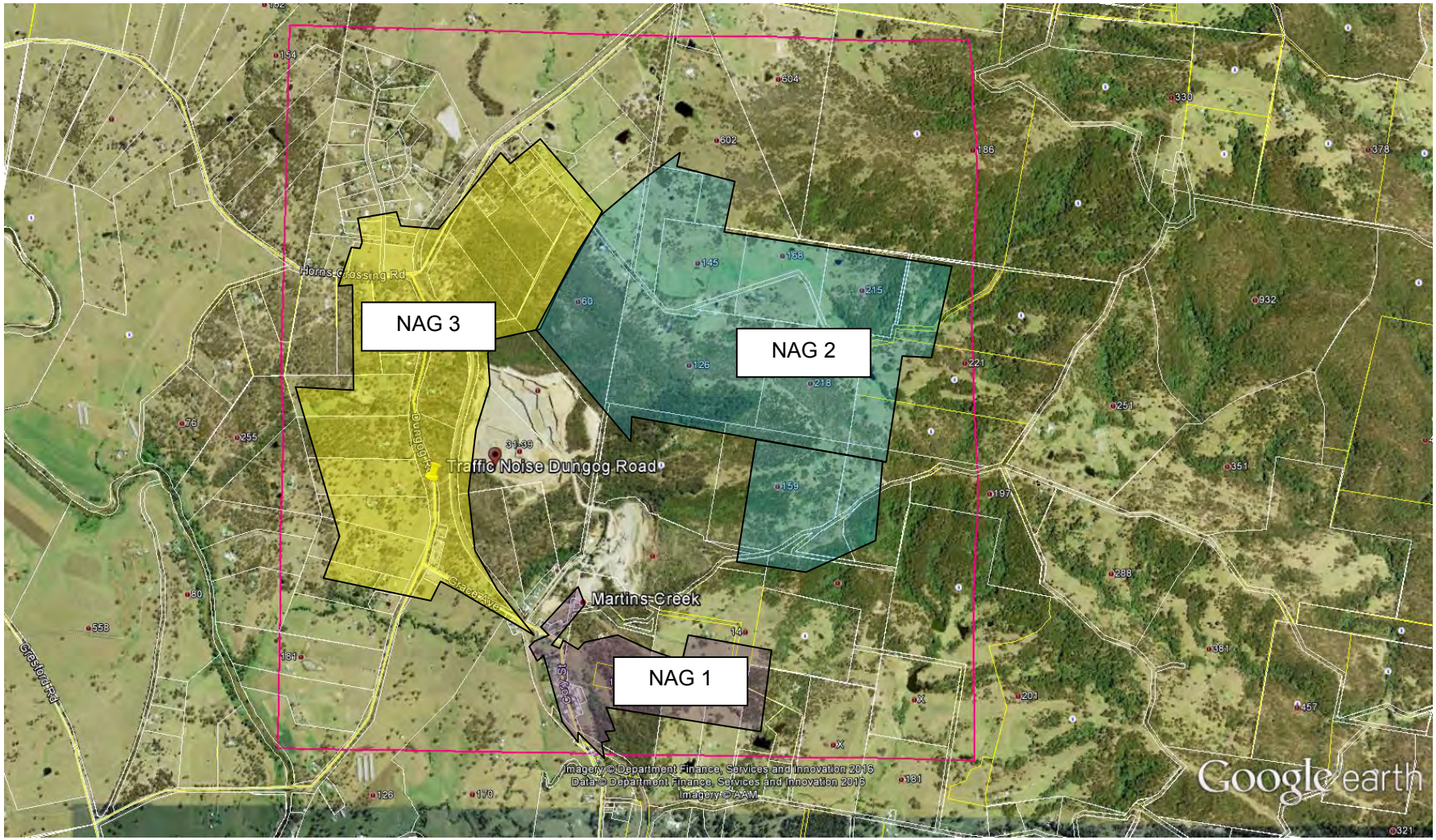



**Figure 3** *Noise Assessment Groups*

# 5 MEASUREMENT OF EXISTING NOISE LEVELS

MCQ is the single industrial source in the area and operates at the present time by and large without complaint arising as a result of operation noise in the quarry. Community concern has been expressed in respect to the traffic noise on Station Street and in the township of Paterson and as a result of some activities associated with rail loading which affect residents in Station Street and Grace Ave. In particular, isolated instances of inappropriate behavior on the part of train crews, has been raised as a source of community concern. An extensive survey of all the anthropogenic noise sources in and around the quarry has been conducted to identify the things that are of community concern and evaluate what mitigation is reasonable and feasible for the project.

## 5.1 UNATTENDED BACKGROUND SOUND LEVEL MEASUREMENT

An unattended noise monitoring survey was undertaken between 12:30pm on 30 May 2014 to 12:30pm on 6 June 2014.

To determine the Rating Background Levels for the area, without the presence of the sound emissions from the quarry, unattended long-term sound level data logging was conducted in the front yard of the residence at 94 Cory Street, Martins Creek (Location A). An 01dB SLS95 Sound Level Meter (SLM) was used and set up to measure 1-second continuous sound level data over a seven day period under suitable weather conditions in accordance with AS1055. This logger also captured information relating to rail movements along the North Coast rail line, which were reviewed to determine if further investigation of noise from the rail corridor was required.

Noise level logging was also conducted a Location D using an unattended ARL EL 215 to Quantify the background level for NAG 3. The logger was located so as to represent the exposure of the residences in NAG 3 to daytime noise (excluding noise from MCQ) including road traffic and rail noise which is part of the normal environment as specified in Clause 3.1.3 of the INP. The road traffic noise along Dungog Road is intermittent during the day and does not dominate the noise climate and therefore, does not need to be excluded to obtain a valid Rating Background Level.

Additional background sound level logging was conducted between 9 and 16 August 2016 outside number 46 Merchants Road to verify the deemed background for Merchants Road residences (NAG2).

The monitoring locations are shown **Figure 4** which is an aerial image of the surrounding area.

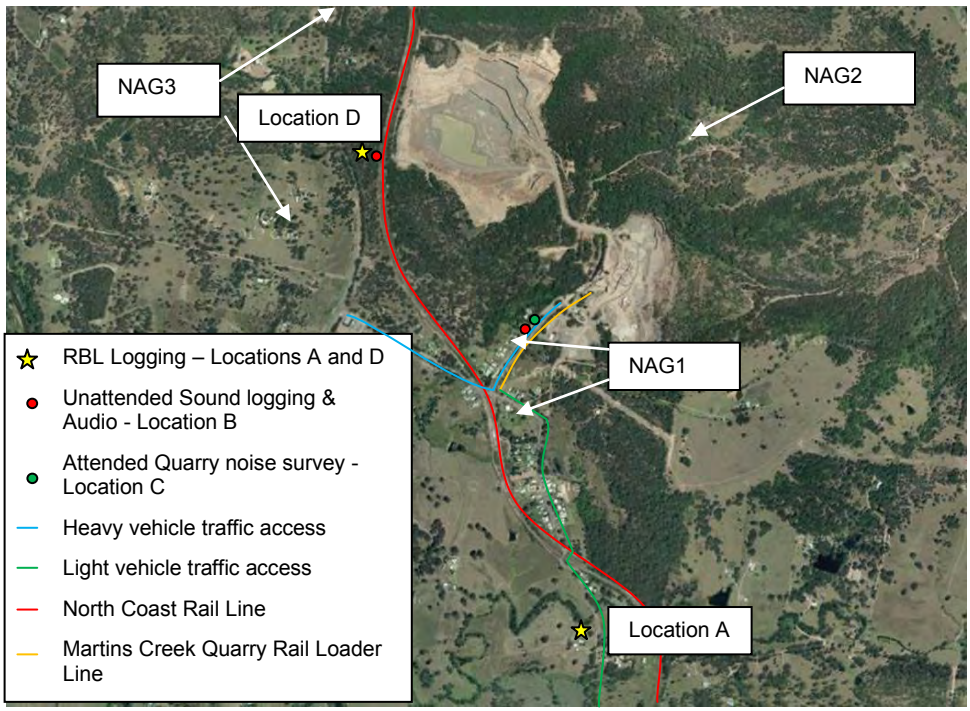



**Figure 4** *Aerial image showing logging and attended Survey Locations around the quarry*

#### 5.1.1 MEASURED BACKGROUND LEVELS

The results of the unattended logging and attended survey measurements are shown in the following tables. **Table 2** details the Rating Background Levels of the area in the absence of sound from the quarry and the target noise goals in accordance with the INP.

**Table 2** *Rating Background Levels from Unattended Surveys*

| | **Day 7am to 6pm** | **Evening 6pm to 10pm** | **Night 10pm to 7am** |
|---|---|---|---|
| **RBL Location A NAG 1 and** | 28 | 25 | 22 |
| **NAG 2** | Deemed 30 (33)* | Deemed 30 (44)* | Deemed 30 (39)* |
| **RBL Dungog Road NAG 3** | 33 | 23 | 18 |

*Measured RBL August 2016.

### 5.2 DETERMINATION OF EXISTING INDUSTRIAL NOISE LEVELS

Attended Sound Level Measurement using a Svan 957 was conducted in Station Street and at the rear of number 1 Corey Street to determine the existing emissions from quarry operations at the closest and worst affected receivers. The SLM was set up to measure one second continuous sound level data and record audio to allow identification of sound sources.

The unattended long term sound level data logging was conducted in the front yard of the residence at 15 Station Street, Martins Creek (Location B). A 15-minute attended survey

was also conducted at the front boundary of the most affected residence located at 23 Station Street at 14:16 on 6 June 2014.

Noise from rail loading activities at the quarry and from train movements associated with loading trains were determined by attended survey outside 23 Station Street on 3 July 2014 during the loading of a train.

Noise emissions from mobile and stationary plant and mobile equipment were measured in accordance with AS2012 and AS 1217 as appropriate during a series of surveys during normal quarry operations  Error! Reference source not found. shows the level of existing industrial noise at the worst affected residential location.

**Table 3** *Attended Noise Survey at Station Street (Location C)*

| Survey Date | Survey Start Time | Location | Overall LAeq 15min | Quarry Site Noise LAeq 15min Contribution | Other Ambient (No Quarry Site Noise) LAeq 15min Contribution |
|---|---|---|---|---|---|
| 6 June, 2014 | 14:16 | 23 Station St (front boundary) | 62.2 | 54.7 | 40.7 |

The results of the unattended logging and attended survey clearly show that Martins Creek Quarry generates sound levels above the PSNL recommended under the NSW INP.

### 5.3 Determination of Existing Traffic and Transport Sound Levels

Existing traffic noise levels along Station Street were determined using the logged data from the unattended sound level logging measured at Location B.  Station Street is a principal haulage route and under Section 2.2.2 of the NSW Road Noise Policy it is classified as a sub-arterial road, therefore the criteria for the existing road traffic noise on Station Street is 60dB $L_{Aeq,15hr}$ for day time (external) and 55dB $L_{Aeq,9hr}$ for night time (external).

Existing traffic noise levels along the primary haulage route to and from market delivery areas were determined at three locations in Paterson, and one at Bolwarra, secondary haulage routes such as Butterwick Road were not identified as being potentially significantly affected by changes in the proposed quarry operations.  The measurement locations for Paterson are shown in **Figure 5** and the locations at Bolwarra and Dungog Road are shown in **Figures 6** and **7** respectively.

At Paterson and Bolwarra unattended data logging was carried out at each location between 25 August and 2 September 2014.  Following the survey, it was discovered that wet weather had reduced quarry transport volumes during the survey period due to reduced orders for material.  The survey was repeated between the 31 October and 11 November 2014 when quarry orders and despatch were considered to be normal.  In both cases simultaneous traffic counting and classification were conducted at locations representative of the traffic flows being measured by the sound level loggers.


**Figure 5** *Traffic Noise Logger Locations in Paterson*


**Figure 6** *Traffic Noise Logger Locations in Bolwarra*

Existing traffic noise levels along Dungog Road to the North of Grace Avenue were measured using a combination of unattended logging and attended survey outside 281 Dungog Road at a distance of 40 metres from the carriageway.


**Figure 7** *Noise Logger Location - Dungog Road Vacy*

#### *5.3.1 MEASURED TRAFFIC NOISE LEVELS*

Simultaneous sound level logging and traffic counting and classification were used to establish the traffic volumes and noise levels generated by MCQ. A detailed discussion of this is presented in Section 5.5.8. **Table 4** sets out the existing measured traffic noise levels at each surveyed location.

**Table 4** *Existing Traffic Noise Levels*

| Location | Existing Traffic Noise $L_{Aeq15hr}$ |
|---|---|
| Station St/Grace Ave | 58.2 |
| Dungog Rd, Vacy | 53 |
| Gresford Rd Paterson Loc 1 and 3 | 61.2 |
| Gresford Rd, Paterson Loc 2 | 64.3 |
| Tocal Rd, Bolwarra | 67 |

### 5.4 OTHER SOURCES OF NOISE IN THE AREA

The are no other significant industrial noise sources in the area.

### 5.5 RAIL TRAFFIC ON THE RAIL NETWORK

Plateway Pty Ltd prepared a report on rail access and existing rail movements for Buttai Gravel in respect of the Martins Creek Quarry and documented the existing rail movements thorough Martins Creek. The report also concluded that the existing usage was well below the capacity determined to be available by ARTC and indicated that the network at Martins Creek could carry 72 trains per day as part of normal growth. **Table 5**

is extracted from the Plateway Report. The proposed additional movements generated by MCQ represent an addition of approximately 14 percent of the existing traffic.

The Plateway report also concluded that:

> *"Based on the current timetable, it would appear that it is possible to load two trains during the period from 20:00 to 05:00 and one during the period 09:00 to 15:00, suggesting that the quarry has a capacity of three trains per day if loading during the evening and night is permitted. A fourth train could be accommodated if the train length was short and the shunting time at Martins Creek reduced by the use of additional ground staff rather than relying on the train crew to shunt the train."*

**Table 5** *Rail Traffic Data (Source Plateway)*

| Day | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday |
|---|---|---|---|---|---|---|---|
| **Number of XPT Services** | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| **Number of Passenger Services** | 10 | 10 | 10 | 10 | 10 | 6 | 6 |
| **Number of Freight Services** | 11 | 15 | 14 | 15 | 14 | 18 | 12 |
| **Total** | **27** | **31** | **30** | **31** | **30** | **30** | **24** |

Noise logging of trains on the North Coast rail line was conducted between 9 and 11 August 2016 at a location at the eastern end of Cook Street Martins Creek at a distance of 15 metres from the nearest track.

Trains were individually marked on a time trace recording and the Sound Exposure Level (SEL) of each train pass by was determined from the continuous time trace on the logger.

A total of 16 passenger services and 12 freight services were measured over the period between 4 pm on 9 August and 4 pm on 10 August.

The number and type of trains measured over a typical 24 hour period closely matches the values in the Plateway Report. However, the Plateway Report indicates that the line supports additional freight services to those identified during the survey. Since the Plateway Report data represents a longer term more reliable source, that information was used in the assessment.

In order to make a determination of the existing rail noise at a distance of 15 metres from the track an average SEL was determined for each train type for day time and night time.

The total daytime and night time SEL were then calculated using the values for the number of services in the Plateway Report and distributing them between daytime and night time periods in the proportions measured during the survey. For example on 9 10 August 16 passenger trains were identified with three of them in the night time period. So

19 percent of the passenger services are considered to occur at night. Likewise 25 percent of the freight services are considered to occur at night.

**Tables 6** and **7** set out the results for the existing and future rail noise levels at the monitoring and assessment point. The calculations assume that the existing condition is that one train (two movements) will be loaded in the day time over a 24 hour period while the new situation assumes the maximum of three trains(six movements) will be loaded in a 24 hour period. The Plateway Report shows that the loading and despatch of two trains at MCQ do not fit into either the day time or night time assessment period because of the restrictions on train paths on the network. So it is assumed that one train is loaded and despatched in each assessment period and that a train will also either arrive or depart in the same assessment period giving three movements due to MCQ in each assessment period.

The measurements were carried out in free field conditions, therefore a correction factor of +2.5 dB(A) has been applied to the measured levels to represent facade reflective conditions.

To make an assessment of the impact of the proposed additional ballast trains indicated in the Plateway report the additional ballast trains were added to the existing traffic volume to produce a before and after assessment of noise at 15, 25 and 70 metres from the track.

Each train type was identified as either freight, passenger or Ballast trains. An XPT train was measured during an attended survey on 11 August and a ballast train was measured on the morning of Thursday 11 August travelling towards the quarry at approximately 7:15 am and departing from the quarry at approximately 10:45 am. This information along with the logged rail noise levels provided sufficient information to determine the existing rail noise levels and the rail noise levels that would apply in the event that MCQ was able to process the maximum number of trains identified in the Plateway Report.

**Table 6** *Existing Rail Traffic Noise at 15, 25 and 70 Metres from the Track*

| Day | Monday | | | Tuesday | | | Wednesday | | | Thursday | | | Friday | | | Saturday | | | Sunday | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Day | Night | | Day | Night | | Day | Night | | Day | Night | | Day | Night | | Day | Night | | Day | Night |
| No XPT Service | 6 | | | 6 | | | 6 | | | 6 | | | 6 | | | 6 | | | 6 | | |
| No Pass Service | 10 | | | 10 | | | 10 | | | 10 | | | 10 | | | 6 | | | 6 | | |
| | 16 | 13 | 3 | 16 | 13 | 3 | 16 | 13 | 3 | 16 | 13 | 3 | 16 | 13 | 3 | 12 | 10 | 2 | 12 | 10 | 2 |
| Ave SEL Service | | 90 | 91 | | 90 | 91 | | 90 | 91 | | 90 | 91 | | 90 | 91 | | 90 | 91 | | 90 | 91 |
| SEL for period | | 100.9 | 96.3 | | 100.9 | 96.3 | | 100.9 | 96.3 | | 100.9 | 96.3 | | 100.9 | 96.3 | | 99.6 | 95.0 | | 99.6 | 95.0 |
| No Freight Service | 11 | 8 | 3 | 15 | 11 | 4 | 14 | 11 | 4 | 15 | 11 | 4 | 14 | 11 | 4 | 18 | 14 | 5 | 12 | 9 | 3 |
| Ave SEL Service | | 106 | 102 | | 106 | 102 | | 106 | 102 | | 106 | 102 | | 106 | 102 | | 106 | 102 | | 106 | 102 |
| SEL for period | | 115.3 | 106.7 | | 116.6 | 108.0 | | 116.3 | 107.7 | | 116.6 | 108.0 | | 116.3 | 107.7 | | 117.4 | 108.8 | | 115.6 | 107.0 |
| No Ballast Service | | 2 | | | 2 | | | 2 | | | 2 | | | 2 | | | 2 | | | 2 | |
| Average SEL per Service | | 98 | | | 98 | | | 98 | | | 98 | | | 98 | | | 98 | | | 98 | |
| SEL for period | | 100.9 | | | | | | | | | | | | | | | | | | | |
| **Total SEL period** | | 115.6 | 107.0 | | 116.7 | 108.3 | | 116.4 | 108.0 | | 116.7 | 108.3 | | 116.4 | 108.0 | | 117.5 | 109.0 | | 115.7 | 107.3 |
| **$L_{Aeq}$ Period** | **15 metres** | **70.7** | **64.4** | | **71.9** | **65.7** | | **71.6** | **65.4** | | **71.9** | **65.7** | | **71.6** | **65.4** | | **72.6** | **66.4** | | **70.9** | **64.7** |
| | **25 metres** | **68.5** | **62.2** | | **69.7** | **63.5** | | **69.4** | **63.2** | | **69.7** | **63.5** | | **69.4** | **63.2** | | **70.4** | **64.2** | | **68.7** | **62.5** |
| | **70 metres** | **64.0** | **57.7** | | **65.2** | **59.0** | | **64.9** | **58.7** | | **65.2** | **59.0** | | **64.9** | **58.7** | | **65.9** | **59.7** | | **64.2** | **58.0** |
| **RING Trigger levels** | | **65** | **60** | | **65** | **60** | | **65** | **60** | | **65** | **60** | | **65** | **60** | | **65** | **60** | | **65** | **60** |

**Table 7** *Future Proposed Rail Traffic Noise at 15, 25 & 70 metres from the Track.*

| Day | Monday | | | Tuesday | | | Wednesday | | | Thursday | | | Friday | | | Saturday | | | Sunday | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Day | Night | | Day | Night | | Day | Night | | Day | Night | | Day | Night | | Day | Night | | Day | Night |
| No XPT Services | 6 | | | 6 | | | 6 | | | 6 | | | 6 | | | 6 | | | 6 | | |
| No Pass Service | 10 | | | 10 | | | 10 | | | 10 | | | 10 | | | 6 | | | 6 | | |
| | 16 | 13 | 3 | 16 | 13 | 3 | 16 | 13 | 3 | 16 | 13 | 3 | 16 | 13 | 3 | 12 | 10 | 2 | 12 | 10 | 2 |
| Ave SEL Service | | 90 | 91 | | 90 | 91 | | 90 | 91 | | 90 | 91 | | 90 | 91 | | 90 | 91 | | 90 | 91 |
| SEL Period | | 100.9 | 96.3 | | 100.9 | 96.3 | | 100.9 | 96.3 | | 100.9 | 96.3 | | 100.9 | 96.3 | | 99.6 | 95.0 | | 99.6 | 95.0 |
| No Freight Service | 11 | 8 | 3 | 15 | 11 | 4 | 14 | 11 | 4 | 15 | 11 | 4 | 14 | 11 | 4 | 18 | 14 | 5 | 12 | 9 | 3 |
| Ave SEL Service | | 106 | 102 | | 106 | 102 | | 106 | 102 | | 106 | 102 | | 106 | 102 | | 106 | 102 | | 106 | 102 |
| SEL Period | | 115.3 | 106.7 | | 116.6 | 108.0 | | 116.3 | 107.7 | | 116.6 | 108.0 | | 116.3 | 107.7 | | 117.4 | 108.8 | | 115.6 | 107.0 |
| No Ballast Services | | 3 | 3 | | 3 | 3 | | 3 | 3 | | 3 | 3 | | 3 | 3 | | 3 | 3 | | 3 | 3 |
| Ave SEL Service | | 98 | 98 | | 98 | 98 | | 98 | 98 | | 98 | 98 | | 98 | 98 | | 98 | 98 | | 98 | 98 |
| SEL Period | | 102.7 | 102.7 | | 102.7 | 102.7 | | 102.7 | 102.7 | | 102.7 | 102.7 | | 102.7 | 102.7 | | 102.7 | 102.7 | | 102.7 | 102.7 |
| **Total SEL period** | | 115.6 | 108.4 | | 116.9 | 109.3 | | 116.6 | 109.1 | | 116.9 | 109.3 | | 116.6 | 109.1 | | 117.6 | 109.9 | | 116.0 | 108.6 |
| **$L_{Aeq}$ Period** | **15 metres** | **70.8** | **65.8** | | **72.1** | **66.7** | | **71.8** | **66.5** | | **72.1** | **66.7** | | **71.8** | **66.5** | | **72.8** | **67.3** | | **71.1** | **66.0** |
| | **25 metres** | **68.6** | **63.6** | | **69.9** | **64.5** | | **69.6** | **64.3** | | **69.9** | **64.5** | | **69.6** | **64.3** | | **70.6** | **65.1** | | **68.9** | **63.8** |
| | **70 metres** | **64.1** | **59.1** | | **65.4** | **60.0** | | **65.1** | **59.8** | | **65.4** | **60.0** | | **65.1** | **59.8** | | **66.1** | **60.6** | | **64.4** | **59.3** |
| **RING Trigger levels** | | **65** | **60** | | **65** | **60** | | **65** | **60** | | **65** | **60** | | **65** | **60** | | **65** | **60** | | **65** | **60** |
| **Change due to MCQ** | | **0.1** | **1.3** | | **0.2** | **1.0** | | **0.2** | **1.1** | | **0.2** | **1.0** | | **0.2** | **1.1** | | **0.1** | **0.9** | | **0.2** | **1.3** |

### 5.5.1 ASSESSMENT OF IMPACTS OF RAIL NOISE ALONG THE RAIL CORRIDOR

If night time rail loading were to be approved and if the quarry is successful in developing expanded markets for the product that can be delivered by rail then it has the potential to generate and additional two trains (four movements) on the network in any 24 hour period.

Assuming it is possible to generate sufficient increases in market value and corresponding improvements in access to train paths and operating hours it would potentially be possible to load and despatch up to three trains (six movements) in a 24 hour period. Based on the information in the Plateway Report it is most likely that three movements would occur in the daytime 15 hour assessment period and three would occur in the night time nine hour assessment period.

The existing rail noise levels at 15 and 25 metres from the track generally exceed the RING trigger levels for both day time and night time assessment periods while the noise levels at 70 metres from the track are generally either slightly below or slightly above the RING trigger level by around 0.2 dB(A) for daytime, while the night time levels are generally below the RING trigger levels by around 2dB.

The increase in rail noise due the additional traffic from MCQ adds between 0.1 dB and 1.2 dB to the existing noise level depending on the day and the number of other freight service scheduled. There are circumstances where there is a project related noise increase and the noise levels are above the RING trigger levels.

The $L_{Amax}$ levels measured from the Ballast train are lower than those for the existing freight trains which are nearly twice as long as that proposed by MCQ and have more powerful locomotives, heavier cars and are more prone to curving noise. Accordingly there will be no increase in the $L_{Amax}$ level due to presence of the MCQ ballast trains.

Based on an assessment in accordance with Appendix 2 of the RING there is a requirement to consider reasonable and feasible mitigation for the ballast trains.

Given the cost of various noise control treatments it is not considered reasonable that applicant who contributes to only 14% of the rail traffic on a major freight line and whose product is transported over a very limited part of the network would be required to incur significant costs for the erection of noise barriers or the provision of at house treatments. The applicant would however, consider a request from a rail track operator to contribute a small part of the cost for such treatments as part of a larger and more comprehensive programme if such a programme was initiated by the rail track operator.

The applicant does not own or control the rolling stock and has no contractual relationship (nor can have) with the train/track operator that would allow them to exert control over the noise emissions from the rolling stock. All locos have to pass a noise compliance test in accordance with the Environmental Protection Licence of the track operator and although it is possible for the applicant to request that only the quietest available locos within the ballast fleet that is operated by the rail operator are used for MCQ ballast transport during the night time assessment period there is now way to ensure this will in fact occur.

There are no viable mitigation measures that are available to MQC to control rail noise impacts.

## 5.6 INDUSTRIAL NOISE

### 5.6.1 OPERATIONAL NOISE CRITERIA

The *NSW Industrial Noise Policy* (INP) [Environment Protection Authority, EPA 00/1, January 2000] establishes two separate noise criteria to meet environmental noise objectives, one to account for intrusive noise and the other to protect the amenity of specific land uses.

The intrusiveness criterion is specified as the equivalent continuous (energy average) A-Weighted source sound pressure level over 15 minutes ($L_{Aeq,\ 15\ minutes}$), less than or equal to 5 decibels (dB) above the measured background level. Descriptors other than the $L_{Aeq}$ may be used as appropriate if it can be justified that an alternate descriptor better reflects the impact sound on the affected community.

The amenity criterion is assigned relative to specific land use and associated activities, taking into consideration the cumulative effect of noise from industrial sources when assessing impact. The amenity criterion does not include noise from transport or other non-industrial sources. Where the existing noise level from industry is found to approach the criterion value, then noise levels from new industries need to be designed so that the cumulative effect does not produce noise levels that would significantly exceed the criterion.

At MCQ the amenity noise levels are already exceeded at some residences in NAG1 but there are no other industries in the area nor are there likely to be so a reduction in the noise levels from MCQ will create a reduction in the overall existing noise level and improve overall amenity

The INP states that the objectives for environmental noise are 'to account for intrusive noise and to protect the amenity of particular land use'.

After determining the relevant intrusive and amenity criteria, the project-specific noise levels (PSNL) for a particular project are assigned, setting the benchmark against which noise impacts and the need for noise mitigation are assessed.

### *5.6.2 PROJECT SPECIFIC NOISE LEVEL*

Martins Creek Quarry is an existing facility, which has been producing hard rock products since the early 1900s. The existing $L_{Aeq}$ from industrial sources in the area around MCQ are relatively constant and are almost entirely due to the presence of the quarry.

The INP provides a method for assessing existing premises which is essentially the same as a new development where PSNL are determined and proposed (or concurrent) operations are assessed against these criteria, with the exception that, should the predicted levels exceed any criterion, an assessment should be made of feasible and reasonable noise mitigation strategies and negotiated achievable noise levels may be agreed upon between the noise source manager and regulator.

Applicable intrusiveness and amenity are derived independently and are then compared to determine PSNL however, in this case Martins Creek Quarry is an existing development with a legacy noise issue and also happens to be the only source of industrial noise in the area and is likely to remain the only source of industrial noise in the area for the rest of the life of the quarry.

**Table 8** *Project-Specific Noise Levels Derivation*

| Assessment Condition | Assessment time period | | | | | |
|---|---|---|---|---|---|---|
| | Day [7:00-18:00] | | Evening [18:00-22:00] | | Night [22:00-7:00 Monday to Saturday and 22:00 to 08:00 on Sundays and public holidays] | |
| | NAG1 &2 | NAG3 | NAG1 &2 | NAG3 | NAG1 &2 | NAG3 |
| Rating background level (RBL), $L_{A90,\ 15\ minute}$ | 28 | 33 | 25 | 23 | 22 | 18 |
| Intrusiveness Criterion [≤ RBL plus 5 dB] | 35 | 38 | 35 | 35 | 35 | 35 |
| Intrusiveness Criterion [*INP Application Notes*][1] | 35 | 38 | 35 | 35 | 35 | 35 |
| Type of Receiver [Table 2.1, INP] | Residence | | | | | |
| Zoning [LEP / planning instrument] | RU1 (Primary Production), Council LEP 2014 | | | | | |
| Indicative Noise Amenity Area [Section 2.2.1, INP] | Rural[2] | | | | | |
| Recommended Acceptable $L_{Aeq}$ Noise Level, dB(A) [Table 2.1, INP] | 50 | | 45 | | 40 | |
| Recommended Maximum $L_{Aeq}$ Noise Level, dB(A) [Table 2.1, INP] | 55 | | 50 | | 45 | |
| Existing Ambient Noise Level $L_{Aeq,\ period}$ dB(A) | 48 | | 39 | | 34 | |
| Existing Ambient Industrial Noise Level Contribution[3], $L_{Aeq}$ dB(A) [Section 3.2.1, INP] | n/a | | n/a | | n/a | |
| Required Table 2.2 modification to ANL [Table 2.2, INP] | n/a | | n/a | | n/a | |
| Acceptable Noise Level (ANL) | 50 | | 45 | | 40 | |
| High Traffic Noise Criterion [Section 2.2.3, INP] | n/a | | n/a | | n/a[4] | |
| Amenity Criterion | 50 | | 45 | | 40 | |
| | NAG 1 & 2 | NAG3 | NAG 1 & 2 | NAG3 | NAG 1 & 2 | NAG3 |
| Project Specific Noise Level [5] $L_{Aeq,\ 15\ minute}$ | 35 | 38 | 35 | 35 | 35 | 35 |

Note: 1. Applying The Application Notes - NSW Industrial Noise Policy [Department of Environment and Climate Change (now OEH), July 2006] (INP Application Notes), '…the intrusive noise level for evening be set at no greater than the intrusive noise level for daytime', and '…the intrusive noise level for Night time should be no greater than the intrusive noise level for day or evening.'

2. The surrounding area has an acoustical environment that: is dominated by natural sounds having little road traffic; an area generally characterised by low background noise levels. The rural category is considered applicable as it is representative as the surrounding residential receivers are isolated single dwellings on large Lots (eg, 2 hectares); and, situated within a Rural Landscape zone.

3. The total existing LAeq noise level from industrial noise sources was less than the ANL minus 6 dB, so no modification to the ANL is required.

4. Although the night period LAeq, night is > 10 dB + ANL, the noise contribution is not dominated by road traffic noise.

5. Applying INP Application Notes, results in the intrusiveness criteria applying to each of the Day, Evening and Night periods.

The proposed quarry operational times vary for different activities:

- Stripping 7am to 6pm (Monday to Saturday).
- Extraction 6am to 6pm (Monday to Saturday).
- Processing to 6am to 10pm (Monday to Saturday).
- Mixing and binding to 4:30am to 10pm (Monday to Friday) and 4:30am to 6pm (Saturdays).
- Stockpiling, loading and dispatch of road transport to 5:30am to 7pm (Monday to Saturday).
- Train loading 24 hours per day, seven days per week.
- Maintenance 24 hours per day, seven days per week.

#### *5.6.3 ON SITE RAIL NOISE*

The project includes an existing rail spur which is proposed to be extended further into the quarry at approximately Stage 3 of the proposed expansion. The purpose of the extension is to accommodate the longer trains that are now used by rail operators, which cannot currently be handled at Martins Creek. The increase in product shipment by rail may create additional rail traffic on the North Coast rail line between MCQ and the target markets which are likely to be in the Sydney metropolitan area. The noise impact from the rail network is assessed in Section 5.5.1.

Noise from the trains and loading activities on the spur line is assessed in accordance with Appendix 3 of the Rail Infrastructure Noise Guide, which sets limits for day, evening and night as shown in **Table 9**. These values correspond with the Acceptable Noise Level from the INP for rural areas.

**Table 9** *Rail Noise Trigger Levels*

| Time Period | Preferred | Maximum |
|---|---|---|
| Day | 50 $L_{Aeq\ period}$ | 55 $L_{Aeq\ period}$ |
| Evening | 45 $L_{Aeq\ period}$ | 50 $L_{Aeq\ period}$ |
| Night | 40 $L_{Aeq\ period}$ | 45 $L_{Aeq\ period}$ |

Appendix 3 of the RING states:

> *"Where the relevant noise level in Table 6 is exceeded, the proponent should consider feasible and reasonable action to reduce the noise down towards these levels and the noise impact assessment should provide justification if they cannot be met".*

Measurements from on site rail operations and train loading activities exceed the target noise goals set out in the RING and mitigation measures are proposed to reduce levels as much as practical towards the RING target levels. The only alternative to the proposed noise barrier is a complete enclosure of the rail siding the expense of which cannot be justified given the product values that can be shipped via rail.

### 5.7 PROPOSED CRITERIA

#### *5.7.1 PROJECT SPECIFIC NOISE LEVELS*

Project Specific Noise levels are the intrusiveness criteria derived in **Table 8** and are set out in **Table 10**.

**Table 10** *Project Specific Noise Levels*

| | Day Period | | Evening Period | | Night Period | |
|---|---|---|---|---|---|---|
| | NAG 1 & 2 | NAG 3 | NAG 1 & 2 | NAG 3 | NAG 1 & 2 | NAG 3 |
| Project Specific Noise Level $L_{Aeq,\ 15\ minute}$ | 35 | 38 | 35 | 35 | 35 | 35 |

The existing EPL does not set limit values for noise imissions at residential premises from the quarry but Condition L4 states:

> *"Where a noise limit has not been prescribed, all operations and activities occurring on the premises must be conducted in a manner that does not cause offensive noise."*

Condition L6.2 states:

> *"Hours of operation for the eastern portion of the premises Lot 1 DP 1006375 and Lot 1 DP 204377 are restricted to 6 am to 6pm Monday to Saturday with no operations allowed on Sundays and public holidays. It is permissible to operate outside these hours for activities like maintenance provided such activities are not audible at the nearest or most affected receiver."*

Also the EPL does not contain any requirement for noise monitoring other than for monitoring of blasting events which are monitored in accordance with ANZECC guidelines.

The development of the Extraction Plan and the proposed quarry expansion has been done with the express purpose of minimising noise impacts. In all a total 26 different operation scenarios and mine layouts and sets of acoustic treatment have been evaluated in conjunction with the quarry operators. The Buttai Gravel personnel who have participated in the project development have extensive experience in operating the Martins Creek Quarry. The engineering limitations that constrain the noise treatments are significant, and it is not feasible to meet the Intrusiveness noise targets for all activities at all times, therefore alternative criteria are proposed for this project.

### *5.7.2 ALTERNATIVE PROPOSED LICENCE LIMITS (CRITERIA)*

The analysis has shown that after the application of all reasonable and feasible mitigation has been applied the PSNL cannot be met under all operating and weather conditions. Alternative licence limits are, therefore, proposed as set out in **Table 11**.

**Table 11** *Proposed Criteria*

| Operating Conditions | Operating time | Proposed Criteria dB(A) Leq 15min | Sleep Disturbance $L_{A01\ 1min}$ | Assessment location |
|---|---|---|---|---|
| Stripping | 7 am to 6 pm | 45 | N/A | Any residence |
| Quarrying (includes processing, pre-coat plant and all other activities except rail loading | 6 am to 6 pm | 42 | N/A | NAG 1 |
| | | 35 | N/A | NAG 2 and 3 |
| Processing includes crushing, screening and stockpile operations but not product despatch by road transport | 6 pm to 10 pm | 38 | N/A | NAG 1 |
| | | 35 | N/A | NAG 2 and 3 |
| Mixing and binding processes include the operation of the Pug Mill and one service loader only | 4:30am - 10pm (Monday to Friday) and 4:30am - 6pm (Saturdays) | 35 | N/A | Any Residence |
| Stockpiling, loading and dispatch of road transport. Includes loading and despatch of product by road only. | 5:30am - 7pm (Monday to Saturday) | 35 | N/A | Any Residence |
| Daytime rail loading includes rail loading in conjunction with all other operations | Individual Campaign 24 hour 7 day availability | 55* | N/A | NAG1 Station St and Corey St, Martins Creek |
| | | 35 | N/A | All other locations |
| Night time rail loading rail loading only with no other operations | Individual Campaign 24 hour 7 day availability | 55* | 65 | NAG1 Station St and Corey St, Martins Creek |
| | | 35 | 45 | All other locations |
| Maintenance | As required 24 hour 7 day availability | 35 | 45 | Any residence |

Note * Subject to Extension of Rail Siding

The proposed criteria reduce the daytime noise impacts at the nearest residents in Station Street and Corey Street by at least 10 dB for most operations from existing levels and involve the construction of extensive noise abatement works. It is not possible to reconfigure the quarry in such a way that stripping activities can be completely screened from residential receivers; however, operational procedures can be used to minimise the impact of stripping activities.

It is not practical to reduce the noise level by more than these targets given the existing circumstances and the fact that that the quarry has been constructed and operated in a similar manner for more than 20 years.

### *5.7.3 SLEEP DISTURBANCE CRITERIA*

The NSW Industrial Noise Policy application notes suggest that sleep disturbance criteria be set as an $L_{A01}$ Level of 15 dB above background outside the residence which has been a long standing criteria used for sleep disturbance. Although the EPA recognises that this is not entirely adequate and that there are alternative criteria proposed by the World health Organisation, WHO. The NSW Road Noise Policy provides updated criteria and suggests absolute levels within a dwelling as appropriate measures.

The World Health Organisation guidelines (World Health Organisation 1999) recommended that:

- 'where noise is continuous, the equivalent sound pressure level should not exceed 30 dB(A) indoors, if negative effects on sleep are to be avoided'.

Further studies by the enHealth Council (2004) and the guidelines published by the World Health Organisation (1999) were reviewed and analysed in terms of the guidance on noise exposure and sleep disturbance. The enHealth report states that:

- 'as a rule for planning for short-term or transient noise events, for good sleep over eight hours the indoor sound pressure level measured as a maximum instantaneous value should not exceed approximately 45 dB(A) LA, (Max) more than 10 or 15 times per night'.

The World Health Organisation report (2009) uses LAnight, outside as a primary measure of night time noise. This is the yearly average of outside façade noise levels during the night time period, and roughly equivalent to the LAeq9hour night time descriptor. Groups vulnerable to night noise exposure include the elderly and shift workers; children tend to be less sensitive. The report concluded that, although individual responses may vary:

- At $L_{Anight}$ levels of <30 db(A) no substantial biological affect can be observed.
- At $L_{Anight}$ levels between 30 and 40 dB(A), a number of effects are observed but their impact is modest.
- At $L_{Anight}$ levels of between 40 and 55 dB(A), adverse health effects are observed with many people needing to adapt their lives to cope, vulnerable groups are more severely affected.
- At $L_{Anight}$ levels above 55dB(A), adverse health effects occur frequently and a sizeable proportion of the population is highly annoyed and sleep disturbed. Cardio vascular disease rises and public health is also threatened.

The report recommends a long-term $L_{Anight}$, outside noise guideline level of 40 dB(A), with an interim $L_{Anight,\ outside}$ target level of 55 dB(A). The interim target is only intended as an intermediate step in localised situations as health impacts, particularly on vulnerable groups, are apparent at this noise level.

Section 5.5 of the Road Noise Policy concludes that:

> *"From the research on sleep disturbance to date it can be concluded that:*
>
> - *maximum internal noise levels below 50–55 dB(A) are unlikely to awaken people from sleep;*
> - *one or two noise events per night, with maximum internal noise levels of 65–70 dB(A), are not likely to affect health and wellbeing significantly.*

For activities at Martins Creek Quarry the risk of sleep disturbance only applies during night time rail loading which is an infrequent activity and the timing and frequency of night time rail loading is largely controlled by the Rail Operators rather than MCQ. Loading of a train takes between four to six hours and the train will usually be loaded and parked up until access is provided on the rail

network. The potential for sleep disturbance is therefore, limited to infrequent activities that do not last an entire night.

Therefore, based on the information available in the Road Noise Policy Sleep Disturbance criteria are proposed for the noise assessment groups as follows:

- For residents in Martins Creek NAG A 55dB $L_{Amax}$ inside the dwelling which is to be measured outside the dwelling under free field conditions as not exceeding 65dB $L_{Amax}$ to allow for a 10dB reduction though an open window.
- All other dwellings 15dB(A) above background measured outside the dwelling under free field conditions.

#### *5.7.4 CUMULATIVE NOISE CRITERIA*

As noted earlier MCQ is the only significant source of industrial noise in the area and is likely to remain so, therefore the question of cumulative noise impact does not arise and is not considered further.

#### *5.7.5 LOW-FREQUENCY NOISE CRITERIA*

This assessment adopts the method set out in the NSW INP for assessing low-frequency noise and uses the [C-Weighted – A-weighted] values of the measured noise source to determine the need for application of modifying factors in accordance with Table 4.1 of the NSW INP. None of the plant or equipment items measured triggers a requirement for a Low-Frequency Noise modifying factor.

#### *5.7.6 ROAD TRAFFIC NOISE CRITERIA*

The existing heavy vehicle traffic along Station Street will be removed completely with the construction of the new internal access road for product dispatch, however the expansion of Martins Creek Quarry may increase the overall tonnage output from the site and may result in an increase in heavy vehicle traffic through the townships of Paterson and Bolwarra.

Section 2.3 of the NSW Road Noise Policy sets out requirements for road traffic noise impacts and Table 3 of the RNP provides criteria for residences affected by traffic noise from increases in traffic volumes as a result of traffic generating developments.

The main trucking route via Dungog Road, Gresford Road/Tocal Road is considered to be an arterial road corridor as defined in the Road Noise Policy and Table 3 of the RNP provides and external criteria of 60 dB $L_{Aeq15hour}$ for Daytime 55 dB $L_{Aeq9hour}$ for Night Time. Presently the quarry only operates though the day with some early traffic occurring in the shoulder period between 6 am and 7 am. Trucks that take product away from the quarry are able to enter the quarry at 6 am and may depart the quarry after early loading between 6 and 7am and so the night time criteria do not apply. Trucks supplying consumables to the pug mill may arrive from 5:30 am onwards and will return at regular intervals throughout the day as production demands require.

Where the existing noise levels are already above the Criteria in Table 3 of the RNP, a relative increase criterion is applied as set out in Table 6 of the RNP.

The relative increase criteria allow for a 12 dB increase in daytime road traffic noise as a result of the additional traffic generated by the development. The application notes clarify that a 12 dB increase can only be applied for quiet areas where the existing road noise is 12 dB or more below the criteria in Table 3 of the Policy, where the existing noise level is already above the criteria then a maximum of a 2dB increase is applicable if the criteria cannot be achieved.

There are three areas where changes in traffic flow as a result of the proposed expansion of Martins Creek Quarry are likely to occur.

- Traffic noise levels will be substantially reduced along Station Street/Grace Avenue Martins Creek due the diversion of all heavy vehicles away from the area.
- Traffic noise levels may increase on Dungog Road between the junction with the new access road and intersection with Grace Avenue as a result of the diversion of the traffic via the new access road.
- Traffic noise levels may increase on Gresford Road as a result of increases in overall traffic volumes as a result of increases in quarry output.

Traffic Noise Criteria are applied as shown in **Table 12** for each location.

**Table 12** *Traffic Noise Criteria*.

| | Existing Traffic Noise | Criteria Type | Criteria Value dB $L_{Aeq15hr}$ |
|---|---|---|---|
| Station St/Grace Ave | 58.2 | Absolute | 60 |
| Dungog Rd, Vacy | 53 | Absolute | 60 |
| Gresford Rd, Paterson Loc 1 and 3 | 61.2 | Relative +2 | 63 |
| Gresford Rd, Paterson Loc 2 | 64.3 | Relative +2 | 66 |
| Tocal Rd, Bolwarra | 67 | Relative +2 | 69 |

## 5.8 VOLUNTARY LAND ACQUISITION AND MITIGATION POLICY:

The NSW Government has recently published the Voluntary Land Acquisition and Mitigation Policy (VLAMP) for State Significant Mining, Petroleum and Extractive Industry Developments (NSW Government, 2014). This document describes the NSW Government's policy for voluntary mitigation and land acquisition to address noise impacts from State Significant mining, Petroleum and extractive industry developments.

### *5.8.1 MITIGATION AND ACQUISITION CRITERIA*

The VLAMP provides the following guidance on the applicability of noise mitigation and acquisition criteria.

A consent authority can grant a voluntary mitigation and/or a voluntary land acquisition right to reduce:

- operational noise impacts of a development on privately-owned land; and
- rail noise impacts of a development on privately owned land near non-network rail lines (private rail lines) on or exclusively servicing industrial sites (use Appendix 3 of the RING).

But not:

- construction noise impacts ,as these impacts are shorter term and can be controlled;
- noise impacts on the public road or rail network; or
- modifications of existing developments with legacy noise issues, where the modifications would have beneficial or negligible noise impact. In such cases, these legacy noise issues

should be addressed through site-specific pollution reduction programmes under the Protection of the Environmental Operations Act 1997.

#### *5.8.2 VOLUNTARY MITIGATION RIGHTS*

The VLAMP states:

A consent Authority should only grant voluntary mitigation rights:

- If the noise generated by the development would be equal to or greater than 3dB(A) above the INP project-specific noise level at any residence on privately owned land; or
- If the development would increase the total industrial noise level at any residence on privately owned land by more than 1dB(A),and noise levels at residence are already the recommended amenity criteria in Table 2.1 of the INP.
- If the development includes a private rail line and the use of that private rail line would cause exceedances of the recommended acceptable levels in Table 6 of Appendix 3 of RING (see Appendix B) by greater than or equal to 3dB(A) at any residence on privately owned land.

All noise levels must be calculated in accordance with the INP or RING (as applicable).

#### *5.8.3 VOLUNTARY LAND ACQUISITION RIGHTS*

The VLAMP states:

A consent authority should only grant voluntary land acquisition rights where:

- The noise generated by the development would be more than 5dB(A) above the project specific noise level at any residence on privately-owned land; or
- The noise generated by the development would contribute to exceedances of the recommended maximum noise levels in Table 2 of the INP on more than 25% of any privately owned land, and a dwelling could be built on that land under existing planning controls (voluntary land acquisition rights should not be applied to address noise levels on vacant land other than vacant land specifically meeting these criteria); or
- If the development includes a private rail line and the use of that private rail line would cause exceedances of the recommended maximum criteria in Table 6 of Appendix 3 of the RING and at any residence on privately owned land.

All noise levels must be calculated in accordance with the INP or RING (as applicable).

#### *5.8.4 EXISTING DEVELOPMENT WITH LEGACY NOISE ISSUES*

The policy recognises that in some circumstances it may not be possible to comply with the assessment criteria even with the implementation of all reasonable and feasible mitigation measures.

The policy outlines the approach to decision making in these situations, including how to set levels at which mitigation and acquisition criteria apply. The policy also states that a consent authority cannot grant voluntary mitigation and acquisition right for:

- Modification of an existing development with legacy noise issues, where the modification would have beneficial or negligible noise impacts. In such cases, the legacy noise issues should be addressed through site-specific pollution reduction programmes under the Protection of the Environmental Operations Act 1997.

It is RCA's opinion that the project fulfils the criteria for 'modification of an existing development with legacy noise issues', as demonstrated by the measurement of the existing sound levels at

nearby residences in Martins Creek and by the predictive models which incorporate noise reduction measures and produce at least a 10dB reduction in most of the existing noise levels.

# 6 NOISE IMPACT ASSESSMENT

## 6.1 NOISE MODELLING METHODOLOGY AND ASSUMPTIONS

### *6.1.1 INDUSTRIAL NOISE*

Based on site specific circumstances (topography, ground types, existing infrastructure and buildings), a 3D computer environmental sound propagation model was created for the proposed staged development of quarry. A three dimensional model which represents operational conditions for the quarry in each of six stages of development was developed with quarry equipment modelled at different locations according to the development stage being assessed.

In all cases the results for the predicted received noise incorporate the specified noise treatments at each stage of the project.

The stages modelled are set out in **Table 13** along with the specified noise mitigation measures that are to be installed at each stage.

**Table 13** *Stages of Development*

| Stage | Year | Description | Scenario Results |
|---|---|---|---|
| | 0 | Current operating conditions as measured during 2014 | Table 16 -16A |
| 1 | 0-2 | New road constructed further development of exiting area and expansion of west pit to south installation of some engineering noise controls to the tertiary plant and haul road. | Table 17 -17A |
| 2 | 5 | Further development of exiting area and expansion of west pit to south. Installation of noise control bunds and barriers and additional engineering noise controls to the plant. | Table 18 -16C |
| 3 | 5-10 | Further development of existing area and expansion of west pit to the north-east.<br>Extension of rail siding<br>(As determined by market requirements).<br>Installation of additional engineering noise controls. | Table 19 -19C |
| 4 | 10-15 | Continued extraction in expanded areas | Table 20 -20C |
| 5 | 15-20 | Continued extraction in expanded areas | Table 21 -21C |
| 6 | 20-25 | Expansion into existing processing area | Table 22 -22C |

The modelling in CadnaA was conducted using the CONCAWE noise model for each of operational scenarios at each stage of development and under noise enhancing wind conditions 3 m/s winds from the south-east north-east and west which represent worst case source to receiver winds.

Predicted received noise levels at affected premises were determined by propagating the Octave Band Sound Power Levels of the noise source and allowing for distance attenuation, topographic and manmade barriers, ground and atmospheric absorption and reflection and adverse meteorological conditions consistent with the area.

In line with the requirements of the INP, assessment locations of the emergent site noise levels were predicted at the most affected point on or within potentially affected receiver property boundaries, if that is more than 30 metres from the residence, at the most-affected point within 30 metres of the residence, at 1.5 metres above ground level.

Actual site-specific noise emission data as measured by RCA Acoustics on site for each item of plant and equipment used in the quarry was used in the model.

To determine the equivalent continuous sound level $L_{Aeq\ 15\ minute}$ received at the assessment locations, the following operational Scenarios were modelled.

- Daytime quarry operations.
- Rail loading only (night time).
- Daytime quarry operations plus rail loading.
- Daytime quarry operations plus campaign crushing using mobile jaw crusher and associated plant.
- Evening processing operations with tertiary plant only.
- Evening processing with all plant operating, (Stage 2 onwards).
- Early morning truck loading and product despatch.
- Overburden stripping in conjunction with normal day time operations.

### 6.2 PLANT ITEMS INCLUDED IN THE MODEL

The plant items required for operating the quarry are not likely to change over the life of the quarry and so the various stages of development assume the same equipment is present but that it is operating in different locations according to the development stage of the quarry. Buttai Gravel Pty Ltd has advised that the existing fixed plant is suitable for the proposed future use and the existing plant or plant of a similar type will be retained for the foreseeable future. Changes and upgrades to mobile plant such as loaders will result in lower sound emission level from the newer equipment as this is the current trend in the industry. **Table 14** details which equipment is assumed to be operating under the various operating conditions of the quarry for all years.

**Table 14** *Equipment Modelled as Operating for each Scenario Variant*

| Scenario ID | | V01 | V02 | V03 | V04 | V05 | V05a | V06 | V07 |
|---|---|---|---|---|---|---|---|---|---|
| **Operational Conditions** | | **Daytime quarry operations** | **Rail loading only (Night time)** | **Daytime Quarry Operation plus Rail loading** | **Daytime Quarry operations with Campaign crushing** | **Evening Processing Operations All Plant** | **Evening Processing Operations Tertiary Plant only** | **Early Morning Product Loading and Despatch** | **Stripping** |
| **Mobile Equipment** | | | | | | | | | |
| | Stock Pile Loader Cat 980 (or equivalent) | Y | Y | Y | Y | Y | N | Y | Y |
| | Stock Pile Loader Cat 988H (or equivalent) | Y | N | Y | Y | Y | Y | Y | Y |
| | Pug Mill Loader Cat 980 (or equivalent) | Y | N | Y | Y | Y | N | Y | Y |
| | Truck loader Cat 988 H (or equivalent) | Y | N | Y | Y | N | N | Y | Y |
| | Quarry Face Loader WA 600 (or equivalent) | Y | N | Y | Y | Y On ROM Pad | N | N | Y |
| | Haul Truck Cat 775 (or equivalent) | Y | N | Y | Y | N | N | N | Y |

| Scenario ID | | V01 | V02 | V03 | V04 | V05 | V05a | V06 | V07 |
|---|---|---|---|---|---|---|---|---|---|
| **Operational Conditions** | | **Daytime quarry operations** | **Rail loading only (Night time)** | **Daytime Quarry Operation plus Rail loading** | **Daytime Quarry operations with Campaign crushing** | **Evening Processing Operations All Plant** | **Evening Processing Operations Tertiary Plant only** | **Early Morning Product Loading and Despatch** | **Stripping** |
| | Haul Truck HD605 (or equivalent) | Y | N | Y | Y | N | N | N | Y |
| | Power Rock Drill (or equivalent) | Y | N | Y | Y | N | N | N | Y |
| | D10 Dozer<br>65 Tonne Excavator (or equivalent) | N | N | N | N | N | N | N | Y |
| | 35 tonne Excavator | Y | N | Y | Y | N | N | N | Y |
| **Fixed Plant** | | | | | | | | | |
| | Jacques Jaw Crusher | Y | N | Y | Y | Y | N | N | Y |
| | Surge Bin and conveyor | Y | N | Y | Y | Y | N | N | Y |
| | 48” Rotary Crusher | Y | N | Y | Y | Y | N | N | Y |
| | Canica Rotary Crusher | Y | N | Y | Y | Y | Y | N | Y |

| Scenario ID | | V01 | V02 | V03 | V04 | V05 | V05a | V06 | V07 |
|---|---|---|---|---|---|---|---|---|---|
| **Operational Conditions** | | **Daytime quarry operations** | **Rail loading only (Night time)** | **Daytime Quarry Operation plus Rail loading** | **Daytime Quarry operations with Campaign crushing** | **Evening Processing Operations All Plant** | **Evening Processing Operations Tertiary Plant only** | **Early Morning Product Loading and Despatch** | **Stripping** |
| | Primary Screen | Y | N | Y | Y | Y | Y | N | Y |
| | Secondary Screen | Y | N | Y | Y | Y | Y | N | Y |
| | Pug mill | Y | N | Y | Y | Y | N | Y | Y |
| | Pre coat plant | Y | N | Y | Y | N | N | N | Y |
| Rail Operations | | | | Y | Y | N | | N | |
| | Rail Loader | N | Y | Y | N | N | N | N | N |
| | Train Operations | N | Y | Y | N | N | N | N | N |
| Mobile Plant | | | | Y | | | | | |
| | Mobile Crushers and ancillary screening plant with 30-tonne excavator | N | N | Y | Y | N | N | N | N |

### 6.3 PLANT SOUND POWER LEVELS

Overall A-weighted sound levels for the most significant noise sources are shown in **Table 15**. Minor sources such as small maintenance forklifts, service vehicles, pumps and generators are not included as sources of significance. The geographic location of each of the modelled source is provided in **Appendix D**.

**Table 15** *Sound Power Levels of Equipment*

| **Point Sources** | |
|---|---|
| CAT D10 Dozer or Equivalent | 116 |
| 65 tonne Excavator CAT 365or equivalent | 109 |
| CAT 988H (3647) (Measured on site at MCQ) | 103.1 |
| CAT 980H (3596) (Measured on site at MCQ) | 100.9 |
| WA 600 (3639) (Measured on site at MCQ) | 104.2 |
| 775E (3361) Stationary High Idle (Measured on site at MCQ) | 108.8 |
| Warrior 2400 Mobile Jaw Crusher with Screen 3611 and ancillary equipment (Measured on site at MCQ) | 121.6 |
| Canica Crusher (Measured on site at MCQ) | 97.7 |
| Screen (Measured on site at MCQ) | 109.1 |
| Pre-coat plant | 105 |
| Rail Feeder (Measured on site at MCQ) | 115.8 |
| Large Road Truck | 92.2 |
| Power Rock Drill (Measured on site at MCQ) | 114.4 |
| Ballast Locos by two (Measured on site at MCQ) | 99.6 |
| **Area Sources** | |
| 48" Rotary Crusher Building West Wall (Measured on site at MCQ) | 122.3* |
| Surge Bin (Measured on site at MCQ) | 110.6 |
| Rail Loader (Measured on site at MCQ) | 120.4* |
| Jacques Primary Crusher Building South Wall (Measured on site at MCQ) | 121.5* |

*Note Most Exposed Façade.

### 6.4 OPERATIONAL NOISE IMPACT ASSESSMENT

#### *6.4.1 PREDICTED A-WEIGHTED RECEIVED SOUND LEVELS*

**Table 16** summarises the existing received noise levels for noise enhancing wind conditions for each NAG and 16A set out the existing received noise level at each noise sensitive receiver under neutral atmospheric conditions.

The range of predicted received noise levels for each NAG are set out below with detailed noise levels for each individual receiver location in the subsequent tables.

Tables 17 to 22 set out the predicted A-weighted Sound levels for future operations at each receiver and NAG under noise enhancing wind conditions, and for F Class stability conditions where operations are conducted after 10pm. In each section the first table presents an overall summary of the noise levels for the group with each individual receiver detailed in the following tables.

The predictions include all specified noise mitigation measured proposed at each stage of the development.

**Table 16** *Summary of A-Weighted Received Sound Levels Current Conditions*

| Operational Scenario | NAG1 Wind 45 Deg 3m/s | NAG2 Wind 270 Deg 3m/s | NAG3 wind 135 Deg 3m/s |
|---|---|---|---|
| Stripping Lot 21 | N/A | N/A | N/A |
| Daytime quarry operations | 55 - 60 | 30-35 | 35-43 |
| Rail loading only (night time) F Class Temperature Inversion no wind | N/A | N/A | N/A |
| Daytime quarry operation plus rail loading | 55-65 | 35-40 | 35-45 |
| Daytime quarry operations plus campaign crushing using mobile jaw crusher | 55-60 | 30-35 | 40-45 |
| Evening processing operations tertiary plant only | 42-45 | <30 | <30 |
| Early morning truck loading and product despatch | N/A | N/A | N/A |

N/A = Not applicable

**Table 16A** *Detailed Existing Noise Levels – at Individual Receivers Neutral Meteorological Conditions*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail loading | Daytime Quarry Operations Plus Campaign Crushing using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 60.1 | 68.1 | 68.7 | 60.1 | N/A | N/A | N/A | 35 | 35 |
| 1 | 1 | 58 | 67.6 | 68 | 58 | | | | 35 | 35 |
| 2 | 1 | 52.3 | 68 | 68.1 | 52.3 | | | | 35 | 35 |
| 3 | 1 | 49.1 | 68.5 | 68.5 | 49.1 | | | | 35 | 35 |
| 4 | 1 | 47.9 | 67.3 | 67.3 | 47.9 | | | | 35 | 35 |
| 5 | 1 | 47.3 | 67.1 | 67.1 | 47.3 | | | | 35 | 35 |
| 6 | 1 | 46.9 | 66.5 | 66.6 | 46.9 | | | | 35 | 35 |
| 7 | 1 | 48.5 | 67 | 67 | 48.5 | | | | 35 | 35 |
| 8 | 1 | 48.7 | 65.4 | 65.5 | 48.7 | | | | 35 | 35 |
| 9 | 1 | 48.8 | 64.9 | 65 | 48.8 | | | | 35 | 35 |
| 10 | 1 | 48.6 | 61.9 | 62.1 | 48.6 | | | | 35 | 35 |
| 11 | | 34.3 | 38.2 | 39.7 | 35 | | | | 35 | 35 |
| 12 | 1 | 38.3 | 40.8 | 42.8 | 38.5 | | | | 35 | 35 |
| 13 | 1 | 48.2 | 49.1 | 51.7 | 48.2 | | | | 35 | 35 |
| 14 | 1 | 44.1 | 51.5 | 52.2 | 44.1 | | | | 35 | 35 |
| 15 | 1 | 45.7 | 53.7 | 54.3 | 45.7 | | | | 35 | 35 |
| 16 | 1 | 46.6 | 56.2 | 56.7 | 46.6 | | | | 35 | 35 |
| 17 | 1 | 46.3 | 57.1 | 57.4 | 46.3 | | | | 35 | 35 |
| 18 | 1 | 36.8 | 62.3 | 62.3 | 36.9 | | | | 35 | 35 |
| 19 | 1 | 46.7 | 59.9 | 60.1 | 46.7 | | | | 35 | 35 |
| 20 | 1 | 46.1 | 56.9 | 57.3 | 46.1 | | | | 35 | 35 |
| 21 | 1 | 41.3 | 49.6 | 50.2 | 41.3 | | | | 35 | 35 |
| 22 | 1 | 46 | 56 | 56.4 | 46 | | | | 35 | 35 |
| 23 | 1 | 45.7 | 54.8 | 55.3 | 45.8 | | | | 35 | 35 |
| 24 | 1 | 27.4 | 34 | 34.8 | 27.6 | | | | 35 | 35 |
| 25 | 1 | 21.7 | 23.5 | 25.7 | 21.9 | | | | 35 | 35 |
| 26 | 1 | 24.7 | 35.7 | 36 | 26.9 | | | | 35 | 35 |
| 27 | 1 | 14.6 | 15.1 | 17.9 | 15 | | | | 35 | 35 |
| 28 | 1 | 17.6 | 19.7 | 21.8 | 18 | | | | 35 | 35 |
| 29 | 3 | 11.4 | 10.8 | 14.1 | 13.8 | | | | 35 | 35 |
| 30 | 3 | 11 | 10.2 | 13.6 | 13.7 | | | | 35 | 35 |
| 31 | 3 | 10.7 | 10.5 | 13.6 | 14.3 | | | | 35 | 35 |
| 32 | 2 | 11.6 | 11.3 | 14.5 | 14.4 | | | | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail loading | Daytime Quarry Operations Plus Campaign Crushing using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 33 | 2 | 12.4 | 12.1 | 15.2 | 14.9 | | | | 35 | 35 |
| 34 | 2 | 14.1 | 13.7 | 16.9 | 16.6 | | | | 35 | 35 |
| 34 A | 2 | 14.5 | 14.2 | 17.3 | 17 | | | | 35 | 35 |
| 35 | 2 | 15 | 14.4 | 17.7 | 17.2 | | | | 35 | 35 |
| 36 | 2 | 13.3 | 12.8 | 16.1 | 15.3 | | | | 35 | 35 |
| 37 | 2 | 13.5 | 13.2 | 16.4 | 15.1 | | | | 35 | 35 |
| 38 | 2 | 10 | 9.9 | 12.9 | 11.4 | | | | 35 | 35 |
| 39 | 3 | 9.1 | 9.1 | 12.1 | 10.1 | | | | 35 | 35 |
| 40 | 3 | 30.6 | 35.7 | 36.9 | 32.7 | | | | 38 | 35 |
| 41 | 3 | 27.7 | 33 | 34.1 | 36.8 | | | | 38 | 35 |
| 42 | 3 | 27.2 | 31.3 | 32.7 | 40.2 | | | | 38 | 35 |
| 43 | 3 | 23.7 | 26.6 | 28.3 | 38.3 | | | | 38 | 35 |
| 44 | 3 | 21.1 | 21.9 | 24.5 | 37.4 | | | | 38 | 35 |
| 45 | 3 | 22.6 | 23.5 | 26.1 | 37.1 | | | | 38 | 35 |
| 46 | 3 | 21 | 21.7 | 24.4 | 39 | | | | 38 | 35 |
| 47 | 3 | 20.4 | 21.2 | 23.8 | 35.7 | | | | 38 | 35 |
| 48 | 3 | 21.7 | 20 | 24 | 37.9 | | | | 38 | 35 |
| 49 | 3 | 17 | 16.8 | 19.9 | 22.5 | | | | 38 | 35 |
| 50 | 3 | 13.5 | 13.9 | 16.7 | 18.2 | | | | 38 | 35 |
| 51 | 3 | 18.2 | 17.3 | 20.8 | 25.4 | | | | 38 | 35 |
| 52 | 3 | 11.6 | 11.9 | 14.8 | 15.6 | | | | 38 | 35 |
| 53 | 3 | 19.7 | 20.3 | 23 | 35.9 | | | | 38 | 35 |
| 54 | 3 | 18 | 17.9 | 20.9 | 35 | | | | 38 | 35 |
| 55 | 3 | 13.3 | 13.1 | 16.2 | 15.9 | | | | 35 | 35 |
| 56 | 3 | 17.7 | 18.8 | 21.3 | 32 | | | | 38 | 35 |

**Table 17** *Summary of Predicted A-eighted Received Sound Levels Stage 1 Year 1-2 New Road Constructed Engineering Noise Controls for Tertiary Plant Installed*

| Operational Scenario | NAG1 Wind 45 Deg 3m/s | NAG2 Wind 270 Deg 3m/s | NAG3 wind 135 Deg 3m/s |
|---|---|---|---|
| Stripping Lot 21 | N/A | N/A | N/A |
| Daytime quarry operations | | 30-35 | 35-43 |
| Rail loading only (night time) F Class temperature inversion no wind | 55-65 | 30-40 | 35-40 |
| Daytime quarry operation plus rail loading | 55-65 | 35-40 | 35-45 |
| Daytime quarry operations plus campaign crushing using mobile jaw crusher | | 30-35 | 40-45 |
| Evening processing operations tertiary plant only | 35 | 35 | 35 |
| Early morning truck loading and product despatch | N/A | N/A | N/A |

**Table 17A** *Detailed Predicted Received Noise Levels Year 1 Construction of New Access Road and Treatment of Tertiary Processing Plant Used for Evening Processing*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No Wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 60.1 | 70.6 | 70.9 | 60.1 | 38.6 | 38 | 60.1 | 35 | 35 |
| 1 | 1 | 58.1 | 69.5 | 69.8 | 58.1 | 39.1 | 35 | 58.1 | 35 | 35 |
| 2 | 1 | 52.3 | 69.2 | 69.3 | 52.4 | 36.7 | 30 | 52.3 | 35 | 35 |
| 3 | 1 | 49.1 | 69.1 | 69.2 | 49.5 | 29.3 | 28.5 | 49.2 | 35 | 35 |
| 4 | 1 | 47.9 | 68.1 | 68.2 | 48.3 | 30.5 | 30 | 48 | 35 | 35 |
| 5 | 1 | 47.4 | 67.9 | 68 | 47.9 | 31.1 | 30.7 | 47.5 | 35 | 35 |
| 6 | 1 | 47 | 67.7 | 67.7 | 47.3 | 30.7 | 30.3 | 47 | 35 | 35 |
| 7 | 1 | 48.5 | 68.1 | 68.1 | 49 | 30.7 | 30.3 | 48.7 | 35 | 35 |
| 8 | 1 | 48.7 | 67 | 67.1 | 49.4 | 29.6 | 29 | 48.9 | 35 | 35 |
| 9 | 1 | 48.9 | 67.1 | 67.2 | 49.1 | 29.4 | 28.7 | 48.9 | 35 | 35 |
| 10 | 1 | 48.6 | 65.6 | 65.7 | 48.6 | 26.9 | 25.5 | 48.6 | 35 | 35 |
| 11 | | 34.5 | 41.8 | 42.5 | 35.9 | 22.2 | 21.7 | 34.7 | 35 | 35 |
| 12 | 1 | 38.4 | 44.5 | 45.4 | 38.7 | 21.7 | 20.8 | 38.4 | 35 | 35 |
| 13 | 1 | 48.2 | 52.7 | 54 | 48.2 | 28.8 | 26.2 | 48.2 | 35 | 35 |
| 14 | 1 | 44.1 | 58.6 | 58.7 | 44.6 | 25.8 | 25 | 44.3 | 35 | 35 |
| 15 | 1 | 45.7 | 60.8 | 60.9 | 46.6 | 28 | 25.5 | 46 | 35 | 35 |
| 16 | 1 | 46.6 | 64.5 | 64.5 | 47.6 | 26.7 | 26.3 | 46.9 | 35 | 35 |
| 17 | 1 | 46.3 | 66.3 | 66.4 | 47.3 | 27.3 | 27 | 46.6 | 35 | 35 |
| 18 | 1 | 36.9 | 66.9 | 66.9 | 42.8 | 23.5 | 22.8 | 39.2 | 35 | 35 |
| 19 | 1 | 46.8 | 62.7 | 62.8 | 47.9 | 29.2 | 28.8 | 47.1 | 35 | 35 |
| 20 | 1 | 46.1 | 59.6 | 59.8 | 47.4 | 31.9 | 28.4 | 46.5 | 35 | 35 |
| 21 | 1 | 41.4 | 53.1 | 53.4 | 42.3 | 26.9 | 24.4 | 41.6 | 35 | 35 |
| 22 | 1 | 46.1 | 58.8 | 59.1 | 47.4 | 31.3 | 28.3 | 46.4 | 35 | 35 |
| 23 | 1 | 45.8 | 58.7 | 58.9 | 46.9 | 28 | 26 | 46.1 | 35 | 35 |
| 24 | 1 | 27.4 | 37.3 | 37.7 | 28 | 14.1 | 12.4 | 27.5 | 35 | 35 |
| 25 | 1 | 21.7 | 27.1 | 28.2 | 22.3 | 7.6 | 5.8 | 21.7 | 35 | 35 |
| 26 | 1 | 24.8 | 39.4 | 39.5 | 39.7 | 16.7 | 14.4 | 34.1 | 35 | 35 |
| 27 | 1 | 14.6 | 18.6 | 20 | 15.6 | 0 | -1.6 | 14.7 | 35 | 35 |
| 28 | 1 | 17.6 | 23.3 | 24.3 | 18.5 | 2.9 | 1.2 | 17.7 | 35 | 35 |
| 29 | 3 | 11.3 | 14.4 | 16.2 | 16.6 | -4.5 | -6.2 | 12.2 | 35 | 35 |
| 30 | 3 | 10.9 | 13.9 | 15.7 | 16 | -5.7 | -7.5 | 11.7 | 35 | 35 |
| 31 | 3 | 10.7 | 14 | 15.7 | 16.1 | -5.1 | -6.5 | 11.3 | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No Wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 32 | 2 | 11.6 | 14.7 | 16.4 | 16.7 | -4.1 | -5.6 | 12.3 | 35 | 35 |
| 33 | 2 | 12.3 | 15.5 | 17.2 | 17.6 | -3.2 | -4.8 | 13.2 | 35 | 35 |
| 34 | 2 | 14 | 17.2 | 18.9 | 19.5 | -1.5 | -3.1 | 15 | 35 | 35 |
| 34 A | 2 | 14.4 | 17.7 | 19.4 | 20.1 | -1.3 | -2.9 | 15.5 | 35 | 35 |
| 35 | 2 | 15 | 18 | 19.7 | 20.8 | -0.4 | -2.2 | 16.1 | 35 | 35 |
| 36 | 2 | 13.2 | 16.4 | 18.1 | 18.5 | -2.4 | -4.1 | 14.2 | 35 | 35 |
| 37 | 2 | 13.5 | 16.7 | 18.4 | 17.3 | -1.9 | -3.6 | 14 | 35 | 35 |
| 38 | 2 | 9.9 | 13.3 | 15 | 13.7 | -4.8 | -6.5 | 10.5 | 35 | 35 |
| 39 | 3 | 9 | 12.5 | 14.1 | 11.8 | -5.6 | -7.2 | 9.3 | 35 | 35 |
| 40 | 3 | 31.4 | 39.6 | 40.1 | 34.8 | 23.9 | 23.8 | 32 | 38 | 35 |
| 41 | 3 | 28.8 | 37.2 | 37.7 | 38.2 | 22.9 | 22.8 | 34.9 | 38 | 35 |
| 42 | 3 | 30.4 | 36.6 | 37.1 | 41.1 | 27.7 | 27.6 | 36.1 | 38 | 35 |
| 43 | 3 | 25.7 | 30.7 | 31.5 | 39 | 21.8 | 21.7 | 32.1 | 38 | 35 |
| 44 | 3 | 22.7 | 26.1 | 27.3 | 37.9 | 17.9 | 17.8 | 26.8 | 38 | 35 |
| 45 | 3 | 24 | 27.6 | 28.8 | 38.1 | 18.8 | 18.7 | 28.6 | 38 | 35 |
| 46 | 3 | 21.6 | 25.6 | 26.9 | 39.3 | 14.1 | 14 | 26.6 | 38 | 35 |
| 47 | 3 | 21.5 | 25.3 | 26.5 | 36.3 | 15.5 | 15.4 | 26.4 | 38 | 35 |
| 48 | 3 | 22.1 | 23.9 | 26 | 38.2 | 12.9 | 12.5 | 25.6 | 38 | 35 |
| 49 | 3 | 17 | 20.2 | 21.9 | 23.7 | 2.1 | 0.9 | 17.7 | 38 | 35 |
| 50 | 3 | 13.4 | 17.2 | 18.7 | 19.6 | -1.7 | -2.9 | 14 | 38 | 35 |
| 51 | 3 | 18.2 | 20.7 | 22.6 | 26.7 | 4 | 2.8 | 19.6 | 38 | 35 |
| 52 | 3 | 11.6 | 15.2 | 16.8 | 17.1 | -4.1 | -5.4 | 12.2 | 38 | 35 |
| 53 | 3 | 20.5 | 24.2 | 25.5 | 36.2 | 13.9 | 13.7 | 26.5 | 38 | 35 |
| 54 | 3 | 18.4 | 21.5 | 23.1 | 35.3 | 10.1 | 9.7 | 22.8 | 38 | 35 |
| 55 | 3 | 13.3 | 16.6 | 18.2 | 19.1 | -2.3 | -3.9 | 14.3 | 35 | 35 |
| 56 | 3 | 17.8 | 22.4 | 23.7 | 32.6 | 5.8 | 4.9 | 25.3 | 38 | 35 |

**Table 18** *Summary of Predicted A–Weighted Received Sound Levels Stage 2 Year 5 Recommended Sound Attenuation Installed for Year 5*

| Operation Scenario | NAG1 Wind 45 Deg 3m/s | NAG2 Wind 270 Deg 3m/s | NAG3 wind 135 Deg 3m/s |
|---|---|---|---|
| Stripping worst Case Lot 21 | | | |
| Daytime quarry operations | 26-37 | <35 | <35 |
| Rail loading only (night time) F Class temperature inversion no wind | 55-65 | <35 | <35 |
| Daytime quarry operation plus rail loading | 50-56 | 30-36 | <35 |
| Daytime quarry operations plus campaign crushing using mobile jaw crusher1 | 26-37 | <35 | <30 |
| Evening processing operations all plant | 26-37 | 30 | <30 |
| Early morning truck loading and product despatch2 | 23-31 | 27-30 | <30 |

[1] Mobile Jaw Crusher Located in South Western Corner of Western Pit

[2] F Class Temperature Inversion

**Table 18A** *Detailed Predicted A–Weighted Received Sound Levels for Individual Receivers Stage 2 Year 5 3m/s NE Wind - Recommended Sound Attenuation Installed for Year 5*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime quarry operations | Rail loading only (Night time) F Class Inversion No wind | Daytime Quarry Operation plus Rail loading | Daytime Quarry operations plus Campaign crushing using mobile jaw crusher | Evening Processing Operations tertiary plant only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 38.8 | 55.3 | 55.4 | 38.9 | 38.1 | 34 | N/A | 35 | 35 |
| 1 | 1 | 36.1 | 56.2 | 56.2 | 36.2 | 35.6 | 32.1 | | 35 | 35 |
| 2 | 1 | 33.7 | 56.2 | 56.3 | 33.9 | 34.3 | 30.6 | | 35 | 35 |
| 3 | 1 | 33.3 | 56.5 | 56.5 | 33.5 | 33.4 | 29.9 | | 35 | 35 |
| 4 | 1 | 33.3 | 56.8 | 56.8 | 33.5 | 33.3 | 30 | | 35 | 35 |
| 5 | 1 | 32.9 | 56.7 | 56.7 | 33.1 | 32.7 | 29.4 | | 35 | 35 |
| 6 | 1 | 32.6 | 56.5 | 56.5 | 32.9 | 32.4 | 29.5 | | 35 | 35 |
| 7 | 1 | 32.7 | 56.6 | 56.6 | 32.9 | 32 | 29.6 | | 35 | 35 |
| 8 | 1 | 31.7 | 56.2 | 56.3 | 32.1 | 31.7 | 28.1 | | 35 | 35 |
| 9 | 1 | 31.8 | 56 | 56 | 32.1 | 31.5 | 28.5 | | 35 | 35 |
| 10 | 1 | 30.5 | 55.1 | 55.2 | 30.9 | 30.9 | 26.7 | | 35 | 35 |
| 11 | | 29.3 | 32 | 34.4 | 32.9 | 22.6 | 28.7 | | 35 | 35 |
| 12 | 1 | 28 | 34 | 35.3 | 30.5 | 25 | 26.7 | | 35 | 35 |
| 13 | 1 | 31.6 | 40 | 40.7 | 32.7 | 31.6 | 27.1 | | 35 | 35 |
| 14 | 1 | 28.7 | 50.6 | 50.6 | 29.3 | 29.1 | 26 | | 35 | 35 |
| 15 | 1 | 30.2 | 51.8 | 51.9 | 30.6 | 30 | 27.2 | | 35 | 35 |
| 16 | 1 | 30.5 | 53.6 | 53.7 | 30.9 | 29.7 | 27.1 | | 35 | 35 |
| 17 | 1 | 30.6 | 55.5 | 55.5 | 31 | 29.1 | 27.5 | | 35 | 35 |
| 18 | 1 | 30.1 | 56.1 | 56.1 | 30.4 | 27.2 | 27.6 | | 35 | 35 |
| 19 | 1 | 31.3 | 53.9 | 53.9 | 31.6 | 31.8 | 28.3 | | 35 | 35 |
| 20 | 1 | 31.8 | 52 | 52.1 | 32 | 31.3 | 28.3 | | 35 | 35 |
| 21 | 1 | 29.4 | 45.8 | 45.9 | 29.6 | 29.5 | 26.1 | | 35 | 35 |
| 22 | 1 | 32.3 | 50.3 | 50.4 | 32.5 | 31.6 | 28.8 | | 35 | 35 |
| 23 | 1 | 38.1 | 42 | 43.5 | 38.1 | 38.2 | 29.5 | | 35 | 35 |
| 24 | 1 | 19.4 | 27.3 | 28.2 | 19.8 | 19.4 | 16.8 | | 35 | 35 |
| 25 | 1 | 9.5 | 17 | 18.4 | 10.9 | 9.5 | 6.8 | | 35 | 35 |
| 26 | 1 | 16.1 | 20 | 28 | 17.9 | 16.2 | 13.5 | | 35 | 35 |
| 27 | 1 | 0.2 | 6.7 | 9.7 | 3.6 | 0.1 | -1.9 | | 35 | 35 |
| 28 | 1 | 6.1 | 12.1 | 14.2 | 7.9 | 6 | 3.2 | | 35 | 35 |
| 29 | 3 | -1 | 0.7 | 8.3 | 4.9 | -1.8 | -2.6 | | 35 | 35 |
| 30 | 3 | -1.1 | 0.3 | 8 | 6.1 | -1.9 | -2.8 | | 35 | 35 |
| 31 | 3 | -0.5 | 1.5 | 8.5 | 7.6 | -1.6 | -2.3 | | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime quarry operations | Rail loading only (Night time) F Class Inversion No wind | Daytime Quarry Operation plus Rail loading | Daytime Quarry operations plus Campaign crushing using mobile jaw crusher | Evening Processing Operations tertiary plant only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 32 | 2 | 0 | 2.7 | 9.3 | 6.5 | -0.9 | -1.6 | | 35 | 35 |
| 33 | 2 | 0.7 | 3.4 | 10 | 6.3 | 0 | -0.7 | | 35 | 35 |
| 34 | 2 | 2.4 | 5 | 11.8 | 7.6 | 1.7 | 1.1 | | 35 | 35 |
| 34 A | 2 | 3 | 5.3 | 12.3 | 7.8 | 2.3 | 1.7 | | 35 | 35 |
| 35 | 2 | 2.7 | 4.7 | 12 | 7.2 | 2.2 | 1.5 | | 35 | 35 |
| 36 | 2 | 0.1 | 3.2 | 9.7 | 5.1 | -0.4 | -1.2 | | 35 | 35 |
| 37 | 2 | -1.3 | 3.6 | 8.3 | 3.9 | -1.7 | -2.8 | | 35 | 35 |
| 38 | 2 | -4.5 | 0.4 | 6 | 0.9 | -4.9 | -6 | | 35 | 35 |
| 39 | 3 | -6 | -0.3 | 4.1 | -6 | -6.3 | -7.7 | | 35 | 35 |
| 40 | 3 | 31.4 | 30.5 | 34.7 | 35.4 | 22.2 | 31.1 | | 38 | 35 |
| 41 | 3 | 31.6 | 26.6 | 33.6 | 35.8 | 25.7 | 29.9 | | 38 | 35 |
| 42 | 3 | 35.6 | 25.4 | 36.6 | 39.7 | 30.2 | 34.1 | | 38 | 35 |
| 43 | 3 | 33.9 | 19.6 | 34.6 | 35.9 | 30.3 | 31.3 | | 38 | 35 |
| 44 | 3 | 31.9 | 15.8 | 32.6 | 33.4 | 30.1 | 30.4 | | 38 | 35 |
| 45 | 3 | 35.4 | 16 | 35.8 | 36.6 | 34.1 | 34.1 | | 38 | 35 |
| 46 | 3 | 32.2 | 14.6 | 32.7 | 33.3 | 30.8 | 30.8 | | 38 | 35 |
| 47 | 3 | 31 | 13.7 | 31.6 | 32.1 | 29.6 | 29.7 | | 38 | 35 |
| 48 | 3 | 18.6 | 11.7 | 21.8 | 25.5 | 15 | 15.5 | | 38 | 35 |
| 49 | 3 | 8 | 8.6 | 15.1 | 17.6 | 6.3 | 6 | | 38 | 35 |
| 50 | 3 | 3.4 | 5.5 | 11.8 | 13.3 | 2 | 1.5 | | 38 | 35 |
| 51 | 3 | 10.5 | 8.7 | 16.5 | 18.6 | 8.5 | 8.3 | | 38 | 35 |
| 52 | 3 | 0.9 | 3.6 | 9.8 | 9.4 | -0.4 | -1 | | 38 | 35 |
| 53 | 3 | 25.7 | 12.3 | 26.7 | 27.6 | 21.7 | 21.9 | | 38 | 35 |
| 54 | 3 | 18.7 | 9.8 | 20.8 | 22.1 | 14.5 | 14.8 | | 38 | 35 |
| 55 | 3 | 1.4 | 3.7 | 10.5 | 6.6 | 0.7 | 0 | | 35 | 35 |
| 56 | 3 | 21.5 | 11 | 23 | 23.7 | 19 | 19 | | 38 | 35 |

**Table 18B** *Detailed Predicted A–Weighted Received Sound Levels for Individual Receivers Stage 2 Year 5 3m/s SE Wind - Recommended Sound Attenuation Installed for Year 5*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation plus Rail loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 35.6 | 55.3 | 55.3 | 35.6 | 36.3 | 30 | N/A | 35 | 35 |
| 1 | 1 | 32.6 | 56.1 | 56.1 | 32.7 | 33.5 | 28.1 | | 35 | 35 |
| 2 | 1 | 30.5 | 56.1 | 56.1 | 30.7 | 32 | 26.8 | | 35 | 35 |
| 3 | 1 | 29.7 | 56.3 | 56.3 | 29.8 | 30.9 | 26.1 | | 35 | 35 |
| 4 | 1 | 29.4 | 56.6 | 56.6 | 29.5 | 30.6 | 25.9 | | 35 | 35 |
| 5 | 1 | 29 | 56.5 | 56.5 | 29.2 | 29.9 | 25.5 | | 35 | 35 |
| 6 | 1 | 28.6 | 56.2 | 56.2 | 28.8 | 29.6 | 25.1 | | 35 | 35 |
| 7 | 1 | 28.3 | 56.3 | 56.3 | 28.5 | 29.1 | 24.9 | | 35 | 35 |
| 8 | 1 | 27.8 | 55.8 | 55.9 | 28 | 28.8 | 24.2 | | 35 | 35 |
| 9 | 1 | 27.6 | 55.5 | 55.5 | 27.8 | 28.5 | 23.9 | | 35 | 35 |
| 10 | 1 | 26.8 | 54.5 | 54.5 | 27 | 27.9 | 22.9 | | 35 | 35 |
| 11 | | 24.5 | 32 | 33.1 | 28.6 | 21.8 | 23.4 | | 35 | 35 |
| 12 | 1 | 24.9 | 33 | 33.8 | 26.8 | 24.5 | 22.7 | | 35 | 35 |
| 13 | 1 | 30.1 | 39.1 | 39.7 | 30.5 | 30.5 | 24.7 | | 35 | 35 |
| 14 | 1 | 25 | 49 | 49.1 | 25.4 | 26 | 22.1 | | 35 | 35 |
| 15 | 1 | 25.7 | 50.1 | 50.2 | 26 | 26.7 | 22 | | 35 | 35 |
| 16 | 1 | 25.6 | 51.8 | 51.9 | 25.9 | 26.2 | 21.6 | | 35 | 35 |
| 17 | 1 | 25.4 | 53.7 | 53.7 | 25.7 | 25.6 | 21.6 | | 35 | 35 |
| 18 | 1 | 24.6 | 55.3 | 55.3 | 24.9 | 23.9 | 22 | | 35 | 35 |
| 19 | 1 | 26.7 | 53 | 53 | 26.9 | 28.1 | 23.2 | | 35 | 35 |
| 20 | 1 | 27.1 | 51.1 | 51.2 | 27.2 | 27.7 | 23.2 | | 35 | 35 |
| 21 | 1 | 25 | 45.1 | 45.2 | 25.1 | 25.4 | 22.1 | | 35 | 35 |
| 22 | 1 | 27.8 | 49.7 | 49.7 | 27.9 | 28 | 24 | | 35 | 35 |
| 23 | 1 | 31.5 | 42.1 | 42.5 | 31.5 | 31.8 | 24.4 | | 35 | 35 |
| 24 | 1 | 16.4 | 29.9 | 30.2 | 16.7 | 16.4 | 14.9 | | 35 | 35 |
| 25 | 1 | 8.4 | 19.3 | 19.8 | 9.6 | 8.5 | 6 | | 35 | 35 |
| 26 | 1 | 18.4 | 22.3 | 28.4 | 19.5 | 18.6 | 15.2 | | 35 | 35 |
| 27 | 1 | -1.1 | 6.4 | 8.5 | 2.1 | -1 | -3 | | 35 | 35 |
| 28 | 1 | 1.4 | 9.6 | 11 | 3.7 | 1.4 | -0.4 | | 35 | 35 |
| 29 | 3 | 6.5 | 7.7 | 15.2 | 12.3 | 5.1 | 3.9 | | 35 | 35 |
| 30 | 3 | 6.3 | 7.1 | 14.7 | 13.4 | 4.7 | 3.6 | | 35 | 35 |
| 31 | 3 | 6.7 | 8.2 | 14.9 | 14.8 | 4.8 | 3.8 | | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation plus Rail loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 32 | 2 | 7.2 | 9.6 | 15.9 | 13.8 | 5.6 | 4.6 | | 35 | 35 |
| 33 | 2 | 8 | 10.3 | 16.7 | 13.4 | 6.5 | 5.5 | | 35 | 35 |
| 34 | 2 | 9.6 | 12 | 18.5 | 14.2 | 8.2 | 7.2 | | 35 | 35 |
| 34 A | 2 | 9.8 | 12.3 | 19 | 14 | 8.5 | 7.5 | | 35 | 35 |
| 35 | 2 | 8 | 10.8 | 17.2 | 11.5 | 7.5 | 5.6 | | 35 | 35 |
| 36 | 2 | 5.3 | 8.8 | 14.5 | 9.2 | 4.8 | 2.9 | | 35 | 35 |
| 37 | 2 | 3.9 | 8.5 | 12.7 | 7.7 | 3.6 | 1.2 | | 35 | 35 |
| 38 | 2 | -0.7 | 4.1 | 9 | 3.5 | -1 | -3.1 | | 35 | 35 |
| 39 | 3 | -4.1 | 1.6 | 5.3 | -4.1 | -4.2 | -6.3 | | 35 | 35 |
| 40 | 3 | 26.5 | 31.2 | 33 | 31.4 | 21.1 | 25.9 | | 38 | 35 |
| 41 | 3 | 29.6 | 26.9 | 32.3 | 34.1 | 23.1 | 28.3 | | 38 | 35 |
| 42 | 3 | 34.5 | 26.7 | 35.7 | 38.9 | 27.5 | 33.3 | | 38 | 35 |
| 43 | 3 | 33.7 | 22.9 | 34.6 | 36.1 | 29.1 | 31.4 | | 38 | 35 |
| 44 | 3 | 32.6 | 19.9 | 33.4 | 34.8 | 30.2 | 31.1 | | 38 | 35 |
| 45 | 3 | 35.6 | 20.5 | 36.2 | 38 | 34.1 | 34.5 | | 38 | 35 |
| 46 | 3 | 33.1 | 19.2 | 33.9 | 35.2 | 31.3 | 31.6 | | 38 | 35 |
| 47 | 3 | 32.8 | 18.6 | 33.5 | 34.6 | 30.9 | 31.3 | | 38 | 35 |
| 48 | 3 | 24.9 | 17.6 | 27.5 | 32.3 | 19.7 | 21.3 | | 38 | 35 |
| 49 | 3 | 14.3 | 14.9 | 20.9 | 24.4 | 11.7 | 11.3 | | 38 | 35 |
| 50 | 3 | 10.1 | 12 | 17.9 | 20.1 | 7.8 | 7.1 | | 38 | 35 |
| 51 | 3 | 16.5 | 14.7 | 22.1 | 25.2 | 13.7 | 13.5 | | 38 | 35 |
| 52 | 3 | 7.8 | 10.3 | 16.1 | 16.4 | 5.7 | 4.9 | | 38 | 35 |
| 53 | 3 | 29.6 | 17.5 | 30.6 | 32 | 24.6 | 25.4 | | 38 | 35 |
| 54 | 3 | 24.2 | 15.4 | 26 | 27.9 | 18.9 | 19.8 | | 38 | 35 |
| 55 | 3 | 7.7 | 10.5 | 16.8 | 12 | 6.8 | 5.2 | | 35 | 35 |
| 56 | 3 | 25.1 | 16.2 | 26.7 | 28.1 | 22.2 | 22.2 | | 38 | 35 |

**Table 18C** *Detailed Predicted A–Weighted Received Sound Levels for Individual Receivers Stage 2 Year 5 3m/s West Wind - Recommended Sound Attenuation Installed for Year 5*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No Wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 34.3 | 55.1 | 55.1 | 34.6 | 33 | 31.6 | N/A | 35 | 35 |
| 1 | 1 | 31.7 | 56.1 | 56.1 | 32.1 | 30.4 | 29.1 | | 35 | 35 |
| 2 | 1 | 29.3 | 56.1 | 56.1 | 29.9 | 28.8 | 27.1 | | 35 | 35 |
| 3 | 1 | 28 | 56.3 | 56.3 | 28.8 | 27.6 | 25.5 | | 35 | 35 |
| 4 | 1 | 27.7 | 56.6 | 56.6 | 28.5 | 27.2 | 25.4 | | 35 | 35 |
| 5 | 1 | 27 | 56.5 | 56.5 | 27.9 | 26.6 | 24.4 | | 35 | 35 |
| 6 | 1 | 26.9 | 56.1 | 56.1 | 27.8 | 26.2 | 24.5 | | 35 | 35 |
| 7 | 1 | 26.8 | 56.2 | 56.2 | 27.7 | 25.7 | 24.6 | | 35 | 35 |
| 8 | 1 | 25.5 | 55.7 | 55.7 | 26.6 | 25.4 | 22.7 | | 35 | 35 |
| 9 | 1 | 25.8 | 55.4 | 55.4 | 26.9 | 25.1 | 23.4 | | 35 | 35 |
| 10 | 1 | 24.1 | 54.3 | 54.3 | 25.4 | 24.5 | 20.9 | | 35 | 35 |
| 11 | | 22.3 | 31.6 | 32.2 | 27.4 | 15 | 22 | | 35 | 35 |
| 12 | 1 | 20.6 | 32 | 32.4 | 24.5 | 17.1 | 19.8 | | 35 | 35 |
| 13 | 1 | 23.8 | 38.4 | 38.6 | 26.6 | 23.2 | 21 | | 35 | 35 |
| 14 | 1 | 21.9 | 48.9 | 48.9 | 23.8 | 22.2 | 19.8 | | 35 | 35 |
| 15 | 1 | 23.6 | 49.9 | 49.9 | 24.9 | 23.1 | 21.3 | | 35 | 35 |
| 16 | 1 | 23.8 | 51.8 | 51.8 | 25 | 22.9 | 21.1 | | 35 | 35 |
| 17 | 1 | 24.1 | 53.9 | 53.9 | 25.1 | 22.5 | 21.6 | | 35 | 35 |
| 18 | 1 | 24.4 | 54.8 | 54.8 | 25.6 | 21.4 | 22.8 | | 35 | 35 |
| 19 | 1 | 26.1 | 52.5 | 52.5 | 26.9 | 25.9 | 23.7 | | 35 | 35 |
| 20 | 1 | 26.5 | 50.4 | 50.5 | 27.2 | 25.8 | 23.8 | | 35 | 35 |
| 21 | 1 | 24.4 | 44.3 | 44.4 | 25.2 | 24.5 | 21.7 | | 35 | 35 |
| 22 | 1 | 27.6 | 48.9 | 49 | 28.1 | 26.6 | 24.8 | | 35 | 35 |
| 23 | 1 | 35 | 41 | 42 | 35.1 | 35 | 27.2 | | 35 | 35 |
| 24 | 1 | 21.6 | 30.2 | 30.9 | 22.2 | 21.5 | 18.5 | | 35 | 35 |
| 25 | 1 | 15.1 | 22.4 | 23.7 | 16.6 | 15 | 11.8 | | 35 | 35 |
| 26 | 1 | 26.4 | 28.9 | 37.1 | 27.5 | 25.9 | 22.7 | | 35 | 35 |
| 27 | 1 | 7.8 | 13.6 | 16.2 | 10.6 | 7.6 | 4.6 | | 35 | 35 |
| 28 | 1 | 10.8 | 17.2 | 19 | 12.7 | 10.6 | 7.4 | | 35 | 35 |
| 29 | 3 | 1.9 | 2.8 | 10.6 | 9.5 | 0.4 | -0.4 | | 35 | 35 |
| 30 | 3 | 1 | 1.8 | 9.6 | 9.9 | -0.5 | -1.3 | | 35 | 35 |
| 31 | 3 | 1.1 | 2.9 | 9.6 | 11.1 | -0.7 | -1.3 | | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No Wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 32 | 2 | 2.1 | 4.6 | 10.9 | 10.5 | 0.5 | -0.2 | | 35 | 35 |
| 33 | 2 | 3.5 | 5.6 | 12.2 | 10.9 | 1.9 | 1.2 | | 35 | 35 |
| 34 | 2 | 6.2 | 7.8 | 14.7 | 13 | 4.4 | 3.8 | | 35 | 35 |
| 34 A | 2 | 7.9 | 8.7 | 16 | 14.1 | 5.9 | 5.4 | | 35 | 35 |
| 35 | 2 | 9.9 | 10.2 | 18.5 | 14.8 | 8.2 | 7.3 | | 35 | 35 |
| 36 | 2 | 7.9 | 9.6 | 16.9 | 13.1 | 6.4 | 5.4 | | 35 | 35 |
| 37 | 2 | 7.4 | 11.2 | 16.2 | 12.3 | 6.4 | 4.6 | | 35 | 35 |
| 38 | 2 | 4.6 | 8.4 | 14.1 | 9.4 | 3.7 | 1.8 | | 35 | 35 |
| 39 | 3 | 3.1 | 7.6 | 12 | 3.1 | 2.6 | 0.2 | | 35 | 35 |
| 40 | 3 | 24.7 | 30.9 | 32.1 | 30.3 | 15.2 | 24.4 | | 38 | 35 |
| 41 | 3 | 20.7 | 26.6 | 28.1 | 28.1 | 16.2 | 19.2 | | 38 | 35 |
| 42 | 3 | 25.6 | 26.4 | 29.4 | 32.5 | 20.9 | 24.4 | | 38 | 35 |
| 43 | 3 | 23.7 | 15.6 | 25.2 | 28.2 | 20.6 | 22 | | 38 | 35 |
| 44 | 3 | 22.4 | 12.7 | 23.8 | 26.4 | 20.6 | 21.4 | | 38 | 35 |
| 45 | 3 | 26.5 | 13.9 | 27.4 | 31 | 25.3 | 25.8 | | 38 | 35 |
| 46 | 3 | 22.6 | 12.4 | 24 | 27 | 21 | 21.3 | | 38 | 35 |
| 47 | 3 | 22.7 | 11.9 | 23.9 | 26.4 | 20.9 | 21.6 | | 38 | 35 |
| 48 | 3 | 17.5 | 11.6 | 20.6 | 27 | 13.1 | 15.1 | | 38 | 35 |
| 49 | 3 | 7.7 | 9.1 | 14.8 | 19.9 | 5.6 | 5.6 | | 38 | 35 |
| 50 | 3 | 3.9 | 6.5 | 12 | 16 | 1.9 | 1.6 | | 38 | 35 |
| 51 | 3 | 9.2 | 8.6 | 15.3 | 19.9 | 7 | 7.1 | | 38 | 35 |
| 52 | 3 | 2 | 4.9 | 10.6 | 12.6 | 0.1 | -0.4 | | 38 | 35 |
| 53 | 3 | 19.7 | 10.9 | 21.4 | 24.3 | 15.5 | 16.6 | | 38 | 35 |
| 54 | 3 | 15.1 | 8.8 | 17.7 | 20.8 | 10.9 | 11.9 | | 38 | 35 |
| 55 | 3 | 8.2 | 8.4 | 16 | 14.2 | 6.2 | 5.5 | | 35 | 35 |
| 56 | 3 | 14.7 | 9.2 | 17.5 | 19.9 | 12.5 | 12.5 | | 38 | 35 |

**Table 19** *Summary Results Predicted A–Weighted Received Sound Levels Stage 3 Year 5-10*

| Operation Scenario | NAG1 Wind 45 Deg 3m/s | NAG2 Wind 270 Deg 3m/s | NAG3 wind 135 Deg 3m/s |
|---|---|---|---|
| Stripping Lot 21 | 32-38 | 15-25 | 30-38 |
| Daytime quarry operations | 30-37 | <30 | 25-30 |
| Rail loading only (night time) F Class Temperature inversion no wind | 50-54 | <30 | <30 |
| Daytime quarry operation plus rail loading | 50-54 | <25 | 30-35 |
| Daytime quarry operations plus campaign crushing using mobile jaw crusher3 | 30-36 | <30 | 30-37 |
| Evening processing operations all plant | 29-36 | <30 | <30 |
| Early morning truck loading and product despatch4 | 25-30 | <30 | <30 |

**Table 19A** *Detailed Predicted A–Weighted Received Sound Levels for individual Receivers Stage 3 Year 5-10 3m/s NE Wind - Recommended Sound Attenuation Installed*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (Night time) F Class Inversion No wind | Daytime Quarry Operation plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 38.6 | 54.2 | 54.1 | 38.6 | 38.1 | 32.3 | 43.8 | 35 | 35 |
| 1 | 1 | 37 | 54.1 | 54 | 37.1 | 36.5 | 31.1 | 43.2 | 35 | 35 |
| 2 | 1 | 34.3 | 53.7 | 53.5 | 34.4 | 34.9 | 28.9 | 35.8 | 35 | 35 |
| 3 | 1 | 34.4 | 53.7 | 53.7 | 34.6 | 34.2 | 29 | 37.3 | 35 | 35 |
| 4 | 1 | 34.4 | 53.9 | 53.8 | 34.5 | 33.8 | 29 | 38.7 | 35 | 35 |
| 5 | 1 | 34.3 | 53.9 | 53.9 | 34.4 | 33.5 | 28.9 | 38.8 | 35 | 35 |
| 6 | 1 | 33.9 | 53.4 | 53.5 | 34.1 | 33.2 | 28.7 | 37.8 | 35 | 35 |
| 7 | 1 | 33.6 | 53.5 | 53.5 | 33.8 | 32.8 | 28.4 | 37.8 | 35 | 35 |

[3] Mobile jaw crusher located in south western corner of western pit

[4] F Class temperature inversion

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (Night time) F Class Inversion No wind | Daytime Quarry Operation plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 8 | 1 | 33.3 | 53 | 53.1 | 33.5 | 32.4 | 27.9 | 37.8 | 35 | 35 |
| 9 | 1 | 32.8 | 52.6 | 52.8 | 33.1 | 32.1 | 27.4 | 35.9 | 35 | 35 |
| 10 | 1 | 32.8 | 51.9 | 52.1 | 33 | 32.1 | 27.4 | 36.4 | 35 | 35 |
| 11 | | 26.1 | 30.4 | 31.4 | 31.8 | 22.2 | 24.2 | 26.6 | 35 | 35 |
| 12 | 1 | 26.1 | 31.9 | 33.1 | 29.7 | 25 | 23.6 | 26.6 | 35 | 35 |
| 13 | 1 | 30.1 | 38 | 38.8 | 31.5 | 29.9 | 26 | 31.2 | 35 | 35 |
| 14 | 1 | 30.1 | 46.6 | 47.2 | 30.5 | 29.5 | 25.3 | 33.2 | 35 | 35 |
| 15 | 1 | 31.8 | 47.7 | 48.4 | 32.1 | 30.7 | 26.5 | 36.3 | 35 | 35 |
| 16 | 1 | 32.2 | 49.1 | 49.8 | 32.5 | 30.9 | 26.7 | 39.7 | 35 | 35 |
| 17 | 1 | 32.4 | 50.6 | 51.3 | 32.6 | 30.5 | 27.1 | 39.7 | 35 | 35 |
| 18 | 1 | 33.3 | 55.9 | 56.2 | 33.5 | 29.9 | 27.9 | 40.8 | 35 | 35 |
| 19 | 1 | 34.4 | 57.5 | 57.8 | 34.5 | 33.1 | 28.4 | 41.1 | 35 | 35 |
| 20 | 1 | 34.1 | 53.7 | 53.8 | 34.2 | 32.4 | 27.8 | 41.1 | 35 | 35 |
| 21 | 1 | 31.1 | 44.6 | 44.3 | 31.3 | 30.2 | 26.3 | 33 | 35 | 35 |
| 22 | 1 | 35.3 | 53 | 52.6 | 35.4 | 32.7 | 28.6 | 39.8 | 35 | 35 |
| 23 | 1 | 39.6 | 47.6 | 45.7 | 39.6 | 38.1 | 29.1 | 42.4 | 35 | 35 |
| 24 | 1 | 19.7 | 31.2 | 27.1 | 20.2 | 19.4 | 15.3 | 20.1 | 35 | 35 |
| 25 | 1 | 10.8 | 20.8 | 16.5 | 12 | 9.8 | 6.4 | 11.7 | 35 | 35 |
| 26 | 1 | 21.3 | 29.6 | 24.1 | 22.7 | 18.6 | 15.5 | 26.5 | 35 | 35 |
| 27 | 1 | 2.7 | 12.9 | 8 | 5.1 | 1.3 | -2 | 3.7 | 35 | 35 |
| 28 | 1 | 8 | 16.8 | 13.5 | 9.5 | 7.2 | 3 | 8.6 | 35 | 35 |
| 29 | 3 | 0 | 7.5 | 3.3 | 5.5 | -3.5 | -6.6 | 1.6 | 35 | 35 |
| 30 | 3 | -0.3 | 6.9 | 3 | 6.5 | -4.2 | -7.9 | 1.3 | 35 | 35 |
| 31 | 3 | 0.1 | 8 | 3.8 | 7.9 | -3.7 | -6.6 | 1.7 | 35 | 35 |
| 32 | 2 | 0.9 | 9.4 | 4.9 | 7 | -2.9 | -5.8 | 2.5 | 35 | 35 |
| 33 | 2 | 1.7 | 10.1 | 5.6 | 7 | -2 | -4.7 | 3.3 | 35 | 35 |
| 34 | 2 | 3.4 | 11.8 | 7.2 | 8.2 | -0.4 | -3.1 | 5.1 | 35 | 35 |
| 34 A | 2 | 3.9 | 12 | 7.6 | 8.5 | -0.1 | -2.7 | 5.7 | 35 | 35 |
| 35 | 2 | 5.7 | 11.7 | 8.2 | 8.8 | 1.2 | -0.6 | 7.3 | 35 | 35 |
| 36 | 2 | 3 | 10.2 | 5.9 | 6.5 | -1.2 | -3.1 | 4.5 | 35 | 35 |
| 37 | 2 | 1.5 | 11.2 | 5.6 | 5.1 | -1.7 | -4.2 | 2.7 | 35 | 35 |
| 38 | 2 | -0.8 | 8.1 | 2.8 | 2.5 | -4.3 | -6.3 | 0.6 | 35 | 35 |
| 39 | 3 | -2.8 | 7.3 | 1.5 | -2.8 | -5.5 | -8 | -1.6 | 35 | 35 |
| 40 | 3 | 27.6 | 29.5 | 31.1 | 34.3 | 21.1 | 26.3 | 28 | 38 | 35 |
| 41 | 3 | 30.7 | 25.6 | 31.7 | 36.1 | 18.7 | 26.8 | 34 | 38 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (Night time) F Class Inversion No wind | Daytime Quarry Operation plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 42 | 3 | 33.6 | 25.2 | 34 | 38.4 | 17.7 | 30.1 | 39.1 | 38 | 35 |
| 43 | 3 | 30.6 | 22 | 31 | 35.3 | 13.6 | 23.2 | 34.3 | 38 | 35 |
| 44 | 3 | 27.4 | 19.1 | 27.6 | 30.8 | 10 | 16.6 | 29.1 | 38 | 35 |
| 45 | 3 | 26 | 19.8 | 26.4 | 32.3 | 11 | 14.2 | 28.5 | 38 | 35 |
| 46 | 3 | 25.2 | 18.6 | 25.6 | 29.4 | 9.5 | 13.2 | 27 | 38 | 35 |
| 47 | 3 | 24.4 | 17.9 | 24.8 | 28.8 | 8.8 | 11.7 | 26.4 | 38 | 35 |
| 48 | 3 | 17.9 | 17.6 | 18.9 | 23.9 | 9.3 | 8.2 | 19.2 | 38 | 35 |
| 49 | 3 | 6.9 | 14.8 | 11 | 17.2 | 3.1 | 0.5 | 8 | 38 | 35 |
| 50 | 3 | 3 | 11.9 | 7.5 | 13.1 | -0.7 | -3.6 | 4.4 | 38 | 35 |
| 51 | 3 | 9.2 | 14.8 | 12.1 | 17.9 | 4.3 | 1.7 | 10.4 | 38 | 35 |
| 52 | 3 | 1 | 10.1 | 5.5 | 9.6 | -2.7 | -5.7 | 2.4 | 38 | 35 |
| 53 | 3 | 24.2 | 17.1 | 24.4 | 27.4 | 7.4 | 9.3 | 26.5 | 38 | 35 |
| 54 | 3 | 17.8 | 15.1 | 18.4 | 21.9 | 5.1 | 5.6 | 18.6 | 38 | 35 |
| 55 | 3 | 2.9 | 10.8 | 6.3 | 7.5 | -1.2 | -3.5 | 4.5 | 35 | 35 |
| 56 | 3 | 20.3 | 15.8 | 20.7 | 23.8 | 5.5 | 4.1 | 24.9 | 38 | 35 |

**Table 19B** *Detailed Predicted A–Weighted Received Sound Levels for individual Receivers Stage 3 Year 5-10 3m/s SE Wind - Recommended Sound Attenuation Installed*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading only (night time) F Class Inversion No wind | Daytime Quarry Operation plus Rail loading | Daytime Quarry operations plus Campaign crushing using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 36 | 54.2 | 54 | 36 | 36.5 | 30.1 | 38.8 | 35 | 35 |
| 1 | 1 | 34 | 54.1 | 53.9 | 34 | 34.4 | 28.3 | 37.8 | 35 | 35 |
| 2 | 1 | 31.8 | 53.7 | 53.4 | 31.9 | 32.8 | 26.6 | 32.4 | 35 | 35 |
| 3 | 1 | 31.2 | 53.7 | 53.5 | 31.3 | 31.7 | 26 | 32.7 | 35 | 35 |
| 4 | 1 | 30.8 | 53.9 | 53.7 | 30.9 | 31.1 | 25.8 | 33.4 | 35 | 35 |
| 5 | 1 | 30.6 | 53.9 | 53.7 | 30.7 | 30.7 | 25.5 | 33.4 | 35 | 35 |
| 6 | 1 | 30.2 | 53.4 | 53.2 | 30.3 | 30.3 | 25.1 | 32.5 | 35 | 35 |
| 7 | 1 | 29.7 | 53.5 | 53.3 | 29.8 | 29.8 | 24.7 | 32.4 | 35 | 35 |
| 8 | 1 | 29.4 | 53 | 52.8 | 29.5 | 29.4 | 24.3 | 32.3 | 35 | 35 |
| 9 | 1 | 29 | 52.6 | 52.4 | 29.1 | 29.1 | 23.8 | 30.8 | 35 | 35 |
| 10 | 1 | 28.8 | 51.9 | 51.6 | 28.9 | 28.9 | 23.6 | 31.1 | 35 | 35 |
| 11 | | 23.6 | 30.4 | 31.9 | 28.1 | 22.1 | 20.8 | 24 | 35 | 35 |
| 12 | 1 | 24.4 | 31.9 | 32.9 | 26.6 | 24.5 | 21.3 | 24.7 | 35 | 35 |
| 13 | 1 | 28.3 | 38 | 38.5 | 29 | 28.8 | 24 | 29 | 35 | 35 |
| 14 | 1 | 26.3 | 46.6 | 46.1 | 26.6 | 26.4 | 21.7 | 28.3 | 35 | 35 |
| 15 | 1 | 27.5 | 47.7 | 47 | 27.6 | 27.2 | 22.3 | 30.7 | 35 | 35 |
| 16 | 1 | 27.6 | 49.1 | 48.1 | 27.7 | 27.2 | 22.3 | 33.4 | 35 | 35 |
| 17 | 1 | 27.4 | 50.6 | 49.3 | 27.6 | 26.7 | 22.4 | 33.3 | 35 | 35 |
| 18 | 1 | 27.7 | 55.9 | 54.2 | 27.9 | 25.9 | 23.2 | 33.9 | 35 | 35 |
| 19 | 1 | 29.1 | 57.5 | 54.8 | 29.2 | 29.1 | 24 | 34.3 | 35 | 35 |
| 20 | 1 | 28.8 | 53.7 | 50.7 | 28.9 | 28.6 | 23.6 | 34.1 | 35 | 35 |
| 21 | 1 | 26.4 | 44.6 | 41.3 | 26.5 | 26.2 | 22.3 | 27.4 | 35 | 35 |
| 22 | 1 | 29.7 | 53 | 49.5 | 29.8 | 28.9 | 24.4 | 33 | 35 | 35 |
| 23 | 1 | 32.4 | 47.6 | 40.7 | 32.4 | 31.8 | 24.3 | 34.4 | 35 | 35 |
| 24 | 1 | 15 | 31.2 | 24.7 | 15.6 | 14.8 | 11.9 | 15.2 | 35 | 35 |
| 25 | 1 | 8.4 | 20.8 | 15.6 | 9.6 | 7.8 | 4.7 | 8.7 | 35 | 35 |
| 26 | 1 | 22.2 | 29.6 | 25.8 | 23.3 | 20.8 | 16.4 | 26.2 | 35 | 35 |
| 27 | 1 | 1.1 | 12.9 | 7.4 | 3.5 | 0.1 | -3.1 | 1.6 | 35 | 35 |
| 28 | 1 | 3.3 | 16.8 | 10.5 | 5.2 | 2.7 | -0.6 | 3.6 | 35 | 35 |
| 29 | 3 | 7.4 | 7.5 | 10.5 | 12.9 | 4 | 0.2 | 9.2 | 35 | 35 |
| 30 | 3 | 6.8 | 6.9 | 10 | 13.7 | 3.1 | -1.2 | 8.7 | 35 | 35 |
| 31 | 3 | 6.9 | 8 | 10.6 | 15 | 3.3 | -0.3 | 8.6 | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading only (night time) F Class Inversion No wind | Daytime Quarry Operation plus Rail loading | Daytime Quarry operations plus Campaign crushing using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 32 | 2 | 7.9 | 9.4 | 11.8 | 14.1 | 4.2 | 0.6 | 9.7 | 35 | 35 |
| 33 | 2 | 8.8 | 10.1 | 12.6 | 14 | 5.3 | 1.9 | 10.7 | 35 | 35 |
| 34 | 2 | 10.5 | 11.8 | 14.3 | 14.9 | 6.9 | 3.5 | 12.5 | 35 | 35 |
| 34 A | 2 | 11.1 | 12 | 14.7 | 14.9 | 7.2 | 3.8 | 13.1 | 35 | 35 |
| 35 | 2 | 11.6 | 11.7 | 14.2 | 13.7 | 8 | 5.1 | 13.7 | 35 | 35 |
| 36 | 2 | 8.6 | 10.2 | 11.6 | 11 | 5.4 | 2.3 | 10.5 | 35 | 35 |
| 37 | 2 | 6.7 | 11.2 | 10.7 | 9.2 | 4.5 | 0.8 | 8.1 | 35 | 35 |
| 38 | 2 | 2.7 | 8.1 | 6.4 | 5.2 | 0.1 | -2.9 | 4.2 | 35 | 35 |
| 39 | 3 | -1.3 | 7.3 | 3.3 | -1.3 | -3.2 | -6.4 | -0.2 | 35 | 35 |
| 40 | 3 | 24.5 | 29.5 | 31.4 | 30.7 | 21.3 | 22.2 | 24.9 | 38 | 35 |
| 41 | 3 | 29.3 | 25.6 | 31.1 | 34.3 | 19 | 25.7 | 32.8 | 38 | 35 |
| 42 | 3 | 33.1 | 25.2 | 33.9 | 37.6 | 18.6 | 30.2 | 38.6 | 38 | 35 |
| 43 | 3 | 31.4 | 22 | 31.9 | 35.8 | 15.3 | 26.1 | 34.7 | 38 | 35 |
| 44 | 3 | 29 | 19.1 | 29.5 | 32.9 | 12.8 | 21.8 | 30.5 | 38 | 35 |
| 45 | 3 | 27.9 | 19.8 | 28.6 | 35.3 | 14.4 | 21.7 | 30 | 38 | 35 |
| 46 | 3 | 27.8 | 18.6 | 28.4 | 32.8 | 13.1 | 20 | 29.3 | 38 | 35 |
| 47 | 3 | 27.5 | 17.9 | 28 | 32.7 | 12.8 | 18.8 | 29.2 | 38 | 35 |
| 48 | 3 | 24.2 | 17.6 | 25.1 | 30.4 | 15.3 | 16.4 | 25.2 | 38 | 35 |
| 49 | 3 | 13 | 14.8 | 17.2 | 23.8 | 9.3 | 6.6 | 14.1 | 38 | 35 |
| 50 | 3 | 9.5 | 11.9 | 14 | 19.9 | 5.8 | 2.5 | 10.8 | 38 | 35 |
| 51 | 3 | 15.2 | 14.8 | 18.1 | 24.3 | 10.4 | 7.9 | 16.3 | 38 | 35 |
| 52 | 3 | 7.6 | 10.1 | 12.2 | 16.5 | 4.1 | 0.5 | 9.2 | 38 | 35 |
| 53 | 3 | 28.3 | 17.1 | 28.6 | 32.1 | 12.1 | 16.7 | 30.3 | 38 | 35 |
| 54 | 3 | 23.4 | 15.1 | 24 | 27.7 | 10.5 | 13.1 | 24.1 | 38 | 35 |
| 55 | 3 | 10 | 10.8 | 13.2 | 13.2 | 6.5 | 3 | 12.1 | 35 | 35 |
| 56 | 3 | 24.1 | 15.8 | 24.7 | 28.4 | 10.2 | 9.3 | 28.5 | 38 | 35 |

**Table 19C** *Detailed Predicted A –Weighted Received Sound Levels for Individual Receivers Stage 3 Year 5-10 3m/s West Wind - Recommended Sound Attenuation Installed*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation plus Rail Loading | Daytime Quarry Operations plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 33.9 | 54.2 | 53.3 | 34.2 | 33.9 | 28 | 37.5 | 35 | 35 |
| 1 | 1 | 31.7 | 54.1 | 53.2 | 32.1 | 31.6 | 26.1 | 36.3 | 35 | 35 |
| 2 | 1 | 29.2 | 53.7 | 52.8 | 29.8 | 29.7 | 24.1 | 30.1 | 35 | 35 |
| 3 | 1 | 28.6 | 53.7 | 52.9 | 29.2 | 28.6 | 23.5 | 30.6 | 35 | 35 |
| 4 | 1 | 28.3 | 53.9 | 53.1 | 28.8 | 28 | 23.3 | 31.5 | 35 | 35 |
| 5 | 1 | 28 | 53.9 | 53.1 | 28.6 | 27.5 | 23 | 31.5 | 35 | 35 |
| 6 | 1 | 27.6 | 53.4 | 52.6 | 28.2 | 27.1 | 22.6 | 30.5 | 35 | 35 |
| 7 | 1 | 27.1 | 53.5 | 52.6 | 27.8 | 26.6 | 22.3 | 30.5 | 35 | 35 |
| 8 | 1 | 26.7 | 53 | 52.1 | 27.3 | 26.2 | 21.5 | 30.3 | 35 | 35 |
| 9 | 1 | 26.3 | 52.6 | 51.7 | 27 | 25.8 | 21.3 | 28.6 | 35 | 35 |
| 10 | 1 | 26 | 51.9 | 50.8 | 26.7 | 25.6 | 20.8 | 28.8 | 35 | 35 |
| 11 | | 19.1 | 30.4 | 25.5 | 26.5 | 14.3 | 17.8 | 19.3 | 35 | 35 |
| 12 | 1 | 18.2 | 31.9 | 26.3 | 23.7 | 16.7 | 16.1 | 18.5 | 35 | 35 |
| 13 | 1 | 22.7 | 38 | 32.8 | 25.8 | 22.1 | 19.3 | 23.5 | 35 | 35 |
| 14 | 1 | 23.4 | 46.6 | 44.5 | 24.4 | 22.8 | 19 | 25.7 | 35 | 35 |
| 15 | 1 | 24.7 | 47.7 | 45.7 | 25.4 | 23.8 | 19.8 | 28.5 | 35 | 35 |
| 16 | 1 | 25.1 | 49.1 | 47.1 | 25.7 | 24 | 20 | 31.7 | 35 | 35 |
| 17 | 1 | 25.2 | 50.6 | 48.6 | 25.8 | 23.7 | 20.3 | 31.7 | 35 | 35 |
| 18 | 1 | 26.7 | 55.9 | 54.6 | 27.2 | 23.8 | 21.8 | 33.5 | 35 | 35 |
| 19 | 1 | 28.3 | 57.5 | 56 | 28.7 | 27.1 | 22.7 | 34.2 | 35 | 35 |
| 20 | 1 | 28.4 | 53.7 | 52.7 | 28.7 | 26.9 | 22.5 | 34.3 | 35 | 35 |
| 21 | 1 | 26.3 | 44.6 | 44.2 | 26.8 | 25.5 | 21.7 | 27.7 | 35 | 35 |
| 22 | 1 | 30 | 53 | 52.6 | 30.2 | 27.8 | 23.6 | 33.7 | 35 | 35 |
| 23 | 1 | 36.4 | 47.6 | 48.2 | 36.4 | 35 | 26.4 | 38.6 | 35 | 35 |
| 24 | 1 | 22.8 | 31.2 | 32.5 | 23.4 | 22.6 | 18.2 | 23 | 35 | 35 |
| 25 | 1 | 16.5 | 20.8 | 22.8 | 17.7 | 15.9 | 11.6 | 17 | 35 | 35 |
| 26 | 1 | 30.4 | 29.6 | 33.3 | 31.5 | 28 | 24 | 35.8 | 35 | 35 |
| 27 | 1 | 9.7 | 12.9 | 15 | 11.9 | 8.7 | 4.4 | 10.5 | 35 | 35 |
| 28 | 1 | 12.4 | 16.8 | 18.5 | 14.1 | 11.9 | 7.1 | 12.9 | 35 | 35 |
| 29 | 3 | 1.9 | 7.5 | 5.3 | 9.7 | -1.5 | -5.1 | 3.4 | 35 | 35 |
| 30 | 3 | 0.8 | 6.9 | 4.3 | 10 | -2.9 | -7 | 2.3 | 35 | 35 |
| 31 | 3 | 0.7 | 8 | 4.9 | 11.2 | -2.9 | -6 | 2 | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation plus Rail Loading | Daytime Quarry Operations plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 32 | 2 | 1.9 | 9.4 | 6.4 | 10.7 | -1.7 | -4.9 | 3.3 | 35 | 35 |
| 33 | 2 | 3.3 | 10.1 | 7.6 | 11.1 | -0.3 | -3.5 | 4.8 | 35 | 35 |
| 34 | 2 | 5.6 | 11.8 | 9.8 | 13.2 | 1.9 | -1.4 | 7.2 | 35 | 35 |
| 34 A | 2 | 7 | 12 | 10.9 | 14.3 | 2.7 | -0.5 | 8.7 | 35 | 35 |
| 35 | 2 | 11.3 | 11.7 | 13.8 | 15.7 | 6.4 | 3.5 | 13.5 | 35 | 35 |
| 36 | 2 | 9.8 | 10.2 | 12.5 | 14 | 5.3 | 2.4 | 12 | 35 | 35 |
| 37 | 2 | 9.6 | 11.2 | 13.5 | 13.3 | 6.6 | 3 | 11.4 | 35 | 35 |
| 38 | 2 | 7.7 | 8.1 | 11 | 10.8 | 4.5 | 1.4 | 9.7 | 35 | 35 |
| 39 | 3 | 5.8 | 7.3 | 9.8 | 5.8 | 3.5 | -0.1 | 7.3 | 35 | 35 |
| 40 | 3 | 21.3 | 29.5 | 25.6 | 29.2 | 13.6 | 20.5 | 21.5 | 38 | 35 |
| 41 | 3 | 19.9 | 25.6 | 22.4 | 28.3 | 10.5 | 15.8 | 22.7 | 38 | 35 |
| 42 | 3 | 23.4 | 25.2 | 24.6 | 31 | 10.2 | 20.5 | 27.8 | 38 | 35 |
| 43 | 3 | 20.5 | 22 | 21.7 | 28.2 | 7 | 15.3 | 23.4 | 38 | 35 |
| 44 | 3 | 18.2 | 19.1 | 19.2 | 24.9 | 4.5 | 11.9 | 19.5 | 38 | 35 |
| 45 | 3 | 18.5 | 19.8 | 19.8 | 29.3 | 6.4 | 15.1 | 20 | 38 | 35 |
| 46 | 3 | 17.5 | 18.6 | 18.6 | 25.7 | 5.1 | 11.8 | 18.8 | 38 | 35 |
| 47 | 3 | 17.1 | 17.9 | 18.2 | 25.6 | 4.8 | 10.9 | 18.6 | 38 | 35 |
| 48 | 3 | 16 | 17.6 | 17.4 | 24.9 | 8 | 10.5 | 16.8 | 38 | 35 |
| 49 | 3 | 6.1 | 14.8 | 11 | 19.2 | 2.5 | 0.6 | 6.8 | 38 | 35 |
| 50 | 3 | 2.8 | 11.9 | 8.1 | 15.7 | -0.7 | -3.3 | 3.8 | 38 | 35 |
| 51 | 3 | 7.5 | 14.8 | 11.2 | 18.9 | 3.2 | 1.4 | 8.4 | 38 | 35 |
| 52 | 3 | 1.2 | 10.1 | 6.4 | 12.5 | -2.3 | -5.3 | 2.4 | 38 | 35 |
| 53 | 3 | 17.8 | 17.1 | 18.6 | 24.5 | 4.2 | 9.1 | 19.7 | 38 | 35 |
| 54 | 3 | 13.9 | 15.1 | 15.1 | 20.5 | 2.7 | 5.6 | 14.5 | 38 | 35 |
| 55 | 3 | 7.7 | 10.8 | 11.1 | 14.4 | 3.2 | -0.1 | 9.6 | 35 | 35 |
| 56 | 3 | 13.3 | 15.8 | 14.7 | 20.3 | 2.1 | 1.4 | 17.3 | 38 | 35 |

**Table 20** *Summary of Predicted A –Weighted Received Sound Levels Stage 4 Years 10-15*

| Operation Scenario | NAG1 Wind 45 Deg 3m/s | NAG2 Wind 270 Deg 3m/s | NAG3 wind 135 Deg 3m/s |
|---|---|---|---|
| Stripping Lot 21 | 38-44 | 10-35 | 30-38 |
| Daytime quarry operations | 30-38 | <20 | 20-30 |
| Rail loading only (night time) F Class temperature inversion no wind | 50-55 | <30 | <30 |
| Daytime quarry operation plus rail loading | 50-55 | <25 | 24-34 |
| Daytime quarry operations plus campaign crushing using mobile jaw crusher | 35-38 | <30 | 32-38 |
| Evening processing operations all plant | 30-38 | <30 | <20 |
| Early morning truck loading and product despatch | 28-32 | <30 | 25-30 |

**Table 20A** *Detailed Predicted A–Weighted Received Sound Levels for individual Receivers Stage 4 Year 10-15 3m/s NE Wind - Recommended Sound Attenuation Installed*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 38.4 | 51.8 | 51.9 | 39.1 | 38.9 | 31.2 | 41.3 | 35 | 35 |
| 1 | 1 | 35.4 | 51.7 | 51.7 | 36.4 | 36.2 | 29.8 | 39.8 | 35 | 35 |
| 2 | 1 | 33.8 | 51.2 | 51.2 | 34.9 | 35 | 28.9 | 35.6 | 35 | 35 |
| 3 | 1 | 33.1 | 51.3 | 51.2 | 34.3 | 34 | 28.4 | 38.3 | 35 | 35 |
| 4 | 1 | 32.8 | 51.4 | 51.4 | 33.9 | 33.5 | 28.2 | 38 | 35 | 35 |
| 5 | 1 | 32.5 | 51.3 | 51.3 | 33.7 | 33.2 | 28.1 | 37.8 | 35 | 35 |
| 6 | 1 | 32.1 | 50.8 | 50.9 | 33.3 | 32.9 | 27.8 | 37.5 | 35 | 35 |
| 7 | 1 | 31.9 | 50.9 | 51 | 33 | 32.5 | 27.4 | 37.3 | 35 | 35 |
| 8 | 1 | 31.5 | 50.5 | 50.6 | 32.7 | 32.2 | 26.9 | 37.1 | 35 | 35 |
| 9 | 1 | 31.3 | 50.1 | 50.3 | 32.5 | 32 | 26.9 | 37 | 35 | 35 |
| 10 | 1 | 30.4 | 49.1 | 49.4 | 31.6 | 31.4 | 25.8 | 36.6 | 35 | 35 |
| 11 | | 25.7 | 28.4 | 30.1 | 27.2 | 22.5 | 24.2 | 26.3 | 35 | 35 |
| 12 | 1 | 26.5 | 29.8 | 31.6 | 27.6 | 25.7 | 23.4 | 27.9 | 35 | 35 |
| 13 | 1 | 32.2 | 35.7 | 37.5 | 32.8 | 32.4 | 25.4 | 35.8 | 35 | 35 |
| 14 | 1 | 29.1 | 43.9 | 44.6 | 30.4 | 29.6 | 25.2 | 32.9 | 35 | 35 |
| 15 | 1 | 29.7 | 44.9 | 45.6 | 30.9 | 30.3 | 25.2 | 36.1 | 35 | 35 |
| 16 | 1 | 29.6 | 46.3 | 47 | 30.8 | 30.2 | 24.5 | 39 | 35 | 35 |
| 17 | 1 | 29.4 | 48.3 | 49 | 30.7 | 29.5 | 24.3 | 35 | 35 | 35 |
| 18 | 1 | 29.9 | 53.9 | 54.2 | 31.6 | 28.3 | 25.1 | 30.7 | 35 | 35 |
| 19 | 1 | 31.8 | 53.1 | 53.3 | 33.1 | 32.4 | 26.6 | 40.3 | 35 | 35 |
| 20 | 1 | 32.4 | 51.7 | 51.8 | 33.9 | 32.1 | 26.5 | 37.5 | 35 | 35 |
| 21 | 1 | 30.5 | 42.7 | 42.5 | 32.9 | 30.4 | 25.9 | 32.9 | 35 | 35 |
| 22 | 1 | 33.2 | 51.4 | 51 | 34.9 | 32.5 | 27.3 | 37.7 | 35 | 35 |
| 23 | 1 | 38.6 | 45.6 | 44 | 40.1 | 38.3 | 29.1 | 40.5 | 35 | 35 |
| 24 | 1 | 19.4 | 29.4 | 25.7 | 21.8 | 19.3 | 15.1 | 19.9 | 35 | 35 |
| 25 | 1 | 9.8 | 19.4 | 15.5 | 13.3 | 9.7 | 6 | 12.3 | 35 | 35 |
| 26 | 1 | 17.4 | 27.9 | 21.5 | 24.9 | 17.3 | 12.1 | 18.6 | 35 | 35 |
| 27 | 1 | 1.4 | 12.3 | 7.5 | 7.2 | 1.1 | -2.5 | 3.5 | 35 | 35 |
| 28 | 1 | 7.3 | 15.5 | 12.5 | 11 | 7.1 | 2.7 | 8.5 | 35 | 35 |
| 29 | 3 | -2.8 | 8.2 | 2.9 | 6.3 | -3.9 | -7.6 | -0.3 | 35 | 35 |
| 30 | 3 | -3.2 | 7.9 | 2.7 | 6.1 | -4.7 | -9.3 | -0.3 | 35 | 35 |
| 31 | 3 | -2.6 | 8.5 | 3.5 | 6.4 | -4.1 | -7.8 | -0.2 | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 32 | 2 | -1.9 | 9.6 | 4.4 | 7.2 | -3.4 | -7 | 0.8 | 35 | 35 |
| 33 | 2 | -1.2 | 10.3 | 5 | 7.9 | -2.5 | -5.9 | 1.6 | 35 | 35 |
| 34 | 2 | 0.4 | 11.8 | 6.5 | 9.7 | -0.9 | -4.4 | 3.1 | 35 | 35 |
| 34 A | 2 | 0.6 | 12.1 | 6.8 | 10 | -0.9 | -4.4 | 3.3 | 35 | 35 |
| 35 | 2 | 1.3 | 12.5 | 7.1 | 10.2 | -0.8 | -4.4 | 4.8 | 35 | 35 |
| 36 | 2 | -1.1 | 10.9 | 5 | 7.7 | -3 | -6.5 | 2.3 | 35 | 35 |
| 37 | 2 | -1.7 | 11.3 | 4.8 | 5.6 | -2.6 | -6 | 1.8 | 35 | 35 |
| 38 | 2 | -4.6 | 8.7 | 2.1 | 4.4 | -5.9 | -9.2 | -1.5 | 35 | 35 |
| 39 | 3 | -5.6 | 7.3 | 0.9 | 2 | -6.3 | -9.6 | -3 | 35 | 35 |
| 40 | 3 | 27.1 | 27.6 | 30 | 28.4 | 21.2 | 26.2 | 27.6 | 38 | 35 |
| 41 | 3 | 27.8 | 23.8 | 29 | 28.5 | 18.5 | 26.7 | 28.7 | 38 | 35 |
| 42 | 3 | 30.5 | 23.6 | 31.2 | 31.1 | 17.6 | 29.9 | 36.4 | 38 | 35 |
| 43 | 3 | 24.5 | 21.1 | 25.7 | 26.2 | 13.6 | 23.2 | 34.7 | 38 | 35 |
| 44 | 3 | 19.5 | 19.3 | 21.4 | 22.7 | 12.6 | 16.8 | 26.6 | 38 | 35 |
| 45 | 3 | 18.7 | 20.5 | 21.2 | 23.6 | 13.2 | 14.5 | 22.4 | 38 | 35 |
| 46 | 3 | 17.5 | 19.4 | 20 | 22 | 12.5 | 13.7 | 23.7 | 38 | 35 |
| 47 | 3 | 16.5 | 19.1 | 19.1 | 21.3 | 11.7 | 12.2 | 22.8 | 38 | 35 |
| 48 | 3 | 13.6 | 18.8 | 16.7 | 18.9 | 11.1 | 9.3 | 14.3 | 38 | 35 |
| 49 | 3 | 4.9 | 14.9 | 10.6 | 13.2 | 3.3 | 0.5 | 6.2 | 38 | 35 |
| 50 | 3 | 0.7 | 11.9 | 7.1 | 9.7 | -0.9 | -4.1 | 2.4 | 38 | 35 |
| 51 | 3 | 7.1 | 15.6 | 11.9 | 14.4 | 5.4 | 2.6 | 8.2 | 38 | 35 |
| 52 | 3 | -1.5 | 10.1 | 5 | 7.7 | -3.1 | -6.6 | 0.4 | 38 | 35 |
| 53 | 3 | 14.7 | 18.4 | 17.5 | 19.5 | 11 | 10.6 | 24.9 | 38 | 35 |
| 54 | 3 | 11.3 | 16.6 | 14.5 | 16.5 | 7.8 | 7 | 12.2 | 38 | 35 |
| 55 | 3 | -0.6 | 11 | 5.4 | 8.3 | -2.4 | -6 | 2.3 | 35 | 35 |
| 56 | 3 | 12 | 17 | 15.4 | 17.1 | 9.6 | 6.6 | 23.1 | 38 | 35 |

**Table 20B** *Detailed Predicted A–Weighted Received Sound Levels for individual Receivers Stage 4 Year 10-15 3m/s SE Wind - Recommended Sound Attenuation Installed*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | V7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 36.5 | 51.8 | 51.6 | 36.9 | 37.3 | 29.8 | 38.4 | 35 | 35 |
| 1 | 1 | 33.3 | 51.7 | 51.5 | 33.8 | 34.3 | 27.9 | 36.3 | 35 | 35 |
| 2 | 1 | 31.7 | 51.2 | 51 | 32.3 | 32.9 | 26.9 | 32.8 | 35 | 35 |
| 3 | 1 | 30.6 | 51.3 | 51 | 31.3 | 31.7 | 26.2 | 34.5 | 35 | 35 |
| 4 | 1 | 30.1 | 51.4 | 51.2 | 30.8 | 31.1 | 25.7 | 34 | 35 | 35 |
| 5 | 1 | 29.8 | 51.3 | 51.1 | 30.4 | 30.7 | 25.5 | 33.7 | 35 | 35 |
| 6 | 1 | 29.3 | 50.8 | 50.6 | 30 | 30.3 | 25.2 | 33.4 | 35 | 35 |
| 7 | 1 | 28.9 | 50.9 | 50.7 | 29.6 | 29.8 | 24.6 | 33.1 | 35 | 35 |
| 8 | 1 | 28.5 | 50.5 | 50.2 | 29.2 | 29.4 | 24.2 | 32.9 | 35 | 35 |
| 9 | 1 | 28.3 | 50.1 | 49.8 | 29 | 29.2 | 24.1 | 32.8 | 35 | 35 |
| 10 | 1 | 27.5 | 49.1 | 48.8 | 28.3 | 28.6 | 23.2 | 32.4 | 35 | 35 |
| 11 | | 23.4 | 28.4 | 30.1 | 24.9 | 22.5 | 20.9 | 24.1 | 35 | 35 |
| 12 | 1 | 25.1 | 29.8 | 31.2 | 25.8 | 25.2 | 21 | 26.2 | 35 | 35 |
| 13 | 1 | 31 | 35.7 | 37 | 31.3 | 31.4 | 23.7 | 33.7 | 35 | 35 |
| 14 | 1 | 25.9 | 43.9 | 43.3 | 26.8 | 26.6 | 22.1 | 28.8 | 35 | 35 |
| 15 | 1 | 26.2 | 44.9 | 44.1 | 27.1 | 27.2 | 21.9 | 31.6 | 35 | 35 |
| 16 | 1 | 25.8 | 46.3 | 45.3 | 26.7 | 26.8 | 21 | 34.2 | 35 | 35 |
| 17 | 1 | 25.4 | 48.3 | 46.9 | 26.4 | 26.1 | 20.7 | 30.2 | 35 | 35 |
| 18 | 1 | 25.5 | 53.9 | 52.1 | 26.8 | 25.1 | 21.5 | 26.1 | 35 | 35 |
| 19 | 1 | 27.8 | 53.1 | 50.7 | 28.6 | 28.8 | 23 | 34.9 | 35 | 35 |
| 20 | 1 | 28.1 | 51.7 | 48.7 | 29.2 | 28.5 | 22.9 | 32.2 | 35 | 35 |
| 21 | 1 | 26.2 | 42.7 | 39.4 | 27.8 | 26.4 | 22.2 | 27.8 | 35 | 35 |
| 22 | 1 | 28.9 | 51.4 | 47.7 | 30.1 | 29 | 23.8 | 32.4 | 35 | 35 |
| 23 | 1 | 30.3 | 42.6 | 37 | 31.8 | 30.4 | 25 | 30.8 | 35 | 35 |
| 24 | 1 | 14.8 | 29.4 | 23.1 | 15 | 13.1 | 10 | 13.3 | 35 | 35 |
| 25 | 1 | 7.9 | 19.4 | 14.4 | 10.5 | 7.9 | 4.8 | 8.9 | 35 | 35 |
| 26 | 1 | 20 | 27.9 | 23.9 | 25.5 | 20.2 | 14.4 | 20.7 | 35 | 35 |
| 27 | 1 | 0.3 | 12.3 | 6.7 | 5.1 | 0.2 | -3.1 | 1.4 | 35 | 35 |
| 28 | 1 | 2.8 | 15.5 | 9.3 | 6.4 | 2.7 | -0.6 | 3.4 | 35 | 35 |
| 29 | 3 | 4.7 | 8.2 | 9.9 | 13.2 | 3.6 | -0.9 | 7.2 | 35 | 35 |
| 30 | 3 | 4.1 | 7.9 | 9.5 | 12.8 | 2.7 | -2.6 | 6.9 | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | V7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 31 | 3 | 4.3 | 8.5 | 10.1 | 12.8 | 2.9 | -1.5 | 6.7 | 35 | 35 |
| 32 | 2 | 5.1 | 9.6 | 11.1 | 13.7 | 3.8 | -0.6 | 7.8 | 35 | 35 |
| 33 | 2 | 6 | 10.3 | 11.8 | 14.5 | 4.8 | 0.7 | 8.8 | 35 | 35 |
| 34 | 2 | 7.6 | 11.8 | 13.4 | 16.3 | 6.4 | 2.2 | 10.4 | 35 | 35 |
| 34 A | 2 | 7.9 | 12.1 | 13.7 | 16.7 | 6.6 | 2.2 | 10.7 | 35 | 35 |
| 35 | 2 | 7.9 | 12.5 | 13.1 | 15.6 | 6.8 | 1.8 | 12.3 | 35 | 35 |
| 36 | 2 | 5.3 | 10.9 | 10.7 | 12.7 | 4.3 | -0.5 | 9.7 | 35 | 35 |
| 37 | 2 | 4.4 | 11.3 | 9.9 | 10.1 | 3.9 | -0.8 | 8.6 | 35 | 35 |
| 38 | 2 | -0.1 | 8.7 | 5.8 | 7.3 | -0.9 | -5.3 | 3.4 | 35 | 35 |
| 39 | 3 | -3.2 | 7.3 | 2.7 | 3 | -3.6 | -7.5 | -1 | 35 | 35 |
| 40 | 3 | 24 | 27.6 | 29.7 | 25.6 | 21.4 | 22.2 | 24.7 | 38 | 35 |
| 41 | 3 | 26.7 | 23.8 | 28.7 | 27.5 | 19 | 25.6 | 27.8 | 38 | 35 |
| 42 | 3 | 30.6 | 23.6 | 31.5 | 31.1 | 18.6 | 30 | 36.3 | 38 | 35 |
| 43 | 3 | 26.9 | 21.1 | 28.1 | 28 | 15.5 | 26.1 | 35.1 | 38 | 35 |
| 44 | 3 | 23.4 | 19.3 | 25 | 25.4 | 15.6 | 21.9 | 28.3 | 38 | 35 |
| 45 | 3 | 23.6 | 20.5 | 25.6 | 26.7 | 16.8 | 21.9 | 25.6 | 38 | 35 |
| 46 | 3 | 22.4 | 19.4 | 24.4 | 25.4 | 16.4 | 20.4 | 26.5 | 38 | 35 |
| 47 | 3 | 21.6 | 19.1 | 23.8 | 24.9 | 16 | 19.1 | 25.9 | 38 | 35 |
| 48 | 3 | 20.4 | 18.8 | 22.9 | 24.5 | 17.1 | 17 | 20.9 | 38 | 35 |
| 49 | 3 | 11.1 | 14.9 | 16.7 | 18.8 | 9.5 | 6.5 | 12.3 | 38 | 35 |
| 50 | 3 | 7.2 | 11.9 | 13.4 | 15.6 | 5.7 | 1.9 | 8.8 | 38 | 35 |
| 51 | 3 | 13.2 | 15.6 | 17.8 | 19.7 | 11.4 | 8.6 | 14.1 | 38 | 35 |
| 52 | 3 | 5.2 | 10.1 | 11.5 | 13.9 | 3.8 | -0.5 | 7.1 | 38 | 35 |
| 53 | 3 | 20.4 | 18.4 | 22.7 | 23.9 | 16 | 17.6 | 28.4 | 38 | 35 |
| 54 | 3 | 17.5 | 16.6 | 20.2 | 21.5 | 13.2 | 13.9 | 18.1 | 38 | 35 |
| 55 | 3 | 6.9 | 11 | 12.3 | 14.8 | 5.6 | 0.7 | 10.1 | 35 | 35 |
| 56 | 3 | 16.7 | 17 | 20 | 21.1 | 14.4 | 11.6 | 26.5 | 38 | 35 |

**Table 20C** *Detailed Predicted A–Weighted Received Sound Levels for individual Receivers Stage 4 Year 10-15 3m/s West Wind - Recommended Sound Attenuation Installed*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crusher Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 33.8 | 51.8 | 50.9 | 34.5 | 34.2 | 27.6 | 34.9 | 35 | 35 |
| 1 | 1 | 30.8 | 51.7 | 50.8 | 31.8 | 31.4 | 25.6 | 32.7 | 35 | 35 |
| 2 | 1 | 28.9 | 51.2 | 50.3 | 30.1 | 29.7 | 24.4 | 29.6 | 35 | 35 |
| 3 | 1 | 27.8 | 51.3 | 50.4 | 29.1 | 28.5 | 23.5 | 30.5 | 35 | 35 |
| 4 | 1 | 27.3 | 51.4 | 50.6 | 28.6 | 27.9 | 23.1 | 30.1 | 35 | 35 |
| 5 | 1 | 26.9 | 51.3 | 50.5 | 28.3 | 27.5 | 22.9 | 29.8 | 35 | 35 |
| 6 | 1 | 26.4 | 50.8 | 50 | 27.8 | 27 | 22.6 | 29.4 | 35 | 35 |
| 7 | 1 | 26 | 50.9 | 50.1 | 27.4 | 26.5 | 22.1 | 29.1 | 35 | 35 |
| 8 | 1 | 25.5 | 50.5 | 49.6 | 27 | 26.1 | 21.4 | 28.8 | 35 | 35 |
| 9 | 1 | 25.3 | 50.1 | 49.1 | 26.8 | 25.9 | 21.5 | 28.7 | 35 | 35 |
| 10 | 1 | 24.3 | 49.1 | 48 | 25.8 | 25.2 | 20.1 | 28.1 | 35 | 35 |
| 11 | | 18.8 | 28.4 | 23.9 | 20.2 | 14.6 | 17.9 | 19.1 | 35 | 35 |
| 12 | 1 | 18.3 | 29.8 | 24.6 | 19.6 | 17.2 | 16.1 | 19.1 | 35 | 35 |
| 13 | 1 | 23.8 | 35.7 | 31 | 24.7 | 23.7 | 19.1 | 26.1 | 35 | 35 |
| 14 | 1 | 22.6 | 43.9 | 41.8 | 24.3 | 23 | 19.3 | 24.8 | 35 | 35 |
| 15 | 1 | 23.2 | 44.9 | 42.8 | 24.7 | 23.7 | 19.4 | 27.3 | 35 | 35 |
| 16 | 1 | 23.2 | 46.3 | 44.2 | 24.7 | 23.5 | 18.7 | 29.8 | 35 | 35 |
| 17 | 1 | 23 | 48.3 | 46.2 | 24.6 | 23.1 | 18.7 | 26.6 | 35 | 35 |
| 18 | 1 | 24.2 | 53.9 | 52.6 | 26.2 | 22.8 | 20.2 | 24.6 | 35 | 35 |
| 19 | 1 | 26.4 | 53.1 | 52 | 27.9 | 26.7 | 21.7 | 32 | 35 | 35 |
| 20 | 1 | 27 | 51.7 | 50.7 | 28.7 | 26.7 | 21.8 | 30.1 | 35 | 35 |
| 21 | 1 | 25.7 | 42.7 | 42.3 | 28.4 | 25.6 | 21.6 | 27 | 35 | 35 |
| 22 | 1 | 28.2 | 51.4 | 50.8 | 30.2 | 27.7 | 23 | 30.8 | 35 | 35 |
| 23 | 1 | 35.5 | 45.6 | 46.3 | 35.6 | 33.3 | 27 | 34.1 | 35 | 35 |
| 24 | 1 | 22.6 | 29.4 | 30.9 | 24.4 | 22.5 | 18 | 22.7 | 35 | 35 |
| 25 | 1 | 15.9 | 19.4 | 21.6 | 18.4 | 15.8 | 11.3 | 17.2 | 35 | 35 |
| 26 | 1 | 27.7 | 27.9 | 31.1 | 33.6 | 27.3 | 21.6 | 28.5 | 35 | 35 |
| 27 | 1 | 8.8 | 12.3 | 14.3 | 13.4 | 8.6 | 4 | 10.4 | 35 | 35 |
| 28 | 1 | 12 | 15.5 | 17.4 | 15 | 11.8 | 6.9 | 12.6 | 35 | 35 |
| 29 | 3 | -0.6 | 8.2 | 4.8 | 8.5 | -1.8 | -5.9 | 1.1 | 35 | 35 |
| 30 | 3 | -1.8 | 7.9 | 4 | 7.5 | -3.2 | -8 | 0.2 | 35 | 35 |
| 31 | 3 | -1.7 | 8.5 | 4.4 | 7.3 | -3.2 | -6.8 | 0 | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crusher Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 32 | 2 | -0.6 | 9.6 | 5.8 | 8.5 | -2 | -5.8 | 1.3 | 35 | 35 |
| 33 | 2 | 0.7 | 10.3 | 6.8 | 9.8 | -0.6 | -4.3 | 2.6 | 35 | 35 |
| 34 | 2 | 2.8 | 11.8 | 8.9 | 12.2 | 1.5 | -2.4 | 4.7 | 35 | 35 |
| 34 A | 2 | 3.8 | 12.1 | 9.8 | 13.4 | 2.2 | -2 | 5.6 | 35 | 35 |
| 35 | 2 | 7.2 | 12.5 | 12.5 | 16.6 | 4.9 | 0 | 10 | 35 | 35 |
| 36 | 2 | 5.9 | 10.9 | 11.4 | 15 | 3.9 | -1 | 9.1 | 35 | 35 |
| 37 | 2 | 6.7 | 11.3 | 12.6 | 13.7 | 5.8 | 0.8 | 10.7 | 35 | 35 |
| 38 | 2 | 4.4 | 8.7 | 10.2 | 12.6 | 3.3 | -1.5 | 8.2 | 35 | 35 |
| 39 | 3 | 3.5 | 7.3 | 9.1 | 10 | 2.9 | -1.8 | 6.5 | 35 | 35 |
| 40 | 3 | 21 | 27.6 | 24.4 | 22 | 13.7 | 20.5 | 21.2 | 38 | 35 |
| 41 | 3 | 17.2 | 23.8 | 20.1 | 18.5 | 10.3 | 15.7 | 18 | 38 | 35 |
| 42 | 3 | 20.9 | 23.6 | 22.4 | 21.8 | 10.2 | 20.2 | 25.2 | 38 | 35 |
| 43 | 3 | 16.4 | 21.1 | 18.5 | 18.2 | 7.3 | 15.3 | 23.3 | 38 | 35 |
| 44 | 3 | 13.7 | 19.3 | 16.1 | 16.5 | 7.3 | 12.1 | 17.2 | 38 | 35 |
| 45 | 3 | 16.4 | 20.5 | 18.5 | 19.4 | 9 | 15.3 | 17.4 | 38 | 35 |
| 46 | 3 | 13.8 | 19.4 | 16.4 | 17.3 | 8.3 | 12.2 | 16.4 | 38 | 35 |
| 47 | 3 | 13.2 | 19.1 | 15.9 | 17 | 8 | 11.3 | 15.9 | 38 | 35 |
| 48 | 3 | 13.4 | 18.8 | 16.2 | 17.7 | 9.9 | 11.1 | 13.7 | 38 | 35 |
| 49 | 3 | 4.6 | 14.9 | 10.5 | 12.5 | 2.9 | 0.8 | 5.3 | 38 | 35 |
| 50 | 3 | 0.9 | 11.9 | 7.5 | 9.7 | -0.8 | -3.5 | 1.9 | 38 | 35 |
| 51 | 3 | 6.1 | 15.6 | 11.1 | 13 | 4.4 | 2.3 | 6.7 | 38 | 35 |
| 52 | 3 | -0.9 | 10.1 | 5.8 | 8.1 | -2.5 | -5.8 | 0.3 | 38 | 35 |
| 53 | 3 | 12.1 | 18.4 | 15 | 16.1 | 8.1 | 10 | 17.7 | 38 | 35 |
| 54 | 3 | 9.3 | 16.6 | 12.7 | 13.9 | 5.6 | 6.6 | 9.8 | 38 | 35 |
| 55 | 3 | 4.3 | 11 | 9.9 | 13.4 | 2.4 | -2.3 | 6.5 | 35 | 35 |
| 56 | 3 | 7.9 | 17 | 12.1 | 13 | 6.3 | 4 | 15.4 | 38 | 35 |

**Table 21** *Summary of Predicted A–Weighted Received Sound Levels Stage 5 Year 15-20*

| Operation Scenario | NAG1 Wind 45 Deg 3m/s | NAG2 Wind 270 Deg 3m/s | NAG3 wind 135 Deg 3m/s |
|---|---|---|---|
| Stripping Lot 21 | 37-41 | <30 | 30-36 |
| Daytime quarry operations | 30-38 | <30 | 25-30 |
| Rail loading only (Night time) F Class Temperature Inversion No wind | 47-52 | <25 | <25 |
| Daytime Quarry Operation plus Rail loading | 52-54 | <30 | 30-36 |
| Daytime Quarry operations plus Campaign crushing using mobile jaw crusher in East part Lot 6 | 32-39 | 10-33 | 25-31 |
| Evening Processing Operations all plant | 32-39 | <30 | <20 |
| Early Morning Truck Loading and Product Despatch | 25-31 | <20 | 15-30 |

**Table 21A** *Detailed Predicted A–Weighted Received Sound Levels for individual Receivers Stage 5 Year 15-20 3m/s NE Wind - Recommended Sound Attenuation Installed*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 38.7 | 55.2 | 55 | 40.4 | 38.9 | 30.8 | 46 | 35 | 35 |
| 1 | 1 | 36 | 55.8 | 55.4 | 38.2 | 36.2 | 29.8 | 45 | 35 | 35 |
| 2 | 1 | 34.9 | 56.1 | 55.8 | 37.2 | 35.7 | 28.9 | 36.7 | 35 | 35 |
| 3 | 1 | 33.7 | 56.7 | 56.4 | 36.2 | 34.1 | 28.5 | 43.6 | 35 | 35 |
| 4 | 1 | 33.4 | 57.2 | 56.9 | 35.9 | 33.5 | 28.2 | 43.2 | 35 | 35 |
| 5 | 1 | 33.2 | 57.3 | 57.1 | 35.7 | 33.2 | 28.1 | 43 | 35 | 35 |
| 6 | 1 | 32.8 | 56.9 | 56.8 | 35.3 | 32.8 | 27.9 | 42.7 | 35 | 35 |
| 7 | 1 | 32.7 | 57 | 56.9 | 35.1 | 32.5 | 27.7 | 42.5 | 35 | 35 |
| 8 | 1 | 32.4 | 56.5 | 56.4 | 34.8 | 32.1 | 27.1 | 42.2 | 35 | 35 |
| 9 | 1 | 32.1 | 56.1 | 56.1 | 34.6 | 32 | 27.2 | 42 | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 10 | 1 | 31.3 | 55.2 | 55.3 | 34 | 31.5 | 26.3 | 41.6 | 35 | 35 |
| 11 | | 25.6 | 33.1 | 32.8 | 28.4 | 22.1 | 24 | 26.3 | 35 | 35 |
| 12 | 1 | 26.3 | 34.3 | 34.6 | 29.3 | 25.8 | 23.1 | 28.2 | 35 | 35 |
| 13 | 1 | 32.5 | 40.3 | 40.6 | 33.9 | 32.8 | 24.8 | 36.3 | 35 | 35 |
| 14 | 1 | 29.2 | 50.1 | 50.4 | 32.3 | 29.6 | 25 | 33.3 | 35 | 35 |
| 15 | 1 | 30.3 | 51.2 | 51.7 | 33 | 30.4 | 25.7 | 36.7 | 35 | 35 |
| 16 | 1 | 30.5 | 53.2 | 53.6 | 33.6 | 30.5 | 26 | 40.2 | 35 | 35 |
| 17 | 1 | 30.3 | 55.1 | 55.4 | 32.9 | 29.9 | 25.3 | 35.8 | 35 | 35 |
| 18 | 1 | 30.2 | 58.7 | 59.1 | 32.9 | 28.4 | 24.9 | 31.1 | 35 | 35 |
| 19 | 1 | 32 | 59.4 | 59.7 | 34.8 | 32.3 | 26.6 | 42.1 | 35 | 35 |
| 20 | 1 | 32.1 | 56.5 | 56.6 | 35 | 32.4 | 26.6 | 36.5 | 35 | 35 |
| 21 | 1 | 30.5 | 47.8 | 47.6 | 34.5 | 30.3 | 25.9 | 33.1 | 35 | 35 |
| 22 | 1 | 32.6 | 55.8 | 55.6 | 35.3 | 32.4 | 27.2 | 36.4 | 35 | 35 |
| 23 | 1 | 37.8 | 47.4 | 45.7 | 39.2 | 37.6 | 29.1 | 38.2 | 35 | 35 |
| 24 | 1 | 18.4 | 31 | 27.1 | 21.8 | 18.3 | 14 | 19 | 35 | 35 |
| 25 | 1 | 11 | 22.8 | 18.5 | 16.2 | 10.9 | 5.7 | 12.7 | 35 | 35 |
| 26 | 1 | 17.4 | 30.2 | 23.1 | 21.2 | 17.3 | 9.9 | 17.9 | 35 | 35 |
| 27 | 1 | 1.2 | 14.8 | 9.6 | 9.3 | 0.8 | -3.5 | 3.5 | 35 | 35 |
| 28 | 1 | 7.2 | 17.7 | 14.3 | 12.4 | 7 | 2.1 | 8.5 | 35 | 35 |
| 29 | 3 | -2.9 | 10.7 | 4.9 | 4.6 | -4.2 | -9.1 | -0.8 | 35 | 35 |
| 30 | 3 | -3.1 | 10.5 | 4.9 | 4.4 | -4.5 | -9.6 | -0.8 | 35 | 35 |
| 31 | 3 | -2.8 | 11 | 5.5 | 4.7 | -4.4 | -9.2 | -0.7 | 35 | 35 |
| 32 | 2 | -2.1 | 12.2 | 6.4 | 5.3 | -3.7 | -8.4 | 0.1 | 35 | 35 |
| 33 | 2 | -1.3 | 12.8 | 7.1 | 6.1 | -2.8 | -7.1 | 1 | 35 | 35 |
| 34 | 2 | 0.3 | 14.6 | 8.8 | 7.7 | -1.2 | -5.6 | 2.5 | 35 | 35 |
| 34 A | 2 | 0.5 | 14.7 | 8.9 | 7.8 | -1.2 | -5.7 | 2.7 | 35 | 35 |
| 35 | 2 | 1 | 15.5 | 9.6 | 8.7 | -1.2 | -5.9 | 3.7 | 35 | 35 |
| 36 | 2 | -1.4 | 13.9 | 7.4 | 6.4 | -3.4 | -7.9 | 1.2 | 35 | 35 |
| 37 | 2 | -2 | 14.1 | 7.1 | 6.4 | -3 | -7.5 | 0.7 | 35 | 35 |
| 38 | 2 | -4.8 | 11.7 | 4.6 | 3.3 | -6.3 | -10.7 | -2.4 | 35 | 35 |
| 39 | 3 | -5.8 | 10.1 | 3.2 | 2.2 | -6.7 | -11 | -3.7 | 35 | 35 |
| 40 | 3 | 27.1 | 32.3 | 32.2 | 28.9 | 20.9 | 26.1 | 27.6 | 38 | 35 |
| 41 | 3 | 28 | 28.5 | 30.6 | 29.2 | 18.1 | 26.6 | 28.6 | 38 | 35 |
| 42 | 3 | 31 | 28.4 | 32.3 | 31.7 | 17.5 | 29.8 | 31.5 | 38 | 35 |
| 43 | 3 | 26.2 | 24.6 | 27.9 | 27.8 | 14.2 | 22.8 | 31.1 | 38 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail Loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 44 | 3 | 20.6 | 22.6 | 23.4 | 23.4 | 12.4 | 16.3 | 24.9 | 38 | 35 |
| 45 | 3 | 18.3 | 23.7 | 23 | 22.8 | 12.9 | 14.2 | 20.6 | 38 | 35 |
| 46 | 3 | 18.9 | 22.7 | 22.4 | 22.4 | 12.3 | 13.3 | 23.4 | 38 | 35 |
| 47 | 3 | 18 | 22.3 | 21.6 | 21.8 | 11.7 | 11.9 | 22.7 | 38 | 35 |
| 48 | 3 | 14.9 | 21.9 | 19 | 20.5 | 11.8 | 9.6 | 16.6 | 38 | 35 |
| 49 | 3 | 4.6 | 17.5 | 12.6 | 11.5 | 3.2 | -0.3 | 5.9 | 38 | 35 |
| 50 | 3 | 0.4 | 14.4 | 9 | 7.8 | -1.2 | -5.3 | 2.1 | 38 | 35 |
| 51 | 3 | 6.8 | 18.4 | 13.9 | 14.2 | 5.5 | 1.8 | 8.2 | 38 | 35 |
| 52 | 3 | -1.7 | 12.5 | 7 | 5.7 | -3.4 | -7.9 | 0 | 38 | 35 |
| 53 | 3 | 16.8 | 21.6 | 20.2 | 20.9 | 11.2 | 10.1 | 20.1 | 38 | 35 |
| 54 | 3 | 12.7 | 19.7 | 17 | 18.2 | 8.6 | 6.5 | 17.3 | 38 | 35 |
| 55 | 3 | -0.9 | 13.8 | 7.7 | 6.5 | -2.7 | -7.4 | 1.4 | 35 | 35 |
| 56 | 3 | 13 | 20.2 | 17.8 | 18.7 | 9.4 | 5.5 | 19.4 | 38 | 35 |

**Table 22B** *Detailed Predicted A–Weighted Received Sound Levels for individual Receivers Stage 5 Year 15-20 3m/s SE Wind - Recommended Sound Attenuation Installed*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 36.6 | 55.2 | 54.8 | 38 | 37.2 | 29.3 | 42.4 | 35 | 35 |
| 1 | 1 | 33.4 | 55.8 | 55.4 | 35.4 | 34.3 | 27.7 | 41.1 | 35 | 35 |
| 2 | 1 | 32.5 | 56.1 | 55.9 | 34.4 | 33.4 | 26.7 | 33.7 | 35 | 35 |
| 3 | 1 | 30.7 | 56.7 | 56.5 | 33 | 31.7 | 25.9 | 39.5 | 35 | 35 |
| 4 | 1 | 30.2 | 57.2 | 57 | 32.5 | 31 | 25.4 | 39.1 | 35 | 35 |
| 5 | 1 | 29.9 | 57.3 | 57 | 32.2 | 30.6 | 25.3 | 38.8 | 35 | 35 |
| 6 | 1 | 29.4 | 56.9 | 56.5 | 31.8 | 30.2 | 24.9 | 38.5 | 35 | 35 |
| 7 | 1 | 29.1 | 57 | 56.6 | 31.5 | 29.8 | 24.5 | 38.1 | 35 | 35 |
| 8 | 1 | 28.7 | 56.5 | 56.1 | 31.2 | 29.3 | 24.1 | 37.9 | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 9 | 1 | 28.4 | 56.1 | 55.6 | 31 | 29.1 | 23.9 | 37.7 | 35 | 35 |
| 10 | 1 | 27.8 | 55.2 | 54.7 | 30.4 | 28.5 | 23.3 | 37.2 | 35 | 35 |
| 11 | | 23.2 | 33.1 | 33.1 | 26.9 | 22 | 20.3 | 24.1 | 35 | 35 |
| 12 | 1 | 24.5 | 34.3 | 34.1 | 27.7 | 24.7 | 20.6 | 26.3 | 35 | 35 |
| 13 | 1 | 30.5 | 40.3 | 40.1 | 31.9 | 30.9 | 23.7 | 33.9 | 35 | 35 |
| 14 | 1 | 25.8 | 50.1 | 49.1 | 28.8 | 26.6 | 21.8 | 29.3 | 35 | 35 |
| 15 | 1 | 26.4 | 51.2 | 50.1 | 29.1 | 27.1 | 22 | 32.3 | 35 | 35 |
| 16 | 1 | 26.8 | 53.2 | 51.9 | 29.8 | 27.5 | 22.2 | 35.7 | 35 | 35 |
| 17 | 1 | 26.8 | 55.1 | 53.7 | 29.2 | 27.2 | 21.4 | 31.3 | 35 | 35 |
| 18 | 1 | 26.2 | 58.7 | 57.6 | 28.8 | 25.8 | 21.3 | 26.9 | 35 | 35 |
| 19 | 1 | 29 | 59.4 | 57.7 | 31.2 | 29.7 | 23 | 37 | 35 | 35 |
| 20 | 1 | 27.8 | 56.5 | 55.1 | 30.6 | 28.6 | 22.9 | 31.3 | 35 | 35 |
| 21 | 1 | 26.1 | 47.8 | 46.7 | 29.8 | 26.3 | 22.1 | 28 | 35 | 35 |
| 22 | 1 | 28.4 | 55.8 | 54.6 | 30.9 | 28.8 | 23.7 | 31.3 | 35 | 35 |
| 23 | 1 | 32.5 | 47.4 | 46.6 | 33.8 | 32.6 | 25.2 | 32.8 | 35 | 35 |
| 24 | 1 | 15.9 | 31 | 29.3 | 18.2 | 15.9 | 13.2 | 16.1 | 35 | 35 |
| 25 | 1 | 10 | 22.8 | 19.8 | 13.9 | 9.9 | 5.2 | 10.6 | 35 | 35 |
| 26 | 1 | 20 | 30.2 | 25.4 | 23.1 | 20.2 | 12 | 20.3 | 35 | 35 |
| 27 | 1 | 0 | 14.8 | 8.6 | 7.5 | -0.2 | -4.1 | 1.4 | 35 | 35 |
| 28 | 1 | 2.6 | 17.7 | 11.1 | 7.8 | 2.5 | -1.3 | 3.3 | 35 | 35 |
| 29 | 3 | 4.7 | 10.7 | 11.9 | 11.5 | 3.5 | -2.1 | 7 | 35 | 35 |
| 30 | 3 | 4.3 | 10.5 | 11.6 | 11 | 2.9 | -2.7 | 6.6 | 35 | 35 |
| 31 | 3 | 4.3 | 11 | 12.1 | 11.1 | 2.8 | -2.6 | 6.4 | 35 | 35 |
| 32 | 2 | 5.1 | 12.2 | 13.1 | 11.8 | 3.6 | -1.7 | 7.4 | 35 | 35 |
| 33 | 2 | 6 | 12.8 | 13.9 | 12.7 | 4.7 | -0.2 | 8.4 | 35 | 35 |
| 34 | 2 | 7.7 | 14.6 | 15.6 | 14.4 | 6.3 | 1.4 | 10 | 35 | 35 |
| 34 A | 2 | 7.9 | 14.7 | 15.7 | 14.6 | 6.5 | 1.3 | 10.3 | 35 | 35 |
| 35 | 2 | 7.9 | 15.5 | 15.5 | 15.2 | 6.6 | 0.9 | 11.2 | 35 | 35 |
| 36 | 2 | 5.2 | 13.9 | 13 | 12.6 | 4.1 | -1.4 | 8.7 | 35 | 35 |
| 37 | 2 | 4.3 | 14.1 | 12 | 12 | 3.7 | -1.7 | 7.6 | 35 | 35 |
| 38 | 2 | -0.2 | 11.7 | 8.1 | 7.4 | -1 | -6.3 | 2.7 | 35 | 35 |
| 39 | 3 | -3.4 | 10.1 | 4.8 | 4.1 | -3.9 | -8.7 | -1.4 | 35 | 35 |
| 40 | 3 | 23.9 | 32.3 | 32.6 | 26.9 | 21.2 | 21.9 | 24.7 | 38 | 35 |
| 41 | 3 | 26.9 | 28.5 | 30.5 | 28.3 | 18.6 | 25.5 | 27.7 | 38 | 35 |
| 42 | 3 | 30.9 | 28.4 | 32.7 | 31.7 | 18.5 | 29.9 | 31.5 | 38 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 43 | 3 | 28 | 24.6 | 29.8 | 29.3 | 16.2 | 25.8 | 31.9 | 38 | 35 |
| 44 | 3 | 24.1 | 22.6 | 26.7 | 26.2 | 15.5 | 21.5 | 27.3 | 38 | 35 |
| 45 | 3 | 23.5 | 23.7 | 27 | 26.5 | 16.6 | 21.8 | 24.7 | 38 | 35 |
| 46 | 3 | 23.4 | 22.7 | 26.4 | 26.1 | 16.2 | 20.1 | 26.6 | 38 | 35 |
| 47 | 3 | 22.8 | 22.3 | 25.9 | 25.8 | 16 | 18.9 | 26.4 | 38 | 35 |
| 48 | 3 | 21.9 | 21.9 | 25.1 | 26.4 | 18 | 17.4 | 23.1 | 38 | 35 |
| 49 | 3 | 10.9 | 17.5 | 18.6 | 17.2 | 9.5 | 6 | 12.2 | 38 | 35 |
| 50 | 3 | 7.1 | 14.4 | 15.3 | 13.8 | 5.5 | 1 | 8.7 | 38 | 35 |
| 51 | 3 | 13.1 | 18.4 | 19.8 | 19.8 | 11.6 | 8 | 14.4 | 38 | 35 |
| 52 | 3 | 5.2 | 12.5 | 13.5 | 11.9 | 3.6 | -1.5 | 6.9 | 38 | 35 |
| 53 | 3 | 22.3 | 21.6 | 25.2 | 25.6 | 16.2 | 17.3 | 24.8 | 38 | 35 |
| 54 | 3 | 19 | 19.7 | 22.6 | 23.5 | 14.2 | 13.7 | 22.8 | 38 | 35 |
| 55 | 3 | 6.8 | 13.8 | 14.5 | 13.5 | 5.5 | -0.2 | 9.4 | 35 | 35 |
| 56 | 3 | 17.9 | 20.2 | 22.4 | 23 | 14.3 | 10.8 | 23.5 | 38 | 35 |

**Table 22C** *Detailed Predicted A–Weighted Received Sound Levels for individual Receivers Stage 5 Year 15-20 3m/s West Wind - Recommended Noise Mitigation Installed*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 34 | 55.2 | 54.3 | 35.3 | 34.2 | 27.6 | 37.9 | 35 | 35 |
| 1 | 1 | 31.3 | 55.8 | 55.1 | 33 | 31.4 | 25.8 | 36.3 | 35 | 35 |
| 2 | 1 | 29.5 | 56.1 | 55.5 | 31.5 | 30.1 | 24.4 | 30.4 | 35 | 35 |
| 3 | 1 | 28.2 | 56.7 | 56.1 | 30.4 | 28.5 | 23.6 | 34.5 | 35 | 35 |
| 4 | 1 | 27.7 | 57.2 | 56.6 | 29.9 | 27.8 | 23.2 | 34.1 | 35 | 35 |
| 5 | 1 | 27.4 | 57.3 | 56.7 | 29.6 | 27.3 | 22.8 | 33.9 | 35 | 35 |
| 6 | 1 | 26.9 | 56.9 | 56.3 | 29.2 | 26.8 | 22.5 | 33.5 | 35 | 35 |
| 7 | 1 | 26.6 | 57 | 56.4 | 28.9 | 26.4 | 22.1 | 33.2 | 35 | 35 |
| 8 | 1 | 26.1 | 56.5 | 55.8 | 28.5 | 25.9 | 21.3 | 32.9 | 35 | 35 |
| 9 | 1 | 25.9 | 56.1 | 55.4 | 28.3 | 25.7 | 21.4 | 32.7 | 35 | 35 |
| 10 | 1 | 24.9 | 55.2 | 54.4 | 27.5 | 25.1 | 20.1 | 32.2 | 35 | 35 |
| 11 | | 18.8 | 33.1 | 30.4 | 21.1 | 14.5 | 17.6 | 19.1 | 35 | 35 |
| 12 | 1 | 19.9 | 34.3 | 31.1 | 22.2 | 21.1 | 15.7 | 20.7 | 35 | 35 |
| 13 | 1 | 27.7 | 40.3 | 37.7 | 28.5 | 28.4 | 19.6 | 28.9 | 35 | 35 |
| 14 | 1 | 22.4 | 50.1 | 48.7 | 25.5 | 22.8 | 18.6 | 24.9 | 35 | 35 |
| 15 | 1 | 23.5 | 51.2 | 49.8 | 26.2 | 23.5 | 19.4 | 27.8 | 35 | 35 |
| 16 | 1 | 24.8 | 53.2 | 51.7 | 27.4 | 24.8 | 19.4 | 31.1 | 35 | 35 |
| 17 | 1 | 25.8 | 55.1 | 53.9 | 27.6 | 25.6 | 19 | 28.3 | 35 | 35 |
| 18 | 1 | 25.6 | 58.7 | 57 | 27.7 | 24.5 | 19.9 | 26 | 35 | 35 |
| 19 | 1 | 29.1 | 59.4 | 57.4 | 30.7 | 29.2 | 21.5 | 34.2 | 35 | 35 |
| 20 | 1 | 26.7 | 56.5 | 54.4 | 29.3 | 26.9 | 21.7 | 29.2 | 35 | 35 |
| 21 | 1 | 25.7 | 47.8 | 46 | 29.2 | 25.6 | 21.5 | 27.2 | 35 | 35 |
| 22 | 1 | 27.7 | 55.8 | 54.1 | 30.1 | 27.6 | 22.8 | 29.7 | 35 | 35 |
| 23 | 1 | 34.6 | 47.4 | 45.5 | 35.8 | 34.3 | 27 | 34.8 | 35 | 35 |
| 24 | 1 | 21.4 | 31 | 30.6 | 24.1 | 21.3 | 16.6 | 21.7 | 35 | 35 |
| 25 | 1 | 16 | 22.8 | 23.7 | 20.6 | 15.9 | 11 | 17.3 | 35 | 35 |
| 26 | 1 | 27.7 | 30.2 | 32.5 | 30.1 | 27.4 | 18.6 | 28.1 | 35 | 35 |
| 27 | 1 | 8.8 | 14.8 | 16.2 | 15.4 | 8.5 | 3.3 | 10.6 | 35 | 35 |
| 28 | 1 | 11.9 | 17.7 | 19.1 | 16.1 | 11.8 | 6.4 | 12.7 | 35 | 35 |
| 29 | 3 | -0.7 | 10.7 | 6.7 | 6.1 | -2 | -7.2 | 1 | 35 | 35 |
| 30 | 3 | -1.6 | 10.5 | 6 | 5.3 | -3 | -8.1 | 0.1 | 35 | 35 |
| 31 | 3 | -1.8 | 11 | 6.4 | 5.1 | -3.4 | -8 | -0.3 | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading Only (night time) F Class Inversion No wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing Using Mobile Jaw Crusher | Evening Processing Operations Tertiary Plant Only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 32 | 2 | -0.7 | 12.2 | 7.8 | 6.1 | -2.2 | -7.1 | 0.9 | 35 | 35 |
| 33 | 2 | 0.6 | 12.8 | 8.8 | 7.3 | -0.8 | -5.4 | 2.3 | 35 | 35 |
| 34 | 2 | 2.8 | 14.6 | 11.1 | 9.5 | 1.3 | -3.4 | 4.5 | 35 | 35 |
| 34 A | 2 | 3.8 | 14.7 | 11.8 | 10.2 | 2 | -2.9 | 5.4 | 35 | 35 |
| 35 | 2 | 7.1 | 15.5 | 14.8 | 13.5 | 4.8 | -1 | 9.3 | 35 | 35 |
| 36 | 2 | 5.8 | 13.9 | 13.8 | 12.4 | 3.8 | -2 | 8.3 | 35 | 35 |
| 37 | 2 | 6.7 | 14.1 | 14.8 | 14 | 5.8 | -0.1 | 9.7 | 35 | 35 |
| 38 | 2 | 4.4 | 11.7 | 12.7 | 11.5 | 3.2 | -2.4 | 7.3 | 35 | 35 |
| 39 | 3 | 3.6 | 10.1 | 11.3 | 10.5 | 2.8 | -2.7 | 5.9 | 35 | 35 |
| 40 | 3 | 21 | 32.3 | 30 | 22.3 | 13.3 | 20.4 | 21.2 | 38 | 35 |
| 41 | 3 | 17.1 | 28.5 | 25.5 | 19 | 9.8 | 15.6 | 17.6 | 38 | 35 |
| 42 | 3 | 21 | 28.4 | 26.4 | 22.1 | 9.9 | 20.1 | 21.4 | 38 | 35 |
| 43 | 3 | 17 | 24.6 | 20.4 | 19.2 | 7.5 | 15 | 20.3 | 38 | 35 |
| 44 | 3 | 13.9 | 22.6 | 17.9 | 16.9 | 6.9 | 11.7 | 16.3 | 38 | 35 |
| 45 | 3 | 16.2 | 23.7 | 19.8 | 18.9 | 8.5 | 15.1 | 16.8 | 38 | 35 |
| 46 | 3 | 14.2 | 22.7 | 18.2 | 17.5 | 7.9 | 11.9 | 16.5 | 38 | 35 |
| 47 | 3 | 13.7 | 22.3 | 17.8 | 17.3 | 7.7 | 11.1 | 16.2 | 38 | 35 |
| 48 | 3 | 14.3 | 21.9 | 18.1 | 18.8 | 10.4 | 11.1 | 15.1 | 38 | 35 |
| 49 | 3 | 4.3 | 17.5 | 12.5 | 10.5 | 2.8 | 0.1 | 5.1 | 38 | 35 |
| 50 | 3 | 0.7 | 14.4 | 9.4 | 7.4 | -1 | -4.5 | 1.7 | 38 | 35 |
| 51 | 3 | 5.8 | 18.4 | 13.1 | 12.6 | 4.4 | 1.5 | 6.7 | 38 | 35 |
| 52 | 3 | -1.1 | 12.5 | 7.7 | 5.7 | -2.7 | -6.9 | 0.1 | 38 | 35 |
| 53 | 3 | 13.1 | 21.6 | 17.1 | 17 | 8 | 9.5 | 14.9 | 38 | 35 |
| 54 | 3 | 10.2 | 19.7 | 14.8 | 15.3 | 6.1 | 6.1 | 13 | 38 | 35 |
| 55 | 3 | 4.2 | 13.8 | 12 | 10.4 | 2.3 | -3.3 | 6 | 35 | 35 |
| 56 | 3 | 8.2 | 20.2 | 14.3 | 14.4 | 5.8 | 2.5 | 12.7 | 38 | 35 |

**Table 22** *Summary of Predicted A –Weighted Received Sound Levels Stage Year 20-25*

| Operation Scenario | NAG1 Wind 45 Deg 3m/s | NAG2 Wind 270 Deg 3m/s | NAG3 wind 135 Deg 3m/s |
|---|---|---|---|
| Stripping Lot 21 | Not Applicable | Not Applicable | Not Applicable |
| Daytime quarry operations | 30-38 | <30 | 22-31 |
| Rail loading only (night time) | 54-57 | <25 | 25-32 |
| Daytime quarry operation plus rail loading | 55-60 | 15-32 | 26-33 |
| Daytime quarry operations plus campaign crushing using mobile jaw crusher | Not Applicable | Not Applicable | Not Applicable |
| Evening processing operations all plant | 30-38 | <30 | 22-31 |
| Early Morning Truck Loading and Product Despatch | 25-31 | <20 | 15-30 |

**Table 23A** *Detailed Predicted A–Weighted Received Sound Levels for individual Receivers Stage 6 Year 20-25 3m/s NE Wind - Recommended Noise Mitigation Installed*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | V7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading Only (night time) F Class Inversion no wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing using mobile jaw crusher | Evening Processing Operations Tertiary Plant only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 39.9 | 54 | 54.3 | 39.9 | 34.2 | 27.6 | N/A | 35 | 35 |
| 1 | 1 | 38.5 | 53.9 | 55.1 | 38.5 | 31.4 | 25.8 | | 35 | 35 |
| 2 | 1 | 37.3 | 53.8 | 55.5 | 37.3 | 30.1 | 24.4 | | 35 | 35 |
| 3 | 1 | 36.6 | 54.3 | 56.1 | 36.6 | 28.5 | 23.6 | | 35 | 35 |
| 4 | 1 | 36.2 | 54.9 | 56.6 | 36.2 | 27.8 | 23.2 | | 35 | 35 |
| 5 | 1 | 35.8 | 55.2 | 56.7 | 35.8 | 27.3 | 22.8 | | 35 | 35 |
| 6 | 1 | 35.6 | 55.1 | 56.3 | 35.6 | 26.8 | 22.5 | | 35 | 35 |
| 7 | 1 | 35.4 | 55.5 | 56.4 | 35.4 | 26.4 | 22.1 | | 35 | 35 |
| 8 | 1 | 34.8 | 55.1 | 55.8 | 34.8 | 25.9 | 21.3 | | 35 | 35 |
| 9 | 1 | 34.7 | 54.9 | 55.4 | 34.7 | 25.7 | 21.4 | | 35 | 35 |
| 10 | 1 | 34.1 | 54.1 | 54.4 | 34.1 | 25.1 | 20.1 | | 35 | 35 |
| 11 | | 28.6 | 30.5 | 30.4 | 28.6 | 14.5 | 17.6 | | 35 | 35 |
| 12 | 1 | 28.3 | 31.6 | 31.1 | 28.3 | 21.1 | 15.7 | | 35 | 35 |
| 13 | 1 | 31.9 | 37.7 | 37.7 | 31.9 | 28.4 | 19.6 | | 35 | 35 |
| 14 | 1 | 32.5 | 48.8 | 48.7 | 32.5 | 22.8 | 18.6 | | 35 | 35 |
| 15 | 1 | 33.2 | 49.9 | 49.8 | 33.2 | 23.5 | 19.4 | | 35 | 35 |
| 16 | 1 | 33.3 | 51.2 | 51.7 | 33.3 | 24.8 | 19.4 | | 35 | 35 |
| 17 | 1 | 33.3 | 53.7 | 53.9 | 33.3 | 25.6 | 19 | | 35 | 35 |
| 18 | 1 | 33.4 | 57.6 | 57 | 33.4 | 24.5 | 19.9 | | 35 | 35 |
| 19 | 1 | 35.2 | 56.8 | 57.4 | 35.2 | 29.2 | 21.5 | | 35 | 35 |
| 20 | 1 | 35.3 | 55.2 | 54.4 | 35.3 | 26.9 | 21.7 | | 35 | 35 |
| 21 | 1 | 33.6 | 46.1 | 46 | 33.6 | 25.6 | 21.5 | | 35 | 35 |
| 22 | 1 | 35.7 | 54.4 | 54.1 | 35.7 | 27.6 | 22.8 | | 35 | 35 |
| 23 | 1 | 39 | 47.2 | 45.5 | 39 | 34.3 | 27 | | 35 | 35 |
| 24 | 1 | 22.1 | 29 | 30.6 | 22.1 | 21.3 | 16.6 | | 35 | 35 |
| 25 | 1 | 15.4 | 21.7 | 23.7 | 15.4 | 15.9 | 11 | | 35 | 35 |
| 26 | 1 | 19.3 | 28.6 | 32.5 | 19.3 | 27.4 | 18.6 | | 35 | 35 |
| 27 | 1 | 7.6 | 13.9 | 16.2 | 7.6 | 8.5 | 3.3 | | 35 | 35 |
| 28 | 1 | 12.7 | 16.8 | 19.1 | 12.7 | 11.8 | 6.4 | | 35 | 35 |
| 29 | 3 | 3.7 | 9.8 | 6.7 | 3.7 | -2 | -7.2 | | 35 | 35 |
| 30 | 3 | 3.7 | 9.5 | 6 | 3.7 | -3 | -8.1 | | 35 | 35 |
| 31 | 3 | 3.7 | 9.7 | 6.4 | 3.7 | -3.4 | -8 | N/A | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | V7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading Only (night time) F Class Inversion no wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing using mobile jaw crusher | Evening Processing Operations Tertiary Plant only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 32 | 2 | 4.5 | 10.8 | 7.8 | 4.5 | -2.2 | -7.1 | | 35 | 35 |
| 33 | 2 | 5.2 | 11.6 | 8.8 | 5.2 | -0.8 | -5.4 | | 35 | 35 |
| 34 | 2 | 6.4 | 13.2 | 11.1 | 6.4 | 1.3 | -3.4 | | 35 | 35 |
| 34 A | 2 | 6.5 | 13.6 | 11.8 | 6.5 | 2 | -2.9 | | 35 | 35 |
| 35 | 2 | 6.5 | 14.6 | 14.8 | 6.5 | 4.8 | -1 | | 35 | 35 |
| 36 | 2 | 4.4 | 12.8 | 13.8 | 4.4 | 3.8 | -2 | | 35 | 35 |
| 37 | 2 | 4.7 | 13 | 14.8 | 4.7 | 5.8 | -0.1 | | 35 | 35 |
| 38 | 2 | 1.6 | 10.3 | 12.7 | 1.6 | 3.2 | -2.4 | | 35 | 35 |
| 39 | 3 | 1 | 8.8 | 11.3 | 1 | 2.8 | -2.7 | | 35 | 35 |
| 40 | 3 | 29.5 | 29.8 | 30 | 29.5 | 13.3 | 20.4 | | 38 | 35 |
| 41 | 3 | 28.5 | 25.8 | 25.5 | 28.5 | 9.8 | 15.6 | | 38 | 35 |
| 42 | 3 | 31.7 | 26.9 | 26.4 | 31.7 | 9.9 | 20.1 | | 38 | 35 |
| 43 | 3 | 26 | 25.3 | 20.4 | 26 | 7.5 | 15 | | 38 | 35 |
| 44 | 3 | 21.3 | 22.5 | 17.9 | 21.3 | 6.9 | 11.7 | | 38 | 35 |
| 45 | 3 | 21.4 | 24.1 | 19.8 | 21.4 | 8.5 | 15.1 | | 38 | 35 |
| 46 | 3 | 20.1 | 22.9 | 18.2 | 20.1 | 7.9 | 11.9 | | 38 | 35 |
| 47 | 3 | 19.7 | 22.6 | 17.8 | 19.7 | 7.7 | 11.1 | | 38 | 35 |
| 48 | 3 | 19 | 23.1 | 18.1 | 19 | 10.4 | 11.1 | | 38 | 35 |
| 49 | 3 | 11 | 16.3 | 12.5 | 11 | 2.8 | 0.1 | | 38 | 35 |
| 50 | 3 | 7.1 | 12.9 | 9.4 | 7.1 | -1 | -4.5 | | 38 | 35 |
| 51 | 3 | 13.1 | 17.7 | 13.1 | 13.1 | 4.4 | 1.5 | | 38 | 35 |
| 52 | 3 | 4.9 | 10.9 | 7.7 | 4.9 | -2.7 | -6.9 | | 38 | 35 |
| 53 | 3 | 18.8 | 22.3 | 17.1 | 18.8 | 8 | 9.5 | | 38 | 35 |
| 54 | 3 | 16 | 20.1 | 14.8 | 16 | 6.1 | 6.1 | | 38 | 35 |
| 55 | 3 | 4.9 | 12.6 | 12 | 4.9 | 2.3 | -3.3 | | 35 | 35 |
| 56 | 3 | 15.4 | 19.9 | 14.3 | 15.4 | 5.8 | 2.5 | | 38 | 35 |

**Table 23B** *Detailed Predicted A–Weighted Received Sound Levels for individual Receivers Stage 6 Year 20-25 3m/s SE Wind - Recommended Noise Mitigation Installed*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading Only (night time) F Class Inversion no wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing using mobile jaw crusher | Evening Processing Operations Tertiary Plant only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 37.7 | 54 | 54.8 | 38 | 37.2 | 29.3 | N/A | 35 | 35 |
| 1 | 1 | 36.1 | 53.9 | 55.4 | 35.4 | 34.3 | 27.7 | | 35 | 35 |
| 2 | 1 | 34.7 | 53.8 | 55.9 | 34.4 | 33.4 | 26.7 | | 35 | 35 |
| 3 | 1 | 33.8 | 54.3 | 56.5 | 33 | 31.7 | 25.9 | | 35 | 35 |
| 4 | 1 | 33.2 | 54.9 | 57 | 32.5 | 31 | 25.4 | | 35 | 35 |
| 5 | 1 | 32.8 | 55.2 | 57 | 32.2 | 30.6 | 25.3 | | 35 | 35 |
| 6 | 1 | 32.4 | 55.1 | 56.5 | 31.8 | 30.2 | 24.9 | | 35 | 35 |
| 7 | 1 | 32.1 | 55.5 | 56.6 | 31.5 | 29.8 | 24.5 | | 35 | 35 |
| 8 | 1 | 31.6 | 55.1 | 56.1 | 31.2 | 29.3 | 24.1 | | 35 | 35 |
| 9 | 1 | 31.4 | 54.9 | 55.6 | 31 | 29.1 | 23.9 | | 35 | 35 |
| 10 | 1 | 30.9 | 54.1 | 54.7 | 30.4 | 28.5 | 23.3 | | 35 | 35 |
| 11 | | 27.1 | 30.5 | 33.1 | 26.9 | 22 | 20.3 | | 35 | 35 |
| 12 | 1 | 26.9 | 31.6 | 34.1 | 27.7 | 24.7 | 20.6 | | 35 | 35 |
| 13 | 1 | 30.5 | 37.7 | 40.1 | 31.9 | 30.9 | 23.7 | | 35 | 35 |
| 14 | 1 | 29.2 | 48.8 | 49.1 | 28.8 | 26.6 | 21.8 | | 35 | 35 |
| 15 | 1 | 29.6 | 49.9 | 50.1 | 29.1 | 27.1 | 22 | | 35 | 35 |
| 16 | 1 | 29.5 | 51.2 | 51.9 | 29.8 | 27.5 | 22.2 | | 35 | 35 |
| 17 | 1 | 29.3 | 53.7 | 53.7 | 29.2 | 27.2 | 21.4 | | 35 | 35 |
| 18 | 1 | 29.3 | 57.6 | 57.6 | 28.8 | 25.8 | 21.3 | | 35 | 35 |
| 19 | 1 | 31.2 | 56.8 | 57.7 | 31.2 | 29.7 | 23 | | 35 | 35 |
| 20 | 1 | 31.1 | 55.2 | 55.1 | 30.6 | 28.6 | 22.9 | | 35 | 35 |
| 21 | 1 | 29.2 | 46.1 | 46.7 | 29.8 | 26.3 | 22.1 | | 35 | 35 |
| 22 | 1 | 31.5 | 54.4 | 54.6 | 30.9 | 28.8 | 23.7 | | 35 | 35 |
| 23 | 1 | 34.2 | 47.2 | 46.6 | 33.8 | 32.6 | 25.2 | | 35 | 35 |
| 24 | 1 | 18.6 | 29 | 29.3 | 18.2 | 15.9 | 13.2 | | 35 | 35 |
| 25 | 1 | 13.5 | 21.7 | 19.8 | 13.9 | 9.9 | 5.2 | | 35 | 35 |
| 26 | 1 | 21.5 | 28.6 | 25.4 | 23.1 | 20.2 | 12 | | 35 | 35 |
| 27 | 1 | 6.5 | 13.9 | 8.6 | 7.5 | -0.2 | -4.1 | | 35 | 35 |
| 28 | 1 | 8.5 | 16.8 | 11.1 | 7.8 | 2.5 | -1.3 | | 35 | 35 |
| 29 | 3 | 11 | 9.8 | 11.9 | 11.5 | 3.5 | -2.1 | | 35 | 35 |
| 30 | 3 | 10.7 | 9.5 | 11.6 | 11 | 2.9 | -2.7 | | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading Only (night time) F Class Inversion no wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing using mobile jaw crusher | Evening Processing Operations Tertiary Plant only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 31 | 3 | 10.5 | 9.7 | 12.1 | 11.1 | 2.8 | -2.6 | | 35 | 35 |
| 32 | 2 | 11.5 | 10.8 | 13.1 | 11.8 | 3.6 | -1.7 | | 35 | 35 |
| 33 | 2 | 12.3 | 11.6 | 13.9 | 12.7 | 4.7 | -0.2 | | 35 | 35 |
| 34 | 2 | 13.6 | 13.2 | 15.6 | 14.4 | 6.3 | 1.4 | | 35 | 35 |
| 34 A | 2 | 13.8 | 13.6 | 15.7 | 14.6 | 6.5 | 1.3 | | 35 | 35 |
| 35 | 2 | 13.7 | 14.6 | 15.5 | 15.2 | 6.6 | 0.9 | | 35 | 35 |
| 36 | 2 | 11.2 | 12.8 | 13 | 12.6 | 4.1 | -1.4 | | 35 | 35 |
| 37 | 2 | 10.7 | 13 | 12 | 12 | 3.7 | -1.7 | | 35 | 35 |
| 38 | 2 | 6.2 | 10.3 | 8.1 | 7.4 | -1 | -6.3 | | 35 | 35 |
| 39 | 3 | 3.3 | 8.8 | 4.8 | 4.1 | -3.9 | -8.7 | | 35 | 35 |
| 40 | 3 | 27.5 | 29.8 | 32.6 | 26.9 | 21.2 | 21.9 | | 38 | 35 |
| 41 | 3 | 27.9 | 25.8 | 30.5 | 28.3 | 18.6 | 25.5 | | 38 | 35 |
| 42 | 3 | 31.9 | 26.9 | 32.7 | 31.7 | 18.5 | 29.9 | | 38 | 35 |
| 43 | 3 | 28.1 | 25.3 | 29.8 | 29.3 | 16.2 | 25.8 | | 38 | 35 |
| 44 | 3 | 25.1 | 22.5 | 26.7 | 26.2 | 15.5 | 21.5 | | 38 | 35 |
| 45 | 3 | 26.2 | 24.1 | 27 | 26.5 | 16.6 | 21.8 | | 38 | 35 |
| 46 | 3 | 24.4 | 22.9 | 26.4 | 26.1 | 16.2 | 20.1 | | 38 | 35 |
| 47 | 3 | 24.6 | 22.6 | 25.9 | 25.8 | 16 | 18.9 | | 38 | 35 |
| 48 | 3 | 25.5 | 23.1 | 25.1 | 26.4 | 18 | 17.4 | | 38 | 35 |
| 49 | 3 | 17.1 | 16.3 | 18.6 | 17.2 | 9.5 | 6 | | 38 | 35 |
| 50 | 3 | 13.5 | 12.9 | 15.3 | 13.8 | 5.5 | 1 | | 38 | 35 |
| 51 | 3 | 19.1 | 17.7 | 19.8 | 19.8 | 11.6 | 8 | | 38 | 35 |
| 52 | 3 | 11.5 | 10.9 | 13.5 | 11.9 | 3.6 | -1.5 | | 38 | 35 |
| 53 | 3 | 24.3 | 22.3 | 25.2 | 25.6 | 16.2 | 17.3 | | 38 | 35 |
| 54 | 3 | 21.8 | 20.1 | 22.6 | 23.5 | 14.2 | 13.7 | | 38 | 35 |
| 55 | 3 | 12.4 | 12.6 | 14.5 | 13.5 | 5.5 | -0.2 | | 35 | 35 |
| 56 | 3 | 20.2 | 19.9 | 22.4 | 23 | 14.3 | 10.8 | | 38 | 35 |

**Table 23C** *Detailed Predicted A –Weighted Received Sound Levels for individual Receivers Stage 6 Year 20-25 3m/s West Wind - Recommended Noise Mitigation Installed*

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading Only (night time) F Class Inversion no wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing using mobile jaw crusher | Evening Processing Operations Tertiary Plant only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 1 | 1 | 35.1 | 54 | 54.3 | 35.3 | 34.2 | 27.6 | N/A | 35 | 35 |
| 1 | 1 | 33.5 | 53.9 | 55.1 | 33 | 31.4 | 25.8 | | 35 | 35 |
| 2 | 1 | 31.9 | 53.8 | 55.5 | 31.5 | 30.1 | 24.4 | | 35 | 35 |
| 3 | 1 | 30.8 | 54.3 | 56.1 | 30.4 | 28.5 | 23.6 | | 35 | 35 |
| 4 | 1 | 30.2 | 54.9 | 56.6 | 29.9 | 27.8 | 23.2 | | 35 | 35 |
| 5 | 1 | 29.7 | 55.2 | 56.7 | 29.6 | 27.3 | 22.8 | | 35 | 35 |
| 6 | 1 | 29.4 | 55.1 | 56.3 | 29.2 | 26.8 | 22.5 | | 35 | 35 |
| 7 | 1 | 29.2 | 55.5 | 56.4 | 28.9 | 26.4 | 22.1 | | 35 | 35 |
| 8 | 1 | 28.3 | 55.1 | 55.8 | 28.5 | 25.9 | 21.3 | | 35 | 35 |
| 9 | 1 | 28.4 | 54.9 | 55.4 | 28.3 | 25.7 | 21.4 | | 35 | 35 |
| 10 | 1 | 27.5 | 54.1 | 54.4 | 27.5 | 25.1 | 20.1 | | 35 | 35 |
| 11 | | 21.1 | 30.5 | 30.4 | 21.1 | 14.5 | 17.6 | | 35 | 35 |
| 12 | 1 | 20.4 | 31.6 | 31.1 | 22.2 | 21.1 | 15.7 | | 35 | 35 |
| 13 | 1 | 24.5 | 37.7 | 37.7 | 28.5 | 28.4 | 19.6 | | 35 | 35 |
| 14 | 1 | 25.5 | 48.8 | 48.7 | 25.5 | 22.8 | 18.6 | | 35 | 35 |
| 15 | 1 | 26.4 | 49.9 | 49.8 | 26.2 | 23.5 | 19.4 | | 35 | 35 |
| 16 | 1 | 26.6 | 51.2 | 51.7 | 27.4 | 24.8 | 19.4 | | 35 | 35 |
| 17 | 1 | 26.6 | 53.7 | 53.9 | 27.6 | 25.6 | 19 | | 35 | 35 |
| 18 | 1 | 27.5 | 57.6 | 57 | 27.7 | 24.5 | 19.9 | | 35 | 35 |
| 19 | 1 | 29.4 | 56.8 | 57.4 | 30.7 | 29.2 | 21.5 | | 35 | 35 |
| 20 | 1 | 29.7 | 55.2 | 54.4 | 29.3 | 26.9 | 21.7 | | 35 | 35 |
| 21 | 1 | 28.4 | 46.1 | 46 | 29.2 | 25.6 | 21.5 | | 35 | 35 |
| 22 | 1 | 30.5 | 54.4 | 54.1 | 30.1 | 27.6 | 22.8 | | 35 | 35 |
| 23 | 1 | 35.3 | 47.2 | 45.5 | 35.8 | 34.3 | 27 | | 35 | 35 |
| 24 | 1 | 25.3 | 29 | 30.6 | 24.1 | 21.3 | 16.6 | | 35 | 35 |
| 25 | 1 | 21 | 21.7 | 23.7 | 20.6 | 15.9 | 11 | | 35 | 35 |
| 26 | 1 | 28 | 28.6 | 32.5 | 30.1 | 27.4 | 18.6 | | 35 | 35 |
| 27 | 1 | 14.6 | 13.9 | 16.2 | 15.4 | 8.5 | 3.3 | | 35 | 35 |
| 28 | 1 | 17 | 16.8 | 19.1 | 16.1 | 11.8 | 6.4 | | 35 | 35 |
| 29 | 3 | 5.7 | 9.8 | 6.7 | 6.1 | -2 | -7.2 | | 35 | 35 |
| 30 | 3 | 5.1 | 9.5 | 6 | 5.3 | -3 | -8.1 | | 35 | 35 |
| 31 | 3 | 4.6 | 9.7 | 6.4 | 5.1 | -3.4 | -8 | | 35 | 35 |

| ID | NAG | V1 | V2 | V3 | V4 | V5 | V6 | N7 | PSNL | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Daytime Quarry Operations | Rail loading Only (night time) F Class Inversion no wind | Daytime Quarry Operation Plus Rail Loading | Daytime Quarry Operations Plus Campaign Crushing using mobile jaw crusher | Evening Processing Operations Tertiary Plant only | Early Morning Truck Loading and Product Despatch | Stripping Lot 21 | DAY | NIGHT |
| 32 | 2 | 5.8 | 10.8 | 7.8 | 6.1 | -2.2 | -7.1 | | 35 | 35 |
| 33 | 2 | 7 | 11.6 | 8.8 | 7.3 | -0.8 | -5.4 | | 35 | 35 |
| 34 | 2 | 8.7 | 13.2 | 11.1 | 9.5 | 1.3 | -3.4 | | 35 | 35 |
| 34 A | 2 | 9.5 | 13.6 | 11.8 | 10.2 | 2 | -2.9 | | 35 | 35 |
| 35 | 2 | 12 | 14.6 | 14.8 | 13.5 | 4.8 | -1 | | 35 | 35 |
| 36 | 2 | 11 | 12.8 | 13.8 | 12.4 | 3.8 | -2 | | 35 | 35 |
| 37 | 2 | 12.8 | 13 | 14.8 | 14 | 5.8 | -0.1 | | 35 | 35 |
| 38 | 2 | 10.3 | 10.3 | 12.7 | 11.5 | 3.2 | -2.4 | | 35 | 35 |
| 39 | 3 | 9.7 | 8.8 | 11.3 | 10.5 | 2.8 | -2.7 | | 35 | 35 |
| 40 | 3 | 22.7 | 29.8 | 30 | 22.3 | 13.3 | 20.4 | | 38 | 35 |
| 41 | 3 | 18 | 25.8 | 25.5 | 19 | 9.8 | 15.6 | | 38 | 35 |
| 42 | 3 | 22.1 | 26.9 | 26.4 | 22.1 | 9.9 | 20.1 | | 38 | 35 |
| 43 | 3 | 18.5 | 25.3 | 20.4 | 19.2 | 7.5 | 15 | | 38 | 35 |
| 44 | 3 | 16.2 | 22.5 | 17.9 | 16.9 | 6.9 | 11.7 | | 38 | 35 |
| 45 | 3 | 19.2 | 24.1 | 19.8 | 18.9 | 8.5 | 15.1 | | 38 | 35 |
| 46 | 3 | 16.7 | 22.9 | 18.2 | 17.5 | 7.9 | 11.9 | | 38 | 35 |
| 47 | 3 | 17 | 22.6 | 17.8 | 17.3 | 7.7 | 11.1 | | 38 | 35 |
| 48 | 3 | 18.6 | 23.1 | 18.1 | 18.8 | 10.4 | 11.1 | | 38 | 35 |
| 49 | 3 | 10.6 | 16.3 | 12.5 | 10.5 | 2.8 | 0.1 | | 38 | 35 |
| 50 | 3 | 7.2 | 12.9 | 9.4 | 7.4 | -1 | -4.5 | | 38 | 35 |
| 51 | 3 | 12.1 | 17.7 | 13.1 | 12.6 | 4.4 | 1.5 | | 38 | 35 |
| 52 | 3 | 5.4 | 10.9 | 7.7 | 5.7 | -2.7 | -6.9 | | 38 | 35 |
| 53 | 3 | 16.5 | 22.3 | 17.1 | 17 | 8 | 9.5 | | 38 | 35 |
| 54 | 3 | 14.2 | 20.1 | 14.8 | 15.3 | 6.1 | 6.1 | | 38 | 35 |
| 55 | 3 | 9.4 | 12.6 | 12 | 10.4 | 2.3 | -3.3 | | 35 | 35 |
| 56 | 3 | 12.3 | 19.9 | 14.3 | 14.4 | 5.8 | 2.5 | | 38 | 35 |

### 6.4.2 *ASSESSMENT OF A-WEIGHTED SOUND LEVELS FROM QUARRY OPERATIONS*

**Noise Assessment Group 1 NAG1**

The noise emissions from existing operating conditions at Martins Creek create relatively high noise levels at residences in NAG1 (Station Street and Corey Street) for most of the operational day. The existing noise levels for NAG1 are mostly from the primary and secondary crushing plant and are continuous throughout the operational day.

Residences in NAG1 also experience noise from truck movements and maintenance activities on the southern part of Lot 1 at night at levels that are presently in the range 38 to 45dB(A) depending on the activity.

During rail loading under existing conditions the residents in NAG 1 experience noise levels of 65 dB(A) $L_{eq15\ min}$ with maximum levels up to 80 dB(A) during rail loading activities.

The quarry generally remains inaudible at all other receivers.

**Proposed Day Time Operations**

Noise control works will be installed over the period from year one to year five and the operations that exist on the southern part of the current processing area will be relocated to the northern part of Lot 1. After the installation of the noise control works and the relocation of quarry activities away from the southern portion of Lot 1 noise levels from general quarry operations will be reduced to 37 dB(A) $L_{eq15\ min}$ at the worst affected residence in NAG1 under noise enhancing wind conditions.

The predicted received sound levels at NAG1 for stripping operations range from 33dB(A) $L_{eq15\ min}$ for westerly winds of 3m/s to 44dB(A) $L_{eq15\ min}$ for north easterly winds of 3 m/s with the dozer on an elevated bench at RL 100 and fully visible from residences in Station Street. This is the worst case condition and is only likely to occur when stripping occurs on the elevated parts of the southern portion of Lot 21. Stripping occurs on a campaign basis and will generally occur for short periods of time through the year with noise levels of around 44 dB(A) $L_{eq15\ min}$ being present intermittently throughout the day depending on the working location and orientation of the dozer at the time.

Campaign crushing and breaking oversize will be conducted in the western portion of Lot 5 with the crusher located at RL 40 or below until year 20. In this location rock breaking and crushing of oversize material causes sound levels of between 38 and 42 dB(A)$L_{eq15min}$ at 281 Dungog Road which has a more direct exposure to the quarry as a result of the local topography. All other residences have much lower noise levels.

This is consistent with existing operations although there is some reduction of noise as a result of moving the location of the crusher closer to the base of the high wall with the consequent improvement in barrier noise attenuation. The crusher may be relocated from time to time to other areas of the pit as production demands require and when it is it will be screened appropriately by dedicated bunds to control sound levels. In years 20 to 25 the crusher will be relocated to the floor of the extension of Lot 1 at an RL of 40 or below and in that location noise from crushing will be further reduced by the increased distance to NAG3 and by the increased attenuation provided by using the crusher at a low RL behind the already constructed noise wall on Lot 1.

Traffic noise for residents in NAG1 will be reduced dramatically as all heavy transport will be rerouted along the new access road on Lot 42 and although there will be a moderate increase in traffic noise for some residents in NAG3 it remains within the limits set down by the Road Noise Policy and is not considered to be a significant impact.

Overall there will be a reduction of between 15 and 20dB(A) for day time quarry operations for residents in NAG1 and reduction of 10dB for rail loading and a reduction of more than 15dB in Road Traffic Noise for Residents in NAG1.

The predicted received noise levels for daytime operations remain generally below the PSNG at all residences in NAG2 and NAG3 for all activities and comply with the requirements of the Road Noise Policy and the RING.

**Proposed Evening Processing Operations**

**Tertiary Processing Only**

The quarry operated the tertiary crushing and screening plant during the evening period up until 2007 when the then operators sought a variation to the EPL to exclude the evening processing activity. The recommencement of evening processing operations using the tertiary plant only will be dependent on the completion of the selected noise control works for the tertiary crusher and screening plant.

Initially evening processing will only consist of operating the tertiary crusher and the associated screens (Numbers 2 and 3).

After the completion of suitable sound barriers for the two screens and engineering noise controls for the tertiary crusher the tertiary processing plant can operate without significant change to the evening acoustic environment.

**Primary, Secondary Processing**

The commencement of primary and secondary processing in the evening will follow the completion of the all reasonable and feasible noise attenuation works and will require the completion of the haul road noise barriers and bunds, the barrier at the southern end of the processing area and further engineering noise controls for the primary and secondary crusher in addition to the treatments already applied to the tertiary processing plant.

Processing during the evening period using all processing plant will cause an increase in the evening ambient sound level at the northern end of Station Street as a result of quarry operations. The RBL in the area is 25dB(A) and the sound level is predicted to increase to approximately 30dB(A) $L_{eq15\ min}$ during neutral conditions and increase to approximately 36 dB(A) $L_{eq15\ min}$ under north easterly winds of 3 m/s.

There will be little or no increase in sound during the evening at the southern end of Station Street and Corey Street.

Most of the individual plant items are predicted to produce sound at the northern part of the Station Street at between 20 and 25dB(A) and the predicted sound level at the north of Station Street is primarily due to the loader on ROM stockpile. The sound is expected to be audible as a low level hum but the sound levels are predicted to be well below the Acceptable Noise Level (ANL) for the area and to remain consistent with the PSNL for the evening period, however they may be occasionally audible to most of the residents in NAG1 depending on ambient conditions at the time.

There will be little or no effect on the sound levels at NAG2 and NAG3 as a result of evening processing activities and sound is expected to remain inaudible at those locations.

**Rail Loading**

Rail loading presently occurs on an as needs basis and only during the daytime. The proposal seeks to extend rail loading operations to be a 24 hour seven day per week activity as dictated by market demands and rail repair programmes.

Although approval for rail loading is sought as a 24 hour operation the loading of a train takes approximately three to four hours with a maximum of two trains being loaded in the daytime period and maximum of one train being loaded in the night time period.

The assessment requirement for rail loading is for the day and/or night time assessment period.

Noise from the rail loading hopper and bin will be reduced to within the PSNL for the and the noise remaining as part of rail loading is then the movement and shunting of the train as loading occurs.

The construction of a noise attenuation wall along the rail corridor and noise control treatments of the rail loader and hopper itself will reduce noise imissions from rail loading to below the levels specified in the RING for day time.

In this assessment it is assumed that if the siding is extended and the noise mitigation wall constructed the noise from train operations will be essentially constant at 55dB(A) during the four hour loading activity after which time it will cease as the train will either be parked up waiting for an access path or will depart the site.

In either case the assessable level for night time rail loading is the equivalent continuous sound level from rail activity over the assessment period. The assessable sound level for the night period is 51.4 dB(A) $L_{eq\ night}$ compared with a requirement in the RING for maximum of 50 B(A) $L_{eq\ Night.}$ and 45dB(A) $L_{eq\ Night.}$

The noise levels from train activity on the spur line during the evening and night time are expected to remain above the RING night time maximum noise levels at NAG1 during the period for which a train is being loaded with all reasonable and feasible mitigation in place.

The cost of the noise wall construction is significant and MQC advises that this would only be considered reasonable if the volume of material shipped by rail increase sufficiently to justify the extension of the rail spur.

In the event that sufficient market volumes are not achieved the spur line would not be extended and the construction of the noise wall not be considered reasonable and alternative mitigation may be considered.

Irrespective of the extension of the rail spur noise control treatments would be applied to the rail loader screen and bin to reduce the noise emissions from that aspect of the operation.

The noise emissions to residences during rail loading if the siding is not extended arise as a result of train operations and include loco engines, bunching and stretching, brakes and noise from operating crews as they conduct operations. The noise from train operations only has been measured as 62dB(A) $L_{eq\ 15\ min}$ with $L_{Amax}$ levels that range between 65dB and 84dB. Mitigation of these noise levels in the absence of a major noise attenuation structure can be achieved with some management activities such as trying to control the

timing of rail activities and/or providing voluntary mitigation as required under the VLAMP such as architectural treatment to dwellings that are affected.

If 24 hour rail loading is approved the authority may be able to offer Voluntary Land Acquisition for most of the Residents in NAG1.

**Maintenance**

RCA has measured actual noise levels from existing maintenance activities conducted on the fixed plant in the northern portion of the existing processing area using impact wrenches and hammers, at between 25 and 32dB(A) when measured at the closest residence in Station Street. The noise from maintenance in the northern part of the existing processing area is not currently considered to represent an adverse noise impact although some aspects of maintenance activity in the southern part of the Lot have previously been cause for concern.

It is proposed that all maintenance activities be moved into the northern part of the existing processing area where they will be conducted behind the noise barrier provided on the southern side of the existing processing area. After the construction of noise treatments in Stage 2 noise from any maintenance activity is expected to be below 25dB $L_{A01}$ at the nearest and worst affected residence and, although this may occasionally be audible outside a dwelling, it is not likely to cause offensive noise nor will it cause sleep disturbance.

Noise from on site truck movements associated with maintenance activities will be reduced as the vehicles will be located further away from the receivers and after year five will be behind the newly constructed noise barrier adjacent to the processing area. Truck movements associated with maintenance activities are isolated individual events and are not properly assessed as an $L_{Aeq}$ but are assessed as $L_{A01\ 1min}$. The predicted received noise level from on site truck movements associated with conducting maintenance is between 10dB(A) and 20dB(A) allowing for airbrake release and body noise. These levels are well below the sleep disturbance criteria and are unlikely to be perceptible to most of the population,

**Early Morning Loading and Despatch**

The operation of loaders and trucks on the site from 5:30 am, after the construction of the Stage 2 noise controls, will produce predicted received sound levels at nearby residences in the range 25 to 30dB(A). These are consistent with the Project Specific Noise Goals and although there may be an increase in the ambient sound level as a result of the operations the impact is considered to be minimal.

## 6.5 ROAD TRAFFIC NOISE ASSESSMENT

### *6.5.1 EXISTING ROADS*

To assess the impact of the proposed quarry extension on traffic noise in the surrounding area the existing traffic volumes and noise levels were measured at representative locations along the transport route. Two separate surveys were conducted in Paterson and Bolwarra. The first was conducted between 25 August 2014 and 2 September 2014 at a time when previous wet weather had caused a reduction in quarry orders and subsequently delivery volumes were reduced. The second survey was conducted between the 31 October and 11 November 2014 when delivery volumes were considered to be normal for the current operations. Further traffic counts were conducted in July 2015 to validate the earlier two counts. Traffic classification counters were installed in

locations that were representative of the traffic flows past the noise logger but remote from the noise logger locations so as not to influence the result. MCQ is currently serviced predominantly by truck and trailer configuration vehicles which classify as Class 9 vehicles on a standard traffic counter. Quarry dispatch records were consulted and it is considered reasonable to assume that most of the Class 9 vehicles traveling via Paterson during the survey were accessing MCQ. The same assumption cannot be made for the Bolwarra location as that section of road also services other quarries in the area including Rosebrook Sand and Gravel at Maitland Vale and also some of the MQC trucks travel via Butterwick Road to access eastern and northern delivery locations.

#### *6.5.1.1 BASELINE ROAD TRAFFIC NOISE LEVELS*

**Table 23** details the existing road traffic noise levels measured at Bolwarra and Paterson in August and October 2014.

**Table 23** *Measured Traffic Noise Levels*

| **Location** | **Week Average $L_{Aeq\ 15hr}$** | | **Worst Day In Week $L_{Aeq\ 15hr}$** | | **RNP Criteria For Arterial Road** |
|---|---|---|---|---|---|
| Patterson | 25 Aug - 2 Sept | 31 Oct - 11 Nov | 25 Aug - 2 Sept | 31 Oct- 11 Nov | |
| Loc1 | 60 | 61 | 62 | 62 | 60 |
| Loc 2 | 64 | 63 | 65 | 64 | 60 |
| Loc 3 | 61 | 60 | 62 | 62 | 60 |
| Bolwarra | 67 | 65 | 68 | 66 | 60 |

#### *6.5.1.2 TRAFFIC MOVEMENTS AS A RESULT OF THE QUARRY EXTENSION PROJECT*

Quarry deliveries are a function of the specific order volume at the time and are subject to significant peaks and troughs depending on the amount of infrastructure work that is being conducted at the time. It is, therefore, not possible to reliably predict exact truck numbers on any given day or in any given week for which to conduct an assessment. Given the nature of the industry and the variation in truck movements, it was decided to make a worst case assessment by assuming that the number of trucks per day (15 hours) doubled from the baseline count at Paterson as a result of the Quarry extension project. The baseline is taken to be the bi-directional five day average for Class 9 vehicles over the survey period. Three survey periods have been assessed to account for natural variations in the traffic flows and summary traffic count data is attached at **Appendix C**.

**Table 24** Sets out the measured traffic counts and noise levels for the August 14 and October 14 survey alongside the predicted sound levels from the CoRTN model used to conduct the assessment. There is less than 1 dB difference between the measured and predicted noise levels for the existing situation. The predicted changes in noise level at the most affected location (Location 2) in Paterson as a result of doubling the number of truck and trailer combinations in the traffic stream is less than 1 dB in all cases and accordingly the NSW Road Noise Policy defines this to be a negligible increase in traffic noise as a result of the Project.

**Table 24** *Changes in Traffic Flows and Noise Levels for Worst Case Residence in Paterson*

| Baseline Survey Date | Aug-14 | | Oct-14 | | Jul-15 | |
|---|---|---|---|---|---|---|
| Vehicle Class | Existing Heavy Traffic | New Heavy Traffic | Existing Heavy Traffic | New Heavy Traffic | Existing Heavy Traffic | New Heavy Traffic |
| 3 | 200 | 200 | 204 | 204 | 151 | 151 |
| 4 | 74 | 74 | 76 | 76 | 44 | 44 |
| 5 | 8 | 8 | 8 | 8 | 3 | 3 |
| 6 | 10 | 10 | 21 | 21 | 10 | 10 |
| 7 | 6 | 6 | 9 | 9 | 12 | 12 |
| 8 | 3 | 3 | 6 | 6 | 5 | 5 |
| 9 | 144 | 287 | 295 | 591 | 180 | 360 |
| 10 | 11 | 11 | 15 | 15 | 29 | 29 |
| Total Heavy | 456 | 600 | 634 | 930 | 434 | 613 |
| 5 Day AADT | 3290 | 3434 | 3078 | 3373 | 3078 | 3258 |
| Percent Heavy | 13.872 | 17.474 | 20.604 | 27.557 | 14.087 | 18.829 |
| Predicted $L_{Aeq\ 15hr}$ | 63.8 | 64 | 64.6 | 65.9 | 63.5 | 64.6 |
| Measured $L_{Aeq\ 15hr}$ | 64 | N/M | 63.8 | N/M | N/M | N/M |
| RNP Target | N/A | 66 | N/A | 66 | N/A | 66 |

*NM = Not Measured *N/A = Not Applicable.

### 6.5.2 *Effects of Traffic on Dungog Road as a Result of New Access Road*

The creation of the new access road to divert heavy vehicle traffic away from the Township of Martins Creek will add additional traffic on the section of road between the new access point and the intersection of Dungog Road and Grace Avenue. This is a relatively short section of road where the outgoing loaded trucks will be accelerating downhill and decelerating uphill thus causing a minimum noise impact. The newly affected residences along this section of road are, for the most part, set back some distance from the road with the exception of number 256 Dungog Road which is approximately 30 metres from the carriageway.

Changes in traffic noise level at the façade of the dwellings at 256, 279, and 281 Dungog Road have been calculated using baseline traffic noise level logging that was conducted at the front boundary of 281 Dungog Road, approximately 30 metres from the carriageway. To establish the traffic noise levels at the façade of the residences that are significantly more than 30 metres from the carriageway distance attenuation was allowed for using the CoRTN model and assuming flat open ground from the roadway to the residential façade and no fencing or other obstructions to the passage of sound. Dungog Road is part of MR101 and carries a five day AADT of approximately 700 vehicles at

Martins Creek. The calculations assume that there is currently 10 percent heavy vehicles on that section of road and adds the maximum predicted increase in the number of heavy vehicles (590 per 15 hour day) to the existing traffic volume.

**Table 25** *Change in Traffic Noise levels at Dungog Road Residences*

| Address | Distance from Carriageway | Existing Traffic SPL LAeq 15hr | Predicted New Traffic SPL LAeq 15hr | RNP Assessment Criteria | Complies with RNP |
|---|---|---|---|---|---|
| 256 Dungog Road | 30 | 53 | 59.5 | Less than 60 | Yes |
| 279 Dungog Road | 300 | 43.9 | 52.9 | Less than 12dB Increase | Yes |
| 281 Dungog Road | 150 | 46.9 | 50.0 | Less than 12dB Increase | Yes |

The road traffic noise levels at properties that are likely to be worst affected by additional traffic as a result of the Quarry Extension Project complies with the assessment criteria set down in the NSW Road Noise Policy and are generally less than the levels that currently exist for residents in Station Street. Reductions in facade noise level for properties near Dungog Road could be achieved by the construction of earthen bunds along the property boundaries should the issue become a concern for affected residents.

# 7 MANAGEMENT AND MONITORING

## 7.1 OPERATIONAL CONTROLS

The noise control management strategies that were developed during the modelling and assessment process are listed below:

- Noise during topsoil stripping will be minimised, wherever, possible by minimising the exposure of the equipment to surrounding residences.
- The following engineering noise control elements will be constructed to either reduce noise at source or to interrupt the noise path. The locations of the treatments are shown in **Figure 8**:
  - Eight-metre high noise barrier to southern area part of processing area.
  - Three-metre high noise barrier to southern section of haul road and dump area.
- Engineering noise-control treatments/to the following plant items:
  - Primary and secondary crusher.
  - Fixed screens.
  - Rail loading screen and hopper.
- Relocation of the maintenance functions,
- Discontinuation of the use of the southern part of the existing area currently used for stockpile and ancillary support functions.


Figure 6
Martins Creek Quarry
Acoustic Treatments
Legend
Noise Barrier
Building Enclosure
Haul Roadway
370100
370200
370300
370400
370500
370600
370700
370800
370900
371000
6397500
6397400
6397300
6397200
6397100
6397000
Martins Creek Martins Creek

- New access road for produce dispatch.
- Discontinuation of the use of Station Street for road transport of the product.
- Construction of a four metre high noise barrier to rail siding in conjunction with the extension of rail siding.

**Monitoring**

In each of the NAG1 and NAG3 one dwelling in each group is more affected by noise from the property that any other in NAG1 it is 23 Station Street in NAG3 the most affected dwelling is 281 Dungog Road as it has most exposure to the quarry operations due to local terrain. None of the dwellings in NAG2 are predicted to be significantly affected and regular monitoring at these locations is considered unnecessary.

Quarterly attended Operational Noise Monitoring will be progressively introduced at Station Street (NAG1) and at 281 Dungog Road (NAG3) as the project develops and the noise controls are put in place. It is not considered necessary to monitor along Merchants Road (NAG2) as the predicted noise levels are too low in that area.

MCQ considers that it is not reasonable to construct the noise wall along the rail siding unless market volumes shipped by rail increase sufficiently to justify the capital expenditure. Although there will be a drop in the noise level while trains are being loaded, unless the market volumes increase to an adequate level, rail loading will generally be a small and infrequent part of the operation, which would not justify the capital expense of the noise wall.

## 8 CONCLUSION

This environmental noise impact assessment has considered all relevant aspects of the proposed expansion project for Martins Creek Quarry.

The assessment indicates that there will be exceedance of the project's specific noise goals for some aspects of the operation at NAG1, however, the overall noise impact on that group of receivers will be reduced significantly.

The noise impacts on other receivers will change very little as a result of the proposed expansion project, however there will be some reduction in noise levels from campaign crushing operations over the life of the quarry as equipment moves away from residents and deeper into the pit.

The quarry has been operating within an existing open footprint and has not needed to undertake, overburden and top soil stripping associated with the opening of new areas for some time. Consequently, the introduction of campaign stripping activities will introduce some short-term higher noise levels that have not been present for some time but are an essential part of the quarry operations and are not feasible to reduce below what is predicted.

In accordance with Section 10 of the INP, where noise levels exceed the PSNG then the regulator and noise source manager may need to negotiate achievable noise limits for the operation. Achievable noise limits after the application of all reasonable and feasible noise controls have been applied to the proposed operation have been determined. It is the opinion of RCA Acoustics that all reasonable and feasible measures have been considered in this assessment.

Martins Creek Quarry therefore, proposes the following criteria be applied for the expansion project

- All Operations Except Rail Loading:
  - NAG1- $L_{eq15min}$ 45 dB(A) for daytime, 35 dB(A) for evening and night time
  - NAG 2 - $L_{eq15min}$ 38 dB(A) for daytime, 35 dB(A) for evening and night time
  - NAG 3 - $L_{eq15min}$ 35dB(A) for all time periods,
- Rail Loading after the extension of the rail spur and construction of noise wall:
  - NAG1 - $L_{eq15min}$ 55 dB(A) for all time periods sleep disturbance 45 dB $L_{A01\ 1min}$
  - NAG 2 - 38 dB(A) for Daytime, 35 dB(A) for Evening and Night time
  - NAG 3 - $L_{Aeq15min}$ 35dB(A) for all time periods sleep disturbance 45 dB $L_{A01\ 1min}$

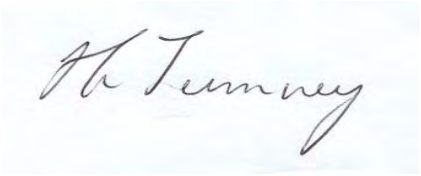
Martins Creek Quarry is a long established facility providing an essential resource which is limited in its availability in the area. The acoustic climate around the area is predominantly quiet rural areas some of which have been dominated by noise from the quarry for a long period.

The proposed expansion project will reduce overall noise levels for most operations and will eliminate a number of issues that have been the subject of public concern in the past, specifically road traffic noise on Station Street and late night noise impacts associated with maintenance.

In conclusion, MCQ has committed to implementing noise reduction measures that will reduce noise impacts overall but will not achieve the PSNG for all operations at all times. The quarry will progressively implement a variety of noise management actions over the Stages 1 and 2 and will monitor progress and effectiveness of those measures as they are installed.

Yours Sincerely

RCA Acoustics



Ray Tumney BEng (Mech), MEnv Stud, MIEAust, MAAS.

Principal Acoustic Engineer

## 9 REFERENCES

[1] Australian Standard 1055.1 – 1997 Acoustics – Description and Measurement of Environmental Noise – General Procedures.

[2] Environmental Protection Agency, NSW Industrial Noise Policy (INP), 2000.

[3] Protection of the Environment Operations Act (POEO Act), 1997.

[4] Rail Logistics Options for Martins Creek Quarry, Plateway Pty Ltd

## 10 GLOSSARY

dB(A) Unit of sound pressure level, modified by the A-weighting network to represent the sensitivity of the human ear.

Gradient Wind Gradient wind is the regional wind determined by synoptic factors (high and low-pressure systems), and may originate from any direction.

SPL Sound Pressure Level (SPL), the incremental variation of sound pressure from the reference pressure level, 20 µPa, expressed in decibels.

SWL ($L_W$) Sound Power Level (SWL) of a noise sources per unit time expressed in decibels from reference level $W_O$ of $10^{-12}$ W.

$L_X$ Statistical noise descriptor. Where (x) represents the percentage of the time for which the specified noise level is exceeded.

$L_{eq}$ Equivalent continuous noise level averaged over time on an equivalent energy basis.

$L_1$ Average Peak Noise Level in a measurement period.

$L_{10}$ Average Maximum Noise Level in a measurement period.

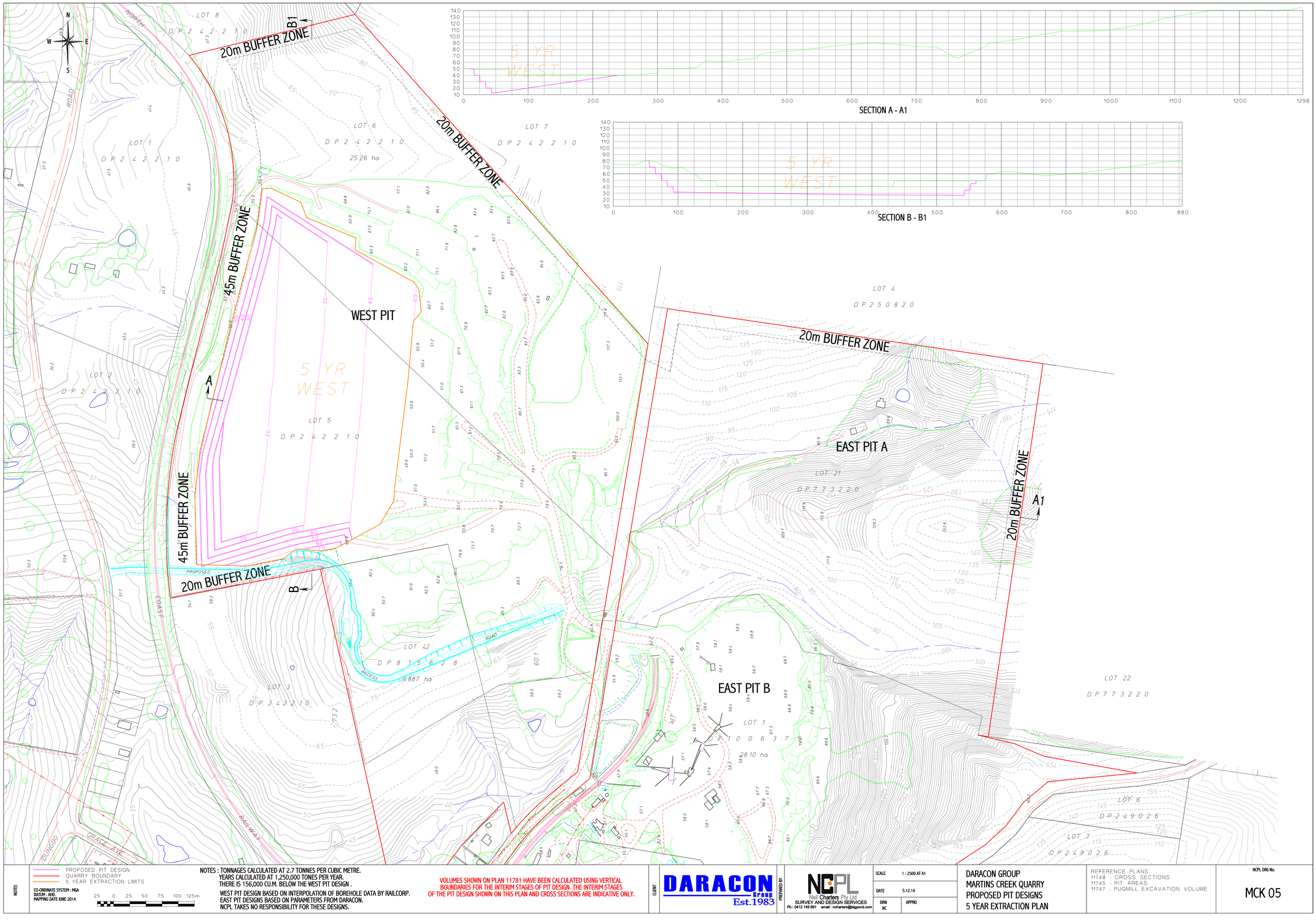
$L_{90}$ Average Minimum Noise Level in a measurement period.

$L_{max}$ Maximum Noise Level in a measurement period.

Background Noise Level Noise level determined for planning purposes as the one tenth percentile of the ambient $L_{A90}$ noise levels.

$P_O$ Reference Sound Pressure, 20 µPa, for the calculation of SPL in decibels.

$W_O$ Reference Sound Power, $10^{-12}$ W, for the calculation of SWL in decibels.




PROPOSED PIT DESIGN
QUARRY BOUNDARY
5 YEAR EXTRACTION LIMITS

CO-ORDINATE SYSTEM : MGA
DATUM : AHD.
MAPPING DATE JUNE 2014

25 0 25 50 75 100 125m

NOTES : TONNAGES CALCULATED AT 2.7 TONNES PER CUBIC METRE.
YEARS CALCULATED AT 1,250,000 TONES PER YEAR.
THERE IS 156,000 CU.M. BELOW THE WEST PIT DESIGN .
WEST PIT DESIGN BASED ON INTERPOLATION OF BOREHOLE DATA BY RAILCORP.
EAST PIT DESIGNS BASED ON PARAMETERS FROM DARACON.
NCPL TAKES NO RESPONSIBILITY FOR THESE DESIGNS.

VOLUMES SHOWN ON PLAN 11781 HAVE BEEN CALCULATED USING VERTICAL BOUNDARIES FOR THE INTERIM STAGES OF PIT DESIGN. THE INTERIM STAGES OF THE PIT DESIGN SHOWN ON THIS PLAN AND CROSS SECTIONS ARE INDICATIVE ONLY.

NOTES

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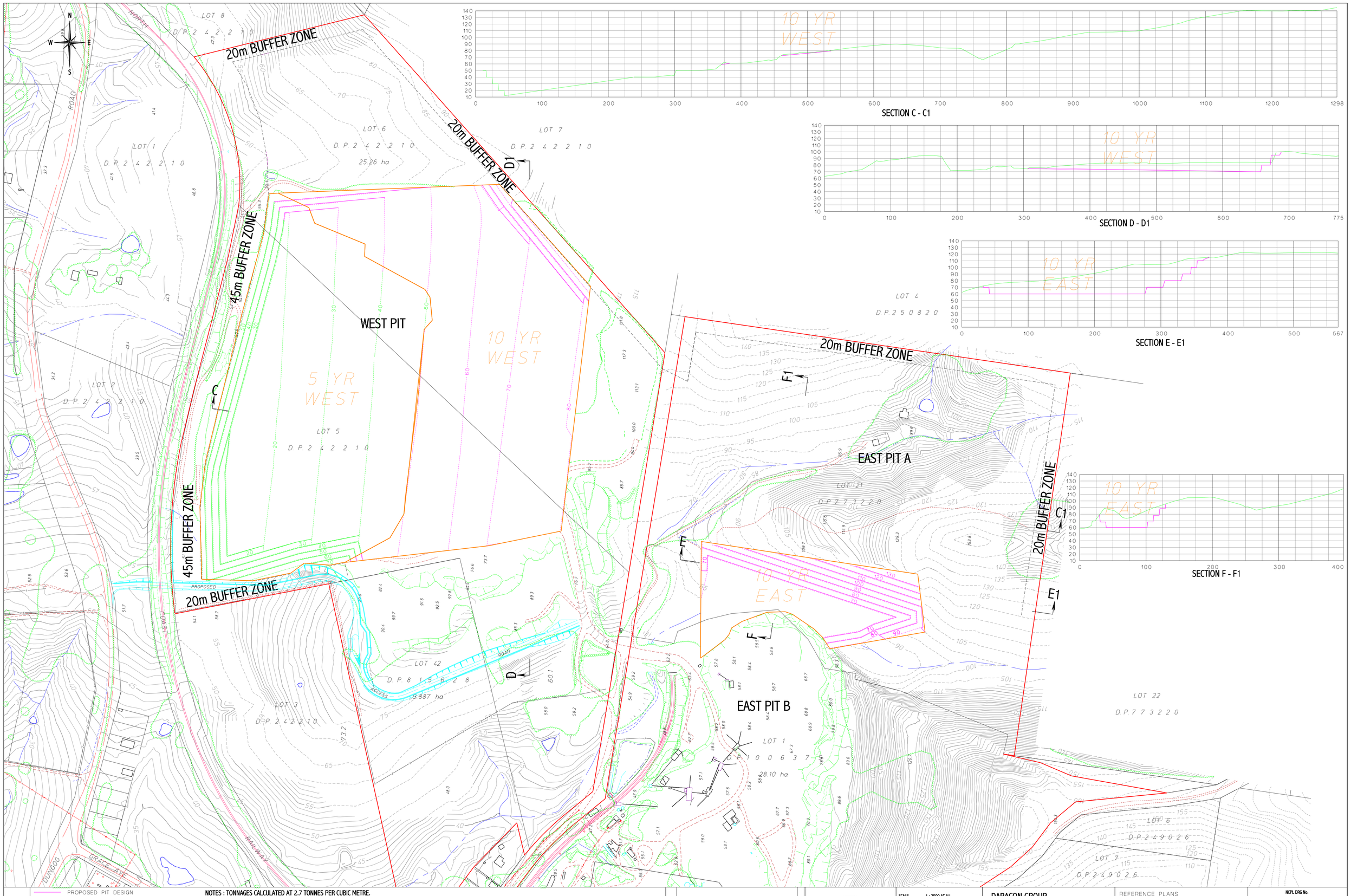
PREPARED BY: NCPL Neil Charters Pty Ltd
SURVEY AND DESIGN SERVICES
Ph : 0412 149 691 email : ncharters@bigpond.com

SCALE 1 : 2500 AT A1
DATE 5.12.14
DRN NC
APPRO

DARACON GROUP
MARTINS CREEK QUARRY
PROPOSED PIT DESIGNS
5 YEAR EXTRACTION PLAN

REFERENCE PLANS
11748 - CROSS SECTIONS
11745 - PIT AREAS
11747 - PUGMILL EXCAVATION VOLUME

NCPL DRG No.
MCK 05




SECTION C - C1




SECTION D - D1




SECTION E - E1




SECTION F - F1




NOTES

PROPOSED PIT DESIGN
QUARRY BOUNDARY
10 YEAR EXTRACTION LIMITS

CO-ORDINATE SYSTEM : MGA
DATUM : AHD.
MAPPING DATE JUNE 2014

25 0 25 50 75 100 125m

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Ph : 0412 149 691 email : ncharters@bigpond.com

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NCPL DRG No.

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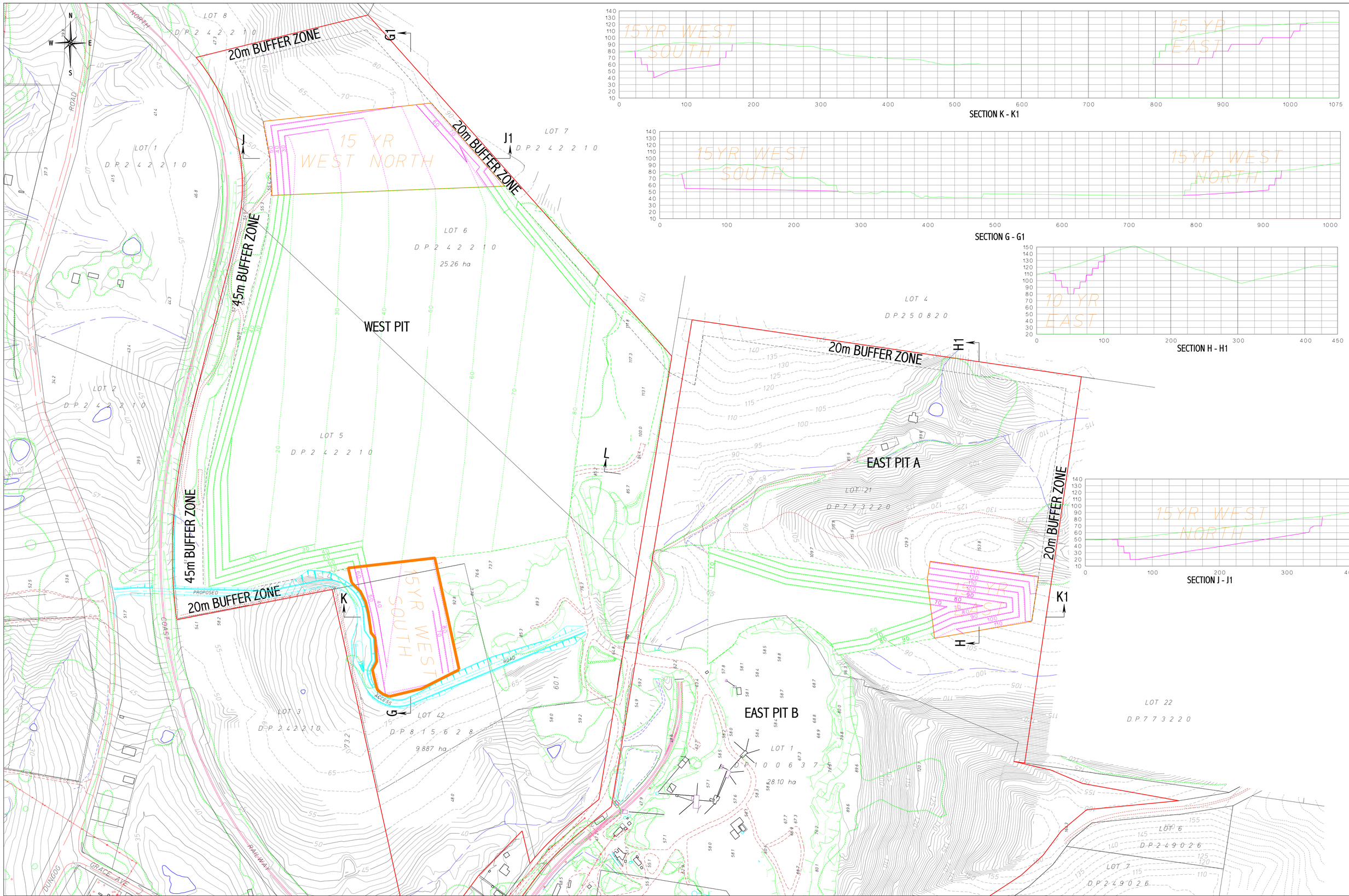





SECTION K - K1




SECTION G - G1




SECTION H - H1




SECTION J - J1

NOTES

PROPOSED PIT DESIGN
QUARRY BOUNDARY
15 YEAR EXTRACTION LIMITS

CO-ORDINATE SYSTEM : MGA
DATUM : AHD.
MAPPING DATE JUNE 2014

25 0 25 50 75 100 125m

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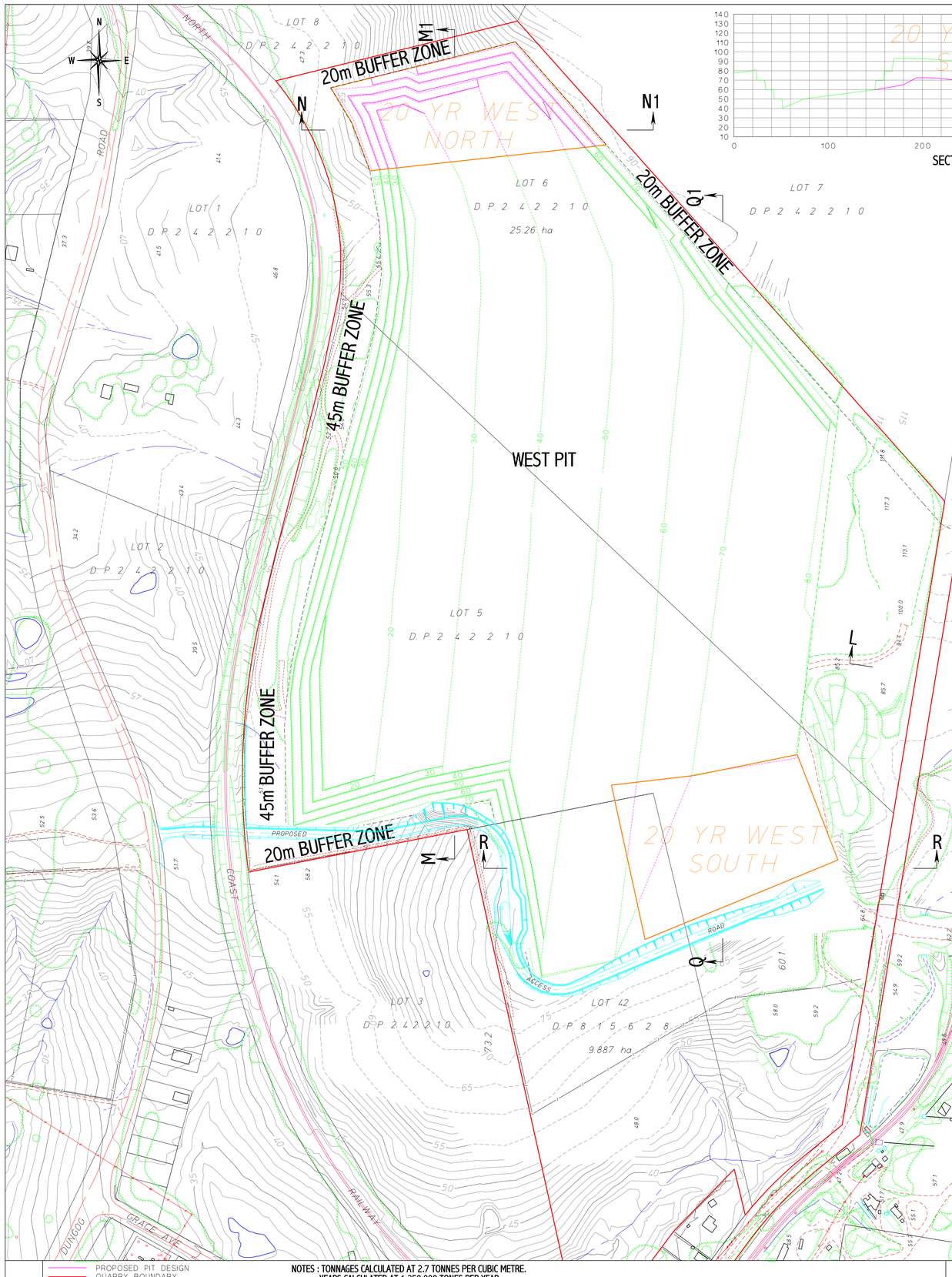
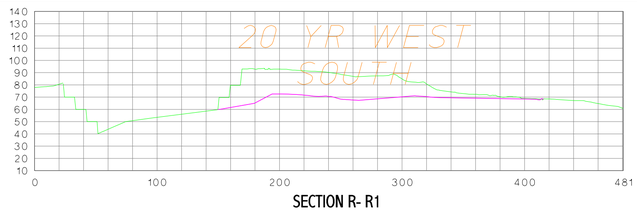
MARTINS CREEK QUARRY
PROPOSED PIT DESIGNS
15 YEAR EXTRACTION PLAN

REFERENCE PLANS
11748 - CROSS SECTIONS
11745 - PIT AREAS
11747 - PUGMILL EXCAVATION VOLUME

NCPL DRG No.
MCK 15

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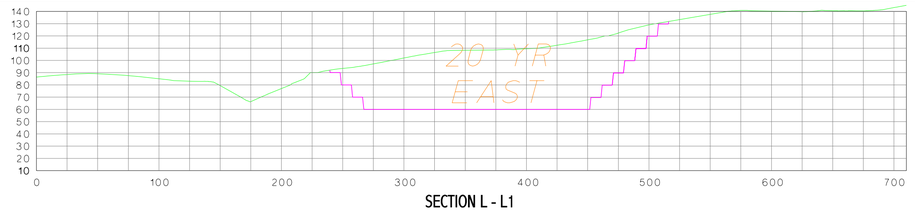


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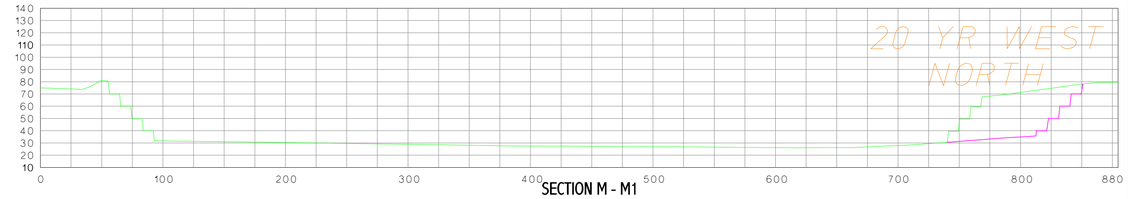


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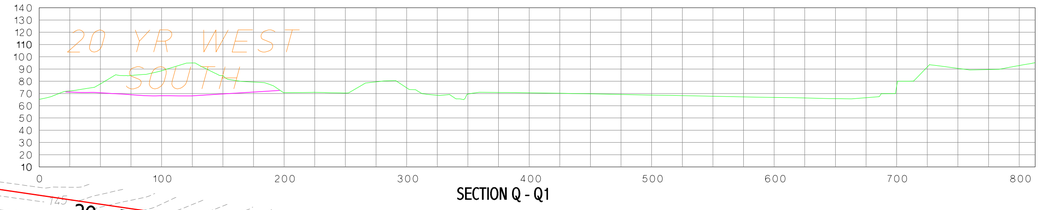


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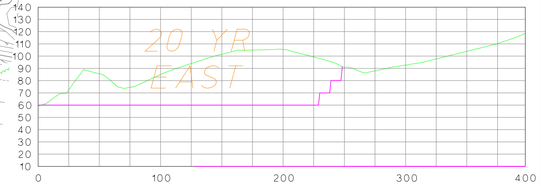


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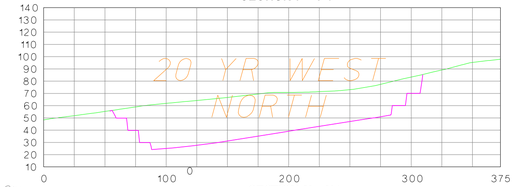


SECTION N - N1

NOTES

PROPOSED PIT DESIGN
QUARRY BOUNDARY
20 YEAR EXTRACTION LIMITS

CO-ORDINATE SYSTEM : MGA
DATUM : AHD.
MAPPING DATE JUNE 2014

25 0 25 50 75 100 125m

NOTES : TONNAGES CALCULATED AT 2.7 TONNES PER CUBIC METRE.
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SURVEY AND DESIGN SERVICES
Ph : 0412 149 691 email : ncharters@bigpond.com

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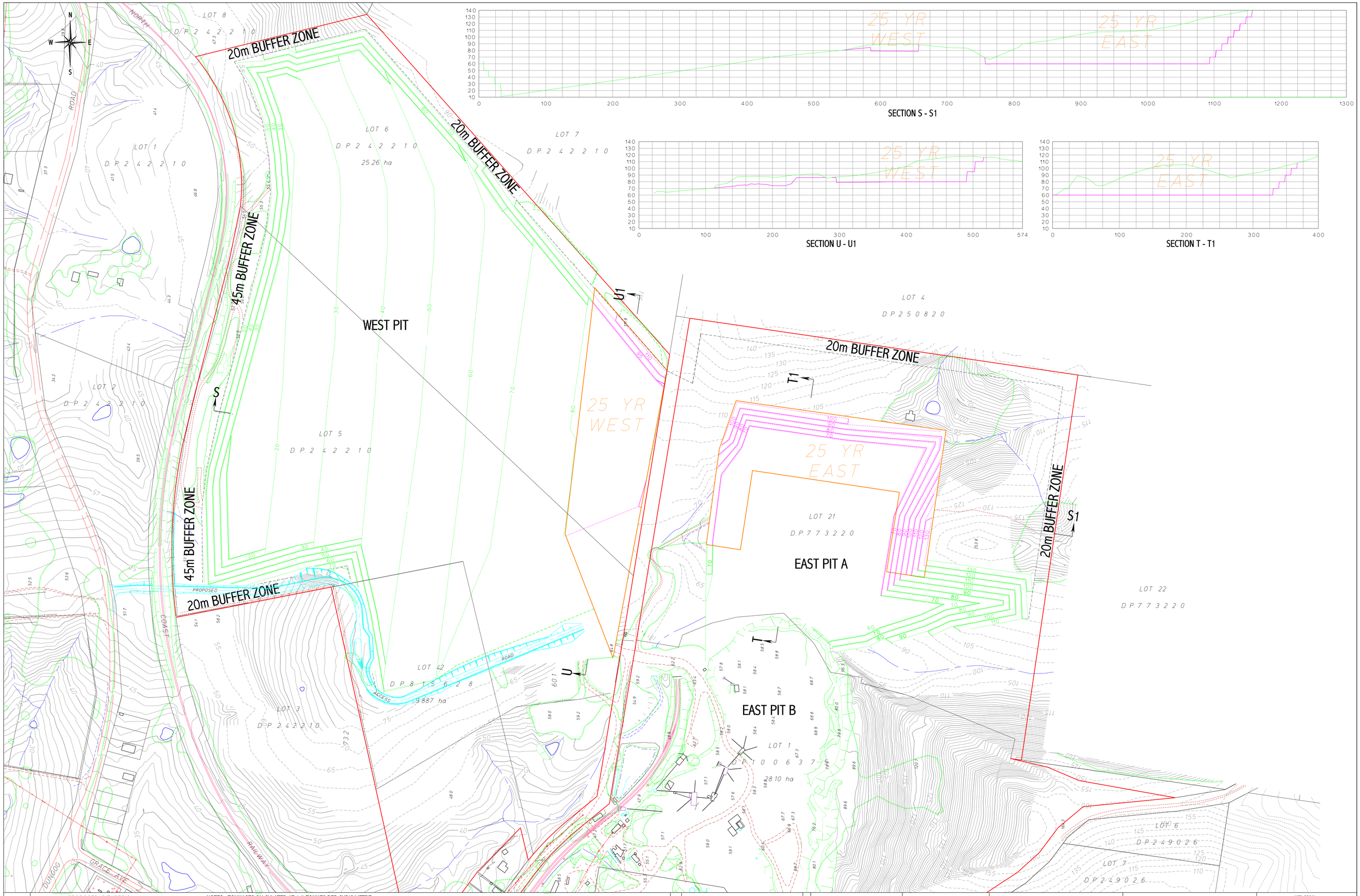
MARTINS CREEK QUARRY
PROPOSED PIT DESIGNS
20 YEAR EXTRACTION PLAN

REFERENCE PLANS
11748 - CROSS SECTIONS
11745 - PIT AREAS
11747 - PUGMILL EXCAVATION VOLUME

NCPL DRG No.

MCK 15




NOTES

PROPOSED PIT DESIGN
QUARRY BOUNDARY
25 YEAR EXTRACTION LIMITS

CO-ORDINATE SYSTEM : MGA
DATUM : AHD.
MAPPING DATE JUNE 2014

25 0 25 50 75 100 125m

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| NC | |

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MARTINS CREEK QUARRY
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25 YEAR EXTRACTION PLAN

REFERENCE PLANS
11748 - CROSS SECTIONS
11745 - PIT AREAS
11747 - PUGMILL EXCAVATION VOLUME

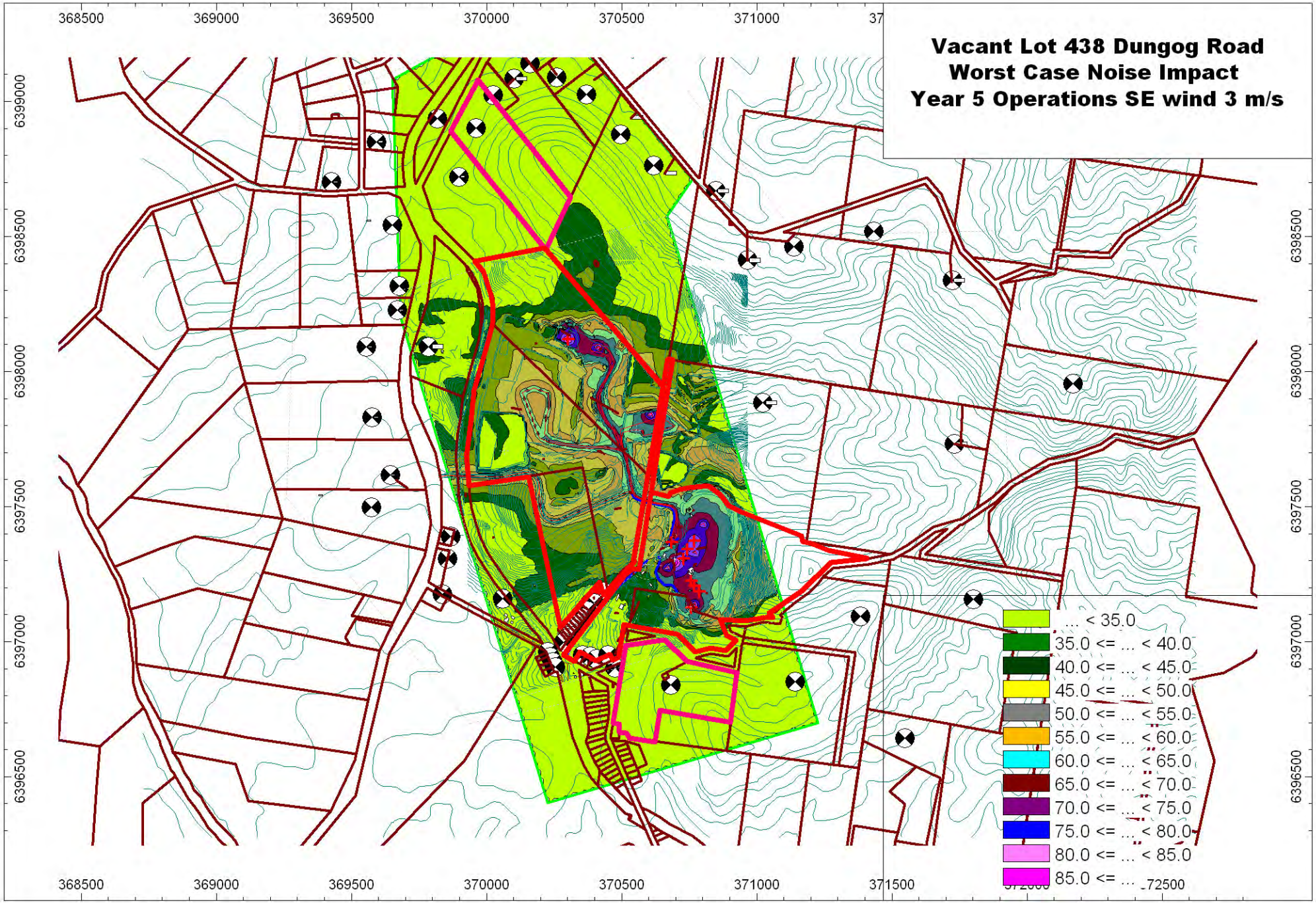
NCPL DRG No.

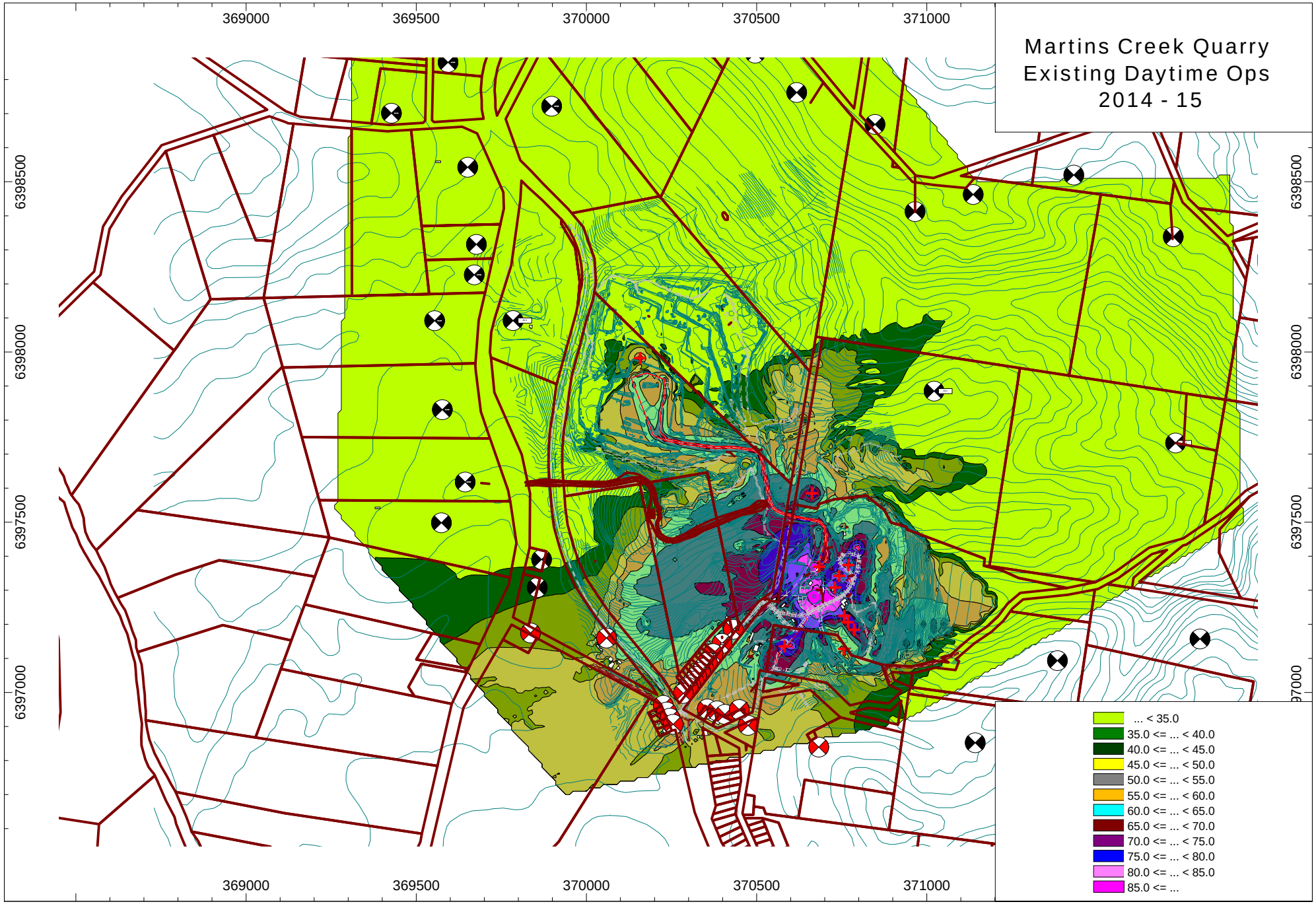
MCK 25

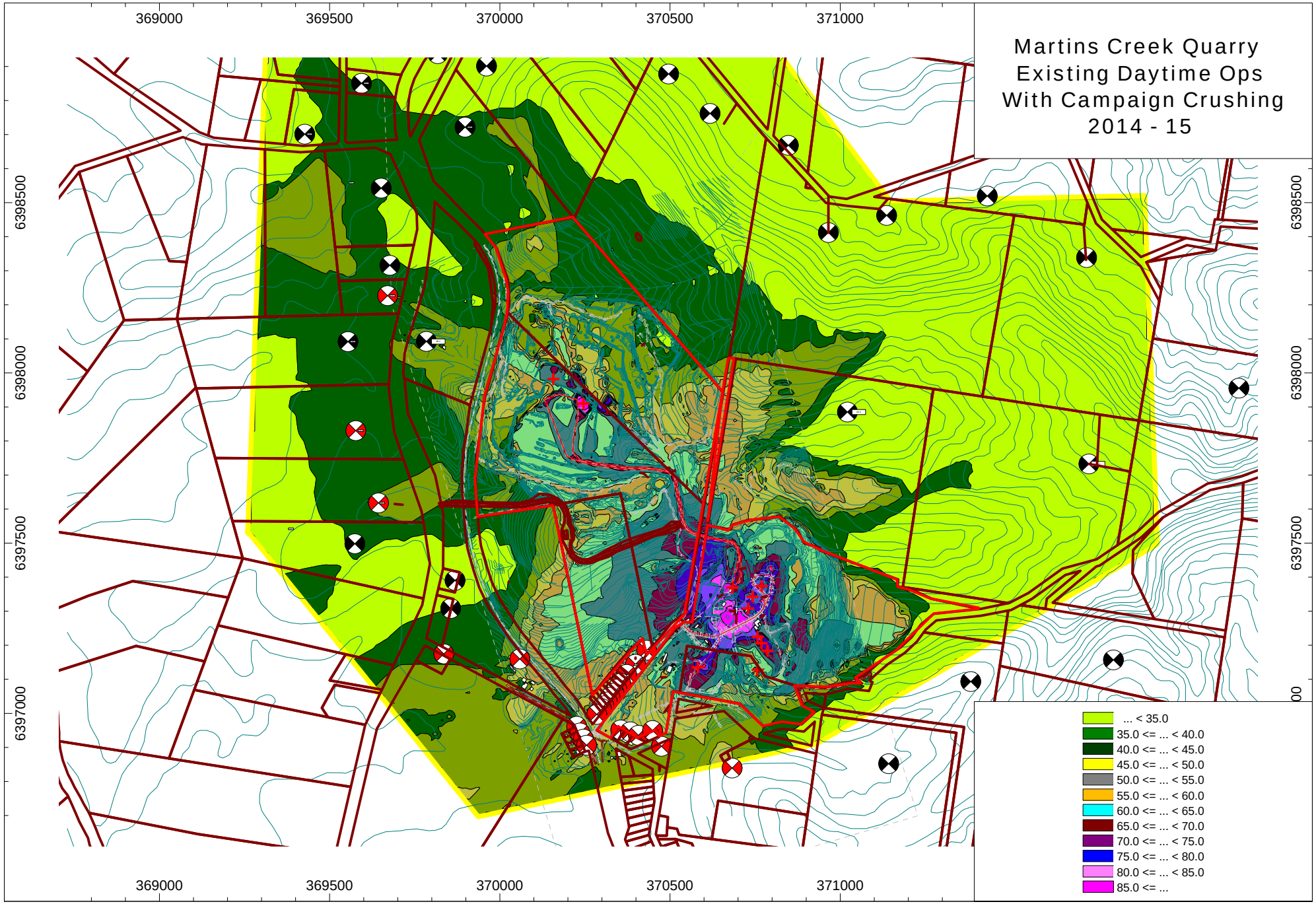
# Appendix B

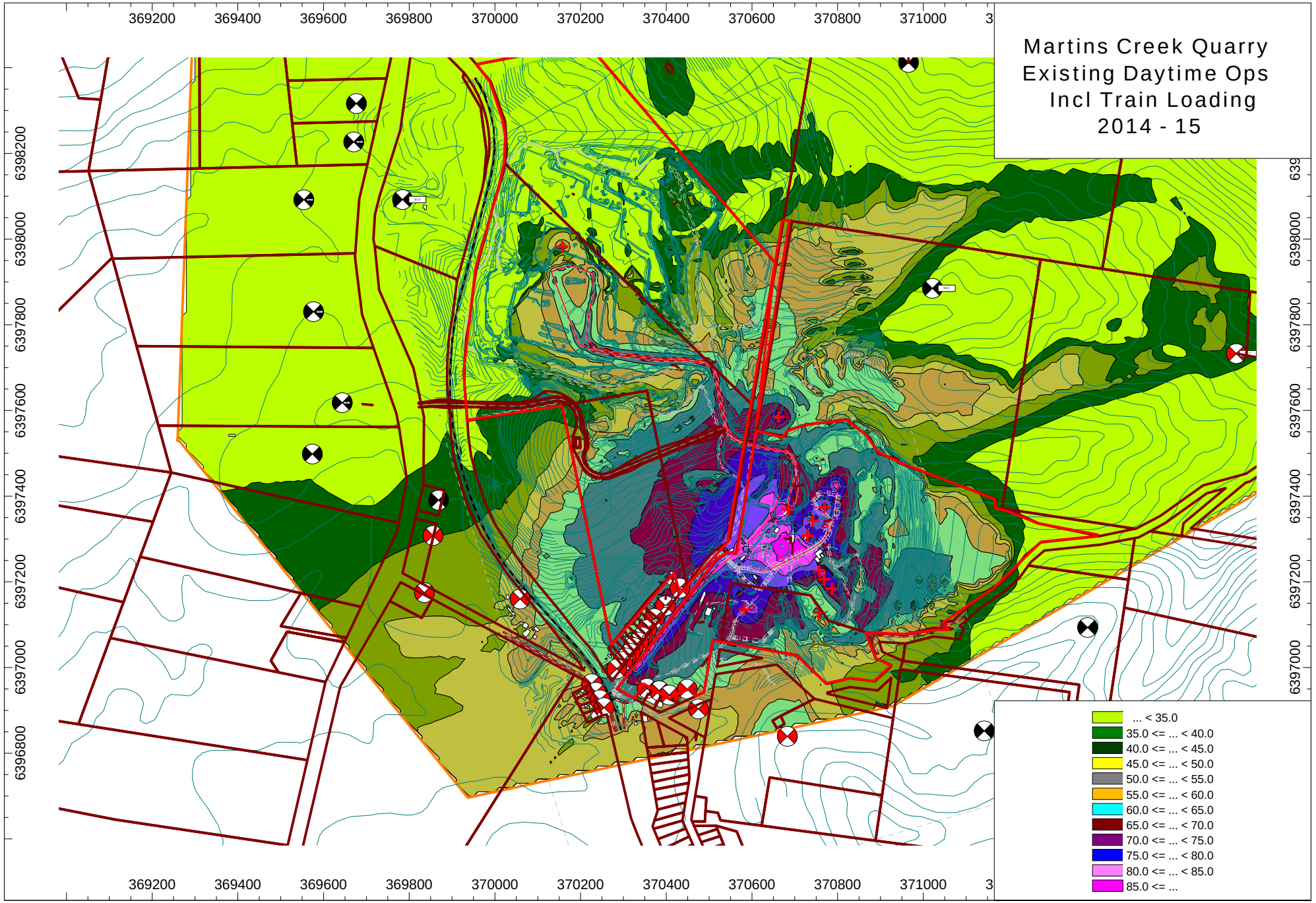
Noise Contours

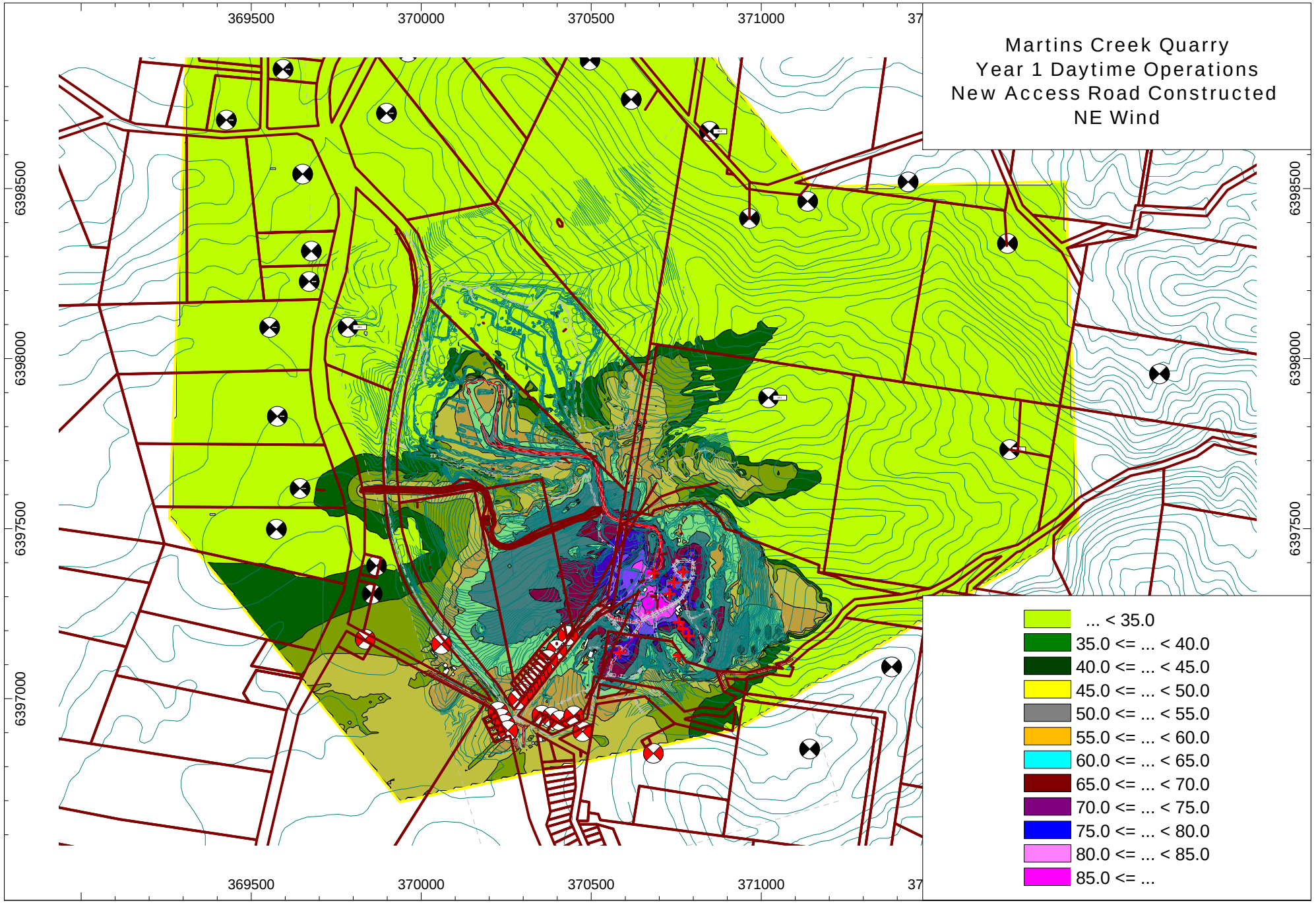

Vacant Lot 10 Vogels Road
Worst Case Year 20 with NE Wind
369600
369800
370000
370200
370400
370600
370800
371000
371200
6398000
6397800
6397600
6397400
6397200
6397000
6396800
6396600
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

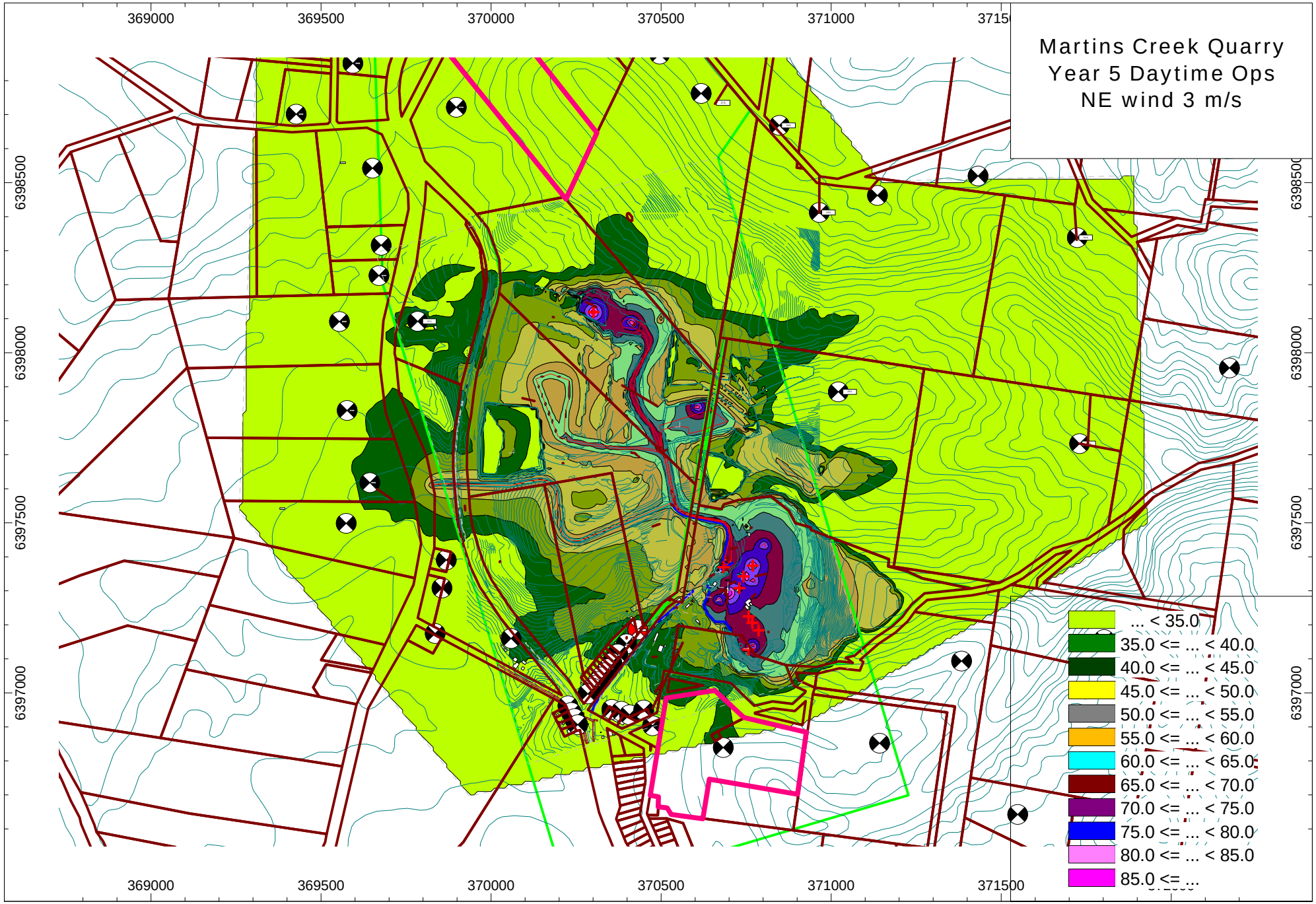

Vacant Lot 438 Dungog Road
Worst Case Noise Impact
Year 5 Operations SE wind 3 m/s
368500
369000
369500
370000
370500
371000
371500
6399000
6398500
6398000
6397500
6397000
6396500
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

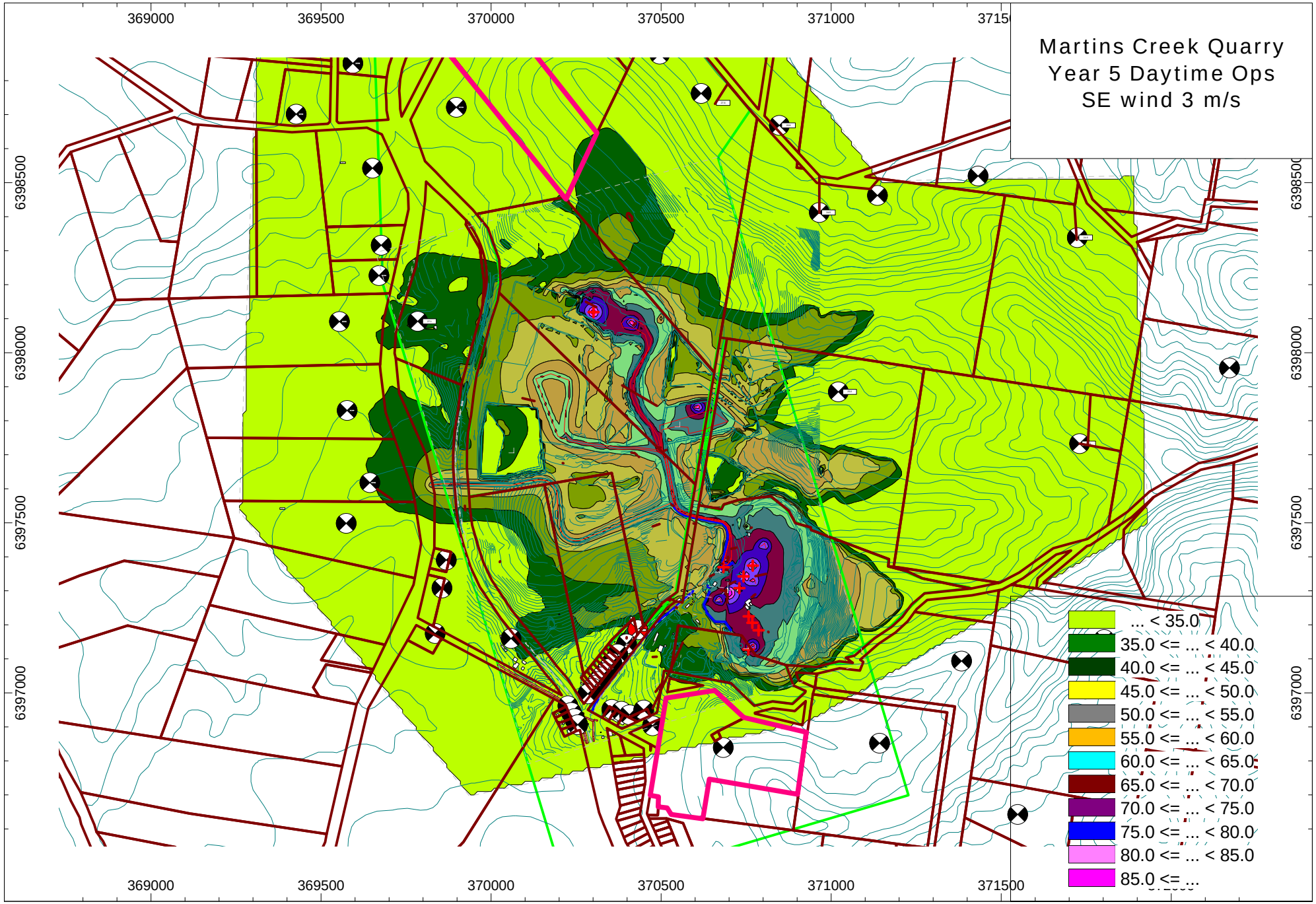

Martins Creek Quarry
Existing Daytime Ops
2014 - 15
369000
369500
370000
370500
371000
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

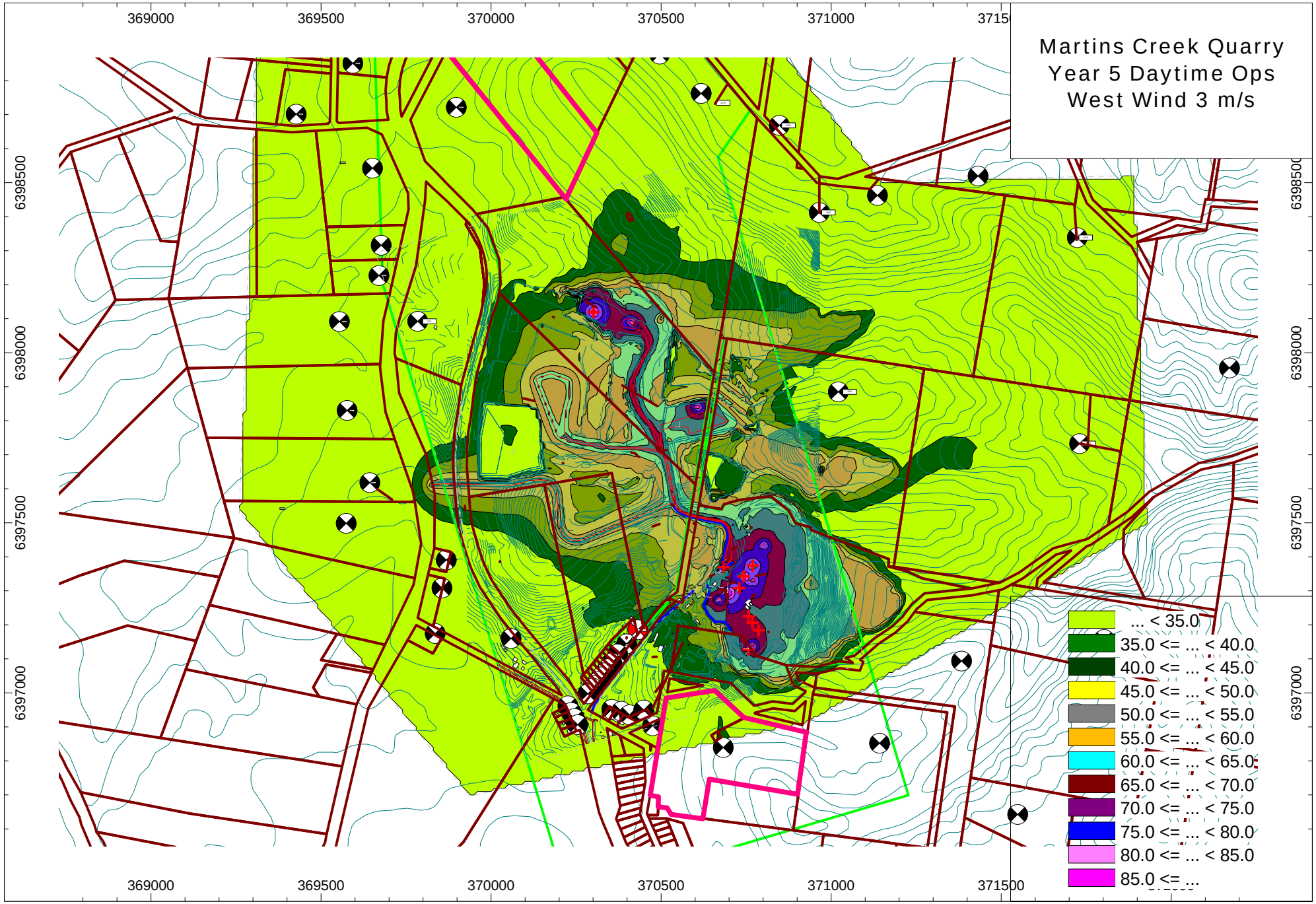

Martins Creek Quarry
Existing Daytime Ops
With Campaign Crushing
2014 - 15
369000
369500
370000
370500
371000
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

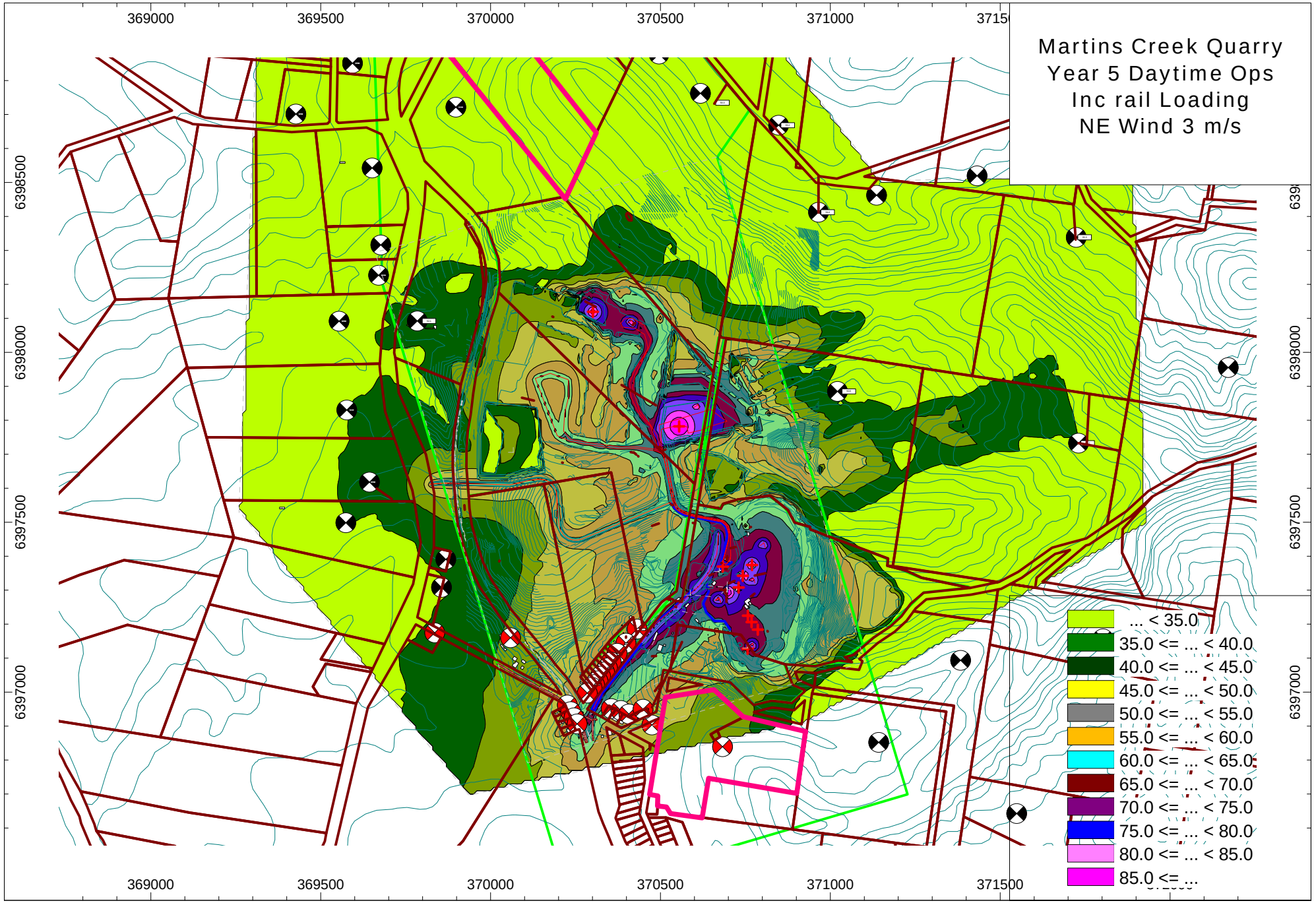

Martins Creek Quarry
Existing Daytime Ops
Incl Train Loading
2014 - 15
369200
369400
369600
369800
370000
370200
370400
370600
370800
371000
6398200
6398000
6397800
6397600
6397400
6397200
6397000
6396800
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

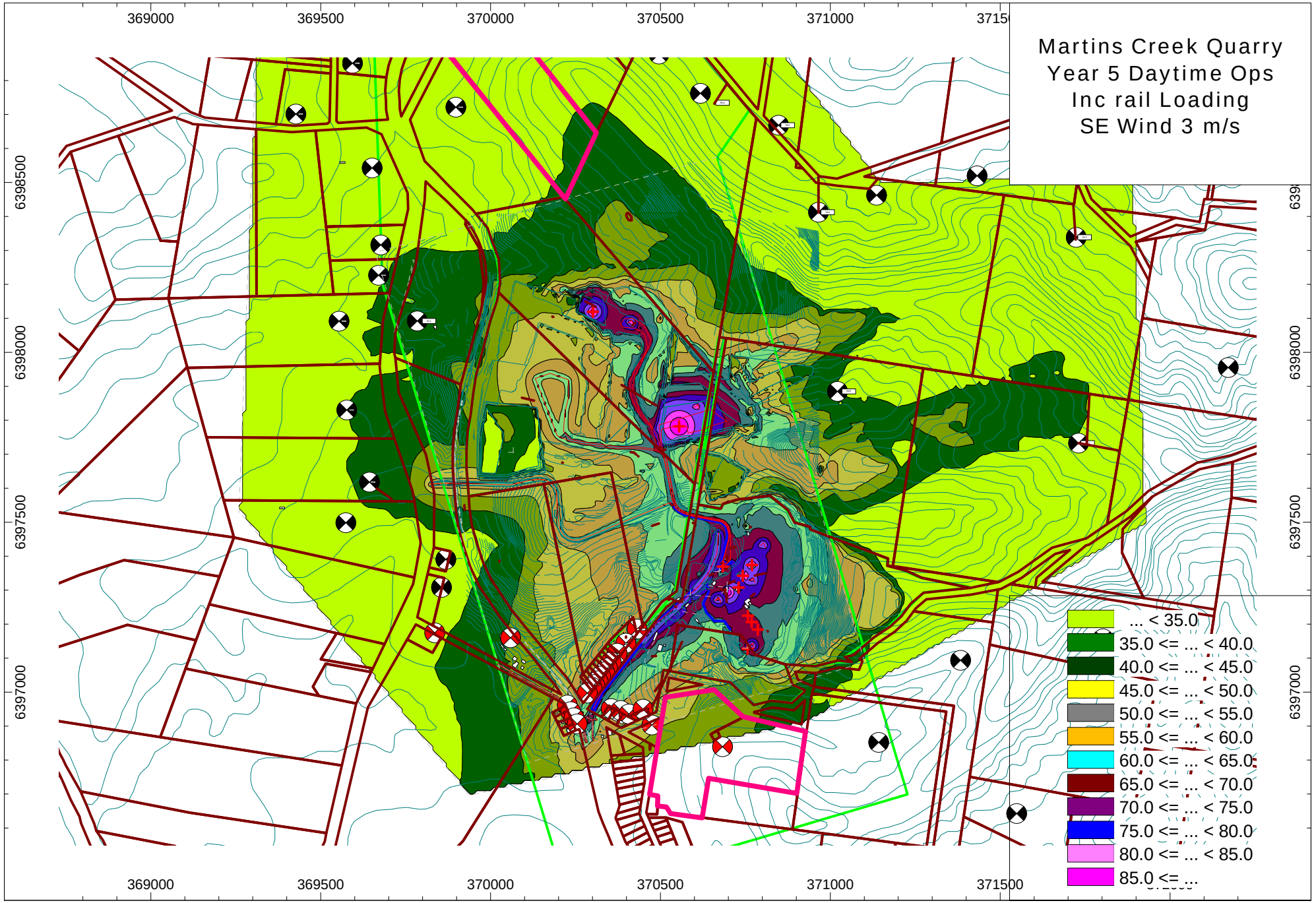

Martins Creek Quarry
Year 1 Daytime Operations
New Access Road Constructed
NE Wind
369500
370000
370500
371000
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

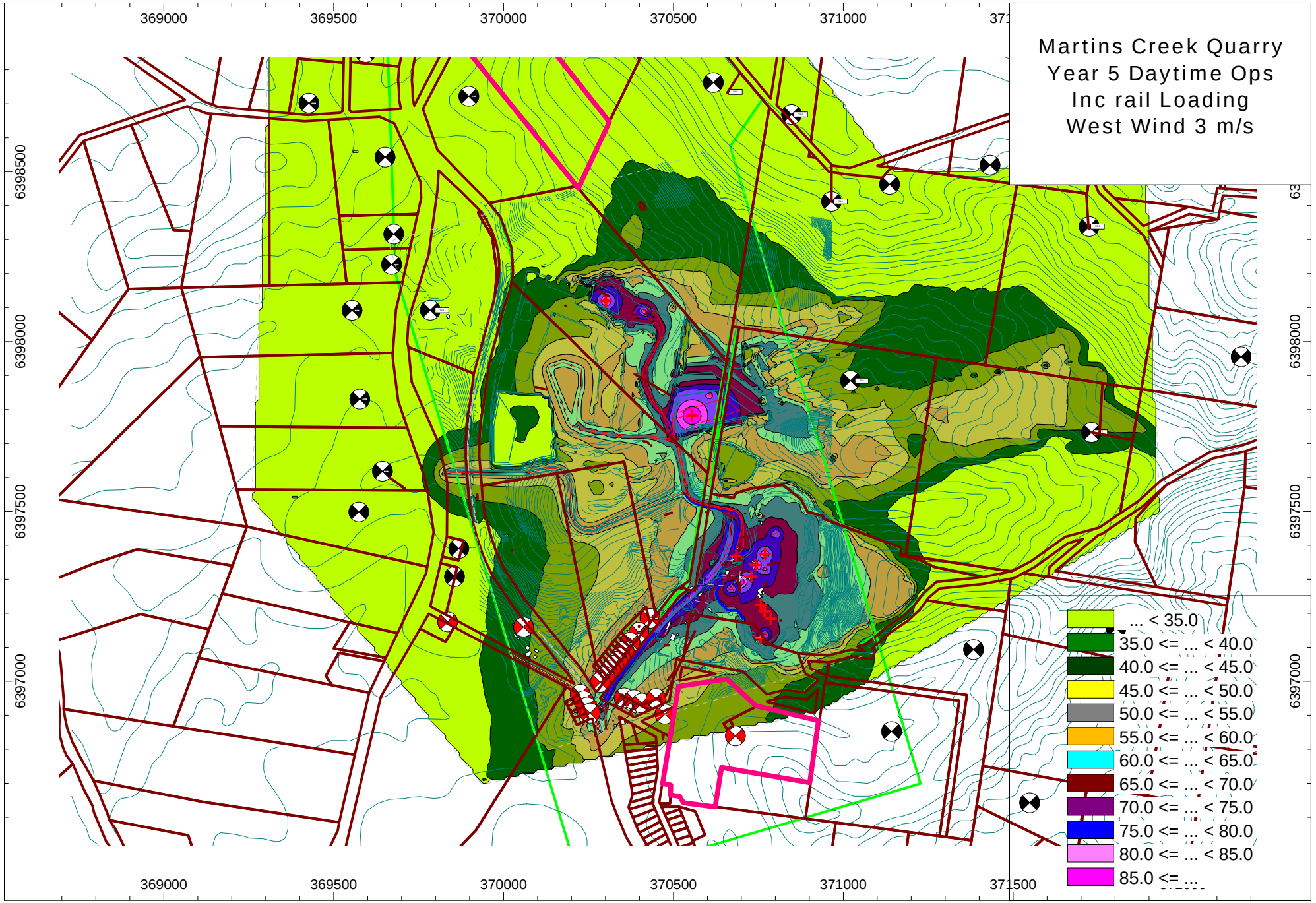

Martins Creek Quarry
Year 5 Daytime Ops
NE wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

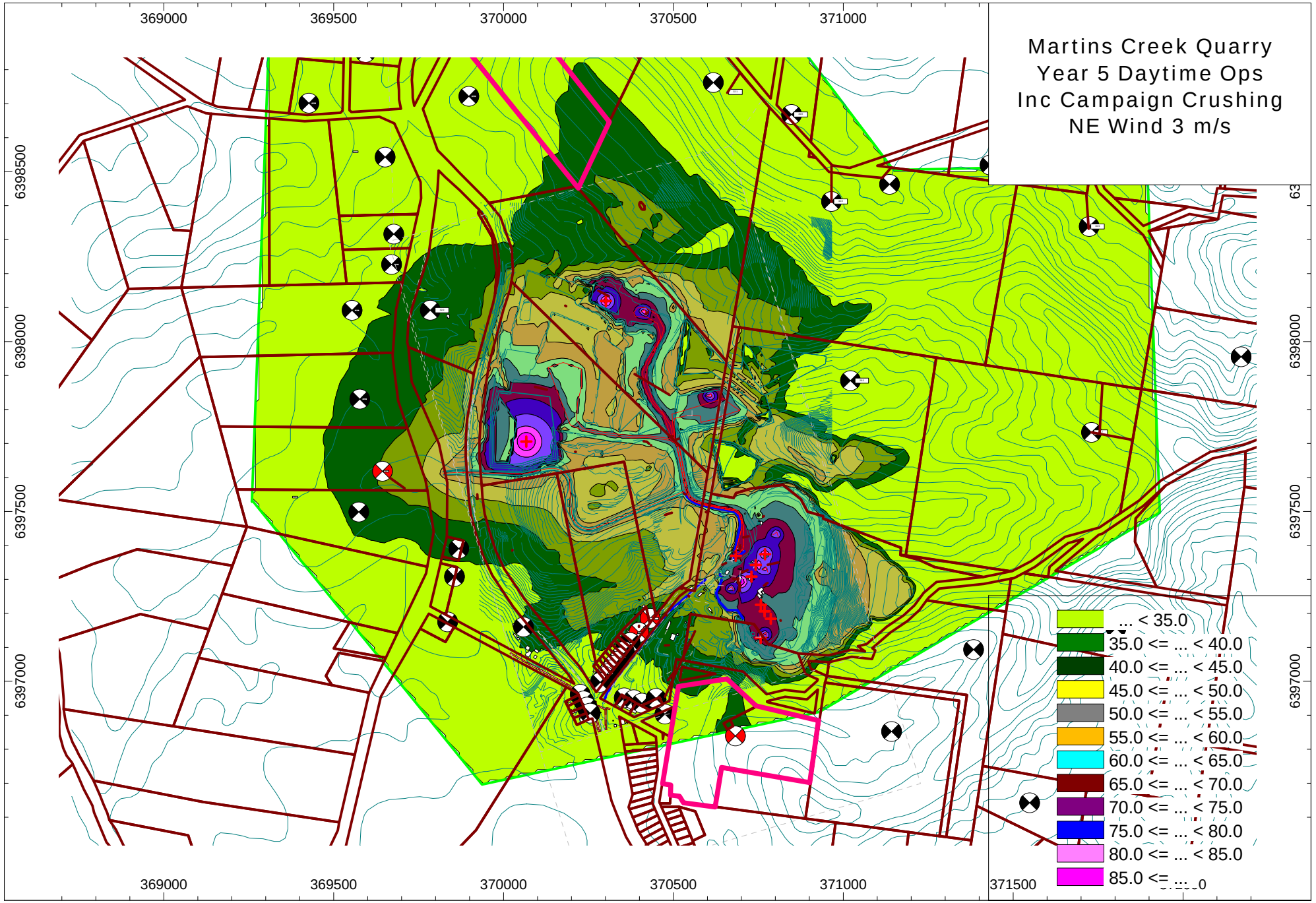

Martins Creek Quarry
Year 5 Daytime Ops
SE wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

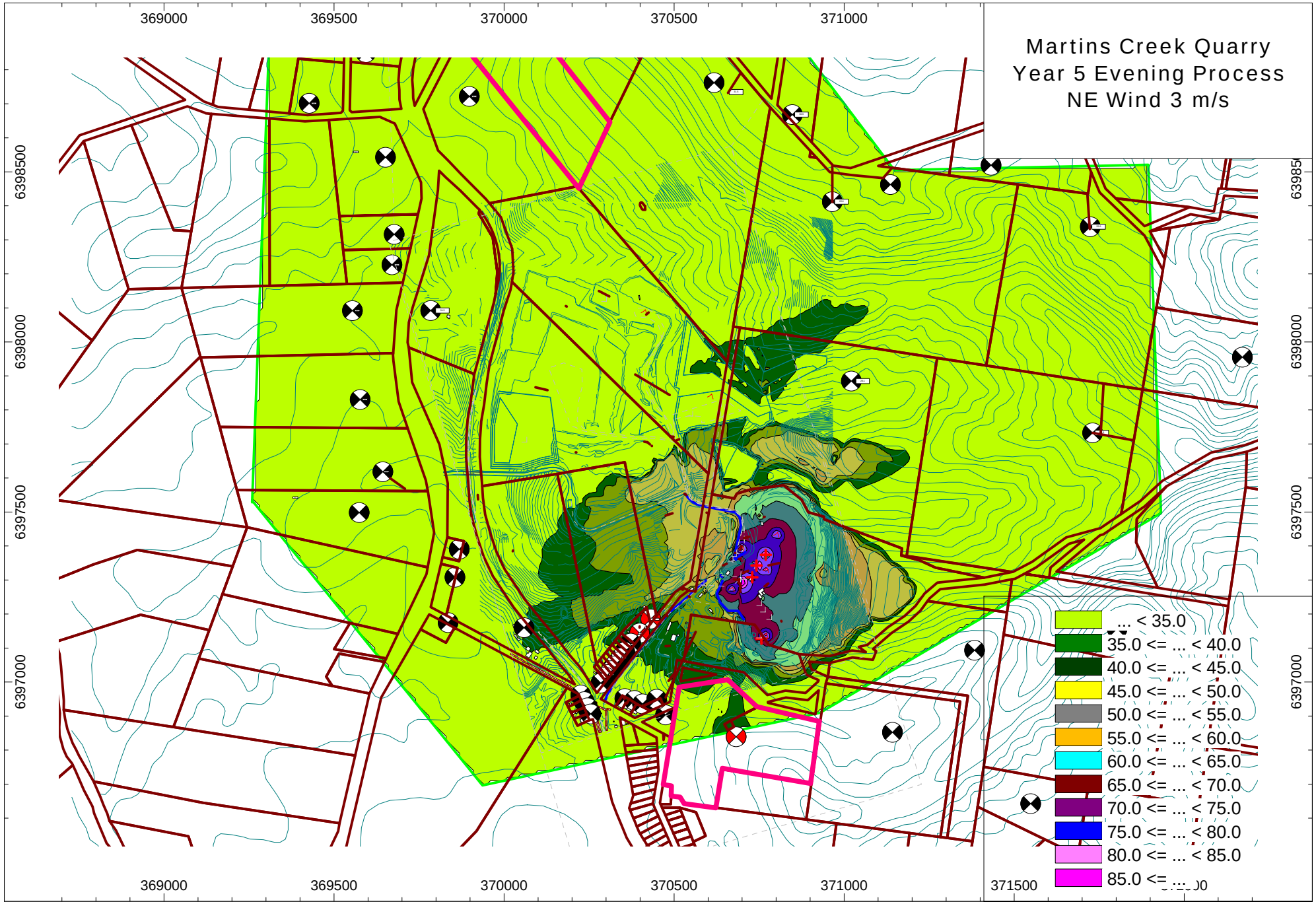

Martins Creek Quarry
Year 5 Daytime Ops
West Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

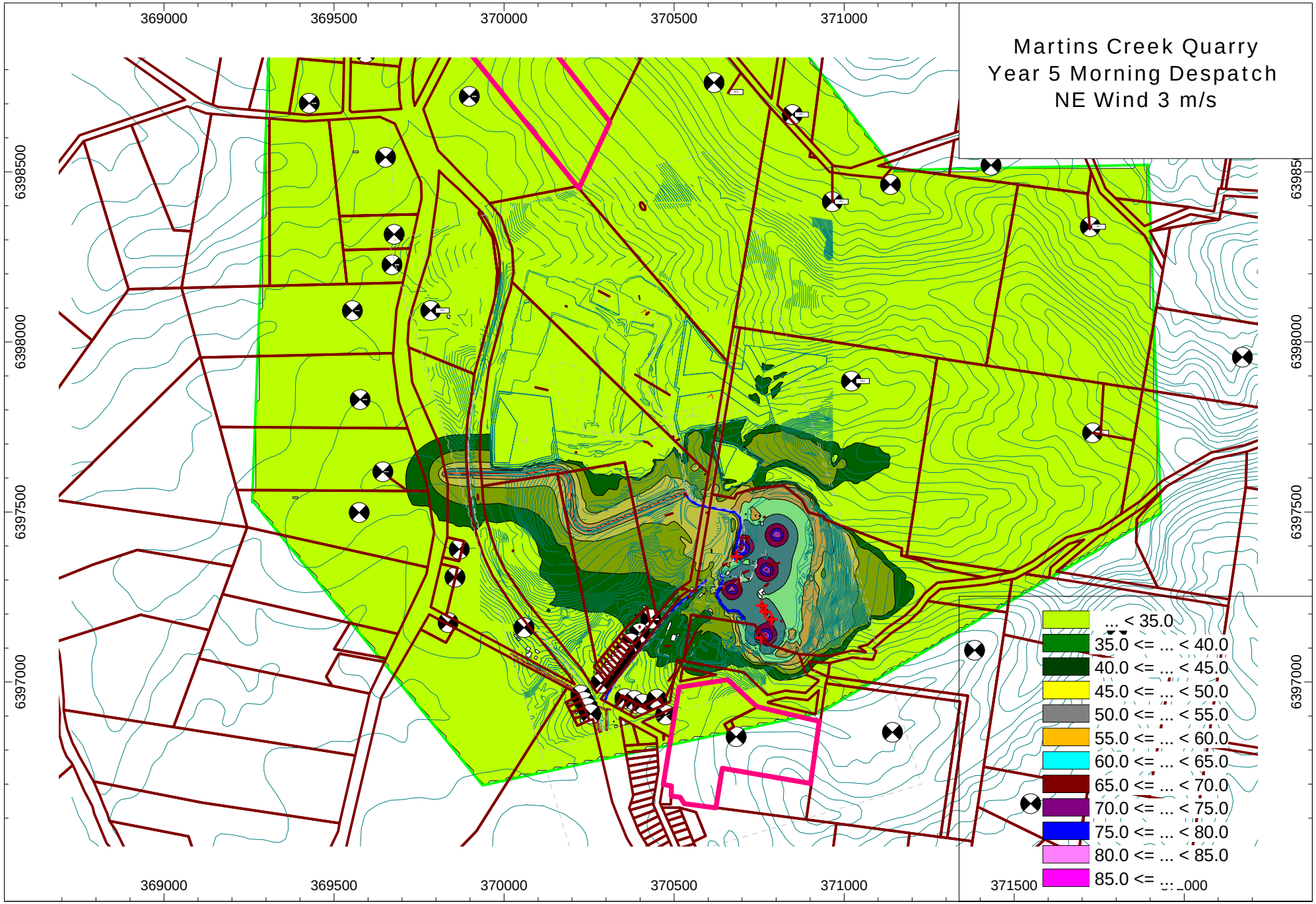

Martins Creek Quarry
Year 5 Daytime Ops
Inc rail Loading
NE Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

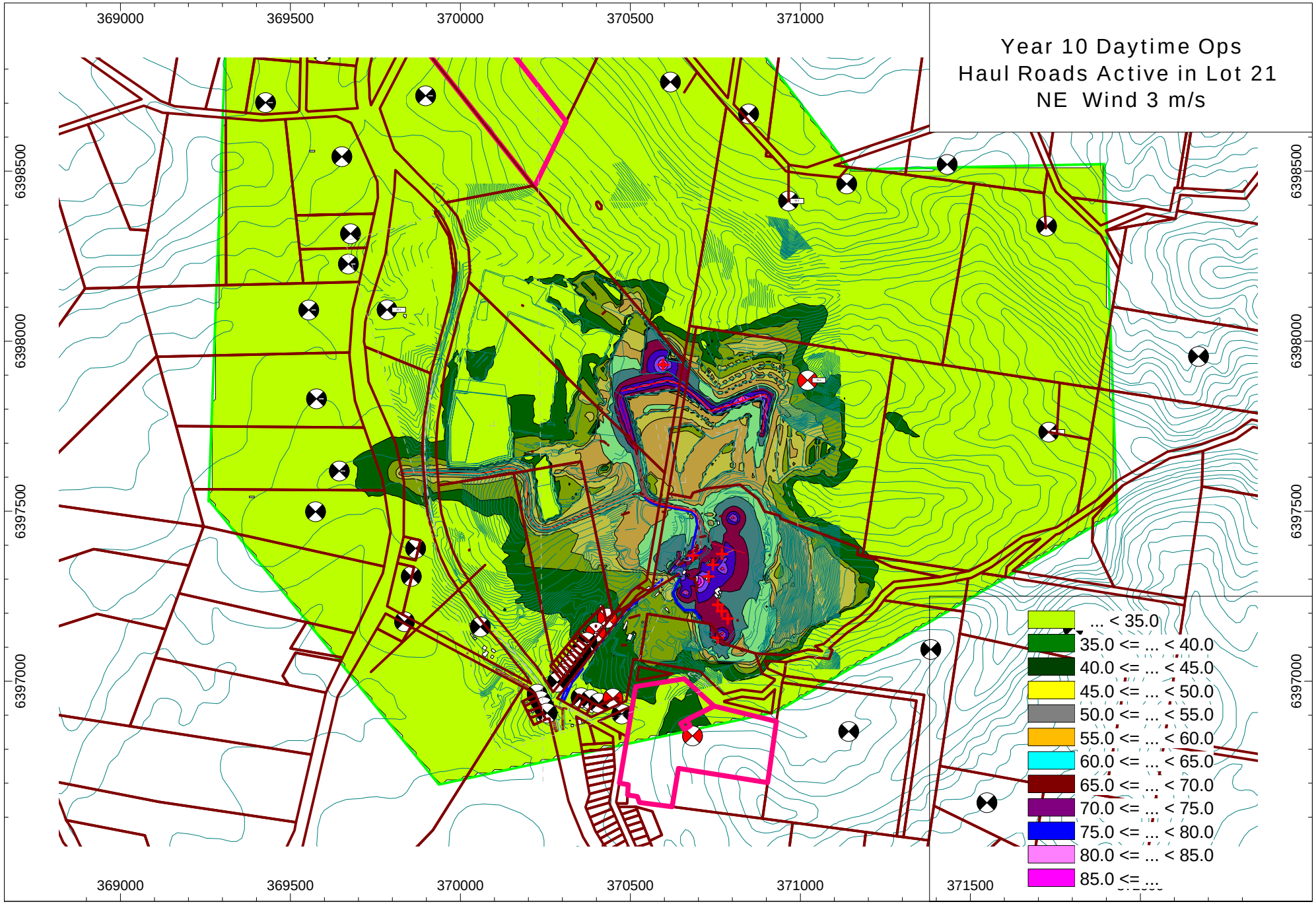

Martins Creek Quarry
Year 5 Daytime Ops
Inc rail Loading
SE Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

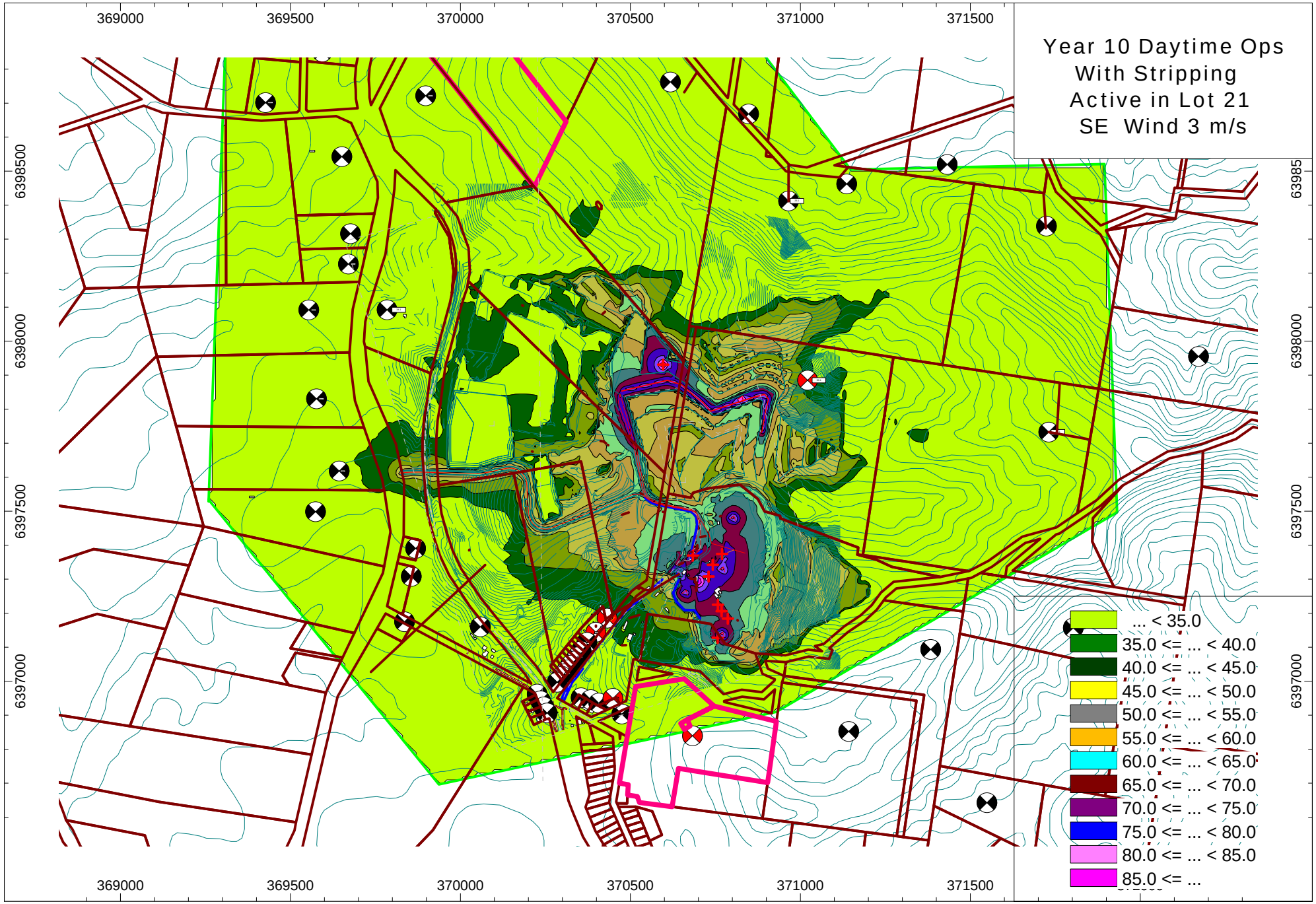

Martins Creek Quarry
Year 5 Daytime Ops
Inc rail Loading
West Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

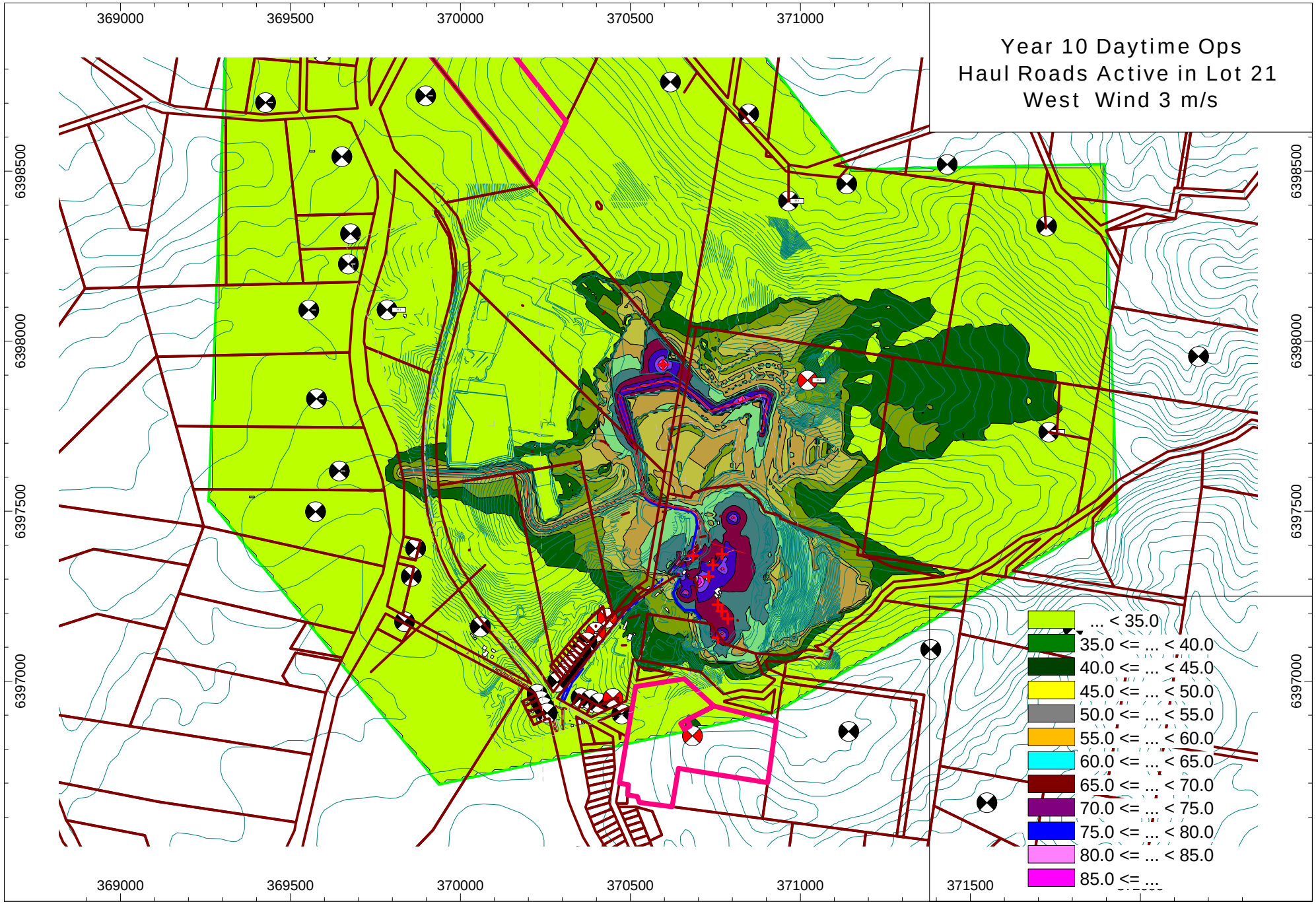

Martins Creek Quarry
Year 5 Daytime Ops
Inc Campaign Crushing
NE Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

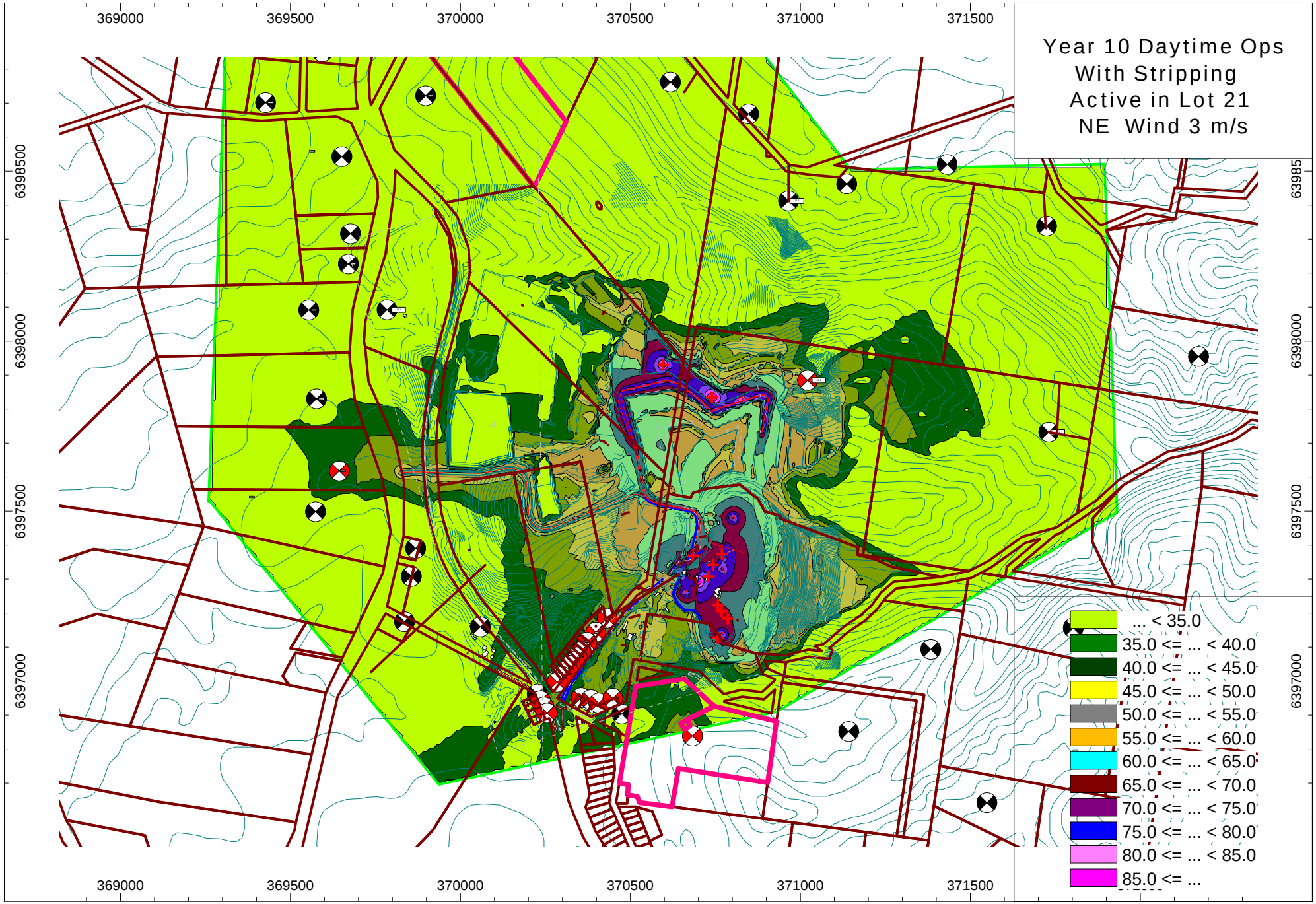

Martins Creek Quarry
Year 5 Evening Process
NE Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

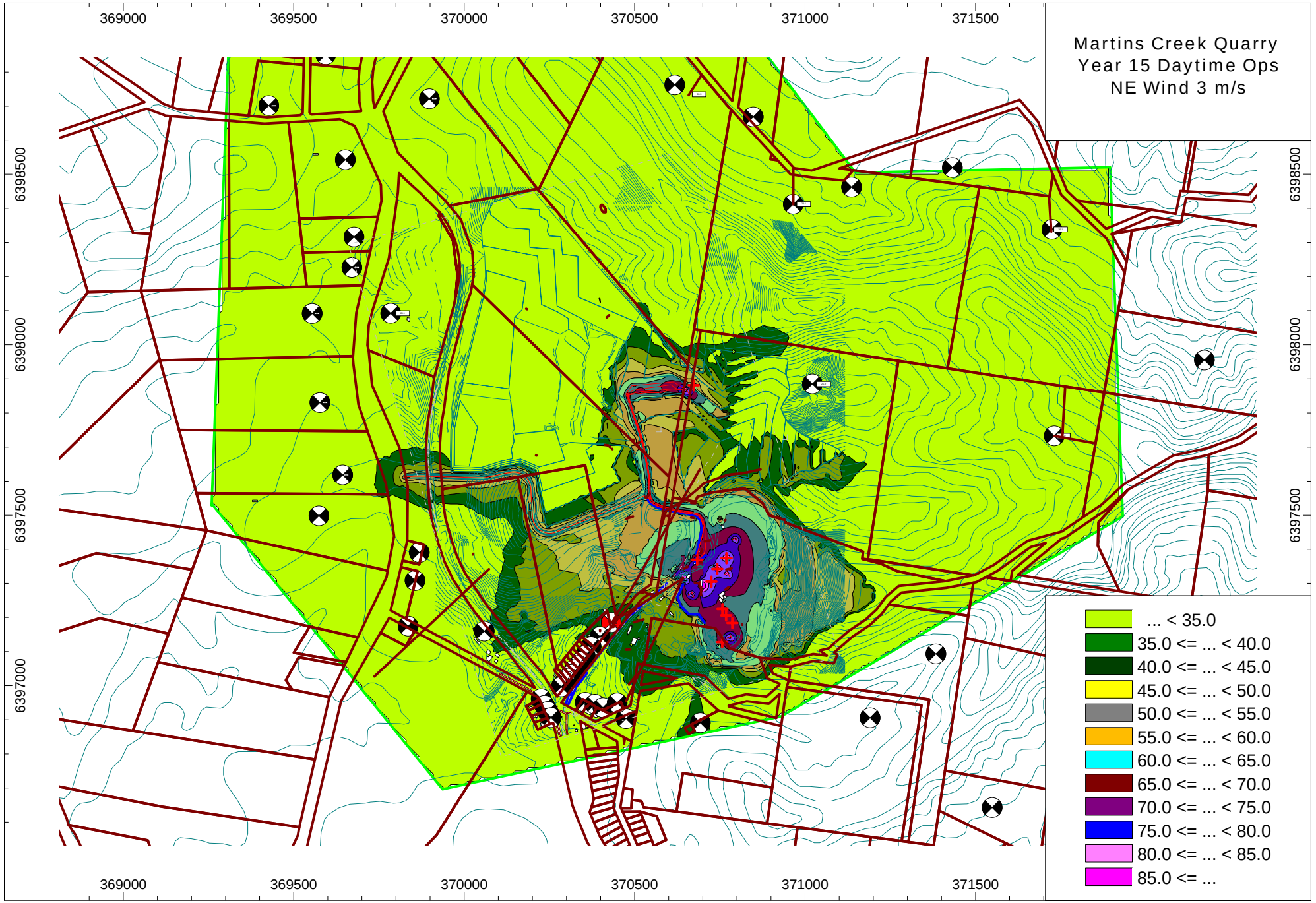

Martins Creek Quarry
Year 5 Morning Despatch
NE Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

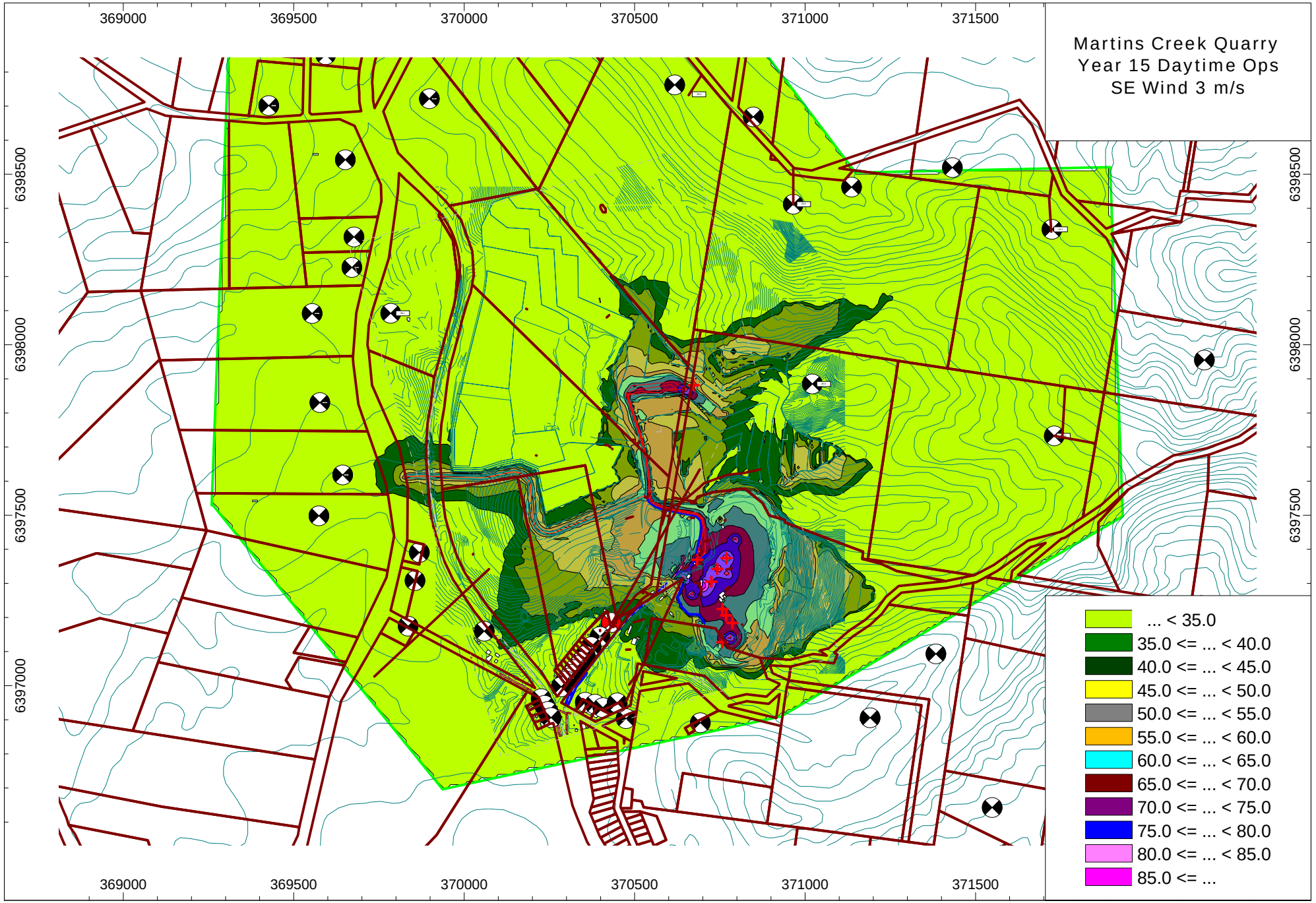

Year 10 Daytime Ops
Haul Roads Active in Lot 21
NE Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

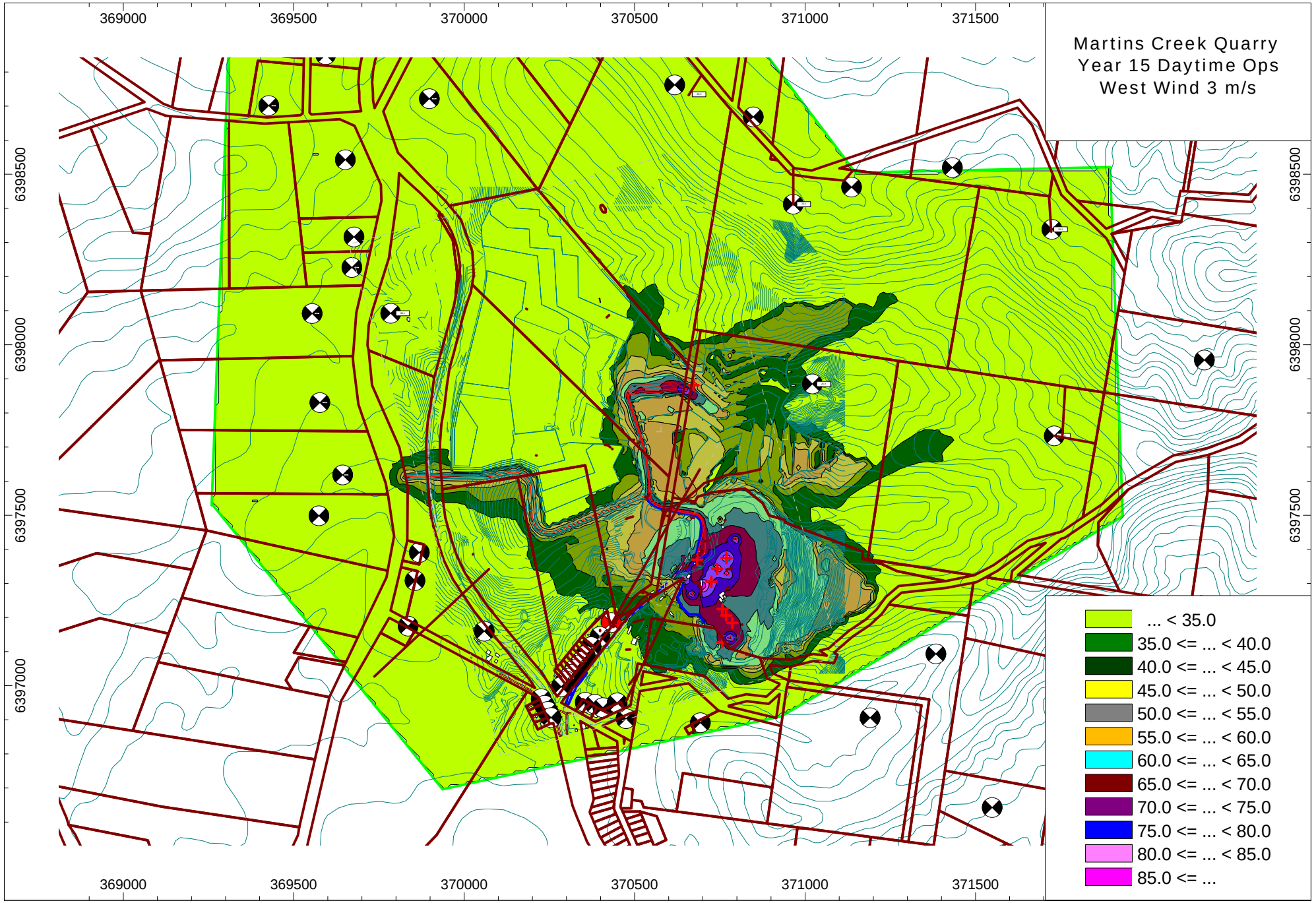

Year 10 Daytime Ops
With Stripping
Active in Lot 21
SE Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

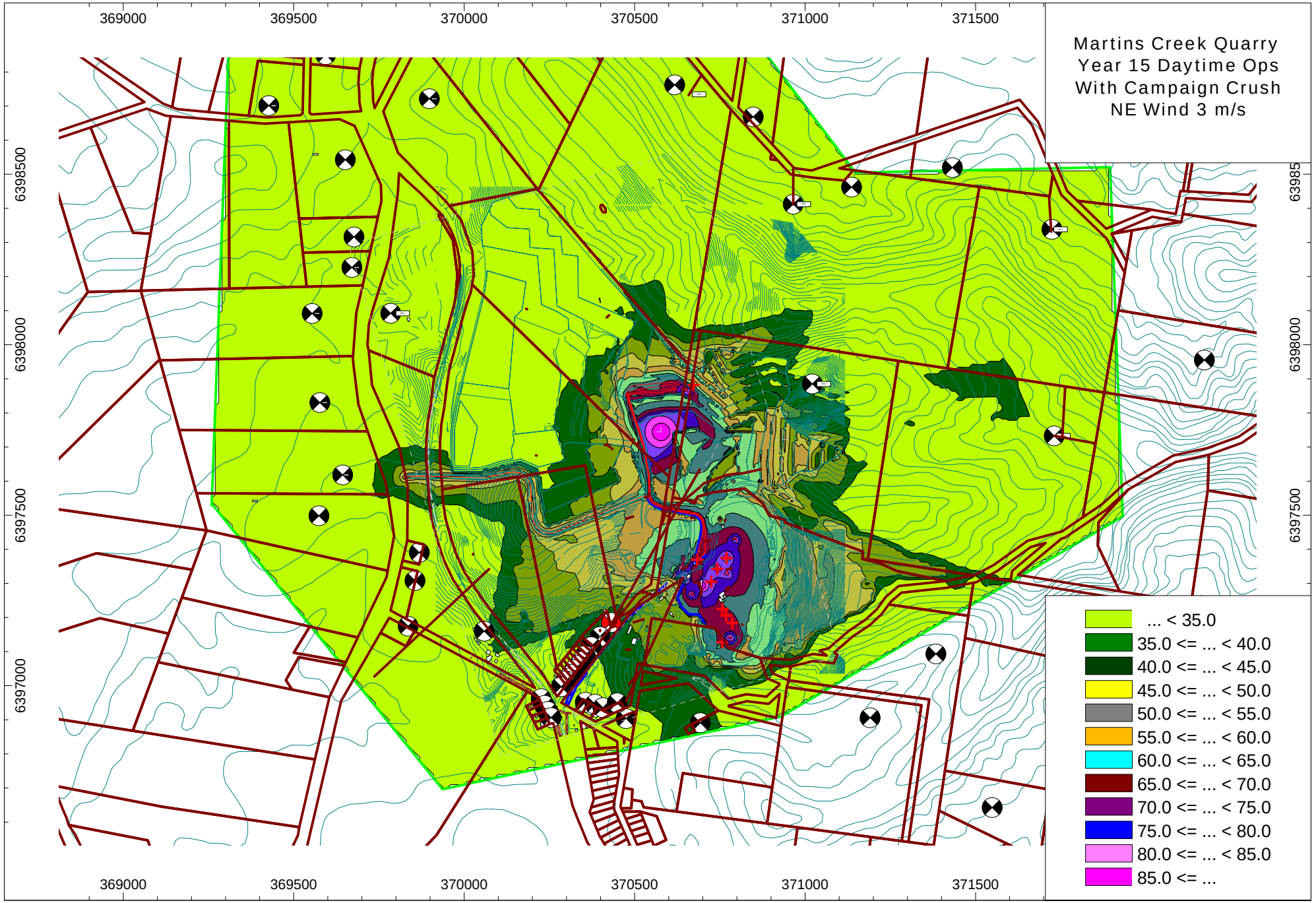

Year 10 Daytime Ops
Haul Roads Active in Lot 21
West Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

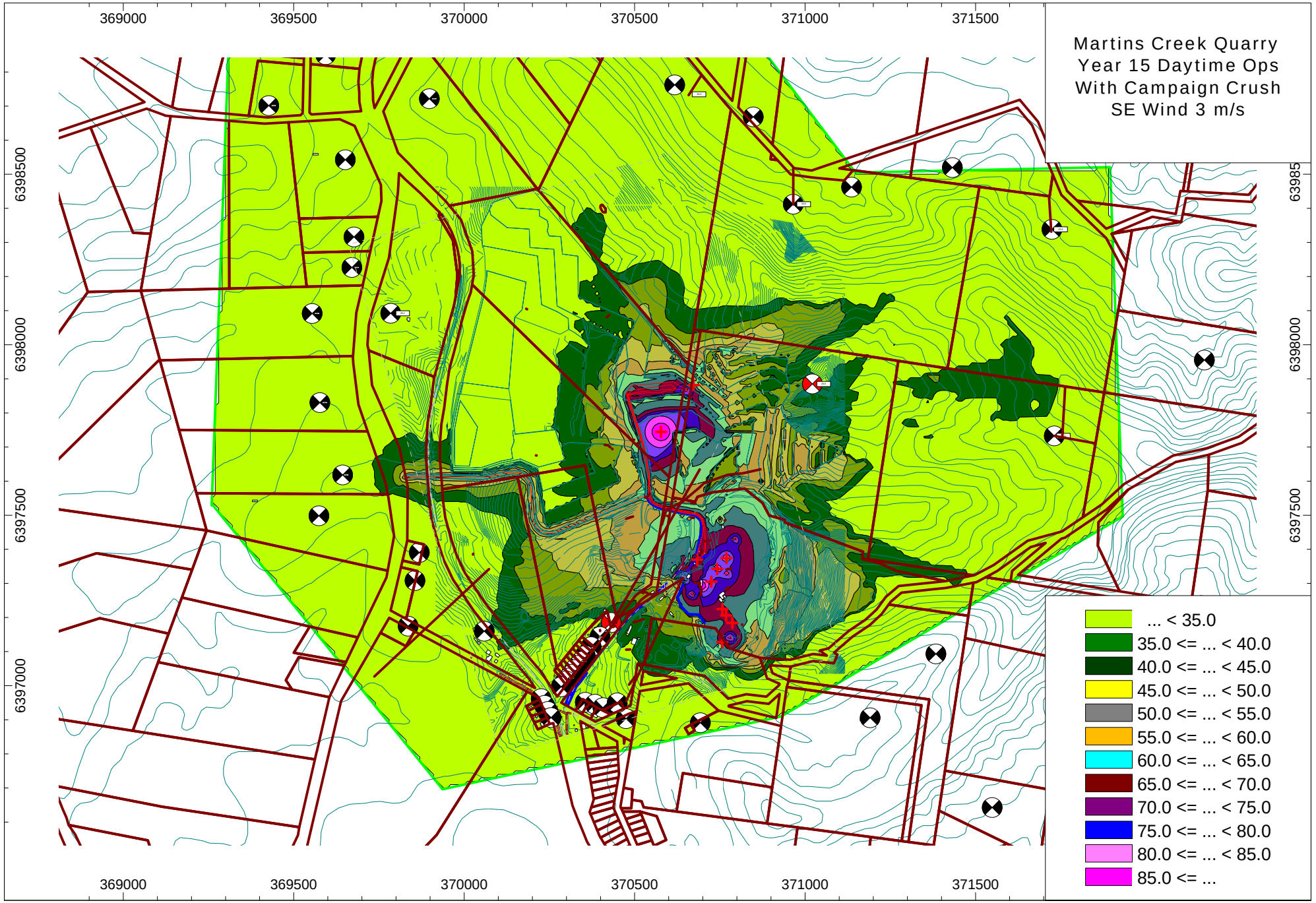

Year 10 Daytime Ops
With Stripping
Active in Lot 21
NE Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

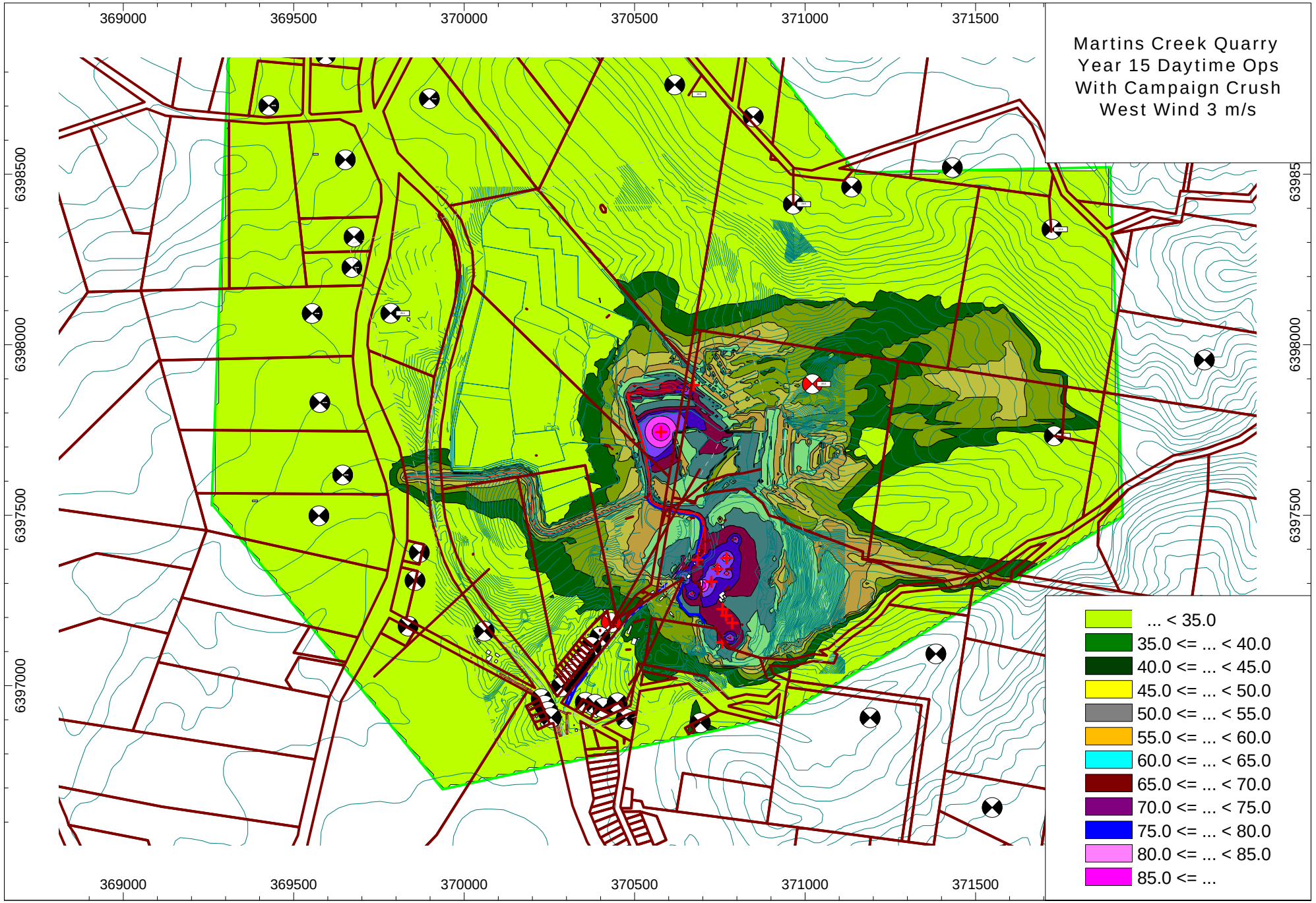

Martins Creek Quarry
Year 15 Daytime Ops
NE Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

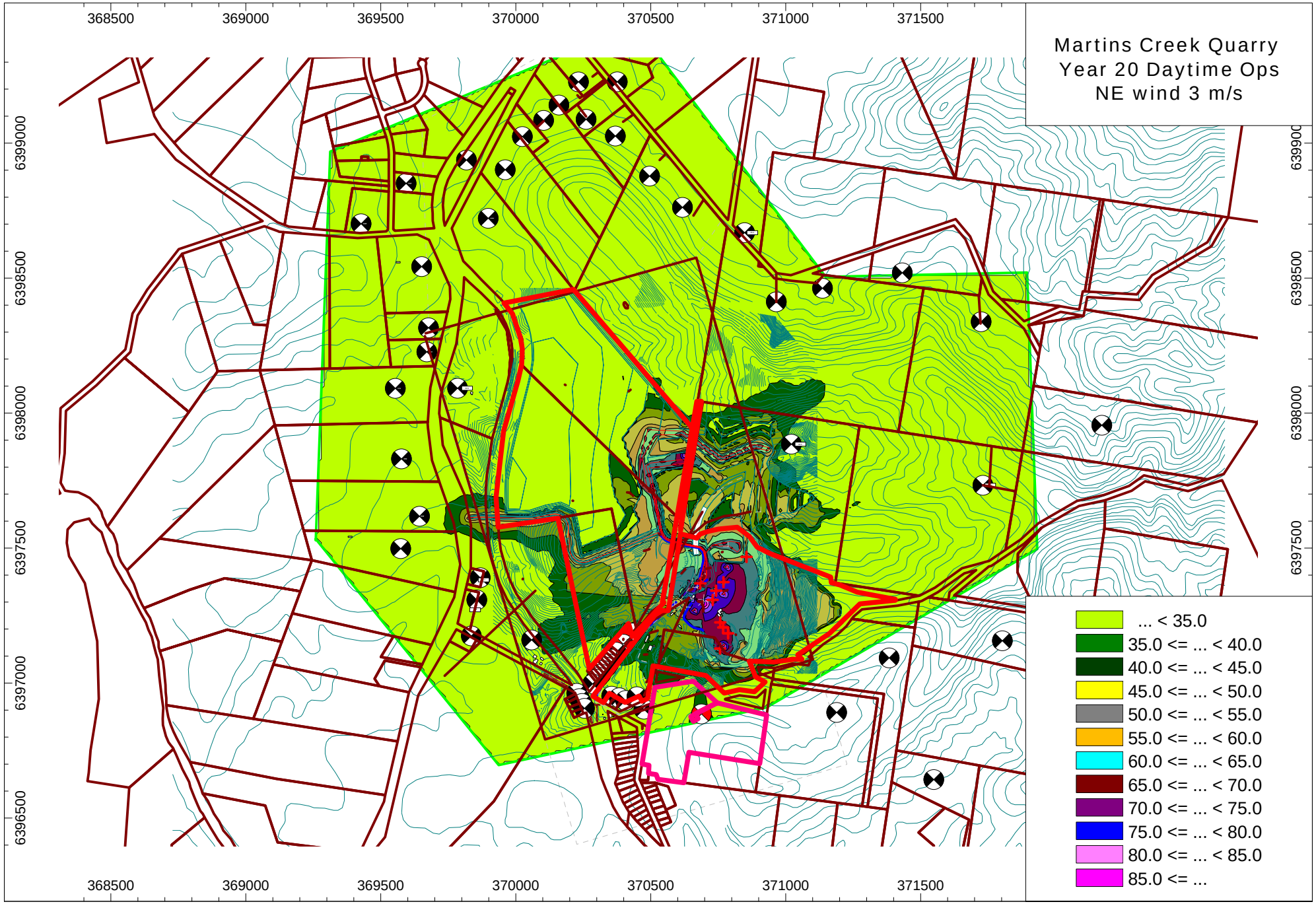

Martins Creek Quarry
Year 15 Daytime Ops
SE Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

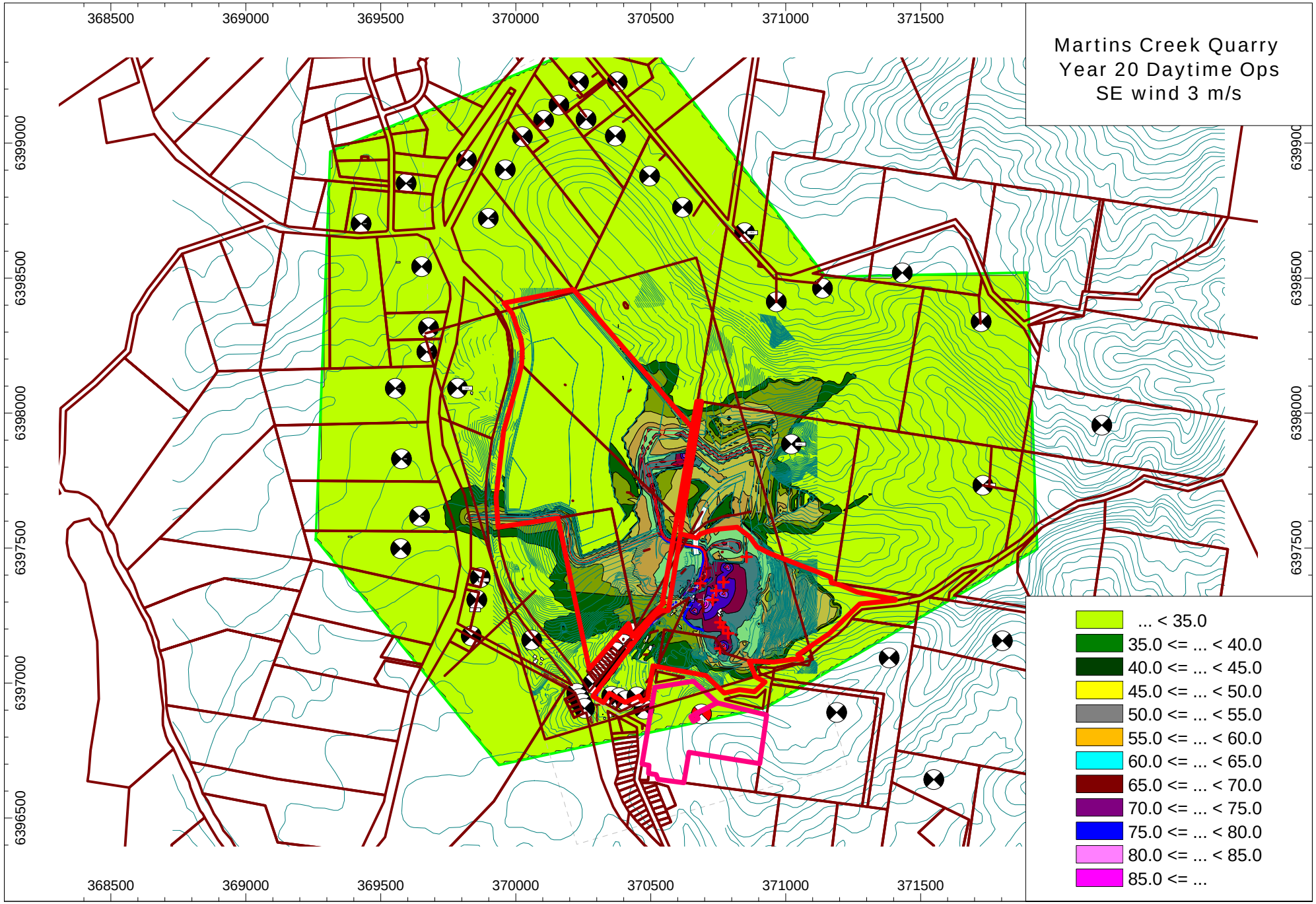

Martins Creek Quarry
Year 15 Daytime Ops
West Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

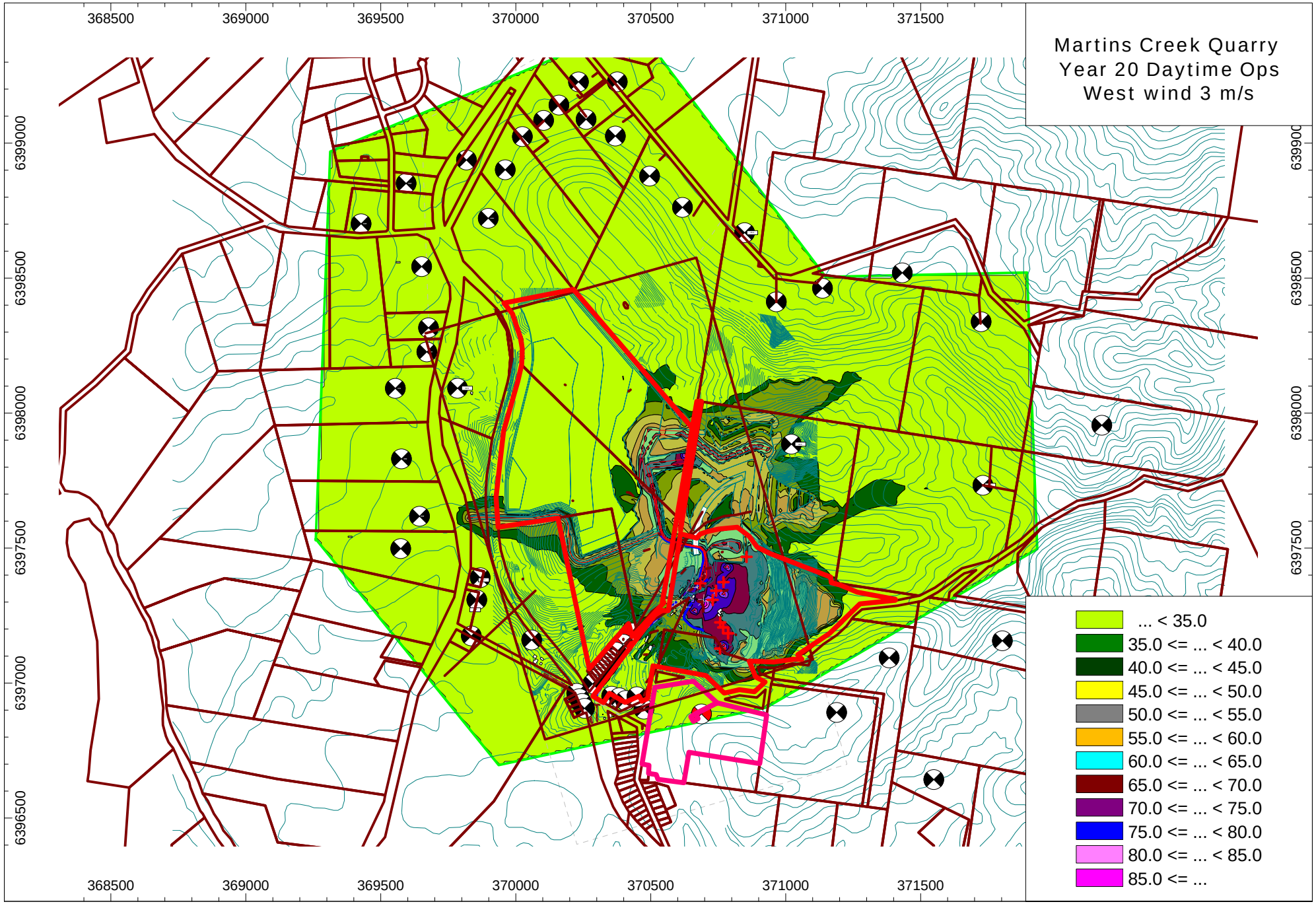

Martins Creek Quarry
Year 15 Daytime Ops
With Campaign Crush
NE Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

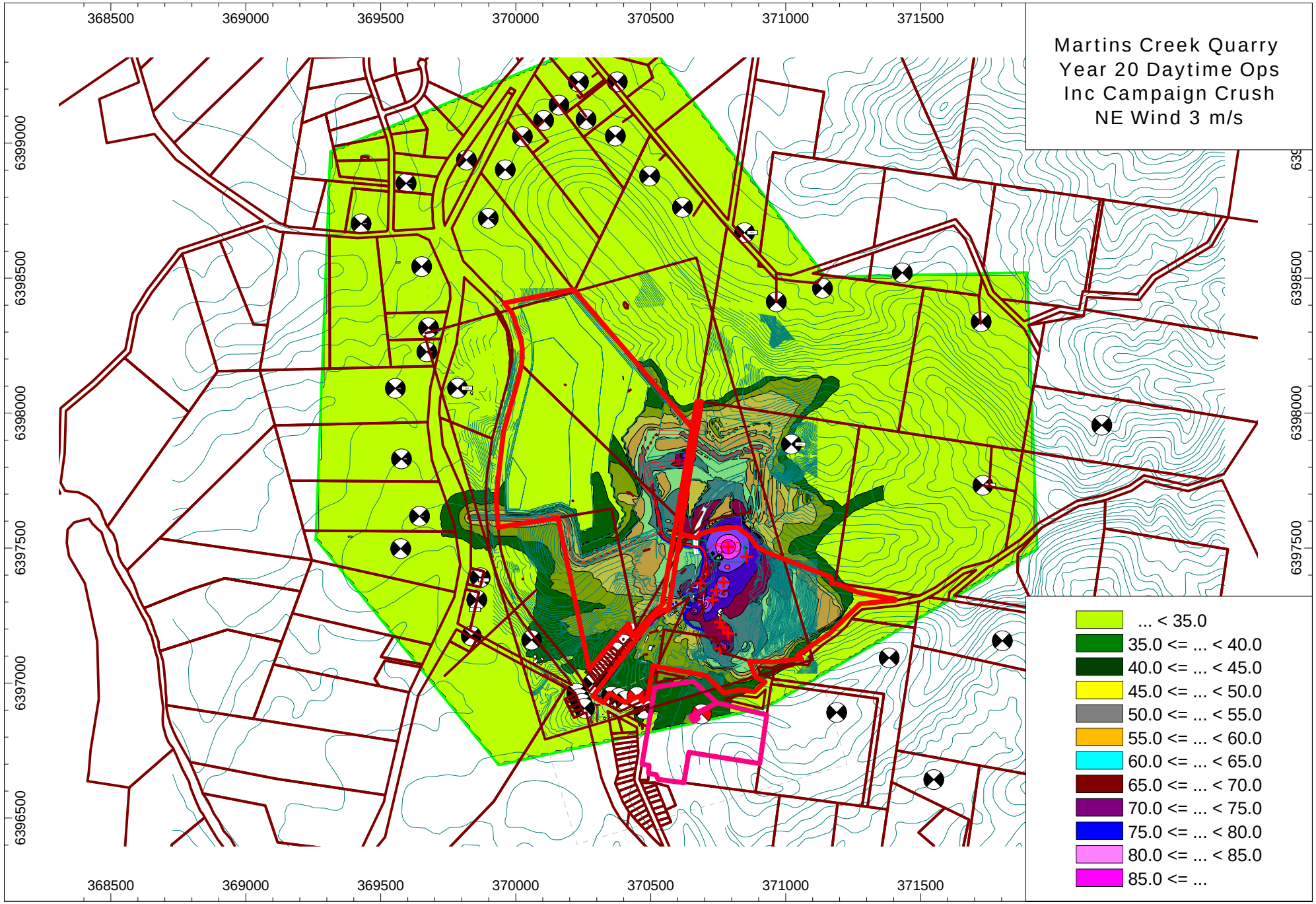

Martins Creek Quarry
Year 15 Daytime Ops
With Campaign Crush
SE Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

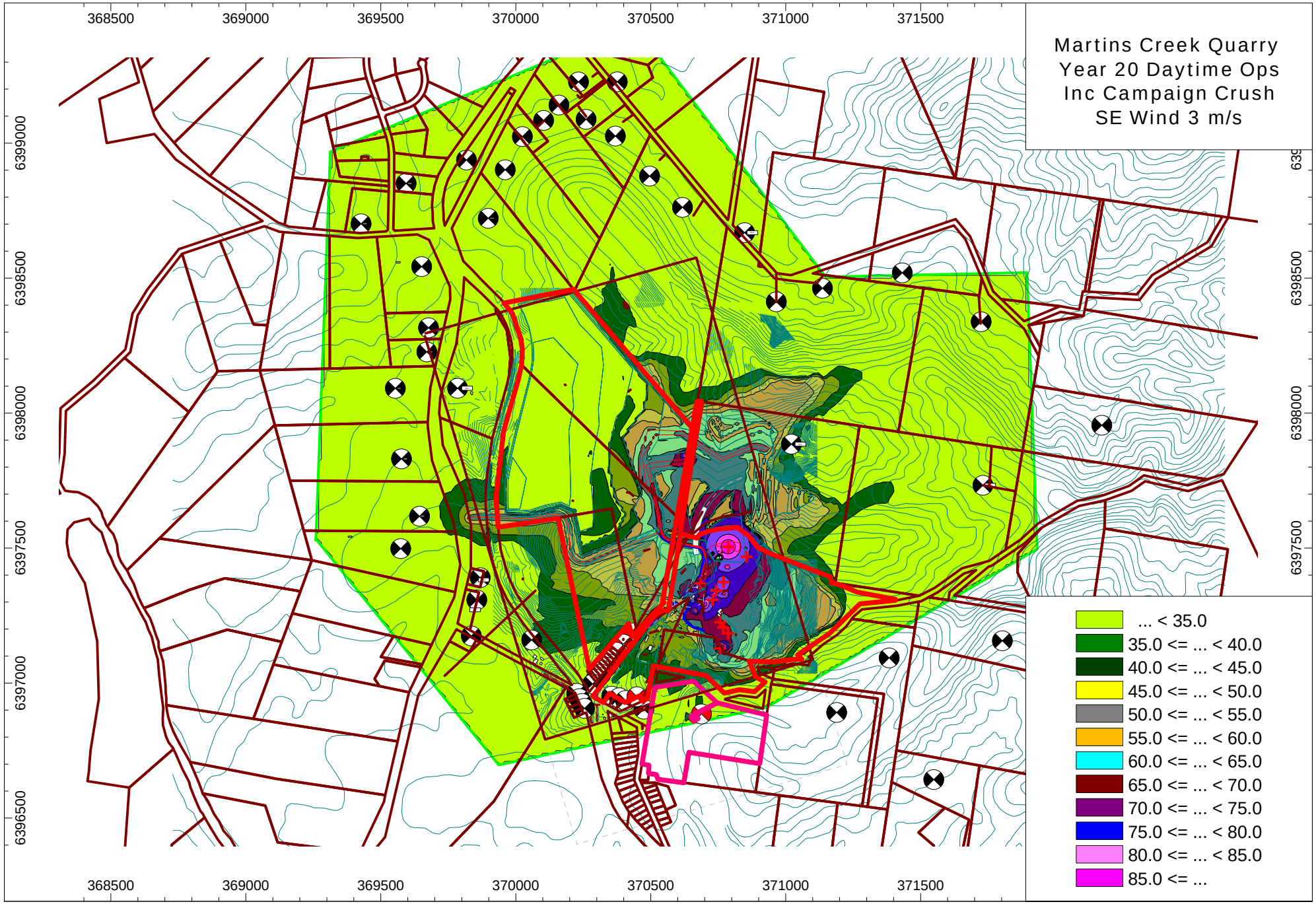

Martins Creek Quarry
Year 15 Daytime Ops
With Campaign Crush
West Wind 3 m/s
369000
369500
370000
370500
371000
371500
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

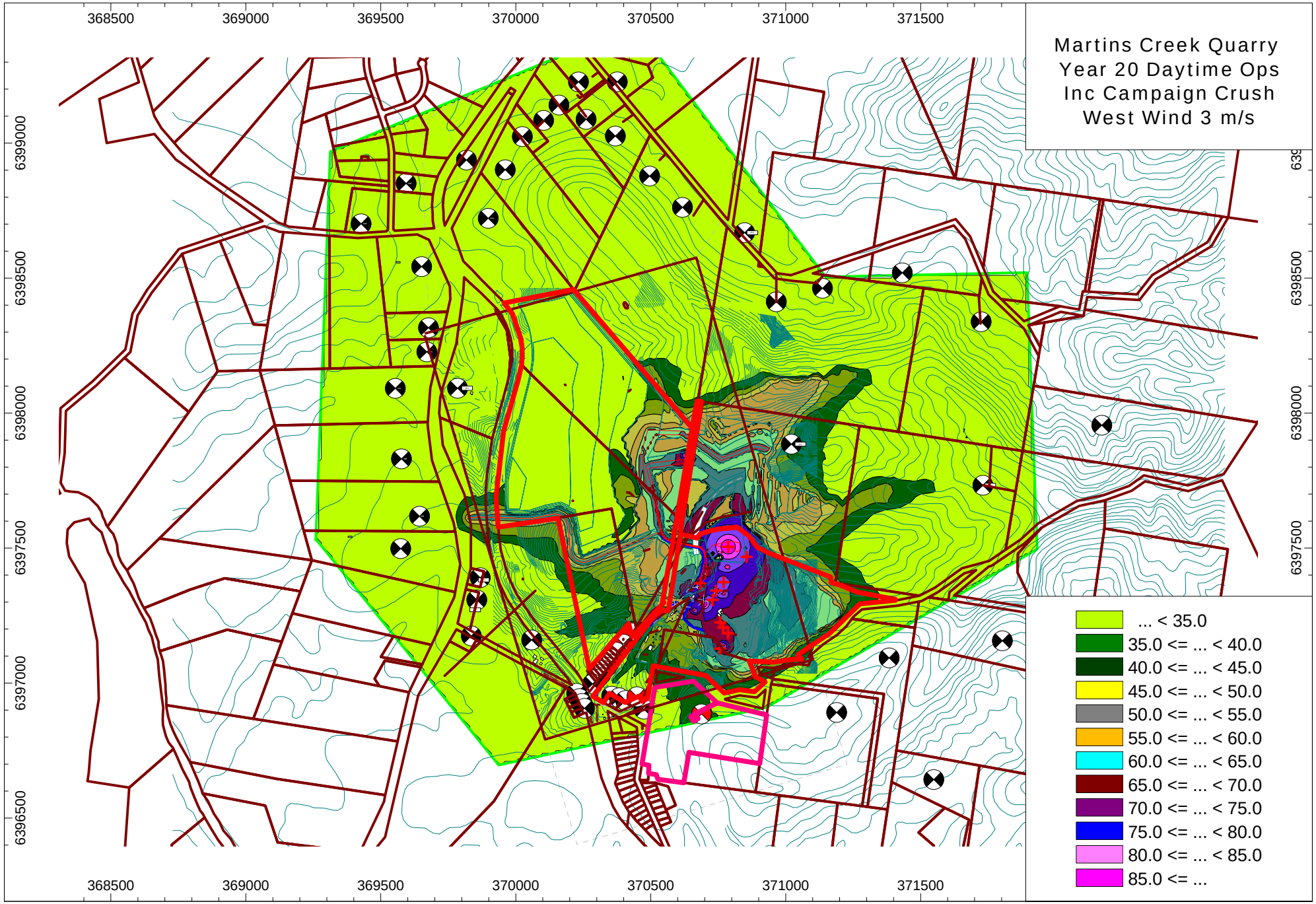

Martins Creek Quarry
Year 20 Daytime Ops
NE wind 3 m/s
368500
369000
369500
370000
370500
371000
371500
6399000
6398500
6398000
6397500
6397000
6396500
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

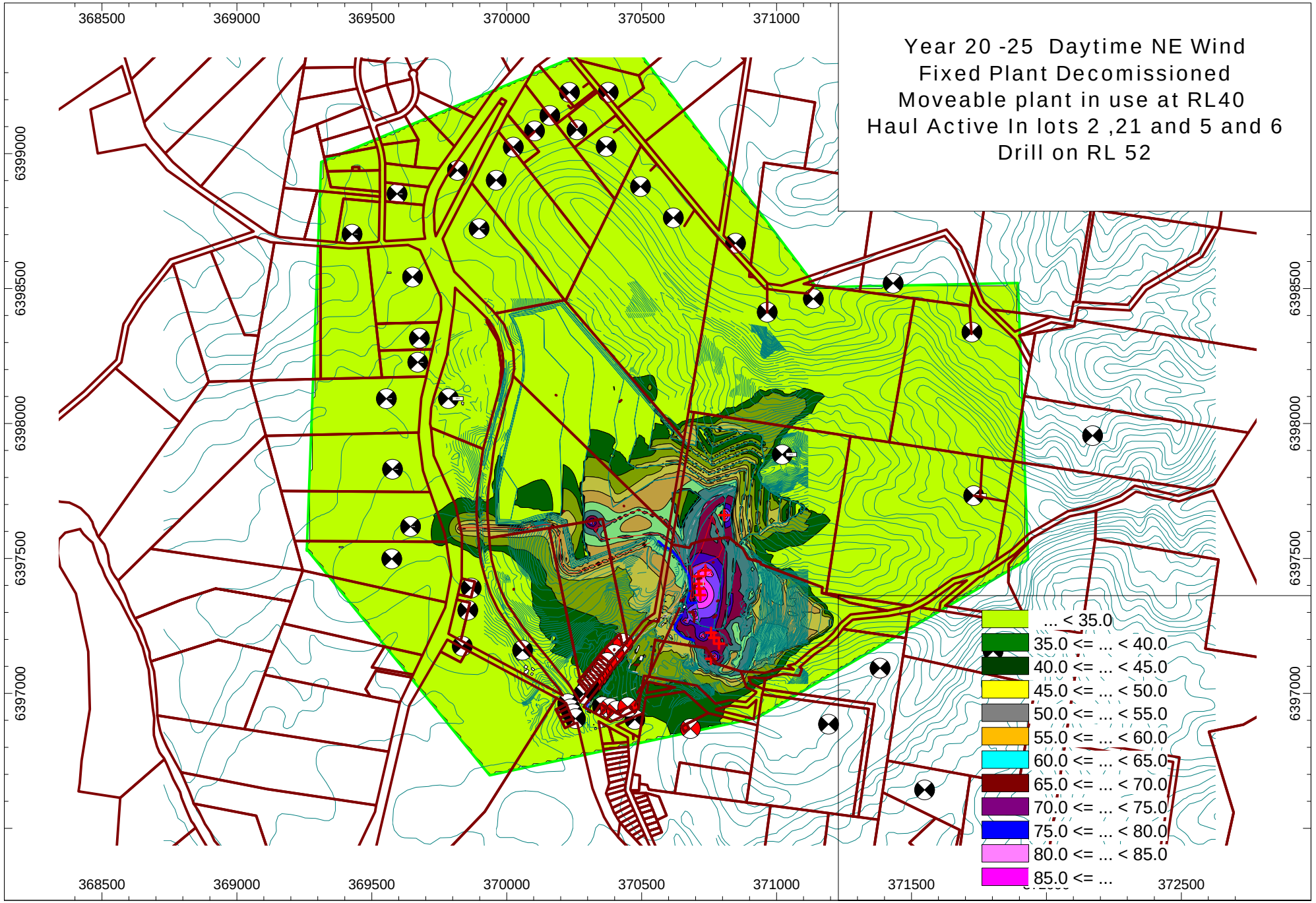

Martins Creek Quarry
Year 20 Daytime Ops
SE wind 3 m/s
368500
369000
369500
370000
370500
371000
371500
6399000
6398500
6398000
6397500
6397000
6396500
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

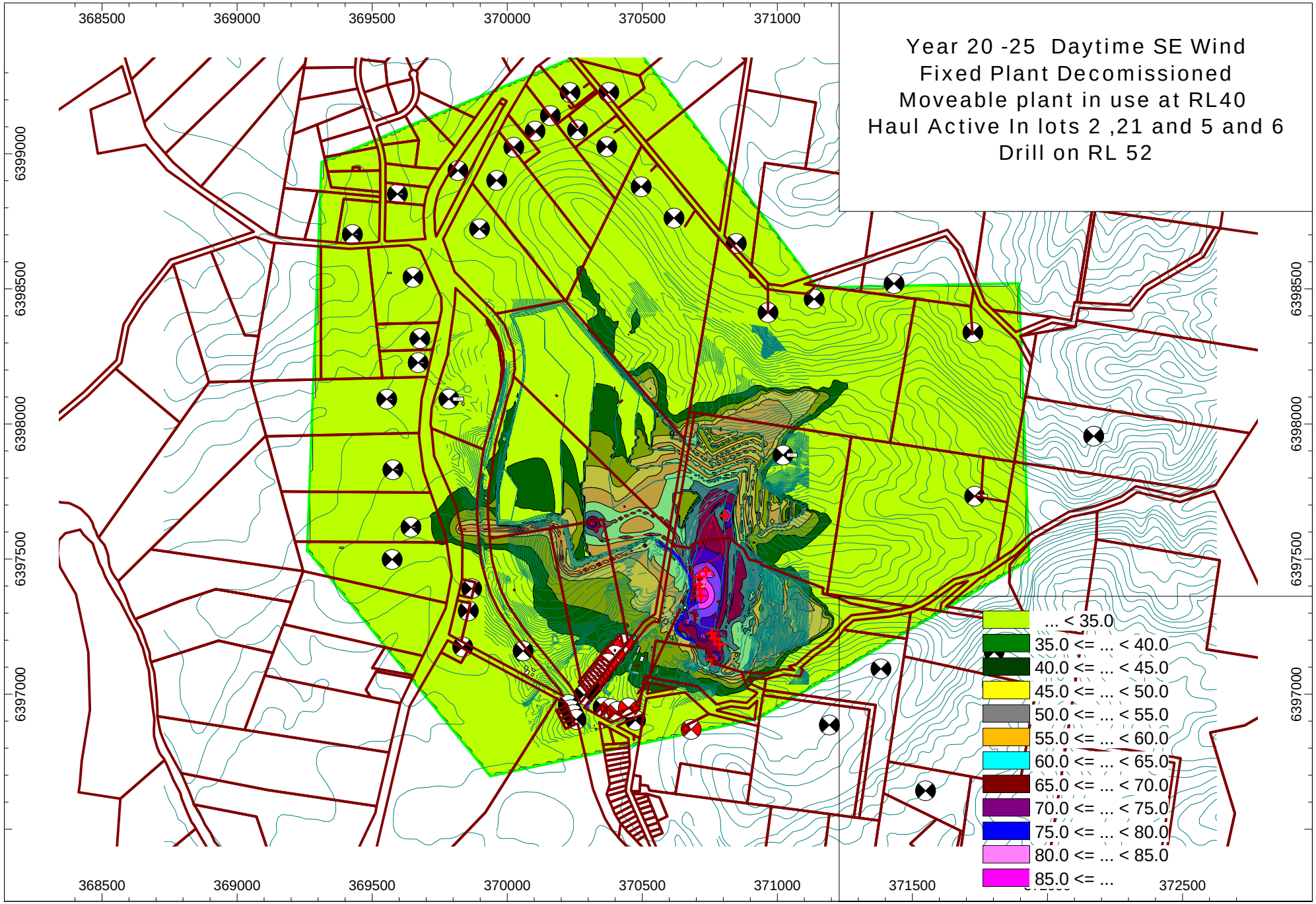

Martins Creek Quarry
Year 20 Daytime Ops
West wind 3 m/s
368500
369000
369500
370000
370500
371000
371500
6399000
6398500
6398000
6397500
6397000
6396500
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

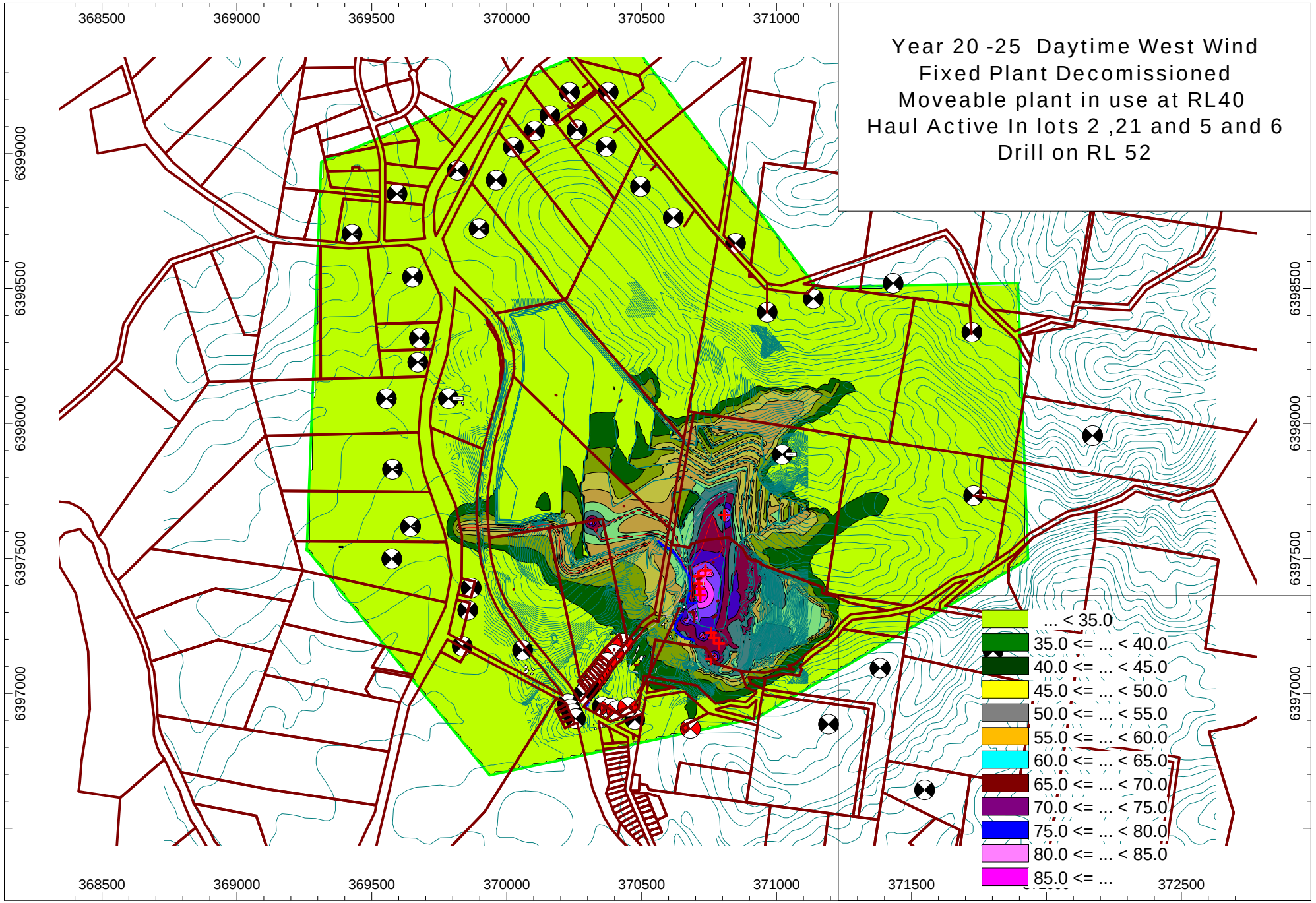

Martins Creek Quarry
Year 20 Daytime Ops
Inc Campaign Crush
NE Wind 3 m/s
368500
369000
369500
370000
370500
371000
371500
6399000
6398500
6398000
6397500
6397000
6396500
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...


Martins Creek Quarry
Year 20 Daytime Ops
Inc Campaign Crush
SE Wind 3 m/s
368500
369000
369500
370000
370500
371000
371500
6399000
6398500
6398000
6397500
6397000
6396500
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...


Martins Creek Quarry
Year 20 Daytime Ops
Inc Campaign Crush
West Wind 3 m/s
368500
369000
369500
370000
370500
371000
371500
6399000
6398500
6398000
6397500
6397000
6396500
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...


Year 20 -25 Daytime NE Wind
Fixed Plant Decomissioned
Moveable plant in use at RL40
Haul Active In lots 2 ,21 and 5 and 6
Drill on RL 52
368500
369000
369500
370000
370500
371000
371500
372500
6399000
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...


Year 20 -25 Daytime SE Wind
Fixed Plant Decomissioned
Moveable plant in use at RL40
Haul Active In lots 2 ,21 and 5 and 6
Drill on RL 52
368500
369000
369500
370000
370500
371000
371500
372500
6399000
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...


Year 20 -25 Daytime West Wind
Fixed Plant Decomissioned
Moveable plant in use at RL40
Haul Active In lots 2 ,21 and 5 and 6
Drill on RL 52
368500
369000
369500
370000
370500
371000
371500
372500
6399000
6398500
6398000
6397500
6397000
... < 35.0
35.0 <= ... < 40.0
40.0 <= ... < 45.0
45.0 <= ... < 50.0
50.0 <= ... < 55.0
55.0 <= ... < 60.0
60.0 <= ... < 65.0
65.0 <= ... < 70.0
70.0 <= ... < 75.0
75.0 <= ... < 80.0
80.0 <= ... < 85.0
85.0 <= ...

# Appendix C

Traffic Count Data

CfeIT bob.white@cfeit.com (02) 9740 8600

# Traffic Count Summary Report

| | | | | |
|---|---|---|---|---|
| **Count Number** | **917** | Ref : **SECA** | **Lat/Long : S32.59903 / E151.61764** | **GOOGLE** |
| Street | **GRESFORD ROAD, PATERSON : Between TOCAL ROAD & PARK ROAD (bidirectional) :** | | | |
| Location | Near the Paterson railway crossing, ELP 010033 | | *Carriageway* | |

| | |
|---|---|
| Start Date | 27-AUG-14 |
| Start Time | 100 |
| Duration | 7 DAYS |
| Interval | 1 HOUR |

| | |
|---|---|
| Weekly 50th Percentile Speed | 35 |
| Weekly 85th Percentile Speed | 45 |
| Five Day AADT | 3290 |
| Seven Day AADT | 3206 |

**TOTAL COUNT MATRIX**

| | MON *1ST* | TUE *2ND* | WED *27TH* | THU *28TH* | FRI *29TH* | SAT *30TH* | SUN *31ST* | 5 Day Total | 5 Day Average | 7 Day Total | 7 Day Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Midnight - 1am** | 3 | 1 | 6 | 4 | 5 | 18 | 22 | **19** | **4** | **59** | **8** |
| **1am - 2am** | 5 | 1 | 7 | 4 | 7 | 9 | 10 | **24** | **5** | **43** | **6** |
| **2am - 3am** | 4 | 4 | 4 | 5 | 6 | 4 | 6 | **23** | **5** | **33** | **5** |
| **3am - 4am** | 10 | 4 | 2 | 4 | 4 | 5 | 3 | **24** | **5** | **32** | **5** |
| **4am - 5am** | 27 | 21 | 26 | 26 | 21 | 12 | 3 | **121** | **24** | **136** | **19** |
| **5am - 6am** | 70 | 66 | 81 | 82 | 80 | 43 | 26 | **379** | **76** | **448** | **64** |
| **6am - 7am** | 137 | 145 | 150 | 137 | 161 | 66 | 43 | **730** | **146** | **839** | **120** |
| **7am - 8am** | 214 | 234 | 289 | 241 | 230 | 114 | 87 | **1208** | **242** | **1409** | **201** |
| **8am - 9am** | **303** | **277** | **328** | **300** | **311** | 208 | 158 | **1519** | **304** | **1885** | **269** |
| **9am - 10am** | 242 | 193 | 280 | 261 | 247 | 248 | 268 | **1223** | **245** | **1739** | **248** |
| **10am - 11am** | 177 | 174 | 198 | 207 | 207 | **270** | 318 | **963** | **193** | **1551** | **222** |
| **11am - Midday** | 188 | 184 | 204 | 191 | 218 | 259 | **361** | **985** | **197** | **1605** | **229** |
| **Midday - 1pm** | 207 | 195 | 179 | 171 | 194 | 244 | **316** | **946** | **189** | **1506** | **215** |
| **1pm - 2pm** | 187 | 171 | 185 | 225 | 230 | 197 | 283 | **998** | **200** | **1478** | **211** |
| **2pm - 3pm** | 214 | 218 | 253 | 239 | 292 | **263** | 260 | **1216** | **243** | **1739** | **248** |
| **3pm - 4pm** | 293 | **255** | **318** | 282 | 330 | 240 | 210 | **1478** | **296** | **1928** | **275** |
| **4pm - 5pm** | **302** | 240 | 286 | **320** | **367** | 224 | 200 | **1515** | **303** | **1939** | **277** |
| **5pm - 6pm** | 208 | 175 | 270 | 267 | 294 | 199 | 149 | **1214** | **243** | **1562** | **223** |
| **6pm - 7pm** | 155 | 130 | 163 | 188 | 185 | 149 | 98 | **821** | **164** | **1068** | **153** |
| **7pm - 8pm** | 60 | 58 | 100 | 106 | 77 | 80 | 50 | **401** | **80** | **531** | **76** |
| **8pm - 9pm** | 44 | 39 | 57 | 75 | 53 | 71 | 31 | **268** | **54** | **370** | **53** |
| **9pm - 10pm** | 28 | 23 | 28 | 55 | 65 | 74 | 16 | **199** | **40** | **289** | **41** |
| **10pm - 11pm** | 13 | 10 | 18 | 33 | 32 | 38 | 13 | **106** | **21** | **157** | **22** |
| **11pm - Midnight** | 7 | 11 | 11 | 9 | 30 | 27 | 4 | **68** | **14** | **99** | **14** |
| **Total** | **3098** | **2829** | **3443** | **3432** | **3646** | **3062** | **2935** | **16448** | **3289** | **22445** | **3206** |

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CfeIT bob.white@cfeit.com (02) 9740 8600

# Traffic Count Summary Report

| | | | | |
|---|---|---|---|---|
| **Count Number** | **1254** | Ref : **SECA** | **Lat/Long : S32.59903 / E151.61764** | **GOOGLE** |
| Street | **GRESFORD ROAD, PATERSON : Between TOCAL ROAD & PARK ROAD (bidirectional) :** | | | |
| Location | Near the Paterson railway crossing, ELP 010033 | | | *Carriageway* |

**TOTAL COUNT MATRIX**

| | |
|---|---|
| Start Date | 30-OCT-14 |
| Start Time | 1700 |
| Duration | 7 DAYS |
| Interval | 1 HOUR |

| | |
|---|---|
| Weekly 50th Percentile Speed | 36 |
| Weekly 85th Percentile Speed | 46 |
| Five Day AADT | 3883 |
| Seven Day AADT | 3668 |

| | MON *3RD* | TUE *4TH* | WED *5TH* | THU *30TH / 6TH* | FRI *31ST* | SAT *1ST* | SUN *2ND* | 5 Day Total | 5 Day Average | 7 Day Total | 7 Day Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Midnight - 1am** | 8 | 5 | 7 | 3 | 12 | 15 | 21 | **35** | **7** | **71** | **10** |
| **1am - 2am** | 2 | 2 | 8 | 2 | 6 | 13 | 9 | **20** | **4** | **42** | **6** |
| **2am - 3am** | 3 | 5 | 2 | 5 | 10 | 11 | 4 | **25** | **5** | **40** | **6** |
| **3am - 4am** | 5 | 4 | 8 | 5 | 6 | 6 | 3 | **28** | **6** | **37** | **5** |
| **4am - 5am** | 33 | 28 | 20 | 30 | 31 | 16 | 7 | **142** | **28** | **165** | **24** |
| **5am - 6am** | 84 | 84 | 102 | 85 | 77 | 48 | 20 | **432** | **86** | **500** | **71** |
| **6am - 7am** | 203 | 192 | 178 | 187 | 201 | 102 | 55 | **961** | **192** | **1118** | **160** |
| **7am - 8am** | 297 | 301 | 322 | 293 | 291 | 149 | 92 | **1504** | **301** | **1745** | **249** |
| **8am - 9am** | **328** | **355** | **371** | **346** | **363** | 245 | 177 | **1763** | **353** | **2185** | **312** |
| **9am - 10am** | 263 | 266 | 294 | 309 | 288 | 264 | 251 | **1420** | **284** | **1935** | **276** |
| **10am - 11am** | 237 | 255 | 263 | 265 | 274 | 283 | 252 | **1294** | **259** | **1829** | **261** |
| **11am - Midday** | 212 | 255 | 228 | 228 | 268 | **297** | **288** | **1191** | **238** | **1776** | **254** |
| **Midday - 1pm** | 222 | 234 | 256 | 260 | 227 | **248** | 246 | **1199** | **240** | **1693** | **242** |
| **1pm - 2pm** | 227 | 199 | 230 | 222 | 246 | 221 | 237 | **1124** | **225** | **1582** | **226** |
| **2pm - 3pm** | 253 | 288 | 299 | 286 | 288 | 189 | 287 | **1414** | **283** | **1890** | **270** |
| **3pm - 4pm** | 303 | 266 | **369** | **320** | 314 | 204 | 267 | **1572** | **314** | **2043** | **292** |
| **4pm - 5pm** | **309** | **295** | 332 | **320** | **323** | 211 | **311** | **1579** | **316** | **2101** | **300** |
| **5pm - 6pm** | 296 | 255 | 305 | 272 | 321 | 171 | 209 | **1449** | **290** | **1829** | **261** |
| **6pm - 7pm** | 179 | 180 | 187 | 212 | 238 | 147 | 154 | **996** | **199** | **1297** | **185** |
| **7pm - 8pm** | 88 | 91 | 83 | 128 | 133 | 99 | 86 | **523** | **105** | **708** | **101** |
| **8pm - 9pm** | 58 | 66 | 47 | 82 | 91 | 72 | 56 | **344** | **69** | **472** | **67** |
| **9pm - 10pm** | 37 | 28 | 60 | 52 | 46 | 55 | 46 | **223** | **45** | **324** | **46** |
| **10pm - 11pm** | 19 | 8 | 17 | 21 | 36 | 49 | 22 | **101** | **20** | **172** | **25** |
| **11pm - Midnight** | 11 | 13 | 8 | 16 | 30 | 33 | 10 | **78** | **16** | **121** | **17** |
| **Total** | **3677** | **3675** | **3996** | **3949** | **4120** | **3148** | **3110** | **19417** | **3883** | **25675** | **3667** |

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CfeIT bob.white@cfeit.com (02) 9740 8600

# Traffic Count Summary Report

| | | | | |
|---|---|---|---|---|
| **Count Number** | **2350** | Ref : **SECA** | **Lat/Long : S32 34.945 / E151 36.365** | **GOOGLE** |
| Street | **GRESFORD ROAD, PATERSON : Between TOCAL ROAD & PARK ROAD (bidirectional) :** | | | |
| Location | Site 2, Mid-way between Patterson township (Tocal Road) and Dungog Road, House No.250 on Tree. | | *Carriageway* | |

**TOTAL COUNT MATRIX**

| | |
|---|---|
| Start Date | 17-JUL-15 |
| Start Time | 100 |
| Duration | 7 DAYS |
| Interval | 1 HOUR |

| | |
|---|---|
| Weekly 50th Percentile Speed | 83 |
| Weekly 85th Percentile Speed | 95 |
| Five Day AADT | 3078 |
| Seven Day AADT | 2980 |

| | MON *20TH* | TUE *21ST* | WED *22ND* | THU *23RD* | FRI *17TH* | SAT *18TH* | SUN *19TH* | 5 Day Total | 5 Day Average | 7 Day Total | 7 Day Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Midnight - 1am** | 4 | 6 | 6 | 4 | 4 | 9 | 17 | **24** | **5** | **50** | **7** |
| **1am - 2am** | 4 | 4 | 5 | 1 | 6 | 3 | 2 | **20** | **4** | **25** | **4** |
| **2am - 3am** | 11 | 6 | 2 | 9 | 7 | 7 | 4 | **35** | **7** | **46** | **7** |
| **3am - 4am** | 9 | 7 | 6 | 3 | 10 | 8 | 7 | **35** | **7** | **50** | **7** |
| **4am - 5am** | 33 | 26 | 19 | 21 | 23 | 8 | 6 | **122** | **24** | **136** | **19** |
| **5am - 6am** | 59 | 68 | 75 | 61 | 74 | 22 | 13 | **337** | **67** | **372** | **53** |
| **6am - 7am** | 148 | 134 | 171 | 122 | 131 | 53 | 21 | **706** | **141** | **780** | **111** |
| **7am - 8am** | 226 | **259** | 250 | 241 | 216 | 125 | 38 | **1192** | **238** | **1355** | **194** |
| **8am - 9am** | **283** | 258 | **264** | **286** | **244** | 235 | 135 | **1335** | **267** | **1705** | **244** |
| **9am - 10am** | 209 | 222 | 246 | 229 | 233 | 286 | 212 | **1139** | **228** | **1637** | **234** |
| **10am - 11am** | 200 | 170 | 218 | 207 | 195 | **327** | 226 | **990** | **198** | **1543** | **220** |
| **11am - Midday** | 186 | 151 | 218 | 188 | 197 | 323 | **309** | **940** | **188** | **1572** | **225** |
| **Midday - 1pm** | 185 | 172 | 191 | 155 | 206 | **295** | **247** | **909** | **182** | **1451** | **207** |
| **1pm - 2pm** | 180 | 195 | 218 | 187 | 173 | 231 | 235 | **953** | **191** | **1419** | **203** |
| **2pm - 3pm** | 228 | 220 | 209 | 202 | 199 | 221 | 246 | **1058** | **212** | **1525** | **218** |
| **3pm - 4pm** | 217 | 257 | 270 | **291** | **293** | 199 | 218 | **1328** | **266** | **1745** | **249** |
| **4pm - 5pm** | **296** | **281** | **273** | 263 | 274 | 200 | 169 | **1387** | **277** | **1756** | **251** |
| **5pm - 6pm** | 229 | 258 | 232 | 231 | 244 | 149 | 143 | **1194** | **239** | **1486** | **212** |
| **6pm - 7pm** | 116 | 134 | 165 | 135 | 149 | 99 | 91 | **699** | **140** | **889** | **127** |
| **7pm - 8pm** | 56 | 73 | 80 | 93 | 64 | 50 | 51 | **366** | **73** | **467** | **67** |
| **8pm - 9pm** | 38 | 47 | 43 | 60 | 63 | 37 | 37 | **251** | **50** | **325** | **46** |
| **9pm - 10pm** | 41 | 30 | 41 | 44 | 53 | 42 | 41 | **209** | **42** | **292** | **42** |
| **10pm - 11pm** | 14 | 10 | 23 | 17 | 41 | 35 | 14 | **105** | **21** | **154** | **22** |
| **11pm - Midnight** | 7 | 6 | 6 | 15 | 20 | 19 | 10 | **54** | **11** | **83** | **12** |
| **Total** | **2979** | **2994** | **3231** | **3065** | **3119** | **2983** | **2492** | **15388** | **3077** | **20863** | **2980** |

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CfeIT bob.white@cfeit.com (02) 9740 8600

# Traffic Count Summary Report

| | | | | |
|---|---|---|---|---|
| **Count Number** | **918** | Ref : **SECA** | **Lat/Long : S32.70295 / E151.58215** | **GOOGLE** |
| Street | **PATERSON ROAD, BOLWARRA : Between EKERT LANE & TOCAL ROAD (NORTH INTERSECTION) (bidirectional) :** | | | |
| Location | South of Tocal Road (south intersection), Bolwarra Heights, Scenic Lookout Sign | | | *Carriageway* |

**TOTAL COUNT MATRIX**

| | |
|---|---|
| Start Date | 27-AUG-14 |
| Start Time | 100 |
| Duration | 7 DAYS |
| Interval | 1 HOUR |

| | |
|---|---|
| Weekly 50th Percentile Speed | 60 |
| Weekly 85th Percentile Speed | 68 |
| Five Day AADT | 10106 |
| Seven Day AADT | 9700 |

| | MON *1ST* | TUE *2ND* | WED *27TH* | THU *28TH* | FRI *29TH* | SAT *30TH* | SUN *31ST* | 5 Dav Total | 5 Dav Average | 7 Dav Total | 7 Dav Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Midnight - 1am** | 3 | 16 | 29 | 21 | 20 | 52 | 91 | **89** | **18** | **232** | **33** |
| **1am - 2am** | 7 | 14 | 15 | 13 | 18 | 21 | 37 | **67** | **13** | **125** | **18** |
| **2am - 3am** | 11 | 10 | 6 | 9 | 14 | 15 | 14 | **50** | **10** | **79** | **11** |
| **3am - 4am** | 32 | 22 | 11 | 16 | 19 | 21 | 18 | **100** | **20** | **139** | **20** |
| **4am - 5am** | 90 | 99 | 85 | 70 | 61 | 41 | 16 | **405** | **81** | **462** | **66** |
| **5am - 6am** | 233 | 219 | 196 | 200 | 208 | 96 | 59 | **1056** | **211** | **1211** | **173** |
| **6am - 7am** | 436 | 480 | 405 | 411 | 408 | 172 | 90 | **2140** | **428** | **2402** | **343** |
| **7am - 8am** | 726 | 727 | 722 | 668 | 645 | 303 | 205 | **3488** | **698** | **3996** | **571** |
| **8am - 9am** | **997** | **961** | **940** | **938** | **983** | 574 | 401 | **4819** | **964** | **5794** | **828** |
| **9am - 10am** | 664 | 675 | 725 | 715 | 756 | 685 | 683 | **3535** | **707** | **4903** | **700** |
| **10am - 11am** | 569 | 605 | 555 | 618 | 647 | 788 | 816 | **2994** | **599** | **4598** | **657** |
| **11am - Midday** | 590 | 550 | 549 | 559 | 659 | **791** | **866** | **2907** | **581** | **4564** | **652** |
| **Midday - 1pm** | 540 | 605 | 530 | 550 | 614 | 743 | 729 | **2839** | **568** | **4311** | **616** |
| **1pm - 2pm** | 526 | 553 | 568 | 580 | 683 | **768** | **733** | **2910** | **582** | **4411** | **630** |
| **2pm - 3pm** | 643 | 636 | 621 | 662 | 769 | 720 | 682 | **3331** | **666** | **4733** | **676** |
| **3pm - 4pm** | 833 | 836 | 808 | 792 | 946 | 702 | 629 | **4215** | **843** | **5546** | **792** |
| **4pm - 5pm** | **940** | **870** | 851 | **898** | **986** | 688 | 598 | **4545** | **909** | **5831** | **833** |
| **5pm - 6pm** | 853 | **870** | **871** | 857 | 941 | 598 | 561 | **4392** | **878** | **5551** | **793** |
| **6pm - 7pm** | 488 | 470 | 495 | 622 | 634 | 494 | 352 | **2709** | **542** | **3555** | **508** |
| **7pm - 8pm** | 267 | 269 | 329 | 340 | 310 | 251 | 187 | **1515** | **303** | **1953** | **279** |
| **8pm - 9pm** | 178 | 172 | 201 | 266 | 265 | 228 | 154 | **1082** | **216** | **1464** | **209** |
| **9pm - 10pm** | 118 | 116 | 123 | 162 | 212 | 210 | 110 | **731** | **146** | **1051** | **150** |
| **10pm - 11pm** | 59 | 57 | 71 | 87 | 131 | 173 | 53 | **405** | **81** | **631** | **90** |
| **11pm - Midnight** | 33 | 28 | 32 | 40 | 75 | 137 | 16 | **208** | **42** | **361** | **52** |
| **Total** | **9836** | **9860** | **9738** | **10094** | **11004** | **9271** | **8100** | **50532** | **10106** | **67903** | **9700** |

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CfeIT bob.white@cfeit.com (02) 9740 8600

# Traffic Count Summary Report

| | | | | |
|---|---|---|---|---|
| **Count Number** | **1255** | Ref : **SECA** | **Lat/Long : S32.70295 / E151.58215** | **GOOGLE** |
| Street | **PATERSON ROAD, BOLWARRA : Between EKERT LANE & TOCAL ROAD (NORTH INTERSECTION) (bidirectional) :** | | | |
| Location | South of Tocal Road (south intersection), Bolwarra Heights, Scenic Lookout Sign, Opposite House 169. | | *Carriageway* | |

**TOTAL COUNT MATRIX**

| | |
|---|---|
| Start Date | 30-OCT-14 |
| Start Time | 1700 |
| Duration | 7 DAYS |
| Interval | 1 HOUR |

| | |
|---|---|
| Weekly 50th Percentile Speed | 59 |
| Weekly 85th Percentile Speed | 68 |
| Five Day AADT | 10266 |
| Seven Day AADT | 9721 |

| | MON *3RD* | TUE *4TH* | WED *5TH* | THU *30TH / 6TH* | FRI *31ST* | SAT *1ST* | SUN *2ND* | 5 Day Total | 5 Day Average | 7 Day Total | 7 Day Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Midnight - 1am** | 14 | 16 | 24 | 20 | 26 | 76 | 77 | **100** | **20** | **253** | **36** |
| **1am - 2am** | 9 | 11 | 20 | 11 | 25 | 36 | 50 | **76** | **15** | **162** | **23** |
| **2am - 3am** | 8 | 10 | 14 | 15 | 12 | 27 | 22 | **59** | **12** | **108** | **15** |
| **3am - 4am** | 26 | 25 | 22 | 19 | 21 | 12 | 19 | **113** | **23** | **144** | **21** |
| **4am - 5am** | 71 | 73 | 69 | 72 | 79 | 41 | 27 | **364** | **73** | **432** | **62** |
| **5am - 6am** | 236 | 243 | 262 | 236 | 228 | 99 | 58 | **1205** | **241** | **1362** | **195** |
| **6am - 7am** | 486 | 426 | 436 | 434 | 464 | 211 | 127 | **2246** | **449** | **2584** | **369** |
| **7am - 8am** | 734 | 739 | 717 | 740 | 680 | 454 | 196 | **3610** | **722** | **4260** | **609** |
| **8am - 9am** | **912** | **869** | **903** | **878** | **914** | 643 | 412 | **4476** | **895** | **5531** | **790** |
| **9am - 10am** | 731 | 680 | 707 | 721 | 724 | 758 | 579 | **3563** | **713** | **4900** | **700** |
| **10am - 11am** | 618 | 578 | 595 | 544 | 704 | 781 | 659 | **3039** | **608** | **4479** | **640** |
| **11am - Midday** | 551 | 597 | 590 | 578 | 671 | **810** | **669** | **2987** | **597** | **4466** | **638** |
| **Midday - 1pm** | 550 | 529 | 547 | 546 | 600 | **701** | 657 | **2772** | **554** | **4130** | **590** |
| **1pm - 2pm** | 576 | 500 | 602 | 543 | 626 | 590 | 595 | **2847** | **569** | **4032** | **576** |
| **2pm - 3pm** | 640 | 585 | 680 | 671 | 734 | 568 | **687** | **3310** | **662** | **4565** | **652** |
| **3pm - 4pm** | 853 | 710 | 832 | 829 | 909 | 560 | 676 | **4133** | **827** | **5369** | **767** |
| **4pm - 5pm** | **881** | **827** | 852 | **916** | 904 | 533 | 612 | **4380** | **876** | **5525** | **789** |
| **5pm - 6pm** | 866 | 808 | **919** | 846 | **940** | 538 | 555 | **4379** | **876** | **5472** | **782** |
| **6pm - 7pm** | 543 | 535 | 532 | 674 | 618 | 444 | 437 | **2902** | **580** | **3783** | **540** |
| **7pm - 8pm** | 350 | 374 | 346 | 420 | 408 | 301 | 267 | **1898** | **380** | **2466** | **352** |
| **8pm - 9pm** | 228 | 238 | 196 | 255 | 319 | 235 | 198 | **1236** | **247** | **1669** | **238** |
| **9pm - 10pm** | 137 | 139 | 176 | 165 | 246 | 158 | 144 | **863** | **173** | **1165** | **166** |
| **10pm - 11pm** | 72 | 76 | 68 | 92 | 174 | 170 | 78 | **482** | **96** | **730** | **104** |
| **11pm - Midnight** | 33 | 25 | 45 | 54 | 133 | 143 | 24 | **290** | **58** | **457** | **65** |
| **Total** | **10125** | **9613** | **10154** | **10279** | **11159** | **8889** | **7825** | **51330** | **10266** | **68044** | **9720** |

CfeIT bob.white@cfeit.com (02) 9740 8600

# Traffic Count Summary Report

**Count Number** 2352 Ref : SECA **Lat/Long : S32 42.437 / E151 34.575** GOOGLE

Street **PATERSON ROAD, BOLWARRA : Between EKERT LANE & WALLALONG ROAD (bidirectional) :**

Location Site 4, Mid-way between Flat Road and Bolwarra Heights, opposite House No.102 on Bike sign / fencepost. *Carriageway*

**TOTAL COUNT MATRIX**

| | |
|---|---|
| Start Date | 17-JUL-15 |
| Start Time | 100 |
| Duration | 7 DAYS |
| Interval | 1 HOUR |

| | |
|---|---|
| Weekly 50th Percentile Speed | 61 |
| Weekly 85th Percentile Speed | 68 |
| Five Day AADT | 11688 |
| Seven Day AADT | 11154 |

| | MON *20TH* | TUE *21ST* | WED *22ND* | THU *23RD* | FRI *17TH* | SAT *18TH* | SUN *19TH* | 5 Day Total | 5 Day Average | 7 Day Total | 7 Day Average |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Midnight - 1am** | 17 | 27 | 20 | 21 | 29 | 47 | 82 | **114** | **23** | **243** | **35** |
| **1am - 2am** | 13 | 9 | 18 | 14 | 15 | 33 | 46 | **69** | **14** | **148** | **21** |
| **2am - 3am** | 19 | 12 | 20 | 16 | 14 | 17 | 24 | **81** | **16** | **122** | **17** |
| **3am - 4am** | 27 | 21 | 30 | 28 | 35 | 17 | 25 | **141** | **28** | **183** | **26** |
| **4am - 5am** | 87 | 79 | 69 | 73 | 77 | 37 | 25 | **385** | **77** | **447** | **64** |
| **5am - 6am** | 244 | 238 | 251 | 230 | 251 | 96 | 50 | **1214** | **243** | **1360** | **194** |
| **6am - 7am** | 514 | 522 | 548 | 516 | 451 | 172 | 94 | **2551** | **510** | **2817** | **402** |
| **7am - 8am** | 784 | 810 | 828 | 758 | 753 | 372 | 178 | **3933** | **787** | **4483** | **640** |
| **8am - 9am** | **1125** | **1128** | **1073** | **1143** | **1092** | 777 | 407 | **5561** | **1112** | **6745** | **964** |
| **9am - 10am** | 777 | 765 | 789 | 773 | 821 | 940 | 671 | **3925** | **785** | **5536** | **791** |
| **10am - 11am** | 619 | 571 | 706 | 610 | 683 | 1024 | 793 | **3189** | **638** | **5006** | **715** |
| **11am - Midday** | 637 | 623 | 639 | 618 | 761 | **1123** | **808** | **3278** | **656** | **5209** | **744** |
| **Midday - 1pm** | 592 | 623 | 692 | 602 | 685 | **957** | **787** | **3194** | **639** | **4938** | **705** |
| **1pm - 2pm** | 661 | 596 | 701 | 602 | 682 | 910 | 735 | **3242** | **648** | **4887** | **698** |
| **2pm - 3pm** | 738 | 720 | 766 | 794 | 726 | 835 | 695 | **3744** | **749** | **5274** | **753** |
| **3pm - 4pm** | 950 | 987 | 1000 | 994 | 1016 | 827 | 733 | **4947** | **989** | **6507** | **930** |
| **4pm - 5pm** | **1095** | **1146** | 1063 | **1182** | 987 | 765 | 670 | **5473** | **1095** | **6908** | **987** |
| **5pm - 6pm** | 1059 | 1106 | **1174** | 1051 | **1042** | 744 | 586 | **5432** | **1086** | **6762** | **966** |
| **6pm - 7pm** | 634 | 650 | 719 | 671 | 600 | 484 | 405 | **3274** | **655** | **4163** | **595** |
| **7pm - 8pm** | 318 | 390 | 380 | 430 | 339 | 285 | 236 | **1857** | **371** | **2378** | **340** |
| **8pm - 9pm** | 195 | 243 | 235 | 281 | 241 | 207 | 182 | **1195** | **239** | **1584** | **226** |
| **9pm - 10pm** | 157 | 166 | 194 | 194 | 227 | 239 | 126 | **938** | **188** | **1303** | **186** |
| **10pm - 11pm** | 68 | 75 | 83 | 90 | 141 | 167 | 62 | **457** | **91** | **686** | **98** |
| **11pm - Midnight** | 29 | 42 | 39 | 54 | 80 | 119 | 26 | **244** | **49** | **389** | **56** |
| **Total** | **11359** | **11549** | **12037** | **11745** | **11748** | **11194** | **8446** | **58438** | **11687** | **78078** | **11154** |

 **CFE Information Technologies**



Data displayed has been compiled from pneumatic traffic count processes and is subject to the documented limitations

# Appendix D

## Source Sound Power Levels and Locations

**Existing Point Sources**

| Name | Result. PWL | Height | | Coordinates | | |
|---|---|---|---|---|---|---|
| | Day | | | X | Y | Z |
| | (dBA) | (m) | | (m) | (m) | (m) |
| Mobile Crusher and Screen | 121.6 | 2.50 | r | 370242.94 | 6397896.83 | 43.30 |
| Powerrock Drill | 114.4 | 1.50 | r | 370157.25 | 6397981.96 | 52.75 |
| Canica Crusher | 97.7 | 3.00 | r | 370729.74 | 6397308.14 | 59.83 |
| Screen 2 | 109.1 | 1.50 | g | 370742.31 | 6397342.48 | 64.16 |
| Screen_3 | 109.1 | 1.50 | g | 370769.42 | 6397374.04 | 64.07 |
| Jacques Primary Crusher | 108.6 | 1.50 | r | 370673.15 | 6397354.93 | 55.08 |
| Dump Truck at Hopper | 102.5 | 2.00 | r | 370683.52 | 6397369.46 | 64.83 |
| Rail Feeder | 118.8 | 1.20 | g | 370587.85 | 6397285.58 | 61.99 |
| Truck Park Up | 92.2 | 1.50 | r | 370786.57 | 6397184.06 | 60.36 |
| Truck Park Up | 92.2 | 1.50 | r | 370768.34 | 6397205.97 | 60.55 |
| Truck Park Up | 92.2 | 1.50 | r | 370757.38 | 6397224.99 | 59.81 |
| Truck Park Up | 92.2 | 1.50 | r | 370581.99 | 6397135.30 | 56.81 |
| Year 10 East pit Truck | 108.8 | 1.50 | r | 370809.00 | 6397688.62 | 96.23 |
| Year 1 East Pit Loader | 104.2 | 1.50 | r | 370662.60 | 6397584.87 | 61.50 |
| Pug Mill | 92.2 | 1.50 | r | 370756.85 | 6397127.68 | 61.56 |
| Warrior Jaw | 121.6 | 1.50 | r | 370245.55 | 6397909.83 | 61.50 |

**Existing Line Sources**

| Name | Result. PWL | Moving Pt. Src | |
|---|---|---|---|
| | Day | Number | Speed |
| | (dBA) | Day | (km/h) |
| Cat 980 | 100.9 | | |
| HD 605 84A91 | 103.2 | 6.0 | 10.0 |
| CAT 775 84A91 | 104.3 | 6.0 | 10.0 |
| Road Haul | 105.5 | 50.0 | 8.0 |
| Road Haul Entry Exit | 86.7 | 40.0 | 10.0 |
| Cat 988H_2 | 103.1 | | |
| Cat 988H | 103.1 | | |
| Road Haulage | 94.9 | 80.0 | 20.0 |
| Road Haulage | 87.7 | 20.0 | 10.0 |
| Cat 980 | 100.9 | | |
| Road Haul | 105.5 | 50.0 | 8.0 |
| Road Haul Entry Exit | 86.7 | 40.0 | 10.0 |
| 119E | 96.7 | 80.0 | 25.0 |
| Cat 988H | 103.1 | | |
| Train | 117.9 | | |

**Existing Areas Sources**

| Name | Result. PWL | |
|---|---|---|
| | (dBA) | Area |
| 48Crusher Roof | 92.6 | ($m^2$) |
| 48" Rotary Crusher AS- South Upper | 90.8 | 79.42 |
| 48" Rotary Crusher AS North | 90.7 | 77.91 |
| 48" Rotary Crusher AS West Upper | 89.7 | 195.94 |
| 48" Rotary Crusher AS East Upper | 94.7 | 194.58 |
| 48" Rotary Crusher AS West Lower | 120.1 | 48.01 |
| 48" Rotary Crusher AS South lower | 122.3 | 31.51 |
| 48" Rotary Crusher AS East Lower | 111.4 | 25.52 |
| Surge Bin | 110.6 | |
| Rail Loader | 116.4 | 18.20 |
| Jacques Building West Wall | 121.5 | 19.50 |
| Primary Crusher Building | 108.6 | 6.79 |

**Year 5 Point Sources**

| Name | Result. PWL | Height | | Coordinates | | |
|---|---|---|---|---|---|---|
| | Day | | | X | Y | Z |
| | (dBA) | (m) | | (m) | (m) | (m) |
| Crusher and Screen | 121.6 | 2.50 | r | 370554.90 | 6397782.08 | 66.50 |
| Power rock Drill | 114.4 | 1.50 | r | 370301.29 | 6398119.33 | 68.83 |
| Canica Crusher | 97.7 | 3.00 | r | 370729.84 | 6397307.99 | 60.98 |
| Screen 2 | 109.1 | 5.00 | r | 370742.31 | 6397342.48 | 62.74 |
| Screen_3 | 109.1 | 5.00 | r | 370769.42 | 6397374.04 | 62.83 |
| Jacques Primary Crusher | 108.6 | 1.50 | r | 370673.15 | 6397354.93 | 55.08 |
| Dump Truck at Hopper | 102.5 | 2.00 | r | 370683.52 | 6397369.46 | 64.70 |
| Rail Feeder | 118.8 | 1.20 | g | 370587.85 | 6397285.58 | 61.99 |
| Truck Park Up | 92.2 | 1.50 | r | 370786.57 | 6397184.06 | 60.21 |
| Truck Park Up | 92.2 | 1.50 | r | 370768.34 | 6397205.97 | 60.74 |
| Truck Park Up | 92.2 | 1.50 | r | 370757.38 | 6397224.99 | 60.40 |
| Pug Mill | 92.2 | 1.50 | r | 370756.85 | 6397127.68 | 60.36 |
| Crusher and Screen | 121.6 | 2.50 | r | 370066.81 | 6397705.59 | 30.50 |
| Pug Mill | 92.2 | 1.50 | r | 370756.85 | 6397129.68 | 60.31 |

**Year 5 Line Sources**

| Name | Result. PWL | Moving Pt. Src | |
|---|---|---|---|
| | | Number | Speed (km/h) |
| | (dBA) | | |
| Rail Stock Pile Loader Cat 980 | 100.9 | | |
| HD 605 84A91 | 103.2 | 6.0 | 10.0 |
| CAT 775 84A91 | 103.1 | 6.0 | 10.0 |
| 848C2 | 0.0 | | |
| Road Haul | 105.5 | 50.0 | 8.0 |
| Road Haul Entry Exit | 86.7 | 40.0 | 10.0 |
| Pug mill Loader Cat 988H_2 | 103.1 | | |
| ROM Loader Lot 21 | 104.2 | | |
| ROM Loader WA600 Lot 6 | 104.2 | | |
| Truck Yr 5 | 103.6 | | |
| New Access road | 97.6 | 80.0 | 20.0 |
| Train Loading | 115.1 | | |
| Train Loading | 118.3 | | |
| Despatch loader 1 Cat 988H | 103.1 | | |
| ROM loader WA600 | 104.2 | | |
| Stock Pile Loader Cat 980 | 100.9 | | |
| Despatch loader 2 Cat 988H | 103.1 | | |

**Year 5 Area Sources**

| Name | Result. PWL | |
|---|---|---|
| | (dBA) | Area |
| 48Crusher Roof | 92.6 | ($m^2$) |
| 48" Rotary Crusher AS- South Upper | 90.8 | 79.42 |
| 48" Rotary Crusher AS North | 90.7 | 77.91 |
| 48" Rotary Crusher AS West Upper | 89.7 | 195.94 |
| 48" Rotary Crusher AS East Upper | 94.7 | 194.58 |
| 48" Rotary Crusher AS West Lower | 88.6 | 48.01 |
| 48" Rotary Crusher AS South lower | 90.8 | 31.51 |
| 48" Rotary Crusher AS East Lower | 111.4 | 25.52 |
| Surge Bin | 81.6 | |
| Rail Loader In shed | 85.5 | 18.20 |
| Jacques Building West Wall | 88.0 | 19.50 |
| Primary Crusher Building | 75.9 | 6.79 |

**Year 10 Point Sources**

| Name | Result. PWL | Height | | Coordinates | | |
|---|---|---|---|---|---|---|
| | | | | X | Y | Z |
| | (dBA) | (m) | | (m) | (m) | (m) |
| Crusher and Screen | 121.6 | 2.50 | r | 370098.78 | 6397750.85 | 30.50 |
| Power Rock Drill | 114.4 | 1.50 | r | 370596.18 | 6397930.85 | 89.50 |
| Canica Crusher | 97.7 | 3.00 | r | 370729.84 | 6397307.99 | 61.01 |
| Screen 2 | 109.1 | 5.00 | r | 370742.31 | 6397342.48 | 62.76 |
| Screen_3 | 109.1 | 5.00 | r | 370769.42 | 6397374.04 | 62.83 |
| Jacques Primary Crusher | 108.6 | 1.50 | r | 370673.15 | 6397354.93 | 55.08 |
| Dump Truck at Hopper | 102.5 | 2.00 | r | 370683.52 | 6397369.46 | 64.70 |
| Rail Feeder | 118.8 | 1.20 | g | 370587.85 | 6397285.58 | 61.99 |
| Truck Park Up | 92.2 | 1.50 | r | 370786.57 | 6397184.06 | 60.22 |
| Truck Park Up | 92.2 | 1.50 | r | 370768.34 | 6397205.97 | 60.80 |
| Truck Park Up | 92.2 | 1.50 | r | 370757.38 | 6397224.99 | 60.50 |
| Year 10 East pit Truck | 108.8 | 1.50 | r | 370809.00 | 6397688.62 | 96.23 |
| Year 10 East Pit Loader | 103.1 | 1.50 | r | 370662.60 | 6397584.87 | 61.58 |
| Pug Mill | 92.2 | 1.50 | r | 370756.85 | 6397127.68 | 60.40 |
| Dozer | 116.3 | 2.50 | r | 370739.94 | 6397834.53 | 90.50 |

**Year 10 Line Sources**

| Name | Result. PWL | Moving Pt. Src | |
|---|---|---|---|
| | | Number | Speed |
| | (dBA) | | (km/h) |
| Stock Pile Loader Cat 980 | 100.9 | | |
| HD 605 84A91 | 99.8 | 6.0 | 10.0 |
| CAT 775 84A91 | 102.2 | 6.0 | 10.0 |
| Pug mill Loader Cat 988H_2 | 103.1 | | |
| ROM loader 2 Cat WA600 | 104.2 | | |
| Cat 980 | 103.1 | | |
| Truck Yr 5 | 103.6 | | |
| Train Loading | 115.1 | | |
| Train Loading | 118.3 | | |
| Access road | 98.5 | 80.0 | 25.0 |
| Loader Pit | 104.2 | | |
| Despatch loader 1 Cat 988H | 103.1 | | |
| Haul 76m bench | 108.8 | | |
| Haul 76m bench | 108.8 | | |
| Despatch loader 2 Cat 988H | 103.1 | | |

**Year 10 Area Sources**

| Name | Result. PWL | |
|---|---|---|
| | (dBA) | Area |
| 48Crusher Roof | 92.6 | ($m^2$) |
| 48" Rotary Crusher AS- South Upper | 90.8 | 79.42 |
| 48" Rotary Crusher AS North | 90.7 | 77.91 |
| 48" Rotary Crusher AS West Upper | 89.7 | 195.94 |
| 48" Rotary Crusher AS East Upper | 94.7 | 194.58 |
| 48" Rotary Crusher AS West Lower | 88.6 | 48.01 |
| 48" Rotary Crusher AS South lower | 90.8 | 31.51 |
| 48" Rotary Crusher AS East Lower | 111.4 | 25.52 |
| Surge Bin | 110.6 | |
| Rail Loader In shed | 85.5 | 18.20 |
| Jacques Building West Wall | 88.0 | 19.50 |
| Primary Crusher Building | 75.9 | 6.79 |

**Year 15 Point Sources**

| Name | Result. PWL | Height | | Coordinates | | |
|---|---|---|---|---|---|---|
| | | | | X | Y | Z |
| | (dBA) | (m) | | (m) | (m) | (m) |
| Crusher and Screen | 121.6 | 2.50 | r | 370577.41 | 6397744.41 | 54.50 |
| Power rock Drill | 114.4 | 1.50 | r | 370672.65 | 6397881.28 | 89.50 |
| Canica Crusher | 97.7 | 3.00 | r | 370724.84 | 6397305.16 | 61.01 |
| Screen 2 | 109.1 | 5.00 | r | 370742.31 | 6397342.48 | 62.76 |
| Screen_3 | 109.1 | 5.00 | r | 370769.42 | 6397374.04 | 62.83 |
| Dump Truck at Hopper | 102.5 | 2.00 | r | 370683.52 | 6397369.46 | 64.70 |
| Truck Park Up | 92.2 | 1.50 | r | 370786.57 | 6397184.06 | 60.76 |
| Truck Park Up | 92.2 | 1.50 | r | 370768.34 | 6397205.97 | 60.78 |
| Truck Park Up | 92.2 | 1.50 | r | 370757.38 | 6397224.99 | 60.46 |
| Year 10 East pit Truck | 108.8 | 1.50 | r | 370809.00 | 6397688.62 | 96.23 |
| Year 10 East Pit Loader | 103.1 | 1.50 | r | 370662.60 | 6397584.87 | 61.58 |
| Pug Mill | 92.2 | 1.50 | r | 370756.85 | 6397127.68 | 60.40 |
| Rail Feeder | 118.8 | 1.20 | g | 370587.85 | 6397285.58 | 61.99 |
| Dozer | 116.3 | 2.50 | r | 370947.81 | 6397721.89 | 102.50 |

**Year 15 Line Sources**

| Name | Result. PWL | Moving Pt. Src | |
|---|---|---|---|
| | | Number | Speed |
| | (dBA) | Day | (km/h) |
| Stock Pile loader | 100.9 | | |
| HD 605 84A91 | 102.3 | 6.0 | 10.0 |
| CAT 775 84A91 | 103.2 | 6.0 | 10.0 |
| Road Haul Entry Exit | 86.7 | 40.0 | 10.0 |
| Pug mill Loader Cat 988H_2 | 103.1 | | |
| Despatch loader 1 Cat 988H | 103.1 | | |
| Face Loader | 104.2 | | |
| ROM Loader 2 WA600 | 104.2 | | |
| 1435B8 | 113.2 | | |
| 1435B8 | 118.3 | | |
| 119E | 96.7 | 80.0 | 25.0 |
| Despatch Loader 2 Cat 980 | 100.9 | | |

**Year 15 Area Sources**

| Name | Result PWL | |
|---|---|---|
| | (dBA) | Area |
| 48Crusher Roof | 92.6 | ($m^2$) |
| 48" Rotary Crusher AS- South Upper | 90.8 | 79.42 |
| 48" Rotary Crusher AS North | 90.7 | 77.91 |
| 48" Rotary Crusher AS West Upper | 89.7 | 195.94 |
| 48" Rotary Crusher AS East Upper | 94.7 | 194.58 |
| 48" Rotary Crusher AS West Lower | 88.6 | 48.01 |
| 48" Rotary Crusher AS South lower | 90.8 | 31.51 |
| 48" Rotary Crusher AS East Lower | 111.4 | 25.52 |
| Surge Bin | 110.6 | |
| Rail Loader In shed | 85.5 | 18.20 |
| Jacques Building West Wall | 88.0 | 19.50 |
| Primary Crusher Building | 75.9 | 6.79 |

**Year 20 point Sources**

| Name | Result. PWL | Height | | Coordinates | | |
|---|---|---|---|---|---|---|
| | | | | X | Y | Z |
| | (dBA) | (m) | | (m) | (m) | (m) |
| Crusher and Screen | 121.6 | 2.50 | r | 370787.33 | 6397504.95 | 54.50 |
| Power Rock Drill | 114.4 | 1.50 | r | 370854.97 | 6397467.53 | 63.92 |
| Canica Crusher | 97.7 | 3.00 | r | 370729.59 | 6397308.33 | 61.33 |
| Screen 2 | 109.1 | 5.00 | r | 370742.31 | 6397342.48 | 62.91 |
| Screen_3 | 109.1 | 5.00 | r | 370769.42 | 6397374.04 | 62.83 |
| Jacques Primary Crusher | 108.6 | 1.50 | r | 370673.15 | 6397354.93 | 55.08 |
| Dump Truck at Hopper | 102.5 | 2.00 | r | 370683.52 | 6397369.46 | 64.70 |
| Truck Park Up | 92.2 | 1.50 | r | 370786.57 | 6397184.06 | 60.55 |
| Truck Park Up | 92.2 | 1.50 | r | 370768.34 | 6397205.97 | 60.61 |
| Truck Park Up | 92.2 | 1.50 | r | 370757.38 | 6397224.99 | 60.76 |
| Pug Mill | 92.2 | 1.50 | r | 370756.85 | 6397127.68 | 60.40 |
| Rail Feeder | 118.8 | 1.20 | g | 370587.85 | 6397285.58 | 61.99 |
| Dozer | 116.3 | 2.50 | r | 370907.64 | 6397634.36 | 90.50 |

**Year 20 Area Sources**

| Name | Result. PWL | Area |
|---|---|---|
| 48Crusher Roof | 92.6 | (m²) |
| 48" Rotary Crusher AS- South Upper | 90.8 | 79.42 |
| 48" Rotary Crusher AS North | 90.7 | 77.91 |
| 48" Rotary Crusher AS West Upper | 89.7 | 195.94 |
| 48" Rotary Crusher AS East Upper | 94.7 | 194.58 |
| 48" Rotary Crusher AS West Lower | 88.6 | 48.01 |
| 48" Rotary Crusher AS South lower | 90.8 | 31.51 |
| 48" Rotary Crusher AS East Lower | 111.4 | 25.52 |
| Surge Bin | 110.6 | |
| Rail Loader In shed | 85.5 | 18.20 |
| Jacques Building West Wall | 88.0 | 19.50 |
| Primary Crusher Building | 75.9 | 6.79 |

**Year 25 Point Sources**

| Name | Result. PWL | Height | | Coordinates | | |
|---|---|---|---|---|---|---|
| | Day | | | X | Y | Z |
| | (dBA) | (m) | | (m) | (m) | (m) |
| Power Rock Drill | 114.4 | 1.50 | r | 370806.07 | 6397660.52 | 53.50 |
| Canica Crusher | 97.7 | 2.00 | r | 370712.58 | 6397406.14 | 42.00 |
| Screen 2 | 109.1 | 5.00 | r | 370710.55 | 6397433.76 | 45.00 |
| Screen_3 | 109.1 | 5.00 | r | 370736.60 | 6397456.07 | 45.00 |
| Truck Park Up | 92.2 | 1.50 | r | 370786.57 | 6397184.06 | 60.55 |
| Truck Park Up | 92.2 | 1.50 | r | 370768.34 | 6397205.97 | 60.23 |
| Truck Park Up | 92.2 | 1.50 | r | 370757.38 | 6397224.99 | 59.94 |
| Pug Mill | 92.2 | 1.50 | r | 370756.85 | 6397127.68 | 60.40 |
| Rail Feeder | 118.8 | 1.20 | g | 370728.99 | 6397398.11 | 61.99 |
| Rail Feeder | 118.8 | 1.20 | g | 370728.36 | 6397398.74 | 61.99 |
| Jaw Crusher | 121.6 | 2.50 | r | 370717.13 | 6397364.01 | 42.50 |
| Secondary Crusher | 117.3 | 2.00 | r | 370712.58 | 6397387.97 | 42.00 |

**Year 25 Line Sources**

| Name | Result. PWL | Moving Pt. Src | |
|---|---|---|---|
| | Day | Number | Speed |
| | (dBA) | Day | (km/h) |
| ACCESS ROAD | 96.7 | 80.0 | 25.0 |
| Stock Pile Loader Cat 980 | 100.9 | | |
| Road Haul | 105.5 | 50.0 | 8.0 |
| Pug mill Loader Cat 988H_2 | 103.1 | | |
| Despatch Loader 2 Cat 988H | 103.1 | | |
| Train Loading | 119.5 | | |
| Train Loading | 118.3 | | |
| Cat 980 | 100.9 | | |
| Despatch Loader 1 Cat 988H | 103.1 | | |
| Lot 2 Pit Haul | 98.8 | 6.0 | 10.0 |
| Lot 2 Pit Haul | 99.5 | 6.0 | 10.0 |

**Year 25 Area Sources**

| Name | Result. PWL | |
|---|---|---|
| | (dBA) | Area ($m^2$) |
| Rail Loader In shed | 85.5 | 18.20 |
| 48" Rotary Crusher AS East Lower | 111.4 | 25.52 |
| 48" Rotary Crusher AS South lower | 90.8 | 31.51 |
| 48" Rotary Crusher AS West Lower | 88.6 | 48.01 |
| 48" Rotary Crusher AS East Upper | 94.7 | 194.58 |
| 48" Rotary Crusher AS West Upper | 89.7 | 195.94 |
| 48" Rotary Crusher AS- South Upper | 90.8 | 79.42 |
| 48" Rotary Crusher AS North | 90.7 | 77.91 |