K2 Environmental Ltd

Specialists in Air Quality Measurement

Dust Management and Monitoring Plan

Hirock Limited

257 Kendalls Line, Linton, Palmerston North

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1.0 INTRODUCTION

Hirock Ltd is a subsidiary of Higgins Family Holdings and operates out of the Linton Quarry. Hirock supply aggregate to the local region. On site they extract, crush, wash and screen aggregates for supply. Through the process of crushing, screening and transport of aggregate, dust may be generated and disturbed.

1.1 Purpose and Objectives of Plan

This Draft Dust Management and Monitoring Plan (DMMP) has been prepared by K2 Environmental Ltd on behalf of Hirock Quarry to establish the framework for managing dust emissions from Linton Quarry. The plan has been prepared in accordance with the Ministry for the Environment's 'Good practice guideline for Assessing and Managing Dust'.

The purpose of the Plan is to identify any sources of nuisance dust and:

- Define ways the dust can be reduced or eliminated
- Identify how the effect of the dust can be reduced
- Measure the effectiveness of the controls employed

1.2 Contents of the Plan

The Plan identifies the following:

• Potential sources of dust that may be created be the quarrying activities, including transportation;

• Sensitive receptors in the vicinity of identified potential sources of dust for targeted dust management;

• Dust management and mitigation methods;

• Monitoring methods;

• Training of staff in relation to dust management; and

• Methods for managing complaints regarding discharges into air and keeping compliance records.

The objectives of the Plan are to inform the quarry operations and site personnel of management and mitigation measures for quarry activities to minimise the adverse impacts of potential dust discharges on the receiving environment.

The methods of dust management are practical for Hirock to implement, while the Plan is intended to be continuously improved to adapt to mitigation where needed during the life of the Linton Quarry to ensure the required outcomes.

1.3 Review and updates to the Plan

This Plan is a live document that will be reviewed and updated during the life of the quarry to reflect significant changes associated with quarrying techniques, mitigation, monitoring results or the natural environment. A review process is described in Section 4.4 of this Plan.

1.4 Site Location

The site is located at 257 Kendalls Line, Linton (40°26'10.72"S 175°36'10.76"E). Local rural residential properties are located at 150 Kendalls Line, 160m (bearing 286°), 75 Kendalls Line; 530m NNE (Bearing 18°) and 950m NW (Bearing 290°) from site.

The terrain of the site location is mostly flat with small undulations. To the south of the site are the Tararua Ranges.

Figure 1 Satellite image of Linton Quarry

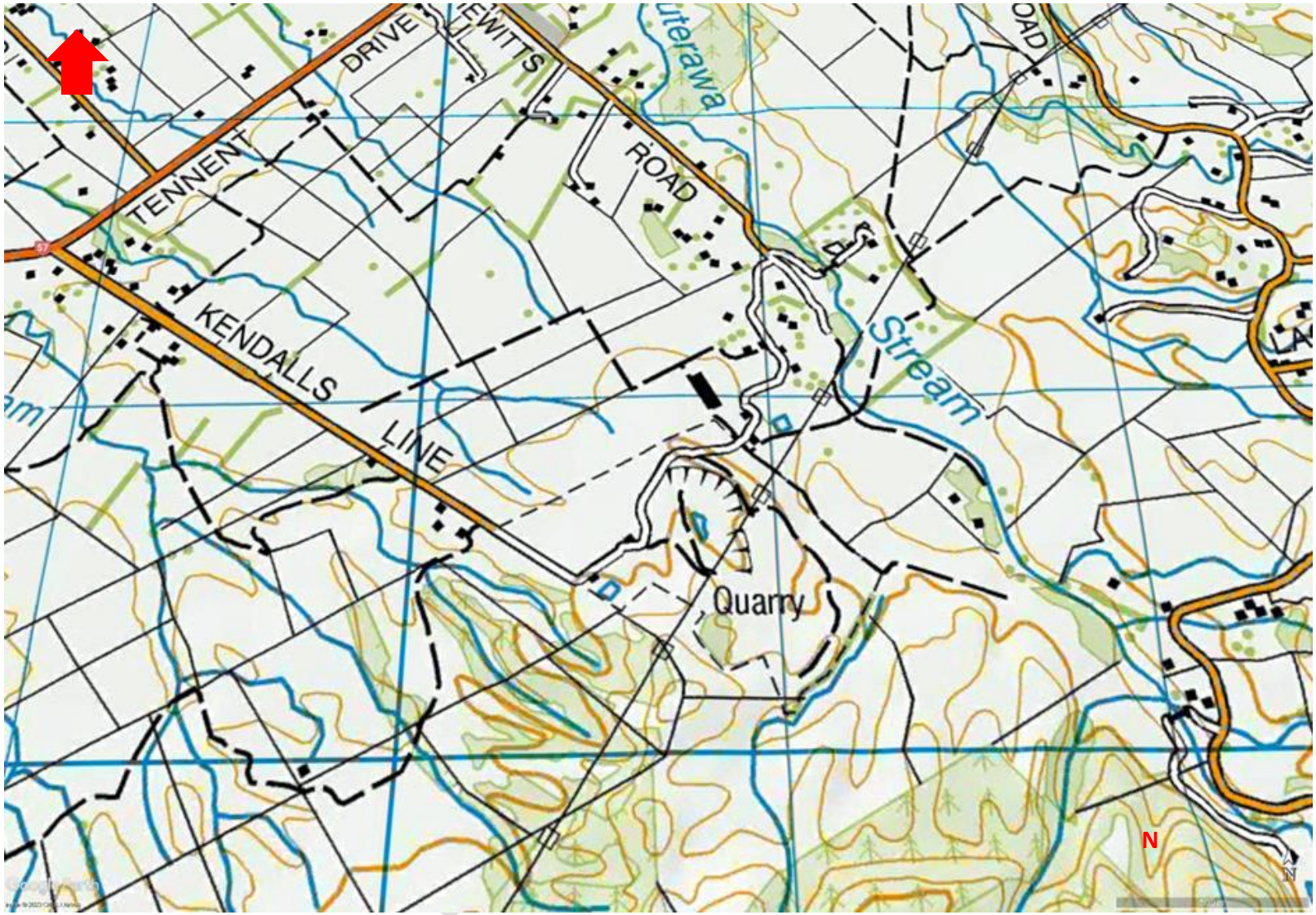

Figure 2 Topographic map of Linton Quarry

1.5 Site Meteorology

Winds within a dry environment are likely to create airborne dust. Therefore, wind and rainfall on site are important components. A wind rose was created with data collected from a NIWA meteorological station in Palmerston North for the period 2022 to 2023. Of all the measurements, 92% were collected with no rain measured.

Fine material from paved surfaces and stockpiles can be subject to disturbance at wind speeds in excess of 5 m/s.

The wind rose shows that the wind is blowing predominantly around the West North West and East South East vectors. Receptors within these vectors of the sources are likely to be subject to meteorological conditions that could give rise to dust emissions. Only 10.8% of wind speeds are above 5 m/s and are from the North West segment.

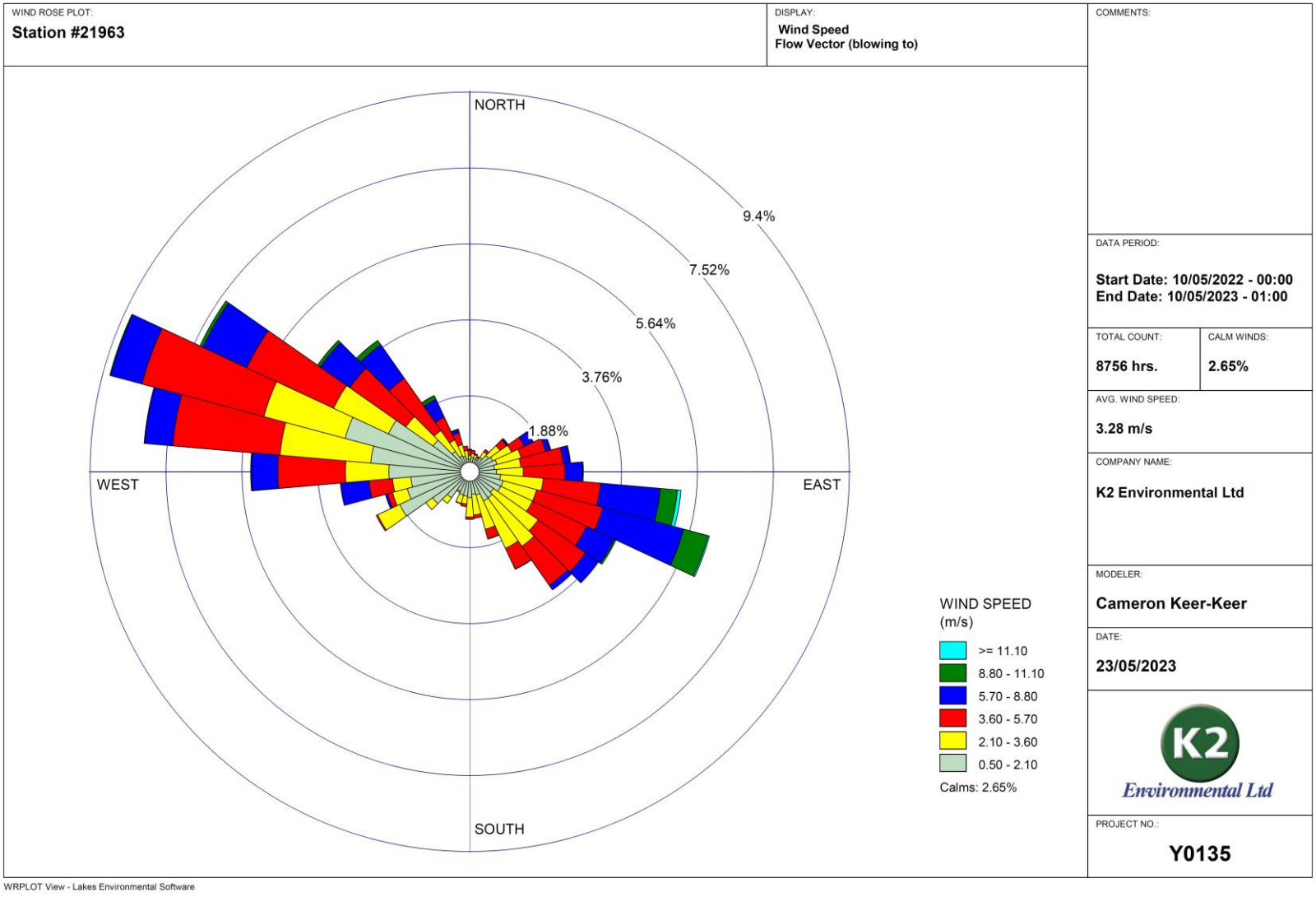

Figure 3 Windrose from Palmerston North

1.6 Receivers

Receivers to dust emissions will include residential houses on neighbouring properties and along Kendalls Line. The sensitive receivers are identified on the map above in Figure 1 Satellite image of Linton Quarry. The list of receivers northwest of site along Kendall's Line are:

Due to the properties being rural residential the sensitivity of the receivers are considered moderate to high.

- 11 Kendalls Line
- 15 Kendalls Line
- 33 Kendalls Line
- 39 Kendalls Line
- 4 Kendalls Line
- 6 Kendalls Line
- 56 Kendalls Line
- 75 Kendalls Line
- 150 Kendalls Line

Three properties along Kendalls Line (#11, #15 and #39) have previously raised concerns about dust from quarry trucks travelling along the road (Kendalls Line). When the road is resealed and the pot holes fixed, the residents report the issues are reduced. The closest neighbour to quarry site (# 150) has not raised any concerns about dust.

No dust issues have been identified by the receivers from activities within the quarry site.

1.7 Complaints

Complaints of every and any nature are first fielded by the Quarry Manger, Dave Larsen who will deal with it appropriately if within their means and field of experience/knowledge. If they cannot deal with it directly, they will escalate it either to the HSE Manager who will in turn escalate it to the Operations/Managing Director.

1.7.1 Dust Complaints

Dust complaints are directed to Dave Larsen (Quarry Manager), who will investigate the complaint within 24 hours of receiving the complaint and using the form found at APPENDIX B. record:

- Location, date and time of the complaint when the dust was observed
- Details of the observed dust emissions
- Onsite meteorological information at the time of the event
- Details of investigation carried out by onsite staff
- Identification of possible source of dust emission, with photos if practical
- Details of any corrective actions
- Details of any preventive actions

If the complaint is outside of their expertise or knowledge, then the complaint will be escalated further to Keith Herlihy (HSQE Co-ordinator) or Josua Grobler (General Manager Aggregate).

1.7.2 Notifications

Keith Herlihy, HSE Manager will notify Horizons or the PNCC of any dust complaints received, as appropriate. Complaints are communicated back to the team through either Toolbox Meetings, HSE Meetings or Special Meetings, depending on the nature of the complaint.

If any training or disciplinary action is required, normal company procedures will be followed.

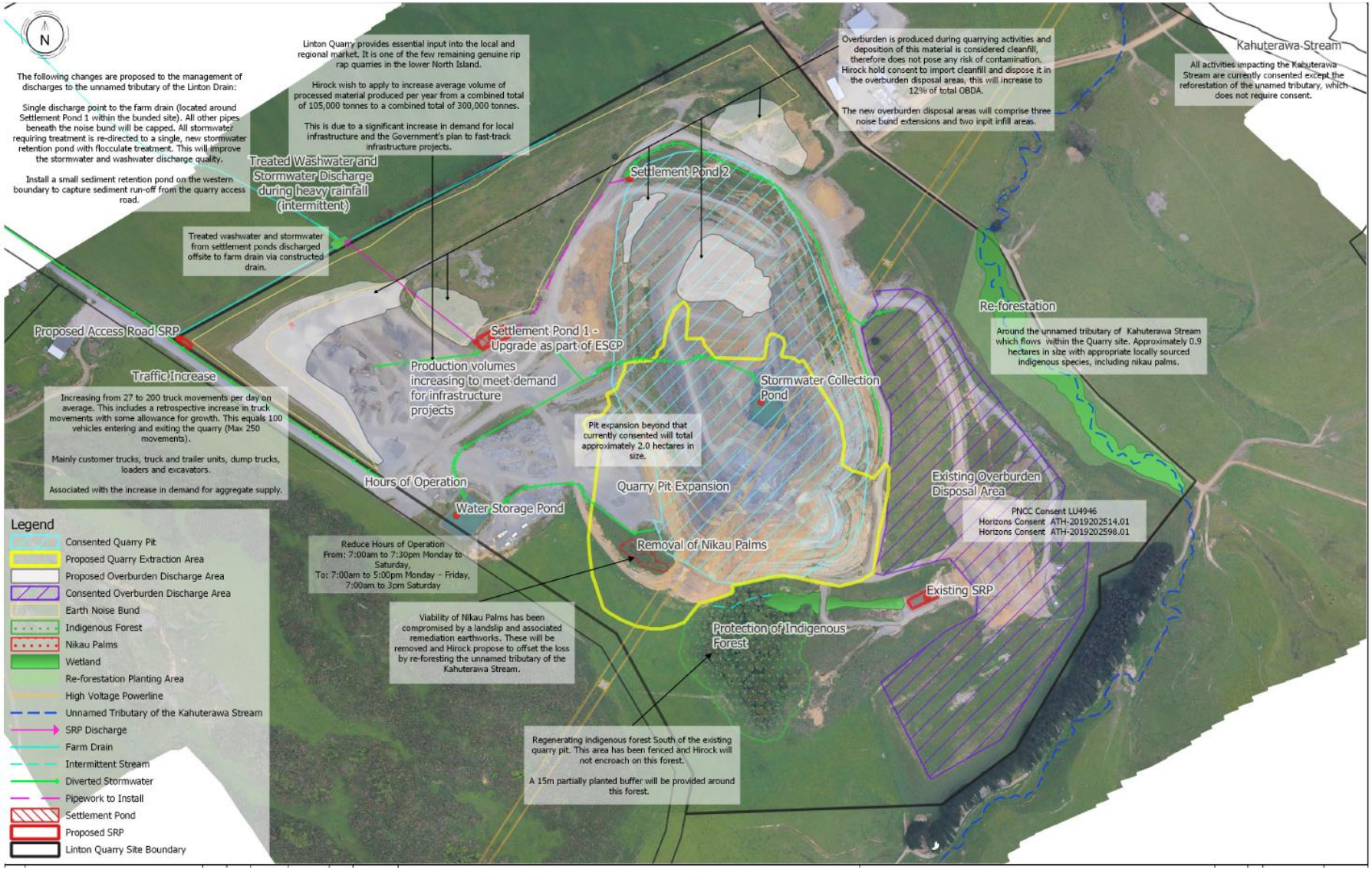

Figure 4 Linton Quarry layout

2.0 SITE INFORMATION

2.1.1 Quarrying Process Summary

The quarrying of hard rock requires drilling and blasting with explosives. Excavators then load the rock into dump trucks. The rocks are delivered to stockpiles.

Rock is processed into aggregate products, using

- crushing,
- screening,
- washing,
- blending, and
- conveying machinery

The products are moved by trucks, loaders, or conveyor to stockpiles.

Some soil and overburden will be stripped on site to expose rock for quarrying. The material stripped will be placed in designated infill areas.

2.1.2 Operating Times

Monday – Friday 7am – 5pm, Saturday 7am – 3pm. Closed on public holidays and reduced hours over the Christmas period.

2.2 Dust Sources

Transportation/excavation/screening of aggregate. Settled dust on aggregate will be disturbed and made airborne, as aggregate is moved from one location to the next and vibrated through screens.

Crushing aggregate. Breaking aggregate down into smaller sizes will create dust.

Rehabilitation of exposed surfaces. Soil removal and overburden disposal will generate dust temporarily.

Stockpiles. Settled dust on stockpiles is likely to be disturbed whilst aggregate is added or removed from the stockpile. Strong winds may also disturb surface dust.

Vehicle movements. The truck movements in this consent are for up to 250 movements per day. The road (Kendalls Line) has been recently resurfaced and considered to be in good condition with a low amount of dust expected from the road surface itself.

Vehicle movements throughout site and along Kendalls Line may disturb and deposit surface dust on the roads and surrounding properties. Dust may also be disturbed by air movements across the vehicles. Condition of the road and vehicle and speed of the vehicle are key components to dust generation.

Product Details. The majority of the product being moved from site are large rocks (300mm – 2000mm in size). The amount of dust from the large rocks in the truck is considered to be low.

On Site Dust. Settled dust on other surfaces throughout may be disturbed during dry and windy conditions.

2.3 Background Monitoring

Background monitoring was conducted at 11 Kendalls Line and 39 Kendalls Line. Monitoring was undertaken from the 28th April to the 24th of May 2023 to obtain baseline results from both sources of quarry operations and road use.

Measurements taken at 11 Kendalls Line for PM_{10} were taken using a TSI Dusttrak between the road and dwelling at to obtain baseline results for vehicles dust emissions. A time lapse video was also taken during monitoring to identify outlying causes of peaks.

Measurements taken at 39 Kendalls Line for PM_1, $PM_{2.5}$, PM_4, PM_{10} and PM_{total} were taken using both a TSI Dusttrak and Palas AQ Guard on the boundary of the property between the dwelling and the quarry site. Measurements were taken using the Palas AQ Guard due to its reliability during low dust concentrations compared to the TSI Dusttrak, as well so that both instruments can be compared to one another.

Monitoring was only undertaken for PM_{10} fraction of dust.

Meteorological monitoring for rainfall, wind speed and wind direction was also conducted at 39 Kendalls Line for rain. It is expected that the months of April and May have a higher frequency of rain events than summer months.

3.0 DUST CONTROL MEASURES

The overall approach to dust management for the quarry activities is primarily based on visual monitoring, combined with good management and a rapid response to complaints received. Taking a proactive approach to dust management will help avoid significant dust emissions or, if dust emissions occur, help mitigate any adverse effects.

3.1 Additional controls

During dry windy conditions additional controls are implemented. Trigger levels of two records of South East winds of 10 m/s within 10 minutes with no rainfall within the previous 12 hours to be used as a trigger for dry windy conditions.

3.2 Dust Management with Water

The main practice of dust management on site is the application of water to keep soil moisture high enough to prevent dust generation and discharge. Water storage in the pond ensures there is a consistent supply of water for dust control.

A yard sprinkler to suppress dust that could potentially rise from road use in this area.

The truck weigh bridge has a sprinkler.

In summer periods, to prevent dust, a watercart is used for the suppression of dust.

These water spray trucks drive around site to wet surfaces.

As a rule of thumb, the water cart is used when dust rises above the wheel diameter of the vehicle creating the dust.

3.3 Traffic Management

Hirock intend to increase the number of heavy vehicle movements from 54 per day to 200 per day (average) along Kendalls Line. To ensure the traffic movements to and from site do not result in the roading network (Kendalls Line and the State Highway 57 / Kendalls Line intersection)

- becoming unsafe, or
- inefficient, and
- to avoid significant adverse effects on the amenity values of the residents of the Kendalls Line.

The following measures are currently implemented at the Linton Quarry:

1. Kendalls Line has an advised speed limit of 70 km/h for quarry traffic which ensures trucks will be traveling at an appropriate speed, and this will reduce to 50km/h once the truck numbers increase.
2. There is a "Quarry Traffic" sign and a "Caution Children" sign within 100 m of the start of Kendalls Line.
3. All truck drivers will be appropriately qualified and licensed and are inducted onto the site by Hirock.
4. Traffic onsite is limited to trucks for loading aggregate, quarry machinery, and staff vehicles for travel around site.
5. Personal cars for travel to and from site are parked in a large, unsealed parking area which is provided on site next to the office and workshop building near the entrance.

6. Hirock have a road maintenance agreement with PNCC which requires annual road condition surveying and maintenance, A copy of the agreement is at Appendix A.

Source of Dust	Control	Additional controls
Screening/Crushing aggregate	Earth bund around site to help control emissions and noise. Suppression using water spray bars during the crushing process. Present on all crushers. Aggregate for screening is wet from the crushing process.	Increase use of water suppression
Excavating/Transporting Aggregate	Minimise drop heights. Limit load size to reduce spillage. Providing a truck wash bay assist in managing dust around the site. Spray bars at transfer points. All loading and servicing are completed on-site from the stockpiles and within the quarry.	Use water suppressant before excavating. Avoid handling material. Avoid excavation during high-speed (10m/s) SE winds.
Vehicle movements within the Quarry	Speed limit onsite is below 15km/hr. **Design:** Roads in the quarry are mainly constructed from aggregates. These are maintained regularly by a grader. If the grader is not available a loader.	Reduce speed limit to 10 km/hr Increase use of water suppression

Source of Dust	Control	Additional controls
	Maintain stabilised roads and a progressive cover of aggregate. Roads inspected weekly for degradation of progressive cover. If found to be degraded, then additional cover is applied. The access road into the quarry, from the gate to the weighbridge entrance, is sealed to eliminate dust from traffic movements into the operational areas by trucks collecting or delivering product. Flanking of the shoulder of the road to remove built up dust is to be completed annually as per the PNCC agreement in APPENDIX A	
Piles of dirt aka Stockpiles and Overburden	Make full use of Earth bund. Visually monitor stockpiles on a regular basis. Rehabilitation is undertaken progressively on the Linton Quarry Site. All disturbed areas not anticipated to be used for production or stockpiling are hydroseeded with grass/legume mix to provide ground stabilisation (3-5 weeks before stabilization). The purpose is to reduce visual impact, dust nuisance and soil erosion. • Stockpiles, • bunds, and	Increase use of water suppression

Source of Dust	Control	Additional controls
	• overburden dumping areas are shaped using a bulldozer and digger to produce neat, landscaped appearance before hydroseeding. Limit the height of stockpiles. Limit the slope of stockpiles.	
Dust on Kendalls Line	Maintain the condition of the road as per the road maintenance agreement. (see APPENDIX A). Limit vehicle speeds along Kendalls Line to 50 km/hr. Carry out shoulder flanking annually to clear dust from Kendalls Line.	Use of wheel wash before exiting site Cleaning of the sealed road within Quarry boundary every 3 months.
Blasting	Continue to only blast in lower quarry regions.	
Railway Ballast	Washing final aggregate.	
Monitoring	Air quality in the quarry is monitored visually. Personal full shift dust exposure monitoring has been done at Linton Quarry for plant operators. A full air quality risk assessment will be performed by independent accredited contractors.	

Source of Dust	Control	Additional controls
	It is important to note that fixed plant operators must wear P1 or above masks when working in the area and mobile plant operators must keep cab doors closed. Realtime monitoring of dust and other parameters as detailed in section 6. Result above 50µg/m^3 PM_{10} over 24 hours will require action. Real time for PM_{10} and time lapse video monitoring adjacent to the road if complaints regarding dust emissions from Kendalls Line exceed 5 substantiated complaints. Real time for PM_{10} and dust deposition monitoring on the boundary of the quarry if complaints regarding dust emissions from Kendalls Line exceed 5 substantiated complaints.	

3.4 Contingencies

Should the controls and additional controls fail to control the emissions from site and dust monitoring identifies that the controls have failed then the contingencies below in table below will be implemented

Source of Dust	Contingency
Screening/Crushing aggregate	Plant pine trees along earth bund. Install wind breaks around equipment Increased suppression during winds above 5/ms
Excavating/Transporting Aggregate	Use of polymer additives for chemical stabilization Increased suppression during winds above 5/ms
Vehicle movements within the Quarry	Increase visual inspection of stabilized roads to daily
Piles of dirt aka Stockpiles and Overburden	Use of polymer additives for chemical stabilization Increased suppression during winds above 5/ms
Dust on Kendalls Line	Provide trees to fill any gaps in the property boundaries along Kendalls Line. Lower speeds further near sensitive receivers Review the agreement and improve the agreement to reduce dust from the road.

4.0 ROLES AND RESPONSIBILITIES

4.1 Key Personnel Contacts

The Quarry Manager, Dave Larsen is responsible for managing resource consent compliance, environmental monitoring, environmental mitigation i.e. dust, noise control.

Dave Larsen, Quarry Supervisor

Hirock Ltd

Phone: 06 325 8135

Mobile: 027 434 2340

Physical Address: 167 Kendalls Line, Linton, 4472

Postal Address: PO Box 12075, Palmerston North, 4444

4.1.1 Company Management

Josua Grobler

General Manager – Aggregate

Hirock Ltd

M: 021 226 9882 | 18 El Prado Drive, Palmerston North, 4414 | PO Box 12075, Palmerston North, 4444

Keith Herlihy

HSQE Co Ordinator

Higgins Family Holdings Limited

P: 06 280 2534 | M: 027 221 0468 | 18 El Prado Drive, Palmerston North, 4414 | PO Box 12075, Palmerston North, 4444

4.2 Roles

The accountability for the implementation of the dust management plan

- dust controlled
- mitigation systems
- management of complaints
- consent conditions

Is Hirock company. The execution of the above is the responsibility of Quarry Manager/Supervisor

4.3 Training of Staff

Environmental training will be undertaken as part of the site induction programme. Environmental training is to be used to ensure all staff onsite aware of the purpose, procedures and intention of dust control.

The areas that staff are to be trained in:

- Information about activities that cause dust emission and their effects on neighbouring properties
- Consent requirements
- Dust control procedures
- Complaint management procedure
- Dust monitoring procedures

Staff training records will be maintained on site. The records will include:

- Who was trained
- When the person was trained
- Description of training content and whether follow up/refresher courses are required at a later date

4.4 DMMP Review

Review of the DMMP will be undertaken every 2 years by onsite staff or contractor. The review of the DMMP will take into consideration:

- Complaints and results of investigations
- Complaints log
- Changes to processes onsite

- Results of any monitoring completed
- Changes to any roles and responsibilities
- Changes to any legislation and standards
- Details of corrective actions
- Compliance with objectives and conditions.

The report will be submitted to the PNCC for review.

5.0 MONITORING

5.1 Air Monitoring – Truck Dust Kendall's Line

Air monitoring will be conducted during the first "dry" summer season, following the grant of the consent to allow an increase in truck movements to 200 movements per day (average) to determine the extent of any nuisance effects from dust. Monitoring will

- Be in times of low rainfall.
- Be real time monitoring
- Measure the same parameters as the background testing
- Include a remote met station

If the outcome of this initial round of monitoring demonstrates that nuisance dust effects have not resulted from the changes to quarry operations proposed in the consent application, including the increased truck movements, then monitoring need only be carried out when complaints are received, as per the triggers for monitoring in section 5.2, below.

5.2 Air Monitoring Quarry Boundary

A one-off round of particulate monitoring assessing the same parameters as the background monitoring will be conducted at a location close to the boundary of the quarry. The purpose of this is to perform a detailed assessment of the effects of dust on from the quarry.

The study purpose is to determine if the controls on site are effective in managing the dust on site. The air monitoring will be for two months when the dust is expected to be the greatest (summer months and high site activity).

5.3 Triggers for Air Monitoring

The following are triggers for more than one round of air monitoring.

Elevated results from air monitoring, conducted during the first "dry" summer season, following grant of consent, such as a PM10 results over 24 hours of greater than 50 µg/m^3, this would need to happen on at least one occasions (from the monitoring at the quarry site or the Kendall's line site).

When two or more complaints are received, by Hirock, Palmerston North City Council or Horizons Regional Council.

- These complaints must be substantiated to prove the dust is from a quarry related source or from trucks associated with the quarry.
- Substantiation may include an XRD/XRF/SEM analysis of the dust found on a sensitive receiver's property.
- Substantiation of complaints may also be completed by review of meteorological conditions and visual observations.
- The substantiation may require demonstration that the dust occurred during days and times where the quarry was operating. An examination of met data may be required.

5.4 Air Monitoring Timing

The first round of air quality monitoring will be after November 1st, 2023, and before 31st March 2024. Monitoring will be for at least two months of dry weather. If rain events occur during the two months, the monitoring will be extended by the number of days where there was rain.

5.5 Air Monitoring Location

The initial Kendall's line monitoring (assess the effects of the trucks) will be at the same sites as the background monitoring.

Any subsequent air monitoring location will depend on the nature of the complaint and the source of the dust emissions. If the substantiated complaints pertain to dust from road use, then the location will be in between a dwelling near the complaint location and the road.

If the source of the complaint is the quarry itself, then monitoring on the boundary of the quarry will be conducted

5.6 Visual Monitoring

Daily visual assessment of dust will be recorded on a check sheet in the office. This will include the amount of dust visible and the source of any visible dust. The direction of any dust plumes will be recorded.

Visual dust monitoring of Kendalls Line will be done on days where the road is used by trucks. This involves observing if there are any plumes of dust visible when a truck travels over Kendalls Line.

5.7 Meteorological Monitoring

Meteorological monitoring is to be kept onsite and logged so that wind speed, wind direction and rainfall can be used to substantiate complaints and to trigger high risk meteorological conditions.

Trigger levels of two records of 10 m/s within 10 minutes with no rainfall within the previous 12 hours to be used as a trigger for dry windy conditions.

5.8 Air Monitoring Parameters

The air monitoring shall continuously measure the following parameters to obtain 1 hour and 24-hourly averages.

- Particle Concentration -
  - PM_1,
  - $PM_{2.5}$
  - PM_4,
  - PM_{10} and
  - the total dust load,
- Time lapse video.
- Meteorological data (wind speed, wind direction and rainfall)

Only the PM10 and total dust load are required to be reported. The other parameters can be used for investigation purposes.

5.9 Annual Reporting

An annual report will include: -

- PM10 and greater than PM10 particulate (hour and 24-hourly averages)
- Meteorological conditions
- Complaints received and actions
- Approximate traffic movements during monitoring period
- Other non-quarry activity that can contribute to dust loadings.

The annual report is only provided if real time monitoring is conducted as a result of substantiated complaints.

APPENDIX A KENDALLS LINE ROAD MAINTENANCE AGREEMENT PNCC/HIROCK

KENDALLS LINE ROAD MAINTENANCE AGREEMENT PNCC/HIROCK

	Agreement
Kendalls Line Shoulder Flanking	Carryout shoulder flanking of Kendall's Line on an annual basis to clear any dust build up and allow water to move away from the road.
Baseline Road Condition Survey	A baseline road condition survey of Kendalls Line undertaken annually, the first baseline survey shall take place after the completion of summer 2022/2023 repairs and re-seal.
	The first baseline survey will use a laser profilometer to identify road pavement shape and condition and this will determine more accurately future pavement rutting and micro cracking caused by heavy commercial vehicles (HCV) wheel track loadings.
	Laser profiling baseline survey will be undertaken once every 3 years. In other years, the annual baseline road condition survey may be a visual survey.
	The annual baseline road condition survey is to be submitted to PNCC within 1 month of being undertaken. PNCC will provide feedback/ comment on the baseline survey and estimates of work required/ materials needed to Hirock within 1 month of receiving the survey.
Ongoing Maintenance	Hirock will provide aggregate for maintenance works within 2 months of PNCC providing an estimate of work required/materials needed.
	Maintenance works are to be undertaken by PNCC's network maintenance contractor within 6 months of feedback being given to Hirock on the baseline survey.
	Maintenance shall be limited to remediating structurally recognised pavement failures attributed to HCV traffic associated with the Quarry, e.g.: a. Excessive pavement rutting b. Locations where the pavement has failed via repetitive pavement blowouts, where the current road's structural aggregate thickness is insufficient to support repetitive HCV loads, e.g.: i. Shoulder edge of seal 'edge breaks' caused by the current sealed carriageway width being insufficient for two-way HCV quarry traffic flow. ii. Pavement dig outs and pavement overlays to enhance pavement structural capacity.
	PNCC will, under their normal road network maintenance requirements, fund and carryout pothole repairs, minor pavement distress, roadside drainage and end of life reseals.
Other Heavy Commercial Vehicles on Kendalls Line	In the event of other significant heavy commercial vehicles using Kendalls Line, such as forest harvesting HCVs, PNCC will undertake a road condition rating review, prior and post forestry operations, and as necessary install traffic tubes to monitor HCV traffic flow against recorded Quarry traffic flow to establish a ratio of impact damage between quarry and forestry generated traffic. Shoulder flanking and ongoing maintenance requirements will be reviewed within 2 months of the road condition rating review being completed to ensure the responsibilities for maintaining Kendalls Line are apportioned fairly between HCV road users.

APPENDIX B COMPLAINTS INVESTIGATION FORM

DUST COMPLAINT & ASSESSMENT FORM

PART A: Complaint Details

Date: Time:

Complaint Received By:

Name:

Address:

Contact phone numbers:

Possible source:

Anonymous: Y/N

Is dust occurring now?

Complaint details (include impacts/effects experienced by complainant:

PART B: Complainant Location Assessment

Date: Time:

Assessors Name:

Person spoken to at complaint location:

Reason for investigation: COMPLAINT/PROACTIVE

Complaint details (include impacts/effects experienced by complainant:

INITIAL IMPRESSIONS:

Type of dust

Time of the intial impression:

Any visible dust deposits: Y/N

Plume width (if known):

VISIBLE DUST DEPOSITS

Describe approximate quantites and extent

When was surface last cleaned?

Frequency of cleaning:

Describe the appearance of the deposits:

Colour

Any odour

Shape

Water soluble

Size

Other

Crystalline or powdery

Hard, soft

Weather Data (see over)

Wind direction:
Wind velocity:
Cloud cover:
Temperature:
Rainfall in past 24 hrs:

Photos Taken: Y/N

Samples taken Y/N

Diagram/description of where photos were taken.

Diagram/description of where samples were taken:

Sample collection: Use a small paintbrush (clean) to sweep samples of the dust onto a sheet of paper and then into a clean plastic bag. At least half a teaspoonful will be required for analysis. Lesser amounts may be collected on strips of clear cellotape, which should then be stuck onto sheets of clear plastic to preserve the samples. Label all samples and record date, time, location, etc on a separate sheet of paper if required.

Based on your assessment on this occasion, which of the following applies:

	I did not find any dust
	I did find dust and consider it would not be objectionable at any location for any duration or frequency
	I did find dust and consider it would be objectionable if it became continuous
	I did find dust and consider it would be objectionable if it occurred on a regular or frequent basis
	I did detect dust and consider it to be objectionable even in periods of short duration.

FINAL CHECKLIST

	Upwind assessment completed. Record details below. If not, detail reason: _____
	Aerial photo/sketch showing location of assessment and upwind assessment attached
	Are there potential witness statements to obtain YES/NO

REMARKS

PART C: Off-site dust and 360° assessment

Assess the dust upwind of the suspected source and if possible conduct a 360° sweep around the source assessing the odour at different points

OTHER POTENTIAL SOURCES **Time:** _____

Check for road works, ploughing, construction activities, burn-offs, unsealed roads, unsealed sites

Site 1:

Wind direction: Wind strength: Wind stability: GPS Loc:

Visible dust: Desciption of dust

Comment:

Site 2:

Wind direction: Wind strength: Wind stability: GPS Loc:

Visible dust: Desciption of dust:

Comment:

Site 3:

Wind direction: Wind strength: Wind stability: GPS Loc:

Visible dust: Description of dust:

Comment:

Diagram of Suspected source, dust assessment sites and dust plume:

COMMENTS

PART D: Source On-site Investigation

If source of dust identified, visit site, identify yourself and show warrant. Explain the findings of your investigation to staff.

Date: Time: Source Identified:

Staff spoken to:: Position:

Staff contact phone number:

Current site operations:

Reason/explanation given for dust

Other Comments

Site Sketch (If Required)

SIGNED BY ASSESSOR _____ DATE: _____

PART E: Dust Reference Sheet

Definitions

Objectionable The term objectionable is the term used in consent conditions and is an ingredient of any subsequent enforcement action. It is a subjective term and is open to interpretation. There is guidance from case law which defines objectionable as: unpleasant or offensive or repugnant; open to objection or undesirable or disapproved of; noxious or dangerous. A test will be applied by the court that the term objectionable will be as it applies to "the minds of a significant cross section of reasonable people in the community". The assessor must bear this test in mind when completing their assessment.

Frequency How often an individual is exposed to dust nuisance events

Intensity As indicated by dust quantity/concentration and the degree of nuisance

Duration The length of the particular dust event

Character How objectionable the dust is, having regard to the nature of the dust

Land Beaufort Wind Scale

B. No.	Description	How to Recognise
0	Calm	Smoke rises straight up
1	Light Air	Smoke drifts
2	Light Breeze	Wind felt on face; leaves rustle
3	Gentle Breeze	Flags flap; twigs move all the time
4	Moderate Breeze	Papers blow; small branches move
5	Fresh Breeze	Small trees sway
6	Strong Breeze	Large branches move, wind whistles
7	Near Gale	Whole trees sway

Measuring Temperature

Use descriptions below or obtain local meterological data, especially temperature from websites such as www.metservice.govt.nz

Cold
Cool
Mild
Warm
Hot

Measuring Cloud Cover

Okta No.	Description
0	Clear Sky
1	Sunny
2	Mostly sunny
3	
4	Half the sky is covered in cloud
5	
6	Mostly cloudy
7	Considerable cloudiness
8	Overcast
F	Fog / Mist

During the day the sun is always shining, so the amount of sunshine reaching the ground depends on the amount and duration of any cloud cover. The amount of cloud cover is usually given in units called oktas. Each okta represents one eighth of the sky covered by cloud.