



Vibration Summary Report

First Quarter 2022

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Summary

- Results from the Blasthub vibration monitoring system for the first quarter 2022 are reported for the Favona, Trio, Correnso, SUPA and Project Martha Underground Mines.
- The number of stope and development blasting events was reduced in relation to Correnso/SUPA, with development and production blasting continuing in the Martha Underground component of Project Martha. Mining in Favona and Trio has ceased.
- Compliance for Correnso development and production blasting, as defined by the consents, was achieved for the average limits and the 95 percentile. Of the 27 blast events, 18 of these triggered compliance monitors (maximum vibration 4.36 mm/s).
- Compliance for Project Martha/SUPA blasting was achieved during the quarter. The maximum vibration recorded during the quarter was 10.62 mm/s.
- 16 vibration-related complaints were received during the reporting period, down from the 22 received in the previous quarter. The number of complainants also decreased; 10 during the quarter cf. 16 in the previous period.
- The total number of blasts (818) was slightly lower than the previous quarter (858). The number of blast events was also lower (109, cf. 163 in the previous quarter).

1. Introduction

This report documents vibration measurements and assessments to meet the requirements of:

- a) Hauraki District Council (HDC) LUC No. 97/98-105 (Condition 3.11) for the extended Martha Mine Project.
- b) HDC Land Use Consent 85.050.326E (Condition 24) for the Favona Underground Mine.
- c) HDC Land Use Consent RC - 15774 (Condition 9) for the Trio Underground Mine Project.
- d) HDC Land Use Consent RC – 202.2012 (Condition 22 (f)) for the Correnso Underground Mine.
- e) HDC Land Use Consent RC – 202.2016 (Condition 14 (f)) for the Slevin Underground Mine (SUPA).
- f) HDC Land Use Consent RC – 202.2017 (Condition 18 (f)) for the Martha Drill Drive Project (MDDP), Condition 18 (f) for MDDP has been assumed by Project Martha below (g).
- g) HDC Land Use Consent LUC 202.2018.857.1 (Condition 53) for Project Martha.

As agreed between OceanaGold and HDC these reports summarise vibration results and general performance of the monitoring system over calendar quarters rather than the dates set out in the consents.

2. Equipment

“Blasthub”, the vibration monitoring system, has been used for reporting purposes, providing real-time monitoring, recording and review of results on a website. Access to the website is controlled, with permissions for review provided to HDC staff and OceanaGold users. The system is set with trigger levels between 0.40 and 0.75 mm/s for Martha and Underground operations.

The Project Martha vibration monitoring network comprises 12 monitors (some shared with the Correnso network). These all have a trigger limit currently set at 0.75 mm/s. Any blasts fired during the period (highlighted in red) and the monitor locations are shown in Figure 1. SUPA utilises some monitors from the Correnso network and some from the Project Martha network, with the data incorporated into a database shared with Project Martha.

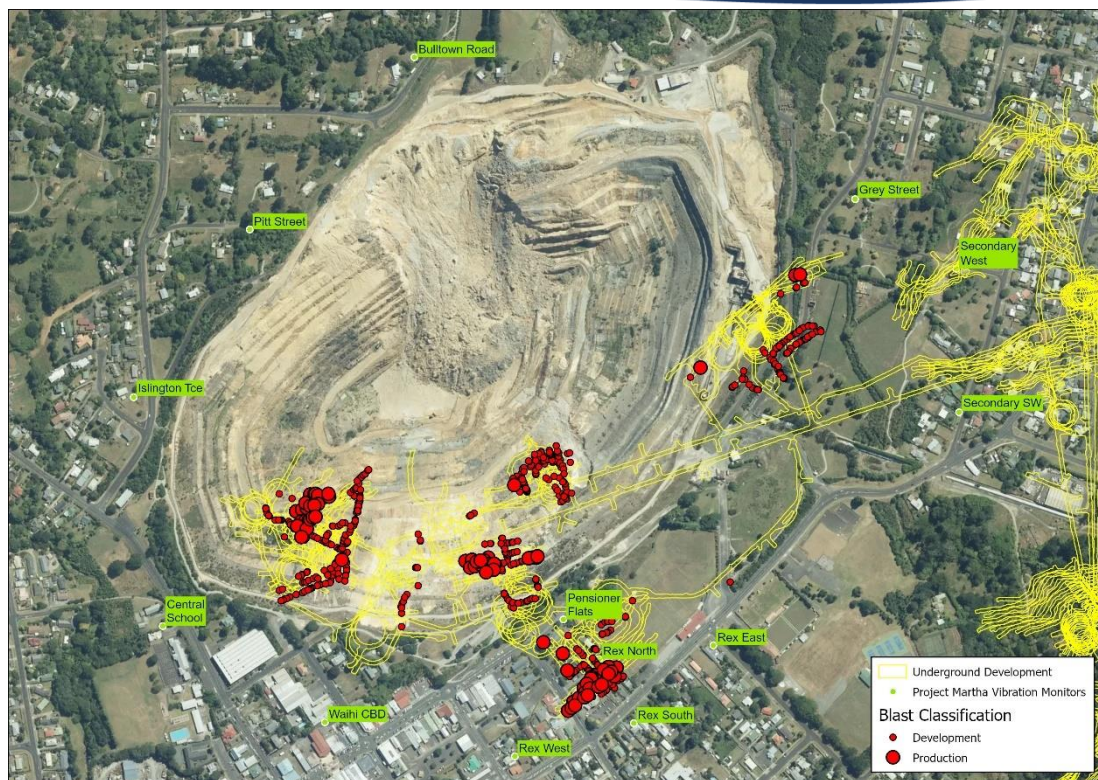


Figure 1. Vibration Monitor & Blast Locations – Project Martha, SUPA

Note: Larger icons indicate production blasts

The Trio Underground Operations have five compliance monitoring locations situated at Boyd Rd, Moore St, Clarke St, the Coreshed (Barry Rd) and the Scout Hall (Baker St). In addition to these, one other monitoring location is located near the Trio vent shaft (Trio VS). As there is currently no mining being undertaken in the Trio Project area, vibration monitors are not installed at these locations, but the infrastructure remains so monitors can be reinstalled should work in the Trio area recommence. Monitoring locations are shown in Figure 2.

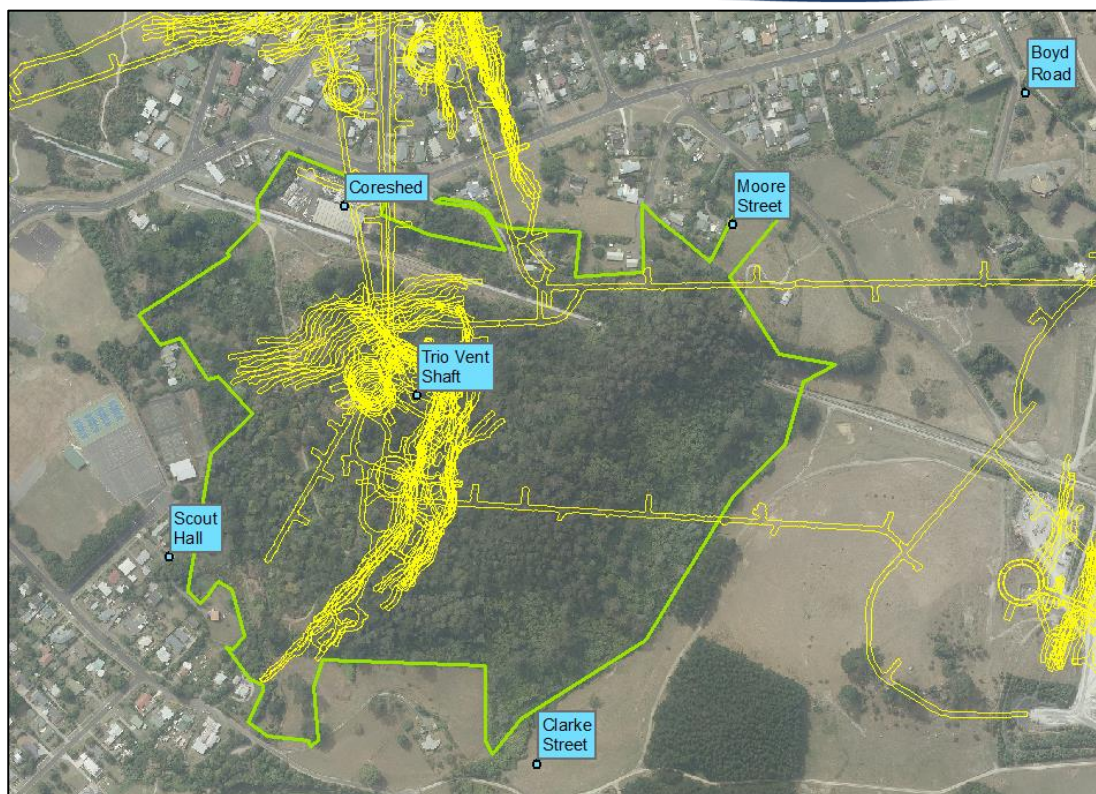


Figure 2. Vibration Monitor Locations – Underground Operations (Trio)

The Correnso Underground monitoring network comprises 10 permanent vibration monitors. These all have a trigger limit currently set at 0.75 mm/s. The blasts fired during the period (highlighted in red) and monitor locations are shown in Figure 3.



Figure 3. Vibration Monitor & Blast Locations – Correnso

Note: Larger icons indicate production blasts

3. Calibration

Calibration of monitoring equipment, including the roving monitors, is completed on a quarterly rotation to allow enough coverage of vibration monitoring while calibrations take place. Due to Covid-19 border restrictions, some calibrations were delayed during 2021. Calibrations were completed throughout quarter four of 2021 to get the network up to date with calibration following the delays. Calibration certificates can be viewed on Blasthub; refer to the monitoring results during those periods. The calibrations were undertaken by the Saros Group Pty Ltd in Queensland and conducted in accordance with AS/NZS ISO9000-2000 and AS ISO/IEC17025-2005 quality standards.

4. Compliance Assessment

Table 1 sets out the consented compliance limits for blast magnitude (peak particle velocity - vector sum) for Correnso and Project Martha, and the corresponding vibration results for Q1 2022. Compliance with all limits was met throughout the quarter.

Table 1. Compliance Assessment Table for Correnso and Project Martha Q1 2022

	Consented Compliance Limit	Q1 Results - Correnso	Q1 Results - Project Marta
Development 95%	5 mm/s	0.76 mm/s	1.91 mm/s
Development Average	2 mm/s	1.08 mm/s	0.72 mm/s
Production 95%	5 mm/s	2.11 mm/s	4.47 mm/s
Production Average	3 mm/s	4.08 mm/s	1.39 mm/s
Maintenance/Safety	1 mm/s	No blasts	No blasts

Note: Data is presented as at the end of the quarter

4.1 Project Martha

109 blast events occurred in Martha Underground during the reporting period (cf. 160 in the previous quarter) with 78 triggering compliance monitors.

Of the 818 individual blasts during the period:

- 736 were development blasts
- 86 were production blasts

Due to anomalously high results being recorded at the Pensioner Flats compliance monitor, with agreement from HDC, results from this monitor have been removed from Martha Underground compliance calculations for Q1 2022 and have been replaced with results from the monitor recording the next highest level of vibration. A replacement Pensioner Flat compliance monitoring location is to be installed in Q2 of 2022.

The peak vibration levels for Martha Underground Operations (both production and development) during the quarter are shown in Figure 4 below.

Development:

- The highest six-month average¹ for development blasting at a compliance monitor was assessed as 0.72 mm/s at both Central School and Rex West, below the consent limit average of 2mm/s.
- The development six month rolling 95 percentile¹ for all locations was assessed as 1.91 mm/s, below the 5mm/s limit.
- One Martha Underground development blast event recorded vibration levels above 5 mm/s during the period (10.62 mm/s recorded at Central School on 24 January 2022).

Production:

¹ Data is presented as at the end of the quarter

- The six-month average² for production blasting at a compliance monitor was assessed as 1.39 mm/s at Central School, below the consent limit average of 3 mm/s.
- The production six-month rolling 95 percentile¹ for all locations was assessed as 4.47 mm/s, below the 5mm/s limit.
- Five Martha Underground production blast events recorded vibration levels above 5 mm/s during the period.
- The highest level of vibration recorded during the quarter for production blasting was 7.36 mm/s at the Central School monitor on 10 March 2022.

No maintenance/safety blasts were required in Martha Underground during the period.

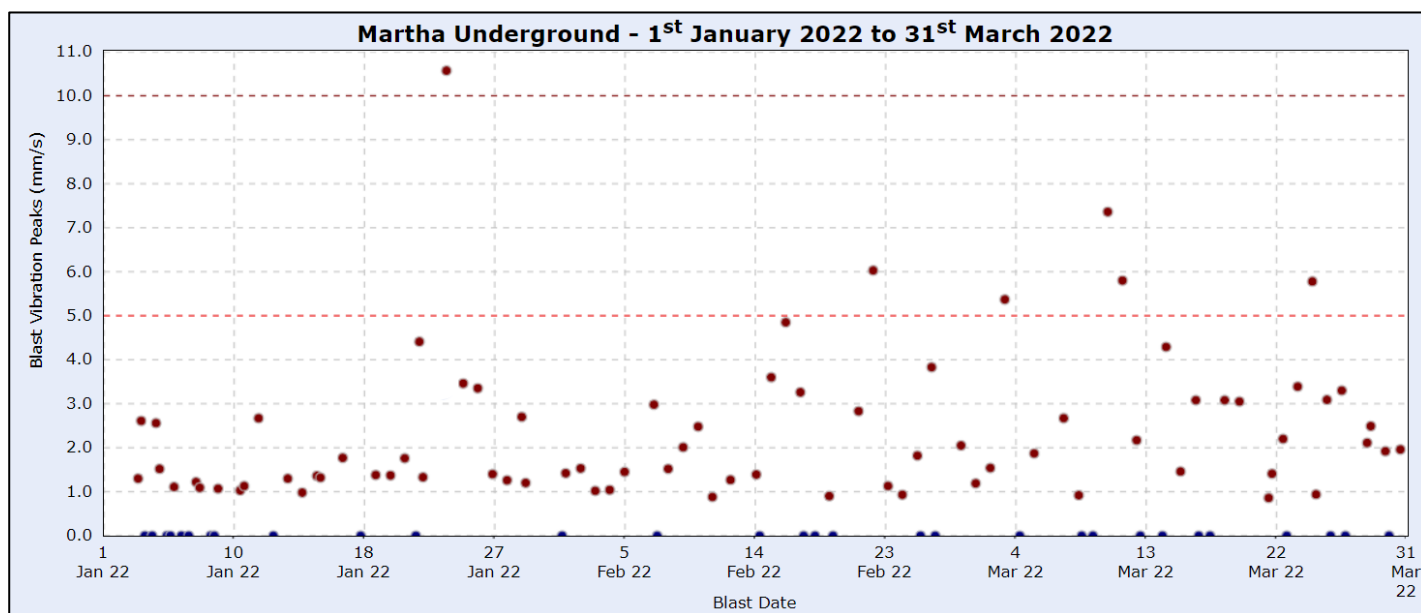


Figure 4. Maximum Peak Vibration Levels (Production and Development) – Martha Underground/SUPA Operations

4.2 Underground (Favona & Trio) Operations

Current mining plans for Trio were exhausted in the first quarter of 2020, and no blasting occurred during the reporting period. Likewise, no blasting was undertaken within Favona.

4.3 Correnso

During the reporting period, 15 blast events (cf. 27 in the previous quarter) occurred in the Correnso and SUPA projects. Of the 15 blast events, 8 of these triggered compliance monitors (maximum vibration 4.17 mm/s). The blast locations are presented in Figure 3 above, with the relative locations indicated for development and production blasting. The peak vibration levels for the period are shown in Figure 5 below.

The 15 blast events during the period comprised 15 sub-blasts (i.e. only one sub-blast within each blast event), with 7 classified as development and 8 production.

Development:

- The highest six-month average¹ for development blasting at a compliance monitor was 0.76mm/s at Main Central and Main South, below the consent limit average of 2mm/s.
- The development six month rolling 95 percentile¹ for all locations was 1.08mm/s, below the 5mm/s limit.

² Data is presented as at the end of the quarter

Production:

- No blasts exceeded the 5mm/s level at a compliance monitor during the quarter.
- The highest six-month average¹ for production blasting at a compliance monitor was 2.11mm/s at Main Central, below the consent limit average of 3mm/s.
- The production six month rolling 95 percentile¹ for all locations was 4.08mm/s, below the 5mm/s limit.

No blasts exceeded the blasting duration limits during the period.



Figure 5. Maximum Peak Vibration Levels (Production and Development) – Correnso

5. Blasting

The 110 blast events during the period was a decrease in events from the previous quarter (Table 2). This reflects a decrease in activity in Correnso now the project is nearing completion, coupled with a decrease in Martha Underground development blasts now the project is in full production.

Table 2. Quarterly blast events

Operation	2 nd Quarter 2021	3 rd Quarter 2021	4 th Quarter 2021	1 st Quarter 2022
Martha Underground	133	106	160	109
Underground (Trio)	0	0	0	0
Correnso/SUPA	70 (20 independent)	71 (9 independent)	27 (3 independent)	15 (1 independent)
Total	153*	115*	163*	110*

*Some blasts occurred simultaneously with blasting in other operational areas and did not contribute to the total number of blast events. Trio and Correnso events only contribute to the total when they are independent of Martha Underground.

Multiple blasts may be fired during the one blast event. There were 833 sub-blasts initiated within 110 blast events during the reporting period (Figure 6).

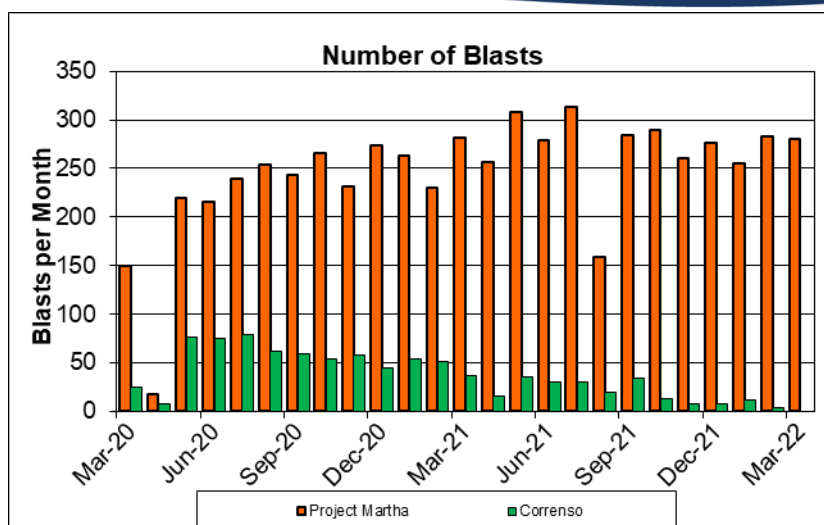


Figure 6. Number of Blasts (Project Martha and Correnso)

6. Complaints

16 vibration-related complaints were received during the reporting period, down from 22 received in the previous quarter (Figures 7 & 8). The number of complainants also decreased; 10 during the quarter cf. 16 in the previous period. Table 2 provides a summary of the complaints received during the quarter.

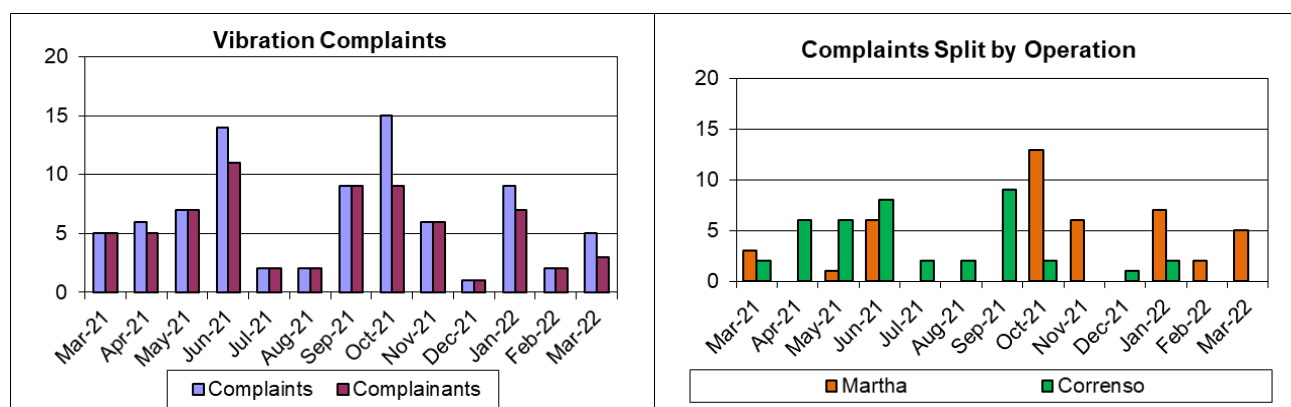


Figure 7. Number of Complaints & Complainants Figure 8. Complaints by Operation

Table 3. Summary of vibration complaints registered by OceanaGold

Date	Location	Nearest Monitor	Reading (mm/s)	Highest Blasthub Reading (mms)	Site
22-Jan-22	Union St	Rex South	3.0	4.8	Pensioner Flats
24-Jan-22	Islington Tce	Islington Tce	3.3	10.6	Central School
24-Jan-22	Islington Tce	Islington Tce	3.3	10.6	Central School
24-Jan-22	Islington Tce	Islington Tce	3.3	10.6	Central School
24-Jan-22	Hobson St	Islington Tce	3.3	10.6	Central School
24-Jan-22	Russell St	Islington Tce	3.3	10.6	Central School
25-Jan-22	Islington Tce	Islington Tce	1.7	3.5	Central School
28-Jan-22	Barry Rd	Main South	4.2	4.2	Main South
28-Jan-22	Union St	Rex South	0.0	4.2	Main South
9-Feb-22	Union St	Rex East	1.2	3.0	Pensioner Flats
16-Feb-22	Johnston St	Rex South	1.5	4.9	Central School
16-Feb-22	Union St	Rex South	1.5	4.9	Central School

16-Feb-22	Johnston St	Rex South	1.5	4.9	Central School
2-Mar-22	Union St	Rex East	1.3	1.6	Pensioner Flats
7-Mar-22	Union St		0.0	0.0	
7-Mar-22	Johnston St		0.0	0.0	
11-Mar-22	Mackay St	Central School	5.8	5.8	Central School
12-Mar-22	Union St	Pensioner Flats	1.9	2.2	Rex South

7. Vibration and Complaint Management

7.1 Roving Monitoring

Roving monitoring was undertaken at two properties on Phillips Lane during the quarter.

Roving monitoring at 6 Phillips Lane was undertaken following a resident complaint in the last quarter of 2021. Results from roving monitoring undertaken on spikes during 2021 were elevated, so follow up monitoring on a concrete block was undertaken during 2022 at both 6 Phillips Lane, and an adjoining property at 10 Phillips Lane. Possible reasons for the elevated roving monitoring results are being investigated by OGL's vibration consultants Heilig and Partners, and a programme of further monitoring is planned at 6 Phillips Lane and surrounding properties during quarter one of 2022.

7.2 Mitigation Actions

Mitigating actions were required in relation to the six high level blasts recorded at the Central School monitor during the quarter. These mitigation actions included:

- Lowering blast charge weights to reduce the likelihood of further high level blasts
- Triple decking blast holes
- Using blast hole liners to reduce the effects of poor ground on vibration propagation.