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Specialists in Explosives, Blasting and Vibration
Consulting Engineers

Blasting Impact Analysis – Revision 1
Cornwall Gravel MacLeod III Quarry New License Application
East half of Lot 6, Concession 4, Township of South Stormont, former
Township of Cornwall

Submitted to:

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RJ

Prepared by:

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EXECUTIVE SUMMARY

Explotech Engineering Ltd. was retained in July 2016 to provide a Blast Impact Analysis for the proposed Cornwall Gravel MacLeod III Quarry new license application located on the East Half of Lot 6, Concession 4, Township of South Stormont, former Township of Cornwall.

Vibration levels assessed in this report are based on the Ministry of Environment and Climate Change Model Municipal Noise Control By-law (NPC119) with regard to guidelines for blasting in Mines and Quarries. We have assessed the area surrounding the proposed license area with regard to potential damage from blasting operations and compliance with the aforementioned by-law document. In addition, we have reviewed blast and vibration reports collected at this quarry for the 2014, 2015 and 2016 blasting operations.

Explotech Engineering undertook a vibration attenuation study at the existing Cornwall Gravel MacLeod 1 Quarry in May 2009. The resultant data was analyzed in order to develop site specific vibration attenuation characteristics and equations.

We have inspected the site and reviewed the available site plans. Explotech is of the opinion that the planned mineral extraction on the site can be carried out safely and within MOECC guidelines as set out in NPC 119 of the By-Law.

Recommendations are included in this report to ensure that blasting operations in all phases of this project are carried out in a safe and productive manner to ensure that no possibility of damage exists to any buildings or residences surrounding the site.



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INTRODUCTION

The proposed Cornwall Gravel MacLeod III Quarry new license application is located on the West side of the existing licensed and operating MacLeod II Quarry. The legal description for the subject property is East Half of Lot 6, Concession 4, Township of South Stormont, former Township of Cornwall.

This Blast Impact Analysis is based on the Ministry of the Environment and Climate Change (MOECC) Model Municipal Noise Control By-law (NPC 119) with regard to Guidelines for Blasting in Mines and Quarries. We have additionally assessed the area surrounding the proposed license with regard to potential damage from blasting operations.

Given that mining operations are currently underway on the adjacent ARA licensed property and all blasts conducted are monitored for ground vibrations and overpressure, site-specific blast monitoring data is available for the area. The site specific data has been incorporated into this assessment to confirm predictable values. It is a recommendation of this report that a vibration monitoring program be continued on this site, including the proposed MacLeod III quarry, and maintained for the duration of all blasting activities to permit timely adjustment to blast parameters as required.

Additionally, a vibration study was conducted by Explotech Engineering at the existing MacLeod 1 quarry in May 2009 to develop site specific vibration attenuation characteristics and equations.

Recommendations are included in this report to ensure that the blasting operations are carried out in a safe and productive manner and to ensure that no possibility of damage exists to any buildings, structures or residences surrounding the site.

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EXISTING CONDITIONS

The current licensed area for the Cornwall Gravel MacLeod Quarries (MacLeod I, MacLeod II and MacLeod IV) is described as Lots 2-5 in Concession 4, Township of South Stormont, former Cornwall Township United Counties of Stormont, Dundas and Glengarry. This property is bounded by Headline Road to the North, South Branch Road to the South, and vacant woodland and sparse rural residential to the East and West.

The proposed MacLeod III new license application is located West of the existing MacLeod II licence on the East half of Lot 6, Concession 4, Township of South Stormont, former Township of Cornwall. The proposed MacLeod III lands are bounded by the existing MacLeod II Quarry to the East, farm fields and sparse commercial and residential properties located on McConnell Avenue (Highway 42) to the West, commercial and residential properties located on Headline Road to the North and vacant farm fields/woodland located adjacent to S Branch Road to the South. A cemetery also exists at the Western limits of extraction. The closest sensitive receptors located in the vicinity of the proposed limit of extraction are listed in Table 1 below as well as in the Sensitive Receptor Overview contained in Appendix A:

Table 1: Closest Sensitive Receptors

Sensitive Receptor	Closest Straight Line Distance to Receptor (m)	Direction from Quarry
3246 McConnell Avenue	730	South
3250 McConnell Avenue	715	South
3256 McConnell Avenue	660	South
3260 McConnell Avenue	645	South
3264/3268 McConnell Avenue	625	South
5515 McConnell Avenue	205	West
5525 McConnell Avenue	190	West
5535 McConnell Avenue	150	West
5537 McConnell Avenue	155	West
5575 McConnell Avenue	150	West
5587 McConnell Avenue	150	West

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5645 McConnell Avenue	170	West
5656 McConnell Avenue	250	West
5756 McConnell Avenue	510	South
520 South Branch Road	655	South
524 South Branch Road	635	South
528 South Branch Road	625	South
532 South Branch Road	610	South
536 South Branch Road	575	South
17499 South Branch Road	670	South
17555 South Branch Road	460	Southeast
17611 South Branch Road	515	Southeast
17615 South Branch Road	540	Southeast
17621 South Branch Road	585	Southeast
17675 South Branch Road	715	Southeast
17679 South Branch Road	840	Southeast
17683 South Branch Road	880	Southeast
17695 South Branch Road	870	Southeast
5501 Charles Road	555	West
17492 Headline Road	510	West
17494 Headline Road	480	West
17498 Headline Road	435	West
17504 Headline Road	375	West
17517 Headline Road	435	West
17522 Headline Road	340	West
17525 Headline Road	390	West
17547 Headline Road	200	West
17550 Headline Road	110	West
17589 Headline Road	215	Northwest
17631 Headline Road	405	North
17681 Headline Road	740	North

Note: The following addresses were intentionally omitted from the above table as they do not constitute sensitive receptors under the MOECC definition: 5555 McConnell Avenue, 5560 McConnell Avenue, 5565 McConnell Avenue, 5661 McConnell Avenue, 17509 Headline Road, 17615 Headline Road, 17645 Headline Road, 5491 Charles Road and the industrial lot on McConnell Avenue south of South Branch Road



PROPOSED MINERAL EXTRACTION

The proposed quarry extraction of the MacLeod III Quarry will be undertaken in three (3) distinct phases.

Phase 1 extraction will begin at the existing MacLeod II West quarry face and will retreat West toward the Western extraction limits. The rock will be extracted in benches. Bench heights will vary and several benches may be concurrently operated to achieve the final grade elevation of -33masl.

Phase 2A extraction will leverage the existing Phase 1 Southern face. Blasting shall commence at the Phase 1 / Phase 2 interface thereby eliminating the need for a sinking cut. Extraction will retreat in a general northeasterly direction to a final design floor elevation of -33masl. Based on existing maximum elevations in the order of 60masl, this phase of extraction will take place in benches with the possibility of several benches being extracted concurrently to achieve the final grade elevation of -33masl.

Phase 2B extraction will leverage the existing Phase 1 Northern face. Blasting shall again commence at the Phase 1 / Phase 2 interface thereby eliminating the need for a sinking cut. Extraction will retreat in a general southwesterly direction to a final design floor elevation of -33masl. Based on existing maximum elevations in the order of 60masl, this phase of extraction will take place in benches with the possibility of several benches being extracted concurrently to achieve the final grade elevation of -33masl.

As quarry operations migrate across the property, the closest sensitive receptors to the required blasting operations will vary. It is a recommendation of this report that initial extraction of all phases occur furthest away from the nearest sensitive receptor. While initial mineral extraction in the proposed licence area in Phase 1 shall occur approximately 330m from the closest sensitive receptors to the blast location, quarry faces retreating along the West, North and South limits of all phases of extraction will come to approximately 150m of the properties located on McConnell Avenue, 110m to the properties located on Headline Road and within 460m to the closest property located on South Branch Road (Refer to Table 1 above).



Limestone Quarries in Ontario normally employ 76 to 102 mm diameter blast holes which, for a 7–15 meter bench, would employ 38kg to 147kg per hole. Since the proposed licensed area will be shooting to an existing open face, no sinking cut will be required and blasts will be designed to fire one hole/deck per period.

Current practice at the Cornwall Gravel MacLeod 1 operation employs 76-102mm diameter blast holes with a typical load per delay of 61 – 127 kg/period. Calculations contained within this report suggest modifications to current blast designs will be necessary before commencing extraction for the MacLeod III quarry. Further modifications will be necessary as operations retreat toward the closest sensitive receptors. The analysis of vibration and overpressure data collected on site will provide insight into blast design modifications required during the extraction retreat toward these sensitive receptors. Additional recommendations with regards to blasting within 250m of sensitive receptors are made later in this report.



BLAST VIBRATION AND OVERPRESSURE LIMITS

The Ontario MOECC guidelines for blasting in quarries are among the most stringent in North America.

Recent studies by the U.S. Bureau of Mines have shown that normal temperature and humidity changes can cause more damage to residences than blast vibrations and overpressure in the range permitted by the MOECC. The limits suggested by the MOECC are as follows.

Vibration _____ 12.5mm/sec Peak Particle Velocity (PPV)

Overpressure _____ 128dB Peak Sound Pressure Level (PSPL)

The above guidelines apply when blasts are being monitored. Cautionary levels are slightly lower and apply when blasts are not monitored on a routine basis. It is a recommendation of this report that all blasts at the operation be monitored to quantify and record ground vibration and overpressure levels employing a minimum of two (2) digital seismographs.



ATTENUATION STUDY

BLAST MECHANICS AND DERIVATIVES

The detonation of explosives within a borehole results in the development of very high gas and shock pressures. This energy is transmitted to the surrounding rock mass, crushing the rock immediately surrounding the borehole (approximately 1 borehole radius) and permanently distorts the rock to several borehole diameters (5-25, depending on the rock type, prevalence of joint sets, etc).

The intensity of this stress wave decays quickly so that there is no further permanent deformation of the rock mass. The remaining energy from the detonation travels through the unbroken material in the form of a pressure wave or shock front which, although it causes no plastic deformation of the rock mass, is transmitted in the form of vibrations.

Particle velocity is the descriptor of choice when dealing with vibrations because of its superior correlation with the appearance of cosmetic cracking. As such, for the purposes this report, ground vibration units have been listed in mm/s.

In addition to the ground vibrations, overpressure, or air vibrations, are generated through the direct action of the explosive venting through cracks in the rock or through the indirect action of the rock movement. In either case, the result is a pressure wave which travels though the air, measured in linear decibels (or dBL) for the purposes of this report.



VIBRATION AND OVERPRESSURE THEORY

Transmission and decay of vibrations and overpressure can be estimated by the development of attenuation relations. These relations utilize empirical data relating measured velocities at specific separation distances from the vibration source to predict particle velocities at variable distances from the source. While the resultant prediction equations are reliable, divergence of data occurs as a result of a wide variety of variables, most notably site-specific geological conditions and blast geometry and design for ground vibrations and local prevailing climatic conditions for overpressure.

In order to circumvent this scatter and improve confidence in forecast vibration levels, probabilistic and statistical modeling is employed to increase conservatism built into prediction models, usually by the application of 95% confidence lines to attenuation data.

The attenuation relations are not designed to conclusively predict vibration levels at a specific location as a result of a specific blast design, application of this probabilistic model creates confidence that for any given scaled distance, 95% of the resultant velocities will fall below the calculated 95% regression line.

While the data still provides insight into probable vibration intensities, attenuation relations for overpressure tends to be less reliable and precise than results for ground vibrations. This is due primarily to wider variations in variables outside of the influence of the blast design which impact propagation of the vibrations. Atmospheric factors such as temperature gradients and prevailing winds (refer to Appendix B) as well as local topography can all serve to significantly alter overpressure attenuation characteristics.

Our experience and analysis demonstrates that blast overpressure is greatest when blasting toward residences, and blast vibrations are greatest when retreating towards the residences.



GROUND VIBRATION AND OVERPRESSURE ATTENUATION STUDY

A comprehensive network of seismographs was installed by Explotech to measure ground vibration intensities and air overpressure for a series of blasts conducted in May 2009 at the existing MacLeod 1 quarry. Monitor locations were established in linear arrays emanating from the blast site to assess the rate of decay of the vibration waveform and to permit the development of attenuation equations. All ground vibration data was plotted using square root scaling from blast vibrations (refer to Appendix C). Overpressure data was plotted employing cube root scaling (refer to Appendix C). It should again be noted that given the high dependence on local environmental conditions, overpressure prediction is far less reliable as a means of blast control.

It has been Explotech's experience, and that of most blast consultants, that ground vibrations are greatest behind the blast while overpressure intensities are greatest in front of the blast. The analysis performed accommodated this fact.

VIBRATION LEVELS AT THE NEAREST SENSITIVE RECEPTOR

The most commonly used formula for predicting PPV is known as Bureau of Mines (BOM) prediction formula or Propagation Law. We have used this formula to predict the PPV's at the closest house for the initial operations.

$$PPV = k \left(\frac{d}{\sqrt{w}} \right)^e$$

Where, PPV = the predicted peak particle velocity (mm/s)

K, e = site factors

d = distance from receptor (m)

w = maximum explosive charge per delay (kg)

The value of K is highly variable and is influenced by many factors (i.e. rock type, geology, thickness of overburden, etc.). Based on the data collected from our attenuation study, the values for "e" and "K" have been established at -1.48 and 1946 respectively (refer Appendix C).

An **example** of this calculation is as follows:

For a distance of 330m (i.e. the closest standoff distance to the nearest existing structure for the initial blasting) and a maximum explosive weight of 74kg (15m deep, 1.5m collar, 76mm hole diameter, single hole delay), we can calculate the maximum PPV at the nearest house.

$$ppv = 1946 \left(\frac{330}{\sqrt{74}} \right)^{-1.48} = 8.81 \text{ mm/s}$$

As discussed in previous sections, the MOECC guideline for blast-induced vibration is 12.5 mm/s (0.5 in/s). The calculated predicted PPV (based on the proposed blasting data discussed above) would be 8.81mm/s. While this value resides below the MOE guideline limit, it is anticipated that design modifications will be necessary to maintain compliance as the separation distance to the closest receptors decreases. Fortunately, a variety of blast design alternatives are available to accomplish this including but not limited to reductions in blast hole diameter, change in explosives types, adjustment in bench heights and decking of holes.

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Given the closer separation distances that will be required within the MacLeod III licence boundary, Table 2 below provides a guide to maximum loads per delay based on various separation distances. The following maximum loads per delay are derived from the ground vibration attenuation equation and are based on an intensity of 12.5mm/s:

Separation distance between sensitive receptor and closest borehole (meters)	Maximum recommended explosive load per delay (Kilograms)
500	272.5
450	220.7
400	174.4
350	133.5
300	98.1
250	68.1
200	43.6
150	24.5
100	10.9
75	6.1
50	2.7
25	0.6

Table 2: Maximum Loads per Delay to Maintain 12.5mm/s at Various Separation Distances

The closest separation distance between a sensitive receptor and any blast over the life of the quarry is approximately 60m. While technically feasible, given current blasting technology and techniques, blasting at this separation distance would not be economically feasible. The actual point of termination of blasting operations in the proposed MacLeod III Quarry will be governed by the results of the on-site monitoring program and market economics.

OVERPRESSURE LEVELS AT THE NEAREST SENSITIVE RECEPTOR

It is unusual for overpressure to reach damaging levels, and when it does, the evidence is immediate and obvious in the form of broken windows in the area. However, overpressure remains of interest due to its ability to travel further distances as well as cause audible sounds and excitation in windows and walls.

Air overpressure decays in a known manner in a uniform atmosphere, however, a uniform atmosphere is not a normal condition. As such, air overpressure attenuation is far more variable due to its intimate relationship with environmental influences. Air vibrations decay slower than ground vibrations with an average decay rate of 6dB for every doubling of distance.

As part of the attenuation study performed on site, air overpressure levels were measured at the front of each blast and analyzed using cube root scaling based on the following equation:

$$PSPL = k \left(\frac{d}{\sqrt[3]{w}} \right)^e$$

Where, PSPL= the peak sound pressure level particle velocity (mm/s)

K, e = site factors

d = distance from receptor (m)

w = maximum explosive charge per delay (kg)

The collection of points gathered in the linear arrays emanating from the front of each blast vibration were again analyzed and used to develop the following 95% regression equation (refer to Appendix C). Based on the data collected from our attenuation study, the values for "e" and "K" have been established at -0.118 and 226 respectively (refer Appendix C).

$$PSPL = 226 \left(\frac{D}{\sqrt[3]{W}} \right)^{-0.118}$$



As discussed in previous sections, the MOECC guideline for blast-induced overpressure is 128dBL. Given that the data points collected for this equation were collected from the front of each blast, the predictive formula shall only be introduced for the closest sensitive receptors to the front of each blast.

For a distance of 950m (i.e. the closest standoff distance to the existing structure in front of the initial blasting) and a maximum explosive weight of 74kg (assumed 15m deep, 1.5m collar, 76mm hole diameter, single hole delay), we can calculate the PSPL at the nearest receptor to be 119.2dBL.

As previously stated in this report, the closest sensitive receptor to initial blasting in Phase 1 of the proposed MacLeod III Quarry will be 330m. This receptor is positioned behind the blast and hence overpressures will be significantly reduced. Research conducted by the USBM has produced a predictive equation for a typical quarry blast in which the receptor is behind the blast. Based on the data collected, the values for "e" and "K" have been established at -0.515 and 0.056 respectively:

$$PSPL = 0.056 \left(\frac{D}{\sqrt[3]{W}} \right)^{-0.515}$$

For a distance of 330 m (i.e. the closest standoff distance to the existing structure for the initial blasting) and a maximum explosive weight of 74 kg (assumed 15 meters deep, 1.5 meter collar, 76mm hole diameter, single hole delay), we can calculate the PSPL at the nearest receptor to be 122.0dBL.

REVIEW OF HISTORICAL MACLEOD QUARRY DATA

A vibration and overpressure monitoring program has been in place for all blasts conducted at the Cornwall Gravel MacLeod 1 Quarry in recent years. As part of this analysis, Cornwall Gravel has provided copies of blast reports from May 2014 through November 2016. For continuity, summaries of the historical data collected and supplied by Cornwall Gravel are included in Appendix E to this report.

2014-2016 Data

Vibration monitoring conducted during the period from May 2014 through November 2016 has been typically limited to one (1) location. However, on occasion, a second seismograph has been installed for select blasts. For the majority of the blasting during this time period, the primary seismograph has been typically installed at the Front Gate to the MacLeod I Quarry. As blasting operations progressed to different areas in the quarry, the seismograph was typically relocated onsite closer to the blasting than the closest offsite sensitive receptor.

All vibration monitoring was performed by the blasting contractor (Orica). A review of the data supplied confirms that for 2014 through 2016 inclusive, with the exception of two (2) blasts, all ground vibration and overpressure intensities remained below the MOECC guideline limits of 12.5mm/s and 128dB respectively. The two (2) incidents of exceedances were as follows:

1. Blast 2016-10 on August 10, 2016 caused an air overpressure reading of 128.8dB at a location 650m Northeast of the blast.
2. Blast 2016-11 on August 22, 2016 caused an air overpressure reading of 129dB at a location 650m Northeast of the blast.

Both instances were marginal exceedances of the NPC 119 air overpressure guideline of 128dB and given conservatism built into the models, do not pose a damage risk of any kind to neighbouring structures. Immediate adjustments to blast designs in response to the measured readings ensured return to compliant air overpressure levels in subsequent recorded blasts.



RECOMMENDATIONS

It is recommended that the following conditions be applied for all blasting operations at the proposed Cornwall Gravel MacLeod III Quarry new license application area:

1. All blasts shall be monitored for both vibration and overpressure at the closest privately owned sensitive receptors adjacent the site, or closer, with a minimum of two (2) digital seismographs – one installed in front of the blast and one installed behind the blast. Monitoring shall be performed by a competent, accredited individual with specialized training in blasting and monitoring.
2. Orientation of the mineral extraction operation will be designed and maintained so that the direction of the overpressure propagation and flyrock from the face will be away from structures as much as possible.
3. Blast designs shall be continually reviewed with respect to fragmentation, ground vibration and overpressure. Blast designs shall be modified as required to ensure compliance with applicable guidelines and regulations. Decking, reduced hole diameters and sequential blasting techniques will be used to ensure minimal explosives per delay period initiated.
4. Once blasting progress reaches 250m separation distance from any off site structure or residence, accumulated blast data and designs shall be reviewed by a qualified blast consultant prior to proceeding closer in order to ensure suitable parameters are employed.
5. All blasts shall be designed to ensure compliance with NPC-119 limits for ground vibration (12.5mm/s) and overpressure (128dBL).
6. Clear crushed stone will be used for stemming.
7. Blasting procedures such as drilling and loading shall be reviewed on a yearly basis and modified as required to ensure compliance with industry standards.

8. Detailed blast records shall be maintained. The MOECC (1985) recommends that the body of blast reports should include the following information:
 - Location, date and time of the blast.
 - Dimensional sketch including photographs, if necessary, of the location of the blasting operation, and the nearest point of reception.
 - Physical and topographical description of the ground between the source and the receptor location.
 - Type of material being blasted.
 - Sub-soil conditions, if known.
 - Prevailing meteorological conditions including wind speed in m/s, wind direction, air temperature in °C, relative humidity, degree of cloud cover and ground moisture content.
 - Number of drill holes.
 - Pattern and pitch of drill holes.
 - Size of holes.
 - Depth of drilling.
 - Depth of collar (or stemming).
 - Depth of toe-load.
 - Weight of charge per delay.
 - Number and time of delays.
 - The result and calculated value of Peak Pressure Level in dB and Peak Particle Velocity in mm/s.
 - Applicable limits.
 - The excess, if any, over the prescribed limit.

The blast parameters described within this report are supported by the modeling in the attached appendices. As the quarry progresses and as site-specific data is collected from the on-going operation, the blast parameters can be refined, as necessary, to ensure continual compliance with MOECC Guidelines.

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CONCLUSION

Blasting operations required for mineral extraction at the proposed Cornwall Gravel MacLeod III quarry can be carried out safely and well within governing guidelines set by the Ministry of the Environment and Climate Change.

Modern blasting techniques will permit blasting to take place with explosives charges below allowable charge weights ensuring that blast vibrations and overpressure will remain minimal at the nearest receptors.

APPENDIX A

HeadlineRd

PlantRd

S BranchRd

PHASE 2A

PHASE 1

PHASE 2B

42

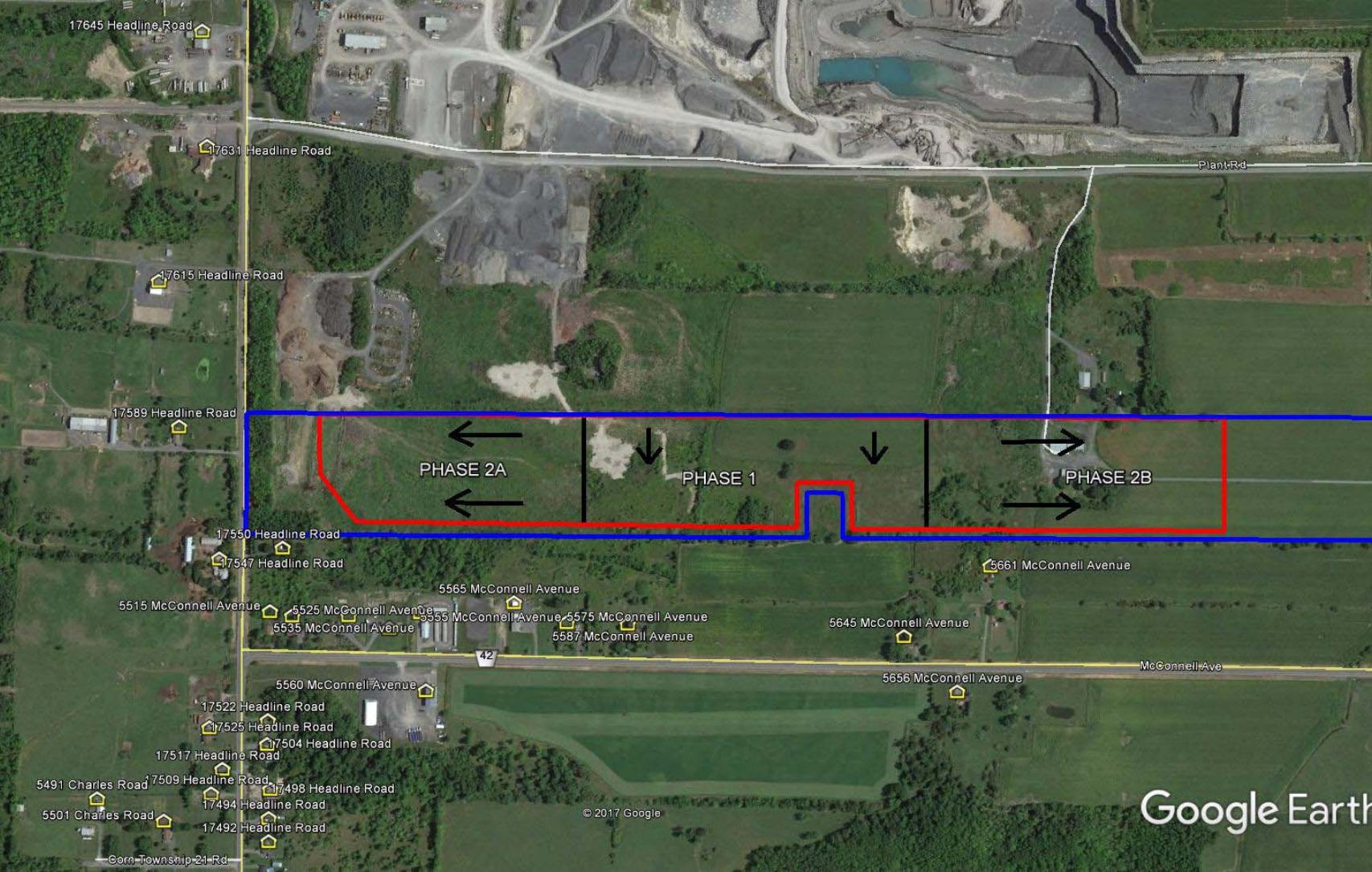
McConnell Ave

© 2017 Google

Google Earth







APPENDIX B

Cornwall Gravel MacLeod III Quarry New License Application

PREVAILING METEOROLOGICAL CONDITIONS

Medians provided by Environment Canada
Canadian Climate Normals 1971-2000
Cornwall, Ontario – Ontario Hydro Weather Station

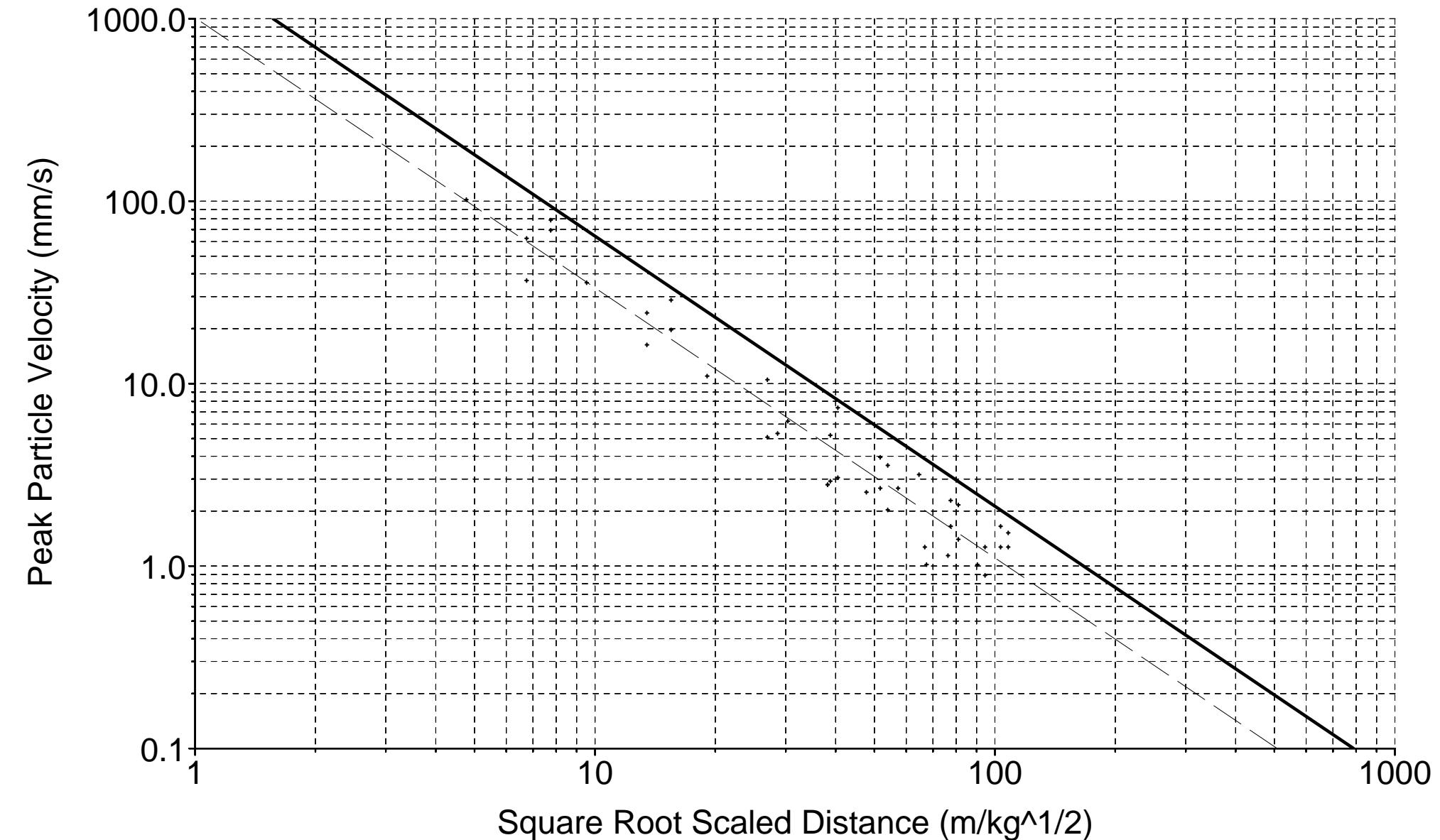
Date	Wind Direction	Wind Velocity Km/h	Temperature (Deg Celcius)
January	W	17.3	-9.4
February	W	16.6	-8.1
March	E	17.5	-2
April	E	17.9	6.3
May	W	15.3	13.8
June	W	14.3	18.4
July	W	13.5	21.4
August	W	13	20.2
September	SW	13.9	15.1
October	SW	15.7	8.6
November	NW	17.1	2.3
December	NW	17.2	-5.7

APPENDIX C

Regression Line For FINAL BACK ATTENUATION.SDF

95% Line Equation: $V = 1946 * (SD)^{-1.48}$

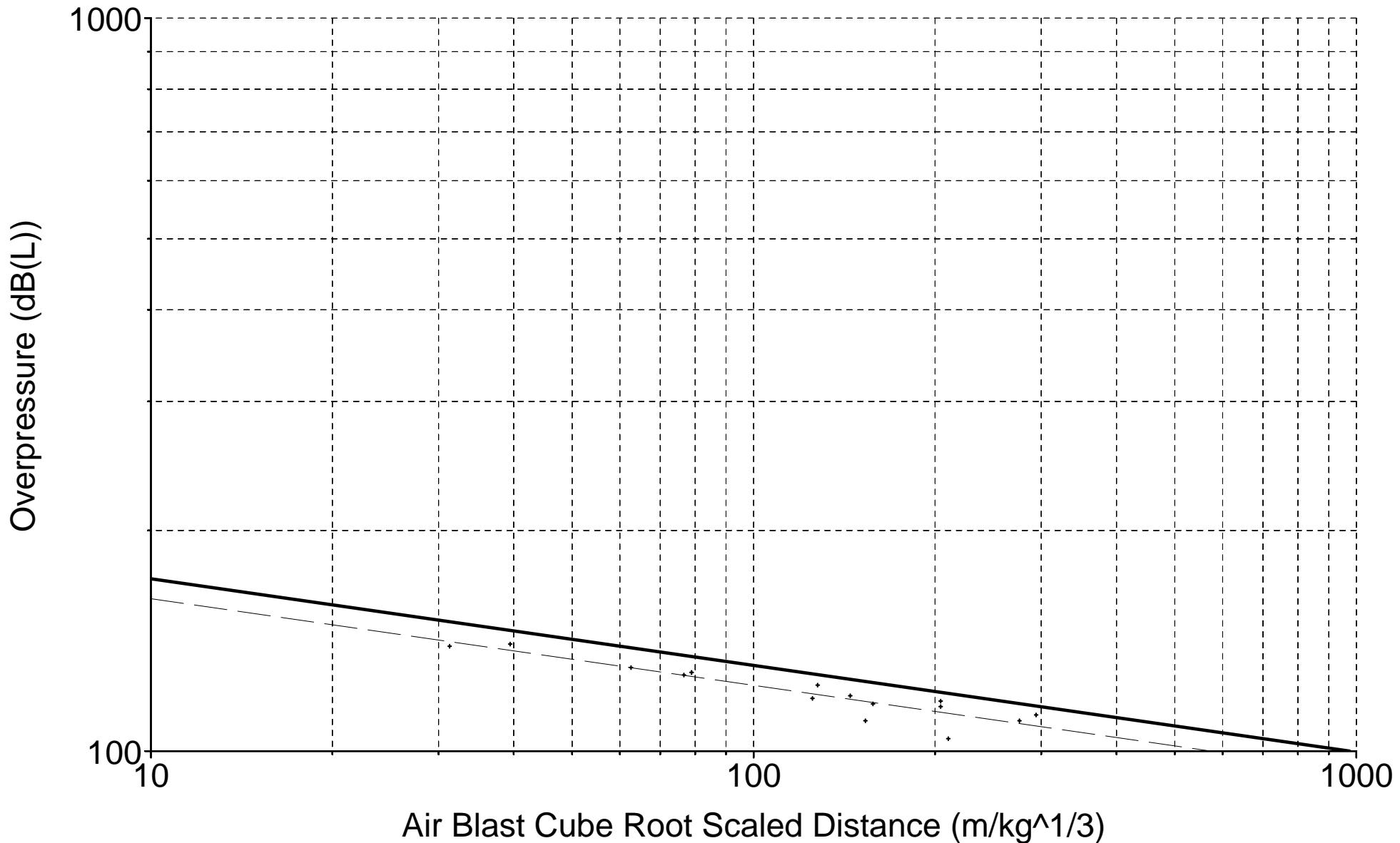
Coefficient of Determination = 0.942 Standard Deviation = 0.142



Regression Line For FINAL FRONT ATTENUATION.SDF

95% Line Equation: $V = 226 * (SD)^{-0.118}$

Coefficient of Determination = 0.858 Standard Deviation = 0.0136



APPENDIX D

Robert J. Cyr, P. Eng.
Principal, Explotech Engineering Ltd.

EDUCATION

Bachelor of Applied Science,
Civil Engineering, Queen's University

PROFESSIONAL AFFILIATIONS

Association of Professional Engineers of Ontario (APEO)
Association of Professional Engineers and Geoscientists of BC (APEG)
Association of Professional Engineers, Geologists and Geophysicists of Alberta
Association of Professional Engineers and Geoscientists of New Brunswick
Association of Professional Engineers of Nova Scotia
Association of Professional Engineers and Geoscientists Manitoba
Professional Engineers and Geoscientists Newfoundland and Labrador
International Society of Explosives Engineers (ISEE)
Aggregate Producers Association of Ontario (APAO)
Surface Blaster Ontario Licence 450109

SUMMARY OF EXPERIENCE

Over thirty years experience in many facets of the construction and mining industry has provided the expertise and experience required to efficiently and accurately address a comprehensive range of engineering and construction conditions. Sound technical training is reinforced by formidable practical experience providing the tools necessary for accurate, comprehensive analysis and application of feasible solutions. Recent focus on vibration analysis, blast monitoring, blast design, damage complaint investigation for explosives consumers and specialized consulting to various consulting engineering firms.

PROFESSIONAL RECORD

2001 – Present	-Principal, Explotech Engineering Ltd.
1996 – 2001	-Leo Alarie & Sons Limited - Project Engineer/Manager
1993 – 1996	-Rideau Oxford Developments Inc. – Project Manager
1982 – 1993:	-Alphe Cyr Ltd. – Project Coordinator/Manager

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Specialists in Explosives, Blasting and Vibration
Consulting Engineers

Matt Morling

Explotech Engineering Ltd.

EDUCATION

Police Foundations,
Algonquin College

Human Resources Management,
Algonquin College

PROFESSIONAL AFFILIATIONS

International Society of Explosives Engineers (ISEE)

SUMMARY OF EXPERIENCE

Hard-working and motivated, Matt holds multiple diplomas from Algonquin College. Strong leadership skills who works well in a team oriented environment and excels in communication. Matt has the ability to manage projects and thrive under various pressure intensive situations. Recent projects have focused on vibration analysis, job estimation, blast monitoring and damage complaint investigations.

PROFESSIONAL RECORD

2013 – Present - Technician, Explotech Engineering Ltd.

EXPLOTECH ENGINEERING LTD.

Ottawa ◆ Sudbury ◆ Toronto ◆ Halifax

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APPENDIX E



Blast Report

Quarry: McLeod
 Blast Number: 14-001
 Customer P.O. #: John
 Orica Order #: 1707956
 Date of Blast: May 15 2014
 Time of Blast: 12:05pm

Customer Name: <u>Cornwall Gravel</u>		Blaster-in-charge: <u>Bradley Crook</u> (print name)		Bench / Face: <u>65' Bench (Hard and Soft Rock)</u>		Latitude ($^{\circ}$ N): <u>N 45.07596*</u> Longitude ($^{\circ}$ W): <u>W 074.74572*</u>	
						Centre of Blast	
Wind Direction: <u>S</u> (from the: W SW S SE E NE N NW)		Wind Velocity: <u>28</u> kph		Temperature: <u>31</u> $^{\circ}$ C		Cloud Altitude: _____ m	
Overcast: <input type="checkbox"/>		Rain: <input type="checkbox"/>		Inversion Altitude: _____ m		Inversion: <input type="checkbox"/>	
Partly Cloudy: <input type="checkbox"/>		Snow: <input type="checkbox"/>		Boretracked Y or N <u>N</u>		Boretracked Y or N <u>N</u>	
Sunny: <input checked="" type="checkbox"/>		Face Profiled Y or N <u>N</u>		# Stone Decks: <u>0</u>		# Stone Decks: <u>0</u>	
Stemming Type / Size: <u>HL3</u>		Stemming Laid out Y or N <u>Y</u>		Total Length of Stone Decks: <u>0.0</u> m		Time Stemming Laid Out <u>6:00am</u>	
Bit diam: <u>76</u> mm (<u>0</u> ') # Holes: <u>0</u>		= <u>0.0</u> m (<u>0</u> ft)		Bit diam: <u>89</u> mm (<u>0</u> ') # Holes: <u>57</u>		= <u>1,128.6</u> m (<u>3,702</u> ft)	
Remote Fired Y or N <u>Y</u>		Re Drills Y or N <u>N</u>		# redrills <u>0</u>		Holes Measured Y or N <u>Y</u>	

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>33,460</u>	<u>25,600</u>	<u>7,860</u>
Pkgd. & Boosters: Size kg			
E113	<u>65X400</u>	<u>5</u>	<u>200</u>
E113	<u>75X400</u>	<u>9</u>	<u>225</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>57</u>	<u>26</u>
Pentex Boosters	<u>0.340</u>		<u>0</u>
Pentex Boosters	<u>0.200</u>	<u>61</u>	<u>12</u>
Total explosives(kg): <u>8,323</u>			

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>3:00am</u>	<u>9.0</u>
Helper #1	<u>7:00am</u>	<u>12:30pm</u>	<u>5.5</u>
Helper #2	<u>7:00am</u>	<u>12:30pm</u>	<u>5.5</u>
Helper #3			
Helper #4			
Helper #5			
MMU # 1	<u>7:00am</u>	<u>11:00am</u>	<u>4.0</u>
MMU # 2			
Total Hrs			<u>24.0</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6m	Uni Tronic 600		<u>0</u>
15m	Uni Tronic 600		<u>0</u>
6m	Ikon 2		<u>0</u>
20M	Ikon 2		<u>118</u>
400M	Uni Tronic Wire		<u>0</u>

Seis #1: <u>Front Gate</u> (200M from blast)	PPV: <u>11.60</u> mm/s	@ Freq: <u>27</u> Hz	Air o/p: _____ dB
Lat $^{\circ}$ N: <u>Long $^{\circ}$ W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ? <u>_____</u>	(Trigger: <u>115</u> dB)
Seis #2: <u> </u>	PPV: <u> </u> mm/s	@ Freq: <u> </u> Hz	Air o/p: _____ dB
Lat $^{\circ}$ N: <u>Long $^{\circ}$ W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ? <u> </u>	(Trigger: <u>115</u> dB)
Seis #3: <u> </u>	PPV: <u> </u> mm/s	@ Freq: <u> </u> Hz	Air o/p: _____ dB
Lat $^{\circ}$ N: <u>test</u> Long $^{\circ}$ W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ? <u> </u>	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeod
 Blast Number: 14-002
 Customer P.O. #: Scott
 Orica Order #: 1710345
 Date of Blast: May 21 2014
 Time of Blast: 12:19pm

Customer Name: <u>Cornwall Gravel</u>		Blaster-in-charge: <u>Bradley Crook</u> (print name)	
Bench / Face: <u>East High Wall Asphalt Stone</u>		Latitude (° N): <u>45.08253</u> Longitude (° W): <u>74.74424</u>	
Centre of Blast		Centre of Blast	
Wind Direction: <u>S</u> (from the: W SW S SE E NE N NW)		Wind Velocity: <u>15</u> kph Temperature: <u>23</u> °C	
Overcast:	<input type="checkbox"/>	Rain:	<input type="checkbox"/>
Partly Cloudy:	<input type="checkbox"/>	Snow:	<input type="checkbox"/>
Sunny:	<input checked="" type="checkbox"/>	Inversion:	<input type="checkbox"/>
Face Profiled	Y or N	N	Inversion Altitude: _____ m
Stemming Type / Size:	<u>HL3</u>		
Stemming Laid out Y or N	<u>Y</u>	# Stone Decks:	<u>0</u>
Time Stemming Laid Out	<u>6:00am</u>		
Bit diam:	<u>76</u> mm (<u>0</u> ') # Holes:	<u>2</u>	= <u>48.2</u> m (<u>158</u> ft)
Bit diam:	<u>89</u> mm (<u>0</u> ') # Holes:	<u>52</u>	<u>1,253.2</u> m (<u>4,110</u> ft)
Remote Fired Y or N	<u>Y</u>	Re Drills Y or N	<u>Y</u>
	# redrills	<u>1</u>	Holes Measured Y or N <u>Y</u>
tonnes Blasted: <u>27,400</u> te			
tonnes Invoiced: _____ te			
Burden: <u>2.8</u> m <u>9.18</u> ft			
Spacing: <u>2.8</u> m <u>9.18</u> ft			
Avg Bench Ht: <u>24.1</u> m <u>79.05</u> ft			
Avg Hole Depth: <u>24.1</u> m <u>79.05</u> ft			
Collar: <u>1.4</u> m <u>4.59</u> ft			
Holes Dewatered: <u>0</u> holes			
Total kg Loaded: <u>10,010</u> kg			
Powder Factor: <u>0.37</u> kg/te <u>0.17</u> #/te			
0.99 kg/m ³ <u>1.66</u> #/cy			
Max. per delay: <u>215</u> kg/delay			
Rock Density: <u>2.70</u> g/cc			
Rows Blasted: <u>4</u> rows			
Bench Length <u>36.3</u> m <u>119.1</u> ft			
Blast Width: <u>11.6</u> m <u>38.0</u> ft			
Rock Vol. Blasted: <u>10,148</u> m ³ <u>13,263</u> cy			

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>35,020</u>	<u>25,420</u>	<u>9,600</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>2</u>	<u>200</u>
E113	<u>75X400</u>	<u>7</u>	<u>175</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>54</u>	<u>24</u>
Pentex Boosters	<u>0.340</u>		<u>0</u>
Pentex Boosters	<u>0.200</u>	<u>54</u>	<u>11</u>
Total explosives(kg):			<u>10,010</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>2:00pm</u>	<u>8.0</u>
Helper #1	<u>7:00am</u>	<u>1:00pm</u>	<u>6.0</u>
Helper #2	<u>7:00am</u>	<u>12:30pm</u>	<u>5.5</u>
Helper #3			
Helper #4			
Helper #5			
MMU # 1	<u>7:00am</u>	<u>12:00pm</u>	<u>5.0</u>
MMU # 2			
Total Hrs			<u>24.5</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6m	Uni Tronic 600		<u>52</u>
30m	Uni Tronic 600		<u>56</u>
6m	Ikon 2		<u>0</u>
20M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>North East Of Blast</u>	PPV: <u>3.68</u> mm/s	@ Freq: <u>9</u> Hz	Air o/p: <u>115</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)	Orica Blaster-in-charge: <u>Bradley Crook</u>		
	Signature		



Blast Report

Quarry: McLeod
 Blast Number: 14-003
 Customer P.O. #: Scott
 Orica Order #: 1716667
 Date of Blast: June 3 2014
 Time of Blast: 12:00pm

Customer Name: <u>Cornwall Gravel</u>			
Blaster-in-charge: <u>Bradley Crook</u> (print name)			
Bench / Face: <u>Toe North End</u>			
Latitude (° N): _____ Longitude (° W): _____		Centre of Blast	
Wind Direction: <u>W</u> (from the: W SW S SE E NE N NW)			
Wind Velocity: <u>15</u> kph		Temperature: <u>23</u> °C	
Overcast:	<input checked="" type="checkbox"/> X	Rain:	<input type="checkbox"/>
Partly Cloudy:	<input checked="" type="checkbox"/> X	Snow:	<input type="checkbox"/>
Sunny:	<input type="checkbox"/>	Inversion:	<input type="checkbox"/>
Face Profiled	Y or N <u>N</u>	Inversion Altitude:	_____ m
Stemming Type / Size:	<u>HL3</u>	# Stone Decks:	<u>0</u>
Stemming Laid out Y or N	<u>Y</u>	Total Length of Stone Decks:	<u>0.0</u> m
Time Stemming Laid Out	<u>6:00am</u>		
Bit diam:	<u>76</u> mm (<u>0</u> ') # Holes: <u>253</u>	=	<u>303.6</u> m (<u>996</u> ft)
Bit diam:	<u>89</u> mm (<u>0</u> ') # Holes: <u>0</u>	=	<u>0.0</u> m (<u>0</u> ft)
Remote Fired Y or N	<u>Y</u>	# redrills	<u>0</u>
Re Drills	<u>Y or N</u>	Holes Measured	Y or N <u>Y</u>
tonnes Blasted: <u>2,029</u> te			
tonnes Invoiced: _____ te			
Burden: <u>1.5</u> m <u>4.92</u> ft			
Spacing: <u>1.5</u> m <u>4.92</u> ft			
Avg Bench Ht: <u>1.2</u> m <u>3.94</u> ft			
Avg Hole Depth: <u>1.2</u> m <u>3.94</u> ft			
Collar: <u>1.2</u> m <u>3.94</u> ft			
Holes Dewatered: <u>0</u> holes			
Total kg Loaded: <u>351</u> kg			
Powder Factor: <u>0.17</u> kg/te <u>0.08</u> #/te			
<u>0.47</u> kg/m ³ <u>0.79</u> #/cy			
Max. per delay: <u>2</u> kg/delay			
Rock Density: <u>2.70</u> g/cc			
Rows Blasted: <u>6</u> rows			
Bench Length <u>45.7</u> m <u>149.9</u> ft			
Blast Width: <u>13.7</u> m <u>44.9</u> ft			
Rock Vol. Blasted: <u>751</u> m ³ <u>982</u> cy			

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>0</u>	<u>0</u>	<u>0</u>
Pkgd. & Boosters: Size kg			
Fortel Elite	<u>65X400</u>	<u>11</u>	<u>275</u>
Senatel MagnaFrac	<u>55X400</u>	<u>1</u>	<u>25</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>		<u>0</u>
Pentex Boosters	<u>0.200</u>	<u>253</u>	<u>51</u>
Total explosives(kg):			<u>351</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>1:00pm</u>	<u>7.0</u>
Helper #1	<u>Darcy</u>	<u>7:00am</u>	<u>12:30pm</u>
Helper #2	<u>Todd</u>	<u>7:00am</u>	<u>12:30pm</u>
Helper #3			
Helper #4			
Helper #5			
MMU # 1			
MMU # 2			
Total Hrs			<u>18.0</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6m	Uni Tronic 600		<u>253</u>
20m	Uni Tronic 600		<u>0</u>
6m	Ikon 2		<u>0</u>
20M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>South End of Quarry (Did not trigger)</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: _____ Long ° W: _____	(Trigger: <u>2.00</u> mm/s)	V / T / L ? _____	(Trigger: <u>115</u> dB)
Seis #2: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: _____ Long ° W: _____	(Trigger: <u>2.00</u> mm/s)	V / T / L ? _____	(Trigger: <u>115</u> dB)
Seis #3: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ? _____	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)	Orica Blaster-in-charge: <u>Bradley Crook</u>		
	Signature		



Blast Report

Quarry: McLeod
 Blast Number: 14-004
 Customer P.O. #: Scott
 Orica Order #: 1717798
 Date of Blast: June 3 2014
 Time of Blast: 1:07pm

Customer Name: <u>Cornwall Gravel</u>			
Blaster-in-charge: <u>Bradley Crook</u> (print name)			
Bench / Face: <u>SouthWall 65'</u>			
Latitude (° N): <u>45.07600*</u> Longitude (° W): <u>074.74523*</u>			
Centre of Blast		Centre of Blast	
Wind Direction: <u>W</u> (from the: W SW S SE E NE N NW)			
Wind Velocity: <u>15</u> kph		Temperature: <u>16</u> °C	
Overcast:	<input checked="" type="checkbox"/> X	Rain:	<input checked="" type="checkbox"/> X
Partly Cloudy:	<input checked="" type="checkbox"/> X	Snow:	<input type="checkbox"/>
Sunny:	<input type="checkbox"/>	Inversion:	<input type="checkbox"/>
Face Profiled	Y or N	N	
Stemming Type / Size:	<u>HL3</u>	# Stone Decks:	<u>0</u>
Stemming Laid out Y or N	<u>Y</u>	Total Length of Stone Decks:	<u>0.0</u> m
Time Stemming Laid Out	<u>6:00am</u>		
Bit diam:	<u>76</u> mm (<u>0</u> ') # Holes:	<u>0.0</u>	= <u>0.0</u> m (<u>0</u> ft)
Bit diam:	<u>89</u> mm (<u>0</u> ') # Holes:	<u>81</u>	<u>1,603.8</u> m (<u>5,260</u> ft)
Remote Fired Y or N	<input checked="" type="checkbox"/> Y		
Re Drills Y or N	<input type="checkbox"/> N	# redrills <u>0</u>	Holes Measured Y or N <input type="checkbox"/> Y
tonnes Blasted: <u>37,259</u> te			
tonnes Invoiced: _____ te			
Burden: <u>2.8</u> m <u>9.18</u> ft			
Spacing: <u>3.1</u> m <u>10.17</u> ft			
Avg Bench Ht: <u>19.8</u> m <u>64.94</u> ft			
Avg Hole Depth: <u>19.8</u> m <u>64.94</u> ft			
Collar: <u>1.4</u> m <u>4.59</u> ft			
Holes Dewatered: <u>0</u> holes			
Total kg Loaded: <u>11,353</u> kg			
Powder Factor: <u>0.30</u> kg/te <u>0.14</u> #/te			
0.82 kg/m ³ <u>1.39</u> #/cy			
Max. per delay: <u>150</u> kg/delay			
Rock Density: <u>2.70</u> g/cc			
Rows Blasted: <u>3</u> rows			
Bench Length <u>79.2</u> m <u>259.8</u> ft			
Blast Width: <u>8.8</u> m <u>28.9</u> ft			
Rock Vol. Blasted: <u>13,800</u> m ³ <u>18,036</u> cy			

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>33,640</u>	<u>21,690</u>	<u>11,950</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>4</u>	<u>100</u>
E113	<u>75X400</u>	<u>10</u>	<u>250</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>81</u>	<u>36</u>
Pentex Boosters	<u>0.340</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.200</u>	<u>81</u>	<u>16</u>
Total explosives(kg):		<u>12,353</u>	

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>2:00pm</u>	<u>8.0</u>
Helper #1	<u>Todd</u>	<u>7:00am</u>	<u>1:30pm</u>
Helper #2	<u>Joel</u>	<u>7:00am</u>	<u>1:30pm</u>
Helper #3			
Helper #4			
Helper #5			
MMU # 1	<u>Brad L</u>	<u>7:30am</u>	<u>1:00pm</u>
MMU # 2			
Total Hrs			<u>26.5</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6m	Uni Tronic 600		<u>0</u>
20m	Ikon 2	<u>NO</u> CHARGE	<u>10</u>
20M	Ikon 2		<u>82</u>
25M	Ikon 2		<u>80</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>Front Gate</u>	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ? _____	(Trigger: <u>115</u> dB)
Seis #2: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ? _____	(Trigger: <u>115</u> dB)
Seis #3: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ? _____	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeod
 Blast Number: 14-005
 Customer P.O. #: Scott
 Orica Order #: 1721941
 Date of Blast: June 16 2014
 Time of Blast: 12:10 PM

Customer Name: <u>Cornwall Gravel</u>	Blaster-in-charge: <u>Bradley Crook</u> (print name)	tonnes Blasted: <u>24,982</u> te
Bench / Face: <u>East Wall 76' Deep</u>	Latitude (° N): <u>45..08249*</u> Longitude (° W): <u>074.74406*</u>	tonnes Invoiced: _____ te
Centre of Blast	Centre of Blast	Burden: <u>2.8</u> m <u>9.18</u> ft
Wind Direction: <u>NW</u> (from the: W SW S SE E NE N NW)	Wind Velocity: <u>1</u> kph	Spacing: <u>3.1</u> m <u>10.17</u> ft
Overcast: <input type="checkbox"/>	Rain: <input type="checkbox"/>	Avg Bench Ht: <u>23.2</u> m <u>76.10</u> ft
Partly Cloudy: <input type="checkbox"/>	Snow: <input type="checkbox"/>	Avg Hole Depth: <u>23.2</u> m <u>76.10</u> ft
Sunny: <input checked="" type="checkbox"/>	Inversion: <input type="checkbox"/>	Collar: <u>1.5</u> m <u>4.92</u> ft
Face Profiled Y or N <u>N</u>	Inversion Altitude: _____ m	Holes Dewatered: <u>0</u> holes
Stemming Type / Size: <u>HL3</u>	Boretracked Y or N <u>N</u>	Total kg Loaded: <u>6,962</u> kg
Stemming Laid out Y or N <u>Y</u>	# Stone Decks: <u>0</u>	Powder Factor: <u>0.28</u> kg/te <u>0.13</u> #/te
Time Stemming Laid Out <u>7:00am</u>	Total Length of Stone Decks: <u>0.0</u> m	0.75 kg/m ³ <u>1.27</u> #/cy
Bit diam: <u>76</u> mm (<u>0</u> ') # Holes: <u>2</u> = <u>46.4</u> m (<u>152</u> ft)	Bit diam: <u>89</u> mm (<u>0</u> ') # Holes: <u>38</u> = <u>881.6</u> m (<u>2,892</u> ft)	Max. per delay: <u>170</u> kg/delay
Remote Fired Y or N <u>Y</u>	# redrills <u>0</u>	Rock Density: <u>2.70</u> g/cc
Re Drills Y or N <u>N</u>	Holes Measured Y or N <u>Y</u>	Rows Blasted: <u>4</u> rows
		Bench Length <u>27.9</u> m <u>91.5</u> ft
		Blast Width: <u>14.3</u> m <u>46.9</u> ft
		Rock Vol. Blasted: <u>9,252</u> m ³ <u>12,092</u> cy

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>33,590</u>	<u>26,950</u>	<u>6,640</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>5</u>	<u>125</u>
E113	<u>75X400</u>	<u>7</u>	<u>175</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>40</u>	<u>14</u>
Pentex Boosters	<u>0.200</u>	<u>40</u>	<u>8</u>
Total explosives(kg):			<u>6,962</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>2:00pm</u>	<u>8.0</u>
Helper #1 Todd	<u>7:00am</u>	<u>12:30pm</u>	<u>5.5</u>
Helper #2 Joel	<u>7:00am</u>	<u>12:30pm</u>	<u>5.5</u>
Helper #3			
Helper #4			
Helper #5			
MMU # 1 Fred D	<u>7:30am</u>	<u>10:00am</u>	<u>2.5</u>
MMU # 2			
Total Hrs			<u>21.5</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6m	Uni Tronic 600		<u>40</u>
25m	Uni Tronic 600		<u>24</u>
30M	Ikon 2		<u>16</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>504 South Branch Rd</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: <u>East of Shot</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: <u>test</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)	Orica Blaster-in-charge: <u>Bradley Crook</u>		
	Signature		



Blast Report

Quarry: McLeod
 Blast Number: 14-006
 Customer P.O. #: Scott
 Orica Order #: 1727880
 Date of Blast: June 27 2014
 Time of Blast: 12:10pm

Customer Name: <u>Cornwall Gravel</u>			
Blaster-in-charge: <u>Bradley Crook</u> (print name)			
Bench / Face: <u>48' Asphalt</u>			
Latitude (° N): <u>45.08280*</u> Longitude (° W): <u>074.74647*</u>			
Centre of Blast		Centre of Blast	
Wind Direction: <u>S</u> (from the: W SW S SE E NE N NW)			
Wind Velocity: <u>1</u> kph		Temperature: <u>27</u> °C	
Overcast:	<input type="checkbox"/>	Rain:	<input type="checkbox"/>
Partly Cloudy:	<input type="checkbox"/>	Snow:	<input type="checkbox"/>
Sunny:	<input checked="" type="checkbox"/>	Inversion:	<input type="checkbox"/>
Face Profiled	Y or N	N	
Stemming Type / Size:	<u>HL3</u>		
Stemming Laid out Y or N	<u>Y</u>	# Stone Decks:	<u>0</u>
Time Stemming Laid Out	<u>6:00am</u>		
Bit diam:	<u>76</u> mm (<u>0</u> °)	# Holes:	<u>4</u> = <u>58.4</u> m (<u>192</u> ft)
Bit diam:	<u>89</u> mm (<u>0</u> °)	# Holes:	<u>70</u> = <u>1,022.0</u> m (<u>3,352</u> ft)
Remote Fired Y or N	<u>Y</u>		
Re Drills	<u>Y or N</u>	<u>N</u>	# redrills <u>0</u> Holes Measured Y or N <u>Y</u>
tonnes Blasted: <u>28,491</u> te			
tonnes Invoiced: _____ te			
Burden: <u>2.8</u> m <u>9.18</u> ft			
Spacing: <u>3.4</u> m <u>11.15</u> ft			
Avg Bench Ht: <u>14.6</u> m <u>47.89</u> ft			
Avg Hole Depth: <u>14.6</u> m <u>47.89</u> ft			
Collar: <u>1.4</u> m <u>4.59</u> ft			
Holes Dewatered: <u>0</u> holes			
Total kg Loaded: <u>8,322</u> kg			
Powder Factor: <u>0.29</u> kg/te <u>0.13</u> #/te			
0.79 kg/m ³ <u>1.33</u> #/cy			
Max. per delay: <u>110</u> kg/delay			
Rock Density: <u>2.70</u> g/cc			
Rows Blasted: <u>4</u> rows			
Bench Length <u>63.4</u> m <u>208.0</u> ft			
Blast Width: <u>11.4</u> m <u>37.4</u> ft			
Rock Vol. Blasted: <u>10,552</u> m ³ <u>13,791</u> cy			

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>34,600</u>	<u>27,080</u>	<u>7,520</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>3</u>	<u>75</u>
E113	<u>75X400</u>	<u>3</u>	<u>75</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>74</u>	<u>25</u>
Pentex Boosters	<u>0.200</u>	<u>74</u>	<u>15</u>
Total explosives(kg):			<u>7,710</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>1:30pm</u>	<u>7.5</u>
Helper #1	<u>Todd</u>	<u>7:00am</u>	<u>12:30pm</u>
Helper #2	<u>Darcy</u>	<u>7:00am</u>	<u>12:30pm</u>
Helper #3			
Helper #4			
Helper #5			
MMU # 1	<u>Jason K</u>	<u>7:30am</u>	<u>10:30am</u>
MMU # 2			
Total Hrs			<u>21.5</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6m	Uni Tronic 600		<u>74</u>
20m	Uni Tronic 600		<u>74</u>
20M	Ikon 2		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>0</u>

Seis #1: <u>Front Gate</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB) <u>0</u>
Seis #2: <u>504 South Branch Rd</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeod
 Blast Number: 14-007
 Customer P.O. #: Scott
 Orica Order #: 1731423
 Date of Blast: July 4 2014
 Time of Blast: 12:05pm

Customer Name: <u>Cornwall Gravel</u>			
Blaster-in-charge: <u>Bradley Crook</u> (print name)			
Bench / Face: <u>South Wall 65' Deep</u>			
Latitude (° N): <u>45.0615*</u> Longitude (° W): <u>074.7457*</u>			
Centre of Blast		Centre of Blast	
Wind Direction: <u>NW</u> (from the: W SW S SE E NE N NW)			
Wind Velocity: <u>15</u> kph		Temperature: <u>23</u> °C	
Overcast:	<input type="checkbox"/>	Rain:	<input type="checkbox"/>
Partly Cloudy:	<input checked="" type="checkbox"/>	Snow:	<input type="checkbox"/>
Sunny:	<input checked="" type="checkbox"/>	Inversion:	<input type="checkbox"/>
Face Profiled Y or N	<u>N</u>	Boretracked Y or N	<u>N</u>
Stemming Type / Size:	<u>HL3</u>	# Stone Decks:	<u>0</u>
Stemming Laid out Y or N	<u>Y</u>	Total Length of Stone Decks:	<u>0.0</u> m
Time Stemming Laid Out	<u>6:00am</u>		
Bit diam: <u>76</u> mm (<u>0</u> ') # Holes: <u>0</u> = <u>0.0</u> m (<u>0</u> ft)			
Bit diam: <u>89</u> mm (<u>0</u> ') # Holes: <u>62</u> = <u>1,227.6</u> m (<u>4,027</u> ft)			
Remote Fired Y or N	<u>Y</u>	# redrills	<u>0</u>
Re Drills Y or N	<u>N</u>	Holes Measured Y or N	<u>Y</u>
tonnes Blasted: <u>30,594</u> te			
tonnes Invoiced: _____ te			
Burden: <u>2.8</u> m <u>9.18</u> ft			
Spacing: <u>3.4</u> m <u>11.15</u> ft			
Avg Bench Ht: <u>19.8</u> m <u>64.94</u> ft			
Avg Hole Depth: <u>19.8</u> m <u>64.94</u> ft			
Collar: <u>1.5</u> m <u>4.92</u> ft			
Holes Dewatered: <u>0</u> holes			
Total kg Loaded: <u>9,058</u> kg			
Powder Factor: <u>0.30</u> kg/te <u>0.13</u> #/te			
<u>0.80</u> kg/m ³ <u>1.35</u> #/cy			
Max. per delay: <u>130</u> kg/delay			
Rock Density: <u>2.70</u> g/cc			
Rows Blasted: <u>4</u> rows			
Bench Length <u>50.2</u> m <u>164.7</u> ft			
Blast Width: <u>11.4</u> m <u>37.4</u> ft			
Rock Vol. Blasted: <u>11,331</u> m ³ <u>14,809</u> cy			

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>33,400</u>	<u>24,550</u>	<u>8,850</u>
Pkgd. & Boosters:			
	Size		kg
E113	<u>65X400</u>	<u>7</u>	<u>175</u>
E113	<u>75X400</u>	<u>0</u>	<u>0</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>62</u>	<u>21</u>
Pentex Boosters	<u>0.200</u>	<u>62</u>	<u>12</u>
Total explosives(kg):			<u>9,058</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>2:00pm</u>	<u>8.0</u>
Helper #1	<u>Pierre</u>	<u>7:00am</u>	<u>12:30pm</u>
Helper #2	<u>Darcy</u>	<u>7:00am</u>	<u>12:30pm</u>
Helper #3			
Helper #4			
Helper #5			
MMU # 1	<u>Brad L</u>	<u>7:00am</u>	<u>10:00am</u>
MMU # 2			
Total Hrs			<u>22.0</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
9M	Uni Tronic 600		<u>62</u>
25M	Uni Tronic 600		<u>62</u>
20M	Ikon 2		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>Front Gate</u>	PPV: <u>7.75</u> mm/s	@ Freq: <u>18</u> Hz	Air o/p: <u>118</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: <u>504 South Branch Rd</u>	PPV: <u>3.94</u> mm/s	@ Freq: <u>39</u> Hz	Air o/p: <u>110</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeod
 Blast Number: 14-008
 Customer P.O. #: Scott
 Orica Order #: 1735639
 Date of Blast: July 15 2014
 Time of Blast: 9:52am

Customer Name: <u>Cornwall Gravel</u>			
Blaster-in-charge: <u>Bradley Crook</u> (print name)			
Bench / Face: <u>63-65' Bench South Wall</u>			
Latitude (° N): <u>45.07576</u> Longitude (° W): <u>74.74545</u>			
Centre of Blast		Centre of Blast	
Wind Direction: <u>NW</u> (from the: W SW S SE E NE N NW)			
Wind Velocity: <u>14</u> kph		Temperature: <u>20</u> °C	
Overcast:	<input checked="" type="checkbox"/> X	Rain:	<input checked="" type="checkbox"/> X
Partly Cloudy:	<input type="checkbox"/>	Snow:	<input type="checkbox"/>
Sunny:	<input type="checkbox"/>	Inversion:	<input type="checkbox"/>
Face Profiled	Y or N <u>N</u>	Inversion Altitude:	<u>1,249</u> m
Stemming Type / Size:	<u>HL3</u>	Boretracked Y or N	<u>N</u>
Stemming Laid out Y or N	<u>Y</u>	# Stone Decks:	<u>0</u>
Time Stemming Laid Out	<u>6:00am</u>		
Bit diam:	<u>76</u> mm (<u>0</u> °)	# Holes:	<u>4</u> = <u>78.0</u> m (<u>256</u> ft)
Bit diam:	<u>89</u> mm (<u>0</u> °)	# Holes:	<u>42</u> = <u>819.0</u> m (<u>2,686</u> ft)
Remote Fired Y or N	<u>Y</u>	Re Drills Y or N	<u>Y</u>
	# redrills <u>3</u>	Holes Measured	Y or N <u>N</u>

tonnes Blasted: 24,327 te
 tonnes Invoiced: _____ te
 Burden: 2.8 m 9.18 ft
 Spacing: 3.4 m 11.15 ft
 Avg Bench Ht: 19.5 m 63.96 ft
 Avg Hole Depth: 19.5 m 63.96 ft
 Collar: 1.4 m 4.59 ft
 Holes Dewatered: 0 holes
 Total kg Loaded: 6,255 kg
 Powder Factor: 0.26 kg/te 0.12 #/te
0.69 kg/m³ 1.17 #/cy
 Max. per delay: 157 kg/delay
 Rock Density: 2.70 g/cc
 Rows Blasted: 4 rows
 Bench Length 39.9 m 130.9 ft
 Blast Width: 11.6 m 38.0 ft
 Rock Vol. Blasted: 9,010 m³ 11,775 cy

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>34,100</u>	<u>28,070</u>	<u>6,030</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>4</u>	<u>100</u>
E113	<u>75X400</u>	<u>4</u>	<u>100</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>46</u>	<u>16</u>
Pentex Boosters	<u>0.200</u>	<u>46</u>	<u>9</u>
Total explosives(kg):			<u>6,255</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>11:30am</u>	<u>5.5</u>
Helper #1	<u>Pierre</u>	<u>6:30am</u>	<u>10:30am</u>
Helper #2	<u>Todd</u>	<u>6:30am</u>	<u>10:30am</u>
Helper #3			
Helper #4			
Helper #5			
MMU # 1	<u>Jason K</u>	<u>7:00am</u>	<u>10:00am</u>
MMU # 2			
Total Hrs			<u>16.5</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>42</u>
25M	Uni Tronic 600		<u>50</u>
20M	Ikon 2		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>504 South Branch Rd</u>	PPV: <u>2.29</u> mm/s	@ Freq: <u>39</u> Hz	Air o/p: _____ dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: <u>Front Gate</u>	PPV: <u>3.94</u> mm/s	@ Freq: <u>30</u> Hz	Air o/p: _____ dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeod
 Blast Number: 14-009
 Customer P.O. #: Scott
 Orica Order #: 1736714
 Date of Blast: July 17 2014
 Time of Blast: 2:00pm

Customer Name: Cornwall Gravel		tonnes Blasted: 28,987 te	
Blaster-in-charge: Bradley Crook (print name)		tonnes Invoiced: _____ te	
Bench / Face: 48' Asphalt		Burden: 2.8 m 9.18 ft	
Latitude (° N): 45.08287 Longitude (° W): 74.74668		Spacing: 3.4 m 11.15 ft	
Centre of Blast		Avg Bench Ht: 14.6 m 47.89 ft	
Wind Direction: W (from the: W SW S SE E NE N NW)		Avg Hole Depth: 14.6 m 47.89 ft	
Wind Velocity: 14 kph Temperature: 22 °C		Collar: 1.4 m 4.59 ft	
Overcast:	Rain:	Holes Dewatered: 0 holes	
Partly Cloudy:	Snow:	Total kg Loaded: 7,943 kg	
Sunny: X	Inversion:	Powder Factor: 0.27 kg/te 0.12 #/te	
Face Profiled Y or N N		0.74 kg/m³ 1.25 #/cy	
Stemming Type / Size: HL3	# Stone Decks: 0	Max. per delay: 105 kg/delay	
Stemming Laid out Y or N Y	Total Length of Stone Decks: 0.0 m	Rock Density: 2.70 g/cc	
Time Stemming Laid Out 6:00am		Rows Blasted: 4 rows	
Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)		Bench Length 63.5 m 208.3 ft	
Bit diam: 89 mm (0 ') # Holes: 79 = 1,153.4 m (3,783 ft)		Blast Width: 11.6 m 38.0 ft	
Remote Fired Y or N Y		Rock Vol. Blasted: 10,736 m³ 14,031 cy	
Re Drills Y or N Y	# redrills 30 Holes Measured Y or N Y		

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	33,660	26,060	7,600
Pkgd. & Boosters: Size kg			
E113	65X400	6	150
E113	75X400	6	150
E113	90X400	0	0
Pentex Boosters	0.450	0	0
Pentex Boosters	0.340	79	27
Pentex Boosters	0.200	79	16
Total explosives(kg):			7,943

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	6:00am	3:30pm	9.5
Helper #1	Andrew	8:30am	2:00pm
Helper #2	Todd	7:00am	2:00pm
Helper #3	Darcy	7:00am	1:30pm
Helper #4			
Helper #5			
MMU # 1	Jason K	8:30am	1:30pm
MMU # 2			
Total Hrs			33.5

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	08122012W	25/475	0
7M Handiets	71712HJKL	25/500	0
9M Connectadets	061112HG	9	0
9M Connectadets	061112HG	17	0
9M Connectadets	061112HG	33	0

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		79
15M	Uni Tronic 600		79
20M	Ikon 2		0
25M	Ikon 2		0
400M	Uni Tronic Wire		1

Seis #1: 504 South Branch Rd	PPV: 0.00 mm/s	@ Freq: 0 Hz	Air o/p: 0 dB
Lat ° N: _____ Long ° W: _____	(Trigger: 2.00 mm/s)	V / T / L ? _____	(Trigger: 115 dB)
Seis #2: Scale House	PPV: 0.00 mm/s	@ Freq: 0 Hz	Air o/p: 0 dB
Lat ° N: _____ Long ° W: _____	(Trigger: 2.00 mm/s)	V / T / L ? _____	(Trigger: 115 dB)
Seis #3: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: test Long ° W: test	(Trigger: 2.00 mm/s)	V / T / L ? _____	(Trigger: 115 dB)
Blast Video Recorded: Y (Yes or No)		Orica Blaster-in-charge: Bradley Crook	
Signature			



Blast Report

Quarry: McLeod
 Blast Number: 14-010
 Customer P.O. #: Scott
 Orica Order #: 1741353
 Date of Blast: July 29 2014
 Time of Blast: 12:05pm

Customer Name: <u>Cornwall Gravel</u>			
Blaster-in-charge: <u>Bradley Crook</u> (print name)			
Bench / Face: <u>48' Asphalt</u>			
Latitude (° N): <u>45.08287</u> Longitude (° W): <u>74.74668</u>			
Centre of Blast		Centre of Blast	
Wind Direction: <u>W</u> (from the: W SW S SE E NE N NW)			
Wind Velocity: <u>17</u> kph		Temperature: <u>22</u> °C	
Overcast:	<input type="checkbox"/>	Rain:	<input type="checkbox"/>
Partly Cloudy:	<input checked="" type="checkbox"/>	Snow:	<input type="checkbox"/>
Sunny:	<input checked="" type="checkbox"/>	Inversion:	<input type="checkbox"/>
Face Profiled	Y or N	N	
Stemming Type / Size:	<u>HL3</u>	# Stone Decks:	<u>0</u>
Stemming Laid out Y or N	<u>Y</u>	Total Length of Stone Decks:	<u>0.0</u> m
Time Stemming Laid Out	<u>6:00am</u>		
Bit diam:	<u>76</u> mm (<u>0</u> ') # Holes:	<u>0</u>	= <u>0.0</u> m (<u>0</u> ft)
Bit diam:	<u>89</u> mm (<u>0</u> ') # Holes:	<u>70</u>	<u>1,022.0</u> m (<u>3,352</u> ft)
Remote Fired Y or N	<input checked="" type="checkbox"/>		
Re Drills Y or N	<input checked="" type="checkbox"/>	# redrills <u>2</u>	Holes Measured Y or N <input checked="" type="checkbox"/>
Tonnes Blasted: <u>25,974</u> te			
Tonnes Invoiced: _____ te			
Burden: <u>2.8</u> m <u>9.18</u> ft			
Spacing: <u>3.4</u> m <u>11.15</u> ft			
Avg Bench Ht: <u>14.6</u> m <u>47.89</u> ft			
Avg Hole Depth: <u>14.6</u> m <u>47.89</u> ft			
Collar: <u>1.4</u> m <u>4.59</u> ft			
Holes Dewatered: <u>0</u> holes			
Total kg Loaded: <u>9,373</u> kg			
Powder Factor: <u>0.36</u> kg/te <u>0.16</u> #/te			
0.97 kg/m ³ <u>1.64</u> #/cy			
Max. per delay: <u>105</u> kg/delay			
Rock Density: <u>2.70</u> g/cc			
Rows Blasted: <u>4</u> rows			
Bench Length <u>56.9</u> m <u>186.6</u> ft			
Blast Width: <u>11.6</u> m <u>38.0</u> ft			
Rock Vol. Blasted: <u>9,620</u> m ³ <u>12,573</u> cy			

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>35,030</u>	<u>28,270</u>	<u>6,760</u>
Pkgd. & Boosters:			
	Size		kg
E113	<u>65X400</u>	<u>4</u>	<u>200</u>
E113	<u>75X400</u>	<u>0</u>	<u>0</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>70</u>	<u>24</u>
Pentex Boosters	<u>0.200</u>	<u>71</u>	<u>14</u>
Total explosives(kg):			<u>6,998</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>1:30pm</u>	<u>7.5</u>
Helper #1			
Helper #2	<u>Todd</u>	<u>7:00am</u>	<u>12:30pm</u>
Helper #3			
Helper #4			
Helper #5			
MMU # 1	<u>Jason K</u>	<u>7:00am</u>	<u>12:00pm</u>
MMU # 2			
Total Hrs			<u>18.0</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>69</u>
20M	Uni Tronic 600		<u>70</u>
20M	Ikon 2		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>504 South Branch Rd</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: <u>Scale House</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: <u> </u>	PPV: <u> </u> mm/s	@ Freq: <u> </u> Hz	Air o/p: <u> </u> dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

 Quarry: McLeod Blast Number: 14-011 Customer P.O. #: Scott Orica Order #: 1747958 Date of Blast: Aug 12 2014 Time of Blast: 10:06am		
	Customer Name: Cornwall Gravel Blaster-in-charge: Bradley Crook (print name) Bench / Face: East Wall Asphalt Latitude (° N): 45.08272 Longitude (° W): 74.74434 Centre of Blast	
Wind Direction: E (from the: W SW S SE E NE N NW) Wind Velocity: 9 kph Temperature: 20 °C Overcast: <input checked="" type="checkbox"/> Rain: <input type="checkbox"/> Partly Cloudy: <input type="checkbox"/> Snow: <input type="checkbox"/> Sunny: <input checked="" type="checkbox"/> Inversion: <input type="checkbox"/> Face Profiled Y or N N Stemming Type / Size: HL3 # Stone Decks: 0 Stemming Laid out Y or N Y Total Length of Stone Decks: 0.0 m Time Stemming Laid Out Day Before Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft) Bit diam: 89 mm (0 ') # Holes: 50 = 1,250.0 m (4,100 ft) Remote Fired Y or N Y Re Drills Y or N Y # redrills 0 Holes Measured Y or N Y		tonnes Blasted: 29,160 te tonnes Invoiced: Burden: 2.7 m 9.00 ft Spacing: 3.4 m 11.00 ft Avg Bench Ht: 25.0 m 82.00 ft Avg Hole Depth: 25.0 m 82.00 ft Collar: 1.4 m 4.60 ft Holes Dewatered: 0 holes Total kg Loaded: 9,383 kg Powder Factor: 0.32 kg/te 0.15#/te 0.87 kg/m³ 1.47#/cy Max. per delay: 185 kg/delay Rock Density: 2.70 g/cc Rows Blasted: 8 rows Bench Length 27.0 m 88.6 ft Blast Width: 16.0 m 52.5 ft Rock Vol. Blasted: 10,800 m³ 14,115 cy

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	33,350	24,300	9,050
Pkgd. & Boosters:			
	Size	kg	
E113	65X400	2	50
E113	75X400	10	250
E113	90X400	0	0
Pentex Boosters	0.450	50	23
Pentex Boosters	0.340	0	0
Pentex Boosters	0.200	51	10
Total explosives(kg):			9,383

Labour & Equipment	Time in	Time Out	Total Hours	
Blaster in Charge	6:00am	11:00pm	5.0	
Helper #1	Pierre	6:00am	10:30am	4.5
Helper #2	Todd	6:00am	10:30am	4.5
Helper #3	Kevin	6:00am	10:30am	4.5
Helper #4				
Helper #5				
MMU # 1	Qm11054	6:00am	8:30am	2.5
MMU # 2				
Total Hrs			21.0	

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	08122012W	25/475	0
7M Handiets	71712HJKL	25/500	0
9M Connectadets	061112HG	9	0
9M Connectadets	061112HG	17	0
9M Connectadets	061112HG	33	0

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		44
25M	Uni Tronic 600		13
30M	Uni Tronic 600		44
25M	Ikon 2		0
400M	Uni Tronic Wire		1

Seis #1: 300M East of Shot	PPV: 3.17 mm/s	@ Freq: 10 Hz	Air o/p: dB
Lat ° N: Long ° W:	(Trigger: 2.00 mm/s)	V / T / L ?	(Trigger: 115 dB)
Seis #2:	PPV: mm/s	@ Freq: Hz	Air o/p: dB
Lat ° N: Long ° W:	(Trigger: 2.00 mm/s)	V / T / L ?	(Trigger: 115 dB)
Seis #3:	PPV: mm/s	@ Freq: Hz	Air o/p: dB
Lat ° N: test Long ° W: test	(Trigger: 2.00 mm/s)	V / T / L ?	(Trigger: 115 dB)
Blast Video Recorded: Y (Yes or No)	Bradley Crook Signature		



Blast Report

Quarry: McLeod
 Blast Number: 14-012
 Customer P.O. #: Scott
 Orica Order #: 1749211
 Date of Blast: Aug 14 2014
 Time of Blast: 12:01pm

Customer Name: <u>Cornwall Gravel</u>				tonnes Blasted: <u>28,645</u> te
Blaster-in-charge: <u>Bradley Crook</u> (print name)				tonnes Invoiced: _____ te
Bench / Face: <u>30' Sump Hole</u>				Burden: <u>2.7</u> m <u>9.00</u> ft
Latitude (° N): <u>45.08272</u> Longitude (° W): <u>74.74434</u>				Spacing: <u>2.7</u> m <u>9.00</u> ft
Centre of Blast				Avg Bench Ht: <u>9.1</u> m <u>30.00</u> ft
Wind Direction: <u>SW</u> (from the: W SW S SE E NE N NW)				Avg Hole Depth: <u>9.1</u> m <u>30.00</u> ft
Wind Velocity: <u>17</u> kph				Collar: <u>1.4</u> m <u>4.60</u> ft
Temperature: <u>14</u> °C				Holes Dewatered: <u>0</u> holes
Overcast:	<input checked="" type="checkbox"/> X	Rain:	<input type="checkbox"/>	Cloud Altitude: <u>975</u> m
Partly Cloudy:	<input type="checkbox"/>	Snow:	<input type="checkbox"/>	Inversion Altitude: _____ m
Sunny:	<input type="checkbox"/>	Inversion:	<input type="checkbox"/>	Boretracked Y or N <u>N</u>
Face Profiled	Y or N <u>N</u>	# Stone Decks:	<u>0</u>	Time Stemming Laid Out <u>6:00am</u>
Stemming Type / Size:	<u>HL3</u>	Total Length of Stone Decks:	<u>0.0</u> m	Bit diam: <u>76</u> mm (<u>0</u> ') # Holes: <u>0</u> = <u>0.0</u> m (<u>0</u> ft)
Stemming Laid out Y or N	<u>Y</u>	Re Drills Y or N <u>Y</u>	# redrills <u>1</u>	Bit diam: <u>89</u> mm (<u>0</u> ') # Holes: <u>156</u> = <u>1,426.6</u> m (<u>4,679</u> ft)
Remote Fired Y or N <u>Y</u>		Holes Measured Y or N <u>Y</u>		Rock Vol. Blasted: <u>10,609</u> m ³ <u>13,866</u> cy

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>33,910</u>	<u>24,380</u>	<u>9,530</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>3</u>	<u>75</u>
E113	<u>75X400</u>	<u>9</u>	<u>225</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>156</u>	<u>53</u>
Pentex Boosters	<u>0.200</u>	<u>28</u>	<u>6</u>
Total explosives(kg):			<u>9,889</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>1:00pm</u>	<u>7.0</u>
Helper #1	<u>Pierre</u>	<u>7:00am</u>	<u>12:30pm</u>
Helper #2	<u>Dana</u>	<u>7:30am</u>	<u>11:30am</u>
Helper #3	<u>Kevin</u>	<u>7:00am</u>	<u>12:30pm</u>
Helper #4			
Helper #5			
MMU # 1	<u>Qm 18</u>	<u>7:30am</u>	<u>11:30am</u>
MMU # 2			
Total Hrs			<u>27.5</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>17</u>
15M	Uni Tronic 600		<u>167</u>
30M	Uni Tronic 600		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>Front Gate</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: _____ Long ° W: _____	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeod
 Blast Number: 14-013
 Customer P.O. #: Scott
 Orica Order #: 1761717
 Date of Blast: Sept 10 2014
 Time of Blast: 12:03pm

Customer Name: <u>Cornwall Gravel</u>		Blaster-in-charge: <u>Bradley Crook</u> (print name)		Centre of Blast	
Bench / Face: <u>East Wall Asphalt</u>		Latitude (° N): <u> </u>		Centre of Blast	
Wind Direction: <u>S</u> (from the: W SW S SE E NE N NW)		Wind Velocity: <u>8</u> kph		Temperature: <u>25</u> °C	
Overcast:	<input type="checkbox"/>	Rain:	<input type="checkbox"/>	Cloud Altitude:	<u> </u> m
Partly Cloudy:	<input type="checkbox"/>	Snow:	<input type="checkbox"/>	Inversion Altitude:	<u> </u> m
Sunny:	<input checked="" type="checkbox"/>	Inversion:	<input type="checkbox"/>	Boretracked Y or N	<u>Y</u>
Face Profiled	Y or N	<u>Y</u>		# Stone Decks:	<u>0</u>
Stemming Type / Size:	<u>HL3</u>		# Stone Decks: <u>0</u> m		
Stemming Laid out Y or N	<u>Y</u>		Total Length of Stone Decks: <u>0.0</u> m		
Time Stemming Laid Out	<u>6:30am</u>				
Bit diam: <u>76</u> mm (<u>0</u> °) # Holes: <u>6</u>	= <u>118.9</u> m (<u>390</u> ft)				
Bit diam: <u>89</u> mm (<u>0</u> °) # Holes: <u>50</u>	= <u>990.9</u> m (<u>3,250</u> ft)				
Remote Fired Y or N	<u>Y</u>	Re Drills Y or N	<u>Y</u>	# redrills <u>1</u>	Holes Measured Y or N <u>Y</u>

tonnes Blasted: 27,268 te
 tonnes Invoiced: te
 Burden: 2.7 m 9.00 ft
 Spacing: 3.4 m 11.00 ft
 Avg Bench Ht: 19.8 m 65.00 ft
 Avg Hole Depth: 19.8 m 65.00 ft
 Collar: 1.4 m 4.60 ft
 Holes Dewatered: 0 holes
 Total kg Loaded: 7,731 kg
 Powder Factor: 0.28 kg/te 0.13 #/te
0.77 kg/m³ 1.29 #/cy
 Max. per delay: 156 kg/delay
 Rock Density: 2.70 g/cc
 Rows Blasted: 4 rows
 Bench Length 44.0 m 144.3 ft
 Blast Width: 11.6 m 38.0 ft
 Rock Vol. Blasted: 10,099 m³ 13,199 cy

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>35,010</u>	<u>27,660</u>	<u>7,350</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>9</u>	<u>225</u>
E113	<u>75X400</u>	<u>5</u>	<u>125</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>56</u>	<u>19</u>
Pentex Boosters	<u>0.200</u>	<u>62</u>	<u>12</u>
Total explosives(kg):			<u>7,731</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>2:00pm</u>	<u>8.0</u>
Helper #1			
Helper #2	<u>7:00am</u>	<u>12:30pm</u>	<u>5.5</u>
Helper #3	<u>Todd</u>	<u>7:00am</u>	<u>1:30pm</u>
Helper #4			
Helper #5			
MMU # 1	<u>QM 9</u>	<u>7:30am</u>	<u>11:30am</u>
MMU # 2			
Total Hrs			<u>24.0</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>54</u>
15M	Uni Tronic 600		<u>4</u>
25M	Uni Tronic 600		<u>60</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>300M East of Shot</u>	PPV: <u>3.05</u> mm/s	@ Freq: <u>18</u> Hz	Air o/p: <u>118</u> dB
Lat ° N: <u> </u> Long ° W: <u> </u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ? <u> </u>	(Trigger: <u>115</u> dB)
Seis #2: <u> </u>	PPV: <u> </u> mm/s	@ Freq: <u> </u> Hz	Air o/p: <u> </u> dB
Lat ° N: <u> </u> Long ° W: <u> </u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ? <u> </u>	(Trigger: <u>115</u> dB)
Seis #3: <u> </u>	PPV: <u> </u> mm/s	@ Freq: <u> </u> Hz	Air o/p: <u> </u> dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ? <u> </u>	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeod
 Blast Number: 14-014
 Customer P.O. #: Scott
 Orica Order #: 1769695
 Date of Blast: Sept 26 2014
 Time of Blast: 12:01pm

Customer Name: <u>Cornwall Gravel</u>			
Blaster-in-charge: <u>Bradley Crook</u> (print name)			
Bench / Face: <u>Middle Bench Ashalt 48'</u>			
Latitude (° N): <u>45.08276</u> <u>74.74707</u>			
Centre of Blast		Centre of Blast	
Wind Direction: <u>S</u> (from the: W SW S SE E NE N NW)			
Wind Velocity: <u>7</u> kph		Temperature: <u>24</u> °C	
Overcast:	<input type="checkbox"/>	Rain:	<input type="checkbox"/>
Partly Cloudy:	<input type="checkbox"/>	Snow:	<input type="checkbox"/>
Sunny:	<input checked="" type="checkbox"/>	Inversion:	<input type="checkbox"/>
Face Profiled	Y or N	N	
Stemming Type / Size:	<u>HL3</u>		
Stemming Laid out Y or N	<u>Y</u>	# Stone Decks:	<u>0</u>
Time Stemming Laid Out	<u>6:00am</u>		
Bit diam:	<u>76</u> mm (<u>0</u> ') # Holes:	<u>0</u>	= <u>0.0</u> m (<u>0</u> ft)
Bit diam:	<u>89</u> mm (<u>0</u> ') # Holes:	<u>80</u>	<u>1,170.6</u> m (<u>3,840</u> ft)
Remote Fired Y or N	<u>Y</u>	Re Drills Y or N	<u>Y</u>
	# redrills	<u>0</u>	Holes Measured Y or N <u>Y</u>
tonnes Blasted: <u>28,162</u> te			
tonnes Invoiced: _____ te			
Burden: <u>2.7</u> m <u>9.00</u> ft			
Spacing: <u>3.4</u> m <u>11.00</u> ft			
Avg Bench Ht: <u>14.6</u> m <u>48.00</u> ft			
Avg Hole Depth: <u>14.6</u> m <u>48.00</u> ft			
Collar: <u>1.4</u> m <u>4.60</u> ft			
Holes Dewatered: <u>0</u> holes			
Total kg Loaded: <u>8,188</u> kg			
Powder Factor: <u>0.29</u> kg/te <u>0.13</u> #/te			
<u>0.79</u> kg/m ³ <u>1.32</u> #/cy			
Max. per delay: <u>105</u> kg/delay			
Rock Density: <u>2.70</u> g/cc			
Rows Blasted: <u>5</u> rows			
Bench Length <u>50.3</u> m <u>165.0</u> ft			
Blast Width: <u>14.2</u> m <u>46.5</u> ft			
Rock Vol. Blasted: <u>10,430</u> m ³ <u>13,632</u> cy			

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>35,170</u>	<u>27,200</u>	<u>7,970</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>5</u>	<u>125</u>
E113	<u>75X400</u>	<u>2</u>	<u>50</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>80</u>	<u>27</u>
Pentex Boosters	<u>0.200</u>	<u>80</u>	<u>16</u>
Total explosives(kg):			<u>8,188</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>1:00pm</u>	<u>7.0</u>
Helper #1	<u>7:00am</u>	<u>12:30pm</u>	<u>5.5</u>
Helper #2	<u>7:00am</u>	<u>12:30pm</u>	<u>5.5</u>
Helper #3	<u>7:00am</u>	<u>12:30pm</u>	<u>5.5</u>
Helper #4			
Helper #5			
MMU # 1	<u>QM 9</u>	<u>7:00am</u>	<u>10:30am</u>
MMU # 2			
Total Hrs			<u>27.0</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>80</u>
20M	Uni Tronic 600		<u>80</u>
25M	Uni Tronic 600		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>300M East of Shot</u>	PPV: <u>2.67</u> mm/s	@ Freq: <u>22</u> Hz	Air o/p: <u>122</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeod
 Blast Number: 14-015
 Customer P.O. #: Scott
 Orica Order #: 1774345
 Date of Blast: Oct 7 2014
 Time of Blast: 2:02pm

Customer Name: <u>Cornwall Gravel</u> Blaster-in-charge: <u>Bradley Crook</u> (print name) Bench / Face: <u>30' Lower Bench</u> Latitude (° N): <u>45.07894</u> <u>74.74780</u> Centre of Blast Centre of Blast		tonnes Blasted: <u>42,469</u> te tonnes Invoiced: _____ te Burden: <u>2.7</u> m <u>9.00</u> ft Spacing: <u>3.4</u> m <u>11.00</u> ft Avg Bench Ht: <u>9.1</u> m <u>30.00</u> ft Avg Hole Depth: <u>9.1</u> m <u>30.00</u> ft Collar: <u>1.4</u> m <u>4.60</u> ft Holes Dewatered: <u>0</u> holes Total kg Loaded: <u>11,837</u> kg Powder Factor: <u>0.28</u> kg/te <u>0.13</u> #/te <u>0.75</u> kg/m ³ <u>1.27</u> #/cy Max. per delay: <u>54</u> kg/delay Rock Density: <u>2.70</u> g/cc Rows Blasted: <u>9</u> rows Bench Length <u>90.5</u> m <u>296.9</u> ft Blast Width: <u>19.0</u> m <u>62.3</u> ft Rock Vol. Blasted: <u>15,729</u> m ³ <u>20,557</u> cy	
Wind Direction: <u>S</u> (from the: W SW S SE E NE N NW) Wind Velocity: <u>15</u> kph Temperature: <u>14</u> °C Overcast: <input type="checkbox"/> Rain: <input type="checkbox"/> Partly Cloudy: <input checked="" type="checkbox"/> Snow: <input type="checkbox"/> Sunny: <input checked="" type="checkbox"/> Inversion: <input type="checkbox"/> Face Profiled Y or N <u>N</u> Boretracked Y or N <u>N</u> Stemming Type / Size: <u>HL3</u> # Stone Decks: <u>0</u> Stemming Laid out Y or N <u>Y</u> Total Length of Stone Decks: <u>0.0</u> m Time Stemming Laid Out <u>6:00am</u> Bit diam: <u>76</u> mm (<u>0</u> ') # Holes: <u>0</u> = <u>0.0</u> m (<u>0</u> ft) Bit diam: <u>89</u> mm (<u>0</u> ') # Holes: <u>194</u> <u>1,774.1</u> m (<u>5,819</u> ft) Remote Fired Y or N <u>Y</u> Re Drills Y or N <u>Y</u> # redrills <u>0</u> Holes Measured Y or N <u>Y</u>			

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>34,080</u>	<u>22,560</u>	<u>11,520</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>3</u>	<u>75</u>
E113	<u>75X400</u>	<u>7</u>	<u>175</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>196</u>	<u>67</u>
Pentex Boosters	<u>0.200</u>	<u>2</u>	<u>0</u>
Total explosives(kg):			<u>11,837</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>3:00pm</u>	<u>9.0</u>
Helper #1	<u>7:00am</u>	<u>2:00pm</u>	<u>7.0</u>
Helper #2	<u>7:00am</u>	<u>2:00pm</u>	<u>7.0</u>
Helper #3	<u>7:00am</u>	<u>2:30pm</u>	<u>7.5</u>
Helper #4	<u>7:00am</u>	<u>1:30pm</u>	<u>6.5</u>
Helper #5			
MMU # 1	<u>QM 18</u>	<u>7:00am</u>	<u>1:30pm</u>
MMU # 2			
Total Hrs			<u>43.5</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>3</u>
15M	Uni Tronic 600		<u>194</u>
25M	Uni Tronic 600		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>Front Gate</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: <u> </u>	PPV: <u> </u> mm/s	@ Freq: <u> </u> Hz	Air o/p: <u> </u> dB
Lat ° N: <u>44*49.204</u> Long ° W: <u>75*19.730</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: <u> </u>	PPV: <u> </u> mm/s	@ Freq: <u> </u> Hz	Air o/p: <u> </u> dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeod
 Blast Number: 14-016
 Customer P.O. #: Scott
 Orica Order #: 1781956
 Date of Blast: Oct 23 2014
 Time of Blast: 12:37pm

Customer Name: <u>Cornwall Gravel</u>				tonnes Blasted: <u>29,664</u> te
Blaster-in-charge: <u>Bradley Crook</u> (print name)				tonnes Invoiced: _____ te
Bench / Face: <u>30' Bottom West Wall</u>				Burden: <u>2.7</u> m <u>9.00</u> ft
Latitude (° N): <u>45.07802</u> <u>74.74717</u>				Spacing: <u>3.0</u> m <u>10.00</u> ft
Centre of Blast				Avg Bench Ht: <u>9.1</u> m <u>30.00</u> ft
Wind Direction: <u>NE</u> (from the: W SW S SE E NE N NW)				Avg Hole Depth: <u>9.1</u> m <u>30.00</u> ft
Wind Velocity: <u>18</u> kph				Collar: <u>1.4</u> m <u>4.60</u> ft
Temperature: <u>9</u> °C				Holes Dewatered: <u>0</u> holes
Overcast:	<input checked="" type="checkbox"/> X	Rain:	<input type="checkbox"/>	Cloud Altitude: <u>1,400</u> m
Partly Cloudy:	<input type="checkbox"/>	Snow:	<input type="checkbox"/>	Inversion Altitude: _____ m
Sunny:	<input type="checkbox"/>	Inversion:	<input type="checkbox"/>	Boretracked Y or N <u>N</u>
Face Profiled	Y or N <u>N</u>	# Stone Decks:	<u>0</u>	Time Stemming Laid Out <u>6:00am</u>
Stemming Type / Size:	<u>HL3</u>	Total Length of Stone Decks:	<u>0.0</u> m	Bit diam: <u>76</u> mm (<u>0</u> ') # Holes: <u>0</u> = <u>0.0</u> m (<u>0</u> ft)
Stemming Laid out Y or N	<u>Y</u>	Re Drills Y or N <u>N</u>	# redrills <u>0</u>	Bit diam: <u>89</u> mm (<u>0</u> ') # Holes: <u>144</u> = <u>1,317.0</u> m (<u>4,320</u> ft)
Remote Fired Y or N	<u>Y</u>	Holes Measured Y or N <u>N</u>		Rock Vol. Blasted: <u>10,986</u> m ³ <u>14,359</u> cy

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>31,090</u>	<u>23,160</u>	<u>7,930</u>
Pkgd. & Boosters: Size kg			
E113	<u>65X400</u>	<u>8</u>	<u>200</u>
E113	<u>75X400</u>	<u>2</u>	<u>50</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>146</u>	<u>50</u>
Pentex Boosters	<u>0.200</u>	<u>0</u>	<u>0</u>
Total explosives(kg):			<u>8,230</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>3:30pm</u>	<u>9.5</u>
Helper #1 Kevin	<u>7:00am</u>	<u>1:00pm</u>	<u>6.0</u>
Helper #2			
Helper #3 Todd	<u>7:00am</u>	<u>3:00pm</u>	<u>8.0</u>
Helper #4			
Helper #5			
MMU # 1 QM 14	<u>7:30am</u>	<u>11:30am</u>	<u>4.0</u>
MMU # 2			
Total Hrs			<u>27.5</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>2</u>
15M	Uni Tronic 600		<u>144</u>
25M	Uni Tronic 600		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>Front Gate</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: <u>44*49.204</u>	PPV: <u>mm/s</u>	@ Freq: <u>Hz</u>	Air o/p: <u>dB</u>
Lat ° N: <u>44*49.204</u> Long ° W: <u>75*19.730</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: <u>test</u>	PPV: <u>mm/s</u>	@ Freq: <u>Hz</u>	Air o/p: <u>dB</u>
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeods
 Blast Number: 14-017
 Customer P.O. #: Scott
 Orica Order #: 178263
 Date of Blast: Oct 27 2014
 Time of Blast: 12:02pm

Customer Name: <u>Cornwall Gravel</u>			
Blaster-in-charge: <u>Bradley Crook</u> (print name)			
Bench / Face: <u>North East Concrete</u>			
Latitude (° N): <u>45.08419</u> <u>74.74536</u>			
Centre of Blast		Centre of Blast	
Wind Direction: <u>W</u> (from the: W SW S SE E NE N NW)			
Wind Velocity: <u>15</u> kph		Temperature: <u>10</u> °C	
Overcast:	<input type="checkbox"/>	Rain:	<input type="checkbox"/>
Partly Cloudy:	<input checked="" type="checkbox"/>	Snow:	<input type="checkbox"/>
Sunny:	<input checked="" type="checkbox"/>	Inversion:	<input type="checkbox"/>
Face Profiled	Y or N	N	
Stemming Type / Size:	<u>HL3</u>	# Stone Decks:	<u>0</u>
Stemming Laid out Y or N	<u>Y</u>	Total Length of Stone Decks:	<u>0.0</u> m
Time Stemming Laid Out	<u>6:00am</u>		
Bit diam:	<u>76</u> mm (<u>0</u> ') # Holes:	<u>0</u>	= <u>0.0</u> m (<u>0</u> ft)
Bit diam:	<u>89</u> mm (<u>0</u> ') # Holes:	<u>75</u>	<u>1,065.0</u> m (<u>3,493</u> ft)
Remote Fired Y or N	<input checked="" type="checkbox"/>		
Re Drills	<u>Y</u> or <u>N</u>	# redrills	<u>0</u>
Holes Measured		Y or N	<input checked="" type="checkbox"/>

tonnes Blasted: 23,188 te
 tonnes Invoiced: _____ te
 Burden: 2.7 m 9.00 ft
 Spacing: 3.0 m 10.00 ft
 Avg Bench Ht: 14.2 m 46.58 ft
 Avg Hole Depth: 14.2 m 46.58 ft
 Collar: 1.4 m 4.60 ft
 Holes Dewatered: 0 holes
 Total kg Loaded: 7,916 kg
 Powder Factor: 0.34 kg/te 0.16 #/te
0.92 kg/m³ 1.55 #/cy
 Max. per delay: 114 kg/delay
 Rock Density: 2.70 g/cc
 Rows Blasted: 5 rows
 Bench Length 42.7 m 140.0 ft
 Blast Width: 14.2 m 46.5 ft
 Rock Vol. Blasted: 8,588 m³ 11,224 cy

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>34,800</u>	<u>27,100</u>	<u>7,700</u>
Pkgd. & Boosters:			
Size			
E113	<u>65X400</u>	<u>0</u>	<u>0</u>
E113	<u>75X400</u>	<u>7</u>	<u>175</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>75</u>	<u>26</u>
Pentex Boosters	<u>0.200</u>	<u>75</u>	<u>15</u>
Total explosives(kg):			<u>7,916</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>2:00pm</u>	<u>8.0</u>
Helper #1	<u>Pierre</u>	<u>7:00am</u>	<u>12:30pm</u>
Helper #2	<u>Joel</u>	<u>7:00am</u>	<u>12:30pm</u>
Helper #3	<u>Todd</u>	<u>7:00am</u>	<u>12:30pm</u>
Helper #4			
Helper #5			
MMU # 1	<u>QM 9</u>	<u>7:30am</u>	<u>11:30am</u>
MMU # 2			
Total Hrs			<u>28.5</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>74</u>
20M	Uni Tronic 600		<u>75</u>
25M	Uni Tronic 600		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>300M East of Shot</u>	PPV: <u>2.41</u> mm/s	@ Freq: <u>22</u> Hz	Air o/p: <u>112</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: <u></u>	PPV: <u></u> mm/s	@ Freq: <u></u> Hz	Air o/p: <u></u> dB
Lat ° N: <u>44*49.204</u> Long ° W: <u>75*19.730</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: <u></u>	PPV: <u></u> mm/s	@ Freq: <u></u> Hz	Air o/p: <u></u> dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeods
 Blast Number: 14-018
 Customer P.O. #: Scott
 Orica Order #: 1784739
 Date of Blast: Oct 29 2014
 Time of Blast: 12:00pm

Customer Name: <u>Cornwall Gravel</u>			
Blaster-in-charge: <u>Bradley Crook</u> (print name)			
Bench / Face: <u>South East 30' LB</u>			
Latitude (° N): <u>45.07848</u> <u>74.74617</u>			
Centre of Blast		Centre of Blast	
Wind Direction: <u>W</u> (from the: W SW S SE E NE N NW)			
Wind Velocity: <u>25</u> kph		Temperature: <u>13</u> °C	
Overcast:	<input type="checkbox"/>	Rain:	<input type="checkbox"/>
Partly Cloudy:	<input checked="" type="checkbox"/>	Snow:	<input type="checkbox"/>
Sunny:	<input checked="" type="checkbox"/>	Inversion:	<input type="checkbox"/>
Face Profiled	Y or N	N	
Stemming Type / Size:	<u>HL3</u>	# Stone Decks:	<u>0</u>
Stemming Laid out Y or N	<u>Y</u>	Total Length of Stone Decks:	<u>0.0</u> m
Time Stemming Laid Out	<u>6:00am</u>		
Bit diam:	<u>76</u> mm (<u>0</u> ') # Holes:	<u>0</u>	= <u>0.0</u> m (<u>0</u> ft)
Bit diam:	<u>89</u> mm (<u>0</u> ') # Holes:	<u>121</u>	<u>1,106.7</u> m (<u>3,630</u> ft)
Remote Fired Y or N	<input checked="" type="checkbox"/>		
Re Drills Y or N	<input type="checkbox"/>	<u>N</u>	# redrills <u>0</u> Holes Measured Y or N <input type="checkbox"/>

tonnes Blasted: 23,851 te
 tonnes Invoiced: _____ te
 Burden: 2.7 m 9.00 ft
 Spacing: 3.0 m 10.00 ft
 Avg Bench Ht: 9.1 m 30.00 ft
 Avg Hole Depth: 9.1 m 30.00 ft
 Collar: 1.4 m 4.60 ft
 Holes Dewatered: 0 holes
 Total kg Loaded: 7,056 kg
 Powder Factor: 0.30 kg/te 0.13 #/te
0.80 kg/m³ 1.35 #/cy
 Max. per delay: 70 kg/delay
 Rock Density: 2.70 g/cc
 Rows Blasted: 4 rows
 Bench Length 84.5 m 277.2 ft
 Blast Width: 11.4 m 37.5 ft
 Rock Vol. Blasted: 8,834 m³ 11,545 cy

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>34,760</u>	<u>27,970</u>	<u>6,790</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>7</u>	<u>175</u>
E113	<u>75X400</u>	<u>2</u>	<u>50</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>121</u>	<u>41</u>
Pentex Boosters	<u>0.200</u>	<u>0</u>	<u>0</u>
Total explosives(kg):			<u>7,056</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>2:00pm</u>	<u>8.0</u>
Helper #1	<u>Dana</u>	<u>7:00am</u>	<u>2:00pm</u>
Helper #2	<u>Kevin</u>	<u>7:00am</u>	<u>2:00pm</u>
Helper #3	<u>Todd</u>	<u>7:00am</u>	<u>12:30pm</u>
Helper #4	<u>Darcy</u>		
Helper #5			
MMU # 1	<u>QM 9</u>	<u>7:30am</u>	<u>11:00am</u>
MMU # 2			
Total Hrs			<u>31.0</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>0</u>
15M	Uni Tronic 600		<u>121</u>
25M	Uni Tronic 600		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>Front Gate</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: <u> </u>	PPV: <u> </u> mm/s	@ Freq: <u> </u> Hz	Air o/p: <u> </u> dB
Lat ° N: <u>44*49.204</u> Long ° W: <u>75*19.730</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: <u> </u>	PPV: <u> </u> mm/s	@ Freq: <u> </u> Hz	Air o/p: <u> </u> dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeods
 Blast Number: 14-019
 Customer P.O. #: Scott
 Orica Order #: 1785587
 Date of Blast: Oct 30 2014
 Time of Blast: 12:00pm

Customer Name: <u>Cornwall Gravel</u>					
Blaster-in-charge: <u>Bradley Crook</u> (print name)					
Bench / Face: <u>27' East Hole</u>					
Latitude (° N): <u>45.07802</u> <u>74.74717</u>					
Centre of Blast Centre of Blast					
Wind Direction: <u>W</u> (from the: W SW S SE E NE N NW)					
Wind Velocity: <u>15</u> kph Temperature: <u>9</u> °C					
Overcast:	<input type="checkbox"/>	Rain:	<input type="checkbox"/>	Cloud Altitude:	<input type="checkbox"/> m
Partly Cloudy:	<input checked="" type="checkbox"/>	Snow:	<input type="checkbox"/>	Inversion Altitude:	<input type="checkbox"/> m
Sunny:	<input type="checkbox"/>	Inversion:	<input type="checkbox"/>	Boretracked Y or N	<input type="checkbox"/> N
Face Profiled	Y or N	<u>N</u>	# Stone Decks:	<u>0</u>	
Stemming Type / Size:	<u>HL3</u>	# Stone Decks:	<u>0</u>		
Stemming Laid out Y or N	<u>Y</u>	Total Length of Stone Decks:	<u>0.0</u> m		
Time Stemming Laid Out	<u>6:00am</u>				
Bit diam:	<u>76</u> mm (<u>0</u> ') # Holes:	<u>0</u>	=	<u>0.0</u> m (<u>0</u> ft)	
Bit diam:	<u>89</u> mm (<u>0</u> ') # Holes:	<u>189</u>		<u>1,555.8</u> m (<u>5,103</u> ft)	
Remote Fired Y or N	<input type="checkbox"/> Y	# redrills	<u>0</u>	Holes Measured	<input type="checkbox"/> Y
Re Drills	<input type="checkbox"/> Y or N	<input type="checkbox"/> N			
tonnes Blasted: <u>32,124</u> te tonnes Invoiced: <input type="checkbox"/> te					
Burden: <u>2.7</u> m <u>9.00</u> ft Spacing: <u>2.7</u> m <u>9.00</u> ft Avg Bench Ht: <u>8.2</u> m <u>27.01</u> ft Avg Hole Depth: <u>8.2</u> m <u>27.00</u> ft Collar: <u>1.4</u> m <u>4.60</u> ft Holes Dewatered: <u>0</u> holes Total kg Loaded: <u>9,535</u> kg Powder Factor: <u>0.30</u> kg/te <u>0.13</u> #/te <u>0.80</u> kg/m ³ <u>1.35</u> #/cy Max. per delay: <u>53</u> kg/delay Rock Density: <u>2.70</u> g/cc Rows Blasted: <u>6</u> rows Bench Length <u>85.5</u> m <u>280.4</u> ft Blast Width: <u>16.9</u> m <u>55.4</u> ft Rock Vol. Blasted: <u>11,898</u> m ³ <u>15,550</u> cy					

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>34,900</u>	<u>25,780</u>	<u>9,120</u>
Pkgd. & Boosters: Size kg			
E113	<u>65X400</u>	<u>10</u>	<u>250</u>
E113	<u>75X400</u>	<u>4</u>	<u>100</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>189</u>	<u>64</u>
Pentex Boosters	<u>0.200</u>	<u>2</u>	<u>0</u>
Total explosives(kg): <u>9,535</u>			

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>1:00pm</u>	<u>7.0</u>
Helper #1	<u>7:00am</u>	<u>12:00pm</u>	<u>5.0</u>
Helper #2	<u>7:00am</u>	<u>12:00pm</u>	<u>5.0</u>
Helper #3	<u>7:00am</u>	<u>12:30pm</u>	<u>5.5</u>
Helper #4			
Helper #5			
MMU # 1	<u>QM 1105</u>	<u>7:00am</u>	<u>12:00pm</u>
MMU # 2			
Total Hrs			<u>27.5</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>2</u>
15M	Uni Tronic 600		<u>189</u>
25M	Uni Tronic 600		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>Front Gate</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2:	PPV: <u> </u> mm/s	@ Freq: <u> </u> Hz	Air o/p: <u> </u> dB
Lat ° N: <u>44*49.204</u> Long ° W: <u>75*19.730</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3:	PPV: <u> </u> mm/s	@ Freq: <u> </u> Hz	Air o/p: <u> </u> dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeods
 Blast Number: 14-020
 Customer P.O. #: Scott
 Orica Order #: 1790813
 Date of Blast: Nov 11 2014
 Time of Blast: 12:03pm

Customer Name: <u>Cornwall Gravel</u>			
Blaster-in-charge: <u>Bradley Crook</u> (print name)			
Bench / Face: <u>27' East Hole</u>			
Latitude (° N): <u>45.08087</u> <u>74.74399</u>			
Centre of Blast		Centre of Blast	
Wind Direction: <u>NE</u> (from the: W SW S SE E NE N NW)			
Wind Velocity: <u>12</u> kph		Temperature: <u>10</u> °C	
Overcast:	<input type="checkbox"/>	Rain:	<input type="checkbox"/>
Partly Cloudy:	<input type="checkbox"/>	Snow:	<input type="checkbox"/>
Sunny:	<input checked="" type="checkbox"/>	Inversion:	<input type="checkbox"/>
Face Profiled	Y or N	N	
Stemming Type / Size:	<u>HL3</u>		
Stemming Laid out Y or N	<u>Y</u>	# Stone Decks:	<u>0</u>
Time Stemming Laid Out	<u>Day Before</u>		
Bit diam: <u>76</u> mm (<u>0</u> ') # Holes: <u>0</u> = <u>0.0</u> m (<u>0</u> ft)			
Bit diam: <u>89</u> mm (<u>0</u> ') # Holes: <u>177</u> = <u>1,510.9</u> m (<u>4,956</u> ft)			
Remote Fired Y or N	<u>Y</u>	# redrills	<u>0</u>
Re Drills	<u>Y or N</u>	Holes Measured	<u>Y or N</u>

tonnes Blasted: 30,691 te
 tonnes Invoiced: _____ te
 Burden: 2.7 m 9.00 ft
 Spacing: 2.7 m 9.00 ft
 Avg Bench Ht: 8.5 m 28.00 ft
 Avg Hole Depth: 8.5 m 28.00 ft
 Collar: 1.4 m 4.60 ft
 Holes Dewatered: 0 holes
 Total kg Loaded: 8,611 kg
 Powder Factor: 0.28 kg/te 0.13 #/te
0.76 kg/m³ 1.28 #/cy
 Max. per delay: 56 kg/delay
 Rock Density: 2.70 g/cc
 Rows Blasted: 8 rows
 Bench Length 60.8 m 199.4 ft
 Blast Width: 21.9 m 71.8 ft
 Rock Vol. Blasted: 11,367 m³ 14,856 cy

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>32,920</u>	<u>24,470</u>	<u>8,450</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>4</u>	<u>100</u>
E113	<u>75X400</u>	<u>0</u>	<u>0</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>178</u>	<u>61</u>
Pentex Boosters	<u>0.200</u>	<u>0</u>	<u>0</u>
Total explosives(kg):			<u>8,611</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>2:00pm</u>	<u>8.0</u>
Helper #1	<u>7:00am</u>	<u>2:00pm</u>	<u>7.0</u>
Helper #2	<u>7:00am</u>	<u>12:00pm</u>	<u>5.0</u>
Helper #3	<u>7:00am</u>	<u>12:00pm</u>	<u>5.0</u>
Helper #4			
Helper #5			
MMU # 1	<u>QM 1105</u>	<u>7:30am</u>	<u>12:00pm</u>
MMU # 2			
Total Hrs			<u>29.5</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>0</u>
20M	Uni Tronic 600		<u>178</u>
25M	Uni Tronic 600		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>Front Gate</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2:	PPV: <u> </u> mm/s	@ Freq: <u> </u> Hz	Air o/p: <u> </u> dB
Lat ° N: <u>44*49.204</u> Long ° W: <u>75*19.730</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3:	PPV: <u> </u> mm/s	@ Freq: <u> </u> Hz	Air o/p: <u> </u> dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeods
 Blast Number: 14-021
 Customer P.O. #: Scott
 Orica Order #: 1791712
 Date of Blast: Nov 12 2014
 Time of Blast: 10:27am

Customer Name: <u>Cornwall Gravel</u>			
Blaster-in-charge: <u>Bradley Crook</u> (print name)			
Bench / Face: <u>Asphalt</u>			
Latitude (° N): <u>45.08269</u> <u>74.74717</u>			
Centre of Blast		Centre of Blast	
Wind Direction: <u>SW</u> (from the: W SW S SE E NE N NW)			
Wind Velocity: <u>32</u> kph		Temperature: <u>6</u> °C	
Overcast:	<input type="checkbox"/>	Rain:	<input type="checkbox"/>
Partly Cloudy:	<input checked="" type="checkbox"/>	Snow:	<input type="checkbox"/>
Sunny:	<input checked="" type="checkbox"/>	Inversion:	<input type="checkbox"/>
Face Profiled	Y or N	N	
Stemming Type / Size:	<u>HL3</u>	# Stone Decks:	<u>0</u>
Stemming Laid out Y or N	<u>Y</u>	Total Length of Stone Decks:	<u>0.0</u> m
Time Stemming Laid Out	<u>Dat Before</u>		
Bit diam: <u>76</u> mm (<u>0</u> ') # Holes: <u>0</u> = <u>0.0</u> m (<u>0</u> ft)			
Bit diam: <u>89</u> mm (<u>0</u> ') # Holes: <u>79</u> = <u>1,156.0</u> m (<u>3,792</u> ft)			
Remote Fired Y or N	<input checked="" type="checkbox"/>	Re Drills Y or N	<input type="checkbox"/>
		# redrills <u>0</u>	Holes Measured Y or N <u>Y</u>
tonnes Blasted: <u>28,162</u> te			
tonnes Invoiced: _____ te			
Burden: <u>2.7</u> m <u>9.00</u> ft			
Spacing: <u>3.4</u> m <u>11.00</u> ft			
Avg Bench Ht: <u>14.6</u> m <u>48.00</u> ft			
Avg Hole Depth: <u>14.6</u> m <u>48.00</u> ft			
Collar: <u>1.4</u> m <u>4.60</u> ft			
Holes Dewatered: <u>0</u> holes			
Total kg Loaded: <u>8,182</u> kg			
Powder Factor: <u>0.29</u> kg/te <u>0.13</u> #/te			
<u>0.78</u> kg/m ³ <u>1.32</u> #/cy			
Max. per delay: <u>105</u> kg/delay			
Rock Density: <u>2.70</u> g/cc			
Rows Blasted: <u>5</u> rows			
Bench Length <u>50.3</u> m <u>165.0</u> ft			
Blast Width: <u>14.2</u> m <u>46.5</u> ft			
Rock Vol. Blasted: <u>10,430</u> m ³ <u>13,632</u> cy			

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>34,650</u>	<u>26,620</u>	<u>8,030</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>4</u>	<u>100</u>
E113	<u>75X400</u>	<u>1</u>	<u>25</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>80</u>	<u>27</u>
Pentex Boosters	<u>0.200</u>	<u>79</u>	<u>16</u>
Total explosives(kg):			<u>8,198</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>12:30pm</u>	<u>6.5</u>
Helper #1	<u>7:00am</u>	<u>10:30am</u>	<u>3.5</u>
Helper #2			
Helper #3	<u>Dana</u>	<u>7:00am</u>	<u>10:30am</u>
Helper #4			
Helper #5			
MMU # 1	<u>QM 1105</u>	<u>7:00am</u>	<u>10:00am</u>
MMU # 2			
Total Hrs			<u>16.5</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>79</u>
20M	Uni Tronic 600		<u>79</u>
25M	Uni Tronic 600		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>East of Shot 400M</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>44*49.204</u> Long ° W: <u>75*19.730</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Blast Report

Quarry: McLeods
 Blast Number: 14-022
 Customer P.O. #: Scott
 Orica Order #: 1793107
 Date of Blast: Nov 18 2014
 Time of Blast: 12:57pm

Customer Name: <u>Cornwall Gravel</u>	Blaster-in-charge: <u>Bradley Crook</u> (print name)	Bench / Face: <u>30' Lower Bench</u>	Latitude (° N): <u>45.07792</u> <u>74.74660</u>	Centre of Blast
Wind Direction: <u>SW</u> (from the: W SW S SE E NE N NW)	Wind Velocity: <u>63</u> kph	Temperature: <u>-2</u> °C		
Overcast: <input type="checkbox"/>	Rain: <input type="checkbox"/>	Cloud Altitude: _____ m		
Partly Cloudy: <input type="checkbox"/>	Snow: <input type="checkbox"/>	Inversion Altitude: _____ m		
Sunny: <input checked="" type="checkbox"/>	Inversion: <input type="checkbox"/>	Boretracked Y or N <u>N</u>	# Stone Decks: <u>0</u>	Total Length of Stone Decks: <u>0.0</u> m
Face Profiled Y or N <u>N</u>	Stemming Type / Size: <u>HL3</u>	Stemming Laid out Y or N <u>Y</u>	Time Stemming Laid Out <u>6:00am</u>	
Bit diam: <u>76</u> mm (<u>0</u> ') # Holes: <u>0</u> = <u>0.0</u> m (<u>0</u> ft)	Bit diam: <u>89</u> mm (<u>0</u> ') # Holes: <u>94</u> = <u>859.8</u> m (<u>2,820</u> ft)	Remote Fired Y or N <u>Y</u>	Re Drills Y or N <u>N</u>	# redrills <u>0</u> Holes Measured Y or N <u>Y</u>
Holes Dewatered: <u>0</u> holes				
Total kg Loaded: <u>5,834</u> kg				
Powder Factor: <u>0.29</u> kg/te <u>0.13</u> #/te				
<u>0.79</u> kg/m ³ <u>1.33</u> #/cy				
Max. per delay: <u>68</u> kg/delay				
Rock Density: <u>2.70</u> g/cc				
Rows Blasted: <u>5</u> rows				
Bench Length <u>64.2</u> m <u>210.4</u> ft				
Blast Width: <u>12.6</u> m <u>41.3</u> ft				
Rock Vol. Blasted: <u>7,395</u> m ³ <u>9,664</u> cy				

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>33,200</u>	<u>27,700</u>	<u>5,500</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>2</u>	<u>50</u>
E113	<u>75X400</u>	<u>5</u>	<u>125</u>
Fortel Elite	<u>65X400</u>	<u>5</u>	<u>125</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>94</u>	<u>32</u>
Pentex Boosters	<u>0.200</u>	<u>11</u>	<u>2</u>
Total explosives(kg):			<u>5,834</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>2:30pm</u>	<u>8.5</u>
Helper #1	<u>7:00am</u>	<u>2:30pm</u>	<u>7.5</u>
Helper #2	<u>7:00am</u>	<u>1:00pm</u>	<u>6.0</u>
Helper #3	<u>7:00am</u>	<u>1:00pm</u>	<u>6.0</u>
Helper #4	<u>6:00am</u>	<u>2:30pm</u>	<u>8.5</u>
Helper #5			
MMU # 1	<u>QM 1105</u>	<u>7:30am</u>	<u>12:00pm</u>
MMU # 2			
Total Hrs			<u>41.0</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>8</u>
15M	Uni Tronic 600		<u>97</u>
25M	Uni Tronic 600		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>Front Gate</u>	PPV: <u>0.00</u> mm/s	@ Freq: <u>0</u> Hz	Air o/p: <u>0</u> dB
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: <u>44*49.204</u>	PPV: <u>mm/s</u>	@ Freq: <u>Hz</u>	Air o/p: <u>dB</u>
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: <u>test</u>	PPV: <u>mm/s</u>	@ Freq: <u>Hz</u>	Air o/p: <u>dB</u>
Lat ° N: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)	Orica Blaster-in-charge: <u>Bradley Crook</u>		
	Signature		



Blast Report

Quarry: McLeods
 Blast Number: 14-023
 Customer P.O. #: Scott
 Orica Order #: 1795980
 Date of Blast: Nov 21 2014
 Time of Blast: 12:26 PM

Customer Name: <u>Cornwall Gravel</u>	Blaster-in-charge: <u>Bradley Crook</u> (print name)	Centre of Blast
Bench / Face: <u>30 Lower Bench</u>	Latitude (° N): <u>45.07810</u>	Centre of Blast
Wind Direction: <u>W</u> (from the: W SW S SE E NE N NW)	Wind Velocity: <u>20</u> kph	Temperature: <u>-5</u> °C
Overcast: <input type="checkbox"/>	Rain: <input type="checkbox"/>	Cloud Altitude: _____ m
Partly Cloudy: <input type="checkbox"/>	Snow: <input type="checkbox"/>	Inversion Altitude: _____ m
Sunny: <input checked="" type="checkbox"/>	Inversion: <input type="checkbox"/>	Boretracked Y or N <u>N</u>
Face Profiled Y or N <u>N</u>	Stemming Type / Size: <u>HL3</u>	# Stone Decks: <u>0</u>
Stemming Laid out Y or N <u>Y</u>	Total Length of Stone Decks: <u>0.0</u> m	Time Stemming Laid Out <u>6:00am</u>
Bit diam: <u>76</u> mm (<u>0</u> ') # Holes: <u>0</u> = <u>0.0</u> m (<u>0</u> ft)	Bit diam: <u>89</u> mm (<u>0</u> ') # Holes: <u>162</u> = <u>1,481.8</u> m (<u>4,860</u> ft)	Remote Fired Y or N <u>Y</u>
Re Drills <u>Y</u> or <u>N</u> <u>N</u>	# redrills <u>0</u>	Holes Measured Y or N <u>N</u>

tonnes Blasted: 34,133 te
 tonnes Invoiced: _____ te
 Burden: 2.7 m 9.00 ft
 Spacing: 3.0 m 10.00 ft
 Avg Bench Ht: 9.1 m 30.00 ft
 Avg Hole Depth: 9.1 m 30.00 ft
 Collar: 1.4 m 4.60 ft
 Holes Dewatered: 0 holes
 Total kg Loaded: 9,727 kg
 Powder Factor: 0.28 kg/te 0.13 #/te
0.77 kg/m³ 1.30 #/cy
 Max. per delay: 62 kg/delay
 Rock Density: 2.70 g/cc
 Rows Blasted: 5 rows
 Bench Length 97.5 m 319.9 ft
 Blast Width: 14.2 m 46.5 ft
 Rock Vol. Blasted: 12,642 m³ 16,522 cy

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>34,740</u>	<u>25,370</u>	<u>9,370</u>
Pkgd. & Boosters: Size kg			
E113	<u>65X400</u>	<u>7</u>	<u>125</u>
E113	<u>75X400</u>	<u>7</u>	<u>175</u>
E113	<u>90X400</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>162</u>	<u>55</u>
Pentex Boosters	<u>0.200</u>	<u>11</u>	<u>2</u>
Total explosives(kg): <u>9,727</u>			

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>2:00pm</u>	<u>8.0</u>
Helper #1	<u>7:00am</u>	<u>1:00pm</u>	<u>6.0</u>
Helper #2	<u>7:00am</u>	<u>1:00pm</u>	<u>6.0</u>
Helper #3	<u>7:00am</u>	<u>1:00pm</u>	<u>6.0</u>
Helper #4			
Helper #5			
MMU # 1	<u>QM 9</u>	<u>7:00am</u>	<u>12:00pm</u>
MMU # 2			
Total Hrs			<u>31.0</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>11</u>
15M	Uni Tronic 600		<u>162</u>
25M	Uni Tronic 600		<u>0</u>
25M	Ikon 2		<u>0</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>Front Gate</u>	PPV: <u>2.16</u> mm/s	@ Freq: <u>47</u> Hz	Air o/p: <u>6</u> pa.(L)
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>44*49.204</u> Long ° W: <u>75*19.730</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)	Orica Blaster-in-charge: <u>Bradley Crook</u>		
	Signature		



Blast Report

Quarry: McLeod
 Blast Number: 14-024
 Customer P.O. #: Scott
 Orica Order #: 1798525
 Date of Blast: Nov 27 2014
 Time of Blast: 4:37 AM

Customer Name: <u>Cornwall Gravel</u>			
Blaster-in-charge: <u>Bradley Crook</u> (print name)			
Bench / Face: <u>65' SE Corner</u>			
Latitude (° N): <u>45.07785</u> <u>74.74549</u>			
Centre of Blast		Centre of Blast	
Wind Direction: <u>N</u> (from the: W SW S SE E NE N NW)			
Wind Velocity: <u>5</u> kph		Temperature: <u>-2</u> °C	
Overcast:	<input type="checkbox"/>	Rain:	<input type="checkbox"/>
Partly Cloudy:	<input checked="" type="checkbox"/>	Snow:	<input type="checkbox"/>
Sunny:	<input type="checkbox"/>	Inversion:	<input type="checkbox"/>
Face Profiled	Y or N	<u>N</u>	Boretracked Y or N <u>N</u>
Stemming Type / Size:	<u>HL3</u>	# Stone Decks:	<u>0</u>
Stemming Laid out Y or N	<u>Y</u>	Total Length of Stone Decks:	<u>0.0</u> m
Time Stemming Laid Out	<u>6:00am</u>		
Bit diam: <u>102</u> mm (<u>0</u> ') # Holes: <u>28</u>	=	<u>537.8</u> m (<u>1,764</u> ft)	
Bit diam: <u>89</u> mm (<u>0</u> ') # Holes: <u>61</u>		<u>1,171.7</u> m (<u>3,843</u> ft)	
Remote Fired Y or N	<u>Y</u>	# redrills	<u>0</u>
Re Drills Y or N	<u>N</u>	Holes Measured	<u>Y or N</u>
		<u>Y</u>	

Bulk Explosives	In (kg)	Out (kg)	Diff. (kg)
Centra Gold 70	<u>34,700</u>	<u>23,740</u>	<u>10,960</u>
Pkgd. & Boosters:			
	Size	kg	
E113	<u>65X400</u>	<u>7</u>	<u>175</u>
E113	<u>75X400</u>	<u>26</u>	<u>650</u>
E113	<u>90X400</u>	<u>18</u>	<u>450</u>
Pentex Boosters	<u>0.450</u>	<u>0</u>	<u>0</u>
Pentex Boosters	<u>0.340</u>	<u>95</u>	<u>32</u>
Pentex Boosters	<u>0.200</u>	<u>87</u>	<u>17</u>
Total explosives(kg):			<u>12,285</u>

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	<u>6:00am</u>	<u>5:00pm</u>	<u>11.0</u>
Helper #1	<u>Kevin</u>	<u>6:00am</u>	<u>4:00pm</u>
Helper #2	<u>Todd</u>	<u>7:00am</u>	<u>4:00pm</u>
Helper #3	<u>Pierre</u>	<u>7:00am</u>	<u>4:00pm</u>
Helper #4			
Helper #5			
MMU # 1	<u>QM 9</u>	<u>7:00am</u>	<u>4:00pm</u>
MMU # 2			
Total Hrs			<u>48.0</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handiets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handiets	<u>71712HJKL</u>	<u>25/500</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>9</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>17</u>	<u>0</u>
9M Connectadets	<u>061112HG</u>	<u>33</u>	<u>0</u>

Electronic Dets:	Case #	ms	Qty
6M	Uni Tronic 600		<u>0</u>
15M	Uni Tronic 600		<u>0</u>
6M	Ikon 2		<u>88</u>
20M	Ikon 2		<u>98</u>
400M	Uni Tronic Wire		<u>1</u>

Seis #1: <u>Front Gate</u>	PPV: <u>3.05</u> mm/s	@ Freq: <u>20</u> Hz	Air o/p: <u>42</u> pa.(L)
Lat ° N: <u>Long ° W:</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #2: <u>504 South Branch Rd</u>	PPV: <u>2.16</u> mm/s	@ Freq: <u>43</u> Hz	Air o/p: <u>13</u> pa.(L)
Lat ° N: <u>44*49.204</u> Long ° W: <u>75*19.730</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Seis #3: _____	PPV: _____ mm/s	@ Freq: _____ Hz	Air o/p: _____ dB
Lat ° N: <u>test</u> Long ° W: <u>test</u>	(Trigger: <u>2.00</u> mm/s)	V / T / L ?	(Trigger: <u>115</u> dB)
Blast Video Recorded: <u>Y</u> (Yes or No)		Orica Blaster-in-charge: <u>Bradley Crook</u>	
Signature			



Customer: Cornwall Gravel

Blast Design

Quarry: McLeod

P.O. #: Scott

Blast Date: 2015-05-22

Blast Number: 15-001

Orica Order #: 1873828

Blast Time: 12:15pm

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: Asphalt Bench 48' (Bench / Face)

GPS Coordinates: 45.08266 °N Latitude 74.74229 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: NW at 20 kph Temperature: 11 to 15 °C

Clear: X
Partly Cloudy:Rain: X
Snow:Overcast: X
Inversion:tonnes Blasted: 25,873 te 9,582 m³

Holes Loaded: 79 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 18 front row

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 61

Bench Height: 48.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 48.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 43.0 ft avg

Main Body: 43.5 ft avg

- Charge Weight -

Front Row: 96.0 kg/hole

Main Body: 97.1 kg/hole

Max. per delay: 100.0 kg/delay

SD () Equation: 1010.9 kg/delay

Total kg Loaded: 8,225 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -		
Yield PF:	0.318	kg/te (actual)
Front row:	0.249	kg/te (theoretical)
Main Body:	0.294	kg/te (theoretical)
"KPI" PF:	0.000	kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

Note: Wireless ElectronicBlasting System and DFX boosters used N/C (158 Used)

50pc of Electric MS 3.5M 00 sold

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	33,500	25,400	8,100

Packaged Explosives:

	cs shipped	cs returned	kg
E113 65X400	8	4	100
E113 75X400	8	7	25
E113 90X400	0	0	0

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	0	
PENTEX 8 (OR EQUIVALENT)	0.23	0	

total explosives weight in Blast (kg): 8,225

Pkgd Prod (125 kg) % of Total kg: 1.5%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 20M			0
UNITRONIC 600 6M			0
ELECTRIC MS 3.5m		50	

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	0
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	2
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	

1.447 lb/yd³
 1.134 lb/yd³
 1.338 lb/yd³
 0.000 lb/yd³

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-05-22

Blast Number:	15-001
Orica Order #:	1873828
Blast Time:	12:15pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08266	74.74229	0.786841	1.304499
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08266	74.74229	0.786841	1.304499

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	1112.8 m			
	Post Blast Data:	ppV: 0.0 mm/s	Trigger set at: 2.0 mm/s		
	frequency: 0.0 Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
	air overpressure: 0.0 dB	Trigger set at: 115 dB			
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (2nd Seis. From Centre of Blast)	0.0 m			
	Post Blast Data:	ppV: 0.0 mm/s	Trigger set at: 2.0 mm/s		
	frequency: 0.0 Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
	air overpressure: 0.0 dB	Trigger set at: 115 dB			
	Scale House				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0 m			
	Post Blast Data:	ppV: 0.0 mm/s	Trigger set at: 2.0 mm/s		
	frequency: 0.0 Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
	air overpressure: 0.0 dB	Trigger set at: 115 dB			
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blast - narrow, multi-row Blast with 1 Free Face?

$$\begin{aligned}
 W &= \frac{D^2}{35^2} \\
 &= \frac{(1112.8)^2}{35^2} \text{ kg} \\
 &= \frac{1,238,324}{1,225} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall

Quarry: McLeod

Blast Number: 15-002

Blast DesignP.O. #: Scott
Blast Date: 2015-06-09Orica Order #: 1881950
Blast Time: 1:25pm

page 1 Blaster-in-charge: Bradley Crook (Print Name)

Blast Location: Granular Bench SE Wall (Bench / Face)
GPS Coordinates: 45.07810 °N Latitude 74.74514 °W Longitude
Centre of Blast Centre of BlastWind from the: W at 15 kph Temperature: 16 to 20 °C
Clear: X Rain: X Overcast: X
Partly Cloudy: Snow: Inversion:**- Drilling Information -**

Angle from Vertical			Nominal Bit Diameter:		
Primary Bit diam:	88.9 mm	0°	# Holes:	54	= 3,402.0 ft (3 1/2 " diam)
Secondary Bit diam:	101.6 mm	0°	# Holes:	11	= 693.0 ft (4 " diam)
Tertiary Bit diam:	76.2 mm	0°	# Holes:	7	= 441.0 ft (3 " diam)

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	33,290	23,950	9,340

Packaged Explosives:

	cs shipped	cs returned	kg
E113 75X400	33	17	400
E113 65X400	33	25	200
	0	0	0

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	84	28.6
PENTEX 12 (OR EQUIVALENT)	0.34	68	23.1

total explosives weight in Blast (kg): 9,992

Pkgd Prod (600 kg) % of Total kg: 6.0%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			70
UNITRONIC 600 15M			7
UNITRONIC 600 25M			75

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	2
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Line Item (Hourly Rate)	1
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 34,174 te 12,657 m³

Holes Loaded: 72 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 6 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 11.0 ft avg

Holes: 19 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 11.0 ft avg

Holes: 53 main body

Bench Height: 63.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 63.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 5.0 ft avg

Material used: HL3

- Charge Length -

Front Row: 58.0 ft avg

Main Body: 58.0 ft avg

- Charge Weight -

Front Row: 129.5 kg/hole

Main Body: 129.5 kg/hole

Max. per delay: 135.0 kg/delay

SD () Equation: 401.1 kg/delay

Total kg Loaded: 9,992 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.292 kg/te (actual)

Front row: 0.233 kg/te (theoretical)

Main Body: 0.272 kg/te (theoretical)

"KPI" PF: 0.265 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

1 - Pentex BC 340 fell down hole

1.331 lb/yd³

1.059 lb/yd³

1.236 lb/yd³

1.206 lb/yd³

Theoretical PF (Based on a single hole)

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-06-09

Blast Number:	15-002
Orica Order #:	1881950
Blast Time:	1:25pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.07810	74.74514	0.786761	1.304549
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.07810	74.74514	0.786761	1.304549

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading	45.07275	74.74414	0.786668	1.304531	
2nd Reading					
Average	45.07275	74.74414	0.786668	1.304531	
Distance (1st Seis. From Centre of Blast)	600.8 m				
Post Blast Data:	ppV: 3.7 mm/s	Trigger set at: 2.0 mm/s			
frequency: 20.0 Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)			
air overpressure: 17.8 pa (L)	dB	Trigger set at: 115 dB			
Front Gate					

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (2nd Seis. From Centre of Blast)	0.0 m				
Post Blast Data:	ppV: mm/s	Trigger set at: 2.0 mm/s			
frequency: Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)			
air overpressure: dB	Trigger set at: 115 dB				
Enter description of seismograph location					

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (3rd Seis. From Centre of Blast)	0.0 m				
Post Blast Data:	ppV: mm/s	Trigger set at: 2.0 mm/s			
frequency: Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)			
air overpressure: dB	Trigger set at: 115 dB				
Enter description of seismograph location					

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: **30** Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(600.8)^2}{30^2} \text{ kg} \\
 &= \frac{360,961}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = **401** kg

Jim Bray
Orica
 Blaster-in-charge:

*Bradley Crook*Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall

Blast Design

Quarry: McLeod

P.O. #: Scott

Blast Date: 2015-06-11

Blast Number: 15-003

Orica Order #: 1883286

Blast Time: 1:59pm

page 1

Blaster-in-charge: Bradley Crook (Print Name)

Blast Location: East Wall Asphalt (Bench / Face)

GPS Coordinates: 45.08287 °N Latitude 74.74445 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: SW at 20 kph Temperature: 21 to 25 °C

Clear:

Rain: X

Overcast: X

Partly Cloudy: X

Snow:

Inversion:

tonnes Blasted: 38,992 te 14,442 m³

Holes Loaded: 62 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 0 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 16 front row

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 46

Bench Height: 85.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 85.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 5.0 ft avg

Material used: HL3

- Charge Length -

Front Row: 80.0 ft avg

Main Body: 80.0 ft avg

- Charge Weight -

Front Row: 178.6 kg/hole

Main Body: 178.6 kg/hole

Max. per delay: 185.0 kg/delay

SD () Equation: 116.5 kg/delay

Total kg Loaded: 12,718 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.326 kg/te (actual)

Front row: 0.262 kg/te (theoretical)

Main Body: 0.305 kg/te (theoretical)

"KPI" PF: #DIV/0! kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

1.484 lb/yd ³
1.191 lb/yd ³
1.390 lb/yd ³
lb/yd ³

Bulk Explosives:	in (kg)	out (kg)	kg
CENTRA GOLD 70	35,770	23,270	12,500

Packaged Explosives:	cs shipped	cs returned	kg
E113 75X400	10	4	150
E113 65X400	15	14	25
	0	0	0

Boosters:	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	62	21.1
PENTEX 12 (OR EQUIVALENT)	0.34	65	22.1

total explosives weight in Blast (kg): 12,718

Pkgd Prod (175 kg) % of Total kg: 1.4%

Detonators:	case #'s	ms	# used
UNITRONIC 600 6M			61
UNITRONIC 600 30M			64
UNITRONIC 600 15M			2

Cord & Accessories:	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	2
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/10,000 kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Line Item (Hourly Rate)	1
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-06-11

Blast Number:	15-003
Orica Order #:	1883286
Blast Time:	1:59pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08287	74.74445	0.786845	1.304537
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08287	74.74445	0.786845	1.304537

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	1126.9	m		
	Post Blast Data:	ppV: 0.0	mm/s	Trigger set at: 2.0	mm/s
	frequency: 0.0	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: 0.0	dB	Trigger set at: 115	dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08551	74.74272	0.786891	1.304507
	2nd Reading				
	Average	45.08551	74.74272	0.786891	1.304507
	Distance (2nd Seis. From Centre of Blast)	323.8	m		
	Post Blast Data:	ppV: 3.7	mm/s	Trigger set at: 2.0	mm/s
	frequency: 22.0	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: 118.0	dB	Trigger set at: 115	dB	
	323M NE of blast (cornwall's property)				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV: 0.0	mm/s	Trigger set at: 2.0	mm/s
	frequency: 0.0	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: 0.0	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(323.8)^2}{30^2} \text{ kg} \\
 &= \frac{104,846}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Jim Bray
Orica
 Blaster-in-charge:

*Bradley Crook*Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall

Quarry: McLeod

Blast Number: 15-004

P.O. #: Scott

Orica Order #: 1885169

Blast Date: 2015-06-16

Blast Time: 1:43pm

Blast Design

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: SE 65' Granular Bench (Bench / Face)

GPS Coordinates: 44.07786 °N Latitude 74.74535 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: W at 5 kph Temperature: 21 to 25 °C

Clear:
Partly Cloudy:Rain:
Snow:Overcast:
Inversion:

tonnes Blasted: 30,827 te 11,417 m³

Holes Loaded: 71 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 0 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 32 front row

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 39

Bench Height: 63.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 63.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 5.0 ft avg

Material used: HL3

- Charge Length -

Front Row: 58.0 ft avg

Main Body: 58.0 ft avg

- Charge Weight -

Front Row: 129.5 kg/hole

Main Body: 129.5 kg/hole

Max. per delay: 195.0 kg/delay

SD () Equation: 0.0 kg/delay

Total kg Loaded: 10,003 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.324 kg/te (actual)

Front row: 0.256 kg/te (theoretical)

Main Body: 0.299 kg/te (theoretical)

"KPI" PF: #DIV/0! kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

Bulk Explosives: in (kg) out (kg) kg

CENTRA GOLD 70	35,670	25,990	9,680
----------------	--------	--------	-------

Packaged Explosives: cs shipped cs returned kg

E113 75X400	10	5	125
E113 65X400	15	9	150
	0	0	0

Boosters: kg / unit # used kg

PENTEX 12 (OR EQUIVALENT)	0.34	71	24.1
PENTEX 12 (OR EQUIVALENT)	0.34	71	24.1

total explosives weight in Blast (kg): 10,003

Pkgd Prod (275 kg) % of Total kg: 2.7%

Detonators: case #'s ms # used

UNITRONIC 600 6M			69
UNITRONIC 600 25M			73

Cord & Accessories: U of M # used

HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

of Blasts today (this Quarry) 1

of Blasters (this Blast) 1

of Helpers (this Blast) Note Exception 2

of MMU's (this Blast) 1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Line Item (Hourly Rate)	1
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

1.477 lb/yd³

1.165 lb/yd³

1.359 lb/yd³

lb/yd³

Theoretical PF (Based on a single hole)

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-06-16

Blast Number:	15-004
Orica Order #:	1885169
Blast Time:	1:43pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	44.07786	74.74535	0.769304	1.304552
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	44.07786	74.74535	0.769304	1.304552

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	3.3 mm/s	Trigger set at: 2.0 mm/s	
		frequency:	18.0 Hz	V / T / L : ?	(Vertical, Transverse or Longitudinal)
		air overpressure:	119.0 dB	Trigger set at: 115 dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08551	74.74272	0.786891	1.304507
	2nd Reading				
	Average	45.08551	74.74272	0.786891	1.304507
	Distance (2nd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0 mm/s	
		frequency:	Hz	V / T / L : ?	(Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115 dB	
	323M NE of blast (cornwall's property)				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0 mm/s	
		frequency:	Hz	V / T / L : ?	(Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115 dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(0)^2}{30^2} \text{ kg} \\
 &= \frac{0}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

jim bray

Orica
Blaster-in-charge:

Bradley Crook

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall

Quarry: McLeod

Blast Number: 15-005

Blast DesignP.O. #: Scott
Blast Date: 2015-06-18Orica Order #: 1886810
Blast Time: 1:59pm

page 1 Blaster-in-charge: Bradley Crook (Print Name)

Blast Location: SE 65' Granular Bench (Bench / Face)
GPS Coordinates: 44.07722 °N Latitude 74.74563 °W Longitude
Centre of Blast Centre of BlastWind from the: SW at 15 kph Temperature: 21 to 25 °C
Clear: X Rain: X Overcast: X
Partly Cloudy: Snow: Inversion:tonnes Blasted: 41,847 te 15,499 m³

Holes Loaded: 91 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 0 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 22 front row

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 69

Bench Height: 63.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 63.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 58.0 ft avg

Main Body: 58.5 ft avg

- Charge Weight -

Front Row: 129.5 kg/hole

Main Body: 130.6 kg/hole

Max. per delay: 179.0 kg/delay

SD () Equation: 0.0 kg/delay

Total kg Loaded: 13,097 kg

Rock Density: 2.70 g/cc = te/m³

Theoretical PF (Based on a single hole)		
1.424	lb/yd ³	
1.165	lb/yd ³	
1.371	lb/yd ³	
#####	lb/yd ³	

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

Resource Deployment:		
# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	2
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/10,000 kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	2
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

Yield Powder Factor (kg Loaded / te Blastec



The Blasting Professionals™

Customer: Cornwall

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-06-18

Blast Number:	15-005
Orica Order #:	1886810
Blast Time:	1:59pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	44.07722	74.74563	0.769293	1.304557
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	44.07722	74.74563	0.769293	1.304557

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	2.2 mm/s	Trigger set at: 2.0	mm/s
		frequency:	24.0 Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
		air overpressure:	119.0 dB	Trigger set at:	115 dB
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.06704	74.75478	0.786568	1.304717
	2nd Reading				
	Average	45.06704	74.75478	0.786568	1.304717
	Distance (2nd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	0.0 mm/s	Trigger set at: 2.0	mm/s
		frequency:	0.0 Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
		air overpressure:	0.0 dB	Trigger set at:	115 dB
	504 South Branch Rd.				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
		frequency:	Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at:	115 dB
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(0)^2}{30^2} \text{ kg} \\
 &= \frac{0}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Jim Bray
Orica
 Blaster-in-charge:

*Bradley Crook*Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall

Quarry: McLeod

Blast Number: 15-006

P.O. #: Scott

Orica Order #: 1890604

Blast Date: 2015-06-26

Blast Time: 1:03pm

page 1

Blast Design

Blast Master-in-charge: Bradley Crook (Print Name)

Blast Location: SE 65' Granular Bench (Bench / Face)

GPS Coordinates: 45.07676 °N Latitude 74.74527 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: N at 10 kph Temperature: 21 to 25 °C

Clear: X

Rain: X

Overcast: X

Partly Cloudy:

Snow:

Inversion:

tonnes Blasted: 39,427 te 14,603 m³

Holes Loaded: 96 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 6 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.0 ft avg

Spacing: 10.0 ft avg

Holes: 21 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 75 main body

Bench Height: 63.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 63.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 58.0 ft avg

Main Body: 58.5 ft avg

- Charge Weight -

Front Row: 129.5 kg/hole

Main Body: 130.6 kg/hole

Max. per delay: 179.0 kg/delay

SD () Equation: 230.2 kg/delay

Total kg Loaded: 12,316 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -		
Yield PF:	0.312	kg/te (actual)
Front row:	0.269	kg/te (theoretical)
Main Body:	0.301	kg/te (theoretical)
"KPI" PF:	0.296	kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	35,100	23,050	12,050

Packaged Explosives:

	cs shipped	cs returned	kg
E113 75X400	10	8	50
E113 65X400	10	4	150
	0	0	0

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	104	35.4
PENTEX 12 (OR EQUIVALENT)	0.34	89	30.3

total explosives weight in Blast (kg): 12,316

Pkgd Prod (200 kg) % of Total kg: 1.6%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			97
UNITRONIC 600 25M			96

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	3
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=10,000 kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	2
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

1.422 lb/yd³
1.223 lb/yd³
1.371 lb/yd³
1.346 lb/yd³

Theoretical PF (Based on a single hole)
Yield Powder Factor (kg Loaded / te Blastec)



Customer: Cornwall

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-06-26

Blast Number:	15-006
Orica Order #:	1890604
Blast Time:	1:03pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.07676	74.74527	0.786738	1.304551
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.07676	74.74527	0.786738	1.304551

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	455.2	m		
	Post Blast Data:	ppV: 3.2	mm/s	Trigger set at: 2.0	mm/s
		frequency: 23.0	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)
		air overpressure: 119.0	dB	Trigger set at: 115	dB
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08478	74.74498	0.786878	1.304546
	2nd Reading				
	Average	45.08478	74.74498	0.786878	1.304546
	Distance (2nd Seis. From Centre of Blast)	893.2	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
		frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)
		air overpressure: DNT	dB	Trigger set at: 115	dB
	890M NE of blast				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
		frequency:	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115	dB
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(455.2)^2}{30^2} \text{ kg} \\
 &= \frac{207,207}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Jim Bray
Orica
 Blaster-in-charge:

*Bradley Crook*Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall

Quarry: McLeod

Blast Number: 15-007

P.O. #: Scott

Orica Order #: 1896013

Blast Date: 2015-07-08

Blast Time: 12:02 PM

page 1

Blast Design

Master-in-charge: Bradley Crook (Print Name)

Blast Location: Asphalt Bench 50' NW (Bench / Face)
GPS Coordinates: 45.08289 °N Latitude 74.74745 °W Longitude

Centre of Blast Centre of Blast

Wind from the: NW at 10 kph Temperature: 21 to 25 °C

Clear: X Rain: X Overcast: X
Partly Cloudy: Snow: Inversion:

- Drilling Information -

Angle from Vertical			Nominal Bit Diameter:		
Primary Bit diam: 88.9 mm	0'	# Holes: 76	= 3,800.0 ft (3 1/2 " diam)		
Secondary Bit diam: 101.6 mm	0'	# Holes: 0	= 0.0 ft (4 " diam)		
Tertiary Bit diam: 76.2 mm	0'	# Holes: 3	= 150.0 ft (3 " diam)		

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	34,610	26,680	7,930

Packaged Explosives:

	cs shipped	cs returned	kg
E113 75X400	33	32	25
E113 65X400	33	30	75
	0	0	0

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	79	26.9
PENTEX 8 (OR EQUIVALENT)	0.23	79	17.9

total explosives weight in Blast (kg): 8,075

Pkgd Prod (100 kg) % of Total kg: 1.2%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			79
UNITRONIC 600 20M			79

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	2
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	2
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 27,237 te 10,088 m³

Holes Loaded: 79 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 4 rows

Rate Code:

- Pattern (Front Row)-

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 21 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 58 main body

Bench Height: 50.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 50.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 45.0 ft avg

Main Body: 45.5 ft avg

- Charge Weight -

Front Row: 100.5 kg/hole

Main Body: 101.6 kg/hole

Max. per delay: 105.0 kg/delay

SD () Equation: 66.9 kg/delay

Total kg Loaded: 8,075 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.296 kg/te (actual)

Front row: 0.292 kg/te (theoretical)

Main Body: 0.295 kg/te (theoretical)

"KPI" PF: 0.294 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

.....

.....

.....

.....

.....

.....

.....

.....

.....

Theoretical PF (Based on a single hole)

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-07-08

Blast Number:	15-007
Orica Order #:	1896013
Blast Time:	12:02 PM

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08289	74.74745	0.786845	1.304589
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08289	74.74745	0.786845	1.304589

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	1158.5	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08478	74.74498	0.786878	1.304546
	2nd Reading				
	Average	45.08478	74.74498	0.786878	1.304546
	Distance (2nd Seis. From Centre of Blast)	286.3	m		
	Post Blast Data:	ppV: 2.2	mm/s	Trigger set at: 2.0	mm/s
	frequency: 47.0	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: 118.0	dB	Trigger set at: 115	dB	
	286M E of blast				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
	frequency:	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure:	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blast - narrow, multi-row Blast with 1 Free Face?

$$\begin{aligned}
 W &= \frac{D^2}{35^2} \\
 &= \frac{(286.3)^2}{35^2} \text{ kg} \\
 &= \frac{81,968}{1,225} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

Signature required, indicating that
Blast Report is Complete & Accurate.

jim bray



Customer: Cornwall

Quarry: McLeod

Blast Number: 15-008

P.O. #: Scott

Orica Order #: 1904157

Blast Date: 2015-07-28

Blast Time: 12:09pm

Blast Design

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: Concrete Bench NE corner (Bench / Face)

GPS Coordinates: 45.08370 °N Latitude 74.74523 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: S at 10 kph Temperature: 26 to 30 °C

Clear: Partly Cloudy: Rain: Snow: Overcast: Inversion: tonnes Blasted: 18,537 te 6,865 m³

Holes Loaded: 64 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: rows

Rate Code:

- Pattern (Front Row)-

Burden: 9.0 ft avg

Spacing: 10.5 ft avg

Holes: 21 front row

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 43

Bench Height: 44.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 44.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 4.5 ft avg

Main Body: 4.3 ft avg

Material used: HL3

- Charge Length -

Front Row: 39.5 ft avg

Main Body: 39.7 ft avg

- Charge Weight -

Front Row: 88.2 kg/hole

Main Body: 88.6 kg/hole

Max. per delay: 98.0 kg/delay

SD () Equation: 16.5 kg/delay

Total kg Loaded: 5,862 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.316 kg/te (actual)

Front row: 0.277 kg/te (theoretical)

Main Body: 0.325 kg/te (theoretical)

"KPI" PF: 0.000 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

Customer: Cornwall		Quarry: McLeod	Blast Number: 15-008
		P.O. #: Scott	Orica Order #: 1904157
		Blast Date: 2015-07-28	Blast Time: 12:09pm
Blast Design			
page 1	Master-in-charge: Bradley Crook (Print Name)		
Blast Location: Concrete Bench NE corner (Bench / Face)			
GPS Coordinates: 45.08370 °N Latitude 74.74523 °W Longitude			
Centre of Blast		Centre of Blast	
Wind from the: S at 10 kph Temperature: 26 to 30 °C			
Clear: <input checked="" type="checkbox"/>	Rain: <input type="checkbox"/>	Overcast: <input type="checkbox"/>	Inversion: <input type="checkbox"/>
Partly Cloudy: <input type="checkbox"/>			
- Drilling Information -			
Angle from Vertical			
Primary Bit diam: 88.9 mm	0°	# Holes: 59	= 2,596.0 ft (3 1/2 " diam)
Secondary Bit diam: 76.2 mm	0°	# Holes: 5	= 220.0 ft (3 " diam)
Tertiary Bit diam: mm	°	# Holes:	= 0.0 ft (" diam)
Nominal Bit Diameter:			
Bulk Explosives: in (kg) out (kg) kg			
CENTRA GOLD 70 33,100 27,350 5,750			
Packaged Explosives: cs shipped cs returned kg			
E113 75X400 10 9 25			
E113 65X400 10 8 50			
0 0 0			
Boosters: kg / unit # used kg			
PENTEX 12 (OR EQUIVALENT) 0.34 68 23.1			
PENTEX 8 (OR EQUIVALENT) 0.23 63 14.3			
total explosives weight in Blast (kg): 5,862			
Pkgd Prod (75 kg) % of Total kg: 1.3%			
Detonators: case #'s ms # used			
UNITRONIC 600 6M 64			
UNITRONIC 600 15M 66			
Cord & Accessories: U of M # used			
HARNESS WIRE DUPLEX (6 PACK) 400M units 1			
Resource Deployment:			
# of Blasts today (this Quarry)			1
# of Blasters (this Blast)			1
# of Helpers (this Blast)	Note Exception		3
# of MMU's (this Blast)			1
Services:			
GPS LAYOUT	Enter "1" if Layout by GPS	0	
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1	
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1	
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1	
3D LASER PROFILE	Enter "1" if 3D Profiled	0	
BORETRACK	Enter "1" if Boretraked	0	
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0	

Theoretical PF (Based on a single hole)

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-07-28

Blast Number:	15-008
Orica Order #:	1904157
Blast Time:	12:09pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08370	74.74523	0.786859	1.304550
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08370	74.74523	0.786859	1.304550

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	1222.1	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08478	74.74498	0.786878	1.304546
	2nd Reading				
	Average	45.08478	74.74498	0.786878	1.304546
	Distance (2nd Seis. From Centre of Blast)	121.8	m		
	Post Blast Data:	ppV: 3.3	mm/s	Trigger set at: 2.0	mm/s
	frequency: 43.0	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: 122.2	dB	Trigger set at: 115	dB	
	120M NE of blast				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
	frequency:	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure:	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(121.8)^2}{30^2} \text{ kg} \\
 &= \frac{14,835}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall

Quarry: McLeod

Blast Number: 15-009

P.O. #: Scott

Orica Order #: 1906886

Blast Date: 2015-08-04

Blast Time: 12:01pm

page 1

Blast Design

Master-in-charge: Bradley Crook (Print Name)

Blast Location: Asphalt Bench 50' N (Bench / Face)

GPS Coordinates: 45.08317 °N Latitude 74.74659 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: SW at 20 kph Temperature: 21 to 25 °C

Clear:
Partly Cloudy: Rain: Overcast:
Snow: Inversion: **- Drilling Information -**

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	88.9	mm	0°	# Holes:	68	=	3,264.0 ft (3 1/2 " diam)
Secondary Bit diam:	101.6	mm	0°	# Holes:		=	0.0 ft (4 " diam)
Tertiary Bit diam:	76.2	mm	0°	# Holes:	0	=	0.0 ft (3 " diam)

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	32,840	25,620	7,220

Packaged Explosives:

	cs shipped	cs returned	kg
E113 75X400	5	2	75
E113 65X400	10	6	100
	0	0	0

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	64	21.8
PENTEX 8 (OR EQUIVALENT)	0.23	72	16.3

total explosives weight in Blast (kg): 7,433

Pkgd Prod (175 kg) % of Total kg: 2.4%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			68
UNITRONIC 600 20M			68

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	2
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	2
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 24,840 te 9,200 m³

Holes Loaded: 68 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 4 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 20 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 48 main body

Bench Height: 48.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 48.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 43.0 ft avg

Main Body: 43.5 ft avg

- Charge Weight -

Front Row: 96.0 kg/hole

Main Body: 97.1 kg/hole

Max. per delay: 105.0 kg/delay

SD () Equation: 53.5 kg/delay

Total kg Loaded: 7,433 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.299 kg/te (actual)

Front row: 0.249 kg/te (theoretical)

Main Body: 0.294 kg/te (theoretical)

"KPI" PF: 0.283 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

.....

.....

.....

.....

.....

.....

.....

.....

.....

Theoretical PF (Based on a single hole)

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-08-04

Blast Number:	15-009
Orica Order #:	1906886
Blast Time:	12:01pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08317	74.74659	0.786850	1.304574
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08317	74.74659	0.786850	1.304574

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	1175.9	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08478	74.74498	0.786878	1.304546
	2nd Reading				
	Average	45.08478	74.74498	0.786878	1.304546
	Distance (2nd Seis. From Centre of Blast)	219.4	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	219M E of blast				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
	frequency:	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure:	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(219.4)^2}{30^2} \text{ kg} \\
 &= \frac{48,136}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

jim bray

Orica
Blaster-in-charge:

Bradley Crook

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2015-08-20

Blast Number: 15-010

Orica Order #: 1914922

Blast Time: 11:43am

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: Asphalt Bench 50' N (Bench / Face)

GPS Coordinates: 45.08300 °N Latitude 74.74740 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: SW at 15 kph Temperature: 26 to 30 °C

Clear: Rain: Overcast: Partly Cloudy: Snow: Inversion: tonnes Blasted: 24,886 te 9,217 m³

Holes Loaded: 75 holes

... including: 5 Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 5 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 17 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 58 main body

Bench Height: 50.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 50.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 45.0 ft avg

Main Body: 45.5 ft avg

- Charge Weight -

Front Row: 100.5 kg/hole

Main Body: 101.6 kg/hole

Max. per delay: 95.0 kg/delay

SD () Equation: 83.8 kg/delay

Total kg Loaded: 7,698 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.309 kg/te (actual)

Front row: 0.250 kg/te (theoretical)

Main Body: 0.295 kg/te (theoretical)

"KPI" PF: 0.286 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	32,970	25,490	7,480

Packaged Explosives:

	cs shipped	cs returned	kg
E113 75X400	5	2	75
E113 65X400	5	1	100
	0	0	0

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	75	25.5
PENTEX 8 (OR EQUIVALENT)	0.23	75	17.0

total explosives weight in Blast (kg): 7,698

Pkgd Prod (175 kg) % of Total kg: 2.3%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			75
UNITRONIC 600 20M			75

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	2
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

1.408 lb/yd³
 1.139 lb/yd³
 1.344 lb/yd³
 1.303 lb/yd³

Theoretical PF (Based on a single hole)
Yield Powder Factor (kg Loaded / te Blastec)



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-08-20

Blast Number:	15-010
Orica Order #:	1914922
Blast Time:	11:43am

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08300	74.74740	0.786847	1.304588
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08300	74.74740	0.786847	1.304588

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	1169.6	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08478	74.74498	0.786878	1.304546
	2nd Reading				
	Average	45.08478	74.74498	0.786878	1.304546
	Distance (2nd Seis. From Centre of Blast)	274.7	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	219M E of blast				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
	frequency:	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure:	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(274.7)^2}{30^2} \text{ kg} \\
 &= \frac{75,460}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

jim bray

Orica
Blaster-in-charge:

Bradley Crook

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2015-09-01

Blast Number: 15-011

Orica Order #: 1920506

Blast Time: 12:27pm

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: Asphalt Bench 50' N (Bench / Face)

GPS Coordinates: 45.08319 °N Latitude 74.74685 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: NW at 10 kph Temperature: 26 to 30 °C

Clear: X

Rain: X

Overcast: X

Partly Cloudy:

Snow:

Inversion:

tonnes Blasted: 27,944 te 10,350 m³

Holes Loaded: 85 holes

... including: 5 Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 5 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 21 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 64 main body

Bench Height: 50.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 50.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 45.0 ft avg

Main Body: 45.5 ft avg

- Charge Weight -

Front Row: 100.5 kg/hole

Main Body: 101.6 kg/hole

Max. per delay: 97.0 kg/delay

SD () Equation: 58.8 kg/delay

Total kg Loaded: 8,053 kg

Rock Density: 2.70 g/cc = te/m³

Theoretical PF (Based on a single hole)

1.312 lb/yd³1.139 lb/yd³1.344 lb/yd³1.303 lb/yd³

Yield Powder Factor (kg Loaded / te Blastec

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	32,840	25,060	7,780

Packaged Explosives:

	cs shipped	cs returned	kg
E113 75X400	5	4	25
E113 65X400	8	0	200
	0	0	0

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	85	28.9
PENTEX 8 (OR EQUIVALENT)	0.23	85	19.3

total explosives weight in Blast (kg): 8,053

Pkgd Prod (225 kg) % of Total kg: 2.8%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			82
UNITRONIC 600 20M			88

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)		1
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-09-01

Blast Number:	15-011
Orica Order #:	1920506
Blast Time:	12:27pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08319	74.74685	0.786850	1.304579
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08319	74.74685	0.786850	1.304579

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	1181.6	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08478	74.74498	0.786878	1.304546
	2nd Reading				
	Average	45.08478	74.74498	0.786878	1.304546
	Distance (2nd Seis. From Centre of Blast)	230.1	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	219M E of blast				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
	frequency:	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure:	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(230.1)^2}{30^2} \text{ kg} \\
 &= \frac{52,946}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Quarry: McLeod

Blast Number: 15-012

P.O. #: Scott

Orica Order #: 1929677

Blast Date: 2015-09-22

Blast Time: 12:03pm

Blast Report

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: Asphalt Bench 50' N (Bench / Face)
GPS Coordinates: 45.08312 °N Latitude 74.74743 °W Longitude

Centre of Blast Centre of Blast

Wind from the: NE at 10 kph Temperature: 16 to 20 °C

Clear: Rain: Overcast:
Partly Cloudy: Snow: Inversion: **- Drilling Information -**

Angle from Vertical			Nominal Bit Diameter:		
Primary Bit diam:	88.9 mm	0°	# Holes:	90	= 4,500.0 ft (3 1/2 " diam)
Secondary Bit diam:	mm	0°	# Holes:		= 0.0 ft (" diam)
Tertiary Bit diam:	mm	°	# Holes:		= 0.0 ft (" diam)

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	33,450	23,980	9,470

Packaged Explosives:

	cs shipped	cs returned	kg
E113 75X400	5	0	125
E113 65X400	7	0	175
	0	0	0

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	90	30.6
PENTEX 8 (OR EQUIVALENT)	0.23	90	20.4

total explosives weight in Blast (kg): 9,821

Pkgd Prod (300 kg) % of Total kg: 3.1%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			90
UNITRONIC 600 20M			90

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)		1
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

Blast Number: 15-012
Orica Order #: 1929677
Blast Time: 12:03pm

tonnes Blasted: 31,595 te 11,702 m³

Holes Loaded: 90 holes

... including: 3 Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 3 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 30 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 60 main body

Bench Height: 50.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 50.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 45.0 ft avg

Main Body: 45.5 ft avg

- Charge Weight -

Front Row: 100.5 kg/hole

Main Body: 101.6 kg/hole

Max. per delay: 101.0 kg/delay

SD () Equation: 79.2 kg/delay

Total kg Loaded: 9,821 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.311 kg/te (actual)

Front row: 0.250 kg/te (theoretical)

Main Body: 0.295 kg/te (theoretical)

"KPI" PF: 0.280 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

1.415 lb/yd³
1.139 lb/yd³
1.344 lb/yd³
1.275 lb/yd³Theoretical PF (Based on a single hole)
Yield Powder Factor (kg Loaded / te Blastec)



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-09-22

Blast Number:	15-012
Orica Order #:	1929677
Blast Time:	12:03pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08312	74.74743	0.786849	1.304589
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08312	74.74743	0.786849	1.304589

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	1183.1	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08478	74.74498	0.786878	1.304546
	2nd Reading				
	Average	45.08478	74.74498	0.786878	1.304546
	Distance (2nd Seis. From Centre of Blast)	266.9	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	219M E of blast				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
	frequency:	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure:	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(266.9)^2}{30^2} \text{ kg} \\
 &= \frac{71,236}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

jim bray

Orica
Blaster-in-charge:

Bradley Crook

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Quarry: McLeod

Blast Number: 15-013

P.O. #: Scott

Orica Order #: 1943958

Blast Date: 2015-10-20

Blast Time: 12:16pm

Blast Report

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: Asphalt Bench 50' N (Bench / Face)

GPS Coordinates: 45.08336 °N Latitude 74.74598 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: W at 20 kph Temperature: 11 to 15 °C

Clear:
Partly Cloudy: Rain:
Snow: Overcast:
Inversion:

- Drilling Information -

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	88.9	mm	0°	# Holes:	90	=	4,500.0 ft (3 1/2 " diam)
Secondary Bit diam:		mm	0°	# Holes:		=	0.0 ft (" diam)
Tertiary Bit diam:		mm	°	# Holes:		=	0.0 ft (" diam)

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	34,680	25,360	9,320

Packaged Explosives:

	cs shipped	cs returned	kg
E113 65X400	10	6	100
E113 75X400	8	7	25
	0	0	0

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	91	30.9
PENTEX 8 (OR EQUIVALENT)	0.23	91	20.7

total explosives weight in Blast (kg): 9,497

Pkgd Prod (125 kg) % of Total kg: 1.3%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			89
UNITRONIC 600 20M			91

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

of Blasts today (this Quarry) 1

of Blasters (this Blast) 1

of Helpers (this Blast) Note Exception 2

of MMU's (this Blast) 1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 32,177 te 11,917 m³

Holes Loaded: 90 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 6 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 16 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 74 main body

Bench Height: 50.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 50.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 45.0 ft avg

Main Body: 45.5 ft avg

- Charge Weight -

Front Row: 100.5 kg/hole

Main Body: 101.6 kg/hole

Max. per delay: 101.0 kg/delay

SD () Equation: 34.7 kg/delay

Total kg Loaded: 9,497 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.295 kg/te (actual)

Front row: 0.250 kg/te (theoretical)

Main Body: 0.295 kg/te (theoretical)

"KPI" PF: 0.288 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

1.343 lb/yd³
 1.139 lb/yd³
 1.344 lb/yd³
 1.310 lb/yd³

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-10-20

Blast Number:	15-013
Orica Order #:	1943958
Blast Time:	12:16pm

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Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08336	74.74598	0.786853	1.304563
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08336	74.74598	0.786853	1.304563

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	1190.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
		frequency:	Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115	dB
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08478	74.74498	0.786878	1.304546
	2nd Reading				
	Average	45.08478	74.74498	0.786878	1.304546
	Distance (2nd Seis. From Centre of Blast)	176.6	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
		frequency:	Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115	dB
	NE of blast				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
		frequency:	Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115	dB
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(176.6)^2}{30^2} \text{ kg} \\
 &= \frac{31,188}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2015-11-02

Blast Number: 15-014

Orica Order #: 1950319

Blast Time: 12:05 PM

page 1

Master-in-charge: Dana Koch (Print Name)

Blast Location: Concrete Upper East Wall (Bench / Face)
GPS Coordinates: 45.08404 °N Latitude 74.74519 °W Longitude

Centre of Blast Centre of Blast

Wind from the: W at 15 kph Temperature: 11 to 15 °C

Clear: Rain: Overcast:
Partly Cloudy: Snow: Inversion:

- Drilling Information -

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	88.9	mm	0°	# Holes:	105	=	4,095.0 ft (3 1/2 " diam)
Secondary Bit diam:	76.2	mm	0°	# Holes:	3	=	117.0 ft (3 " diam)
Tertiary Bit diam:		mm	°	# Holes:		=	0.0 ft (" diam)

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	35,190	26,480	8,710

Packaged Explosives:	cs shipped	cs returned	kg
E113 65X400	15	8	175
E113 75X400	10	10	0

Boosters:	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	108	36.7
PENTEX 8 (OR EQUIVALENT)	0.23	108	24.5

total explosives weight in Blast (kg): 8,946

Pkgd Prod (175 kg) % of Total kg: 2.0%

Detonators:	case #'s	ms	# used
UNITRONIC 600 6M			108
UNITRONIC 600 15M			108

Cord & Accessories:	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	3
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 28,978 te 10,733 m³

Holes Loaded: 108 holes

... including: 0 Dead Holes

... and: 0 Helper Holes

Helper Hole Collar: 0.0 ft avg

Rows Blasted: 5 rows

Rate Code: - Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 9.0 ft avg

Holes: 25 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 83 main body

Bench Height: 39.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 39.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: 13mm

- Charge Length -

Front Row: 34.0 ft avg

Main Body: 34.5 ft avg

- Charge Weight -

Front Row: 75.9 kg/hole

Main Body: 77.0 kg/hole

Max. per delay: 90.0 kg/delay

SD () Equation: 122.5 kg/delay

Total kg Loaded: 8,946 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.309 kg/te (actual)

Front row: 0.269 kg/te (theoretical)

Main Body: 0.319 kg/te (theoretical)

"KPI" PF: 0.309 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

.....

.....

.....

.....

.....

.....

.....

.....

.....

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-11-02

Blast Number:	15-014
Orica Order #:	1950319
Blast Time:	12:05 PM

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Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08404	74.74519	0.786865	1.304550
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08404	74.74519	0.786865	1.304550

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08598	74.74198	0.786899	1.304494
	2nd Reading				
	Average	45.08598	74.74198	0.786899	1.304494
	Distance (1st Seis. From Centre of Blast)	332.1	m		
	Post Blast Data:	ppV:	4.6 mm/s	Trigger set at: 2.0 mm/s	
		frequency:	32.0 Hz	V / T / L: T	(Vertical, Transverse or Longitudinal)
		air overpressure:	118.7 dB	Trigger set at: 115 dB	
	NE of Blast				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (2nd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0 mm/s	
		frequency:	Hz	V / T / L: T	(Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115 dB	

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0 mm/s	
		frequency:	Hz	V / T / L: T	(Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115 dB	

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(332.1)^2}{30^2} \text{ kg} \\
 &= \frac{110,290}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

jim bray

Orica
Blaster-in-charge:

Dana Koch

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2015-11-23

Blast Number: 15-015

Orica Order #: 1959336

Blast Time: 1:37 AM

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: SE Mid Bench 65' (Bench / Face)

GPS Coordinates: 45.07625 °N Latitude 74.74496 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: W at 10 kph Temperature: 0 °C

Clear: X
Partly Cloudy:Rain: X
Snow:Overcast: X
Inversion:tonnes Blasted: 35,654 te 13,205 m³

Holes Loaded: 79 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 5 rows

Rate Code:

- Pattern (Front Row)-

Burden: 13.0 ft avg

Spacing: 10.0 ft avg

Holes: 17 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 62 main body

Bench Height: 62.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 62.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 5.0 ft avg

Material used: HL3

- Charge Length -

Front Row: 57.0 ft avg

Main Body: 57.0 ft avg

- Charge Weight -

Front Row: 127.3 kg/hole

Main Body: 127.3 kg/hole

Max. per delay: 185.0 kg/delay

SD () Equation: 173.3 kg/delay

Total kg Loaded: 11,781 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -		
Yield PF:	0.330	kg/te (actual)
Front row:	0.207	kg/te (theoretical)
Main Body:	0.298	kg/te (theoretical)
"KPI" PF:	0.280	kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

Resource Deployment:

of Blasts today (this Quarry) 1

of Blasters (this Blast) 1

of Helpers (this Blast) Note Exception 2

of MMU's (this Blast) 1

Services:

GPS LAYOUT Enter "1" if Layout by GPS 0

BULK TRUCK CHARGE >/=10,000 kg 1

SHOT SERVICE FEE * Line Item (Fee per Blast) 1

SEISMOGRAPH RENTAL Line Item (Fee per Blast) 1

3D LASER PROFILE Enter "1" if 3D Profiled 0

BORETRACK Enter "1" if Boretraked 0

LABOUR CHARGE (enter HOURS) Must be pre-authorized 0.0

1.504 lb/yd³
 0.940 lb/yd³
 1.357 lb/yd³
 1.274 lb/yd³

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-11-23

Blast Number:	15-015
Orica Order #:	1959336
Blast Time:	1:37 AM

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.07625	74.74496	0.786729	1.304546
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.07625	74.74496	0.786729	1.304546

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	394.9	m		
	Post Blast Data:	ppV:	7.8 mm/s	Trigger set at: 2.0 mm/s	
		frequency:	27.0 Hz	V / T / L : ?	(Vertical, Transverse or Longitudinal)
		air overpressure:	121.0 dB	Trigger set at: 115 dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (2nd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0 mm/s	
		frequency:	Hz	V / T / L : ?	(Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115 dB	
	Enter description of seismograph location				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0 mm/s	
		frequency:	Hz	V / T / L : ?	(Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115 dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(394.9)^2}{30^2} \text{ kg} \\
 &= \frac{155,946}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2015-11-25

Blast Number: 15-016

Orica Order #: 1961307

Blast Time: 12:47pm

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: 27° East Bench (Bench / Face)

GPS Coordinates: 45.07989 °N Latitude 74.74451 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: S at 10 kph Temperature: 1 to 5 °C

Clear: Partly Cloudy: Rain: Snow: Overcast: Inversion: **- Drilling Information -**

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	88.9	mm	0°	# Holes:	200	=	5,400.0 ft (3 1/2 " diam)
Secondary Bit diam:		mm	°	# Holes:		=	0.0 ft (" diam)
Tertiary Bit diam:		mm	°	# Holes:		=	0.0 ft (" diam)

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	35,020	24,160	10,860

Packaged Explosives:

	cs shipped	cs returned	kg
E113 65X400	15	6	225
E113 75X400	10	7	75

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	200	68.0
PENTEX 8 (OR EQUIVALENT)	0.23	0	

total explosives weight in Blast (kg): 11,228

Pkgd Prod (300 kg) % of Total kg: 2.7%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			0
UNITRONIC 600 15M			200

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

of Blasts today (this Quarry) 1

of Blasters (this Blast) 1

of Helpers (this Blast) Note Exception 2

of MMU's (this Blast) 1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=10,000 kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 34,138 te 12,644 m³

Holes Loaded: 200 holes

... including: 4 Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 4 rows**Rate Code:***- Pattern (Front Row)-*

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 25 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 175 main body

Bench Height: 27.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 27.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast*- Collar Stemming -*

Front Row: 5.0 ft avg

Main Body: 5.0 ft avg

Material used: HL3

- Charge Length -

Front Row: 22.0 ft avg

Main Body: 22.0 ft avg

- Charge Weight -

Front Row: 49.1 kg/hole

Main Body: 49.1 kg/hole

Max. per delay: 55.0 kg/delay

SD () Equation: 516.5 kg/delay

Total kg Loaded: 11,228 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.329 kg/te (actual)

Front row: 0.227 kg/te (theoretical)

Main Body: 0.294 kg/te (theoretical)

"KPI" PF: 0.277 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

1.497 lb/yd³
 1.031 lb/yd³
 1.337 lb/yd³
 1.260 lb/yd³

Yield Powder Factor (kg Loaded / te Blastec



The Blasting Professionals™

Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-11-25

Blast Number:	15-016
Orica Order #:	1961307
Blast Time:	12:47pm

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Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.07989	74.74451	0.786793	1.304538
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.07989	74.74451	0.786793	1.304538

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	795.4	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (2nd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blast - narrow, multi-row Blast with 1 Free Face?

$$\begin{aligned}
 W &= \frac{D^2}{35^2} \\
 &= \frac{(795.4)^2}{35^2} \text{ kg} \\
 &= \frac{632,661}{1,225} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2015-12-01

Blast Number: 15-017

Orica Order #: 1964118

Blast Time: 12:30pm

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: 30' Lower Bench (Bench / Face)

GPS Coordinates: 45.07773 °N Latitude 74.74647 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: E at 10 kph Temperature: 1 to 5 °C

Clear:

Rain: X

Overcast: X

Partly Cloudy: X

Snow:

Inversion:

tonnes Blasted: 36,899 te 13,666 m³

Holes Loaded: 180 holes

... including: 9 Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 9 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 24 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 156 main body

Bench Height: 30.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 30.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 5.0 ft avg

Material used: HL3

- Charge Length -

Front Row: 25.0 ft avg

Main Body: 25.0 ft avg

- Charge Weight -

Front Row: 55.8 kg/hole

Main Body: 55.8 kg/hole

Max. per delay: 65.0 kg/delay

SD () Equation: 278.3 kg/delay

Total kg Loaded: 11,044 kg

Rock Density: 2.70 g/cc = te/m³

Theoretical PF (Based on a single hole)

1.362 lb/yd³1.055 lb/yd³1.230 lb/yd³1.211 lb/yd³

- Powder Factor -

Yield PF: 0.299 kg/te (actual)

Front row: 0.232 kg/te (theoretical)

Main Body: 0.270 kg/te (theoretical)

"KPI" PF: 0.266 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit, B, S, Expl or IS from previous Blast:

20M Uni Tronic sold as 15M Uni Tronic (Low Inventory)

Row left out along highwall (unsafe due to ice falling)

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	35,000	24,370	10,630

Packaged Explosives:

	cs shipped	cs returned	kg
E113 65X400	10	3	175
E113 75X400	13	6	175

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	180	61.2
PENTEX 8 (OR EQUIVALENT)	0.23	11	2.5

total explosives weight in Blast (kg): 11,044

Pkgd Prod (350 kg) % of Total kg: 3.2%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			11
UNITRONIC 600 20M			180

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

of Blasts today (this Quarry) 1

of Blasters (this Blast) 1

of Helpers (this Blast) Note Exception 3

of MMU's (this Blast) 1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=10,000 kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2015-12-01

Blast Number:	15-017
Orica Order #:	1964118
Blast Time:	12:30pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.07773	74.74647	0.786755	1.304572
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.07773	74.74647	0.786755	1.304572

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	583.9	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (2nd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blast - narrow, multi-row Blast with 1 Free Face?

$$\begin{aligned}
 W &= \frac{D^2}{35^2} \\
 &= \frac{(583.9)^2}{35^2} \text{ kg} \\
 &= \frac{340,939}{1,225} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2016-04-28

Blast Number: 16-001

Orica Order #: 2023927

Blast Time: 12:41pm

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: 50' Asphalt (Bench / Face)
GPS Coordinates: 45.08353 °N Latitude 74.74619 °W Longitude
Centre of Blast Centre of BlastWind from the: N at 10 kph Temperature: 6 to 10 °C
Clear: X Rain: X Overcast: X
Partly Cloudy: Snow: Inversion:**- Drilling Information -**

Angle from Vertical				Nominal Bit Diameter:	
Primary Bit diam:	88.9 mm	0°	# Holes:	81	= 4,050.0 ft (3 1/2 " diam)
Secondary Bit diam:	76.2 mm	°	# Holes:	31	= 1,550.0 ft (3 " diam)
Tertiary Bit diam:	mm	°	# Holes:		= 0.0 ft (" diam)

Bulk Explosives:	in (kg)	out (kg)	kg
CENTRA GOLD 70	36,200	24,740	11,460
Packaged Explosives:	cs shipped	cs returned	kg
E113 65X400	15	4	275
E113 75X400	10	5	125
Boosters:	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	111	37.7
PENTEX 8 (OR EQUIVALENT)	0.23	116	26.3
total explosives weight in Blast (kg):			
Pkgd Prod (400 kg) % of Total kg:			

Detonators:	case #'s	ms	# used
UNITRONIC 600 6M			111
UNITRONIC 600 20M			116

Cord & Accessories:	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:		
# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	3
# of MMU's (this Blast)		1

Services:		
GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/10,000 kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 36,354 te 13,464 m³

Holes Loaded: 111 holes

... including: 6 Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 6 rows

Rate Code:

- Pattern (Front Row)-

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 22 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 89 main body

Bench Height: 48.0 ft avg

Sub-drill: 2.0 ft avg

Hole Depth: 50.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 45.0 ft avg

Main Body: 45.5 ft avg

- Charge Weight -

Front Row: 100.5 kg/hole

Main Body: 101.6 kg/hole

Max. per delay: 107.0 kg/delay

SD () Equation: 31.6 kg/delay

Total kg Loaded: 11,924 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.328 kg/te (actual)

Front row: 0.338 kg/te (theoretical)

Main Body: 0.308 kg/te (theoretical)

"KPI" PF: 0.313 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2016-04-28

Blast Number:	16-001
Orica Order #:	2023927
Blast Time:	12:41pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08353	74.74619	0.786856	1.304567
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08353	74.74619	0.786856	1.304567

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08478	74.74498	0.786878	1.304546
	2nd Reading				
	Average	45.08478	74.74498	0.786878	1.304546
	Distance (1st Seis. From Centre of Blast)	168.6 m			
	Post Blast Data:	ppV: 2.3 mm/s	Trigger set at: 2.0 mm/s		
		frequency: 30.0 Hz	V / T / L: ? (Vertical, Transverse or Longitudinal)		
		air overpressure: 115.0 dB	Trigger set at: 115 dB		
	NE of Blast				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (2nd Seis. From Centre of Blast)	0.0 m			
	Post Blast Data:	ppV: mm/s	Trigger set at: 2.0 mm/s		
		frequency: Hz	V / T / L: ? (Vertical, Transverse or Longitudinal)		
		air overpressure: dB	Trigger set at: 115 dB		
	Enter description of seismograph location				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0 m			
	Post Blast Data:	ppV: mm/s	Trigger set at: 2.0 mm/s		
		frequency: Hz	V / T / L: ? (Vertical, Transverse or Longitudinal)		
		air overpressure: dB	Trigger set at: 115 dB		
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(168.6)^2}{30^2} \text{ kg} \\
 &= \frac{28,426}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Quarry: McLeod

Blast Number: 16-002

P.O. #: Scott

Orica Order #: 2026057

Blast Date: 2016-05-03

Blast Time: 3:07pm

Blast Report

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: 30' Lower Bench (Bench / Face)

GPS Coordinates: 45.07768 °N Latitude 74.74630 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: E at 10 kph Temperature: 11 to 15 °C

Clear: X

Rain: X

Overcast: X

Partly Cloudy:

Snow:

Inversion:

tonnes Blasted: 46,852 te 17,353 m³

Holes Loaded: 231 holes

... including: 9 Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 9 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 31 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 200 main body

Bench Height: 30.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 30.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 5.0 ft avg

Material used: HL3

- Charge Length -

Front Row: 25.0 ft avg

Main Body: 25.0 ft avg

- Charge Weight -

Front Row: 55.8 kg/hole

Main Body: 55.8 kg/hole

Max. per delay: 61.0 kg/delay

SD () Equation: 269.4 kg/delay

Total kg Loaded: 14,471 kg

Rock Density: 2.70 g/cc = te/m³

Theoretical PF (Based on a single hole)

Yield Powder Factor (kg Loaded / te Blastec

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	34,890	21,530	13,360

Packaged Explosives:

	cs shipped	cs returned	kg
E113 65X400	33	25	200
E113 75X400	33	0	825

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	231	78.5
PENTEX 8 (OR EQUIVALENT)	0.23	31	7.0

total explosives weight in Blast (kg): 14,471

Pkgd Prod (1025 kg) % of Total kg: 7.1%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			31
UNITRONIC 600 15M			231

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	2
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=10,000 kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

1.406 lb/yd³
 1.055 lb/yd³
 1.230 lb/yd³
 1.211 lb/yd³

- Powder Factor -

Yield PF: 0.309 kg/te (actual)

Front row: 0.232 kg/te (theoretical)

Main Body: 0.270 kg/te (theoretical)

"KPI" PF: 0.266 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

Many voids and seams at the west end of the shot



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2016-05-03

Blast Number:	16-002
Orica Order #:	2026057
Blast Time:	3:07pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.07768	74.74630	0.786754	1.304569
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.07768	74.74630	0.786754	1.304569

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	574.5	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (2nd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blast - narrow, multi-row Blast with 1 Free Face?

$$\begin{aligned}
 W &= \frac{D^2}{35^2} \\
 &= \frac{(574.5)^2}{35^2} \text{ kg} \\
 &= \frac{330,050}{1,225} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2016-06-01

Blast Number: 16-003

Orica Order #: 2038757

Blast Time: 12:00pm

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: 50' Asphalt (Bench / Face)

GPS Coordinates: 45.08357 °N Latitude 74.74507 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: NE at 10 kph Temperature: 21 to 25 °C

Clear: Rain:
Overcast:
Partly Cloudy: Snow:
Inversion:

- Drilling Information -

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	88.9 mm	0°	# Holes:	71	=	3,266.0 ft (3 1/2 " diam)
Secondary Bit diam:	76.2 mm	°	# Holes:	13	=	598.0 ft (3 " diam)
Tertiary Bit diam:	101.6 mm	°	# Holes:	3	=	138.0 ft (4 " diam)

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	35,020	27,480	7,540

Packaged Explosives:

	cs shipped	cs returned	kg
E113 65X400	10	0	250
E113 75X400	10	9	25

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	87	29.6
PENTEX 8 (OR EQUIVALENT)	0.23	87	19.7

total explosives weight in Blast (kg): 7,864

Pkgd Prod (275 kg) % of Total kg: 3.5%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			86
UNITRONIC 600 20M			88

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

of Blasts today (this Quarry) 1

of Blasters (this Blast) 1

of Helpers (this Blast) Note Exception 3

of MMU's (this Blast) 1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 27,696 te 10,258 m³

Holes Loaded: 87 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 4 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 23 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 64 main body

Bench Height: 46.0 ft avg

Sub-drill: ft avg

Hole Depth: 46.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 41.0 ft avg

Main Body: 41.5 ft avg

- Charge Weight -

Front Row: 91.5 kg/hole

Main Body: 92.6 kg/hole

Max. per delay: 112.0 kg/delay

SD () Equation: 115.6 kg/delay

Total kg Loaded: 7,864 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.284 kg/te (actual)

Front row: 0.248 kg/te (theoretical)

Main Body: 0.293 kg/te (theoretical)

"KPI" PF: 0.281 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

1.292 lb/yd³
 1.128 lb/yd³
 1.332 lb/yd³
 1.281 lb/yd³

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2016-06-01

Blast Number:	16-003
Orica Order #:	2038757
Blast Time:	12:00pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08357	74.74507	0.786857	1.304548
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08357	74.74507	0.786857	1.304548

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading		45.08572	74.74232	0.786894	1.304500
2nd Reading					
Average	45.08572	74.74232	0.786894	1.304500	
Distance (1st Seis. From Centre of Blast)	322.5	m			
Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s	
frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
air overpressure: DNT	dB	Trigger set at: 115	dB		
NE of Blast					

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (2nd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s	
frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
air overpressure: DNT	dB	Trigger set at: 115	dB		
Enter description of seismograph location					

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (3rd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s	
frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
air overpressure: DNT	dB	Trigger set at: 115	dB		
Enter description of seismograph location					

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(322.5)^2}{30^2} \text{ kg} \\
 &= \frac{104,006}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2016-06-13

Blast Number: 16-004

Orica Order #: 2043225

Blast Time: 11:58am

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: 30' Lower Bench (Bench / Face)

GPS Coordinates: 45.07829 °N Latitude 74.74587 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: W at 20 kph Temperature: 11 to 15 °C

Clear: Rain: Overcast: Partly Cloudy: Snow: Inversion: tonnes Blasted: 35,988 te 13,329 m³

Holes Loaded: 170 holes

... including: Dead Holes

... and: 1 Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 10 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 26 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 144 main body

Bench Height: 30.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 30.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 25.0 ft avg

Main Body: 25.5 ft avg

- Charge Weight -

Front Row: 55.8 kg/hole

Main Body: 56.9 kg/hole

Max. per delay: 61.0 kg/delay

SD () Equation: 325.6 kg/delay

Total kg Loaded: 10,653 kg

Rock Density: 2.70 g/cc = te/m³

Theoretical PF (Based on a single hole)

1.347 lb/yd³1.055 lb/yd³1.255 lb/yd³1.235 lb/yd³

- Powder Factor -

Yield PF: 0.296 kg/te (actual)

Front row: 0.232 kg/te (theoretical)

Main Body: 0.276 kg/te (theoretical)

"KPI" PF: 0.271 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	35,170	24,900	10,270

Packaged Explosives:

	cs shipped	cs returned	kg
E113 65X400	15	11	100
E113 75X400	10	1	225

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	171	58.1
PENTEX 8 (OR EQUIVALENT)	0.23	1	0.2

total explosives weight in Blast (kg): 10,653

Pkgd Prod (325 kg) % of Total kg: 3.1%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			1
UNITRONIC 600 15M			171

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

of Blasts today (this Quarry) 1

of Blasters (this Blast) 1

of Helpers (this Blast) Note Exception 3

of MMU's (this Blast) 1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=10,000 kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry: McLeod
P.O. #: Scott
Blast Date: 2016-06-13

Blast Number: 16-004
Orica Order #: 2043225
Blast Time: 11:58am

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.07829	74.74587	0.786765	1.304562
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.07829	74.74587	0.786765	1.304562

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	631.6	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (2nd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blast - narrow, multi-row Blast with 1 Free Face?

$$\begin{aligned}
 W &= \frac{D^2}{35^2} \\
 &= \frac{(631.6)^2}{35^2} \text{ kg} \\
 &= \frac{398,919}{1,225} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Quarry: McLeod

Blast Number: 16-005

P.O. #: Scott

Orica Order #: 2044509

Blast Date: 2016-06-15

Blast Time: 12:59pm

Blast Report

page 1

Master-in-charge: Bradley Crook

(Print Name)

Blast Location: 30' Lower Bench

(Bench / Face)

GPS Coordinates: 45.07747

°N Latitude

74.74638

°W Longitude

Centre of Blast

Centre of Blast

Wind from the: W at 10 kph

Temperature: 26 to 30 °C

Clear: X

Rain: X

Overcast: X

Partly Cloudy:

Snow:

Inversion:

tonnes Blasted: 39,497 te 14,628 m³

Holes Loaded: 205 holes

... including: Dead Holes

... and: Helper Holes

ft avg

9 rows

Helper Hole Collar:

Rows Blasted:

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 27 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 178 main body

Bench Height: 30.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 30.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 25.0 ft avg

Main Body: 25.5 ft avg

- Charge Weight -

Front Row: 55.8 kg/hole

Main Body: 56.9 kg/hole

Max. per delay: 61.0 kg/delay

SD () Equation: 250.7 kg/delay

Total kg Loaded: 12,187 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.309 kg/te (actual)

Front row: 0.232 kg/te (theoretical)

Main Body: 0.276 kg/te (theoretical)

"KPI" PF: 0.271 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=10,000 kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretotraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2016-06-15

Blast Number:	16-005
Orica Order #:	2044509
Blast Time:	12:59pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.07747	74.74638	0.786750	1.304570
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.07747	74.74638	0.786750	1.304570

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	554.2	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (2nd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blast - narrow, multi-row Blast with 1 Free Face?

$$\begin{aligned}
 W &= \frac{D^2}{35^2} \\
 &= \frac{(554.2)^2}{35^2} \text{ kg} \\
 &= \frac{307,138}{1,225} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2016-06-16

Blast Number: 16-006

Orica Order #: 2045161

Blast Time: 12:04pm

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: 50' Asphalt (Bench / Face)

GPS Coordinates: 45.08355 °N Latitude 74.74567 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: E at 10 kph Temperature: 26 to 30 °C

Clear: Rain: Overcast: Partly Cloudy: Snow: Inversion: tonnes Blasted: 28,078 te 10,399 m³

Holes Loaded: 72 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 6 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 19 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 53 main body

Bench Height: 50.0 ft avg

Sub-drill: ft avg

Hole Depth: 50.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 45.0 ft avg

Main Body: 45.5 ft avg

- Charge Weight -

Front Row: 100.5 kg/hole

Main Body: 101.6 kg/hole

Max. per delay: 112.0 kg/delay

SD () Equation: 141.9 kg/delay

Total kg Loaded: 8,996 kg

Rock Density: 2.70 g/cc = te/m³

Theoretical PF (Based on a single hole)		
1.458	lb/yd ³	
1.139	lb/yd ³	
1.344	lb/yd ³	
1.310	lb/yd ³	

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

Cord & Accessories:		
	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:		
# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	2
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2016-06-16

Blast Number:	16-006
Orica Order #:	2045161
Blast Time:	12:04pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08355	74.74567	0.786856	1.304558
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08355	74.74567	0.786856	1.304558

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08572	74.74232	0.786894	1.304500
	2nd Reading				
	Average	45.08572	74.74232	0.786894	1.304500
	Distance (1st Seis. From Centre of Blast)	357.4	m		
	Post Blast Data:	ppV:	2.5 mm/s	Trigger set at: 2.0 mm/s	
		frequency:	30.0 Hz	V / T / L : ?	(Vertical, Transverse or Longitudinal)
		air overpressure:	113.0 dB	Trigger set at: 115 dB	
	NE of Blast				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (2nd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0 mm/s	
		frequency:	Hz	V / T / L : ?	(Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115 dB	
	Enter description of seismograph location				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0 mm/s	
		frequency:	Hz	V / T / L : ?	(Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115 dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(357.4)^2}{30^2} \text{ kg} \\
 &= \frac{127,735}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Quarry: McLeod

Blast Number: 16-007

Blast Report

P.O. #: Scott

Orica Order #: 2046337

Blast Date: 2016-06-20

Blast Time: 12:00pm

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: 30' Lower Bench (Bench / Face)

GPS Coordinates: 45.07863 °N Latitude 74.74613 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: SW at 15 kph Temperature: 26 to 30 °C

Clear: X

Rain: X

Overcast: X

Partly Cloudy:

Snow:

Inversion:

tonnes Blasted: 29,691 te 10,997 m³

Holes Loaded: 140 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 10 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 23 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 117 main body

Bench Height: 30.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 30.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 25.0 ft avg

Main Body: 25.5 ft avg

- Charge Weight -

Front Row: 55.8 kg/hole

Main Body: 56.9 kg/hole

Max. per delay: 61.0 kg/delay

SD () Equation: 369.8 kg/delay

Total kg Loaded: 8,013 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.270 kg/te (actual)

Front row: 0.232 kg/te (theoretical)

Main Body: 0.276 kg/te (theoretical)

"KPI" PF: 0.271 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit, B, S, Expl or IS from previous Blast:

Resource Deployment:

of Blasts today (this Quarry) 1

of Blasters (this Blast) 1

of Helpers (this Blast) Note Exception 3

of MMU's (this Blast) 1

Services:

GPS LAYOUT Enter "1" if Layout by GPS 0

BULK TRUCK CHARGE >/=5,000kg <10,000kg 1

SHOT SERVICE FEE * Line Item (Fee per Blast) 1

SEISMOGRAPH RENTAL Line Item (Fee per Blast) 1

3D LASER PROFILE Enter "1" if 3D Profiled 0

BORETRACK Enter "1" if Boretraked 0

LABOUR CHARGE (enter HOURS) Must be pre-authorized 0.0

1.228 lb/yd³1.055 lb/yd³1.255 lb/yd³1.235 lb/yd³

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry: McLeod
P.O. #: Scott
Blast Date: 2016-06-20

Blast Number: 16-007
Orica Order #: 2046337
Blast Time: 12:00pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.07863	74.74613	0.786771	1.304566
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.07863	74.74613	0.786771	1.304566

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	673.1	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (2nd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
	frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)	
	air overpressure: DNT	dB	Trigger set at: 115	dB	
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blast - narrow, multi-row Blast with 1 Free Face?

$$\begin{aligned}
 W &= \frac{D^2}{35^2} \\
 &= \frac{(673.1)^2}{35^2} \text{ kg} \\
 &= \frac{453,064}{1,225} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

jim bray

Orica
Blaster-in-charge:

Bradley Crook

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Quarry: McLeod

Blast Number: 16-008

P.O. #: Scott

Orica Order #: 2052220

Blast Date: 2016-07-04 Blast Time: 1:00pm

Blast Report

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: 50' Concrete (Bench / Face)

GPS Coordinates: 45.08276 °N Latitude 74.77492 °W Longitude
Centre of Blast Centre of Blast

Wind from the: SW at 10 kph Temperature: 26 to 30 °C

Clear: Rain: Overcast:
Partly Cloudy: Snow: Inversion:

- Drilling Information -

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	88.9	mm	0°	# Holes:	100	=	5,000.0 ft (3 1/2 " diam)
Secondary Bit diam:	76.2	mm	°	# Holes:	5	=	250.0 ft (3 " diam)
Tertiary Bit diam:	101.6	mm	°	# Holes:	6	=	300.0 ft (4 " diam)

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	35,200	23,890	11,310

Packaged Explosives:

	cs shipped	cs returned	kg
E113 65X400	10	4	150
E113 75X400	10	1	225

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	111	37.7
PENTEX 8 (OR EQUIVALENT)	0.23	111	25.2

total explosives weight in Blast (kg): 11,748

Pkgd Prod (375 kg) % of Total kg: 3.2%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			111
UNITRONIC 600 20M			111

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	2
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=10,000 kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 35,609 te 13,189 m³

Holes Loaded: 111 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 6 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 9.0 ft avg

Holes: 24 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 87 main body

Bench Height: 50.0 ft avg

Sub-drill: ft avg

Hole Depth: 50.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 45.0 ft avg

Main Body: 45.5 ft avg

- Charge Weight -

Front Row: 100.5 kg/hole

Main Body: 101.6 kg/hole

Max. per delay: 112.0 kg/delay

SD () Equation: 5449.8 kg/delay

Total kg Loaded: 11,748 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.330 kg/te (actual)

Front row: 0.278 kg/te (theoretical)

Main Body: 0.328 kg/te (theoretical)

"KPI" PF: 0.320 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

1.501 lb/yd³
 1.266 lb/yd³
 1.493 lb/yd³
 1.455 lb/yd³

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2016-07-04

Blast Number:	16-008
Orica Order #:	2052220
Blast Time:	1:00pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08276	74.77492	0.786843	1.305069
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08276	74.77492	0.786843	1.305069

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading		45.08572	74.74232	0.786894	1.304500
2nd Reading					
Average	45.08572	74.74232	0.786894	1.304500	
Distance (1st Seis. From Centre of Blast)	2583.8	m			
Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s	
frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
air overpressure: DNT	dB	Trigger set at: 115	dB		
NE of Blast					

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (2nd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s	
frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
air overpressure: DNT	dB	Trigger set at: 115	dB		
Enter description of seismograph location					

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (3rd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s	
frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
air overpressure: DNT	dB	Trigger set at: 115	dB		
Enter description of seismograph location					

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blast - narrow, multi-row Blast with 1 Free Face?

$$\begin{aligned}
 W &= \frac{D^2}{35^2} \\
 &= \frac{(2583.8)^2}{35^2} \text{ kg} \\
 &= \frac{6,676,022}{1,225} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Quarry: McLeod

Blast Number: 16-009

P.O. #: Scott

Orica Order #: 2060936

Blast Date: 2016-07-25

Blast Time: 12:20pm

Blast Report

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: 50' Concrete (Bench / Face)

GPS Coordinates: 45.08231 °N Latitude 74.74898 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: SW at 15 kph Temperature: 26 to 30 °C

Clear:

Rain: X

Overcast: X

Partly Cloudy:

Snow:

Inversion:

- Drilling Information -

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	88.9	mm	0°	# Holes:	83	=	4,150.0 ft (3 1/2 " diam)
Secondary Bit diam:	76.2	mm	°	# Holes:	22	=	1,100.0 ft (3 " diam)
Tertiary Bit diam:		mm	°	# Holes:		=	0.0 ft (" diam)

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	32,700	22,790	9,910

Packaged Explosives:

	cs shipped	cs returned	kg
E113 65X400	10	3	175
E113 75X400	10	10	0

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	105	35.7
PENTEX 8 (OR EQUIVALENT)	0.23	105	23.8

total explosives weight in Blast (kg): 10,145

Pkgd Prod (175 kg) % of Total kg: 1.7%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			105
UNITRONIC 600 20M			105

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

of Blasts today (this Quarry) 1

of Blasters (this Blast) 1

of Helpers (this Blast) Note Exception 2

of MMU's (this Blast) 1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 31,584 te 11,698 m³**# Holes Loaded:** 105 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 6 rows

Rate Code:

- Pattern (Front Row)-

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 21 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 84 main body

Bench Height: 50.0 ft avg

Sub-drill: ft avg

Hole Depth: 50.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 45.0 ft avg

Main Body: 45.5 ft avg

- Charge Weight -

Front Row: 100.5 kg/hole

Main Body: 101.6 kg/hole

Max. per delay: 112.0 kg/delay

SD () Equation: 340.8 kg/delay

Total kg Loaded: 10,145 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.321 kg/te (actual)

Front row: 0.324 kg/te (theoretical)

Main Body: 0.328 kg/te (theoretical)

"KPI" PF: 0.327 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

.....

.....

.....

.....

.....

.....

.....

.....

.....

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2016-07-25

Blast Number:	16-009
Orica Order #:	2060936
Blast Time:	12:20pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08231	74.74898	0.786835	1.304616
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08231	74.74898	0.786835	1.304616

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading		45.08572	74.74232	0.786894	1.304500
2nd Reading					
Average	45.08572	74.74232	0.786894	1.304500	
Distance (1st Seis. From Centre of Blast)	646.1	m			
Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s	
frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
air overpressure: DNT	dB	Trigger set at: 115	dB		
NE of Blast					

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (2nd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s	
frequency:	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
air overpressure:	dB	Trigger set at: 115	dB		
Enter description of seismograph location					

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (3rd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s	
frequency:	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
air overpressure:	dB	Trigger set at: 115	dB		
Enter description of seismograph location					

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blast - narrow, multi-row Blast with 1 Free Face?

$$\begin{aligned}
 W &= \frac{D^2}{35^2} \\
 &= \frac{(646.1)^2}{35^2} \text{ kg} \\
 &= \frac{417,445}{1,225} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2016-08-10

Blast Number: 16-010

Orica Order #: 2067902

Blast Time: 12:07 PM

page 1

Master-in-charge: Dana Koch (Print Name)

Blast Location: 50' Concrete (Bench / Face)

GPS Coordinates: 45.08261 °N Latitude 74.74933 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: SW at 20 kph Temperature: 26 to 30 °C

Clear: X

Rain: X

Overcast: X

Partly Cloudy:

Snow:

Inversion:

tonnes Blasted: 13,005 te 4,817 m³

Holes Loaded: 46 holes

... including: Dead Holes

... and: 64 Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 3 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 9.0 ft avg

Holes: 16 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 30 main body

Bench Height: 50.0 ft avg

Sub-drill: ft avg

Hole Depth: 50.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 45.0 ft avg

Main Body: 45.5 ft avg

- Charge Weight -

Front Row: 100.5 kg/hole

Main Body: 101.6 kg/hole

Max. per delay: 127.0 kg/delay

SD () Equation: 346.1 kg/delay

Total kg Loaded: 4,886 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.376 kg/te (actual)

Front row: 0.278 kg/te (theoretical)

Main Body: 0.328 kg/te (theoretical)

"KPI" PF: 0.311 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

Pre Shear 38 holes loaded

Sold 2 cases of Powerfrac 50 x 400

Sold 1 case of Powditch 50 x 400

Sold 6 cases of Primaflex 400 grain

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	33,660	29,000	4,660

Packaged Explosives:

	cs shipped	cs returned	kg
E113 65X400	6	2	100
E113 75X400	6	2	100

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	46	15.6
PENTEX 8 (OR EQUIVALENT)	0.23	46	10.4

total explosives weight in Blast (kg): 4,886

Pkgd Prod (200 kg) % of Total kg: 4.1%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			46
UNITRONIC 600 20M			84

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

of Blasts today (this Quarry) 1

of Blasters (this Blast) 1

of Helpers (this Blast) Note Exception 3

of MMU's (this Blast) 1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=2,000kg <5,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

1.710 lb/yd³1.266 lb/yd³1.493 lb/yd³1.417 lb/yd³Theoretical PF (Based on a single hole)
Yield Powder Factor (kg Loaded / te Blastec)



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2016-08-10

Blast Number:	16-010
Orica Order #:	2067902
Blast Time:	12:07 PM

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08261	74.74933	0.786840	1.304622
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08261	74.74933	0.786840	1.304622

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading		45.08572	74.74232	0.786894	1.304500
2nd Reading					
Average	45.08572	74.74232	0.786894	1.304500	
Distance (1st Seis. From Centre of Blast)	651.1	m			
Post Blast Data:	ppV:	2.0	mm/s	Trigger set at: 2.0	mm/s
	frequency:	17.0	Hz	V / T / L :	T (Vertical, Transverse or Longitudinal)
	air overpressure:	128.8	dB	Trigger set at:	115 dB
650M NE of Blast					

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (2nd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV:		mm/s	Trigger set at: 2.0	mm/s
	frequency:		Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
	air overpressure:		dB	Trigger set at:	115 dB
Enter description of seismograph location					

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (3rd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV:		mm/s	Trigger set at: 2.0	mm/s
	frequency:		Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
	air overpressure:		dB	Trigger set at:	115 dB
Enter description of seismograph location					

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blast - narrow, multi-row Blast with 1 Free Face?

$$\begin{aligned}
 W &= \frac{D^2}{35^2} \\
 &= \frac{(651.1)^2}{35^2} \text{ kg} \\
 &= \frac{423,931}{1,225} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Dana Koch

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Quarry: McLeod

Blast Number: 16-011

P.O. #: Scott

Orica Order #: 2072534

Blast Date: 2016-08-22

Blast Time: 2:30pm

Blast Report

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: 35' Concrete Bench (Bench / Face)

GPS Coordinates: 45.08236 °N Latitude 74.74920 °W Longitude

Centre of Blast

Centre of Blast

Wind from the: NW at 15 kph Temperature: 21 to 25 °C

Clear: Rain: Overcast: Partly Cloudy: Snow: Inversion: tonnes Blasted: 19,941 te 7,386 m³

Holes Loaded: 90 holes

... including: Dead Holes

... and: 76 Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 7 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 9.0 ft avg

Holes: 12 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 78 main body

Bench Height: 35.0 ft avg

Sub-drill: ft avg

Hole Depth: 35.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 5.0 ft avg

Material used: HL3

- Charge Length -

Front Row: 30.0 ft avg

Main Body: 30.0 ft avg

- Charge Weight -

Front Row: 67.0 kg/hole

Main Body: 67.0 kg/hole

Max. per delay: 72.0 kg/delay

SD () Equation: 480.5 kg/delay

Total kg Loaded: 6,806 kg

Rock Density: 2.70 g/cc = te/m³

Theoretical PF (Based on a single hole)

1.553 lb/yd³1.205 lb/yd³1.406 lb/yd³1.378 lb/yd³

- Powder Factor -

Yield PF: 0.341 kg/te (actual)

Front row: 0.265 kg/te (theoretical)

Main Body: 0.309 kg/te (theoretical)

"KPI" PF: 0.303 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

Pre Shear 37 holes loaded

Sold 2 cases of Powerfrac 50 x 400 (2x16)

Sold 2 cases of Primaflex Det cord 400 grain

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	35,010	28,610	6,400

Packaged Explosives:

	cs shipped	cs returned	kg
E113 65X400	8	1	175
E113 75X400	8	0	200

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	90	30.6
PENTEX 8 (OR EQUIVALENT)	0.23	0	

total explosives weight in Blast (kg): 6,806

Pkgd Prod (375 kg) % of Total kg: 5.5%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			0
UNITRONIC 600 15M			127

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

of Blasts today (this Quarry) 1

of Blasters (this Blast) 1

of Helpers (this Blast) Note Exception 3

of MMU's (this Blast) 1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2016-08-22

Blast Number:	16-011
Orica Order #:	2072534
Blast Time:	2:30pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08236	74.74920	0.786836	1.304620
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08236	74.74920	0.786836	1.304620

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading		45.08572	74.74232	0.786894	1.304500
2nd Reading					
Average	45.08572	74.74232	0.786894	1.304500	
Distance (1st Seis. From Centre of Blast)	657.6	m			
Post Blast Data:	ppV:	2.8	mm/s	Trigger set at: 2.0	mm/s
	frequency:	39.0	Hz	V / T / L :	T (Vertical, Transverse or Longitudinal)
	air overpressure:	129.0	dB	Trigger set at:	115 dB
650M NE of Blast					

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (2nd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV:		mm/s	Trigger set at: 2.0	mm/s
	frequency:		Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
	air overpressure:		dB	Trigger set at:	115 dB
Enter description of seismograph location					

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (3rd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV:		mm/s	Trigger set at: 2.0	mm/s
	frequency:		Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
	air overpressure:		dB	Trigger set at:	115 dB
Enter description of seismograph location					

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(657.6)^2}{30^2} \text{ kg} \\
 &= \frac{432,438}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2016-08-29

Blast Number: 16-012

Orica Order #: 1014484

Blast Time: 12:06m

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: North Concrete Bench (Bench / Face)

GPS Coordinates: 45.08369 °N Latitude 74.74745 °W Longitude
Centre of Blast Centre of Blast

Wind from the: NW at 15 kph Temperature: 21 to 25 °C

Clear: Rain: Overcast:
Partly Cloudy: Snow: Inversion: **- Drilling Information -**

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	88.9	mm	0°	# Holes:	89	=	4,361.0 ft (3 1/2 " diam)
Secondary Bit diam:	76.2	mm	°	# Holes:	13	=	637.0 ft (3 " diam)
Tertiary Bit diam:	101.6	mm	°	# Holes:	1	=	49.0 ft (4 " diam)

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	33,080	22,650	10,430

Packaged Explosives:	cs shipped	cs returned	kg
E113 65X400	15	3	300
E113 75X400	15	10	125

Boosters:	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	103	35.0
PENTEX 8 (OR EQUIVALENT)	0.23	104	23.6

total explosives weight in Blast (kg): 10,914

Pkgd Prod (425 kg) % of Total kg: 3.9%

Detonators: case #'s ms # used

UNITRONIC 600 6M			98
UNITRONIC 600 20M			108

Cord & Accessories: U of M # used

HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	3
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=10,000 kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 32,975 te 12,213 m³

Holes Loaded: 103 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 4 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 9.0 ft avg

Holes: 34 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 69 main body

Bench Height: 49.0 ft avg

Sub-drill: ft avg

Hole Depth: 49.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 5.0 ft avg

Material used: HL3

- Charge Length -

Front Row: 44.0 ft avg

Main Body: 44.0 ft avg

- Charge Weight -

Front Row: 98.2 kg/hole

Main Body: 98.2 kg/hole

Max. per delay: 112.0 kg/delay

SD () Equation: 237.7 kg/delay

Total kg Loaded: 10,914 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.331 kg/te (actual)

Front row: 0.277 kg/te (theoretical)

Main Body: 0.324 kg/te (theoretical)

"KPI" PF: 0.312 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

.....

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Theoretical PF (Based on a single hole)

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2016-08-29

Blast Number:	16-012
Orica Order #:	1014484
Blast Time:	12:06m

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08369	74.74745	0.786859	1.304589
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08369	74.74745	0.786859	1.304589

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading		45.08572	74.74232	0.786894	1.304500
2nd Reading					
Average	45.08572	74.74232	0.786894	1.304500	
Distance (1st Seis. From Centre of Blast)	462.5	m			
Post Blast Data:	ppV:	2.7	mm/s	Trigger set at: 2.0	mm/s
	frequency:	34.0	Hz	V / T / L :	T (Vertical, Transverse or Longitudinal)
	air overpressure:	118.0	dB	Trigger set at:	115 dB
460M East of Blast					

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (2nd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV:		mm/s	Trigger set at: 2.0	mm/s
	frequency:		Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
	air overpressure:		dB	Trigger set at:	115 dB
Enter description of seismograph location					

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (3rd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV:		mm/s	Trigger set at: 2.0	mm/s
	frequency:		Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
	air overpressure:		dB	Trigger set at:	115 dB
Enter description of seismograph location					

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(462.5)^2}{30^2} \text{ kg} \\
 &= \frac{213,906}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Jim Bray
Orica
 Blaster-in-charge:

*Bradley Crook*Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2016-09-13

Blast Number: 16-013

Orica Order #: 2082627

Blast Time: 2:52pm

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: North Concrete Bench (Bench / Face)
GPS Coordinates: 45.08377 °N Latitude 74.74787 °W Longitude

Centre of Blast Centre of Blast

Wind from the: SW at 25 kph Temperature: 26 to 30 °C

Clear: X Rain: X Overcast: X
Partly Cloudy: Snow: Inversion:**- Drilling Information -**

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	88.9 mm	0°	# Holes: 122	= 5,978.0 ft (3 1/2 " diam)
Secondary Bit diam:	mm	°	# Holes:	= 0.0 ft (" diam)
Tertiary Bit diam:	mm	°	# Holes:	= 0.0 ft (" diam)

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	32,470	21,190	11,280
CENTRA GOLD 70	29,070	27,590	1,480

Packaged Explosives:

	cs shipped	cs returned	kg
E113 65X400	10	6	100
E113 75X400	10	1	225

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	122	41.5
PENTEX 8 (OR EQUIVALENT)	0.23	128	29.1

total explosives weight in Blast (kg): 13,156

Pkgd Prod (325 kg) % of Total kg: 2.5%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			122
UNITRONIC 600 20M			127

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	2
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=10,000 kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

Theoretical PF (Based on a single hole)

tonnes Blasted: 38,640 te 14,311 m³

Holes Loaded: 122 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 4 rows

Rate Code:

- Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 9.0 ft avg

Holes: 32 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 90 main body

Bench Height: 49.0 ft avg

Sub-drill: ft avg

Hole Depth: 49.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 5.0 ft avg

Material used: HL3

- Charge Length -

Front Row: 44.0 ft avg

Main Body: 44.0 ft avg

- Charge Weight -

Front Row: 98.2 kg/hole

Main Body: 98.2 kg/hole

Max. per delay: 109.0 kg/delay

SD () Equation: 264.3 kg/delay

Total kg Loaded: 13,156 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.340 kg/te (actual)

Front row: 0.277 kg/te (theoretical)

Main Body: 0.324 kg/te (theoretical)

"KPI" PF: 0.312 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

5 voids had to triple prime and load with E113 75

1 200g booster dropped into hole

1.549 lb/yd³

1.263 lb/yd³

1.473 lb/yd³

1.421 lb/yd³

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry: McLeod
P.O. #: Scott
Blast Date: 2016-09-13

Blast Number: 16-013
Orica Order #: 2082627
Blast Time: 2:52pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08377	74.74787	0.786860	1.304597
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08377	74.74787	0.786860	1.304597

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.08572	74.74232	0.786894	1.304500
	2nd Reading				
	Average	45.08572	74.74232	0.786894	1.304500
	Distance (1st Seis. From Centre of Blast)	487.7	m		
	Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s
		frequency: DNT	Hz	V / T / L: T	(Vertical, Transverse or Longitudinal)
		air overpressure: DNT	dB	Trigger set at: 115	dB
	487M East of Blast				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (2nd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
		frequency:	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115	dB

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
		frequency:	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at: 115	dB
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(487.7)^2}{30^2} \text{ kg} \\
 &= \frac{237,851}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Quarry: McLeod

Blast Number: 16-014

P.O. #: Scott

Orica Order #: 2092601

Blast Date: 2016-10-05

Blast Time: 12:02pm

Blast Report

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: North Concrete Bench (Bench / Face)
GPS Coordinates: 45.08301 °N Latitude 74.74944 °W Longitude

Centre of Blast Centre of Blast

Wind from the: S at 10 kph Temperature: 16 to 20 °C

Clear: X Rain: X Overcast: X
Partly Cloudy: Snow: Inversion:

- Drilling Information -

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	88.9	mm	0°	# Holes:	58	=	2,900.0 ft (3 1/2 " diam)
Secondary Bit diam:	76.2	mm	°	# Holes:	17	=	850.0 ft (3 " diam)
Tertiary Bit diam:		mm	°	# Holes:		=	0.0 ft (" diam)

Bulk Explosives:

	in (kg)	out (kg)	kg
CENTRA GOLD 70	33,890	26,560	7,330

Packaged Explosives:

	cs shipped	cs returned	kg
FORTEL PRO 65X400	10	2	200
E113 75X400	5	5	0

Boosters:

	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	75	25.5
PENTEX 8 (OR EQUIVALENT)	0.23	76	17.3

total explosives weight in Blast (kg): 7,573

Pkgd Prod (200 kg) % of Total kg: 2.6%

Detonators:

	case #'s	ms	# used
UNITRONIC 600 6M			76
UNITRONIC 600 20M			75

Cord & Accessories:

	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

of Blasts today (this Quarry) 1

of Blasters (this Blast) 1

of Helpers (this Blast) Note Exception 2

of MMU's (this Blast) 1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 21,025 te 7,787 m³

Holes Loaded: 75 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 10 rows

Rate Code: - Pattern (Front Row)-

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 13 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 62 main body

Bench Height: 50.0 ft avg

Sub-drill: ft avg

Hole Depth: 50.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 5.0 ft avg

Material used: HL3

- Charge Length -

Front Row: 45.0 ft avg

Main Body: 45.0 ft avg

- Charge Weight -

Front Row: 100.5 kg/hole

Main Body: 100.5 kg/hole

Max. per delay: 109.0 kg/delay

SD () Equation: 469.8 kg/delay

Total kg Loaded: 7,573 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.360 kg/te (actual)

Front row: 0.324 kg/te (theoretical)

Main Body: 0.324 kg/te (theoretical)

"KPI" PF: 0.324 kg/te (theoretical)

Theoretical PF (Based on a single hole)

1.639 lb/yd³

1.477 lb/yd³

1.477 lb/yd³

1.477 lb/yd³

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

9' Face Buden with 3" holes

Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2016-10-05

Blast Number:	16-014
Orica Order #:	2092601
Blast Time:	12:02pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08301	74.74944	0.786847	1.304624
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08301	74.74944	0.786847	1.304624

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading		45.08960	74.74698	0.786962	1.304581
2nd Reading					
Average	45.08960	74.74698	0.786962	1.304581	
Distance (1st Seis. From Centre of Blast)	758.6	m			
Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s	
frequency: DNT	Hz	V / T / L: T	(Vertical, Transverse or Longitudinal)		
air overpressure: DNT	dB	Trigger set at: 115	dB		
Concrete Dump Site					

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (2nd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s	
frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
air overpressure: DNT	dB	Trigger set at: 115	dB		
Enter description of seismograph location					

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (3rd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s	
frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
air overpressure: DNT	dB	Trigger set at: 115	dB		
Enter description of seismograph location					

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blast - narrow, multi-row Blast with 1 Free Face?

$$\begin{aligned}
 W &= \frac{D^2}{35^2} \\
 &= \frac{(758.6)^2}{35^2} \text{ kg} \\
 &= \frac{575,474}{1,225} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2016-11-01

Blast Number: 16-015

Orica Order #: 2104824

Blast Time: 1:46pm

page 1

Master-in-charge: Bradley Crook (Print Name)

Blast Location: North Concrete Bench (Bench / Face)
GPS Coordinates: 45.08312 °N Latitude 74.74898 °W Longitude

Centre of Blast Centre of Blast

Wind from the: S at 10 kph Temperature: 6 to 10 °C

Clear: Rain: Overcast:
Partly Cloudy: Snow: Inversion: **- Drilling Information -**

Angle from Vertical			Nominal Bit Diameter:		
Primary Bit diam:	88.9 mm	0°	# Holes:	46	= 2,300.0 ft (3 1/2 " diam)
Secondary Bit diam:	76.2 mm	°	# Holes:	30	= 1,500.0 ft (3 " diam)
Tertiary Bit diam:	mm	°	# Holes:		= 0.0 ft (" diam)

Bulk Explosives:	in (kg)	out (kg)	kg
CENTRA GOLD 70	34,010	25,920	8,090
Packaged Explosives:	cs shipped	cs returned	kg
E113 65X400	33	16	425
E113 75X400	33	24	225
Boosters:	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	91	30.9
PENTEX 8 (OR EQUIVALENT)	0.23	92	20.9
total explosives weight in Blast (kg):			8,792
Pkgd Prod (650 kg) % of Total kg:			7.4%

Detonators:	case #'s	ms	# used
UNITRONIC 600 6M			72
UNITRONIC 600 9M			14
UNITRONIC 600 20M			97

Cord & Accessories:	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	3
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/=5,000kg <10,000kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 25,613 te 9,486 m³

Holes Loaded: 91 holes

... including: Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 4 rows

Rate Code:

- Pattern (Front Row)-

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 24 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 9.0 ft avg

Holes: 67 main body

Bench Height: 50.0 ft avg

Sub-drill: ft avg

Hole Depth: 50.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 5.0 ft avg

Main Body: 5.0 ft avg

Material used: HL3

- Charge Length -

Front Row: 45.0 ft avg

Main Body: 45.0 ft avg

- Charge Weight -

Front Row: 100.5 kg/hole

Main Body: 100.5 kg/hole

Max. per delay: 109.0 kg/delay

SD () Equation: 607.3 kg/delay

Total kg Loaded: 8,792 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.343 kg/te (actual)

Front row: 0.324 kg/te (theoretical)

Main Body: 0.324 kg/te (theoretical)

"KPI" PF: 0.324 kg/te (theoretical)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:

9' Face Buden with 3" holes

1.562 lb/yd³
1.477 lb/yd³
1.477 lb/yd³
1.477 lb/yd³Theoretical PF (Based on a single hole)
Yield Powder Factor (kg Loaded / te Blastec



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2016-11-01

Blast Number:	16-015
Orica Order #:	2104824
Blast Time:	1:46pm

page 2

Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.08312	74.74898	0.786849	1.304616
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.08312	74.74898	0.786849	1.304616

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading		45.08960	74.74698	0.786962	1.304581
2nd Reading					
Average	45.08960	74.74698	0.786962	1.304581	
Distance (1st Seis. From Centre of Blast)	739.3	m			
Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s	
frequency: DNT	Hz	V / T / L: T	(Vertical, Transverse or Longitudinal)		
air overpressure: DNT	dB	Trigger set at: 115	dB		
Concrete Dump Site					

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (2nd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s	
frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
air overpressure: DNT	dB	Trigger set at: 115	dB		
Concrete Dump Site					

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
1st Reading					
2nd Reading					
Average	0.00000	0.00000	0.000000	0.000000	0.000000
Distance (3rd Seis. From Centre of Blast)	0.0	m			
Post Blast Data:	ppV: DNT	mm/s	Trigger set at: 2.0	mm/s	
frequency: DNT	Hz	V / T / L: ?	(Vertical, Transverse or Longitudinal)		
air overpressure: DNT	dB	Trigger set at: 115	dB		
Concrete Dump Site					

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blasting - 2 Free Faces

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(739.3)^2}{30^2} \text{ kg} \\
 &= \frac{546,564}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.



Customer: Cornwall Gravel

Blast Report

Quarry: McLeod

P.O. #: Scott

Blast Date: 2016-11-10

Blast Number: 16-016

Orica Order #: 2109028

Blast Time: 12:29 PM

page 1 Blaster-in-charge: Kevin Myerscough (Print Name)

Blast Location: 30' Bench, South Face (Bench / Face)
GPS Coordinates: 45.07723 °N Latitude 74.74632 °W Longitude
Centre of Blast Centre of BlastWind from the: SW at 30 kph Temperature: 6 to 10 °C
Clear: Rain: Overcast:
Partly Cloudy: Snow: Inversion: **- Drilling Information -**

Angle from Vertical				Nominal Bit Diameter:
Primary Bit diam: 88.9 mm	0°	# Holes: 175	=	5,250.0 ft (3 1/2 " diam)
Secondary Bit diam: 76.2 mm	°	# Holes: 7	=	210.0 ft (3 " diam)
Tertiary Bit diam: mm	°	# Holes:	=	0.0 ft (" diam)

Bulk Explosives:	in (kg)	out (kg)	kg
CENTRA GOLD 70	33,700	22,730	10,970
Packaged Explosives:	cs shipped	cs returned	kg
E113 65X400	15	7	200
E113 75X400	15	8	175
Boosters:	kg / unit	# used	kg
PENTEX 12 (OR EQUIVALENT)	0.34	182	61.9
PENTEX 8 (OR EQUIVALENT)	0.23	4	0.9

total explosives weight in Blast (kg): 11,408

Pkgd Prod (375 kg) % of Total kg: 3.3%

Detonators:	case #'s	ms	# used
UNITRONIC 600 6M	61336353-15		4
UNITRONIC 600 15M	61336662-32		182

Cord & Accessories:	U of M	# used
HARNESS WIRE DUPLEX (6 PACK) 400M	units	1
	units	
	units	

Resource Deployment:

# of Blasts today (this Quarry)		1
# of Blasters (this Blast)		1
# of Helpers (this Blast)	Note Exception	3
# of MMU's (this Blast)		1

Services:

GPS LAYOUT	Enter "1" if Layout by GPS	0
BULK TRUCK CHARGE	>/10,000 kg	1
SHOT SERVICE FEE *	Line Item (Fee per Blast)	1
SEISMOGRAPH RENTAL	Line Item (Fee per Blast)	1
3D LASER PROFILE	Enter "1" if 3D Profiled	0
BORETRACK	Enter "1" if Boretraked	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: 36,301 te 13,445 m³

Holes Loaded: 182 holes

... including: 9 Dead Holes

... and: Helper Holes

Helper Hole Collar: ft avg

Rows Blasted: 9 rows

Rate Code: - Pattern (Front Row)-

Burden: 10.5 ft avg

Spacing: 10.0 ft avg

Holes: 18 front row

- Pattern (Main Body) -

Burden: 9.0 ft avg

Spacing: 10.0 ft avg

Holes: 164 main body

Bench Height: 30.0 ft avg

Sub-drill: 0.0 ft avg

Hole Depth: 30.0 ft avg

- Stone Decking -

Front Row: 0.0 ft avg

Main Body: 0.0 ft avg

Stone Decks: 0 per blast

- Collar Stemming -

Front Row: 4.5 ft avg

Main Body: 4.5 ft avg

Material used: HL3

- Charge Length -

Front Row: 25.5 ft avg

Main Body: 25.5 ft avg

- Charge Weight -

Front Row: 56.9 kg/hole

Main Body: 56.9 kg/hole

Max. per delay: 75.0 kg/delay

SD () Equation: 227.1 kg/delay

Total kg Loaded: 11,408 kg

Rock Density: 2.70 g/cc = te/m³

- Powder Factor -

Yield PF: 0.314 kg/te (actual)

Front row: 0.236 kg/te (theoretical)

Main Body: 0.276 kg/te (theoretical)

"KPI" PF: 0.271 kg/te (theoretical)

Theoretical PF (Based on a single hole)

Cost Reduction Notes (this Blast) - change in Bit , B, S, Expl or IS from previous Blast:



Customer: Cornwall Gravel

Blast Design

Quarry:	McLeod
P.O. #:	Scott
Blast Date:	2016-11-10

Blast Number:	16-016
Orica Order #:	2109028
Blast Time:	12:29 PM

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Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
Mid Blast	45.07723	74.74632	0.786746	1.304569
Front Row Corner				
Back Row Corner				
Average (Centre of Blast)	45.07723	74.74632	0.786746	1.304569

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading	45.07275	74.74414	0.786668	1.304531
	2nd Reading				
	Average	45.07275	74.74414	0.786668	1.304531
	Distance (1st Seis. From Centre of Blast)	527.4	m		
	Post Blast Data:	ppV:	2.2 mm/s	Trigger set at: 2.0	mm/s
		frequency:	43.0 Hz	V / T / L :	T (Vertical, Transverse or Longitudinal)
		air overpressure:	109.3 dB	Trigger set at:	115 dB
	Front Gate				

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (2nd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
		frequency:	Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at:	115 dB
	Enter description of seismograph location				

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.	(N) Radians	(W) Radians
	1st Reading				
	2nd Reading				
	Average	0.00000	0.00000	0.000000	0.000000
	Distance (3rd Seis. From Centre of Blast)	0.0	m		
	Post Blast Data:	ppV:	mm/s	Trigger set at: 2.0	mm/s
		frequency:	Hz	V / T / L :	? (Vertical, Transverse or Longitudinal)
		air overpressure:	dB	Trigger set at:	115 dB
	Enter description of seismograph location				

Scaling Factor denotes the degree of Blast confinement.

The higher the SF, the more confined the Blast.

A Scaling Factor of 30 is commonly used in the Scaled Distance formula for Quarry Bench Blasting:

Enter a scaling Factor: Quarry Bench Blast - narrow, multi-row Blast with 1 Free Face?

$$\begin{aligned}
 W &= \frac{D^2}{35^2} \\
 &= \frac{(527.4)^2}{35^2} \text{ kg} \\
 &= \frac{278,151}{1,225} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

Signature required, indicating that
Blast Report is Complete & Accurate.

APPENDIX F

Blasting Terminology

ANFO:	Ammonium Nitrate and Fuel Oil – explosive product
ANFO WR:	Water resistant ANFO
Blast Pattern:	Array of blast holes
Body hole:	Those blast holes behind the first row of holes (Face Holes)
Burden:	Distance between the blast hole and a free face
Column:	That portion of the blast hole above the required grade
Column Load:	The portion of the explosive loaded above grade
Collar:	That portion of the blast hole above the explosive column, filled with inert material, preferably clean crushed stone
Face Hole:	The blast holes nearest the free face
Overpressure:	A compressional wave in air caused by the direct action of the unconfined explosive or the direct action of confining material subjected to explosive loading.
Peak Particle Velocity:	The rate of change of amplitude, usually measured in mm/s or in/s. This is the velocity or excitation of the particles in the ground resulting from vibratory motion.
Scaled distance:	An equation relating separation distance between a blast and receptor to the energy (usually expressed as explosive weight) released at any given instant in time.
Spacing:	Distance between blast holes
Stemming:	Inert material, preferably clean crushed stone applied into the blast hole from the surface of the rock to the surface of the explosive in the blast hole.
Sub-grade:	That portion of the blast hole drilled band loaded below the required grade
Toe Load:	The portion of explosive loaded below grade