



Specialists in Explosives, Blasting and Vibration
Consulting Engineers

Blasting Impact Analysis – Revision 1
Cornwall Gravel MacLeod V Quarry New License Application
Part of Lots 1 and 2, Concession 4, Township of South Stormont,
former Township of Cornwall

Submitted to:

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Prepared by:

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Explotech Engineering Ltd.

August 1, 2017

EXPLOTECH ENGINEERING LTD.

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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 V Quarry new license application located on Part of Lots 1 & 2, Concession 4, Geographic Township of Cornwall, Township of South Stormont.

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 V Quarry license application lands are located on the East side of the existing licensed MacLeod IV Quarry. The legal description for the subject property is Part of Lots 1 & 2, Concession 4, Geographic Township of Cornwall, Township of South Stormont. The area to be licenced is comprised of 40.1HA with the extraction footprint comprising 33.0HA when allowing for setbacks and sterilized areas.

For the purposes of this report, the cardinal directions have been adjusted off True North such that Site North runs parallel to the East and West extraction limits of the proposed licence.

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 ARA licensed properties to the West 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 in the area, including the proposed MacLeod V 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 for the area.

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.



EXISTING CONDITIONS

The current licensed areas for the Cornwall Gravel MacLeod Quarries (MacLeod I, MacLeod II and MacLeod IV) are described as Lots 2-5 in Concession 4, Township of South Stormont, former Cornwall Township United Counties of Stormont, Dundas and Glengarry. These properties are bound 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 V license application is located East of the existing MacLeod IV licence on Part Lots 1 & 2, Concession 4, Geographic Township of Cornwall, Township of South Stormont. The proposed MacLeod V lands are bounded by the licenced MacLeod IV Quarry to the West, farm fields and sparse residential properties located on South Branch Road to the South, forested areas and sparse residential properties located on Headline Road to the East and residential properties on Headline Road to the North. 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
17681 Headline Road	462	NW
17723 Headline Road	220	NW
17735 Headline Road	280	N
17751 Headline Road	220	N
17764 Headline Road	110	N
17765 Headline Road	200	N
17820 Headline Road	122	NE
17830 Headline Road	140	NE
17840 Headline Road	192	NE
17850 Headline Road	225	NE
17876 Headline Road	295	NE
17880 Headline Road	330	NE
17679 South Branch Road	1000	SW



17683 South Branch Road	1000	SW
17675 South Branch Road	890	SW
17695 South Branch Road	800	SW
17707 South Branch Road	890	SW
17751 South Branch Road	800	S
17795 South Branch Road	925	SE
17815 South Branch Road	925	SE
17825 South Branch Road	880	SE
17845 South Branch Road	725	SE



PROPOSED MINERAL EXTRACTION

The proposed quarry extraction of the MacLeod V Quarry will be undertaken in two (2) distinct phases.

Phase 1 extraction will begin at the Southern portion of the existing MacLeod IV East quarry face and will retreat East towards the Eastern extraction limits. Given that extraction in MacLeod V will take place after the development of MacLeod IV, there will be no need for a sinking cut. Based on existing maximum elevations in the order of 72masl, 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 2 extraction will leverage the existing MacLeod V Phase 1 North 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 northerly direction to a final design floor elevation of -33masl. Based on existing maximum elevations in the order of 82masl, this phase of extraction will also 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 receptors. While initial mineral extraction in the proposed licence area in Phase 1 shall occur approximately 800m from the closest sensitive receptor to the blast location, namely 17764 Headline Road, quarry faces retreating to the North limits will come within approximately 110m of the 17764 Headline Road residence and within approximately 140m of the 17830 and 17820 Headline Road residences (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 may be necessary as operations within the MacLeod V lands retreat



toward Headline Road. 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 through 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 2009 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 800m (i.e. the closest standoff distance to the nearest existing structure for the initial blasting) and a maximum explosive weight of 132kg (15m deep, 1.5m collar, 102mm hole diameter, single hole delay), we can calculate the maximum PPV at the nearest house.

$$ppv = 1946 \left(\frac{800}{\sqrt{132}} \right)^{-1.48} = 3.6 \text{ mm / s}$$

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 3.6mm/s. While this value resides below the MOECC 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.



Given the closer separation distances that will be required within the MacLeod V licence boundary as extraction progresses North, Table 2 below provides guidance on 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

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



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 2009 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 – 17695 South Branch Road) and a maximum explosive weight of 132kg (assumed 15m deep, 1.5m collar, 102mm hole diameter, single hole delay), we can calculate the PSPL at the nearest receptor to be 121.9dBL.



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 1 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 V 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.

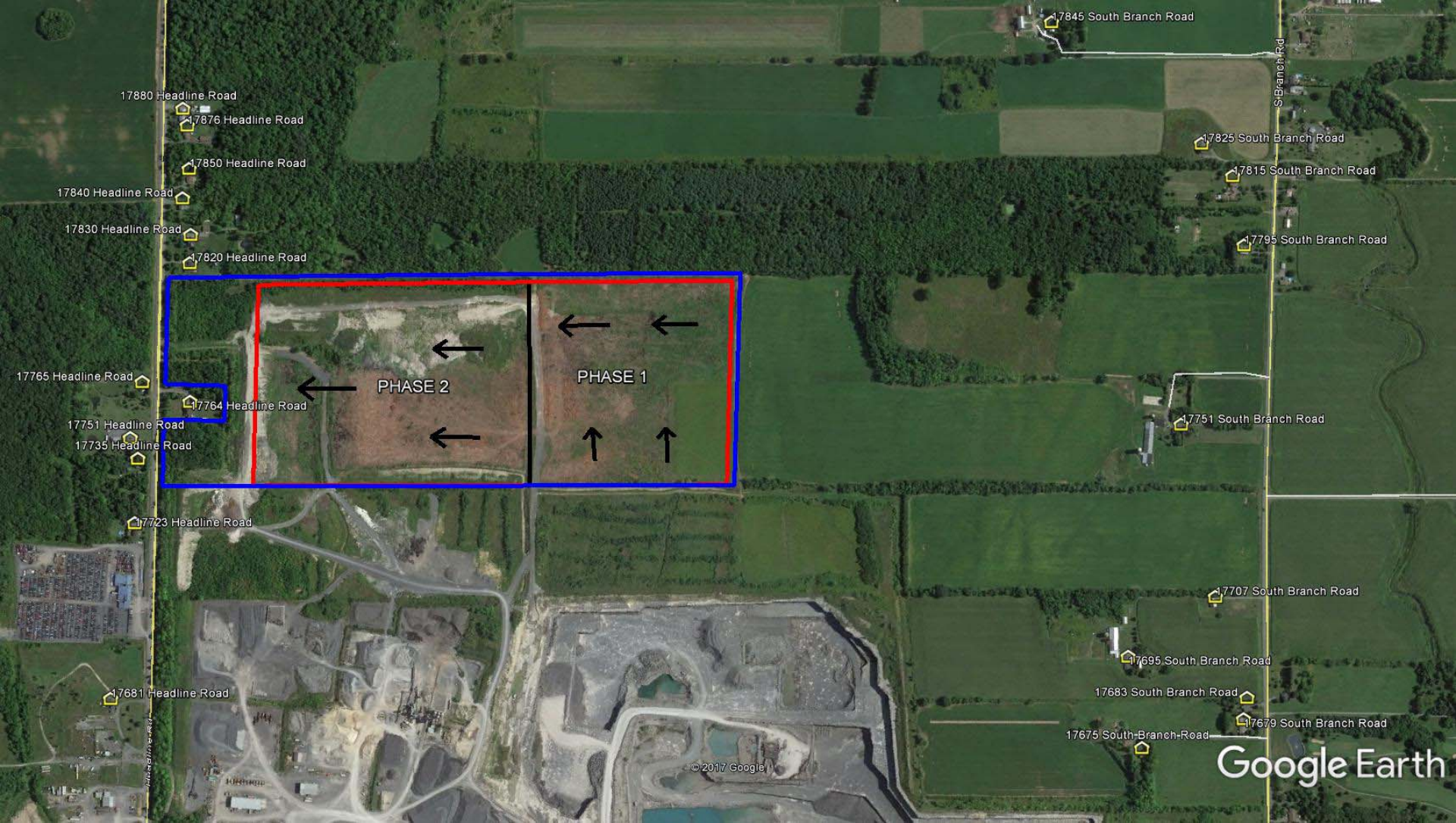


CONCLUSION

Blasting operations required for mineral extraction at the proposed Cornwall Gravel MacLeod V 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



17880 Headline Road

17876 Headline Road

17850 Headline Road

17840 Headline Road

17830 Headline Road

17820 Headline Road

17845 South Branch Road

17825 South Branch Road

17815 South Branch Road

17795 South Branch Road

17765 Headline Road

17764 Headline Road

17751 Headline Road

17735 Headline Road

17751 South Branch Road

17723 Headline Road

17707 South Branch Road

17695 South Branch Road

17683 South Branch Road

17675 South Branch Road

17679 South Branch Road

17681 Headline Road

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PHASE 2

Google Earth



PHASE 1

17845 South Branch Road

17825 South Branch Road

17815 South Branch Road

17795 South Branch Road

17751 South Branch Road

17695 South Branch Road

17675 South Branch Road

17683 South Branch Road

17679 South Branch Road

Plant Rd

Google Earth

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APPENDIX B

Cornwall Gravel MacLeod V Quarry Expansion

PREVAILING METEOROLOGICAL CONDITIONS

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

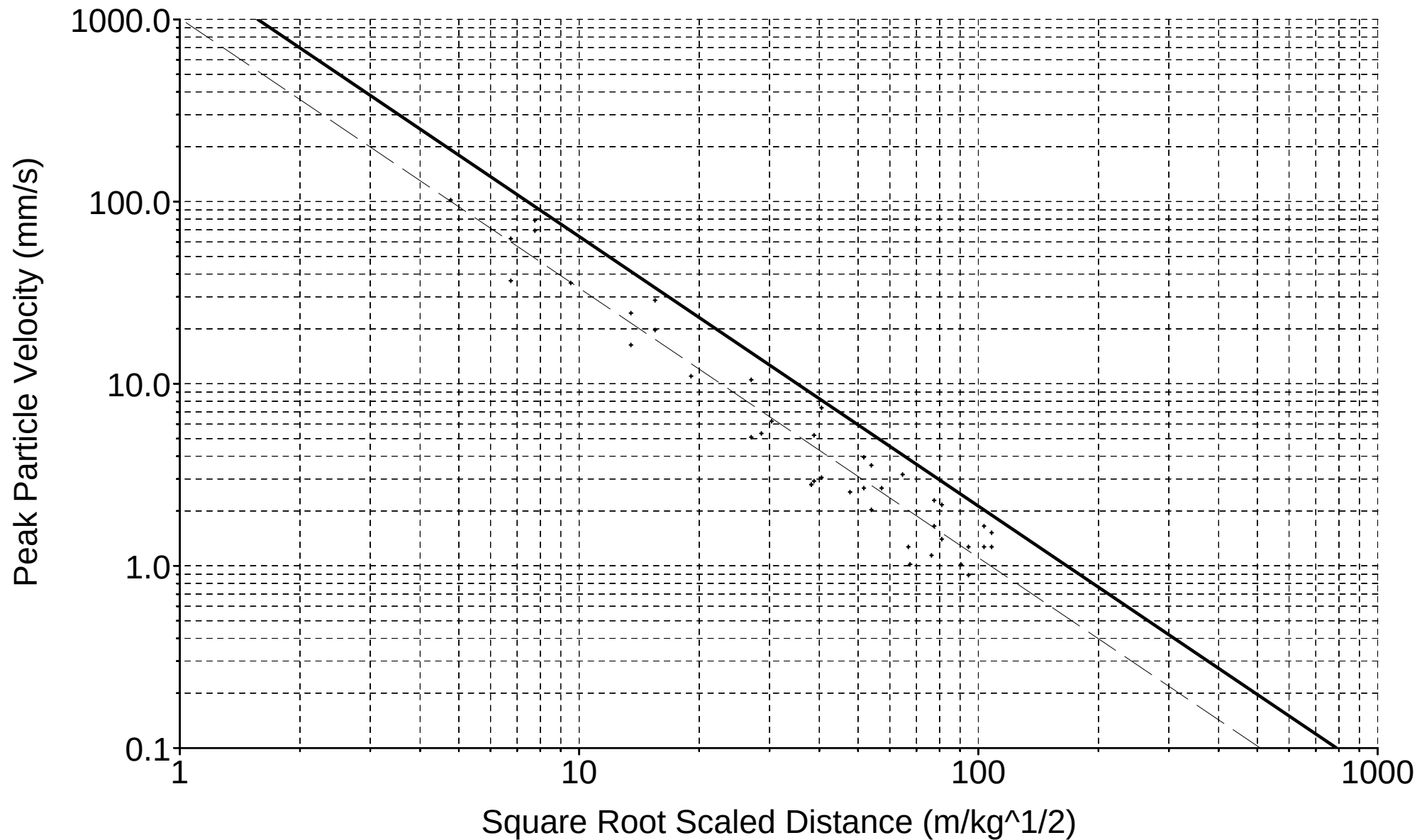
Date	Wind Direction	Wind Velocity Km/h	Temperature (Deg Celcius)
January	W	17.3	-9.4
February	W	16.6	-8.1
March	E	17.5	-2
April	E	17.9	6.3
May	W	15.3	13.8
June	W	14.3	18.4
July	W	13.5	21.4
August	W	13	20.2
September	SW	13.9	15.1
October	SW	15.7	8.6
November	NW	17.1	2.3
December	NW	17.2	-5.7

APPENDIX C

Regression Line For FINAL BACK ATTENUATION.SDF

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

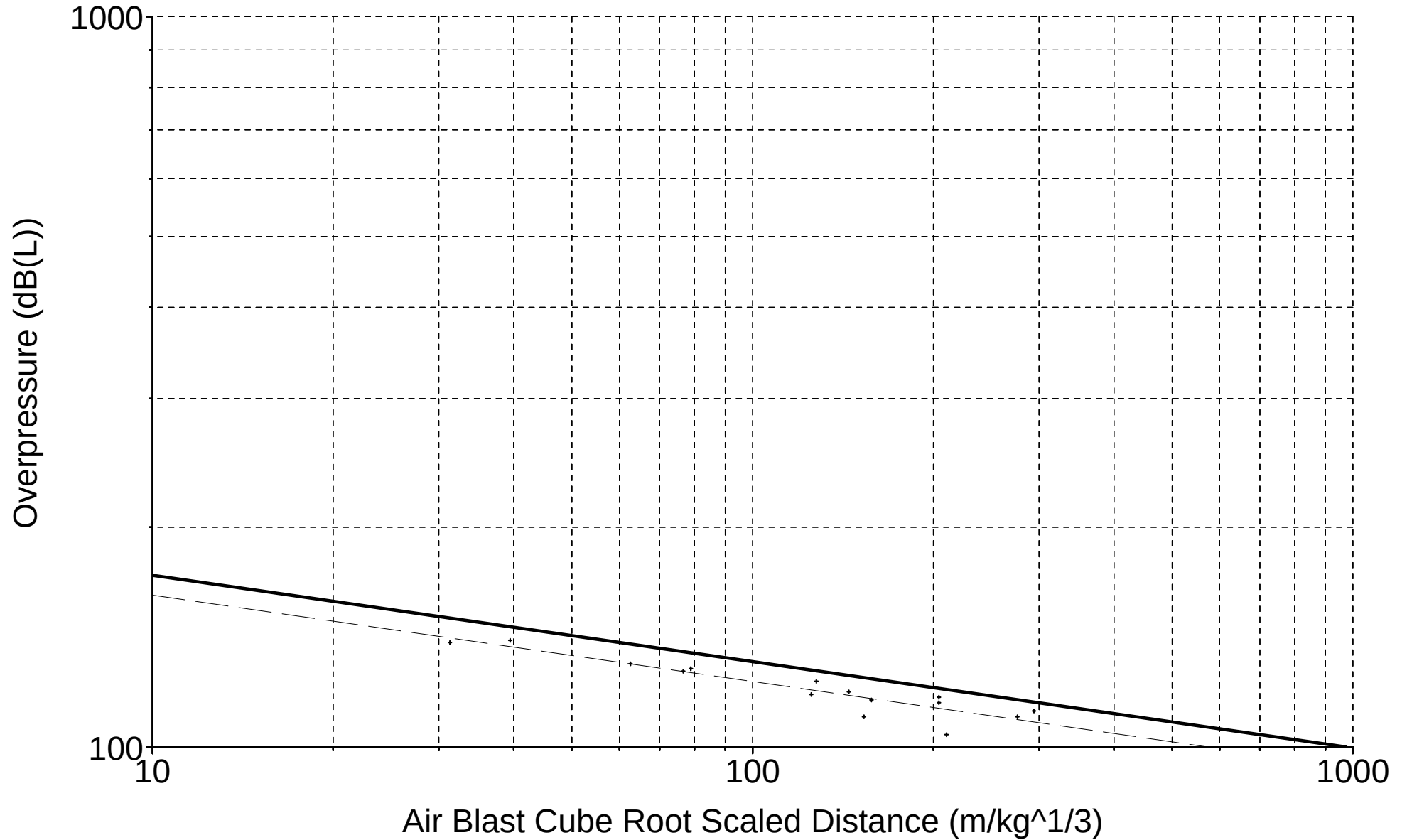
Coefficient of Determination = 0.942 Standard Deviation = 0.142



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



Specialists in Explosives, Blasting and Vibration
Consulting Engineers

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



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.

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: Cornwall Gravel
 Blaster-in-charge: Bradley Crook (print name)
 Bench / Face: 65' Bench (Hard and Soft Rock)
 Latitude (° N): N 45.07596* Longitude (° W): W 074.74572*
 Centre of Blast Centre of Blast

Wind Direction: S (from the: W SW S SE E NE N NW)
 Wind Velocity: 28 kph Temperature: 31 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
 Partly Cloudy: ☐ Snow: ☐
 Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m
 Face Profiled Y or N N Boretracked 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 6:00am
 Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
 Bit diam: 89 mm (0 ') # Holes: 57 1,128.6 m (3,702 ft)
 Remote Fired Y or N ☒
 Re Drills Y or N N # redrills 0 Holes Measured Y or N Y

tonnes Blasted: 24,123 te
 tonnes Invoiced: _____ te
 Burden: 2.8 m 9.18 ft
 Spacing: 2.8 m 9.18 ft
 Avg Bench Ht: 19.8 m 64.94 ft
 Avg Hole Depth: 19.8 m 64.94 ft
 Collar: 1.4 m 4.59 ft
 Holes Dewatered: 0 holes
 Total kg Loaded: 8,323 kg
 Powder Factor: 0.35 kg/te 0.16 #/te
0.93 kg/m³ 1.57 #/cy
 Max. per delay: 150 kg/delay
 Rock Density: 2.70 g/cc
 Rows Blasted: 4 rows
 Bench Length 38.9 m 127.6 ft
 Blast Width: 11.6 m 38.0 ft
 Rock Vol. Blasted: 8,935 m³ 11,677 cy

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

Labour & Equipment		Time in	Time Out	Total Hours
Blaster in Charge		6:00am	3:00am	9.0
Helper #1	Jason K	7:00am	12:30pm	5.5
Helper #2	Pierre	7:00am	12:30pm	5.5
Helper #3				
Helper #4				
Helper #5				
MMU # 1	Brad L	7:00am	11:00am	4.0
MMU # 2				
Total Hrs				24.0

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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		0
15m	Uni Tronic 600		0
6m	Ikon 2		0
20M	Ikon 2		118
400M	Uni Tronic Wire		0

Seis #1: Front Gate (200M from blast) PPV: 11.60 mm/s @ Freq: 27 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)

Orica Blaster-in-charge: _____

Bradley Crook
 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: Cornwall Gravel
 Blaster-in-charge: Bradley Crook (print name)
 Bench / Face: East High Wall Asphalt Stone
 Latitude (° N): 45.08253 Longitude (° W): 74.74424
 Centre of Blast Centre of Blast

tonnes Blasted: 27,400 te
 tonnes Invoiced: te
 Burden: 2.8 m 9.18 ft
 Spacing: 2.8 m 9.18 ft
 Avg Bench Ht: 24.1 m 79.05 ft
 Avg Hole Depth: 24.1 m 79.05 ft
 Collar: 1.4 m 4.59 ft
 Holes Dewatered: 0 holes
 Total kg Loaded: 10,010 kg
 Powder Factor: 0.37 kg/te 0.17 #/te
0.99 kg/m³ 1.66 #/cy
 Max. per delay: 215 kg/delay
 Rock Density: 2.70 g/cc
 Rows Blasted: 4 rows
 Bench Length 36.3 m 119.1 ft
 Blast Width: 11.6 m 38.0 ft
 Rock Vol. Blasted: 10,148 m³ 13,263 cy

Wind Direction: S (from the: W SW S SE E NE N NW)
 Wind Velocity: 15 kph Temperature: 23 °C
 Overcast: Rain: Cloud Altitude: m
 Partly Cloudy: Snow:
 Sunny: X Inversion: Inversion Altitude: m
 Face Profiled Y or N N Boretracked 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 6:00am
 Bit diam: 76 mm (0 ') # Holes: 2 = 48.2 m (158 ft)
 Bit diam: 89 mm (0 ') # Holes: 52 1,253.2 m (4,110 ft)
 Remote Fired Y or N Y
 Re Drills Y or N Y # redrills 1 Holes Measured Y or N Y

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> </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>	8.0
Helper #1	<u>Kevin M</u>	<u>7:00am</u> <u>1:00pm</u>	6.0
Helper #2	<u>Pierre</u>	<u>7:00am</u> <u>12:30pm</u>	5.5
Helper #3			
Helper #4			
Helper #5			
MMU # 1	<u>Jason K</u>	<u>7:00am</u> <u>12:00pm</u>	5.0
MMU # 2			
Total Hrs			24.5

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handidets	<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
<u>6m</u>	Uni Tronic 600		<u>52</u>
<u>30m</u>	Uni Tronic 600		<u>56</u>
<u>6m</u>	Ikon 2		<u>0</u>
<u>20M</u>	Ikon 2		<u>0</u>
<u>400M</u>	Uni Tronic Wire		<u>1</u>

Seis #1: North East Of Blast PPV: 3.68 mm/s @ Freq: 9 Hz Air o/p: 115 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)

Orica Blaster-in-charge:

Bradley Crook
 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: Cornwall Gravel
 Blaster-in-charge: Bradley Crook (print name)
 Bench / Face: Toe North End
 Latitude (° N): _____ Longitude (° W): _____
 Centre of Blast Centre of Blast

Wind Direction: W (from the: W SW S SE E NE N NW)
 Wind Velocity: 15 kph Temperature: 23 °C

Overcast: ☒ Rain: ☐ Cloud Altitude: _____ m
 Partly Cloudy: ☒ Snow: ☐
 Sunny: ☐ Inversion: ☐ Inversion Altitude: _____ m

Face Profiled Y or N N Boretracked 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 6:00am
 Bit diam: 76 mm (0 ') # Holes: 253 = 303.6 m (996 ft)
 Bit diam: 89 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
 Remote Fired Y or N ☒
 Re Drills Y or N ☒ # redrills 0 Holes Measured Y or N ☒

tonnes Blasted: 2,029 te
 tonnes Invoiced: _____ te
 Burden: 1.5 m 4.92 ft
 Spacing: 1.5 m 4.92 ft
 Avg Bench Ht: 1.2 m 3.94 ft
 Avg Hole Depth: 1.2 m 3.94 ft
 Collar: 1.2 m 3.94 ft
 Holes Dewatered: 0 holes
 Total kg Loaded: 351 kg
 Powder Factor: 0.17 kg/te 0.08 #/te
0.47 kg/m³ 0.79 #/cy
 Max. per delay: 2 kg/delay
 Rock Density: 2.70 g/cc
 Rows Blasted: 6 rows
 Bench Length 45.7 m 149.9 ft
 Blast Width: 13.7 m 44.9 ft
 Rock Vol. Blasted: 751 m³ 982 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>	<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>	<u>5.5</u>
Helper #2	<u>Todd</u> <u>7:00am</u>	<u>12:30pm</u>	<u>5.5</u>
Helper #3			
Helper #4			
Helper #5			
MMU # 1			
MMU # 2			
Total Hrs			<u>18.0</u>

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handidets	<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
<u>6m</u> Uni Tronic 600			<u>253</u>
<u>20m</u> Uni Tronic 600			<u>0</u>
<u>6m</u> Ikon 2			<u>0</u>
<u>20M</u> Ikon 2			<u>0</u>
<u>400M</u> Uni Tronic Wire			<u>1</u>

Seis #1: South End of Quarry (Did not trigger) 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: _____ 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)

Orica Blaster-in-charge: _____

Bradley Crook
 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: Cornwall Gravel
 Blaster-in-charge: Bradley Crook (print name)
 Bench / Face: SouthWall 65'
 Latitude (° N): 45.07600* Longitude (° W): 074.74523*
 Centre of Blast Centre of Blast

Wind Direction: W (from the: W SW S SE E NE N NW)
 Wind Velocity: 15 kph Temperature: 16 °C

Overcast: ☒ Rain: ☒ Cloud Altitude: 1,463 m
 Partly Cloudy: ☒ Snow: ☐
 Sunny: ☐ Inversion: ☐ Inversion Altitude: m
 Face Profiled Y or N N Boretracked 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 6:00am
 Bit diam: 76 mm (0 ') # Holes: = 0.0 m (0 ft)
 Bit diam: 89 mm (0 ') # Holes: 81 1,603.8 m (5,260 ft)
 Remote Fired Y or N ☒
 Re Drills Y or N ☒ # redrills 0 Holes Measured Y or N ☒

tonnes Blasted: 37,259 te
 tonnes Invoiced: te
 Burden: 2.8 m 9.18 ft
 Spacing: 3.1 m 10.17 ft
 Avg Bench Ht: 19.8 m 64.94 ft
 Avg Hole Depth: 19.8 m 64.94 ft
 Collar: 1.4 m 4.59 ft
 Holes Dewatered: 0 holes
 Total kg Loaded: 11,353 kg
 Powder Factor: 0.30 kg/te 0.14 #/te
0.82 kg/m³ 1.39 #/cy
 Max. per delay: 150 kg/delay
 Rock Density: 2.70 g/cc
 Rows Blasted: 3 rows
 Bench Length 79.2 m 259.8 ft
 Blast Width: 8.8 m 28.9 ft
 Rock Vol. Blasted: 13,800 m³ 18,036 cy

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

Labour & Equipment		Time in	Time Out	Total Hours
Blaster in Charge		6:00am	2:00pm	8.0
Helper #1	Todd	7:00am	1:30pm	6.5
Helper #2	Joel	7:00am	1:30pm	6.5
Helper #3				
Helper #4				
Helper #5				
MMU # 1	Brad L	7:30am	1:00pm	5.5
MMU # 2				
Total Hrs				26.5

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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			0
20m	Ikon 2	NO	CHARGE	10
20M	Ikon 2			82
25M	Ikon 2			80
400M	Uni Tronic Wire			1

Seis #1: Front Gate 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 #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)

Orica Blaster-in-charge: Bradley Crook

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: Cornwall Gravel
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: East Wall 76' Deep
Latitude (° N): 45..08249* Longitude (° W): 074.74406*
Centre of Blast Centre of Blast

Wind Direction: NW (from the: W SW S SE E NE N NW)
Wind Velocity: 1 kph Temperature: 25 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
Partly Cloudy: ☐ Snow: ☐
Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m
Face Profiled Y or N N Boretracked 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 7:00am
Bit diam: 76 mm (0 ') # Holes: 2 = 46.4 m (152 ft)
Bit diam: 89 mm (0 ') # Holes: 38 = 881.6 m (2,892 ft)
Remote Fired Y or N Y
Re Drills Y or N N # redrills 0 Holes Measured Y or N Y

tonnes Blasted: 24,982 te
tonnes Invoiced: _____ te
Burden: 2.8 m 9.18 ft
Spacing: 3.1 m 10.17 ft
Avg Bench Ht: 23.2 m 76.10 ft
Avg Hole Depth: 23.2 m 76.10 ft
Collar: 1.5 m 4.92 ft
Holes Dewatered: 0 holes
Total kg Loaded: 6,962 kg
Powder Factor: 0.28 kg/te 0.13 #/te
0.75 kg/m³ 1.27 #/cy
Max. per delay: 170 kg/delay
Rock Density: 2.70 g/cc
Rows Blasted: 4 rows
Bench Length 27.9 m 91.5 ft
Blast Width: 14.3 m 46.9 ft
Rock Vol. Blasted: 9,252 m³ 12,092 cy

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

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

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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		40
25m	Uni Tronic 600		24
30M	Ikon 2		16
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: East of Shot 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: 14-006
Customer P.O. #: Scott
Orica Order #: 1727880
Date of Blast: June 27 2014
Time of Blast: 12:10pm

Customer Name: Cornwall Gravel
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: 48' Asphalt
Latitude (° N): 45.08280* Longitude (° W): 074.74647*
Centre of Blast Centre of Blast

Wind Direction: S (from the: W SW S SE E NE N NW)
Wind Velocity: 1 kph Temperature: 27 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
Partly Cloudy: ☐ Snow: ☐
Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m
Face Profiled Y or N N Boretracked 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 6:00am
Bit diam: 76 mm (0 ') # Holes: 4 = 58.4 m (192 ft)
Bit diam: 89 mm (0 ') # Holes: 70 1,022.0 m (3,352 ft)
Remote Fired Y or N Y
Re Drills Y or N N # redrills 0 Holes Measured Y or N Y

tonnes Blasted: 28,491 te
tonnes Invoiced: _____ te
Burden: 2.8 m 9.18 ft
Spacing: 3.4 m 11.15 ft
Avg Bench Ht: 14.6 m 47.89 ft
Avg Hole Depth: 14.6 m 47.89 ft
Collar: 1.4 m 4.59 ft
Holes Dewatered: 0 holes
Total kg Loaded: 8,322 kg
Powder Factor: 0.29 kg/te 0.13 #/te
0.79 kg/m³ 1.33 #/cy
Max. per delay: 110 kg/delay
Rock Density: 2.70 g/cc
Rows Blasted: 4 rows
Bench Length 63.4 m 208.0 ft
Blast Width: 11.4 m 37.4 ft
Rock Vol. Blasted: 10,552 m³ 13,791 cy

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

Labour & Equipment		Time in	Time Out	Total Hours
Blaster in Charge		6:00am	1:30pm	7.5
Helper #1	Todd	7:00am	12:30pm	5.5
Helper #2	Darcy	7:00am	12:30pm	5.5
Helper #3				
Helper #4				
Helper #5				
MMU # 1	Jason K	7:30am	10:30am	3.0
MMU # 2				
			Total Hrs	21.5

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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		74
20m	Uni Tronic 600		74
20M	Ikon 2		0
25M	Ikon 2		0
400M	Uni Tronic Wire		0

Seis #1: Front Gate 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)
0
Seis #2: 504 South Branch Rd PPV: 0.00 mm/s @ Freq: 0 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)

Orica Blaster-in-charge: _____

Bradley Crook
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: Cornwall Gravel
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: South Wall 65' Deep
Latitude (° N): 45.0615* Longitude (° W): 074.7457*
Centre of Blast Centre of Blast

Wind Direction: NW (from the: W SW S SE E NE N NW)
Wind Velocity: 15 kph Temperature: 23 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
Partly Cloudy: ☒ Snow: ☐
Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m
Face Profiled Y or N N Boretracked 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 6:00am
Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
Bit diam: 89 mm (0 ') # Holes: 62 1,227.6 m (4,027 ft)
Remote Fired Y or N ☒
Re Drills Y or N ☒ # redrills 0 Holes Measured Y or N ☒

tonnes Blasted: 30,594 te
tonnes Invoiced: _____ te
Burden: 2.8 m 9.18 ft
Spacing: 3.4 m 11.15 ft
Avg Bench Ht: 19.8 m 64.94 ft
Avg Hole Depth: 19.8 m 64.94 ft
Collar: 1.5 m 4.92 ft
Holes Dewatered: 0 holes
Total kg Loaded: 9,058 kg
Powder Factor: 0.30 kg/te 0.13 #/te
0.80 kg/m³ 1.35 #/cy
Max. per delay: 130 kg/delay
Rock Density: 2.70 g/cc
Rows Blasted: 4 rows
Bench Length 50.2 m 164.7 ft
Blast Width: 11.4 m 37.4 ft
Rock Vol. Blasted: 11,331 m³ 14,809 cy

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

Labour & Equipment	Time in	Time Out	Total Hours
Blaster in Charge	6:00am	2:00pm	8.0
Helper #1	Pierre 7:00am	12:30pm	5.5
Helper #2	Darcy 7:00am	12:30pm	5.5
Helper #3			
Helper #4			
Helper #5			
MMU # 1	Brad L 7:00am	10:00am	3.0
MMU # 2			
Total Hrs			22.0

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

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

Seis #1: Front Gate PPV: 7.75 mm/s @ Freq: 18 Hz Air o/p: 118 dB
Lat ° N: _____ Long ° W: _____ (Trigger: 2.00 mm/s) V / T / L ? _____ (Trigger: 115 dB)
Seis #2: 504 South Branch Rd PPV: 3.94 mm/s @ Freq: 39 Hz Air o/p: 110 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: 14-008
Customer P.O. #: Scott
Orica Order #: 1735639
Date of Blast: July 15 2014
Time of Blast: 9:52am

Customer Name: Cornwall Gravel
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: 63-65' Bench South Wall
Latitude (° N): 45.07576 Longitude (° W): 74.74545
Centre of Blast Centre of Blast

Wind Direction: NW (from the: W SW S SE E NE N NW)
Wind Velocity: 14 kph Temperature: 20 °C

Overcast: ☒ Rain: ☒ Cloud Altitude: 1,249 m
Partly Cloudy: ☐ Snow: ☐
Sunny: ☐ Inversion: ☐ Inversion Altitude: m
Face Profiled Y or N N Boretracked 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 6:00am
Bit diam: 76 mm (0 ') # Holes: 4 = 78.0 m (256 ft)
Bit diam: 89 mm (0 ') # Holes: 42 = 819.0 m (2,686 ft)
Remote Fired Y or N ☒
Re Drills Y or N ☒ # redrills 3 Holes Measured Y or N ☒

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	34,100	28,070	6,030
Pkgd. & Boosters:	Size	kg	
E113	65X400	4	100
E113	75X400	4	100
E113	90X400	0	0
Pentex Boosters	0.450	0	0
Pentex Boosters	0.340	46	16
Pentex Boosters	0.200	46	9
Total explosives(kg):		6,255	

Labour & Equipment		Time in	Time Out	Total Hours
Blaster in Charge		6:00am	11:30am	5.5
Helper #1	Pierre	6:30am	10:30am	4.0
Helper #2	Todd	6:30am	10:30am	4.0
Helper #3				
Helper #4				
Helper #5				
MMU # 1	Jason K	7:00am	10:00am	3.0
MMU # 2				
Total Hrs				16.5

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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		42
25M	Uni Tronic 600		50
20M	Ikon 2		0
25M	Ikon 2		0
400M	Uni Tronic Wire		1

Seis #1: 504 South Branch Rd PPV: 2.29 mm/s @ Freq: 39 Hz Air o/p: dB
Lat ° N: Long ° W: (Trigger: 2.00 mm/s) V / T / L ? (Trigger: 115 dB)

Seis #2: Front Gate PPV: 3.94 mm/s @ Freq: 30 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)

Orica Blaster-in-charge: Bradley Crook

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
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: 48' Asphalt
Latitude (° N): 45.08287 Longitude (° W): 74.74668
Centre of Blast Centre of Blast

Wind Direction: W (from the: W SW S SE E NE N NW)
Wind Velocity: 14 kph Temperature: 22 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
Partly Cloudy: ☐ Snow: ☐
Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m
Face Profiled Y or N N Boretracked 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 6:00am
Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
Bit diam: 89 mm (0 ') # Holes: 79 1,153.4 m (3,783 ft)
Remote Fired Y or N Y
Re Drills Y or N Y # redrills 30 Holes Measured Y or N Y

tonnes Blasted: 28,987 te
tonnes Invoiced: _____ te
Burden: 2.8 m 9.18 ft
Spacing: 3.4 m 11.15 ft
Avg Bench Ht: 14.6 m 47.89 ft
Avg Hole Depth: 14.6 m 47.89 ft
Collar: 1.4 m 4.59 ft
Holes Dewatered: 0 holes
Total kg Loaded: 7,943 kg
Powder Factor: 0.27 kg/te 0.12 #/te
0.74 kg/m³ 1.25 #/cy
Max. per delay: 105 kg/delay
Rock Density: 2.70 g/cc
Rows Blasted: 4 rows
Bench Length 63.5 m 208.3 ft
Blast Width: 11.6 m 38.0 ft
Rock Vol. Blasted: 10,736 m³ 14,031 cy

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	5.5
Helper #2	Todd 7:00am	2:00pm	7.0
Helper #3	Darcy 7:00am	1:30pm	6.5
Helper #4			
Helper #5			
MMU # 1	Jason K 8:30am	1:30pm	5.0
MMU # 2			
Total Hrs			33.5

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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: Cornwall Gravel
 Blaster-in-charge: Bradley Crook (print name)
 Bench / Face: 48' Asphalt
 Latitude (° N): 45.08287 Longitude (° W): 74.74668
 Centre of Blast Centre of Blast

tonnes Blasted: 25,974 te
 tonnes Invoiced: te
 Burden: 2.8 m 9.18 ft
 Spacing: 3.4 m 11.15 ft
 Avg Bench Ht: 14.6 m 47.89 ft
 Avg Hole Depth: 14.6 m 47.89 ft
 Collar: 1.4 m 4.59 ft
 Holes Dewatered: 0 holes
 Total kg Loaded: 9,373 kg
 Powder Factor: 0.36 kg/te 0.16 #/te
0.97 kg/m³ 1.64 #/cy
 Max. per delay: 105 kg/delay
 Rock Density: 2.70 g/cc
 Rows Blasted: 4 rows
 Bench Length 56.9 m 186.6 ft
 Blast Width: 11.6 m 38.0 ft
 Rock Vol. Blasted: 9,620 m³ 12,573 cy

Wind Direction: W (from the: W SW S SE E NE N NW)
 Wind Velocity: 17 kph Temperature: 22 °C
 Overcast: Rain: Cloud Altitude: 2,072 m
 Partly Cloudy: X Snow:
 Sunny: X Inversion: Inversion Altitude: m
 Face Profiled Y or N N Boretracked 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 6:00am
 Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
 Bit diam: 89 mm (0 ') # Holes: 70 1,022.0 m (3,352 ft)
 Remote Fired Y or N Y
 Re Drills Y or N Y # redrills 2 Holes Measured Y or N Y

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 Handidets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handidets	<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
<u>6M</u>	Uni Tronic 600		<u>69</u>
<u>20M</u>	Uni Tronic 600		<u>70</u>
<u>20M</u>	Ikon 2		<u>0</u>
<u>25M</u>	Ikon 2		<u>0</u>
<u>400M</u>	Uni Tronic Wire		<u>1</u>

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: 14-011
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 Centre of Blast

Wind Direction: E (from the: W SW S SE E NE N NW)
Wind Velocity: 9 kph Temperature: 20 °C

Overcast: ☒ Rain: ☐ Cloud Altitude: _____ m
Partly Cloudy: ☐ Snow: ☐
Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m
Face Profiled Y or N N Boretracked 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 ☒
Re Drills Y or N ☒ # redrills 0 Holes Measured Y or N ☒

tonnes Blasted: 29,160 te
tonnes Invoiced: _____ te
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 Handidets	08122012W	25/475	0
7M Handidets	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	Ikron 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)

Orica Blaster-in-charge: _____

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: Cornwall Gravel
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: 30' Sump Hole
Latitude (° N): 45.08272 Longitude (° W): 74.74434
Centre of Blast Centre of Blast

Wind Direction: SW (from the: W SW S SE E NE N NW)
Wind Velocity: 17 kph Temperature: 14 °C

Overcast: ☒ Rain: ☐ Cloud Altitude: 975 m
Partly Cloudy: ☐ Snow: ☐
Sunny: ☐ Inversion: ☐ Inversion Altitude: m
Face Profiled Y or N N Boretracked 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 6:00am
Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
Bit diam: 89 mm (0 ') # Holes: 156 1,426.6 m (4,679 ft)
Remote Fired Y or N ☒
Re Drills Y or N ☒ # redrills 1 Holes Measured Y or N ☒

tonnes Blasted: 28,645 te
tonnes Invoiced: te
Burden: 2.7 m 9.00 ft
Spacing: 2.7 m 9.00 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: 9,889 kg
Powder Factor: 0.35 kg/te 0.16 #/te
0.93 kg/m³ 1.57 #/cy
Max. per delay: 60 kg/delay
Rock Density: 2.70 g/cc
Rows Blasted: 6 rows
Bench Length 68.6 m 224.9 ft
Blast Width: 16.9 m 55.5 ft
Rock Vol. Blasted: 10,609 m³ 13,866 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		6:00am	1:00pm	7.0
Helper #1	Pierre	7:00am	12:30pm	5.5
Helper #2	Dana	7:30am	11:30am	4.5
Helper #3	Kevin	7:00am	12:30pm	5.5
Helper #4				
Helper #5				
MMU # 1	Qm 18	7:30am	11:30am	5.0
MMU # 2				
Total Hrs				27.5

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handidets	<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
<u>6M</u>	Uni Tronic 600		<u>17</u>
<u>15M</u>	Uni Tronic 600		<u>167</u>
<u>30M</u>	Uni Tronic 600		<u>0</u>
<u>25M</u>	Ikon 2		<u>0</u>
<u>400M</u>	Uni Tronic Wire		<u>1</u>

Seis #1: Front Gate 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: 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)

Orica Blaster-in-charge: Bradley Crook

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: Cornwall Gravel
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: East Wall Asphalt
Latitude (° N): _____

Centre of Blast Centre of Blast

Wind Direction: S (from the: W SW S SE E NE N NW)
Wind Velocity: 8 kph Temperature: 25 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
Partly Cloudy: ☐ Snow: ☐
Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m

Face Profiled Y or N Y Boretracked Y or N Y
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 6:30am
Bit diam: 76 mm (0 ') # Holes: 6 = 118.9 m (390 ft)
Bit diam: 89 mm (0 ') # Holes: 50 = 990.9 m (3,250 ft)
Remote Fired Y or N Y
Re Drills Y or N Y # redrills 1 Holes Measured Y or N Y

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	35,010	27,660	7,350
Pkgd. & Boosters:	Size		kg
E113	65X400	9	225
E113	75X400	5	125
E113	90X400	0	0
Pentex Boosters	0.450	0	0
Pentex Boosters	0.340	56	19
Pentex Boosters	0.200	62	12
Total explosives(kg):			7,731

Labour & Equipment		Time in	Time Out	Total Hours
Blaster in Charge		6:00am	2:00pm	8.0
Helper #1				
Helper #2	Kevin M	7:00am	12:30pm	5.5
Helper #3	Todd	7:00am	1:30pm	6.5
Helper #4				
Helper #5				
MMU # 1	QM 9	7:30am	11:30am	4.0
MMU # 2				
Total Hrs				24.0

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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		54
15M	Uni Tronic 600		4
25M	Uni Tronic 600		60
25M	Ikon 2		0
400M	Uni Tronic Wire		1

Seis #1: 300M East of Shot PPV: 3.05 mm/s @ Freq: 18 Hz Air o/p: 118 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)

Orica Blaster-in-charge: _____

Bradley Crook
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: Cornwall Gravel
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: Middle Bench Ashalt 48'
Latitude (° N): 45.08276 74.74707
Centre of Blast Centre of Blast

Wind Direction: S (from the: W SW S SE E NE N NW)
Wind Velocity: 7 kph Temperature: 24 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
Partly Cloudy: ☐ Snow: ☐
Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m
Face Profiled Y or N N Boretracked 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 6:00am
Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
Bit diam: 89 mm (0 ') # Holes: 80 1,170.6 m (3,840 ft)
Remote Fired Y or N ☒
Re Drills Y or N ☒ # redrills 0 Holes Measured Y or N ☒

tonnes Blasted: 28,162 te
tonnes Invoiced: _____ te
Burden: 2.7 m 9.00 ft
Spacing: 3.4 m 11.00 ft
Avg Bench Ht: 14.6 m 48.00 ft
Avg Hole Depth: 14.6 m 48.00 ft
Collar: 1.4 m 4.60 ft
Holes Dewatered: 0 holes
Total kg Loaded: 8,188 kg
Powder Factor: 0.29 kg/te 0.13 #/te
0.79 kg/m³ 1.32 #/cy
Max. per delay: 105 kg/delay
Rock Density: 2.70 g/cc
Rows Blasted: 5 rows
Bench Length 50.3 m 165.0 ft
Blast Width: 14.2 m 46.5 ft
Rock Vol. Blasted: 10,430 m³ 13,632 cy

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

Labour & Equipment		Time in	Time Out	Total Hours
Blaster in Charge		6:00am	1:00pm	7.0
Helper #1	Joel	7:00am	12:30pm	5.5
Helper #2	Kevin	7:00am	12:30pm	5.5
Helper #3	Dana	7:00am	12:30pm	5.5
Helper #4				
Helper #5				
MMU # 1	QM 9	7:00am	10:30am	3.5
MMU # 2				
			Total Hrs	27.0

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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		80
20M	Uni Tronic 600		80
25M	Uni Tronic 600		0
25M	Ikron 2		0
400M	Uni Tronic Wire		1

Seis #1: 300M East of Shot PPV: 2.67 mm/s @ Freq: 22 Hz Air o/p: 122 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)

Orica Blaster-in-charge: _____

Bradley Crook
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: Cornwall Gravel
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: 30' Lower Bench
Latitude (° N): 45.07894 74.74780
Centre of Blast Centre of Blast

Wind Direction: S (from the: W SW S SE E NE N NW)
Wind Velocity: 15 kph Temperature: 14 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
Partly Cloudy: ☒ Snow: ☐
Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m

Face Profiled Y or N N Boretracked 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 6:00am
Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
Bit diam: 89 mm (0 ') # Holes: 194 1,774.1 m (5,819 ft)
Remote Fired Y or N ☒
Re Drills Y or N ☒ # redrills 0 Holes Measured Y or N ☒

tonnes Blasted: 42,469 te
tonnes Invoiced: _____ te
Burden: 2.7 m 9.00 ft
Spacing: 3.4 m 11.00 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: 11,837 kg
Powder Factor: 0.28 kg/te 0.13 #/te
0.75 kg/m³ 1.27 #/cy
Max. per delay: 54 kg/delay
Rock Density: 2.70 g/cc
Rows Blasted: 9 rows
Bench Length 90.5 m 296.9 ft
Blast Width: 19.0 m 62.3 ft
Rock Vol. Blasted: 15,729 m³ 20,557 cy

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

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

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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		3
15M	Uni Tronic 600		194
25M	Uni Tronic 600		0
25M	Ikon 2		0
400M	Uni Tronic Wire		1

Seis #1: Front Gate 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: _____ PPV: _____ mm/s @ Freq: _____ Hz Air o/p: _____ dB
Lat ° N: 44*49.204 Long ° W: 75*19.730 (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: 14-016
Customer P.O. #: Scott
Orica Order #: 1781956
Date of Blast: Oct 23 2014
Time of Blast: 12:37pm

Customer Name: Cornwall Gravel
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: 30' Bottom West Wall
Latitude (° N): 45.07802 74.74717
Centre of Blast Centre of Blast

Wind Direction: NE (from the: W SW S SE E NE N NW)
Wind Velocity: 18 kph Temperature: 9 °C

Overcast: ☒ Rain: ☐ Cloud Altitude: 1,400 m
Partly Cloudy: ☐ Snow: ☐
Sunny: ☐ Inversion: ☐ Inversion Altitude: m
Face Profiled Y or N N Boretracked 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 6:00am
Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
Bit diam: 89 mm (0 ') # Holes: 144 1,317.0 m (4,320 ft)
Remote Fired Y or N Y
Re Drills Y or N N # redrills 0 Holes Measured Y or N N

tonnes Blasted: 29,664 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: 8,230 kg
Powder Factor: 0.28 kg/te 0.13 #/te
0.75 kg/m³ 1.26 #/cy
Max. per delay: 62 kg/delay
Rock Density: 2.70 g/cc
Rows Blasted: 7 rows
Bench Length 64.1 m 210.2 ft
Blast Width: 18.7 m 61.5 ft
Rock Vol. Blasted: 10,986 m³ 14,359 cy

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

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

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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		2
15M	Uni Tronic 600		144
25M	Uni Tronic 600		0
25M	Ikon 2		0
400M	Uni Tronic Wire		1

Seis #1: Front Gate 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: PPV: mm/s @ Freq: Hz Air o/p: dB
Lat ° N: 44*49.204 Long ° W: 75*19.730 (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: 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: Cornwall Gravel
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: North East Concrete
Latitude (° N): 45.08419 74.74536
Centre of Blast Centre of Blast

Wind Direction: W (from the: W SW S SE E NE N NW)
Wind Velocity: 15 kph Temperature: 10 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
Partly Cloudy: ☒ Snow: ☐
Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m
Face Profiled Y or N N Boretracked 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 6:00am
Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
Bit diam: 89 mm (0 ') # Holes: 75 1,065.0 m (3,493 ft)
Remote Fired Y or N ☒
Re Drills Y or N ☒ # redrills 0 Holes Measured Y or N ☒

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	34,800	27,100	7,700
Pkgd. & Boosters:	Size	kg	
E113	65X400	0	0
E113	75X400	7	175
E113	90X400	0	0
Pentex Boosters	0.450	0	0
Pentex Boosters	0.340	75	26
Pentex Boosters	0.200	75	15
Total explosives(kg):		7,916	

Labour & Equipment		Time in	Time Out	Total Hours
Blaster in Charge		6:00am	2:00pm	8.0
Helper #1	Pierre	7:00am	12:30pm	5.5
Helper #2	Joel	7:00am	12:30pm	5.5
Helper #3	Todd	7:00am	12:30pm	5.5
Helper #4				
Helper #5				
MMU # 1	QM 9	7:30am	11:30am	4.0
MMU # 2				
			Total Hrs	28.5

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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		74
20M	Uni Tronic 600		75
25M	Uni Tronic 600		0
25M	Ikon 2		0
400M	Uni Tronic Wire		1

Seis #1: 300M East of Shot PPV: 2.41 mm/s @ Freq: 22 Hz Air o/p: 112 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: 44*49.204 Long ° W: 75*19.730 (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: 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: Cornwall Gravel
 Blaster-in-charge: Bradley Crook (print name)
 Bench / Face: South East 30' LB
 Latitude (° N): 45.07848 74.74617
 Centre of Blast Centre of Blast

Wind Direction: W (from the: W SW S SE E NE N NW)
 Wind Velocity: 25 kph Temperature: 13 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
 Partly Cloudy: ☒ Snow: ☐
 Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m
 Face Profiled Y or N N Boretracked 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 6:00am
 Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
 Bit diam: 89 mm (0 ') # Holes: 121 1,106.7 m (3,630 ft)
 Remote Fired Y or N ☒
 Re Drills Y or N N # redrills 0 Holes Measured Y or N Y

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	34,760	27,970	6,790
Pkgd. & Boosters:	Size	kg	
E113	65X400	7	175
E113	75X400	2	50
E113	90X400	0	0
Pentex Boosters	0.450	0	0
Pentex Boosters	0.340	121	41
Pentex Boosters	0.200	0	0
Total explosives(kg):		7,056	

Labour & Equipment		Time in	Time Out	Total Hours
Blaster in Charge		6:00am	2:00pm	8.0
Helper #1	Dana	7:00am	2:00pm	7.0
Helper #2	Kevin	7:00am	2:00pm	7.0
Helper #3	Todd	7:00am	12:30pm	5.5
Helper #4	Darcy			
Helper #5				
MMU # 1	QM 9	7:30am	11:00am	3.5
MMU # 2				
Total Hrs				31.0

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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		0
15M	Uni Tronic 600		121
25M	Uni Tronic 600		0
25M	Ikon 2		0
400M	Uni Tronic Wire		1

Seis #1: Front Gate 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: _____ PPV: _____ mm/s @ Freq: _____ Hz Air o/p: _____ dB
 Lat ° N: 44*49.204 Long ° W: 75*19.730 (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: 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: Cornwall Gravel
 Blaster-in-charge: Bradley Crook (print name)
 Bench / Face: 27' East Hole
 Latitude (° N): 45.07802 74.74717
 Centre of Blast Centre of Blast

Wind Direction: W (from the: W SW S SE E NE N NW)
 Wind Velocity: 15 kph Temperature: 9 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
 Partly Cloudy: ☒ Snow: ☐
 Sunny: ☐ Inversion: ☐ Inversion Altitude: _____ m

Face Profiled Y or N N Boretracked 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 6:00am
 Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
 Bit diam: 89 mm (0 ') # Holes: 189 1,555.8 m (5,103 ft)
 Remote Fired Y or N Y
 Re Drills Y or N N # redrills 0 Holes Measured Y or N Y

tonnes Blasted: 32,124 te
 tonnes Invoiced: _____ te
 Burden: 2.7 m 9.00 ft
 Spacing: 2.7 m 9.00 ft
 Avg Bench Ht: 8.2 m 27.01 ft
 Avg Hole Depth: 8.2 m 27.00 ft
 Collar: 1.4 m 4.60 ft
 Holes Dewatered: 0 holes
 Total kg Loaded: 9,535 kg
 Powder Factor: 0.30 kg/te 0.13 #/te
0.80 kg/m³ 1.35 #/cy
 Max. per delay: 53 kg/delay
 Rock Density: 2.70 g/cc
 Rows Blasted: 6 rows
 Bench Length 85.5 m 280.4 ft
 Blast Width: 16.9 m 55.4 ft
 Rock Vol. Blasted: 11,898 m³ 15,550 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>	7.0
Helper #1	<u>Kevin</u> <u>7:00am</u>	<u>12:00pm</u>	5.0
Helper #2	<u>Dana</u> <u>7:00am</u>	<u>12:00pm</u>	5.0
Helper #3	<u>Todd</u> <u>7:00am</u>	<u>12:30pm</u>	5.5
Helper #4			
Helper #5			
MMU # 1	<u>QM 11054</u> <u>7:00am</u>	<u>12:00pm</u>	5.0
MMU # 2			
Total Hrs			27.5

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handidets	<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
<u>6M</u>	Uni Tronic 600		<u>2</u>
<u>15M</u>	Uni Tronic 600		<u>189</u>
<u>25M</u>	Uni Tronic 600		<u>0</u>
<u>25M</u>	Ikon 2		<u>0</u>
<u>400M</u>	Uni Tronic Wire		<u>1</u>

Seis #1: Front Gate 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: _____ PPV: _____ mm/s @ Freq: _____ Hz Air o/p: _____ dB
 Lat ° N: 44*49.204 Long ° W: 75*19.730 (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: 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: Cornwall Gravel
 Blaster-in-charge: Bradley Crook (print name)
 Bench / Face: 27' East Hole
 Latitude (° N): 45.08087 74.74399
 Centre of Blast Centre of Blast

Wind Direction: NE (from the: W SW S SE E NE N NW)
 Wind Velocity: 12 kph Temperature: 10 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
 Partly Cloudy: ☐ Snow: ☐
 Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m
 Face Profiled Y or N N Boretracked 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: 177 1,510.9 m (4,956 ft)
 Remote Fired Y or N Y
 Re Drills Y or N N # redrills 0 Holes Measured Y or N Y

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		6:00am	2:00pm	8.0
Helper #1	Kevin	7:00am	2:00pm	7.0
Helper #2	Pierre	7:00am	12:00pm	5.0
Helper #3	Joel	7:00am	12:00pm	5.0
Helper #4				
Helper #5				
MMU # 1	QM 11054	7:30am	12:00pm	4.5
MMU # 2				
Total Hrs				29.5

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handidets	<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
<u>6M</u>	Uni Tronic 600		<u>0</u>
<u>20M</u>	Uni Tronic 600		<u>178</u>
<u>25M</u>	Uni Tronic 600		<u>0</u>
<u>25M</u>	Ikon 2		<u>0</u>
<u>400M</u>	Uni Tronic Wire		<u>1</u>

Seis #1: Front Gate 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: _____ PPV: _____ mm/s @ Freq: _____ Hz Air o/p: _____ dB
 Lat ° N: 44*49.204 Long ° W: 75*19.730 (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: 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: Cornwall Gravel
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: Asphalt
Latitude (° N): 45.08269 74.74717
Centre of Blast Centre of Blast

Wind Direction: SW (from the: W SW S SE E NE N NW)
Wind Velocity: 32 kph Temperature: 6 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: 1,127 m
Partly Cloudy: ☒ Snow: ☐
Sunny: ☒ Inversion: ☐ Inversion Altitude: m
Face Profiled Y or N N Boretracked 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 Dat Before
Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
Bit diam: 89 mm (0 ') # Holes: 79 1,156.0 m (3,792 ft)
Remote Fired Y or N ☒
Re Drills Y or N ☒ # redrills 0 Holes Measured Y or N ☒

tonnes Blasted: 28,162 te
tonnes Invoiced: te
Burden: 2.7 m 9.00 ft
Spacing: 3.4 m 11.00 ft
Avg Bench Ht: 14.6 m 48.00 ft
Avg Hole Depth: 14.6 m 48.00 ft
Collar: 1.4 m 4.60 ft
Holes Dewatered: 0 holes
Total kg Loaded: 8,182 kg
Powder Factor: 0.29 kg/te 0.13 #/te
0.78 kg/m³ 1.32 #/cy
Max. per delay: 105 kg/delay
Rock Density: 2.70 g/cc
Rows Blasted: 5 rows
Bench Length 50.3 m 165.0 ft
Blast Width: 14.2 m 46.5 ft
Rock Vol. Blasted: 10,430 m³ 13,632 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		6:00am	12:30pm	6.5
Helper #1	Kevin	7:00am	10:30am	3.5
Helper #2				
Helper #3	Dana	7:00am	10:30am	3.5
Helper #4				
Helper #5				
MMU # 1	QM 11054	7:00am	10:00am	3.0
MMU # 2				
Total Hrs				16.5

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handidets	<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
<u>6M</u>	Uni Tronic 600		<u>79</u>
<u>20M</u>	Uni Tronic 600		<u>79</u>
<u>25M</u>	Uni Tronic 600		<u>0</u>
<u>25M</u>	Ikon 2		<u>0</u>
<u>400M</u>	Uni Tronic Wire		<u>1</u>

Seis #1: East of Shot 400M 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: PPV: mm/s @ Freq: Hz Air o/p: dB
Lat ° N: 44*49.204 Long ° W: 75*19.730 (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: 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: Cornwall Gravel
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: 30' Lower Bench
Latitude (° N): 45.07792 74.74660
Centre of Blast Centre of Blast

Wind Direction: SW (from the: W SW S SE E NE N NW)
Wind Velocity: 63 kph Temperature: -2 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
Partly Cloudy: ☐ Snow: ☐
Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m
Face Profiled Y or N N Boretracked 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 6:00am
Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
Bit diam: 89 mm (0 ') # Holes: 94 859.8 m (2,820 ft)
Remote Fired Y or N Y
Re Drills Y or N N # redrills 0 Holes Measured Y or N Y

tonnes Blasted: 19,965 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: 5,834 kg
Powder Factor: 0.29 kg/te 0.13 #/te
0.79 kg/m³ 1.33 #/cy
Max. per delay: 68 kg/delay
Rock Density: 2.70 g/cc
Rows Blasted: 5 rows
Bench Length 64.2 m 210.4 ft
Blast Width: 12.6 m 41.3 ft
Rock Vol. Blasted: 7,395 m³ 9,664 cy

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

Labour & Equipment		Time in	Time Out	Total Hours
Blaster in Charge		6:00am	2:30pm	8.5
Helper #1	Kevin	7:00am	2:30pm	7.5
Helper #2	Andrew	7:00am	1:00pm	6.0
Helper #3	Tim	7:00am	1:00pm	6.0
Helper #4	Jason	6:00am	2:30pm	8.5
Helper #5				
MMU # 1	QM 11054	7:30am	12:00pm	4.5
MMU # 2				
Total Hrs				41.0

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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		8
15M	Uni Tronic 600		97
25M	Uni Tronic 600		0
25M	Ikon 2		0
400M	Uni Tronic Wire		1

Seis #1: Front Gate 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: _____ PPV: _____ mm/s @ Freq: _____ Hz Air o/p: _____ dB
Lat ° N: 44*49.204 Long ° W: 75*19.730 (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: 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: Cornwall Gravel
Blaster-in-charge: Bradley Crook (print name)
Bench / Face: 30 Lower Bench
Latitude (° N): 45.07810 74.74633
Centre of Blast Centre of Blast

Wind Direction: W (from the: W SW S SE E NE N NW)
Wind Velocity: 20 kph Temperature: -5 °C

Overcast: ☐ Rain: ☐ Cloud Altitude: _____ m
Partly Cloudy: ☐ Snow: ☐
Sunny: ☒ Inversion: ☐ Inversion Altitude: _____ m
Face Profiled Y or N N Boretracked 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 6:00am
Bit diam: 76 mm (0 ') # Holes: 0 = 0.0 m (0 ft)
Bit diam: 89 mm (0 ') # Holes: 162 1,481.8 m (4,860 ft)
Remote Fired Y or N Y
Re Drills Y or N N # redrills 0 Holes Measured Y or N N

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	34,740	25,370	9,370
Pkgd. & Boosters:	Size	kg	
E113	65X400	7	125
E113	75X400	7	175
E113	90X400	0	0
Pentex Boosters	0.450	0	0
Pentex Boosters	0.340	162	55
Pentex Boosters	0.200	11	2
Total explosives(kg):		9,727	

Labour & Equipment		Time in	Time Out	Total Hours
Blaster in Charge		6:00am	2:00pm	8.0
Helper #1	Kevin	7:00am	1:00pm	6.0
Helper #2	Todd	7:00am	1:00pm	6.0
Helper #3	Dana	7:00am	1:00pm	6.0
Helper #4				
Helper #5				
MMU # 1	QM 9	7:00am	12:00pm	5.0
MMU # 2				
Total Hrs				31.0

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	08122012W	25/475	0
7M Handidets	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		11
15M	Uni Tronic 600		162
25M	Uni Tronic 600		0
25M	Ikon 2		0
400M	Uni Tronic Wire		1

Seis #1: Front Gate PPV: 2.16 mm/s @ Freq: 47 Hz Air o/p: 6 pa.(L)
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: 44*49.204 Long ° W: 75*19.730 (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: 14-024
 Customer P.O. #: Scott
 Orica Order #: 1798525
 Date of Blast: Nov 27 2014
 Time of Blast: 4:37 AM

Customer Name: Cornwall Gravel
 Blaster-in-charge: Bradley Crook (print name)
 Bench / Face: 65' SE Corner
 Latitude (° N): 45.07785 74.74549
 Centre of Blast Centre of Blast

tonnes Blasted: 49,833 te
 tonnes Invoiced: te
 Burden: 2.7 m 9.00 ft
 Spacing: 3.4 m 11.00 ft
 Avg Bench Ht: 19.2 m 63.00 ft
 Avg Hole Depth: 19.2 m 63.00 ft
 Collar: 1.4 m 4.60 ft
 Holes Dewatered: 0 holes
 Total kg Loaded: 12,285 kg
 Powder Factor: 0.25 kg/te 0.11 #/te
0.67 kg/m³ 1.12 #/cy
 Max. per delay: 240 kg/delay
 Rock Density: 2.70 g/cc
 Rows Blasted: 3 rows
 Bench Length 99.1 m 324.9 ft
 Blast Width: 9.7 m 31.8 ft
 Rock Vol. Blasted: 18,457 m³ 24,122 cy

Wind Direction: N (from the: W SW S SE E NE N NW)
 Wind Velocity: 5 kph Temperature: -2 °C
 Overcast: Rain: Cloud Altitude: m
 Partly Cloudy: X Snow:
 Sunny: Inversion: Inversion Altitude: m
 Face Profiled Y or N N Boretracked 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 6:00am
 Bit diam: 102 mm (0 ') # Holes: 28 = 537.8 m (1,764 ft)
 Bit diam: 89 mm (0 ') # Holes: 61 1,171.7 m (3,843 ft)
 Remote Fired Y or N Y
 Re Drills Y or N N # redrills 0 Holes Measured Y or N Y

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		6:00am	5:00pm	11.0
Helper #1	Kevin	6:00am	4:00pm	10.0
Helper #2	Todd	7:00am	4:00pm	9.0
Helper #3	Pierre	7:00am	4:00pm	9.0
Helper #4				
Helper #5				
MMU # 1	QM 9	7:00am	4:00pm	9.0
MMU # 2				
Total Hrs				48.0

Pyro-technic Dets:	Case #	ms	Qty
12M Handidets	<u>08122012W</u>	<u>25/475</u>	<u>0</u>
7M Handidets	<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
<u>6M</u>	Uni Tronic 600		<u>0</u>
<u>15M</u>	Uni Tronic 600		<u>0</u>
<u>6M</u>	Ikon 2		<u>88</u>
<u>20M</u>	Ikon 2		<u>98</u>
<u>400M</u>	Uni Tronic Wire		<u>1</u>

Seis #1: Front Gate PPV: 3.05 mm/s @ Freq: 20 Hz Air o/p: 42 pa.(L)
 Lat ° N: Long ° W: (Trigger: 2.00 mm/s) V / T / L ? (Trigger: 115 dB)
 Seis #2: 504 South Branch Rd PPV: 2.16 mm/s @ Freq: 43 Hz Air o/p: 13 pa.(L)
 Lat ° N: 44*49.204 Long ° W: 75*19.730 (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

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**

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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** °CClear: **X**Rain: ☐Overcast: ☐Partly Cloudy: ☐Snow: ☐Inversion: ☐**- Drilling Information -**

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	mm	°	# Holes:	=	ft	(	in	)	diam
88.9	mm	0	77	=	3,696.0	ft	3 1/2	)	diam
76.2	mm	0	2	=	96.0	ft	3	)	diam
101.6	mm	0	0	=	0.0	ft	4	)	diam

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	# usec	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

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	

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 avgSpacing: **10.0** ft avg# Holes: **18** front rowBurden: **9.0** ft avgSpacing: **10.0** ft avg# Holes: **61**Bench Height: **48.0** ft avgSub-drill: **0.0** ft avgHole Depth: **48.0** ft avg**- Stone Decking -**Front Row: **0.0** ft avgMain Body: **0.0** ft avg# Stone Decks: **0** per blast**- Collar Stemming -**Front Row: **5.0** ft avgMain Body: **4.5** ft avgMaterial used: **HL3****- Charge Length -**Front Row: **43.0** ft avgMain Body: **43.5** ft avg**- Charge Weight -**Front Row: **96.0** kg/holeMain Body: **97.1** kg/holeMax. per delay: **100.0** kg/delaySD () Equation: **1010.9** kg/delayTotal kg Loaded: **8,225** kgRock 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)1.447 lb/yd³1.134 lb/yd³1.338 lb/yd³0.000 lb/yd³

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

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

50pc of Electric MS 3.5M 00 sold

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**

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

(N) Radians	(W) Radians
0.786841	1.304499
0.786841	1.304499

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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

[Scale House](#)

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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: **35** 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 = **1,011** kg

Orica

Blaster-in-charge:

jim bray

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

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 1

Master-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 Blast

Wind from the: **W** at **15** kph Temperature: **16 to 20** °CClear: ☐Rain: ☐Overcast: ☒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 avgSpacing: **11.0** ft avg# Holes: **19** front row**- Pattern (Main Body) -**Burden: **9.0** ft avgSpacing: **11.0** ft avg# Holes: **53** main bodyBench Height: **63.0** ft avgSub-drill: **0.0** ft avgHole Depth: **63.0** ft avg**- Stone Decking -**Front Row: **0.0** ft avgMain Body: **0.0** ft avg# Stone Decks: **0** per blast**- Collar Stemming -**Front Row: **5.0** ft avgMain Body: **5.0** ft avgMaterial used: **HL3****- Charge Length -**Front Row: **58.0** ft avgMain Body: **58.0** ft avg**- Charge Weight -**Front Row: **129.5** kg/holeMain Body: **129.5** kg/holeMax. per delay: **135.0** kg/delaySD () Equation: **401.1** kg/delayTotal kg Loaded: **9,992** kgRock 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)1.331 lb/yd³1.059 lb/yd³1.236 lb/yd³1.206 lb/yd³

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

1 - Pentex BC 340 fell down hole

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**

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

(N) Radians	(W) Radians
0.786761	1.304549
0.786761	1.304549

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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**Orica**

Blaster-in-charge:

jim bray

*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

Master-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** °CClear: ☐Rain: ☐Overcast: ☐Partly Cloudy: ☒Snow: ☐Inversion: ☐**- Drilling Information -**

Angle from Vertical

Nominal Bit Diameter:

Bit Type	Diameter (mm)	Angle (°)	# Holes	Length (ft)	Diameter (in)
Primary Bit diam:	88.9	0	60	5,100.0	3 1/2
Secondary Bit diam:	101.6	0	1	85.0	4
Tertiary Bit diam:	76.2	0	1	85.0	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

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 avgSpacing: **10.0** ft avg# Holes: **16** front rowBurden: **9.0** ft avgSpacing: **10.0** ft avg# Holes: **46**Bench Height: **85.0** ft avgSub-drill: **0.0** ft avgHole Depth: **85.0** ft avg**- Stone Decking -**Front Row: **0.0** ft avgMain Body: **0.0** ft avg# Stone Decks: **0** per blast**- Collar Stemming -**Front Row: **5.0** ft avgMain Body: **5.0** ft avgMaterial used: **HL3****- Charge Length -**Front Row: **80.0** ft avgMain Body: **80.0** ft avg**- Charge Weight -**Front Row: **178.6** kg/holeMain Body: **178.6** kg/holeMax. per delay: **185.0** kg/delaySD () Equation: **116.5** kg/delayTotal kg Loaded: **12,718** kgRock 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)

1.484 lb/yd³1.191 lb/yd³1.390 lb/yd³##### lb/yd³

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

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**

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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:		Trigger set at: 2.0 mm/s	
		frequency:		V / T / L : ? (Vertical, Transverse or Longitudinal)	
		air overpressure:		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

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

Maximum Indicated Charge Weight per Delay = **116** kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

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

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**

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Laster-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** °CClear: ☐Rain: ☐Overcast: ☒Partly Cloudy: ☐Snow: ☐Inversion: ☐**- Drilling Information -**

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	88.9 mm	0 °	# Holes:	36	=	2,268.0 ft (3 1/2 " diam)
Secondary Bit diam:	101.6 mm	0 °	# Holes:	10	=	630.0 ft (4 " diam)
Tertiary Bit diam:	76.2 mm	0 °	# Holes:	25	=	1,575.0 ft (3 " diam)

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	# usec	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

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 avgSpacing: **10.0** ft avg# Holes: **32** front rowBurden: **9.0** ft avgSpacing: **10.0** ft avg# Holes: **39**Bench Height: **63.0** ft avgSub-drill: **0.0** ft avgHole Depth: **63.0** ft avg**- Stone Decking -**Front Row: **0.0** ft avgMain Body: **0.0** ft avg# Stone Decks: **0** per blast**- Collar Stemming -**Front Row: **5.0** ft avgMain Body: **5.0** ft avgMaterial used: **HL3****- Charge Length -**Front Row: **58.0** ft avgMain Body: **58.0** ft avg**- Charge Weight -**Front Row: **129.5** kg/holeMain Body: **129.5** kg/holeMax. per delay: **195.0** kg/delaySD () Equation: **0.0** kg/delayTotal kg Loaded: **10,003** kgRock 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)

1.477 lb/yd³1.165 lb/yd³1.359 lb/yd³##### lb/yd³

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

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.
Mid Blast	44.07786	74.74535
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	44.07786	74.74535

(N) Radians	(W) Radians
0.769304	1.304552
0.769304	1.304552

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading	45.08551	74.74272
	2nd Reading		
	Average	45.08551	74.74272

(N) Radians	(W) Radians
0.786891	1.304507
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	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

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

Maximum Indicated Charge Weight per Delay = **0** kg**Orica**

Blaster-in-charge:

jim bray

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

[illegible]

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.
Mid Blast	44.07722	74.74563
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	44.07722	74.74563

(N) Radians	(W) Radians
0.769293	1.304557
0.769293	1.304557

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading	45.06704	74.75478
	2nd Reading		
	Average	45.06704	74.75478

(N) Radians	(W) Radians
0.786568	1.304717
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	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

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

Maximum Indicated Charge Weight per Delay = **0** kg**Orica**

Blaster-in-charge:

jim bray

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

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.
Mid Blast	45.07676	74.74527
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.07676	74.74527

(N) Radians	(W) Radians
0.786738	1.304551
0.786738	1.304551

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading	45.08478	74.74498
	2nd Reading		
	Average	45.08478	74.74498

(N) Radians	(W) Radians
0.786878	1.304546
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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

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

Maximum Indicated Charge Weight per Delay = **230** kg

Orica

Blaster-in-charge:

jim bray

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

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**

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

(N) Radians	(W) Radians
0.786845	1.304589
0.786845	1.304589

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading	45.08478	74.74498
	2nd Reading		
	Average	45.08478	74.74498

(N) Radians	(W) Radians
0.786878	1.304546
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	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: **35** 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 = **67** kg

Orica

Blaster-in-charge:

jim bray

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

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.
Mid Blast	45.08370	74.74523
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.08370	74.74523

(N) Radians	(W) Radians
0.786859	1.304550
0.786859	1.304550

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading	45.08478	74.74498
	2nd Reading		
	Average	45.08478	74.74498

(N) Radians	(W) Radians
0.786878	1.304546
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	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

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

Maximum Indicated Charge Weight per Delay = **16** kg**Orica**

Blaster-in-charge:

Bradley Crook

jim bray

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

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.
Mid Blast	45.08317	74.74659
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.08317	74.74659

(N) Radians	(W) Radians
0.786850	1.304574
0.786850	1.304574

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading	45.08478	74.74498
	2nd Reading		
	Average	45.08478	74.74498

(N) Radians	(W) Radians
0.786878	1.304546
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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

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

Maximum Indicated Charge Weight per Delay = **53** kg

Orica

Blaster-in-charge:

jim bray

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

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is a vertical margin line on the left side, creating a narrow left margin. The paper appears to be from a notebook or a standard ruled document.

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.
Mid Blast	45.08300	74.74740
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.08300	74.74740

(N) Radians	(W) Radians
0.786847	1.304588
0.786847	1.304588

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading	45.08478	74.74498
	2nd Reading		
	Average	45.08478	74.74498

(N) Radians	(W) Radians
0.786878	1.304546
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	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: **30** 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 = **84** kg**Orica**

Blaster-in-charge:

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

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: 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: **30** 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 = **59** kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

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

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: **2015-09-22**Blast Number: **15-012**Orica Order #: **1929677**Blast Time: **12:03pm**

page 2

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

(N) Radians	(W) Radians
0.786849	1.304589
0.786849	1.304589

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading	45.08478	74.74498
	2nd Reading		
	Average	45.08478	74.74498

(N) Radians	(W) Radians
0.786878	1.304546
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	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: **30** 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 = **79** kg**Orica**

Blaster-in-charge:

Bradley Crook

jim bray

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

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: **2015-10-20**

Blast Number: **15-013**

Orica Order #: **1943958**

Blast Time: **12:16pm**

page 2

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

(N) Radians	(W) Radians
0.786853	1.304563
0.786853	1.304563

1st

Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
1st Reading	45.07275	74.74414
2nd Reading		
Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
1st Reading	45.08478	74.74498
2nd Reading		
Average	45.08478	74.74498

(N) Radians	(W) Radians
0.786878	1.304546
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.
1st Reading		
2nd Reading		
Average	0.00000	0.00000

(N) Radians	(W) Radians
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

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

Maximum Indicated Charge Weight per Delay = **35** kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

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

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: **2015-11-02**

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

page 2

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 : (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		

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

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

Maximum Indicated Charge Weight per Delay = **123** kg

Orica

Blaster-in-charge:

jim bray

Dana Koch

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

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: **2015-11-23**

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	

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: **30** 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 = **173** kg

Orica

Blaster-in-charge:

Bradley Crook

jim bray

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

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:

2015-11-25

Blast Number:

15-016

Orica Order #:

1961307

Blast Time:

12:47pm

page 2

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

(N) Radians	(W) Radians
0.786793	1.304538
0.786793	1.304538

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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: **35** 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 = **516** kg

Orica

Blaster-in-charge:

jim bray

*Bradley Crook*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** kphTemperature: **1 to 5** °CClear: ☐Rain: ☐Overcast: ☐Partly Cloudy: ☒Snow: ☐Inversion: ☐**- Drilling Information -**

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam: **88.9** mm **0**° # Holes: **179** = 5,370.0 ft (3 1/2 " diam)
 Secondary Bit diam: **76.2** mm **0**° # Holes: **1** = 30.0 ft (3 " diam)
 Tertiary Bit diam: **0** mm **0**° # Holes: **0** = 0.0 ft (" diam)

Bulk Explosives:

in (kg) out (kg) kg

CENTRA GOLD 70	35,000	24,370	10,630
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Packaged Explosives:

cs shipped cs returned kg

E113 65X400	10	3	175
E113 75X400	13	6	175

Boosters:

kg / unit # usec 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
--	-------	----------

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: **36,899** te **13,666** m³# Holes Loaded: **180** holes... including: **9** Dead Holes... and: **0** Helper HolesHelper Hole Collar: **0** ft avg# Rows Blasted: **9** rowsRate Code: **0****- Pattern (Front Row) -**Burden: **10.5** ft avgSpacing: **10.0** ft avg# Holes: **24** front row**- Pattern (Main Body) -**Burden: **9.0** ft avgSpacing: **10.0** ft avg# Holes: **156** main bodyBench Height: **30.0** ft avgSub-drill: **0.0** ft avgHole Depth: **30.0** ft avg**- Stone Decking -**Front Row: **0.0** ft avgMain Body: **0.0** ft avg# Stone Decks: **0** per blast**- Collar Stemming -**Front Row: **5.0** ft avgMain Body: **5.0** ft avgMaterial used: **HL3****- Charge Length -**Front Row: **25.0** ft avgMain Body: **25.0** ft avg**- Charge Weight -**Front Row: **55.8** kg/holeMain Body: **55.8** kg/holeMax. per delay: **65.0** kg/delaySD () Equation: **278.3** kg/delayTotal kg Loaded: **11,044** kgRock Density: **2.70** g/cc = te/m³**- 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)1.362 lb/yd³1.055 lb/yd³1.230 lb/yd³1.211 lb/yd³

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 too ice falling)

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.
Mid Blast	45.07773	74.74647
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.07773	74.74647

(N) Radians	(W) Radians
0.786755	1.304572
0.786755	1.304572

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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: **35** 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 = **278** kg

Orica

Blaster-in-charge:

jim bray

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

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:

2016-04-28

Blast Number:

16-001

Orica Order #:

2023927

Blast Time:

12:41pm

page 2

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

(N) Radians	(W) Radians
0.786856	1.304567
0.786856	1.304567

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.08478	74.74498
	2nd Reading		
	Average	45.08478	74.74498

(N) Radians	(W) Radians
0.786878	1.304546
0.786878	1.304546

Distance (1st Seis. From Centre of Blast)	168.6	m
Post Blast Data:	ppV:	2.3 mm/s
	frequency:	30.0 Hz
	air overpressure:	115.0 dB

Trigger set at: 2.0 mm/s
V / T / L : ? (Vertical, Transverse or Longitudinal)
Trigger set at: 115 dB

NE of Blast

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (2nd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	mm/s
	frequency:	Hz
	air overpressure:	dB

Trigger set at: 2.0 mm/s
V / T / L : ? (Vertical, Transverse or Longitudinal)
Trigger set at: 115 dB

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (3rd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	mm/s
	frequency:	Hz
	air overpressure:	dB

Trigger set at: 2.0 mm/s
V / T / L : ? (Vertical, Transverse or Longitudinal)
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

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

Maximum Indicated Charge Weight per Delay = **32** kg

Orica

Blaster-in-charge:

jim bray

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

Customer: **Cornwall Gravel****Blast Report**Quarry: **McLeod**P.O. #: **Scott**Blast Date: **2016-05-03**Blast Number: **16-002**Orica Order #: **2026057**Blast Time: **3:07pm**

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** kphTemperature: **11 to 15** °CClear: **X**Rain: ☐Overcast: ☐Partly Cloudy: ☐Snow: ☐Inversion: ☐☐**- Drilling Information -**

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	mm	°	# Holes:	=	ft	(	in	)	diam
88.9		0	214	=	6,420.0	ft	(	3 1/2	in
Secondary Bit diam:	101.6	mm	°	# Holes:	14	=	420.0	ft	(
			°	# Holes:	3	=	90.0	ft	(
			°	# Holes:	3	=	90.0	ft	(

Bulk Explosives:

in (kg) out (kg) kg

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

Packaged Explosives:

cs shipped cs returned kg

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

Boosters:

kg / unit # usec kg

	kg / unit	# usec	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

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

Cord & Accessories:

U of M # used

	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: **46,852** te **17,353** m³# Holes Loaded: **231** holes... including: **9** Dead Holes... and: **1** Helper HolesHelper Hole Collar: **1** ft avg# Rows Blasted: **9** rowsRate Code: **1**

- Pattern (Front Row)-

Burden: **10.5** ft avgSpacing: **10.0** ft avg# Holes: **31** front row

- Pattern (Main Body) -

Burden: **9.0** ft avgSpacing: **10.0** ft avg# Holes: **200** main bodyBench Height: **30.0** ft avgSub-drill: **0.0** ft avgHole Depth: **30.0** ft avg

- Stone Decking -

Front Row: **0.0** ft avgMain Body: **0.0** ft avg# Stone Decks: **0** per blast

- Collar Stemming -

Front Row: **5.0** ft avgMain Body: **5.0** ft avgMaterial used: **HL3**

- Charge Length -

Front Row: **25.0** ft avgMain Body: **25.0** ft avg

- Charge Weight -

Front Row: **55.8** kg/holeMain Body: **55.8** kg/holeMax. per delay: **61.0** kg/delaySD () Equation: **269.4** kg/delayTotal kg Loaded: **14,471** kgRock 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: **0.270** 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**

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

(N) Radians	(W) Radians
0.786754	1.304569
0.786754	1.304569

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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: **35** 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 = **269** kg**Orica**

Blaster-in-charge:

jim bray

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

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:

2016-06-01

Blast Number:

16-003

Orica Order #:

2038757

Blast Time:

12:00pm

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

(N) Radians	(W) Radians
0.786857	1.304548
0.786857	1.304548

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.08572	74.74232
	2nd Reading		
	Average	45.08572	74.74232

(N) Radians	(W) Radians
0.786894	1.304500
0.786894	1.304500

Distance (1st Seis. From Centre of Blast)	322.5	m
Post Blast Data:	ppV: DNT	mm/s
	frequency: DNT	Hz
	air overpressure: DNT	dB
		Trigger set at: 2.0 mm/s
		V / T / L : ? (Vertical, Transverse or Longitudinal)
		Trigger set at: 115 dB

NE of Blast

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (2nd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	mm/s
	frequency:	Hz
	air overpressure:	dB
		Trigger set at: 2.0 mm/s
		V / T / L : ? (Vertical, Transverse or Longitudinal)
		Trigger set at: 115 dB

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (3rd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	mm/s
	frequency:	Hz
	air overpressure:	dB
		Trigger set at: 2.0 mm/s
		V / T / L : ? (Vertical, Transverse or Longitudinal)
		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

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

Maximum Indicated Charge Weight per Delay = **116** kg

Orica

Blaster-in-charge:

jim bray

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

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: **2016-06-13**Blast Number: **16-004**Orica Order #: **2043225**Blast Time: **11:58am**

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

(N) Radians	(W) Radians
0.786765	1.304562
0.786765	1.304562

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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: **35** 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 = **326** kg**Orica**

Blaster-in-charge:

jim bray

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

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:

2016-06-15

Blast Number:

16-005

Orica Order #:

2044509

Blast Time:

12:59pm

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

(N) Radians	(W) Radians
0.786750	1.304570
0.786750	1.304570

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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: **35** 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 = **251** kg

Orica

Blaster-in-charge:

jim bray

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

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:

2016-06-16

Blast Number:

16-006

Orica Order #:

2045161

Blast Time:

12:04pm

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

(N) Radians	(W) Radians
0.786856	1.304558
0.786856	1.304558

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.08572	74.74232
	2nd Reading		
	Average	45.08572	74.74232

(N) Radians	(W) Radians
0.786894	1.304500
0.786894	1.304500

Distance (1st Seis. From Centre of Blast)	357.4	m
Post Blast Data:	ppV:	2.5 mm/s
	frequency:	30.0 Hz
	air overpressure:	113.0 dB

Trigger set at: 2.0 mm/s
V / T / L : ? (Vertical, Transverse or Longitudinal)
Trigger set at: 115 dB

NE of Blast

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (2nd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	mm/s
	frequency:	Hz
	air overpressure:	dB

Trigger set at: 2.0 mm/s
V / T / L : ? (Vertical, Transverse or Longitudinal)
Trigger set at: 115 dB

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (3rd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	mm/s
	frequency:	Hz
	air overpressure:	dB

Trigger set at: 2.0 mm/s
V / T / L : ? (Vertical, Transverse or Longitudinal)
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

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

Maximum Indicated Charge Weight per Delay = **142** kg

Orica

Blaster-in-charge:

jim bray

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

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: **2016-06-20**Blast Number: **16-007**Orica Order #: **2046337**Blast Time: **12:00pm**

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Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.
Mid Blast	45.07863	74.74613
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.07863	74.74613

(N) Radians	(W) Radians
0.786771	1.304566
0.786771	1.304566

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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: **35** 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 = **370** kg**Orica**

Blaster-in-charge:

Bradley Crook

jim bray

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

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: **2016-07-04**Blast Number: **16-008**Orica Order #: **2052220**Blast Time: **1:00pm**

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Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.
Mid Blast	45.08276	74.77492
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.08276	74.77492

(N) Radians	(W) Radians
0.786843	1.305069
0.786843	1.305069

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.08572	74.74232
	2nd Reading		
	Average	45.08572	74.74232

(N) Radians	(W) Radians
0.786894	1.304500
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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: **35** 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 = 5,450 kg**Orica**

Blaster-in-charge:

jim bray

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

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:

2016-07-25

Blast Number:

16-009

Orica Order #:

2060936

Blast Time:

12:20pm

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Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.
Mid Blast	45.08231	74.74898
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.08231	74.74898

(N) Radians	(W) Radians
0.786835	1.304616
0.786835	1.304616

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.08572	74.74232
	2nd Reading		
	Average	45.08572	74.74232

(N) Radians	(W) Radians
0.786894	1.304500
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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: **35** 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 = **341** kg

Orica

Blaster-in-charge:

jim bray

*Bradley Crook*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

Blast-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** kphTemperature: **26 to 30** °CClear: **X**Rain: ☐Overcast: ☐Partly Cloudy: ☐Snow: ☐Inversion: ☐☐**- Drilling Information -**

Angle from Vertical

Nominal Bit Diameter:

Bit Type	Diameter (mm)	Angle (°)	# Holes	Length (ft)	Diameter (in)
Primary Bit diam:	88.9	0	92	4,600.0	3 1/2 "
Secondary Bit diam:	76.2	0	14	700.0	3 "
Tertiary Bit diam:	101.6	0	4	200.0	4 "

Bulk Explosives:

in (kg) out (kg) kg

Explosive	in (kg)	out (kg)	kg
CENTRA GOLD 70	33,660	29,000	4,660

Packaged Explosives:

cs shipped cs returned kg

Explosive	cs shipped	cs returned	kg
E113 65X400	6	2	100
E113 75X400	6	2	100

Boosters:

kg / unit # usec kg

Booster	kg / unit	# usec	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

Detonator	case #s	ms	# used
UNITRONIC 600 6M			46
UNITRONIC 600 20M			84

Cord & Accessories:

U of M # used

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

Resource Deployment:

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

Services:

Service	Details	Count
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 Boretraced	0
LABOUR CHARGE (enter HOURS)	Must be pre-authorized	0.0

tonnes Blasted: **13,005** te **4,817** m³# Holes Loaded: **46** holes... including: **Dead Holes**... and: **64** Helper HolesHelper Hole Collar: **ft avg**# Rows Blasted: **3** rowsRate Code: **- Pattern (Front Row) -**Burden: **10.5** ft avgSpacing: **9.0** ft avg# Holes: **16** front row**- Pattern (Main Body) -**Burden: **9.0** ft avgSpacing: **9.0** ft avg# Holes: **30** main bodyBench Height: **50.0** ft avgSub-drill: **ft avg**Hole Depth: **50.0** ft avg**- Stone Decking -**Front Row: **0.0** ft avgMain Body: **0.0** ft avg# Stone Decks: **0** per blast**- Collar Stemming -**Front Row: **5.0** ft avgMain Body: **4.5** ft avgMaterial used: **HL3****- Charge Length -**Front Row: **45.0** ft avgMain Body: **45.5** ft avg**- Charge Weight -**Front Row: **100.5** kg/holeMain Body: **101.6** kg/holeMax. per delay: **127.0** kg/delaySD () Equation: **346.1** kg/delayTotal kg Loaded: **4,886** kgRock 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)1.710 lb/yd³1.266 lb/yd³1.493 lb/yd³1.417 lb/yd³

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 Powerditch 50 x 400

Sold 6 cases of Primaflex 400 grain

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

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Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.
Mid Blast	45.08261	74.74933
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.08261	74.74933

(N) Radians	(W) Radians
0.786840	1.304622
0.786840	1.304622

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.08572	74.74232
	2nd Reading		
	Average	45.08572	74.74232

(N) Radians	(W) Radians
0.786894	1.304500
0.786894	1.304500

Distance (1st Seis. From Centre of Blast)	651.1	m
Post Blast Data:	ppV:	2.0 mm/s
	frequency:	17.0 Hz
	air overpressure:	128.8 dB
650M NE of Blast		

Trigger set at: 2.0 mm/s
 V / T / L : T (Vertical, Transverse or Longitudinal)
 Trigger set at: 115 dB

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (2nd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	2.0 mm/s
	frequency:	Hz
	air overpressure:	dB

Trigger set at: 2.0 mm/s
 V / T / L : ? (Vertical, Transverse or Longitudinal)
 Trigger set at: 115 dB

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (3rd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	2.0 mm/s
	frequency:	Hz
	air overpressure:	dB

Trigger set at: 2.0 mm/s
 V / T / L : ? (Vertical, Transverse or Longitudinal)
 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: **35** 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 = **346** kg

Orica

Blaster-in-charge:

jim bray

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

Customer: **Cornwall Gravel****Blast Report**Quarry: **McLeod**P.O. #: **Scott**Blast Date: **2016-08-22**Blast Number: **16-011**Orica Order #: **2072534**Blast Time: **2:30pm**

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** kphTemperature: **21 to 25** °CClear: ☐Rain: ☐Overcast: ☐Partly Cloudy: ☒Snow: ☐Inversion: ☐**- Drilling Information -**

Angle from Vertical

Nominal Bit Diameter:

Primary Bit diam:	mm	°	# Holes:	=	ft	(	inch	)	diam
88.9		0	148	=	5,180.0	ft	3 1/2	"	diam
Secondary Bit diam:	76.2	mm	°	# Holes:	8	=	280.0	ft	3 " diam
Tertiary Bit diam:	101.6	mm	°	# Holes:	10	=	350.0	ft	4 " diam

Bulk Explosives:

in (kg) out (kg) kg

	in (kg)	out (kg)	kg
CENTRA GOLD 70	35,010	28,610	6,400

Packaged Explosives:

cs shipped cs returned kg

	cs shipped	cs returned	kg
E113 65X400	8	1	175
E113 75X400	8	0	200

Boosters:

kg / unit # usec kg

	kg / unit	# usec	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

	case #s	ms	# used
UNITRONIC 600 6M			0
UNITRONIC 600 15M			127

Cord & Accessories:

U of M # used

	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

tonnes Blasted: **19,941** te **7,386** m³# Holes Loaded: **90** holes... including: **Dead Holes**... and: **76** Helper HolesHelper Hole Collar: **ft avg**# Rows Blasted: **7** rowsRate Code:

- Pattern (Front Row)-

Burden: **10.5** ft avgSpacing: **9.0** ft avg# Holes: **12** front row

- Pattern (Main Body) -

Burden: **9.0** ft avgSpacing: **9.0** ft avg# Holes: **78** main bodyBench Height: **35.0** ft avgSub-drill: **ft avg**Hole Depth: **35.0** ft avg

- Stone Decking -

Front Row: **0.0** ft avgMain Body: **0.0** ft avg# Stone Decks: **0** per blast

- Collar Stemming -

Front Row: **5.0** ft avgMain Body: **5.0** ft avgMaterial used: **HL3**

- Charge Length -

Front Row: **30.0** ft avgMain Body: **30.0** ft avg

- Charge Weight -

Front Row: **67.0** kg/holeMain Body: **67.0** kg/holeMax. per delay: **72.0** kg/delaySD () Equation: **480.5** kg/delayTotal kg Loaded: **6,806** kgRock Density: **2.70** g/cc = te/m³

- 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

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.
Mid Blast	45.08236	74.74920
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.08236	74.74920

(N) Radians	(W) Radians
0.786836	1.304620
0.786836	1.304620

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.08572	74.74232
	2nd Reading		
	Average	45.08572	74.74232

(N) Radians	(W) Radians
0.786894	1.304500
0.786894	1.304500

Distance (1st Seis. From Centre of Blast)	657.6	m
Post Blast Data:	ppV:	2.8 mm/s
	frequency:	39.0 Hz
	air overpressure:	129.0 dB
650M NE of Blast		

Trigger set at: 2.0 mm/s
V / T / L : T (Vertical, Transverse or Longitudinal)
Trigger set at: 115 dB

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (2nd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	mm/s
	frequency:	Hz
	air overpressure:	dB

Trigger set at: 2.0 mm/s
V / T / L : ? (Vertical, Transverse or Longitudinal)
Trigger set at: 115 dB

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (3rd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	mm/s
	frequency:	Hz
	air overpressure:	dB

Trigger set at: 2.0 mm/s
V / T / L : ? (Vertical, Transverse or Longitudinal)
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

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(657.6)^2}{30^2} \text{ kg} \\
 &= \frac{432,438}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = **480** kg

Orica

Blaster-in-charge:

jim bray

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

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:

2016-08-29

Blast Number:

16-012

Orica Order #:

1014484

Blast Time:

12:06m

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Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.
Mid Blast	45.08369	74.74745
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.08369	74.74745

(N) Radians	(W) Radians
0.786859	1.304589
0.786859	1.304589

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.08572	74.74232
	2nd Reading		
	Average	45.08572	74.74232

(N) Radians	(W) Radians
0.786894	1.304500
0.786894	1.304500

Distance (1st Seis. From Centre of Blast)	462.5	m
Post Blast Data:	ppV:	2.7 mm/s
	frequency:	34.0 Hz
	air overpressure:	118.0 dB
460M East of Blast		

Trigger set at: 2.0 mm/s
V / T / L : T (Vertical, Transverse or Longitudinal)
Trigger set at: 115 dB

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (2nd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	mm/s
	frequency:	Hz
	air overpressure:	dB

Trigger set at: 2.0 mm/s
V / T / L : ? (Vertical, Transverse or Longitudinal)
Trigger set at: 115 dB

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (3rd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	mm/s
	frequency:	Hz
	air overpressure:	dB

Trigger set at: 2.0 mm/s
V / T / L : ? (Vertical, Transverse or Longitudinal)
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

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(462.5)^2}{30^2} \text{ kg} \\
 &= \frac{213,906}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = **238** kg

Orica

Blaster-in-charge:

jim bray

*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** °CClear: **X**Rain: ☐Overcast: ☐Partly Cloudy: ☐Snow: ☐Inversion: ☐**- Drilling Information -**

Angle from Vertical

Nominal Bit Diameter:

Bit Type	Diameter (mm)	Angle (°)	# Holes	Length (ft)	Diameter (in)
Primary Bit diam:	88.9	0	122	5,978.0	3 1/2
Secondary Bit diam:				0.0	
Tertiary Bit diam:				0.0	

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

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: **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 avgSpacing: **9.0** ft avg# Holes: **32** front row**- Pattern (Main Body) -**Burden: **9.0** ft avgSpacing: **9.0** ft avg# Holes: **90** main bodyBench Height: **49.0** ft avg

Sub-drill: ft avg

Hole Depth: **49.0** ft avg**- Stone Decking -**Front Row: **0.0** ft avgMain Body: **0.0** ft avg# Stone Decks: **0** per blast**- Collar Stemming -**Front Row: **5.0** ft avgMain Body: **5.0** ft avgMaterial used: **HL3****- Charge Length -**Front Row: **44.0** ft avgMain Body: **44.0** ft avg**- Charge Weight -**Front Row: **98.2** kg/holeMain Body: **98.2** kg/holeMax. per delay: **109.0** kg/delaySD () Equation: **264.3** kg/delayTotal kg Loaded: **13,156** kgRock 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)1.549 lb/yd³1.263 lb/yd³1.473 lb/yd³1.421 lb/yd³

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

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**

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Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.
Mid Blast	45.08377	74.74787
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.08377	74.74787

(N) Radians	(W) Radians
0.786860	1.304597
0.786860	1.304597

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.08572	74.74232
	2nd Reading		
	Average	45.08572	74.74232

(N) Radians	(W) Radians
0.786894	1.304500
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(487.7)^2}{30^2} \text{ kg} \\
 &= \frac{237,851}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = 264 kg**Orica**

Blaster-in-charge:

jim bray

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

Customer: **Cornwall Gravel****Blast Report**Quarry: **McLeod**P.O. #: **Scott**Blast Date: **2016-10-05**Blast Number: **16-014**Orica Order #: **2092601**Blast Time: **12:02pm**

page 1

Laster-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** °CClear: **X**Rain: ☐Overcast: ☐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 **0**° # 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 avgSpacing: **9.0** ft avg# Holes: **13** front row**- Pattern (Main Body) -**Burden: **9.0** ft avgSpacing: **9.0** ft avg# Holes: **62** main bodyBench Height: **50.0** ft avg

Sub-drill: ft avg

Hole Depth: **50.0** ft avg**- Stone Decking -**Front Row: **0.0** ft avgMain Body: **0.0** ft avg# **Stone Decks:** **0** per blast**- Collar Stemming -**Front Row: **5.0** ft avgMain Body: **5.0** ft avgMaterial used: **HL3****- Charge Length -**Front Row: **45.0** ft avgMain Body: **45.0** ft avg**- Charge Weight -**Front Row: **100.5** kg/holeMain Body: **100.5** kg/holeMax. per delay: **109.0** kg/delaySD () Equation: **469.8** kg/delayTotal kg Loaded: **7,573** kgRock 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)1.639 lb/yd³1.477 lb/yd³1.477 lb/yd³1.477 lb/yd³

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

9' Face Buden with 3" holes

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**

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Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.
Mid Blast	45.08301	74.74944
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.08301	74.74944

(N) Radians	(W) Radians
0.786847	1.304624
0.786847	1.304624

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.08960	74.74698
	2nd Reading		
	Average	45.08960	74.74698

(N) Radians	(W) Radians
0.786962	1.304581
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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: **35** 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 = **470** kg

Orica

Blaster-in-charge:

jim bray

*Bradley Crook*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** °CClear: ☐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

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 avgSpacing: **9.0** ft avg# Holes: **24** front row**- Pattern (Main Body) -**Burden: **9.0** ft avgSpacing: **9.0** ft avg# Holes: **67** main bodyBench Height: **50.0** ft avg

Sub-drill: ft avg

Hole Depth: **50.0** ft avg**- Stone Decking -**Front Row: **0.0** ft avgMain Body: **0.0** ft avg# **Stone Decks:** **0** per blast**- Collar Stemming -**Front Row: **5.0** ft avgMain Body: **5.0** ft avgMaterial used: **HL3****- Charge Length -**Front Row: **45.0** ft avgMain Body: **45.0** ft avg**- Charge Weight -**Front Row: **100.5** kg/holeMain Body: **100.5** kg/holeMax. per delay: **109.0** kg/delaySD () Equation: **607.3** kg/delayTotal kg Loaded: **8,792** kgRock 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)1.562 lb/yd³1.477 lb/yd³1.477 lb/yd³1.477 lb/yd³

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

9' Face Buden with 3" holes

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**

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Blast Co-ordinates	Enter ° N Lat.	Enter ° W Long.
Mid Blast	45.08312	74.74898
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.08312	74.74898

(N) Radians	(W) Radians
0.786849	1.304616
0.786849	1.304616

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.08960	74.74698
	2nd Reading		
	Average	45.08960	74.74698

(N) Radians	(W) Radians
0.786962	1.304581
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
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

$$\begin{aligned}
 W &= \frac{D^2}{30^2} \\
 &= \frac{(739.3)^2}{30^2} \text{ kg} \\
 &= \frac{546,564}{900} \text{ kg}
 \end{aligned}$$

Maximum Indicated Charge Weight per Delay = **607** kg

Orica

Blaster-in-charge:

jim bray

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

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.
Mid Blast	45.07723	74.74632
Front Row Corner		
Back Row Corner		
Average (Centre of Blast)	45.07723	74.74632

(N) Radians	(W) Radians
0.786746	1.304569
0.786746	1.304569

1st	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading	45.07275	74.74414
	2nd Reading		
	Average	45.07275	74.74414

(N) Radians	(W) Radians
0.786668	1.304531
0.786668	1.304531

Distance (1st Seis. From Centre of Blast)	527.4	m
Post Blast Data:	ppV:	2.2 mm/s
	frequency:	43.0 Hz
	air overpressure:	109.3 dB

Trigger set at:	2.0 mm/s
V / T / L :	T (Vertical, Transverse or Longitudinal)
Trigger set at:	115 dB

Front Gate

2nd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (2nd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	mm/s
	frequency:	Hz
	air overpressure:	dB

Trigger set at:	2.0 mm/s
V / T / L :	? (Vertical, Transverse or Longitudinal)
Trigger set at:	115 dB

3rd	Seismograph Co-ordinates	Enter ° N Lat.	Enter ° W Long.
	1st Reading		
	2nd Reading		
	Average	0.00000	0.00000

(N) Radians	(W) Radians
0.000000	0.000000

Distance (3rd Seis. From Centre of Blast)	0.0	m
Post Blast Data:	ppV:	mm/s
	frequency:	Hz
	air overpressure:	dB

Trigger set at:	2.0 mm/s
V / T / L :	? (Vertical, Transverse or Longitudinal)
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: **35** 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 = **227** kg

Orica

Blaster-in-charge:

jim bray

*Bradley Crook*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 and loaded below the required grade
Toe Load:	The portion of explosive loaded below grade