

Calculation of the Cost to Blast and Crush

Gravel Density Data

Gravel, loose, dry 1.52 tonne/cubic metre
Gravel, w/sand, natural 1.92 tonne/cubic metre
Gravel, dry 1/4 to 2 inch 1.68 tonne/cubic metre
Gravel, wet 1/4 inch to 2 inch - 2 tonnes/cubic metre
Concrete Gravel 2.40 tonne/cubic metre

Chose the density that most closely matches your gravel and calculate using formula below

cubic metre * density = tonnes
tonnes/density = cubic metres

Crushing Costs based on 2017 and 2019 pricing
Equipment that may be used \$ 9.64/tonne
Crushing \$ 3.90/tonne
Total with possible equipment \$ 13.54/tonne
Total without additional equipment needed = \$3.90

Rock blasting

Can cost anywhere from \$3.00/m³ to \$150/m³ depending on location in world and location relative to buildings and other features
Small diameter drills (115mm or less) cost about \$20,000 USD/per month to operate. \$1000/day without a contract operator and \$1500/day for contract operator.
Explosive stick powder is roughly \$2.20-\$7.00/kg, figure a powder factor of 1/5kg/m³ as average. Detonators are approx. \$7.00 USD

Not knowing location but using small diameter charge of 64mm with a pattern of 1.5m x 1.5m, holes are three metres deep. 1 hole is equal to 6.75m³ = 148 holes but round to 150
Two days to 1000m³

150 holes x \$7 (detonators) = \$1050
Powder - \$3.00/kg x 1.5gm/m³ = \$4.50 x 1000m³ = \$4500

Drilling @ 2 days = \$3000
Explosives and detonators = \$5550
Insurance = \$1000/day = \$2000
Monitoring = \$500/day = \$1000
Payroll = 1000/day = \$2000
Total = \$13,550 = 13.55/m³ - no profits factored in
Total per Tonne = \$8.91

Hammer

operating cost = \$200-300/hour, takes 8-10 times longer
80 hours at \$200/hour = \$16000

Total Cost to Blast and Crush

\$13.55 for 1.52 tonnes USD
\$8.91 for 1 tonne USD
\$12.86 per tonne in current Canadian Dollar
\$ 3.90 crushing cost/per tonne
Total estimated price to blast and crush = \$16.76 per tonne

* This may not need to occur until such time as all of the Esker materials have been depleted which could take decades
* economies of scale could be found if producing larger amount of materials

Current Cost to Purchase Gravel

2 inch crusher run - \$7.25/tonne
5/8 crusher run - \$7.35/tonne
Pit run - \$4.80/tonne
2 inch limestone crusher run - \$8.20/tonne - \$14.00/tonne
Granular A Limestone Crusher Run - \$8.20/tonne
5/8 limestone - \$13.15/tonne - \$15.20/tonne
3/4 stone
3/4 Limestone Crusher run - \$14.00/tonne

Current Trucking Cost for Material - range from \$2.80/tonne to \$5.70/tonne

This cost will be dependent on market forces, distance from source to location of application or location of Township stockpile