November 14, 2014
Diavik Diamond Mines
RE: Mining Plan Model

Mr. Erik Madsen,

You had approached us with a question about how to plan your company's most recent mining endeavour. You asked us to find the optimal depth of mine, and thus a corresponding dike circumference, that will allow you to obtain a maximum net revenue. After an in depth analysis of the problem, we have developed a model for the problem. We are now in the stages of running the simulation with the data you have provided. What we find is that given an unlimited amount of time and capital, the net revenue will continually increase. That is, should we set the mine to have a maximum depth of 600m, the maximum revenue will be obtained by digging the full 600m depth.

This in not the expected result, as you had outlined that mines are rarely more than 500m in depth. At this point we would like to discuss with you whether there might be additional limits on the construction of the mine, such as completion time, employee costs, or available land. We have provided a brief summary of some of our findings in the chart below. Completion dates assume that dike construction is started in January 2015, and cost have considered inflation.

Mine Depth (m)	600	450	360
Dike Circumference (m)	5030	4150	3623
Completion Time (yrs)	33	25	20
Diamond Profit	$28.6 billion	$18.9 billion	$13.6 billion
Processing Costs	$2 billion	$1.5 billion	$1.3 billion
Mining Costs	$9.3 billion	$5.5 billion	$3.7 billion
Dike Construction Costs	$503 million	415 million	$363 million
Net Revenue	$16.7 billion	$11.4 billion	$8.5 billion