Risk assessment

Below are five of the most predominant risks associated with the water pipe line project. These risks are listed in order of rank regarding risk profile:

1. Combination of pipe thicknesses

The most important risk that has a major tie in with overall cost of the project is the combination of pipe thicknesses used throughout the length of the pipeline build. Furthermore, the exact locations in which the thickness values change. If the location calculations or the thickness calculations are incorrect and pipe of a larger thickness extends past the required distance, the price will increase by millions of dollars due to unneeded materials. To mitigate this risk we have incorporated an N choose K function into our code to calculate every possible combination.

1. Pump placement

The junction location selected for the pump directly correlates to the combination of selected pipe thicknesses. If the incorrect placement is selected for pump site location, then it will produce incorrect values for pipe thickness which in turn produces fluctuations in overall material costs. This also extends into pump site leveling since site selection can change the type of ground you are excavating, which can further fluctuate price point. In order to mitigate this risk, we have tested our N choose K function at each junction point to procure results in which fit the best possibility for project constraints.

1. Pump site leveling

Pump site leveling risk is directly created by pump site selection. If you pick the incorrect location, then the quantity of track hoes would exceed the number that can fit in a 500ft section. Also, excavating the worst-case junction (junction 11) would result in roughly 4-5 times the excavation costs.

1. Time

The risk regarding time is brought forth since with these calculations, we have used all 50 allotted site preparation days for construction. The risk itself is possibility of time overlap, where time allotted for site preparation extends into allotted time for finalization of construction procedures. In this scenario it is assumed that the amount of work done per unit of equipment is accurate however in a real-world scenario a margin could be applied in order to insure timely completion. For example, hiring more equipment or scheduling an increase to time constraints.

1. Calculation of work truck quantity

Risk in regard to work truck quantity it directly connected to pump site selection, as well as the pump site leveling. Improper calculations in either field will result in improper quantity outputs for required work trucks, in most cases these errors result in a surplus of work trucks. Which in turn result in higher total costs to the project.