

# **Scraper – Topsoil Replacement Talpac Haul Simulations**

| Production Summary - Full Simulation                                                                  |             |                                                 |                                    |  |
|-------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------|------------------------------------|--|
| <b>Haulage System: Scrapers Worst Case 2013</b>                                                       |             | <b>Haul Cycle: [PRJ] A94-2</b>                  |                                    |  |
| <b>Material: [PRJ] Topsoil</b>                                                                        |             | <b>Roster: [PRJ] 5 day Week - 8 Hour Shifts</b> |                                    |  |
| <b>Loader</b>                                                                                         |             | <b>[PRJ] CATERPILLAR 637 G (Push Pull)</b>      |                                    |  |
| Availability                                                                                          | %           | 85.00                                           |                                    |  |
| Bucket Fill Factor                                                                                    |             | 0.80                                            |                                    |  |
| Average Bucket Load Volume                                                                            | cu.yards    | 27.14                                           |                                    |  |
| Average Payload                                                                                       | bcy         | 18.85                                           |                                    |  |
| Operating Hours per Year                                                                              | OpHr/Year   | 1,099.00                                        | Op. hrs factored by availability   |  |
| Average Operating Shifts per Year                                                                     | shifts/Year | 157.00                                          | Shifts factored by availability    |  |
| Average Bucket Cycle Time                                                                             | min         | 1.70                                            |                                    |  |
| Loaded Transport Time                                                                                 | min         | 1.68                                            |                                    |  |
| Unloaded Transport Time                                                                               | min         | 1.67                                            |                                    |  |
| Total Loading unit Cycle Time                                                                         | min         | 3.56                                            |                                    |  |
| Transport Distance (One Way)                                                                          | feet        | 3,280.00                                        |                                    |  |
| Production per Operating Hour                                                                         | bcy         | 148.08                                          |                                    |  |
| Production per Loader Operating Shift                                                                 | bcy         | 1,037                                           | Max. prod. based on 100% avail.    |  |
| Production per Year                                                                                   | bcy         | 162,736                                         | Avg. production factored by avail. |  |
| <b>Haulage System</b>                                                                                 |             |                                                 |                                    |  |
| Production per Year                                                                                   | bcy/Year    | 162,736                                         |                                    |  |
| Discounted Capital Cost                                                                               | \$/bcy      | 0.00                                            | <b>Loading Methodology</b>         |  |
| Discounted Operating Cost                                                                             | \$/bcy      | 0.00                                            | Single Sided                       |  |
| Discounted Average Cost                                                                               | \$/bcy      | 0.00                                            | Full Truck                         |  |
| Excavation Target                                                                                     | bcy         | 105,122.00                                      | Average for 150 Shifts             |  |
| Time to move Excavation Target                                                                        | Days        | 235.94                                          | 104834                             |  |
| Loader Hrs to move Target                                                                             | Op. Hours.  | 710                                             |                                    |  |
| Total Truck Hrs to move Target                                                                        | Op. Hours.  | 710                                             |                                    |  |
| Total cost to move Target                                                                             | \$          | 0                                               |                                    |  |
| Productivity estimates allow for insufficient time at the end of the shift to complete another cycle. |             |                                                 |                                    |  |
| Time for the first bucket pass coincides with the truck queuing and maneuvering times.                |             |                                                 |                                    |  |
| This simulation is based on data provided by the equipment manufacturer.                              |             |                                                 |                                    |  |
| Equipment data should be checked to ensure it is valid for this site.                                 |             |                                                 |                                    |  |

| Type  | Title               | Distance<br>feet | Grade<br>% | Roll<br>Res. % | Max<br>mph | Curve<br>Angle | Final<br>mph | Load<br>% of Full |
|-------|---------------------|------------------|------------|----------------|------------|----------------|--------------|-------------------|
| Queue | Queue at Loader     | Auto             | Mins       |                |            |                |              |                   |
| Spot  | Spot Time at loader | Auto             | Mins       |                |            |                |              |                   |
| Load  | Loading             | Auto             | Mins       |                |            |                |              |                   |
| 1     | Haul Segment        | 170.0            | 0.0        | 4.0            | Max        | 0.0            | Max          | Full              |
| 2     | Haul Segment        | 220.0            | 2.3        | 3.5            | Max        | 0.0            | Max          | Full              |
| 3     | Haul Segment        | 390.0            | 3.8        | 3.5            | Max        | 0.0            | Max          | Full              |
| 4     | Haul Segment        | 1950.0           | -7.4       | 3.5            | Max        | 0.0            | Max          | Full              |
| 5     | Haul Segment        | 550.0            | 8.5        | 4.0            | Max        | 0.0            | Max          | Full              |
| Spot  | Spot Time at Dump   | Auto             | Mins       |                |            |                |              |                   |
| Dump  | Dumping             | Auto             | Mins       |                |            |                |              |                   |
| 6     | Haul Segment (rev.) | 550.0            | -8.5       | 4.0            | Max        | 0.0            | Max          | Empty             |
| 7     | Haul Segment (rev.) | 1950.0           | 7.4        | 3.5            | Max        | 0.0            | Max          | Empty             |
| 8     | Haul Segment (rev.) | 390.0            | -3.8       | 3.5            | Max        | 0.0            | Max          | Empty             |
| 9     | Haul Segment (rev.) | 220.0            | -2.3       | 3.5            | Max        | 0.0            | Max          | Empty             |
| 10    | Haul Segment (rev.) | 170.0            | 0.0        | 4.0            | Max        | 0.0            | Max          | Empty             |

Production Summary - Full Simulation

Haulage System: Scrapers Worst Case 2013

Haul Cycle: [PRJ] A92-3

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] CATERPILLAR 637 G (Push Pull) |                                    |
|---------------------------------------|-------------|-------------------------------------|------------------------------------|
| Availability                          | %           | 85.00                               |                                    |
| Bucket Fill Factor                    |             | 0.80                                |                                    |
| Average Bucket Load Volume            | cu.yards    | 27.14                               |                                    |
| Average Payload                       | bcy         | 18.85                               |                                    |
| Operating Hours per Year              | OpHr/Year   | 1,099.00                            | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 157.00                              | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 1.70                                |                                    |
| Loaded Transport Time                 | min         | 0.38                                |                                    |
| Unloaded Transport Time               | min         | 0.39                                |                                    |
| Total Loading unit Cycle Time         | min         | 0.97                                |                                    |
| Transport Distance (One Way)          | feet        | 350.00                              |                                    |
| Production per Operating Hour         | bcy         | 239.61                              |                                    |
| Production per Loader Operating Shift | bcy         | 1,677                               | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 263,337                             | Avg. production factored by avail. |

Haulage System

|                                |            |          |                                                                                    |
|--------------------------------|------------|----------|------------------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 263,337  |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00     | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00     |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00     |                                                                                    |
| Excavation Target              | bcy        | 7,632.00 |                                                                                    |
| Time to move Excavation Target | Days       | 10.59    |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 32       |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 32       |                                                                                    |
| Total cost to move Target      | \$         | 0        |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

| Type  | Title               | Distance<br>feet | Grade<br>% | Roll<br>Res. % | Max<br>mph | Curve<br>Angle | Final<br>mph | Load<br>% of Full |
|-------|---------------------|------------------|------------|----------------|------------|----------------|--------------|-------------------|
| Queue | Queue at Loader     | Auto             | Mins       |                |            |                |              |                   |
| Spot  | Spot Time at loader | Auto             | Mins       |                |            |                |              |                   |
| Load  | Loading             | Auto             | Mins       |                |            |                |              |                   |
| 1     | Haul Segment        | 165.0            | -6.6       | 4.0            | Max        | 0.0            | Max          | Full              |
| 2     | Haul Segment        | 55.0             | 0.0        | 3.5            | Max        | 0.0            | Max          | Full              |
| 3     | Haul Segment        | 130.0            | 2.8        | 3.5            | Max        | 0.0            | Max          | Full              |
| Spot  | Spot Time at Dump   | Auto             | Mins       |                |            |                |              |                   |
| Dump  | Dumping             | Auto             | Mins       |                |            |                |              |                   |
| 4     | Haul Segment (rev.) | 130.0            | -2.8       | 3.5            | Max        | 0.0            | Max          | Empty             |
| 5     | Haul Segment (rev.) | 55.0             | 0.0        | 3.5            | Max        | 0.0            | Max          | Empty             |
| 6     | Haul Segment (rev.) | 165.0            | 6.6        | 4.0            | Max        | 0.0            | Max          | Empty             |

350 @ - 2.07 %

Scraper Topsoil Placement  
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| Production Summary - Full Simulation                                                                                                                                                                                                                                                                                                                              |            |           |                                                                                    |  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-----------|------------------------------------------------------------------------------------|--|
| <i>Haulage System: Scrapers Worst Case 2013</i>                                                                                                                                                                                                                                                                                                                   |            |           | <i>Haul Cycle: [PRJ] A96-2</i>                                                     |  |
| <i>Material: [PRJ] Topsoil</i>                                                                                                                                                                                                                                                                                                                                    |            |           | <i>Roster: [PRJ] 5 day Week - 8 Hour Shifts</i>                                    |  |
| <b>Loader</b>                                                                                                                                                                                                                                                                                                                                                     |            |           | <b>[PRJ] CATERPILLAR 637 G (Push Pull)</b>                                         |  |
| Availability                                                                                                                                                                                                                                                                                                                                                      | %          | 85.00     |                                                                                    |  |
| Bucket Fill Factor                                                                                                                                                                                                                                                                                                                                                |            | 0.80      |                                                                                    |  |
| Average Bucket Load Volume                                                                                                                                                                                                                                                                                                                                        | cu.yards   | 27.14     |                                                                                    |  |
| Average Payload                                                                                                                                                                                                                                                                                                                                                   | bcy        | 18.85     |                                                                                    |  |
| Operating Hours per Year                                                                                                                                                                                                                                                                                                                                          | OpHr/Yea   | 1,099.00  | Op. hrs factored by availability                                                   |  |
| Average Operating Shifts per Year                                                                                                                                                                                                                                                                                                                                 | shifts/Yea | 157.00    | Shifts factored by availability                                                    |  |
| Average Bucket Cycle Time                                                                                                                                                                                                                                                                                                                                         | min        | 1.70      |                                                                                    |  |
| Loaded Transport Time                                                                                                                                                                                                                                                                                                                                             | min        | 0.26      |                                                                                    |  |
| Unloaded Transport Time                                                                                                                                                                                                                                                                                                                                           | min        | 0.78      |                                                                                    |  |
| Total Loading unit Cycle Time                                                                                                                                                                                                                                                                                                                                     | min        | 1.25      |                                                                                    |  |
| Transport Distance (One Way)                                                                                                                                                                                                                                                                                                                                      | feet       | 760.00    |                                                                                    |  |
| Production per Operating Hour                                                                                                                                                                                                                                                                                                                                     | bcy        | 234.23    |                                                                                    |  |
| Production per Loader Operating Shift                                                                                                                                                                                                                                                                                                                             | bcy        | 1,640     | Max. prod. based on 100% avail.                                                    |  |
| Production per Year                                                                                                                                                                                                                                                                                                                                               | bcy        | 257,419   | Avg. production factored by avail.                                                 |  |
| <b>Haulage System</b>                                                                                                                                                                                                                                                                                                                                             |            |           |                                                                                    |  |
| Production per Year                                                                                                                                                                                                                                                                                                                                               | bcy/Year   | 257,419   |                                                                                    |  |
| Discounted Capital Cost                                                                                                                                                                                                                                                                                                                                           | \$/bcy     | 0.00      | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |  |
| Discounted Operating Cost                                                                                                                                                                                                                                                                                                                                         | \$/bcy     | 0.00      |                                                                                    |  |
| Discounted Average Cost                                                                                                                                                                                                                                                                                                                                           | \$/bcy     | 0.00      |                                                                                    |  |
| Excavation Target                                                                                                                                                                                                                                                                                                                                                 | bcy        | 26,216.00 |                                                                                    |  |
| Time to move Excavation Target                                                                                                                                                                                                                                                                                                                                    | Days       | 37.20     |                                                                                    |  |
| Loader Hrs to move Target                                                                                                                                                                                                                                                                                                                                         | Op. Hours. | 112       |                                                                                    |  |
| Total Truck Hrs to move Target                                                                                                                                                                                                                                                                                                                                    | Op. Hours. | 112       |                                                                                    |  |
| Total cost to move Target                                                                                                                                                                                                                                                                                                                                         | \$         | 0         |                                                                                    |  |
| <p>Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.<br/> Time for the first bucket pass coincides with the truck queuing and maneuvering times.<br/> This simulation is based on data provided by the equipment manufacturer.<br/> Equipment data should be checked to ensure it is valid for this site.</p> |            |           |                                                                                    |  |



Scrap Topsoil Placement  
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[PRJ] A96-2

| Type  | Title               | Distance<br>feet | Grade<br>% | Roll<br>Res. % | Max<br>mph | Curve<br>Angle | Final<br>mph | Load<br>% of Full |
|-------|---------------------|------------------|------------|----------------|------------|----------------|--------------|-------------------|
| Queue | Queue at Loader     | Auto             | Mins       |                |            |                |              |                   |
| Spot  | Spot Time at loader | Auto             | Mins       |                |            |                |              |                   |
| Load  | Loading             | Auto             | Mins       |                |            |                |              |                   |
| 1     | Haul Segment        | 250.0            | -20.0      | 4.0            | Max        | 0.0            | Max          | Full              |
| 2     | Haul Segment        | 160.0            | -6.2       | 3.5            | Max        | 0.0            | Max          | Full              |
| 3     | Haul Segment        | 350.0            | -4.3       | 4.0            | Max        | 0.0            | Max          | Full              |
| Spot  | Spot Time at Dump   | Auto             | Mins       |                |            |                |              |                   |
| Dump  | Dumping             | Auto             | Mins       |                |            |                |              |                   |
| 4     | Haul Segment (rev.) | 350.0            | 4.3        | 4.0            | Max        | 0.0            | Max          | Empty             |
| 5     | Haul Segment (rev.) | 160.0            | 6.2        | 3.5            | Max        | 0.0            | Max          | Empty             |
| 6     | Haul Segment (rev.) | 250.0            | 20.0       | 4.0            | Max        | 0.0            | Max          | Empty             |

250 @ -20.0 %  
160 @ - 6.2 %  
350 @ 4.3 %  
760 @ - 9.68 %

| Production Summary - Full Simulation                                                                  |             |                                                 |                                    |  |
|-------------------------------------------------------------------------------------------------------|-------------|-------------------------------------------------|------------------------------------|--|
| <b>Haulage System: Scrapers Worst Case 2013</b>                                                       |             | <b>Haul Cycle: [PRJ] A97-3</b>                  |                                    |  |
| <b>Material: [PRJ] Topsoil</b>                                                                        |             | <b>Roster: [PRJ] 5 day Week - 8 Hour Shifts</b> |                                    |  |
| <b>Loader</b>                                                                                         |             | <b>[PRJ] CATERPILLAR 637 G (Push Pull)</b>      |                                    |  |
| Availability                                                                                          | %           | 85.00                                           |                                    |  |
| Bucket Fill Factor                                                                                    |             | 0.80                                            |                                    |  |
| Average Bucket Load Volume                                                                            | cu.yards    | 27.14                                           |                                    |  |
| Average Payload                                                                                       | bcy         | 18.85                                           |                                    |  |
| Operating Hours per Year                                                                              | OpHr/Year   | 1,099.00                                        | Op. hrs factored by availability   |  |
| Average Operating Shifts per Year                                                                     | shifts/Year | 157.00                                          | Shifts factored by availability    |  |
| Average Bucket Cycle Time                                                                             | min         | 1.70                                            |                                    |  |
| Loaded Transport Time                                                                                 | min         | 0.44                                            |                                    |  |
| Unloaded Transport Time                                                                               | min         | 0.48                                            |                                    |  |
| Total Loading unit Cycle Time                                                                         | min         | 1.13                                            |                                    |  |
| Transport Distance (One Way)                                                                          | feet        | 480.00                                          |                                    |  |
| Production per Operating Hour                                                                         | bcy         | 234.23                                          |                                    |  |
| Production per Loader Operating Shift                                                                 | bcy         | 1,640                                           | Max. prod. based on 100% avail.    |  |
| Production per Year                                                                                   | bcy         | 257,419                                         | Avg. production factored by avail. |  |
| <b>Haulage System</b>                                                                                 |             |                                                 |                                    |  |
| Production per Year                                                                                   | bcy/Year    | 257,419                                         |                                    |  |
| Discounted Capital Cost                                                                               | \$/bcy      | 0.00                                            | <b>Loading Methodology</b>         |  |
| Discounted Operating Cost                                                                             | \$/bcy      | 0.00                                            | Single Sided                       |  |
| Discounted Average Cost                                                                               | \$/bcy      | 0.00                                            | Full Truck                         |  |
| Excavation Target                                                                                     | bcy         | 15,484.00                                       | Average for 150 Shifts             |  |
| Time to move Excavation Target                                                                        | Days        | 21.97                                           |                                    |  |
| Loader Hrs to move Target                                                                             | Op. Hours.  | 66                                              |                                    |  |
| Total Truck Hrs to move Target                                                                        | Op. Hours.  | 66                                              |                                    |  |
| Total cost to move Target                                                                             | \$          | 0                                               |                                    |  |
| Productivity estimates allow for insufficient time at the end of the shift to complete another cycle. |             |                                                 |                                    |  |
| Time for the first bucket pass coincides with the truck queuing and maneuvering times.                |             |                                                 |                                    |  |
| This simulation is based on data provided by the equipment manufacturer.                              |             |                                                 |                                    |  |
| Equipment data should be checked to ensure it is valid for this site.                                 |             |                                                 |                                    |  |



Topsoil Placement  
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[PRJ] A97-3

| Type  | Title               | Distance<br>feet | Grade<br>% | Roll<br>Res. % | Max<br>mph | Curve<br>Angle | Final<br>mph | Load<br>% of Full |
|-------|---------------------|------------------|------------|----------------|------------|----------------|--------------|-------------------|
| Queue | Queue at Loader     | Auto             | Mins       |                |            |                |              |                   |
| Spot  | Spot Time at loader | Auto             | Mins       |                |            |                |              |                   |
| Load  | Loading             | Auto             | Mins       |                |            |                |              |                   |
| 1     | Haul Segment        | 116.0            | -7.8       | 4.0            | Max        | 0.0            | Max          | Full              |
| 2     | Haul Segment        | 364.0            | -7.4       | 3.5            | Max        | 0.0            | Max          | Full              |
| Spot  | Spot Time at Dump   | Auto             | Mins       |                |            |                |              |                   |
| Dump  | Dumping             | Auto             | Mins       |                |            |                |              |                   |
| 3     | Haul Segment (rev.) | 364.0            | 7.4        | 3.5            | Max        | 0.0            | Max          | Empty             |
| 4     | Haul Segment (rev.) | 116.0            | 7.8        | 4.0            | Max        | 0.0            | Max          | Empty             |

116 @ -7.8  
364 @ -7.4  
480 @ -7.9

Production Summary - Full Simulation

Haulage System: Scrapers Worst Case 2013

Haul Cycle: [PRJ] MP1

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

Loader

[PRJ] CATERPILLAR 637 G (Push Pull)

|                                       |             |          |                                    |
|---------------------------------------|-------------|----------|------------------------------------|
| Availability                          | %           | 85.00    |                                    |
| Bucket Fill Factor                    |             | 0.80     |                                    |
| Average Bucket Load Volume            | cu.yards    | 27.14    |                                    |
| Average Payload                       | bcy         | 18.85    |                                    |
| Operating Hours per Year              | OpHr/Year   | 1,099.00 | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 157.00   | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 1.70     |                                    |
| Loaded Transport Time                 | min         | 0.38     |                                    |
| Unloaded Transport Time               | min         | 0.33     |                                    |
| Total Loading unit Cycle Time         | min         | 0.91     |                                    |
| Transport Distance (One Way)          | feet        | 270.00   |                                    |
| Production per Operating Hour         | bcy         | 239.61   |                                    |
| Production per Loader Operating Shift | bcy         | 1,677    | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 263,337  | Avg. production factored by avail. |

Haulage System

|                                |            |          |                                                                                    |
|--------------------------------|------------|----------|------------------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 263,337  |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00     | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00     |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00     |                                                                                    |
| Excavation Target              | bcy        | 4,200.00 |                                                                                    |
| Time to move Excavation Target | Days       | 5.83     |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 18       |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 18       |                                                                                    |
| Total cost to move Target      | \$         | 0        |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

Scrapers  
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[PRJ] MP1

| Type  | Title               | Distance<br>feet | Grade<br>% | Roll<br>Res. % | Max<br>mph | Curve<br>Angle | Final<br>mph | Load<br>% of Full |
|-------|---------------------|------------------|------------|----------------|------------|----------------|--------------|-------------------|
| Queue | Queue at Loader     | Auto             | Mins       |                |            |                |              |                   |
| Spot  | Spot Time at loader | Auto             | Mins       |                |            |                |              |                   |
| Load  | Loading             | Auto             | Mins       |                |            |                |              |                   |
| 1     | Haul Segment        | 270.0            | 7.4        | 4.0            | Max        | 0.0            | Max          | Full              |
| Spot  | Spot Time at Dump   | Auto             | Mins       |                |            |                |              |                   |
| Dump  | Dumping             | Auto             | Mins       |                |            |                |              |                   |
| 2     | Haul Segment (rev.) | 270.0            | -7.4       | 4.0            | Max        | 0.0            | Max          | Empty             |

270 @ 7.4

Prepared by: .Tim Cummins

Prepared for: .PR7\_ Worst Case Bond Calculations

.Trapper Mining Inc.  
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Production Summary - Full Simulation

Haulage System: Scrapers Worst Case 2013

Haul Cycle: [PRJ] MP2

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

Loader:

[PRJ] CATERPILLAR 637 G (Push Pull)

|                                       |             |          |                                    |
|---------------------------------------|-------------|----------|------------------------------------|
| Availability                          | %           | 85.00    |                                    |
| Bucket Fill Factor                    |             | 0.80     |                                    |
| Average Bucket Load Volume            | cu.yards    | 27.14    |                                    |
| Average Payload                       | bcy         | 18.85    |                                    |
| Operating Hours per Year              | OpHr/Year   | 1,099.00 | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 157.00   | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 1.70     |                                    |
| Loaded Transport Time                 | min         | 0.13     |                                    |
| Unloaded Transport Time               | min         | 0.52     |                                    |
| Total Loading unit Cycle Time         | min         | 0.85     |                                    |
| Transport Distance (One Way)          | feet        | 370.00   |                                    |
| Production per Operating Hour         | bcy         | 253.08   |                                    |
| Production per Loader Operating Shift | bcy         | 1,772    | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 278,131  | Avg. production factored by avail. |

Haulage System

|                                |            |           |                            |
|--------------------------------|------------|-----------|----------------------------|
| Production per Year            | bcy/Year   | 278,131   |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00      |                            |
| Discounted Operating Cost      | \$/bcy     | 0.00      | <b>Loading Methodology</b> |
| Discounted Average Cost        | \$/bcy     | 0.00      | Single Sided               |
| Excavation Target              | bcy        | 12,500.00 | Full Truck                 |
| Time to move Excavation Target | Days       | 16.42     | Average for 150 Shifts     |
| Loader Hrs to move Target      | Op. Hours. | 49        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 49        |                            |
| Total cost to move Target      | \$         | 0         |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.  
Time for the first bucket pass coincides with the truck queuing and maneuvering times.  
This simulation is based on data provided by the equipment manufacturer.  
Equipment data should be checked to ensure it is valid for this site.

Spotsoil Placement  
TOPSOIL PLACEMENT\_SCRAPERS

alpac

[PRJ] MP2

| Type  | Title               | Distance<br>feet | Grade<br>% | Roll<br>Res. % | Max<br>mph | Curve<br>Angle | Final<br>mph | Load<br>% of Full |
|-------|---------------------|------------------|------------|----------------|------------|----------------|--------------|-------------------|
| Queue | Queue at Loader     | Auto             | Mins       |                |            |                |              |                   |
| Spot  | Spot Time at loader | Auto             | Mins       |                |            |                |              |                   |
| Load  | Loading             | Auto             | Mins       |                |            |                |              |                   |
| 1     | Haul Segment        | 170.0            | -14.9      | 4.0            | Max        | 0.0            | Max          | Full              |
| 2     | Haul Segment        | 200.0            | -14.9      | 3.5            | Max        | 0.0            | Max          | Full              |
| Spot  | Spot Time at Dump   | Auto             | Mins       |                |            |                |              |                   |
| Dump  | Dumping             | Auto             | Mins       |                |            |                |              |                   |
| 3     | Haul Segment (rev.) | 200.0            | 14.9       | 3.5            | Max        | 0.0            | Max          | Empty             |
| 4     | Haul Segment (rev.) | 170.0            | 14.9       | 4.0            | Max        | 0.0            | Max          | Empty             |

376 @ ~14.9



Production Summary - Full Simulation

Haulage System: Scrapers Worst Case 2013

Haul Cycle: [PRJ] G06-DG

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

Loader:

[PRJ] CATERPILLAR 637 G (Push Pull)

|                                       |             |          |                                    |
|---------------------------------------|-------------|----------|------------------------------------|
| Availability                          | %           | 85.00    |                                    |
| Bucket Fill Factor                    |             | 0.80     |                                    |
| Average Bucket Load Volume            | cu.yards    | 27.14    |                                    |
| Average Payload                       | bcy         | 18.85    |                                    |
| Operating Hours per Year              | OpHr/Year   | 1,099.00 | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 157.00   | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 1.70     |                                    |
| Loaded Transport Time                 | min         | 0.29     |                                    |
| Unloaded Transport Time               | min         | 0.23     |                                    |
| Total Loading unit Cycle Time         | min         | 0.72     |                                    |
| Transport Distance (One Way)          | feet        | 214.00   |                                    |
| Production per Operating Hour         | bcy         | 253.08   |                                    |
| Production per Loader Operating Shift | bcy         | 1,772    | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 278,131  | Avg. production factored by avail. |

Haulage System

|                                |            |          |                            |
|--------------------------------|------------|----------|----------------------------|
| Production per Year            | bcy/Year   | 278,131  |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00     | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00     | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00     | Full Truck                 |
| Excavation Target              | bcy        | 4,844.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 6.36     |                            |
| Loader Hrs to move Target      | Op. Hours. | 19       |                            |
| Total Truck Hrs to move Target | Op. Hours. | 19       |                            |
| Total cost to move Target      | \$         | 0        |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

Super Topsoil Placement  
TOPSOIL PLACEMENT\_SCRAPERS

ralpac

[PRJ] G06-DG

| Type  | Title               | Distance<br>feet | Grade<br>% | Roll<br>Res. % | Max<br>mph | Curve<br>Angle | Final<br>mph | Load<br>% of Full |
|-------|---------------------|------------------|------------|----------------|------------|----------------|--------------|-------------------|
| Queue | Queue at Loader     | Auto             | Mins       |                |            |                |              |                   |
| Spot  | Spot Time at loader | Auto             | Mins       |                |            |                |              |                   |
| Load  | Loading             | Auto             | Mins       |                |            |                |              |                   |
| 1     | Haul Segment        | 40.0             | 14.7       | 4.0            | Max        | 0.0            | Max          | Full              |
| 2     | Haul Segment        | 110.0            | 9.1        | 3.5            | Max        | 0.0            | Max          | Full              |
| 3     | Haul Segment        | 64.0             | -25.0      | 3.5            | Max        | 0.0            | Max          | Full              |
| Spot  | Spot Time at Dump   | Auto             | Mins       |                |            |                |              |                   |
| Dump  | Dumping             | Auto             | Mins       |                |            |                |              |                   |
| 4     | Haul Segment (rev.) | 64.0             | 25.0       | 3.5            | Max        | 0.0            | Max          | Empty             |
| 5     | Haul Segment (rev.) | 110.0            | -9.1       | 3.5            | Max        | 0.0            | Max          | Empty             |
| 6     | Haul Segment (rev.) | 40.0             | -14.7      | 4.0            | Max        | 0.0            | Max          | Empty             |

40 @ 14.7  
110 @ 9.1  
64 @ -25.0  
214 @ -0.05

**Scraper Topsoil Placement**  
**TOPSOIL PLACEMENT\_SCRAPERS**

Talpac

| Production Summary - Full Simulation            |             |                                                 |  |                                    |
|-------------------------------------------------|-------------|-------------------------------------------------|--|------------------------------------|
| <i>Haulage System: Scrapers Worst Case 2013</i> |             | <i>Haul Cycle: [PRJ] H04</i>                    |  |                                    |
| <i>Material: [PRJ] Topsoil</i>                  |             | <i>Roster: [PRJ] 5 day Week - 8 Hour Shifts</i> |  |                                    |
| <b>Loader</b>                                   |             | <b>[PRJ] CATERPILLAR 637 G (Push Pull)</b>      |  |                                    |
| Availability                                    | %           | 85.00                                           |  |                                    |
| Bucket Fill Factor                              |             | 0.80                                            |  |                                    |
| Average Bucket Load Volume                      | cu.yards    | 27.14                                           |  |                                    |
| Average Payload                                 | bcy         | 18.85                                           |  |                                    |
| Operating Hours per Year                        | OpHr/Year   | 1,099.00                                        |  | Op. hrs factored by availability   |
| Average Operating Shifts per Year               | shifts/Year | 157.00                                          |  | Shifts factored by availability    |
| Average Bucket Cycle Time                       | min         | 1.70                                            |  |                                    |
| Loaded Transport Time                           | min         | 0.10                                            |  |                                    |
| Unloaded Transport Time                         | min         | 0.36                                            |  |                                    |
| Total Loading unit Cycle Time                   | min         | 0.65                                            |  |                                    |
| Transport Distance (One Way)                    | feet        | 265.00                                          |  |                                    |
| Production per Operating Hour                   | bcy         | 261.15                                          |  |                                    |
| Production per Loader Operating Shift           | bcy         | 1,828                                           |  | Max. prod. based on 100% avail.    |
| Production per Year                             | bcy         | 287,007                                         |  | Avg. production factored by avail. |
| <b>Haulage System</b>                           |             |                                                 |  |                                    |
| Production per Year                             | bcy/Year    | 287,007                                         |  |                                    |
| Discounted Capital Cost                         | \$/bcy      | 0.00                                            |  |                                    |
| Discounted Operating Cost                       | \$/bcy      | 0.00                                            |  | <b>Loading Methodology</b>         |
| Discounted Average Cost                         | \$/bcy      | 0.00                                            |  | Single Sided                       |
| Excavation Target                               | bcy         | 6,244.00                                        |  | Full Truck                         |
| Time to move Excavation Target                  | Days        | 7.95                                            |  | Average for 150 Shifts             |
| Loader Hrs to move Target                       | Op. Hours.  | 24                                              |  |                                    |
| Total Truck Hrs to move Target                  | Op. Hours.  | 24                                              |  |                                    |
| Total cost to move Target                       | \$          | 0                                               |  |                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.  
Time for the first bucket pass coincides with the truck queuing and maneuvering times.  
This simulation is based on data provided by the equipment manufacturer.  
Equipment data should be checked to ensure it is valid for this site.

[PRJ] H04

| Type  | Title               | Distance<br>feet | Grade<br>% | Roll<br>Res. % | Max<br>mph | Curve<br>Angle | Final<br>mph | Load<br>% of Full |
|-------|---------------------|------------------|------------|----------------|------------|----------------|--------------|-------------------|
| Queue | Queue at Loader     | Auto             | Mins       |                |            |                |              |                   |
| Spot  | Spot Time at loader | Auto             | Mins       |                |            |                |              |                   |
| Load  | Loading             | Auto             | Mins       |                |            |                |              |                   |
| 1     | Haul Segment        | 45.0             | -11.1      | 4.0            | Max        | 0.0            | Max          | Full              |
| 2     | Haul Segment        | 220.0            | -11.1      | 3.5            | Max        | 0.0            | Max          | Full              |
| Spot  | Spot Time at Dump   | Auto             | Mins       |                |            |                |              |                   |
| Dump  | Dumping             | Auto             | Mins       |                |            |                |              |                   |
| 3     | Haul Segment (rev.) | 220.0            | 11.1       | 3.5            | Max        | 0.0            | Max          | Empty             |
| 4     | Haul Segment (rev.) | 45.0             | 11.1       | 4.0            | Max        | 0.0            | Max          | Empty             |

265 @ -11.1



| Production Summary - Full Simulation     |             |                                          |                                                                             |  |
|------------------------------------------|-------------|------------------------------------------|-----------------------------------------------------------------------------|--|
| Haulage System: Scrapers Worst Case 2013 |             | Haul Cycle: [PRJ] SP5-94                 |                                                                             |  |
| Material: [PRJ] Topsoil                  |             | Roster: [PRJ] 5 day Week - 8 Hour Shifts |                                                                             |  |
| Loader                                   |             | [PRJ] CATERPILLAR 637 G (Push Pull)      |                                                                             |  |
| Availability                             | %           | 85.00                                    |                                                                             |  |
| Bucket Fill Factor                       |             | 0.80                                     |                                                                             |  |
| Average Bucket Load Volume               | cu.yards    | 27.14                                    |                                                                             |  |
| Average Payload                          | bcy         | 18.85                                    |                                                                             |  |
| Operating Hours per Year                 | OpHr/Year   | 1,099.00                                 | Op. hrs factored by availability                                            |  |
| Average Operating Shifts per Year        | shifts/Year | 157.00                                   | Shifts factored by availability                                             |  |
| Average Bucket Cycle Time                | min         | 1.70                                     |                                                                             |  |
| Loaded Transport Time                    | min         | 0.23                                     |                                                                             |  |
| Unloaded Transport Time                  | min         | 0.74                                     |                                                                             |  |
| Total Loading unit Cycle Time            | min         | 1.17                                     |                                                                             |  |
| Transport Distance (One Way)             | feet        | 660.00                                   |                                                                             |  |
| Production per Operating Hour            | bcy         | 234.23                                   |                                                                             |  |
| Production per Loader Operating Shift    | bcy         | 1,640                                    | Max. prod. based on 100% avail.                                             |  |
| Production per Year                      | bcy         | 257,419                                  | Avg. production factored by avail.                                          |  |
| Haulage System                           |             |                                          |                                                                             |  |
| Production per Year                      | bcy/Year    | 257,419                                  |                                                                             |  |
| Discounted Capital Cost                  | \$/bcy      | 0.00                                     | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |  |
| Discounted Operating Cost                | \$/bcy      | 0.00                                     |                                                                             |  |
| Discounted Average Cost                  | \$/bcy      | 0.00                                     |                                                                             |  |
| Excavation Target                        | bcy         | 6,318.00                                 |                                                                             |  |
| Time to move Excavation Target           | Days        | 8.96                                     |                                                                             |  |
| Loader Hrs to move Target                | Op. Hours.  | 27                                       |                                                                             |  |
| Total Truck Hrs to move Target           | Op. Hours.  | 27                                       |                                                                             |  |
| Total cost to move Target                | \$          | 0                                        |                                                                             |  |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.  
Time for the first bucket pass coincides with the truck queuing and maneuvering times.  
This simulation is based on data provided by the equipment manufacturer.  
Equipment data should be checked to ensure it is valid for this site.



[PRJ] SP5-94

| Type  | Title               | Distance<br>feet | Grade<br>% | Roll<br>Res. % | Max<br>mph | Curve<br>Angle | Final<br>mph | Load<br>% of Full |
|-------|---------------------|------------------|------------|----------------|------------|----------------|--------------|-------------------|
| Queue | Queue at Loader     | Auto             | Mins       |                |            |                |              |                   |
| Spot  | Spot Time at loader | Auto             | Mins       |                |            |                |              |                   |
| Load  | Loading             | Auto             | Mins       |                |            |                |              |                   |
| 1     | Haul Segment        | 100.0            | -12.1      | 4.0            | Max        | 0.0            | Max          | Full              |
| 2     | Haul Segment        | 560.0            | -12.2      | 3.5            | Max        | 0.0            | Max          | Full              |
| Spot  | Spot Time at Dump   | Auto             | Mins       |                |            |                |              |                   |
| Dump  | Dumping             | Auto             | Mins       |                |            |                |              |                   |
| 3     | Haul Segment (rev.) | 560.0            | 12.2       | 3.5            | Max        | 0.0            | Max          | Empty             |
| 4     | Haul Segment (rev.) | 100.0            | 12.1       | 4.0            | Max        | 0.0            | Max          | Empty             |

660 @ - 12.15

### Production Summary - Full Simulation

Haulage System: Scrapers Worst Case 2013

Haul Cycle: [PRJ] SP6-94

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

#### Loader

[PRJ] CATERPILLAR 637 G (Push Pull)

|                                       |             |          |                                    |
|---------------------------------------|-------------|----------|------------------------------------|
| Availability                          | %           | 85.00    |                                    |
| Bucket Fill Factor                    |             | 0.80     |                                    |
| Average Bucket Load Volume            | cu.yards    | 27.14    |                                    |
| Average Payload                       | bcy         | 18.85    |                                    |
| Operating Hours per Year              | OpHr/Year   | 1,099.00 | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 157.00   | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 1.70     |                                    |
| Loaded Transport Time                 | min         | 0.17     |                                    |
| Unloaded Transport Time               | min         | 0.53     |                                    |
| Total Loading unit Cycle Time         | min         | 0.91     |                                    |
| Transport Distance (One Way)          | feet        | 490.00   |                                    |
| Production per Operating Hour         | bcy         | 250.38   |                                    |
| Production per Loader Operating Shift | bcy         | 1,753    | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 275,172  | Avg. production factored by avail. |

#### Haulage System

|                                |            |           |                            |
|--------------------------------|------------|-----------|----------------------------|
| Production per Year            | bcy/Year   | 275,172   |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00      |                            |
| Discounted Operating Cost      | \$/bcy     | 0.00      | <b>Loading Methodology</b> |
| Discounted Average Cost        | \$/bcy     | 0.00      | Single Sided               |
| Excavation Target              | bcy        | 12,204.00 | Full Truck                 |
| Time to move Excavation Target | Days       | 16.20     | Average for 150 Shifts     |
| Loader Hrs to move Target      | Op. Hours. | 49        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 49        |                            |
| Total cost to move Target      | \$         | 0         |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.  
Time for the first bucket pass coincides with the truck queuing and maneuvering times.  
This simulation is based on data provided by the equipment manufacturer.  
Equipment data should be checked to ensure it is valid for this site.

Topsoil Placement  
TOPSOIL PLACEMENT\_SCRAPERS

alpaca

[PRJ] SP8-94

| Type  | Title               | Distance<br>feet | Grade<br>% | Roll<br>Res. % | Max<br>mph | Curve<br>Angle | Final<br>mph | Load<br>% of Full |
|-------|---------------------|------------------|------------|----------------|------------|----------------|--------------|-------------------|
| Queue | Queue at Loader     | Auto             | Mins       |                |            |                |              |                   |
| Spot  | Spot Time at loader | Auto             | Mins       |                |            |                |              |                   |
| Load  | Loading             | Auto             | Mins       |                |            |                |              |                   |
| 1     | Haul Segment        | 90.0             | -10.0      | 4.0            | Max        | 0.0            | Max          | Full              |
| 2     | Haul Segment        | 400.0            | -10.0      | 3.5            | Max        | 0.0            | Max          | Full              |
| Spot  | Spot Time at Dump   | Auto             | Mins       |                |            |                |              |                   |
| Dump  | Dumping             | Auto             | Mins       |                |            |                |              |                   |
| 3     | Haul Segment (rev.) | 400.0            | 10.0       | 3.5            | Max        | 0.0            | Max          | Empty             |
| 4     | Haul Segment (rev.) | 90.0             | 10.0       | 4.0            | Max        | 0.0            | Max          | Empty             |

490 @ -10.0

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] 19-5 to L Pit Area 2**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 637 G**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.85      |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.92     |                                    |
| Average Payload                       | bcy         | 28.08     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Loaded Transport Time                 | min         | 2.02      |                                    |
| Unloaded Transport Time               | min         | 1.62      |                                    |
| Total Loading unit Cycle Time         | min         | 4.34      |                                    |
| Transport Distance (One Way)          | feet        | 3,041.00  |                                    |
| Production per Operating Hour         | bcy         | 308.89    |                                    |
| Production per Loader Operating Shift | bcy         | 2,162     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,299,497 | Avg. production factored by avail. |

### Haulage System

|                                |            |           |                            |
|--------------------------------|------------|-----------|----------------------------|
| Production per Year            | bcy/Year   | 1,299,497 |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck                 |
| Excavation Target              | bcy        | 1,097.00  | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 0.31      |                            |
| Loader Hrs to move Target      | Op. Hours. | 4         |                            |
| Total Truck Hrs to move Target | Op. Hours. | 4         |                            |
| Total cost to move Target      | \$         | 0         |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |          |       |                 |             |       |              |            |          |            |                |                  |                  |            |              |
|------------------------------------------|---------------------|----------|-------|-----------------|-------------|-------|--------------|------------|----------|------------|----------------|------------------|------------------|------------|--------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |          |       |                 |             |       |              |            |          |            |                |                  |                  |            |              |
| Haulage System: Haulage System-1         |                     |          |       |                 |             |       |              |            |          |            |                |                  |                  |            |              |
| Haul Cycle: [PRJ] 19-5 to L Pit Area 2   |                     |          |       |                 |             |       |              |            |          |            |                |                  |                  |            |              |
| Type                                     | Segment Title       | Distance | Grade | Rolling Resist. | Curve Angle | Load  | Segment Time | Cycle Time | Max Vel. | Final Vel. | Velocity Limit | Average Velocity | Elevation Change | Fuel Usage | % Duty Cycle |
|                                          |                     | feet     | %     | %               | degrees     | %     | min          | %          | mph      | mph        |                | mph              | feet             | S.gal/OpHr | %            |
| [PRJ] Caterpillar 637 G                  |                     |          |       |                 |             |       |              |            |          |            |                |                  |                  |            |              |
| Queue                                    | Queue at Loader     | Auto     | Mins  |                 |             |       | 0.00         | 0.00       |          |            |                |                  |                  | 0.0        |              |
| Spot                                     | Spot Time at loader | Auto     | Mins  |                 |             |       | 0.00         | 0.00       |          |            |                |                  |                  | 0.0        |              |
| Load                                     | Loading             | Auto     | Mins  |                 |             |       | 0.50         | 11.53      |          |            |                |                  |                  | 0.0        |              |
| 1                                        | Haul Segment        | 3041     | 2.3   | 3.0             | 0.0         | Full  | 2.02         | 46.55      | 24.6     | 0.0        | Final Sp.      | 17.1             | 69.9             | 0.0        | 61.7         |
| Spot                                     | Spot Time at Dump   | Auto     | Mins  |                 |             |       | 0.00         | 0.00       |          |            |                |                  |                  | 0.0        |              |
| Dump                                     | Dumping             | Auto     | Mins  |                 |             |       | 0.20         | 4.61       |          |            |                |                  |                  | 0.0        |              |
| 1                                        | Haul Segment (rev.) | 3041     | -2.3  | 3.0             | 0.0         | Empty | 1.62         | 37.31      | 34.5     | 0.0        | Final Sp.      | 21.4             | -69.9            | 0.0        | 42.1         |
| Total                                    |                     | 6,082    |       |                 |             |       | 4.34         | 100.00     |          |            |                | 15.9             | 0                |            |              |



# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] A1-08 to L Pit Area 4**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 637 G**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.85      |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.94     |                                    |
| Average Payload                       | bcy         | 28.10     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Loaded Transport Time                 | min         | 2.95      |                                    |
| Unloaded Transport Time               | min         | 1.20      |                                    |
| Total Loading unit Cycle Time         | min         | 4.85      |                                    |
| Transport Distance (One Way)          | feet        | 2,686.00  |                                    |
| Production per Operating Hour         | bcy         | 280.99    |                                    |
| Production per Loader Operating Shift | bcy         | 1,967     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,182,121 | Avg. production factored by avail. |

### Haulage System

|                                |            |           |                            |
|--------------------------------|------------|-----------|----------------------------|
| Production per Year            | bcy/Year   | 1,182,121 |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck                 |
| Excavation Target              | bcy        | 12,632.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 3.90      |                            |
| Loader Hrs to move Target      | Op. Hours. | 45        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 45        |                            |
| Total cost to move Target      | \$         | 0         |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

| Full Simulation Results                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] A1-08 to L Pit Area 4  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S-gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 10.31              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 2686             | 8.6        | 3.0                     | 0.0                       | Full      | 2.95                   | 60.74              | 11.4               | 0.0                  | Final Sp.          | 10.4                       | 231.0                       | 0.0                         | 87.6            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 4.12               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 2686             | -8.6       | 3.0                     | 0.0                       | Empty     | 1.20                   | 24.82              | 34.5               | 0.0                  | Final Sp.          | 25.4                       | -231.0                      | 0.0                         | 0.0             |
| Total                                    |                     | 5,372            |            |                         |                           |           | 4.85                   | 100.00             |                    |                      |                    | 12.6                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] A92-1 to N Pit Area 1**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 637 G**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.85      |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.90     |                                    |
| Average Payload                       | bcy         | 28.06     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Loaded Transport Time                 | min         | 2.78      |                                    |
| Unloaded Transport Time               | min         | 1.70      |                                    |
| Total Loading unit Cycle Time         | min         | 5.18      |                                    |
| Transport Distance (One Way)          | feet        | 3,281.00  |                                    |
| Production per Operating Hour         | bcy         | 264.58    |                                    |
| Production per Loader Operating Shift | bcy         | 1,852     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,113,078 | Avg. production factored by avail. |

### Haulage System

|                                |            |            |                            |
|--------------------------------|------------|------------|----------------------------|
| Production per Year            | bcy/Year   | 1,113,078  |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck                 |
| Excavation Target              | bcy        | 123,206.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 40.43      |                            |
| Loader Hrs to move Target      | Op. Hours. | 466        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 466        |                            |
| Total cost to move Target      | \$         | 0          |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |  |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|--|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |  |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |  |
| Haul Cycle: [PRJ] A92-1 to N Pit Area 1  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |  |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |  |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |  |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |  |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |  |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 9.65               |                    |                      |                    |                            |                             | 0.0                         |                 |  |
| 1                                        | Haul Segment        | 3281             | 5.6        | 3.0                     | 0.0                       | Full      | 2.78                   | 53.73              | 15.4               | 0.0                  | Final Sp.          | 13.4                       | 183.7                       | 0.0                         | 82.3            |  |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |  |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 3.86               |                    |                      |                    |                            |                             | 0.0                         |                 |  |
| 1                                        | Haul Segment (rev.) | 3281             | -5.6       | 3.0                     | 0.0                       | Empty     | 1.70                   | 32.76              | 34.5               | 0.0                  | Final Sp.          | 22.0                       | -183.7                      | 0.0                         | 6.2             |  |
| Total                                    |                     | 6,562            |            |                         |                           |           | 5.18                   | 100.00             |                    |                      |                    | 14.4                       | 0                           |                             |                 |  |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] A92-1 to N Pit Area 2**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 637 G</b> |                                    |
|---------------------------------------|-------------|--------------------------------|------------------------------------|
| Availability                          | %           | 85.00                          |                                    |
| Bucket Fill Factor                    |             | 0.85                           |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.92                          |                                    |
| Average Payload                       | bcy         | 28.08                          |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                       | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                         | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                           |                                    |
| Loaded Transport Time                 | min         | 1.66                           |                                    |
| Unloaded Transport Time               | min         | 1.37                           |                                    |
| Total Loading unit Cycle Time         | min         | 3.74                           |                                    |
| Transport Distance (One Way)          | feet        | 2,295.00                       |                                    |
| Production per Operating Hour         | bcy         | 352.92                         |                                    |
| Production per Loader Operating Shift | bcy         | 2,470                          | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,484,724                      | Avg. production factored by avail. |

| <b>Haulage System</b>          |            |            |                            |
|--------------------------------|------------|------------|----------------------------|
| Production per Year            | bcy/Year   | 1,484,724  |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck                 |
| Excavation Target              | bcy        | 199,876.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 49.17      |                            |
| Loader Hrs to move Target      | Op. Hours. | 566        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 566        |                            |
| Total cost to move Target      | \$         | 0          |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.



# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haul Cycle: [PRJ] A92-1 to N Pit Area 2  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S-gal/OprHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 13.38              |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment        | 2295             | 2.2        | 3.0                     | 0.0                       | Full      | 1.66                   | 44.51              | 24.9               | 0.0                  | Final Sp.          | 15.7                       | 50.5                        | 0.0                          | 53.0            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 5.35               |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment (rev.) | 2295             | -2.2       | 3.0                     | 0.0                       | Empty     | 1.37                   | 36.75              | 34.5               | 0.0                  | Final Sp.          | 19.0                       | -50.5                       | 0.0                          | 32.1            |
| Total                                    |                     | 4,590            |            |                         |                           |           | 3.74                   | 100.00             |                    |                      |                    | 14.0                       | 0                           |                              |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] A98-3 to L Pit Area 6**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 637 G**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.85      |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.95     |                                    |
| Average Payload                       | bcy         | 28.11     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Loaded Transport Time                 | min         | 1.66      |                                    |
| Unloaded Transport Time               | min         | 1.16      |                                    |
| Total Loading unit Cycle Time         | min         | 3.53      |                                    |
| Transport Distance (One Way)          | feet        | 1,667.00  |                                    |
| Production per Operating Hour         | bcy         | 369.43    |                                    |
| Production per Loader Operating Shift | bcy         | 2,586     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,554,206 | Avg. production factored by avail. |

### Haulage System

|                                |            |           |                            |
|--------------------------------|------------|-----------|----------------------------|
| Production per Year            | bcy/Year   | 1,554,206 |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck                 |
| Excavation Target              | bcy        | 8,988.00  | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 2.11      |                            |
| Loader Hrs to move Target      | Op. Hours. | 24        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 24        |                            |
| Total cost to move Target      | \$         | 0         |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haul Cycle: [PRJ] A98-3 to L Pit Area 6  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$/gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 14.18              |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment        | 1667             | 6.3        | 3.0                     | 0.0                       | Full      | 1.66                   | 47.15              | 14.2               | 0.0                  | Final Sp.          | 11.4                       | 105.0                       | 0.0                          | 72.5            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 5.67               |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment (rev.) | 1667             | -6.3       | 3.0                     | 0.0                       | Empty     | 1.16                   | 33.00              | 32.9               | 0.0                  | Final Sp.          | 16.3                       | -105.0                      | 0.0                          | 4.2             |
| Total                                    |                     | 3,334            |            |                         |                           |           | 3.53                   | 100.00             |                    |                      |                    | 10.7                       | 0                           |                              |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] A98-3 to L Pit Area 4**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 637 G**

|                                       |             |          |                                    |
|---------------------------------------|-------------|----------|------------------------------------|
| Availability                          | %           | 85.00    |                                    |
| Bucket Fill Factor                    |             | 0.85     |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.94    |                                    |
| Average Payload                       | bcy         | 28.10    |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00 | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00   | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50     |                                    |
| Loaded Transport Time                 | min         | 3.81     |                                    |
| Unloaded Transport Time               | min         | 1.49     |                                    |
| Total Loading unit Cycle Time         | min         | 6.00     |                                    |
| Transport Distance (One Way)          | feet        | 3,552.00 |                                    |
| Production per Operating Hour         | bcy         | 232.82   |                                    |
| Production per Loader Operating Shift | bcy         | 1,630    | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 979,490  | Avg. production factored by avail. |

### Haulage System

|                                |            |            |                            |
|--------------------------------|------------|------------|----------------------------|
| Production per Year            | bcy/Year   | 979,490    |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck                 |
| Excavation Target              | bcy        | 195,036.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 72.73      |                            |
| Loader Hrs to move Target      | Op. Hours. | 838        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 838        |                            |
| Total cost to move Target      | \$         | 0          |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] A98-3 to L Pit Area 4  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 8.33               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 3552             | 8.6        | 3.0                     | 0.0                       | Full      | 3.81                   | 63.52              | 11.4               | 0.0                  | Final Sp.         | 10.6                       | 305.5                       | 0.0                         | 90.4            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 3.33               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 3552             | -8.6       | 3.0                     | 0.0                       | Empty     | 1.49                   | 24.81              | 34.5               | 0.0                  | Final Sp.         | 27.1                       | -305.5                      | 0.0                         | 0.0             |
| Total                                    |                     | 7,104            |            |                         |                           |           | 6.00                   | 100.00             |                    |                      |                   | 13.5                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] A99-3 to L Pit Area 6**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 637 G**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.85      |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.94     |                                    |
| Average Payload                       | bcy         | 28.10     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Loaded Transport Time                 | min         | 1.42      |                                    |
| Unloaded Transport Time               | min         | 1.10      |                                    |
| Total Loading unit Cycle Time         | min         | 3.21      |                                    |
| Transport Distance (One Way)          | feet        | 1,478.00  |                                    |
| Production per Operating Hour         | bcy         | 398.31    |                                    |
| Production per Loader Operating Shift | bcy         | 2,788     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,675,686 | Avg. production factored by avail. |

### Haulage System

|                                |            |           |                            |
|--------------------------------|------------|-----------|----------------------------|
| Production per Year            | bcy/Year   | 1,675,686 |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck                 |
| Excavation Target              | bcy        | 9,000.00  | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 1.96      |                            |
| Loader Hrs to move Target      | Op. Hours. | 23        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 23        |                            |
| Total cost to move Target      | \$         | 0         |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.



# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] A99-3 to 1 Pit Area 6  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 15.55              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 1478             | 5.1        | 3.0                     | 0.0                       | Full      | 1.42                   | 44.13              | 16.1               | 0.0                  | Final Sp.         | 11.8                       | 75.4                        | 0.0                         | 63.7            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 6.22               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 1478             | -5.1       | 3.0                     | 0.0                       | Empty     | 1.10                   | 34.09              | 31.1               | 0.0                  | Final Sp.         | 15.3                       | -75.4                       | 0.0                         | 8.8             |
| Total                                    |                     | 2,956            |            |                         |                           |           | 3.21                   | 100.00             |                    |                      |                   | 10.4                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] ASH1\_2020 to Ash Road

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 637 G

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.85      |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.94     |                                    |
| Average Payload                       | bcy         | 28.10     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Loaded Transport Time                 | min         | 2.57      |                                    |
| Unloaded Transport Time               | min         | 0.97      |                                    |
| Total Loading unit Cycle Time         | min         | 4.24      |                                    |
| Transport Distance (One Way)          | feet        | 1,978.00  |                                    |
| Production per Operating Hour         | bcy         | 317.04    |                                    |
| Production per Loader Operating Shift | bcy         | 2,219     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,333,766 | Avg. production factored by avail. |

### Haulage System

|                                |            |           |                        |
|--------------------------------|------------|-----------|------------------------|
| Production per Year            | bcy/Year   | 1,333,766 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck             |
| Excavation Target              | bcy        | 11,254.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 3.08      |                        |
| Loader Hrs to move Target      | Op. Hours. | 35        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 35        |                        |
| Total cost to move Target      | \$         | 0         |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.  
Time for the first bucket pass coincides with the truck queuing and maneuvering times.  
Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                                         |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|-----------------------------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     | Haulage System: Haulage System-1        |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|                                          |                     | Haul Cycle: [PRJ] ASH1_2020 to Ash Road |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet                        | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                                         |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto                                    | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto                                    | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto                                    | Mins       |                         |                           |           | 0.50                   | 11.80              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 1978                                    | 10.4       | 3.0                     | 0.0                       | Full      | 2.57                   | 60.57              | 9.6                | 0.0                  | Final Sp.         | 8.8                        | 205.7                       | 0.0                         | 87.9            |
| Spot                                     | Spot Time at Dump   | Auto                                    | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto                                    | Mins       |                         |                           |           | 0.20                   | 4.72               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 1978                                    | -10.4      | 3.0                     | 0.0                       | Empty     | 0.97                   | 22.91              | 34.5               | 0.0                  | Final Sp.         | 23.2                       | -205.7                      | 0.0                         | 0.0             |
| Total                                    |                     | 3,956                                   |            |                         |                           |           | 4.24                   | 100.00             |                    |                      |                   | 10.6                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] ASH2\_2020 to Ash Road**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 637 G**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.85      |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.93     |                                    |
| Average Payload                       | bcy         | 28.09     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Loaded Transport Time                 | min         | -24.51    |                                    |
| Unloaded Transport Time               | min         | 0.88      |                                    |
| Total Loading unit Cycle Time         | min         | -22.93    |                                    |
| Transport Distance (One Way)          | feet        | 711.00    |                                    |
| Production per Operating Hour         | bcy         | 1,119.14  |                                    |
| Production per Loader Operating Shift | bcy         | 7,834     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 4,708,224 | Avg. production factored by avail. |

### Haulage System

|                                |            |           |                            |
|--------------------------------|------------|-----------|----------------------------|
| Production per Year            | bcy/Year   | 4,708,224 |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck                 |
| Excavation Target              | bcy        | 60,000.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 4.65      |                            |
| Loader Hrs to move Target      | Op. Hours. | 54        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 54        |                            |
| Total cost to move Target      | \$         | 0         |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |  |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|--|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |  |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |  |
| Haul Cycle: [PRJ] ASH2_2020 to Ash Road  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |  |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |  |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |  |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |  |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |  |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | -2.18              |                    |                      |                    |                            |                             | 0.0                         |                 |  |
| 1                                        | Haul Segment        | 711              | -12.0      | 3.0                     | 0.0                       | Full      | -24.51                 | 106.89             | 34.5               | 0.0                  | Final Sp.          | 0.0                        | -85.3                       | 0.0                         | 0.0             |  |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |  |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | -0.87              |                    |                      |                    |                            |                             | 0.0                         |                 |  |
| 1                                        | Haul Segment (rev.) | 711              | 12.0       | 3.0                     | 0.0                       | Empty     | 0.88                   | -3.83              | 12.3               | 0.0                  | Final Sp.          | 9.2                        | 85.3                        | 0.0                         | 66.4            |  |
| Total                                    |                     | 1,422            |            |                         |                           |           | -22.93                 | 100.00             |                    |                      |                    | -0.7                       | 0                           |                             |                 |  |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] C Pit Future TS to C Pit**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 637 G**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.85      |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.90     |                                    |
| Average Payload                       | bcy         | 28.06     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Loaded Transport Time                 | min         | 1.43      |                                    |
| Unloaded Transport Time               | min         | 1.40      |                                    |
| Total Loading unit Cycle Time         | min         | 3.52      |                                    |
| Transport Distance (One Way)          | feet        | 2,000.00  |                                    |
| Production per Operating Hour         | bcy         | 368.81    |                                    |
| Production per Loader Operating Shift | bcy         | 2,582     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,551,587 | Avg. production factored by avail. |

### Haulage System

|                                |            |            |                            |
|--------------------------------|------------|------------|----------------------------|
| Production per Year            | bcy/Year   | 1,551,587  |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck                 |
| Excavation Target              | bcy        | 304,436.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 71.67      |                            |
| Loader Hrs to move Target      | Op. Hours. | 825        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 825        |                            |
| Total cost to move Target      | \$         | 0          |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

Full Simulation Results

| Material: [PRJ] Topsoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
|--------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts   |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haulage System: Haulage System-1           |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haul Cycle: [PRJ] C Pit Future TS to C Pit |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Type                                       | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OptHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Queue                                      | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Spot                                       | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Load                                       | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 14.19              |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                          | Haul Segment        | 2000             | -4.5       | 3.0                     | 0.0                       | Full      | 1.43                   | 40.47              | 32.3               | 0.0                  | Final Sp.          | 15.9                       | -90.0                       | 0.0                          | 13.2            |
| Spot                                       | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Dump                                       | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 5.68               |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                          | Haul Segment (rev.) | 2000             | 4.5        | 3.0                     | 0.0                       | Empty     | 1.40                   | 39.66              | 24.8               | 0.0                  | Final Sp.          | 16.3                       | 90.0                        | 0.0                          | 58.7            |
| Total                                      |                     | 4,000            |            |                         |                           |           | 3.52                   | 100.00             |                    |                      |                    | 12.9                       | 0                           |                              |                 |



# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] CG1 to I Middle Pit**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

| Loader                                |             | [PRJ] Caterpillar 637 G |                                    |
|---------------------------------------|-------------|-------------------------|------------------------------------|
| Availability                          | %           | 85.00                   |                                    |
| Bucket Fill Factor                    |             | 0.85                    |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.94                   |                                    |
| Average Payload                       | bcy         | 28.10                   |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                  | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                    |                                    |
| Loaded Transport Time                 | min         | 1.60                    |                                    |
| Unloaded Transport Time               | min         | 1.28                    |                                    |
| Total Loading unit Cycle Time         | min         | 3.59                    |                                    |
| Transport Distance (One Way)          | feet        | 2,024.00                |                                    |
| Production per Operating Hour         | bcy         | 365.29                  |                                    |
| Production per Loader Operating Shift | bcy         | 2,557                   | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,536,771               | Avg. production factored by avail. |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 1,536,771 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 11,910.00 |                                                                             |
| Time to move Excavation Target | Days       | 2.83      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 33        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 33        |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                          |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                          |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                          |                            |                             |                             |                 |
| Haul Cycle: [PRJ] CG1 to I Middle Pit    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                          |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit<br>mph | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                          |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                          |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                          |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 13.94              |                    |                      |                          |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 2024             | 3.2        | 3.0                     | 0.0                       | Full      | 1.60                   | 44.70              | 21.1               | 0.0                  | Final Sp.                | 14.3                       | 64.8                        | 0.0                         | 58.3            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                          |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 5.58               |                    |                      |                          |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 2024             | -3.2       | 3.0                     | 0.0                       | Empty     | 1.28                   | 35.79              | 34.5               | 0.0                  | Final Sp.                | 17.9                       | -64.8                       | 0.0                         | 19.4            |
| Total                                    |                     | 4,048            |            |                         |                           |           | 3.59                   | 100.00             |                    |                      |                          | 12.8                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] D1-07 to Area 4**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

| Loader                                |             | [PRJ] Caterpillar 637 G |                                    |
|---------------------------------------|-------------|-------------------------|------------------------------------|
| Availability                          | %           | 85.00                   |                                    |
| Bucket Fill Factor                    |             | 0.85                    |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.93                   |                                    |
| Average Payload                       | bcy         | 28.09                   |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                  | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                    |                                    |
| Loaded Transport Time                 | min         | 1.15                    |                                    |
| Unloaded Transport Time               | min         | 1.00                    |                                    |
| Total Loading unit Cycle Time         | min         | 2.85                    |                                    |
| Transport Distance (One Way)          | feet        | 1,221.00                |                                    |
| Production per Operating Hour         | bcy         | 441.27                  |                                    |
| Production per Loader Operating Shift | bcy         | 3,089                   | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,856,437               | Avg. production factored by avail. |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 1,856,437 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 7,476.00  |                                                                             |
| Time to move Excavation Target | Days       | 1.47      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 17        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 17        |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.  
Time for the first bucket pass coincides with the truck queuing and maneuvering times.  
Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-------------------------------|-----------------|
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haul Cycle: [PRJ] D1-07 to Area 4        |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$./gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 17.55              |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment        | 1221             | 2.8        | 3.0                     | 0.0                       | Full      | 1.15                   | 40.45              | 21.1               | 0.0                  | Final Sp.          | 12.0                       | 34.2                        | 0.0                           | 41.6            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 7.02               |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment (rev.) | 1221             | -2.8       | 3.0                     | 0.0                       | Empty     | 1.00                   | 34.97              | 28.0               | 0.0                  | Final Sp.          | 13.9                       | -34.2                       | 0.0                           | 17.0            |
| Total                                    |                     | 2,442            |            |                         |                           |           | 2.85                   | 100.00             |                    |                      |                    | 9.7                        | 0                           |                               |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] D97-1 to Area 2**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 637 G**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.85      |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.92     |                                    |
| Average Payload                       | bcy         | 28.07     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Loaded Transport Time                 | min         | 1.24      |                                    |
| Unloaded Transport Time               | min         | 1.10      |                                    |
| Total Loading unit Cycle Time         | min         | 3.04      |                                    |
| Transport Distance (One Way)          | feet        | 1,496.00  |                                    |
| Production per Operating Hour         | bcy         | 417.11    |                                    |
| Production per Loader Operating Shift | bcy         | 2,920     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,754,773 | Avg. production factored by avail. |

### Haulage System

|                                |            |           |                            |
|--------------------------------|------------|-----------|----------------------------|
| Production per Year            | bcy/Year   | 1,754,773 |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck                 |
| Excavation Target              | bcy        | 62,216.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 12.95     |                            |
| Loader Hrs to move Target      | Op. Hours. | 149       |                            |
| Total Truck Hrs to move Target | Op. Hours. | 149       |                            |
| Total cost to move Target      | \$         | 0         |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                              |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                              |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                              |                 |
| Haul Cycle: [PRJ] D97-1 to Area 2        |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                              |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OptHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                              |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                          |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                          |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 16.43              |                    |                      |                   |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment        | 1496             | 0.0        | 3.0                     | 0.0                       | Full      | 1.24                   | 40.76              | 26.7               | 0.0                  | Final Sp.         | 13.7                       | 0.0                         | 0.0                          | 29.9            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                          |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 6.57               |                    |                      |                   |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment (rev.) | 1496             | 0.0        | 3.0                     | 0.0                       | Empty     | 1.10                   | 36.24              | 31.1               | 0.0                  | Final Sp.         | 15.4                       | 0.0                         | 0.0                          | 29.6            |
| Total                                    |                     | 2,992            |            |                         |                           |           | 3.04                   | 100.00             |                    |                      |                   | 11.2                       | 0                           |                              |                 |

### Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] EM1 to I Middle Pit

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 637 G |                                    |
|---------------------------------------|-------------|-------------------------|------------------------------------|
| Availability                          | %           | 85.00                   |                                    |
| Bucket Fill Factor                    |             | 0.85                    |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.92                   |                                    |
| Average Payload                       | bcy         | 28.08                   |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                  | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                    |                                    |
| Loaded Transport Time                 | min         | 0.64                    |                                    |
| Unloaded Transport Time               | min         | 0.57                    |                                    |
| Total Loading unit Cycle Time         | min         | 1.90                    |                                    |
| Transport Distance (One Way)          | feet        | 397.00                  |                                    |
| Production per Operating Hour         | bcy         | 601.54                  |                                    |
| Production per Loader Operating Shift | bcy         | 4,211                   | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 2,530,666               | Avg. production factored by avail. |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 2,530,666 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 5,456.00  |                                                                             |
| Time to move Excavation Target | Days       | 0.79      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 9         |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 9         |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] EM1 to I Middle Pit    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 26.27              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 397              | 0.0        | 3.0                     | 0.0                       | Full      | 0.64                   | 33.37              | 14.3               | 0.0                  | Final Sp.          | 7.1                        | 0.0                         | 0.0                         | 16.6            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 10.51              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 397              | 0.0        | 3.0                     | 0.0                       | Empty     | 0.57                   | 29.85              | 16.2               | 0.0                  | Final Sp.          | 7.9                        | 0.0                         | 0.0                         | 15.9            |
| Total                                    |                     | 794              |            |                         |                           |           | 1.90                   | 100.00             |                    |                      |                    | 4.7                        | 0                           |                             |                 |



# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] HRS to L Pit Area 5**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 637 G</b> |                                    |
|---------------------------------------|-------------|--------------------------------|------------------------------------|
| Availability                          | %           | 85.00                          |                                    |
| Bucket Fill Factor                    |             | 0.85                           |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.93                          |                                    |
| Average Payload                       | bcy         | 28.09                          |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                       | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                         | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                           |                                    |
| Loaded Transport Time                 | min         | 2.44                           |                                    |
| Unloaded Transport Time               | min         | 0.91                           |                                    |
| Total Loading unit Cycle Time         | min         | 4.05                           |                                    |
| Transport Distance (One Way)          | feet        | 1,796.00                       |                                    |
| Production per Operating Hour         | bcy         | 329.07                         |                                    |
| Production per Loader Operating Shift | bcy         | 2,304                          | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,384,405                      | Avg. production factored by avail. |

| <b>Haulage System</b>          |            |           |                                                                                    |
|--------------------------------|------------|-----------|------------------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 1,384,405 |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                                    |
| Excavation Target              | bcy        | 12,391.00 |                                                                                    |
| Time to move Excavation Target | Days       | 3.27      |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 38        |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 38        |                                                                                    |
| Total cost to move Target      | \$         | 0         |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] HRS to L Pit Area 5    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/Ophr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 12.35              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 1796             | 11.1       | 3.0                     | 0.0                       | Full      | 2.44                   | 60.22              | 9.1                | 0.0                  | Final Sp.         | 8.4                        | 199.4                       | 0.0                         | 87.9            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 4.94               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 1796             | -11.1      | 3.0                     | 0.0                       | Empty     | 0.91                   | 22.49              | 34.5               | 0.0                  | Final Sp.         | 22.4                       | -199.4                      | 0.0                         | 0.0             |
| Total                                    |                     | 3,592            |            |                         |                           |           | 4.05                   | 100.00             |                    |                      |                   | 10.1                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] I20-1 to I Middle Pit

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 637 G |                                    |
|---------------------------------------|-------------|-------------------------|------------------------------------|
| Availability                          | %           | 85.00                   |                                    |
| Bucket Fill Factor                    |             | 0.85                    |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.94                   |                                    |
| Average Payload                       | bcy         | 28.10                   |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                  | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                    |                                    |
| Loaded Transport Time                 | min         | 0.84                    |                                    |
| Unloaded Transport Time               | min         | 0.75                    |                                    |
| Total Loading unit Cycle Time         | min         | 2.28                    |                                    |
| Transport Distance (One Way)          | feet        | 688.00                  |                                    |
| Production per Operating Hour         | bcy         | 524.55                  |                                    |
| Production per Loader Operating Shift | bcy         | 3,672                   | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 2,206,793               | Avg. production factored by avail. |

| Haulage System                 |            | Loading Methodology |                        |
|--------------------------------|------------|---------------------|------------------------|
| Production per Year            | bcy/Year   | 2,206,793           |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00                | Single Sided           |
| Discounted Operating Cost      | \$/bcy     | 0.00                | Full Truck             |
| Discounted Average Cost        | \$/bcy     | 0.00                | Average for 150 Shifts |
| Excavation Target              | bcy        | 11,884.00           |                        |
| Time to move Excavation Target | Days       | 1.97                |                        |
| Loader Hrs to move Target      | Op. Hours. | 23                  |                        |
| Total Truck Hrs to move Target | Op. Hours. | 23                  |                        |
| Total cost to move Target      | \$         | 0                   |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

Material: [PRJ] Topsoil

Haulage System: Haulage System-1

Roster: [PRJ] 5 day Week - 8 Hour Shifts

Haul Cycle: [PRJ] 120-1 to 1 Middle Pit

| Type                    | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit.<br>mph | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OptHr | % Duty<br>Cycle |
|-------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|---------------------------|----------------------------|-----------------------------|------------------------------|-----------------|
| [PRJ] Caterpillar 637 G |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                              |                 |
| Queue                   | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                           |                            |                             | 0.0                          |                 |
| Spot                    | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                           |                            |                             | 0.0                          |                 |
| Load                    | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 21.89              |                    |                      |                           |                            |                             | 0.0                          |                 |
| 1                       | Haul Segment        | 688              | 0.7        | 3.0                     | 0.0                       | Full      | 0.84                   | 36.61              | 18.6               | 0.0                  | Final Sp.                 | 9.3                        | 4.8                         | 0.0                          | 23.7            |
| Spot                    | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                           |                            |                             | 0.0                          |                 |
| Dump                    | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 8.76               |                    |                      |                           |                            |                             | 0.0                          |                 |
| 1                       | Haul Segment (rev.) | 688              | -0.7       | 3.0                     | 0.0                       | Empty     | 0.75                   | 32.74              | 21.1               | 0.0                  | Final Sp.                 | 10.5                       | -4.8                        | 0.0                          | 18.9            |
| Total                   |                     | 1,376            |            |                         |                           |           | 2.28                   | 100.00             |                    |                      |                           | 6.8                        | 0                           |                              |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] I20-2 to I Middle Pit**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

|                                       |             |                                |                                    |
|---------------------------------------|-------------|--------------------------------|------------------------------------|
| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 637 G</b> |                                    |
| Availability                          | %           | 85.00                          |                                    |
| Bucket Fill Factor                    |             | 0.85                           |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.93                          |                                    |
| Average Payload                       | bcy         | 28.09                          |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                       | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                         | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                           |                                    |
| Loaded Transport Time                 | min         | 0.76                           |                                    |
| Unloaded Transport Time               | min         | 0.67                           |                                    |
| Total Loading unit Cycle Time         | min         | 2.13                           |                                    |
| Transport Distance (One Way)          | feet        | 552.00                         |                                    |
| Production per Operating Hour         | bcy         | 553.72                         |                                    |
| Production per Loader Operating Shift | bcy         | 3,876                          | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 2,329,501                      | Avg. production factored by avail. |

|                                |            |           |                            |
|--------------------------------|------------|-----------|----------------------------|
| <b>Haulage System</b>          |            |           |                            |
| Production per Year            | bcy/Year   | 2,329,501 |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck                 |
| Excavation Target              | bcy        | 13,291.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 2.08      |                            |
| Loader Hrs to move Target      | Op. Hours. | 24        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 24        |                            |
| Total cost to move Target      | \$         | 0         |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                          |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|--------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                          |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                          |                 |
| Haul Cycle: [PRJ] 120-2 to 1 Middle Pit  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                          |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                          |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                      |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                      |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 23.52              |                    |                      |                   |                            |                             | 0.0                      |                 |
| 1                                        | Haul Segment        | 552              | 4.5        | 3.0                     | 0.0                       | Full      | 0.76                   | 35.56              | 15.5               | 0.0                  | Final Sp.         | 8.3                        | 24.8                        | 0.0                      | 33.1            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                      |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 9.41               |                    |                      |                   |                            |                             | 0.0                      |                 |
| 1                                        | Haul Segment (rev.) | 552              | -4.5       | 3.0                     | 0.0                       | Empty     | 0.67                   | 31.51              | 19.3               | 0.0                  | Final Sp.         | 9.4                        | -24.8                       | 0.0                      | 6.9             |
| Total                                    |                     | 1,104            |            |                         |                           |           | 2.13                   | 100.00             |                    |                      |                   | 5.9                        | 0                           |                          |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] I20-3 to I Middle Pit

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 637 G

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.85      |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.92     |                                    |
| Average Payload                       | bcy         | 28.08     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Loaded Transport Time                 | min         | 0.82      |                                    |
| Unloaded Transport Time               | min         | 0.73      |                                    |
| Total Loading unit Cycle Time         | min         | 2.25      |                                    |
| Transport Distance (One Way)          | feet        | 653.00    |                                    |
| Production per Operating Hour         | bcy         | 529.57    |                                    |
| Production per Loader Operating Shift | bcy         | 3,707     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 2,227,884 | Avg. production factored by avail. |

### Haulage System

|                                |            |           |                        |
|--------------------------------|------------|-----------|------------------------|
| Production per Year            | bcy/Year   | 2,227,884 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck             |
| Excavation Target              | bcy        | 12,782.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 2.10      |                        |
| Loader Hrs to move Target      | Op. Hours. | 24        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 24        |                        |
| Total cost to move Target      | \$         | 0         |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haul Cycle: [PRJ] 120-3 to 1 Middle Pit  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$-gal/OprHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 22.21              |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment        | 653              | 3.8        | 3.0                     | 0.0                       | Full      | 0.82                   | 36.55              | 16.8               | 0.0                  | Final Sp.          | 9.0                        | 24.8                        | 0.0                           | 33.7            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 8.88               |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment (rev.) | 653              | -3.8       | 3.0                     | 0.0                       | Empty     | 0.73                   | 32.36              | 20.5               | 0.0                  | Final Sp.          | 10.2                       | -24.8                       | 0.0                           | 9.8             |
| Total                                    |                     | 1,306            |            |                         |                           |           | 2.25                   | 100.00             |                    |                      |                    | 6.6                        | 0                           |                               |                 |



# Productivity

## Quick Estimate Results

Haulage System: Haulage System-1

Haul Cycle: [PRJ] L2-17 to L Pit Area 7

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 637 G |                                    |
|---------------------------------------|-------------|-------------------------|------------------------------------|
| Availability                          | %           | 85.00                   |                                    |
| Bucket Fill Factor                    |             | 0.85                    |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.91                   |                                    |
| Average Payload                       | bcy         | 28.06                   |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                  | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                    |                                    |
| Loaded Transport Time                 | min         | -8.63                   |                                    |
| Unloaded Transport Time               | min         | 1.13                    |                                    |
| Total Loading unit Cycle Time         | min         | -6.81                   |                                    |
| Transport Distance (One Way)          | feet        | 1,145.00                |                                    |
| Production per Operating Hour         | bcy         | 1,591.68                |                                    |
| Production per Loader Operating Shift | bcy         | 11,142                  | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 6,696,190               | Avg. production factored by avail. |

| Haulage System                 |            |           |                                                   |
|--------------------------------|------------|-----------|---------------------------------------------------|
| Production per Year            | bcy/Year   | 6,696,190 |                                                   |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                   |
| Excavation Target              | bcy        | 21,940.00 |                                                   |
| Time to move Excavation Target | Days       | 1.20      |                                                   |
| Loader Hrs to move Target      | Op. Hours. | 14        |                                                   |
| Total Truck Hrs to move Target | Op. Hours. | 14        |                                                   |
| Total cost to move Target      | \$         | 0         |                                                   |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

## Quick Estimate Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                   |                            |                             |                              |                 |
|------------------------------------------|---------------------|------------------|------------|--------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                   |                            |                             |                              |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                   |                            |                             |                              |                 |
| Haul Cycle: [PRJ] L2-17 to 1 Pit Area 7  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                   |                            |                             |                              |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist. | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$-gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                   |                            |                             |                              |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                          |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                          |                 |
| Load                                     | Loading             | Auto             | Mins       |                    |                           |           | 0.50                   | -7.35              |                    |                      |                   |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment        | 1145             | -9.2       | 3.0                | 0.0                       | Full      | -8.63                  | 126.86             | 34.5               | 0.0                  | Final Sp.         | 0.0                        | -105.3                      | 0.0                          | 0.0             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                          |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                    |                           |           | 0.20                   | -2.94              |                    |                      |                   |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment (rev.) | 1145             | 9.2        | 3.0                | 0.0                       | Empty     | 1.13                   | -16.58             | 15.4               | 0.0                  | Final Sp.         | 11.5                       | 105.3                       | 0.0                          | 67.6            |
| Total                                    |                     | 2,290            |            |                    |                           |           | -6.81                  | 100.00             |                    |                      |                   | -3.8                       | 0                           |                              |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] L2-17 to L Pit Area 8

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 637 G |                                    |
|---------------------------------------|-------------|-------------------------|------------------------------------|
| Availability                          | %           | 85.00                   |                                    |
| Bucket Fill Factor                    |             | 0.85                    |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.93                   |                                    |
| Average Payload                       | bcy         | 28.09                   |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                  | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                    |                                    |
| Loaded Transport Time                 | min         | 0.81                    |                                    |
| Unloaded Transport Time               | min         | 0.73                    |                                    |
| Total Loading unit Cycle Time         | min         | 2.24                    |                                    |
| Transport Distance (One Way)          | feet        | 652.00                  |                                    |
| Production per Operating Hour         | bcy         | 531.42                  |                                    |
| Production per Loader Operating Shift | bcy         | 3,720                   | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 2,235,672               | Avg. production factored by avail. |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 2,235,672 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 24,585.00 |                                                                             |
| Time to move Excavation Target | Days       | 4.02      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 46        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 46        |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
|------------------------------------------|---------------------|------------------|------------|--------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haul Cycle: [PRJ] 12-17 to 1 Pit Area 8  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist. | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OptHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Load                                     | Loading             | Auto             | Mins       |                    |                           |           | 0.50                   | 22.30              |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment        | 652              | 0.0        | 3.0                | 0.0                       | Full      | 0.81                   | 36.30              | 18.6               | 0.0                  | Final Sp.          | 9.1                        | 0.0                         | 0.0                          | 19.8            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                    |                           |           | 0.20                   | 8.92               |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment (rev.) | 652              | 0.0        | 3.0                | 0.0                       | Empty     | 0.73                   | 32.47              | 20.5               | 0.0                  | Final Sp.          | 10.2                       | 0.0                         | 0.0                          | 20.5            |
| Total                                    |                     | 1,304            |            |                    |                           |           | 2.24                   | 100.00             |                    |                      |                    | 6.6                        | 0                           |                              |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] L5-17 to L Pit Area 6

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 637 G |                                    |
|---------------------------------------|-------------|-------------------------|------------------------------------|
| Availability                          | %           | 85.00                   |                                    |
| Bucket Fill Factor                    |             | 0.85                    |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.91                   |                                    |
| Average Payload                       | bcy         | 28.07                   |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                  | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                    |                                    |
| Loaded Transport Time                 | min         | 0.87                    |                                    |
| Unloaded Transport Time               | min         | 0.77                    |                                    |
| Total Loading unit Cycle Time         | min         | 2.34                    |                                    |
| Transport Distance (One Way)          | feet        | 739.00                  |                                    |
| Production per Operating Hour         | bcy         | 513.30                  |                                    |
| Production per Loader Operating Shift | bcy         | 3,593                   | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 2,159,467               | Avg. production factored by avail. |

| Haulage System                 |            |           |                        |
|--------------------------------|------------|-----------|------------------------|
| Production per Year            | bcy/Year   | 2,159,467 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck             |
| Excavation Target              | bcy        | 4,349.00  | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 0.74      |                        |
| Loader Hrs to move Target      | Op. Hours. | 8         |                        |
| Total Truck Hrs to move Target | Op. Hours. | 8         |                        |
| Total cost to move Target      | \$         | 0         |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|--------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] LS-17 to L Pit Area 6  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist. | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                    |                           |           | 0.50                   | 21.33              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 739              | 2.1        | 3.0                | 0.0                       | Full      | 0.87                   | 37.09              | 18.6               | 0.0                  | Final Sp.          | 9.7                        | 15.5                        | 0.0                         | 29.2            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                    |                           |           | 0.20                   | 8.53               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 739              | -2.1       | 3.0                | 0.0                       | Empty     | 0.77                   | 33.05              | 21.7               | 0.0                  | Final Sp.          | 10.8                       | -15.5                       | 0.0                         | 15.5            |
| Total                                    |                     | 1,478            |            |                    |                           |           | 2.34                   | 100.00             |                    |                      |                    | 7.2                        | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] L5-17 to L Pit Area 7

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 637 G |                                    |
|---------------------------------------|-------------|-------------------------|------------------------------------|
| Availability                          | %           | 85.00                   |                                    |
| Bucket Fill Factor                    |             | 0.85                    |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.93                   |                                    |
| Average Payload                       | bcy         | 28.09                   |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                  | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                    |                                    |
| Loaded Transport Time                 | min         | 0.87                    |                                    |
| Unloaded Transport Time               | min         | 0.77                    |                                    |
| Total Loading unit Cycle Time         | min         | 2.34                    |                                    |
| Transport Distance (One Way)          | feet        | 739.00                  |                                    |
| Production per Operating Hour         | bcy         | 513.56                  |                                    |
| Production per Loader Operating Shift | bcy         | 3,595                   | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 2,160,533               | Avg. production factored by avail. |

| Haulage System                 |            | Loading Methodology |                        |
|--------------------------------|------------|---------------------|------------------------|
| Production per Year            | bcy/Year   | 2,160,533           | Single Sided           |
| Discounted Capital Cost        | \$/bcy     | 0.00                | Full Truck             |
| Discounted Operating Cost      | \$/bcy     | 0.00                | Average for 150 Shifts |
| Discounted Average Cost        | \$/bcy     | 0.00                |                        |
| Excavation Target              | bcy        | 87,396.00           |                        |
| Time to move Excavation Target | Days       | 14.77               |                        |
| Loader Hrs to move Target      | Op. Hours. | 170                 |                        |
| Total Truck Hrs to move Target | Op. Hours. | 170                 |                        |
| Total cost to move Target      | \$         | 0                   |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.  
Time for the first bucket pass coincides with the truck queuing and maneuvering times.  
Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
|------------------------------------------|---------------------|------------------|------------|--------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haul Cycle: [PRJ] LS-17 to L Pit Area 7  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist. | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$./gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Load                                     | Loading             | Auto             | Mins       |                    |                           |           | 0.50                   | 21.33              |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment        | 739              | 2.1        | 3.0                | 0.0                       | Full      | 0.87                   | 37.09              | 18.6               | 0.0                  | Final Sp.          | 9.7                        | 15.5                        | 0.0                           | 29.2            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                    |                           |           | 0.20                   | 8.53               |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment (rev.) | 739              | -2.1       | 3.0                | 0.0                       | Empty     | 0.77                   | 33.05              | 21.7               | 0.0                  | Final Sp.          | 10.8                       | -15.5                       | 0.0                           | 15.5            |
| Total                                    |                     | 1,478            |            |                    |                           |           | 2.34                   | 100.00             |                    |                      |                    | 7.2                        | 0                           |                               |                 |



# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] L21-1 to L Pit Area 1

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 637 G |                                    |
|---------------------------------------|-------------|-------------------------|------------------------------------|
| Availability                          | %           | 85.00                   |                                    |
| Bucket Fill Factor                    |             | 0.85                    |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.93                   |                                    |
| Average Payload                       | bcy         | 28.09                   |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                  | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                    |                                    |
| Loaded Transport Time                 | min         | 1.46                    |                                    |
| Unloaded Transport Time               | min         | 1.42                    |                                    |
| Total Loading unit Cycle Time         | min         | 3.58                    |                                    |
| Transport Distance (One Way)          | feet        | 2,096.00                |                                    |
| Production per Operating Hour         | bcy         | 365.16                  |                                    |
| Production per Loader Operating Shift | bcy         | 2,556                   | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,536,247               | Avg. production factored by avail. |

| Haulage System                 |            |           |                        |
|--------------------------------|------------|-----------|------------------------|
| Production per Year            | bcy/Year   | 1,536,247 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck             |
| Excavation Target              | bcy        | 49,516.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 11.77     |                        |
| Loader Hrs to move Target      | Op. Hours. | 136       |                        |
| Total Truck Hrs to move Target | Op. Hours. | 136       |                        |
| Total cost to move Target      | \$         | 0         |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|--------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] L21-1 to L Pit Area 1  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist. | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S-gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                    |                           |           | 0.50                   | 13.97              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 2096             | -4.1       | 3.0                | 0.0                       | Full      | 1.46                   | 40.78              | 32.9               | 0.0                  | Final Sp.          | 16.3                       | -85.9                       | 0.0                         | 15.8            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                    |                           |           | 0.20                   | 5.59               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 2096             | 4.1        | 3.0                | 0.0                       | Empty     | 1.42                   | 39.66              | 26.1               | 0.0                  | Final Sp.          | 16.8                       | 85.9                        | 0.0                         | 57.4            |
| Total                                    |                     | 4,192            |            |                    |                           |           | 3.58                   | 100.00             |                    |                      |                    | 13.3                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] L21-2 to L Pit Area 1

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 637 G

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.85      |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.93     |                                    |
| Average Payload                       | bcy         | 28.08     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Loaded Transport Time                 | min         | 1.90      |                                    |
| Unloaded Transport Time               | min         | 1.32      |                                    |
| Total Loading unit Cycle Time         | min         | 3.92      |                                    |
| Transport Distance (One Way)          | feet        | 2,121.00  |                                    |
| Production per Operating Hour         | bcy         | 337.01    |                                    |
| Production per Loader Operating Shift | bcy         | 2,359     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,417,793 | Avg. production factored by avail. |

### Haulage System

|                                |            |           |                        |
|--------------------------------|------------|-----------|------------------------|
| Production per Year            | bcy/Year   | 1,417,793 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck             |
| Excavation Target              | bcy        | 19,502.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 5.02      |                        |
| Loader Hrs to move Target      | Op. Hours. | 58        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 58        |                        |
| Total cost to move Target      | \$         | 0         |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] L21-2 to L Pit Area 1  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 12.75              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 2121             | 5.4        | 3.0                     | 0.0                       | Full      | 1.90                   | 48.59              | 15.7               | 0.0                  | Final Sp.          | 12.7                       | 114.5                       | 0.0                         | 73.7            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 5.10               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 2121             | -5.4       | 3.0                     | 0.0                       | Empty     | 1.32                   | 33.56              | 34.5               | 0.0                  | Final Sp.          | 18.3                       | -114.5                      | 0.0                         | 8.9             |
| Total                                    |                     | 4,242            |            |                         |                           |           | 3.92                   | 100.00             |                    |                      |                    | 12.3                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] L21-3 to L Pit Area 1

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 637 G |                                    |
|---------------------------------------|-------------|-------------------------|------------------------------------|
| Availability                          | %           | 85.00                   |                                    |
| Bucket Fill Factor                    |             | 0.85                    |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.92                   |                                    |
| Average Payload                       | bcy         | 28.08                   |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                  | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                    |                                    |
| Loaded Transport Time                 | min         | 1.83                    |                                    |
| Unloaded Transport Time               | min         | 1.49                    |                                    |
| Total Loading unit Cycle Time         | min         | 4.01                    |                                    |
| Transport Distance (One Way)          | feet        | 2,647.00                |                                    |
| Production per Operating Hour         | bcy         | 330.22                  |                                    |
| Production per Loader Operating Shift | bcy         | 2,312                   | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,389,236               | Avg. production factored by avail. |

| Haulage System                 |            |           |                        |
|--------------------------------|------------|-----------|------------------------|
| Production per Year            | bcy/Year   | 1,389,236 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck             |
| Excavation Target              | bcy        | 23,815.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 6.26      |                        |
| Loader Hrs to move Target      | Op. Hours. | 72        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 72        |                        |
| Total cost to move Target      | \$         | 0         |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|--------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] L21-3 to L Pit Area 1  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist. | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                    |                           |           | 0.50                   | 12.45              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 2647             | 2.2        | 3.0                | 0.0                       | Full      | 1.83                   | 45.48              | 24.9               | 0.0                  | Final Sp.          | 16.5                       | 58.2                        | 0.0                         | 57.2            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                    |                           |           | 0.20                   | 4.98               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 2647             | -2.2       | 3.0                | 0.0                       | Empty     | 1.49                   | 37.09              | 34.5               | 0.0                  | Final Sp.          | 20.2                       | -58.2                       | 0.0                         | 37.4            |
| Total                                    |                     | 5,294            |            |                    |                           |           | 4.01                   | 100.00             |                    |                      |                    | 15.0                       | 0                           |                             |                 |

### Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] N20-7 to N Pit Area 3

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 637 G |                                    |
|---------------------------------------|-------------|-------------------------|------------------------------------|
| Availability                          | %           | 85.00                   |                                    |
| Bucket Fill Factor                    |             | 0.85                    |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.92                   |                                    |
| Average Payload                       | bcy         | 28.08                   |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                  | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                    |                                    |
| Loaded Transport Time                 | min         | 2.99                    |                                    |
| Unloaded Transport Time               | min         | 1.01                    |                                    |
| Total Loading unit Cycle Time         | min         | 4.70                    |                                    |
| Transport Distance (One Way)          | feet        | 2,097.00                |                                    |
| Production per Operating Hour         | bcy         | 288.82                  |                                    |
| Production per Loader Operating Shift | bcy         | 2,022                   | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,215,060               | Avg. production factored by avail. |

| Haulage System                 |            |           |                        |
|--------------------------------|------------|-----------|------------------------|
| Production per Year            | bcy/Year   | 1,215,060 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck             |
| Excavation Target              | bcy        | 1,713.00  | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 0.51      |                        |
| Loader Hrs to move Target      | Op. Hours. | 6         |                        |
| Total Truck Hrs to move Target | Op. Hours. | 6         |                        |
| Total cost to move Target      | \$         | 0         |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.  
 Time for the first bucket pass coincides with the truck queuing and maneuvering times.  
 Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|--------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] N20-7 to N Pit Area 3  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist. | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/Ophr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                    |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                    |                           |           | 0.50                   | 10.65              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 2097             | 12.4       | 3.0                | 0.0                       | Full      | 2.99                   | 63.58              | 8.5                | 0.0                  | Final Sp.          | 8.0                        | 260.0                       | 0.0                         | 90.8            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                    |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                    |                           |           | 0.20                   | 4.26               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 2097             | -12.4      | 3.0                | 0.0                       | Empty     | 1.01                   | 21.51              | 34.5               | 0.0                  | Final Sp.          | 23.6                       | -260.0                      | 0.0                         | 0.0             |
| Total                                    |                     | 4,194            |            |                    |                           |           | 4.70                   | 100.00             |                    |                      |                    | 10.2                       | 0                           |                             |                 |



# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] N21-1 to N Pit Area 3

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 637 G

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.85      |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.90     |                                    |
| Average Payload                       | bcy         | 28.06     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Loaded Transport Time                 | min         | 3.38      |                                    |
| Unloaded Transport Time               | min         | 1.18      |                                    |
| Total Loading unit Cycle Time         | min         | 5.26      |                                    |
| Transport Distance (One Way)          | feet        | 2,616.00  |                                    |
| Production per Operating Hour         | bcy         | 260.54    |                                    |
| Production per Loader Operating Shift | bcy         | 1,824     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,096,110 | Avg. production factored by avail. |

### Haulage System

|                                |            |           |                        |
|--------------------------------|------------|-----------|------------------------|
| Production per Year            | bcy/Year   | 1,096,110 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck             |
| Excavation Target              | bcy        | 5,035.00  | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 1.68      |                        |
| Loader Hrs to move Target      | Op. Hours. | 19        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 19        |                        |
| Total cost to move Target      | \$         | 0         |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] N21-1 to N Pit Area 3  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 9.50               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 2616             | 10.7       | 3.0                     | 0.0                       | Full      | 3.38                   | 64.27              | 9.4                | 0.0                  | Final Sp.          | 8.8                        | 279.9                       | 0.0                         | 91.0            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 3.80               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 2616             | -10.7      | 3.0                     | 0.0                       | Empty     | 1.18                   | 22.43              | 34.5               | 0.0                  | Final Sp.          | 25.2                       | -279.9                      | 0.0                         | 0.0             |
| Total                                    |                     | 5,232            |            |                         |                           |           | 5.26                   | 100.00             |                    |                      |                    | 11.3                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] NN20-1 to I Middle Pit**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 637 G**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.85      |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.92     |                                    |
| Average Payload                       | bcy         | 28.08     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Loaded Transport Time                 | min         | 1.66      |                                    |
| Unloaded Transport Time               | min         | 1.55      |                                    |
| Total Loading unit Cycle Time         | min         | 3.91      |                                    |
| Transport Distance (One Way)          | feet        | 2,679.00  |                                    |
| Production per Operating Hour         | bcy         | 337.08    |                                    |
| Production per Loader Operating Shift | bcy         | 2,360     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,418,078 | Avg. production factored by avail. |

### Haulage System

|                                |            |           |                            |
|--------------------------------|------------|-----------|----------------------------|
| Production per Year            | bcy/Year   | 1,418,078 |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck                 |
| Excavation Target              | bcy        | 1,660.00  | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 0.43      |                            |
| Loader Hrs to move Target      | Op. Hours. | 5         |                            |
| Total Truck Hrs to move Target | Op. Hours. | 5         |                            |
| Total cost to move Target      | \$         | 0         |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|---------------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                             |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                             |                 |
| Haul Cycle: [PRJ] NN20-1 to I Middle Pit |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit.<br>mph | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                           |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                           |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 12.79              |                    |                      |                           |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 2679             | -2.1       | 3.0                     | 0.0                       | Full      | 1.66                   | 42.39              | 34.5               | 0.0                  | Final Sp.                 | 18.4                       | -56.3                       | 0.0                         | 30.9            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                           |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 5.12               |                    |                      |                           |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 2679             | 2.1        | 3.0                     | 0.0                       | Empty     | 1.55                   | 39.71              | 32.0               | 0.0                  | Final Sp.                 | 19.6                       | 56.3                        | 0.0                         | 52.2            |
| Total                                    |                     | 5,358            |            |                         |                           |           | 3.91                   | 100.00             |                    |                      |                           | 15.6                       | 0                           |                             |                 |

### Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] NN20-1 to J Pit

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 637 G |                                    |
|---------------------------------------|-------------|-------------------------|------------------------------------|
| Availability                          | %           | 85.00                   |                                    |
| Bucket Fill Factor                    |             | 0.85                    |                                    |
| Average Bucket Load Volume            | cu.yards    | 28.92                   |                                    |
| Average Payload                       | bcy         | 28.08                   |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                  | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                    |                                    |
| Loaded Transport Time                 | min         | 1.75                    |                                    |
| Unloaded Transport Time               | min         | 1.62                    |                                    |
| Total Loading unit Cycle Time         | min         | 4.07                    |                                    |
| Transport Distance (One Way)          | feet        | 2,938.00                |                                    |
| Production per Operating Hour         | bcy         | 326.52                  |                                    |
| Production per Loader Operating Shift | bcy         | 2,286                   | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 1,373,658               | Avg. production factored by avail. |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 1,373,658 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 11,260.00 |                                                                             |
| Time to move Excavation Target | Days       | 2.99      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 34        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 34        |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] NN20-1 to J Pit        |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S-gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 637 G                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.50                   | 12.28              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 2938             | -1.5       | 3.0                     | 0.0                       | Full      | 1.75                   | 42.95              | 34.5               | 0.0                  | Final Sp.         | 19.1                       | -44.1                       | 0.0                         | 35.9            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.00                   | 0.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 4.91               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 2938             | 1.5        | 3.0                     | 0.0                       | Empty     | 1.62                   | 39.86              | 33.0               | 0.0                  | Final Sp.         | 20.6                       | 44.1                        | 0.0                         | 52.5            |
| Total                                    |                     | 5,876            |            |                         |                           |           | 4.07                   | 100.00             |                    |                      |                   | 16.4                       | 0                           |                             |                 |

# **Truck/Excavator – Topsoil Replacement Talpac Haul Simulations**

| Production Summary - Full Simulation                                                                  |             |                             |                                          |              |
|-------------------------------------------------------------------------------------------------------|-------------|-----------------------------|------------------------------------------|--------------|
| Haulage System: Truck/Backhoe Topsoil Placement PR7                                                   |             |                             | Haul Cycle: [PRJ] A91-8                  |              |
| Material: [PRJ] Topsoil                                                                               |             |                             | Roster: [PRJ] 5 day Week - 8 Hour Shifts |              |
| Loader                                                                                                |             | [PRJ] CATERPILLAR 5130 B ME |                                          |              |
| Availability                                                                                          | %           | 85.00                       |                                          |              |
| Bucket Fill Factor                                                                                    |             | 0.92                        |                                          |              |
| Average Bucket Load Volume                                                                            | cu.yards    | 21.36                       |                                          |              |
| Average Payload                                                                                       | bcy         | 14.83                       |                                          |              |
| Operating Hours per Year                                                                              | OpHr/Year   | 1,099.00                    | Op. hrs factored by availability         |              |
| Average Operating Shifts per Year                                                                     | shifts/Year | 157.00                      | Shifts factored by availability          |              |
| Average Bucket Cycle Time                                                                             | min         | 1.00                        |                                          |              |
| Production per Operating Hour                                                                         | bcy         | 380.23                      |                                          |              |
| Production per Loader Operating Shift                                                                 | bcy         | 2,662                       | Max. prod. based on 100% avail.          |              |
| Production per Year                                                                                   | bcy         | 417,869                     | Avg. production factored by avail.       |              |
| Wait Time per Operating Hour                                                                          | min         | 28.62                       |                                          |              |
| Truck                                                                                                 |             | [PRJ] CATERPILLAR 777 C     |                                          |              |
| Availability                                                                                          | %           | 100.00                      |                                          |              |
| Payload in Template                                                                                   | bcy         | 75.00                       |                                          |              |
| Operating Hours per Year                                                                              | OpHr/Year   | 1,099.00                    |                                          |              |
| Average Payload                                                                                       | bcy         | 75.24                       |                                          |              |
| Production per Operating Hour                                                                         | bcy         | 380.23                      |                                          |              |
| Production per Loader Operating Shift                                                                 | bcy         | 2,662                       |                                          |              |
| Production per Year                                                                                   | bcy         | 417,869                     |                                          |              |
| Queue Time at Loader                                                                                  | min/ Cycle  | 0.70                        |                                          |              |
| Spot Time at loader                                                                                   | min/ Cycle  | 0.40                        |                                          |              |
| Average Loading Time                                                                                  | min/ Cycle  | 4.07                        |                                          |              |
| Travel Time                                                                                           | min/ Cycle  | 5.34                        |                                          |              |
| Spot Time at Dump                                                                                     | min/ Cycle  | 0.30                        |                                          |              |
| Average Dump Time                                                                                     | min/ Cycle  | 0.20                        |                                          |              |
| Average Cycle Time                                                                                    | min/ Cycle  | 11.01                       |                                          |              |
| Fleet Size                                                                                            |             | 1                           |                                          |              |
| Average No. of Bucket Passes                                                                          |             | 5.07                        |                                          |              |
| Haulage System                                                                                        |             |                             |                                          |              |
| Production per Year                                                                                   | bcy/Year    | 417,869                     |                                          |              |
| Discounted Capital Cost                                                                               | \$/bcy      | 0.00                        | Loading Methodology                      |              |
| Discounted Operating Cost                                                                             | \$/bcy      | 0.00                        |                                          | Single Sided |
| Discounted Average Cost                                                                               | \$/bcy      | 0.00                        |                                          | Full Truck   |
| Excavation Target                                                                                     | bcy         | 29,201.00                   | Average for 150 Shifts                   |              |
| Time to move Excavation Target                                                                        | Days        | 25.52                       | 67159                                    |              |
| Loader Hrs to move Target                                                                             | Op. Hours.  | 77                          |                                          |              |
| Total Truck Hrs to move Target                                                                        | Op. Hours.  | 77                          |                                          |              |
| Total cost to move Target                                                                             | \$          | 0                           |                                          |              |
| Productivity estimates allow for insufficient time at the end of the shift to complete another cycle. |             |                             |                                          |              |
| Time for the first bucket pass coincides with the truck queuing and maneuvering times.                |             |                             |                                          |              |
| This simulation is based on data provided by the equipment manufacturer.                              |             |                             |                                          |              |
| Equipment data should be checked to ensure it is valid for this site.                                 |             |                             |                                          |              |



[PRJ] A91-8

| Type  | Title               | Distance<br>feet | Grade<br>% | Roll<br>Res. % | Max<br>mph | Curve<br>Angle | Final<br>mph | Load<br>% of Full |
|-------|---------------------|------------------|------------|----------------|------------|----------------|--------------|-------------------|
| Queue | Queue at Loader     | Auto             | Mins       |                |            |                |              |                   |
| Spot  | Spot Time at loader | Auto             | Mins       |                |            |                |              |                   |
| Load  | Loading             | Auto             | Mins       |                |            |                |              |                   |
| 1     | Haul Segment        | 400.0            | -7.5       | 4.0            | 0.0        | 0.0            | Max          | Full              |
| 2     | Haul Segment        | 753.0            | 0.0        | 3.5            | Max        | 0.0            | Max          | Full              |
| 3     | Haul Segment        | 114.0            | 10.5       | 3.5            | Max        | 0.0            | Max          | Full              |
| 4     | Haul Segment        | 1393.0           | 1.9        | 3.5            | Max        | 0.0            | Max          | Full              |
| 5     | Haul Segment        | 1580.0           | -1.0       | 3.5            | Max        | 0.0            | Max          | Full              |
| 6     | Haul Segment        | 674.0            | 0.0        | 3.5            | Max        | 0.0            | 0            | Full              |
| Spot  | Spot Time at Dump   | Auto             | Mins       |                |            |                |              |                   |
| Dump  | Dumping             | Auto             | Mins       |                |            |                |              |                   |
| 7     | Haul Segment (rev.) | 674.0            | 0.0        | 3.5            | 0.0        | 0.0            | Max          | Empty             |
| 8     | Haul Segment (rev.) | 1580.0           | 1.0        | 3.5            | Max        | 0.0            | Max          | Empty             |
| 9     | Haul Segment (rev.) | 1393.0           | -1.9       | 3.5            | Max        | 0.0            | Max          | Empty             |
| 10    | Haul Segment (rev.) | 114.0            | -10.5      | 3.5            | Max        | 0.0            | Max          | Empty             |
| 11    | Haul Segment (rev.) | 753.0            | 0.0        | 3.5            | Max        | 0.0            | Max          | Empty             |
| 12    | Haul Segment (rev.) | 400.0            | 7.5        | 4.0            | Max        | 0.0            | 0            | Empty             |

4914 @ -0.10 %

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] 19-1 to L Pit Area 2

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 5130 B ME |                                    |
|---------------------------------------|-------------|-----------------------------|------------------------------------|
| Availability                          | %           | 85.00                       |                                    |
| Bucket Fill Factor                    |             | 0.93                        |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.53                       |                                    |
| Average Payload                       | bcy         | 12.17                       |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                    | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                      | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                        |                                    |
| Production per Operating Hour         | bcy         | 1,151.38                    |                                    |
| Production per Loader Operating Shift | bcy         | 8,060                       | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 4,843,838                   | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 6.12                        |                                    |

| Truck                                 |            | [PRJ] Caterpillar 777 F |  |
|---------------------------------------|------------|-------------------------|--|
| Availability                          | %          | 100.00                  |  |
| Payload in Template                   | bcy        | 76.45                   |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                |  |
| Average Payload                       | bcy        | 75.24                   |  |
| Production per Operating Hour         | bcy        | 383.79                  |  |
| Production per Loader Operating Shift | bcy        | 2,687                   |  |
| Production per Year                   | bcy        | 1,614,613               |  |
| Queue Time at Loader                  | min/ Cycle | 0.78                    |  |
| Spot Time at loader                   | min/ Cycle | 0.40                    |  |
| Average Loading Time                  | min/ Cycle | 2.59                    |  |
| Travel Time                           | min/ Cycle | 6.58                    |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                    |  |
| Average Dump Time                     | min/ Cycle | 0.20                    |  |
| Average Cycle Time                    | min/ Cycle | 10.86                   |  |
| Fleet Size                            |            | 3                       |  |
| Average No. of Bucket Passes          |            | 6.18                    |  |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 4,843,838 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 7,261.00  |                                                                             |
| Time to move Excavation Target | Days       | 0.55      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 6         |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 19        |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] 19-1 to L Pit Area 2   |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.78                   | 7.22               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.68               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 23.88              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 3435             | 8.2        | 3.0                     | 0.0                       | Full      | 4.89                   | 45.00              | 8.3                | 0.0                  | Final Sp.         | 8.0                        | 281.7                       | 0.0                         | 94.6            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.76               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.84               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 3435             | -8.2       | 3.0                     | 0.0                       | Empty     | 1.69                   | 15.60              | 39.6               | 0.0                  | Final Sp.         | 23.0                       | -281.7                      | 0.0                         | 0.5             |
| Total                                    |                     |                  |            |                         |                           |           | 10.86                  | 100.00             |                    |                      |                   | 7.2                        | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] 19-5 to L Pit Area 1

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 5130 B ME |                                    |
|---------------------------------------|-------------|-----------------------------|------------------------------------|
| Availability                          | %           | 85.00                       |                                    |
| Bucket Fill Factor                    |             | 0.93                        |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54                       |                                    |
| Average Payload                       | bcy         | 12.17                       |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                    | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                      | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                        |                                    |
| Production per Operating Hour         | bcy         | 1,206.97                    |                                    |
| Production per Loader Operating Shift | bcy         | 8,449                       | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,077,709                   | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 3.91                        |                                    |

| Truck                                 |            | [PRJ] Caterpillar 777 F |  |
|---------------------------------------|------------|-------------------------|--|
| Availability                          | %          | 100.00                  |  |
| Payload in Template                   | bcy        | 76.45                   |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                |  |
| Average Payload                       | bcy        | 75.23                   |  |
| Production per Operating Hour         | bcy        | 402.32                  |  |
| Production per Loader Operating Shift | bcy        | 2,816                   |  |
| Production per Year                   | bcy        | 1,692,570               |  |
| Queue Time at Loader                  | min/ Cycle | 0.84                    |  |
| Spot Time at loader                   | min/ Cycle | 0.40                    |  |
| Average Loading Time                  | min/ Cycle | 2.59                    |  |
| Travel Time                           | min/ Cycle | 6.06                    |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                    |  |
| Average Dump Time                     | min/ Cycle | 0.20                    |  |
| Average Cycle Time                    | min/ Cycle | 10.39                   |  |
| Fleet Size                            |            | 3                       |  |
| Average No. of Bucket Passes          |            | 6.18                    |  |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 5,077,709 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 19,488.00 |                                                                             |
| Time to move Excavation Target | Days       | 1.40      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 16        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 48        |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] 19-5 to L Pit Area 1   |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S-gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.84                   | 8.07               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.85               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 24.94              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 4465             | 4.4        | 3.0                     | 0.0                       | Full      | 4.07                   | 39.18              | 13.5               | 0.0                  | Final Sp.          | 12.5                       | 196.5                       | 0.0                         | 89.6            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.89               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.93               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 4465             | -4.4       | 3.0                     | 0.0                       | Empty     | 1.99                   | 19.15              | 39.6               | 0.0                  | Final Sp.          | 25.5                       | -196.5                      | 0.0                         | 11.7            |
| Total                                    |                     | 8,930            |            |                         |                           |           | 10.39                  | 100.00             |                    |                      |                    | 9.8                        | 0                           |                             |                 |

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] A1-08 to L Pit Area 2

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 5130 B ME |                                    |
|---------------------------------------|-------------|-----------------------------|------------------------------------|
| Availability                          | %           | 85.00                       |                                    |
| Bucket Fill Factor                    |             | 0.93                        |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54                       |                                    |
| Average Payload                       | bcy         | 12.17                       |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                    | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                      | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                        |                                    |
| Production per Operating Hour         | bcy         | 1,203.78                    |                                    |
| Production per Loader Operating Shift | bcy         | 8,426                       | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,064,282                   | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 3.65                        |                                    |

| Truck                                 |            | [PRJ] Caterpillar 777 F |  |
|---------------------------------------|------------|-------------------------|--|
| Availability                          | %          | 100.00                  |  |
| Payload in Template                   | bcy        | 76.45                   |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                |  |
| Average Payload                       | bcy        | 75.24                   |  |
| Production per Operating Hour         | bcy        | 300.94                  |  |
| Production per Loader Operating Shift | bcy        | 2,107                   |  |
| Production per Year                   | bcy        | 1,266,070               |  |
| Queue Time at Loader                  | min/ Cycle | 1.38                    |  |
| Spot Time at loader                   | min/ Cycle | 0.40                    |  |
| Average Loading Time                  | min/ Cycle | 2.59                    |  |
| Travel Time                           | min/ Cycle | 8.96                    |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                    |  |
| Average Dump Time                     | min/ Cycle | 0.20                    |  |
| Average Cycle Time                    | min/ Cycle | 13.83                   |  |
| Fleet Size                            |            | 4                       |  |
| Average No. of Bucket Passes          |            | 6.18                    |  |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 5,064,282 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 83,827.00 |                                                                             |
| Time to move Excavation Target | Days       | 6.05      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 70        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 279       |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haul Cycle: [PRJ] A1-08 to L Pit Area 2  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$-gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.38                   | 9.99               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 2.89               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 18.74              |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment        | 4732             | 9.3        | 3.0                     | 0.0                       | Full      | 6.89                   | 49.82              | 8.0                | 0.0                  | Final Sp.          | 7.8                        | 440.1                       | 0.0                          | 96.4            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.17               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.45               |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment (rev.) | 4732             | -9.3       | 3.0                     | 0.0                       | Empty     | 2.07                   | 14.94              | 39.6               | 0.0                  | Final Sp.          | 26.0                       | -440.1                      | 0.0                          | 0.4             |
| Total                                    |                     | 9,464            |            |                         |                           |           | 13.83                  | 100.00             |                    |                      |                    | 7.8                        | 0                           |                              |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] A1-08 to L Pit Area 3

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 5130 B ME |                                    |
|---------------------------------------|-------------|-----------------------------|------------------------------------|
| Availability                          | %           | 85.00                       |                                    |
| Bucket Fill Factor                    |             | 0.93                        |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54                       |                                    |
| Average Payload                       | bcy         | 12.17                       |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                    | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                      | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                        |                                    |
| Production per Operating Hour         | bcy         | 1,248.00                    |                                    |
| Production per Loader Operating Shift | bcy         | 8,736                       | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,250,331                   | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 2.26                        |                                    |

| Truck                                 |            | [PRJ] Caterpillar 777 F |  |
|---------------------------------------|------------|-------------------------|--|
| Availability                          | %          | 100.00                  |  |
| Payload in Template                   | bcy        | 76.45                   |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                |  |
| Average Payload                       | bcy        | 75.23                   |  |
| Production per Operating Hour         | bcy        | 416.00                  |  |
| Production per Loader Operating Shift | bcy        | 2,912                   |  |
| Production per Year                   | bcy        | 1,750,110               |  |
| Queue Time at Loader                  | min/ Cycle | 0.95                    |  |
| Spot Time at loader                   | min/ Cycle | 0.40                    |  |
| Average Loading Time                  | min/ Cycle | 2.59                    |  |
| Travel Time                           | min/ Cycle | 5.61                    |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                    |  |
| Average Dump Time                     | min/ Cycle | 0.20                    |  |
| Average Cycle Time                    | min/ Cycle | 10.05                   |  |
| Fleet Size                            |            | 3                       |  |
| Average No. of Bucket Passes          |            | 6.18                    |  |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 5,250,331 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 87,523.00 |                                                                             |
| Time to move Excavation Target | Days       | 6.09      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 70        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 210       |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.



# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] A1-08 to L Pit Area 3  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.95                   | 9.43               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.98               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 25.78              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 3185             | 7.4        | 3.0                     | 0.0                       | Full      | 3.99                   | 39.69              | 9.6                | 0.0                  | Final Sp.          | 9.1                        | 235.7                       | 0.0                         | 92.4            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.98               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 2.00               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 3185             | -7.4       | 3.0                     | 0.0                       | Empty     | 1.62                   | 16.14              | 39.6               | 0.0                  | Final Sp.          | 22.3                       | -235.7                      | 0.0                         | 0.5             |
| Total                                    |                     | 6,370            |            |                         |                           |           | 10.05                  | 100.00             |                    |                      |                    | 7.2                        | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] A91-8 to I/J Pit Spoil Dump**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 5130 B ME</b> |                                    |
|---------------------------------------|-------------|------------------------------------|------------------------------------|
| Availability                          | %           | 85.00                              |                                    |
| Bucket Fill Factor                    |             | 0.93                               |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.53                              |                                    |
| Average Payload                       | bcy         | 12.17                              |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                           | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                             | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                               |                                    |
| Production per Operating Hour         | bcy         | 1,301.14                           |                                    |
| Production per Loader Operating Shift | bcy         | 9,108                              | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,473,908                          | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 0.19                               |                                    |

| <b>Truck</b>                          |            | <b>[PRJ] Caterpillar 777 F</b> |  |
|---------------------------------------|------------|--------------------------------|--|
| Availability                          | %          | 100.00                         |  |
| Payload in Template                   | bcy        | 76.45                          |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                       |  |
| Average Payload                       | bcy        | 75.26                          |  |
| Production per Operating Hour         | bcy        | 433.71                         |  |
| Production per Loader Operating Shift | bcy        | 3,036                          |  |
| Production per Year                   | bcy        | 1,824,636                      |  |
| Queue Time at Loader                  | min/ Cycle | 1.46                           |  |
| Spot Time at loader                   | min/ Cycle | 0.40                           |  |
| Average Loading Time                  | min/ Cycle | 2.59                           |  |
| Travel Time                           | min/ Cycle | 4.70                           |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                           |  |
| Average Dump Time                     | min/ Cycle | 0.20                           |  |
| Average Cycle Time                    | min/ Cycle | 9.65                           |  |
| Fleet Size                            |            | 3                              |  |
| Average No. of Bucket Passes          |            | 6.19                           |  |

| <b>Haulage System</b>          |            |           |                                                                                    |
|--------------------------------|------------|-----------|------------------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 5,473,908 |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                                    |
| Excavation Target              | bcy        | 42,431.00 |                                                                                    |
| Time to move Excavation Target | Days       | 2.83      |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 33        |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 98        |                                                                                    |
| Total cost to move Target      | \$         | 0         |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Haulage System: Haulage System-1              |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                          |                            |                             |                             |                 |
|-----------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Material: [PRJ] Topsoil                       |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                          |                            |                             |                             |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts      |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                          |                            |                             |                             |                 |
| Haul Cycle: [PRJ] A91-8 to I/J Pit Spoil Dump |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                          |                            |                             |                             |                 |
| Type                                          | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit<br>mph | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                       |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                          |                            |                             |                             |                 |
| Queue                                         | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.46                   | 15.13              |                    |                      |                          |                            |                             | 0.0                         |                 |
| Spot                                          | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 4.14               |                    |                      |                          |                            |                             | 0.0                         |                 |
| Load                                          | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 26.87              |                    |                      |                          |                            |                             | 0.0                         |                 |
| 1                                             | Haul Segment        | 4387             | -4.7       | 3.0                     | 0.0                       | Full      | 2.14                   | 22.21              | 39.6               | 0.0                  | Final Sp.                | 23.3                       | -206.2                      | 0.0                         | 17.5            |
| Spot                                          | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 3.11               |                    |                      |                          |                            |                             | 0.0                         |                 |
| Dump                                          | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 2.07               |                    |                      |                          |                            |                             | 0.0                         |                 |
| 1                                             | Haul Segment (rev.) | 4387             | 4.7        | 3.0                     | 0.0                       | Empty     | 2.56                   | 26.47              | 24.0               | 0.0                  | Final Sp.                | 19.5                       | 206.2                       | 0.0                         | 78.3            |
| Total                                         |                     | 8,774            |            |                         |                           |           | 9.65                   | 100.00             |                    |                      |                          | 10.3                       | 0                           |                             |                 |

# Productivity

| Production Summary - Full Simulation                                                                  |             |                                          |                                                                             |  |
|-------------------------------------------------------------------------------------------------------|-------------|------------------------------------------|-----------------------------------------------------------------------------|--|
| Haulage System: Haulage System-1                                                                      |             | Haul Cycle: [PRJ] A91-8 to J Pit         |                                                                             |  |
| Material: [PRJ] Topsoil                                                                               |             | Roster: [PRJ] 5 day Week - 8 Hour Shifts |                                                                             |  |
| <b>Loader</b>                                                                                         |             | <b>[PRJ] Caterpillar 5130 B ME</b>       |                                                                             |  |
| Availability                                                                                          | %           | 85.00                                    |                                                                             |  |
| Bucket Fill Factor                                                                                    |             | 0.93                                     |                                                                             |  |
| Average Bucket Load Volume                                                                            | cu.yards    | 12.54                                    |                                                                             |  |
| Average Payload                                                                                       | bcy         | 12.17                                    |                                                                             |  |
| Operating Hours per Year                                                                              | OpHr/Year   | 4,207.00                                 | Op. hrs factored by availability                                            |  |
| Average Operating Shifts per Year                                                                     | shifts/Year | 601.00                                   | Shifts factored by availability                                             |  |
| Average Bucket Cycle Time                                                                             | min         | 0.50                                     |                                                                             |  |
| Production per Operating Hour                                                                         | bcy         | 1,162.96                                 |                                                                             |  |
| Production per Loader Operating Shift                                                                 | bcy         | 8,141                                    | Max. prod. based on 100% avail.                                             |  |
| Production per Year                                                                                   | bcy         | 4,892,571                                | Avg. production factored by avail.                                          |  |
| Wait Time per Operating Hour                                                                          | min         | 5.64                                     |                                                                             |  |
| <b>Truck</b>                                                                                          |             | <b>[PRJ] Caterpillar 777 F</b>           |                                                                             |  |
| Availability                                                                                          | %           | 100.00                                   |                                                                             |  |
| Payload in Template                                                                                   | bcy         | 76.45                                    |                                                                             |  |
| Operating Hours per Year                                                                              | OpHr/Year   | 4,207.00                                 |                                                                             |  |
| Average Payload                                                                                       | bcy         | 75.22                                    |                                                                             |  |
| Production per Operating Hour                                                                         | bcy         | 387.65                                   |                                                                             |  |
| Production per Loader Operating Shift                                                                 | bcy         | 2,714                                    |                                                                             |  |
| Production per Year                                                                                   | bcy         | 1,630,857                                |                                                                             |  |
| Queue Time at Loader                                                                                  | min/ Cycle  | 0.79                                     |                                                                             |  |
| Spot Time at loader                                                                                   | min/ Cycle  | 0.40                                     |                                                                             |  |
| Average Loading Time                                                                                  | min/ Cycle  | 2.59                                     |                                                                             |  |
| Travel Time                                                                                           | min/ Cycle  | 6.48                                     |                                                                             |  |
| Spot Time at Dump                                                                                     | min/ Cycle  | 0.30                                     |                                                                             |  |
| Average Dump Time                                                                                     | min/ Cycle  | 0.20                                     |                                                                             |  |
| Average Cycle Time                                                                                    | min/ Cycle  | 10.76                                    |                                                                             |  |
| Fleet Size                                                                                            |             | 3                                        |                                                                             |  |
| Average No. of Bucket Passes                                                                          |             | 6.18                                     |                                                                             |  |
| <b>Haulage System</b>                                                                                 |             |                                          |                                                                             |  |
| Production per Year                                                                                   | bcy/Year    | 4,892,571                                |                                                                             |  |
| Discounted Capital Cost                                                                               | \$/bcy      | 0.00                                     | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |  |
| Discounted Operating Cost                                                                             | \$/bcy      | 0.00                                     |                                                                             |  |
| Discounted Average Cost                                                                               | \$/bcy      | 0.00                                     |                                                                             |  |
| Excavation Target                                                                                     | bcy         | 24,728.00                                |                                                                             |  |
| Time to move Excavation Target                                                                        | Days        | 1.85                                     |                                                                             |  |
| Loader Hrs to move Target                                                                             | Op. Hours.  | 21                                       |                                                                             |  |
| Total Truck Hrs to move Target                                                                        | Op. Hours.  | 64                                       |                                                                             |  |
| Total cost to move Target                                                                             | \$          | 0                                        |                                                                             |  |
| Productivity estimates allow for insufficient time at the end of the shift to complete another cycle. |             |                                          |                                                                             |  |
| Time for the first bucket pass coincides with the truck queuing and maneuvering times.                |             |                                          |                                                                             |  |
| This simulation is based on data provided by the equipment manufacturer.                              |             |                                          |                                                                             |  |
| Equipment data should be checked to ensure it is valid for this site.                                 |             |                                          |                                                                             |  |

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                              |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|---------------------------|----------------------------|-----------------------------|------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                              |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                              |                 |
| Haul Cycle: [PRJ] A91-8 to J Pit         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                              |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit.<br>mph | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$-gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                              |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.79                   | 7.35               |                    |                      |                           |                            |                             | 0.0                          |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.72               |                    |                      |                           |                            |                             | 0.0                          |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 24.07              |                    |                      |                           |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment        | 7749             | -2.6       | 3.0                     | 0.0                       | Full      | 3.11                   | 28.91              | 40.4               | 0.0                  | Final Sp.                 | 28.3                       | -201.5                      | 0.0                          | 34.2            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.79               |                    |                      |                           |                            |                             | 0.0                          |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.86               |                    |                      |                           |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment (rev.) | 7749             | 2.6        | 3.0                     | 0.0                       | Empty     | 3.37                   | 31.32              | 33.0               | 0.0                  | Final Sp.                 | 26.1                       | 201.5                       | 0.0                          | 77.9            |
| Total                                    |                     | 15,498           |            |                         |                           |           | 10.76                  | 100.00             |                    |                      |                           | 16.4                       | 0                           |                              |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] A92-1 to N Pit Area 3

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 5130 B ME |                                    |
|---------------------------------------|-------------|-----------------------------|------------------------------------|
| Availability                          | %           | 85.00                       |                                    |
| Bucket Fill Factor                    |             | 0.93                        |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.53                       |                                    |
| Average Payload                       | bcy         | 12.17                       |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                    | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                      | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                        |                                    |
| Production per Operating Hour         | bcy         | 1,165.56                    |                                    |
| Production per Loader Operating Shift | bcy         | 8,159                       | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 4,903,509                   | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 5.52                        |                                    |

| Truck                                 |            | [PRJ] Caterpillar 777 F |  |
|---------------------------------------|------------|-------------------------|--|
| Availability                          | %          | 100.00                  |  |
| Payload in Template                   | bcy        | 76.45                   |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                |  |
| Average Payload                       | bcy        | 75.26                   |  |
| Production per Operating Hour         | bcy        | 388.52                  |  |
| Production per Loader Operating Shift | bcy        | 2,720                   |  |
| Production per Year                   | bcy        | 1,634,503               |  |
| Queue Time at Loader                  | min/ Cycle | 0.79                    |  |
| Spot Time at loader                   | min/ Cycle | 0.40                    |  |
| Average Loading Time                  | min/ Cycle | 2.59                    |  |
| Travel Time                           | min/ Cycle | 6.46                    |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                    |  |
| Average Dump Time                     | min/ Cycle | 0.20                    |  |
| Average Cycle Time                    | min/ Cycle | 10.74                   |  |
| Fleet Size                            |            | 3                       |  |
| Average No. of Bucket Passes          |            | 6.19                    |  |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 4,903,509 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 13,347.00 |                                                                             |
| Time to move Excavation Target | Days       | 0.99      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 11        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 34        |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haul Cycle: [PRJ] A92-1 to N Pit Area 3  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$./gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.79                   | 7.33               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.73               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 24.15              |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment        | 4120             | 6.1        | 3.0                     | 0.0                       | Full      | 4.57                   | 42.53              | 10.8               | 0.0                  | Final Sp.          | 10.3                       | 251.3                       | 0.0                           | 92.5            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.79               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.86               |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment (rev.) | 4120             | -6.1       | 3.0                     | 0.0                       | Empty     | 1.89                   | 17.60              | 39.6               | 0.0                  | Final Sp.          | 24.8                       | -251.3                      | 0.0                           | 5.0             |
| Total                                    |                     | 8,240            |            |                         |                           |           | 10.74                  | 100.00             |                    |                      |                    | 8.7                        | 0                           |                               |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] A92-4 to Middle Pyeatt

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 5130 B ME |                                    |
|---------------------------------------|-------------|-----------------------------|------------------------------------|
| Availability                          | %           | 85.00                       |                                    |
| Bucket Fill Factor                    |             | 0.93                        |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54                       |                                    |
| Average Payload                       | bcy         | 12.17                       |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                    | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                      | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                        |                                    |
| Production per Operating Hour         | bcy         | 1,143.08                    |                                    |
| Production per Loader Operating Shift | bcy         | 8,002                       | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 4,808,925                   | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 6.09                        |                                    |

| Truck                                 |            | [PRJ] Caterpillar 777 F |  |
|---------------------------------------|------------|-------------------------|--|
| Availability                          | %          | 100.00                  |  |
| Payload in Template                   | bcy        | 76.45                   |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                |  |
| Average Payload                       | bcy        | 75.23                   |  |
| Production per Operating Hour         | bcy        | 285.77                  |  |
| Production per Loader Operating Shift | bcy        | 2,000                   |  |
| Production per Year                   | bcy        | 1,202,231               |  |
| Queue Time at Loader                  | min/ Cycle | 1.27                    |  |
| Spot Time at loader                   | min/ Cycle | 0.40                    |  |
| Average Loading Time                  | min/ Cycle | 2.59                    |  |
| Travel Time                           | min/ Cycle | 9.78                    |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                    |  |
| Average Dump Time                     | min/ Cycle | 0.20                    |  |
| Average Cycle Time                    | min/ Cycle | 14.55                   |  |
| Fleet Size                            |            | 4                       |  |
| Average No. of Bucket Passes          |            | 6.18                    |  |

| Haulage System                 |            |            |                                                                             |
|--------------------------------|------------|------------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 4,808,925  |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                             |
| Excavation Target              | bcy        | 115,215.00 |                                                                             |
| Time to move Excavation Target | Days       | 8.75       |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 101        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 403        |                                                                             |
| Total cost to move Target      | \$         | 0          |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.



## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] A92-4 to Middle Pyeatt |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>5-gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.27                   | 8.75               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 2.75               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 17.81              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 5147             | 9.6        | 3.0                     | 0.0                       | Full      | 7.60                   | 52.23              | 7.9                | 0.0                  | Final Sp.         | 7.7                        | 494.1                       | 0.0                         | 96.8            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.06               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.38               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 5147             | -9.6       | 3.0                     | 0.0                       | Empty     | 2.18                   | 15.02              | 39.6               | 0.0                  | Final Sp.         | 26.8                       | -494.1                      | 0.0                         | 0.4             |
| Total                                    |                     | 10,294           |            |                         |                           |           | 14.55                  | 100.00             |                    |                      |                   | 8.0                        | 0                           |                             |                 |

### Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] A92-4 to N Pit Area 3\_4169

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 5130 B ME |                                    |
|---------------------------------------|-------------|-----------------------------|------------------------------------|
| Availability                          | %           | 85.00                       |                                    |
| Bucket Fill Factor                    |             | 0.93                        |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54                       |                                    |
| Average Payload                       | bcy         | 12.17                       |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                    | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                      | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                        |                                    |
| Production per Operating Hour         | bcy         | 1,272.43                    |                                    |
| Production per Loader Operating Shift | bcy         | 8,907                       | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,353,126                   | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 1.02                        |                                    |

| Truck                                 |            | [PRJ] Caterpillar 777 F |  |
|---------------------------------------|------------|-------------------------|--|
| Availability                          | %          | 100.00                  |  |
| Payload in Template                   | bcy        | 76.45                   |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                |  |
| Average Payload                       | bcy        | 75.23                   |  |
| Production per Operating Hour         | bcy        | 318.11                  |  |
| Production per Loader Operating Shift | bcy        | 2,227                   |  |
| Production per Year                   | bcy        | 1,338,281               |  |
| Queue Time at Loader                  | min/ Cycle | 1.79                    |  |
| Spot Time at loader                   | min/ Cycle | 0.40                    |  |
| Average Loading Time                  | min/ Cycle | 2.59                    |  |
| Travel Time                           | min/ Cycle | 7.92                    |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                    |  |
| Average Dump Time                     | min/ Cycle | 0.20                    |  |
| Average Cycle Time                    | min/ Cycle | 13.21                   |  |
| Fleet Size                            |            | 4                       |  |
| Average No. of Bucket Passes          |            | 6.18                    |  |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 5,353,126 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 38,155.00 |                                                                             |
| Time to move Excavation Target | Days       | 2.60      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 30        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 120       |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                      |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
|----------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts     |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haulage System: Haulage System-1             |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haul Cycle: [PRJ] A92-4 to N Pit Area 3 4169 |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Type                                         | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$-gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                      |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Queue                                        | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.79                   | 13.57              |                    |                      |                    |                            |                             | 0.0                          |                 |
| Spot                                         | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.03               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Load                                         | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 19.62              |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                            | Haul Segment        | 4169             | 8.3        | 3.0                     | 0.0                       | Full      | 6.02                   | 45.58              | 8.1                | 0.0                  | Final Sp.          | 7.9                        | 346.0                       | 0.0                          | 95.7            |
| Spot                                         | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.27               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Dump                                         | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.52               |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                            | Haul Segment (rev.) | 4169             | -8.3       | 3.0                     | 0.0                       | Empty     | 1.90                   | 14.42              | 39.6               | 0.0                  | Final Sp.          | 24.9                       | -346.0                      | 0.0                          | 0.4             |
| Total                                        |                     | 8,338            |            |                         |                           |           | 13.21                  | 100.00             |                    |                      |                    | 7.2                        | 0                           |                              |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] A93-1 to Area 4

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 5130 B ME

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.93      |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.53     |                                    |
| Average Payload                       | bcy         | 12.17     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Production per Operating Hour         | bcy         | 1,144.74  |                                    |
| Production per Loader Operating Shift | bcy         | 8,013     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 4,815,902 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 6.39      |                                    |

### Truck

[PRJ] Caterpillar 777 F

|                                       |            |           |  |
|---------------------------------------|------------|-----------|--|
| Availability                          | %          | 100.00    |  |
| Payload in Template                   | bcy        | 76.45     |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |  |
| Average Payload                       | bcy        | 75.24     |  |
| Production per Operating Hour         | bcy        | 381.58    |  |
| Production per Loader Operating Shift | bcy        | 2,671     |  |
| Production per Year                   | bcy        | 1,605,301 |  |
| Queue Time at Loader                  | min/ Cycle | 0.77      |  |
| Spot Time at loader                   | min/ Cycle | 0.40      |  |
| Average Loading Time                  | min/ Cycle | 2.59      |  |
| Travel Time                           | min/ Cycle | 6.69      |  |
| Spot Time at Dump                     | min/ Cycle | 0.30      |  |
| Average Dump Time                     | min/ Cycle | 0.20      |  |
| Average Cycle Time                    | min/ Cycle | 10.95     |  |
| Fleet Size                            |            | 3         |  |
| Average No. of Bucket Passes          |            | 6.18      |  |

### Haulage System

|                                |            |            |                        |
|--------------------------------|------------|------------|------------------------|
| Production per Year            | bcy/Year   | 4,815,902  |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck             |
| Excavation Target              | bcy        | 101,319.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 7.68       |                        |
| Loader Hrs to move Target      | Op. Hours. | 89         |                        |
| Total Truck Hrs to move Target | Op. Hours. | 266        |                        |
| Total cost to move Target      | \$         | 0          |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] A93-1 to Area 4        |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/Ophr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.77                   | 7.02               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.65               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 23.67              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 7952             | -2.8       | 3.0                     | 0.0                       | Full      | 3.16                   | 28.87              | 40.4               | 0.0                  | Final Sp.          | 28.6                       | -222.7                      | 0.0                         | 27.6            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.74               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.83               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 7952             | 2.8        | 3.0                     | 0.0                       | Empty     | 3.53                   | 32.22              | 31.6               | 0.0                  | Final Sp.          | 25.6                       | 222.7                       | 0.0                         | 79.7            |
| Total                                    |                     | 15,904           |            |                         |                           |           | 10.95                  | 100.00             |                    |                      |                    | 16.5                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] A93-1 to Area 5 (below 6700)

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 5130 B ME |                                    |
|---------------------------------------|-------------|-----------------------------|------------------------------------|
| Availability                          | %           | 85.00                       |                                    |
| Bucket Fill Factor                    |             | 0.93                        |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54                       |                                    |
| Average Payload                       | bcy         | 12.17                       |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                    | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                      | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                        |                                    |
| Production per Operating Hour         | bcy         | 1,266.00                    |                                    |
| Production per Loader Operating Shift | bcy         | 8,862                       | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,326,078                   | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 1.24                        |                                    |

| Truck                                 |            | [PRJ] Caterpillar 777 F |  |
|---------------------------------------|------------|-------------------------|--|
| Availability                          | %          | 100.00                  |  |
| Payload in Template                   | bcy        | 76.45                   |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                |  |
| Average Payload                       | bcy        | 75.23                   |  |
| Production per Operating Hour         | bcy        | 316.50                  |  |
| Production per Loader Operating Shift | bcy        | 2,216                   |  |
| Production per Year                   | bcy        | 1,331,520               |  |
| Queue Time at Loader                  | min/ Cycle | 1.73                    |  |
| Spot Time at loader                   | min/ Cycle | 0.40                    |  |
| Average Loading Time                  | min/ Cycle | 2.59                    |  |
| Travel Time                           | min/ Cycle | 7.96                    |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                    |  |
| Average Dump Time                     | min/ Cycle | 0.20                    |  |
| Average Cycle Time                    | min/ Cycle | 13.18                   |  |
| Fleet Size                            |            | 4                       |  |
| Average No. of Bucket Passes          |            | 6.18                    |  |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 5,326,078 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 25,330.00 |                                                                             |
| Time to move Excavation Target | Days       | 1.74      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 20        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 80        |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                        |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts       |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haulage System: Haulage System-1               |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] A93-1 to Area 5 (below 6700) |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                           | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                        |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                          | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.73                   | 13.12              |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                           | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.04               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                           | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 19.67              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                              | Haul Segment        | 8920             | -4.3       | 3.0                     | 0.0                       | Full      | 3.44                   | 26.14              | 39.6               | 0.0                  | Final Sp.         | 29.4                       | -383.6                      | 0.0                         | 12.5            |
| Spot                                           | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.28               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                           | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.52               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                              | Haul Segment (rev.) | 8920             | 4.3        | 3.0                     | 0.0                       | Empty     | 4.51                   | 34.24              | 25.2               | 0.0                  | Final Sp.         | 22.5                       | 383.6                       | 0.0                         | 87.1            |
| Total                                          |                     | 17,840           |            |                         |                           |           | 13.18                  | 100.00             |                    |                      |                   | 15.4                       | 0                           |                             |                 |

# Productivity

| Production Summary - Full Simulation                                                                  |             |                                          |                                                                             |  |
|-------------------------------------------------------------------------------------------------------|-------------|------------------------------------------|-----------------------------------------------------------------------------|--|
| Haulage System: Haulage System-1                                                                      |             | Haul Cycle: [PRJ] A92-4 to N Pit Area 3  |                                                                             |  |
| Material: [PRJ] Topsoil                                                                               |             | Roster: [PRJ] 5 day Week - 8 Hour Shifts |                                                                             |  |
| <b>Loader</b>                                                                                         |             | <b>[PRJ] Caterpillar 5130 B ME</b>       |                                                                             |  |
| Availability                                                                                          | %           | 85.00                                    |                                                                             |  |
| Bucket Fill Factor                                                                                    |             | 0.93                                     |                                                                             |  |
| Average Bucket Load Volume                                                                            | cu.yards    | 12.53                                    |                                                                             |  |
| Average Payload                                                                                       | bcy         | 12.17                                    |                                                                             |  |
| Operating Hours per Year                                                                              | OpHr/Year   | 4,207.00                                 | Op. hrs factored by availability                                            |  |
| Average Operating Shifts per Year                                                                     | shifts/Year | 601.00                                   | Shifts factored by availability                                             |  |
| Average Bucket Cycle Time                                                                             | min         | 0.50                                     |                                                                             |  |
| Production per Operating Hour                                                                         | bcy         | 1,176.74                                 |                                                                             |  |
| Production per Loader Operating Shift                                                                 | bcy         | 8,237                                    | Max. prod. based on 100% avail.                                             |  |
| Production per Year                                                                                   | bcy         | 4,950,561                                | Avg. production factored by avail.                                          |  |
| Wait Time per Operating Hour                                                                          | min         | 5.10                                     |                                                                             |  |
| <b>Truck</b>                                                                                          |             | <b>[PRJ] Caterpillar 777 F</b>           |                                                                             |  |
| Availability                                                                                          | %           | 100.00                                   |                                                                             |  |
| Payload in Template                                                                                   | bcy         | 76.45                                    |                                                                             |  |
| Operating Hours per Year                                                                              | OpHr/Year   | 4,207.00                                 |                                                                             |  |
| Average Payload                                                                                       | bcy         | 75.22                                    |                                                                             |  |
| Production per Operating Hour                                                                         | bcy         | 392.25                                   |                                                                             |  |
| Production per Loader Operating Shift                                                                 | bcy         | 2,746                                    |                                                                             |  |
| Production per Year                                                                                   | bcy         | 1,650,187                                |                                                                             |  |
| Queue Time at Loader                                                                                  | min/ Cycle  | 0.80                                     |                                                                             |  |
| Spot Time at loader                                                                                   | min/ Cycle  | 0.40                                     |                                                                             |  |
| Average Loading Time                                                                                  | min/ Cycle  | 2.59                                     |                                                                             |  |
| Travel Time                                                                                           | min/ Cycle  | 6.34                                     |                                                                             |  |
| Spot Time at Dump                                                                                     | min/ Cycle  | 0.30                                     |                                                                             |  |
| Average Dump Time                                                                                     | min/ Cycle  | 0.20                                     |                                                                             |  |
| Average Cycle Time                                                                                    | min/ Cycle  | 10.63                                    |                                                                             |  |
| Fleet Size                                                                                            |             | 3                                        |                                                                             |  |
| Average No. of Bucket Passes                                                                          |             | 6.18                                     |                                                                             |  |
| <b>Haulage System</b>                                                                                 |             |                                          |                                                                             |  |
| Production per Year                                                                                   | bcy/Year    | 4,950,561                                |                                                                             |  |
| Discounted Capital Cost                                                                               | \$/bcy      | 0.00                                     | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |  |
| Discounted Operating Cost                                                                             | \$/bcy      | 0.00                                     |                                                                             |  |
| Discounted Average Cost                                                                               | \$/bcy      | 0.00                                     |                                                                             |  |
| Excavation Target                                                                                     | bcy         | 18,602.00                                |                                                                             |  |
| Time to move Excavation Target                                                                        | Days        | 1.37                                     |                                                                             |  |
| Loader Hrs to move Target                                                                             | Op. Hours.  | 16                                       |                                                                             |  |
| Total Truck Hrs to move Target                                                                        | Op. Hours.  | 47                                       |                                                                             |  |
| Total cost to move Target                                                                             | \$          | 0                                        |                                                                             |  |
| Productivity estimates allow for insufficient time at the end of the shift to complete another cycle. |             |                                          |                                                                             |  |
| Time for the first bucket pass coincides with the truck queuing and maneuvering times.                |             |                                          |                                                                             |  |
| This simulation is based on data provided by the equipment manufacturer.                              |             |                                          |                                                                             |  |
| Equipment data should be checked to ensure it is valid for this site.                                 |             |                                          |                                                                             |  |



# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |             |              |
|------------------------------------------|---------------------|----------|-------|-----------------|-------------|-------|--------------|------------|----------|------------|-----------------|------------------|------------------|-------------|--------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |             |              |
| Haulage System: Haulage System-1         |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |             |              |
| Haul Cycle: [PRJ] A92-4 to N Pit Area 3  |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |             |              |
| Type                                     | Segment Title       | Distance | Grade | Rolling Resist. | Curve Angle | Load  | Segment Time | Cycle Time | Max Vel. | Final Vel. | Velocity Limit. | Average Velocity | Elevation Change | Fuel Usage  | % Duty Cycle |
|                                          |                     | feet     | %     | %               | degrees     | %     | min          | %          | mph      | mph        |                 | mph              | feet             | \$ gal/OpHr | %            |
| [PRJ] Caterpillar 777 F                  |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |             |              |
| Queue                                    | Queue at Loader     | Auto     | Mins  |                 |             |       | 0.80         | 7.56       |          |            |                 |                  |                  | 0.0         |              |
| Spot                                     | Spot Time at loader | Auto     | Mins  |                 |             |       | 0.40         | 3.76       |          |            |                 |                  |                  | 0.0         |              |
| Load                                     | Loading             | Auto     | Mins  |                 |             |       | 2.59         | 24.38      |          |            |                 |                  |                  | 0.0         |              |
| 1                                        | Haul Segment        | 3167     | 9.5   | 3.0             | 0.0         | Full  | 4.72         | 44.39      | 7.9      | 0.0        | Final Sp.       | 7.6              | 300.9            | 0.0         | 94.7         |
| Spot                                     | Spot Time at Dump   | Auto     | Mins  |                 |             |       | 0.30         | 2.82       |          |            |                 |                  |                  | 0.0         |              |
| Dump                                     | Dumping             | Auto     | Mins  |                 |             |       | 0.20         | 1.89       |          |            |                 |                  |                  | 0.0         |              |
| 1                                        | Haul Segment (rev.) | 3167     | -9.5  | 3.0             | 0.0         | Empty | 1.62         | 15.21      | 39.6     | 0.0        | Final Sp.       | 22.3             | -300.9           | 0.0         | 0.5          |
| Total                                    |                     | 6,334    |       |                 |             |       | 10.63        | 100.00     |          |            |                 | 6.8              | 0                |             |              |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] A94-2 to L Pit Area 6

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 5130 B ME |                                    |
|---------------------------------------|-------------|-----------------------------|------------------------------------|
| Availability                          | %           | 85.00                       |                                    |
| Bucket Fill Factor                    |             | 0.93                        |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54                       |                                    |
| Average Payload                       | bcy         | 12.17                       |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                    | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                      | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                        |                                    |
| Production per Operating Hour         | bcy         | 1,166.14                    |                                    |
| Production per Loader Operating Shift | bcy         | 8,163                       | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 4,905,947                   | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 4.76                        |                                    |

| Truck                                 |            | [PRJ] Caterpillar 777 F |  |
|---------------------------------------|------------|-------------------------|--|
| Availability                          | %          | 100.00                  |  |
| Payload in Template                   | bcy        | 76.45                   |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                |  |
| Average Payload                       | bcy        | 75.24                   |  |
| Production per Operating Hour         | bcy        | 233.23                  |  |
| Production per Loader Operating Shift | bcy        | 1,633                   |  |
| Production per Year                   | bcy        | 981,189                 |  |
| Queue Time at Loader                  | min/ Cycle | 1.76                    |  |
| Spot Time at loader                   | min/ Cycle | 0.40                    |  |
| Average Loading Time                  | min/ Cycle | 2.59                    |  |
| Travel Time                           | min/ Cycle | 12.53                   |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                    |  |
| Average Dump Time                     | min/ Cycle | 0.20                    |  |
| Average Cycle Time                    | min/ Cycle | 17.79                   |  |
| Fleet Size                            |            | 5                       |  |
| Average No. of Bucket Passes          |            | 6.18                    |  |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 4,905,947 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 74,977.00 |                                                                             |
| Time to move Excavation Target | Days       | 5.58      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 64        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 321       |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] A94-2 to L Pit Area 6  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S-gal/Ophr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.76                   | 9.90               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 2.25               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 14.57              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 10873            | 3.5        | 3.0                     | 0.0                       | Full      | 8.71                   | 48.94              | 14.8               | 0.0                  | Final Sp.         | 14.2                       | 380.6                       | 0.0                         | 94.7            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 1.69               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.13               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 10873            | -3.5       | 3.0                     | 0.0                       | Empty     | 3.83                   | 21.52              | 39.6               | 0.0                  | Final Sp.         | 32.3                       | -380.6                      | 0.0                         | 8.0             |
| Total                                    |                     | 21,746           |            |                         |                           |           | 17.79                  | 100.00             |                    |                      |                   | 13.9                       | 0                           |                             |                 |

# Productivity

| Production Summary - Full Simulation                                                                  |             |                                          |                                                                             |  |
|-------------------------------------------------------------------------------------------------------|-------------|------------------------------------------|-----------------------------------------------------------------------------|--|
| Haulage System: Haulage System-1                                                                      |             | Haul Cycle: [PRJ] A94-2 to N Pit Area 1  |                                                                             |  |
| Material: [PRJ] Topsoil                                                                               |             | Roster: [PRJ] 5 day Week - 8 Hour Shifts |                                                                             |  |
| <b>Loader</b>                                                                                         |             | <b>[PRJ] Caterpillar 5130 B ME</b>       |                                                                             |  |
| Availability                                                                                          | %           | 85.00                                    |                                                                             |  |
| Bucket Fill Factor                                                                                    |             | 0.93                                     |                                                                             |  |
| Average Bucket Load Volume                                                                            | cu.yards    | 12.54                                    |                                                                             |  |
| Average Payload                                                                                       | bcy         | 12.17                                    |                                                                             |  |
| Operating Hours per Year                                                                              | OpHr/Year   | 4,207.00                                 | Op. hrs factored by availability                                            |  |
| Average Operating Shifts per Year                                                                     | shifts/Year | 601.00                                   | Shifts factored by availability                                             |  |
| Average Bucket Cycle Time                                                                             | min         | 0.50                                     |                                                                             |  |
| Production per Operating Hour                                                                         | bcy         | 1,189.66                                 |                                                                             |  |
| Production per Loader Operating Shift                                                                 | bcy         | 8,328                                    | Max. prod. based on 100% avail.                                             |  |
| Production per Year                                                                                   | bcy         | 5,004,898                                | Avg. production factored by avail.                                          |  |
| Wait Time per Operating Hour                                                                          | min         | 4.60                                     |                                                                             |  |
| <b>Truck</b>                                                                                          |             | <b>[PRJ] Caterpillar 777 F</b>           |                                                                             |  |
| Availability                                                                                          | %           | 100.00                                   |                                                                             |  |
| Payload in Template                                                                                   | bcy         | 76.45                                    |                                                                             |  |
| Operating Hours per Year                                                                              | OpHr/Year   | 4,207.00                                 |                                                                             |  |
| Average Payload                                                                                       | bcy         | 75.24                                    |                                                                             |  |
| Production per Operating Hour                                                                         | bcy         | 396.55                                   |                                                                             |  |
| Production per Loader Operating Shift                                                                 | bcy         | 2,776                                    |                                                                             |  |
| Production per Year                                                                                   | bcy         | 1,668,299                                |                                                                             |  |
| Queue Time at Loader                                                                                  | min/ Cycle  | 0.82                                     |                                                                             |  |
| Spot Time at loader                                                                                   | min/ Cycle  | 0.40                                     |                                                                             |  |
| Average Loading Time                                                                                  | min/ Cycle  | 2.59                                     |                                                                             |  |
| Travel Time                                                                                           | min/ Cycle  | 6.22                                     |                                                                             |  |
| Spot Time at Dump                                                                                     | min/ Cycle  | 0.30                                     |                                                                             |  |
| Average Dump Time                                                                                     | min/ Cycle  | 0.20                                     |                                                                             |  |
| Average Cycle Time                                                                                    | min/ Cycle  | 10.53                                    |                                                                             |  |
| Fleet Size                                                                                            |             | 3                                        |                                                                             |  |
| Average No. of Bucket Passes                                                                          |             | 6.18                                     |                                                                             |  |
| <b>Haulage System</b>                                                                                 |             |                                          |                                                                             |  |
| Production per Year                                                                                   | bcy/Year    | 5,004,898                                | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |  |
| Discounted Capital Cost                                                                               | \$/bcy      | 0.00                                     |                                                                             |  |
| Discounted Operating Cost                                                                             | \$/bcy      | 0.00                                     |                                                                             |  |
| Discounted Average Cost                                                                               | \$/bcy      | 0.00                                     |                                                                             |  |
| Excavation Target                                                                                     | bcy         | 45,629.00                                |                                                                             |  |
| Time to move Excavation Target                                                                        | Days        | 3.33                                     |                                                                             |  |
| Loader Hrs to move Target                                                                             | Op. Hours.  | 38                                       |                                                                             |  |
| Total Truck Hrs to move Target                                                                        | Op. Hours.  | 115                                      |                                                                             |  |
| Total cost to move Target                                                                             | \$          | 0                                        |                                                                             |  |
| Productivity estimates allow for insufficient time at the end of the shift to complete another cycle. |             |                                          |                                                                             |  |
| Time for the first bucket pass coincides with the truck queuing and maneuvering times.                |             |                                          |                                                                             |  |
| This simulation is based on data provided by the equipment manufacturer.                              |             |                                          |                                                                             |  |
| Equipment data should be checked to ensure it is valid for this site.                                 |             |                                          |                                                                             |  |

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-------------------------------|-----------------|
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haul Cycle: [PRJ] A94-2 to N Pit Area 1  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$./gal/OpHr | % Duty<br>Cycle |
|                                          |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.82                   | 7.75               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.80               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 24.61              |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment        | 4840             | 3.8        | 3.0                     | 0.0                       | Full      | 4.13                   | 39.18              | 14.6               | 0.0                  | Final Sp.          | 13.3                       | 183.9                       | 0.0                           | 88.9            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.85               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.90               |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment (rev.) | 4840             | -3.8       | 3.0                     | 0.0                       | Empty     | 2.10                   | 19.91              | 39.6               | 0.0                  | Final Sp.          | 26.2                       | -183.9                      | 0.0                           | 13.4            |
| Total                                    |                     | 9,680            |            |                         |                           |           | 10.53                  | 100.00             |                    |                      |                    | 10.4                       | 0                           |                               |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] A96-2 to L Pit Area 5**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 5130 B ME**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.93      |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54     |                                    |
| Average Payload                       | bcy         | 12.18     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Production per Operating Hour         | bcy         | 1,254.66  |                                    |
| Production per Loader Operating Shift | bcy         | 8,783     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,278,337 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 1.38      |                                    |

### Truck

**[PRJ] Caterpillar 777 F**

|                                       |            |           |  |
|---------------------------------------|------------|-----------|--|
| Availability                          | %          | 100.00    |  |
| Payload in Template                   | bcy        | 76.45     |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |  |
| Average Payload                       | bcy        | 75.23     |  |
| Production per Operating Hour         | bcy        | 250.93    |  |
| Production per Loader Operating Shift | bcy        | 1,757     |  |
| Production per Year                   | bcy        | 1,055,667 |  |
| Queue Time at Loader                  | min/ Cycle | 2.22      |  |
| Spot Time at loader                   | min/ Cycle | 0.40      |  |
| Average Loading Time                  | min/ Cycle | 2.59      |  |
| Travel Time                           | min/ Cycle | 10.85     |  |
| Spot Time at Dump                     | min/ Cycle | 0.30      |  |
| Average Dump Time                     | min/ Cycle | 0.20      |  |
| Average Cycle Time                    | min/ Cycle | 16.56     |  |
| Fleet Size                            |            | 5         |  |
| Average No. of Bucket Passes          |            | 6.18      |  |

### Haulage System

|                                |            |           |                            |
|--------------------------------|------------|-----------|----------------------------|
| Production per Year            | bcy/Year   | 5,278,337 |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck                 |
| Excavation Target              | bcy        | 23,419.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 1.62      |                            |
| Loader Hrs to move Target      | Op. Hours. | 19        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 93        |                            |
| Total cost to move Target      | \$         | 0         |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] A96-2 to L Pit Area 5  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S-gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 2.22                   | 13.42              |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 2.41               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 15.64              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 11486            | 1.7        | 3.0                     | 0.0                       | Full      | 6.89                   | 41.62              | 20.4               | 0.0                  | Final Sp.          | 18.9                       | 195.3                       | 0.0                         | 90.8            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 1.81               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.21               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 11486            | -1.7       | 3.0                     | 0.0                       | Empty     | 3.96                   | 23.89              | 40.4               | 0.0                  | Final Sp.          | 33.0                       | -195.3                      | 0.0                         | 43.5            |
| Total                                    |                     | 22,972           |            |                         |                           |           | 16.56                  | 100.00             |                    |                      |                    | 15.8                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] A96-2 to L Pit Area 6

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 5130 B ME

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.93      |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54     |                                    |
| Average Payload                       | bcy         | 12.17     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Production per Operating Hour         | bcy         | 1,177.42  |                                    |
| Production per Loader Operating Shift | bcy         | 8,242     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 4,953,416 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 4.74      |                                    |

### Truck

[PRJ] Caterpillar 777 F

|                                       |            |           |  |
|---------------------------------------|------------|-----------|--|
| Availability                          | %          | 100.00    |  |
| Payload in Template                   | bcy        | 76.45     |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |  |
| Average Payload                       | bcy        | 75.24     |  |
| Production per Operating Hour         | bcy        | 294.36    |  |
| Production per Loader Operating Shift | bcy        | 2,060     |  |
| Production per Year                   | bcy        | 1,238,354 |  |
| Queue Time at Loader                  | min/ Cycle | 1.32      |  |
| Spot Time at loader                   | min/ Cycle | 0.40      |  |
| Average Loading Time                  | min/ Cycle | 2.59      |  |
| Travel Time                           | min/ Cycle | 9.32      |  |
| Spot Time at Dump                     | min/ Cycle | 0.30      |  |
| Average Dump Time                     | min/ Cycle | 0.20      |  |
| Average Cycle Time                    | min/ Cycle | 14.13     |  |
| Fleet Size                            |            | 4         |  |
| Average No. of Bucket Passes          |            | 6.18      |  |

### Haulage System

|                                |            |           |                        |
|--------------------------------|------------|-----------|------------------------|
| Production per Year            | bcy/Year   | 4,953,416 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck             |
| Excavation Target              | bcy        | 2,797.00  | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 0.21      |                        |
| Loader Hrs to move Target      | Op. Hours. | 2         |                        |
| Total Truck Hrs to move Target | Op. Hours. | 10        |                        |
| Total cost to move Target      | \$         | 0         |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.



## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] A96-2 to L Pit Area 6  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.32                   | 9.35               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 2.83               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 18.34              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 9534             | 1.9        | 3.0                     | 0.0                       | Full      | 5.91                   | 41.82              | 20.0               | 0.0                  | Final Sp.         | 18.3                       | 181.1                       | 0.0                         | 89.5            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.12               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.42               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 9534             | -1.9       | 3.0                     | 0.0                       | Empty     | 3.41                   | 24.11              | 40.4               | 0.0                  | Final Sp.         | 31.8                       | -181.1                      | 0.0                         | 37.6            |
| Total                                    |                     |                  |            |                         |                           |           | 14.13                  | 100.00             |                    |                      |                   | 15.3                       | 0                           |                             |                 |

### Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] A97-2 to L Pit Area 6

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 5130 B ME |                                    |
|---------------------------------------|-------------|-----------------------------|------------------------------------|
| Availability                          | %           | 85.00                       |                                    |
| Bucket Fill Factor                    |             | 0.93                        |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.55                       |                                    |
| Average Payload                       | bcy         | 12.18                       |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                    | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                      | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                        |                                    |
| Production per Operating Hour         | bcy         | 1,280.69                    |                                    |
| Production per Loader Operating Shift | bcy         | 8,965                       | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,387,849                   | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 0.76                        |                                    |

| Truck                                 |            | [PRJ] Caterpillar 777 F |  |
|---------------------------------------|------------|-------------------------|--|
| Availability                          | %          | 100.00                  |  |
| Payload in Template                   | bcy        | 76.45                   |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                |  |
| Average Payload                       | bcy        | 75.23                   |  |
| Production per Operating Hour         | bcy        | 320.17                  |  |
| Production per Loader Operating Shift | bcy        | 2,241                   |  |
| Production per Year                   | bcy        | 1,346,962               |  |
| Queue Time at Loader                  | min/ Cycle | 1.89                    |  |
| Spot Time at loader                   | min/ Cycle | 0.40                    |  |
| Average Loading Time                  | min/ Cycle | 2.59                    |  |
| Travel Time                           | min/ Cycle | 7.66                    |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                    |  |
| Average Dump Time                     | min/ Cycle | 0.20                    |  |
| Average Cycle Time                    | min/ Cycle | 13.04                   |  |
| Fleet Size                            |            | 4                       |  |
| Average No. of Bucket Passes          |            | 6.18                    |  |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 5,387,849 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 50,972.00 |                                                                             |
| Time to move Excavation Target | Days       | 3.46      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 40        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 159       |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] A97-2 to L Pit Area 6  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.89                   | 14.51              |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.07               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 19.86              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 9347             | 0.1        | 3.0                     | 0.0                       | Full      | 4.26                   | 32.68              | 32.3               | 0.0                  | Final Sp.         | 24.9                       | 8.0                         | 0.0                         | 77.1            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.30               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.53               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 9347             | -0.1       | 3.0                     | 0.0                       | Empty     | 3.40                   | 26.06              | 39.9               | 0.0                  | Final Sp.         | 31.3                       | -8.0                        | 0.0                         | 72.6            |
| Total                                    |                     | 18,694           |            |                         |                           |           | 13.04                  | 100.00             |                    |                      |                   | 16.3                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] ASH1 to J Pit

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 5130 B ME

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.93      |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54     |                                    |
| Average Payload                       | bcy         | 12.17     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Production per Operating Hour         | bcy         | 1,110.76  |                                    |
| Production per Loader Operating Shift | bcy         | 7,775     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 4,672,954 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 7.77      |                                    |

### Truck

[PRJ] Caterpillar 777 F

|                                       |            |           |  |
|---------------------------------------|------------|-----------|--|
| Availability                          | %          | 100.00    |  |
| Payload in Template                   | bcy        | 76.45     |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |  |
| Average Payload                       | bcy        | 75.22     |  |
| Production per Operating Hour         | bcy        | 370.25    |  |
| Production per Loader Operating Shift | bcy        | 2,592     |  |
| Production per Year                   | bcy        | 1,557,651 |  |
| Queue Time at Loader                  | min/ Cycle | 0.75      |  |
| Spot Time at loader                   | min/ Cycle | 0.40      |  |
| Average Loading Time                  | min/ Cycle | 2.59      |  |
| Travel Time                           | min/ Cycle | 7.01      |  |
| Spot Time at Dump                     | min/ Cycle | 0.30      |  |
| Average Dump Time                     | min/ Cycle | 0.20      |  |
| Average Cycle Time                    | min/ Cycle | 11.25     |  |
| Fleet Size                            |            | 3         |  |
| Average No. of Bucket Passes          |            | 6.18      |  |

### Haulage System

|                                |            |           |                        |
|--------------------------------|------------|-----------|------------------------|
| Production per Year            | bcy/Year   | 4,672,954 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck             |
| Excavation Target              | bcy        | 69,895.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 5.46      |                        |
| Loader Hrs to move Target      | Op. Hours. | 63        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 189       |                        |
| Total cost to move Target      | \$         | 0         |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haul Cycle: [PRJ] ASH1 to J Pit          |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$./gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.75                   | 6.71               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.56               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 23.02              |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment        | 7908             | -3.5       | 3.0                     | 0.0                       | Full      | 3.16                   | 28.09              | 39.6               | 0.0                  | Final Sp.          | 28.4                       | -276.8                      | 0.0                           | 17.1            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.67               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.78               |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment (rev.) | 7908             | 3.5        | 3.0                     | 0.0                       | Empty     | 3.85                   | 34.19              | 27.0               | 0.0                  | Final Sp.          | 23.4                       | 276.8                       | 0.0                           | 83.8            |
| Total                                    |                     | 15,816           |            |                         |                           |           | 11.25                  | 100.00             |                    |                      |                    | 16.0                       | 0                           |                               |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] E78-1 to Area 3

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 5130 B ME |                                    |
|---------------------------------------|-------------|-----------------------------|------------------------------------|
| Availability                          | %           | 85.00                       |                                    |
| Bucket Fill Factor                    |             | 0.93                        |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54                       |                                    |
| Average Payload                       | bcy         | 12.18                       |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                    | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                      | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                        |                                    |
| Production per Operating Hour         | bcy         | 1,248.16                    |                                    |
| Production per Loader Operating Shift | bcy         | 8,737                       | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,250,989                   | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 1.91                        |                                    |

| Truck                                 |            | [PRJ] Caterpillar 777 F |  |
|---------------------------------------|------------|-------------------------|--|
| Availability                          | %          | 100.00                  |  |
| Payload in Template                   | bcy        | 76.45                   |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                |  |
| Average Payload                       | bcy        | 75.22                   |  |
| Production per Operating Hour         | bcy        | 312.04                  |  |
| Production per Loader Operating Shift | bcy        | 2,184                   |  |
| Production per Year                   | bcy        | 1,312,747               |  |
| Queue Time at Loader                  | min/ Cycle | 1.60                    |  |
| Spot Time at loader                   | min/ Cycle | 0.40                    |  |
| Average Loading Time                  | min/ Cycle | 2.59                    |  |
| Travel Time                           | min/ Cycle | 8.41                    |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                    |  |
| Average Dump Time                     | min/ Cycle | 0.20                    |  |
| Average Cycle Time                    | min/ Cycle | 13.51                   |  |
| Fleet Size                            |            | 4                       |  |
| Average No. of Bucket Passes          |            | 6.18                    |  |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 5,250,989 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 10,000.00 |                                                                             |
| Time to move Excavation Target | Days       | 0.70      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 8         |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 32        |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] E78-1 to Area 3        |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.60                   | 11.88              |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 2.96               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 19.18              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 5157             | -9.6       | 3.0                     | 0.0                       | Full      | 4.10                   | 30.37              | 15.6               | 0.0                  | Final Sp.          | 14.3                       | -495.1                      | 0.0                         | 0.0             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.22               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.48               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 5157             | 9.6        | 3.0                     | 0.0                       | Empty     | 4.31                   | 31.91              | 14.5               | 0.0                  | Final Sp.          | 13.6                       | 495.1                       | 0.0                         | 92.0            |
| Total                                    |                     | 10,314           |            |                         |                           |           | 13.51                  | 100.00             |                    |                      |                    | 8.7                        | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] E78-2 to Area 3**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 5130 B ME**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.93      |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.53     |                                    |
| Average Payload                       | bcy         | 12.17     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Production per Operating Hour         | bcy         | 1,219.48  |                                    |
| Production per Loader Operating Shift | bcy         | 8,536     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,130,365 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 3.40      |                                    |

### Truck

**[PRJ] Caterpillar 777 F**

|                                       |            |           |  |
|---------------------------------------|------------|-----------|--|
| Availability                          | %          | 100.00    |  |
| Payload in Template                   | bcy        | 76.45     |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |  |
| Average Payload                       | bcy        | 75.24     |  |
| Production per Operating Hour         | bcy        | 406.49    |  |
| Production per Loader Operating Shift | bcy        | 2,845     |  |
| Production per Year                   | bcy        | 1,710,122 |  |
| Queue Time at Loader                  | min/ Cycle | 0.87      |  |
| Spot Time at loader                   | min/ Cycle | 0.40      |  |
| Average Loading Time                  | min/ Cycle | 2.59      |  |
| Travel Time                           | min/ Cycle | 5.92      |  |
| Spot Time at Dump                     | min/ Cycle | 0.30      |  |
| Average Dump Time                     | min/ Cycle | 0.20      |  |
| Average Cycle Time                    | min/ Cycle | 10.28     |  |
| Fleet Size                            |            | 3         |  |
| Average No. of Bucket Passes          |            | 6.18      |  |

### Haulage System

|                                |            |           |                            |
|--------------------------------|------------|-----------|----------------------------|
| Production per Year            | bcy/Year   | 5,130,365 |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck                 |
| Excavation Target              | bcy        | 25,238.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 1.80      |                            |
| Loader Hrs to move Target      | Op. Hours. | 21        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 62        |                            |
| Total cost to move Target      | \$         | 0         |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.



# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                              |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|---------------------------|----------------------------|-----------------------------|------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                              |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                              |                 |
| Haul Cycle: [PRJ] E78-2 to Area 3        |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                              |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit.<br>mph | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$ gal/Ophr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                           |                            |                             |                              |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.87                   | 8.43               |                    |                      |                           |                            |                             | 0.0                          |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.89               |                    |                      |                           |                            |                             | 0.0                          |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 25.22              |                    |                      |                           |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment        | 4755             | -7.3       | 3.0                     | 0.0                       | Full      | 2.56                   | 24.92              | 27.9               | 0.0                  | Final Sp.                 | 21.1                       | -347.1                      | 0.0                          | 0.4             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.92               |                    |                      |                           |                            |                             | 0.0                          |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.95               |                    |                      |                           |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment (rev.) | 4755             | 7.3        | 3.0                     | 0.0                       | Empty     | 3.36                   | 32.68              | 17.9               | 0.0                  | Final Sp.                 | 16.1                       | 347.1                       | 0.0                          | 87.5            |
| Total                                    |                     | 9,510            |            |                         |                           |           | 10.28                  | 100.00             |                    |                      |                           | 10.5                       | 0                           |                              |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] E79-4 to Area 3

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 5130 B ME

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.93      |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54     |                                    |
| Average Payload                       | bcy         | 12.17     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Production per Operating Hour         | bcy         | 1,191.42  |                                    |
| Production per Loader Operating Shift | bcy         | 8,340     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,012,288 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 4.18      |                                    |

### Truck

[PRJ] Caterpillar 777 F

|                                       |            |           |  |
|---------------------------------------|------------|-----------|--|
| Availability                          | %          | 100.00    |  |
| Payload in Template                   | bcy        | 76.45     |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |  |
| Average Payload                       | bcy        | 75.24     |  |
| Production per Operating Hour         | bcy        | 297.85    |  |
| Production per Loader Operating Shift | bcy        | 2,085     |  |
| Production per Year                   | bcy        | 1,253,072 |  |
| Queue Time at Loader                  | min/ Cycle | 1.35      |  |
| Spot Time at loader                   | min/ Cycle | 0.40      |  |
| Average Loading Time                  | min/ Cycle | 2.59      |  |
| Travel Time                           | min/ Cycle | 9.14      |  |
| Spot Time at Dump                     | min/ Cycle | 0.30      |  |
| Average Dump Time                     | min/ Cycle | 0.20      |  |
| Average Cycle Time                    | min/ Cycle | 13.98     |  |
| Fleet Size                            |            | 4         |  |
| Average No. of Bucket Passes          |            | 6.18      |  |

### Haulage System

|                                |            |           |                        |
|--------------------------------|------------|-----------|------------------------|
| Production per Year            | bcy/Year   | 5,012,288 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck             |
| Excavation Target              | bcy        | 34,010.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 2.48      |                        |
| Loader Hrs to move Target      | Op. Hours. | 29        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 114       |                        |
| Total cost to move Target      | \$         | 0         |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |             |              |
|------------------------------------------|---------------------|----------|-------|-----------------|-------------|-------|--------------|------------|----------|------------|-----------------|------------------|------------------|-------------|--------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |             |              |
| Haulage System: Haulage System-1         |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |             |              |
| Haul Cycle: [PRJ] E79-4 to Area 3        |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |             |              |
| Type                                     | Segment Title       | Distance | Grade | Rolling Resist. | Curve Angle | Load  | Segment Time | Cycle Time | Max Vel. | Final Vel. | Velocity Limit. | Average Velocity | Elevation Change | Fuel Usage  | % Duty Cycle |
|                                          |                     | feet     | %     | %               | degrees     | %     | min          | %          | mph      | mph        |                 | mph              | feet             | \$ gal/Ophr | %            |
| [PRJ] Caterpillar 777 F                  |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |             |              |
| Queue                                    | Queue at Loader     | Auto     | Mins  |                 |             |       | 1.35         | 9.65       |          |            |                 |                  |                  | 0.0         |              |
| Spot                                     | Spot Time at loader | Auto     | Mins  |                 |             |       | 0.40         | 2.86       |          |            |                 |                  |                  | 0.0         |              |
| Load                                     | Loading             | Auto     | Mins  |                 |             |       | 2.59         | 18.54      |          |            |                 |                  |                  | 0.0         |              |
| 1                                        | Haul Segment        | 5415     | -10.8 | 3.0             | 0.0         | Full  | 4.29         | 30.69      | 15.6     | 0.0        | Final Sp.       | 14.3             | -584.8           | 0.0         | 0.0          |
| Spot                                     | Spot Time at Dump   | Auto     | Mins  |                 |             |       | 0.30         | 2.15       |          |            |                 |                  |                  | 0.0         |              |
| Dump                                     | Dumping             | Auto     | Mins  |                 |             |       | 0.20         | 1.43       |          |            |                 |                  |                  | 0.0         |              |
| 1                                        | Haul Segment (rev.) | 5415     | 10.8  | 3.0             | 0.0         | Empty | 4.85         | 34.67      | 13.4     | 0.0        | Final Sp.       | 12.7             | 584.8            | 0.0         | 93.5         |
| Total                                    |                     | 10,830   |       |                 |             |       | 13.98        | 100.00     |          |            |                 | 8.8              | 0                |             |              |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] E79-6 to Area 1

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 5130 B ME

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.93      |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54     |                                    |
| Average Payload                       | bcy         | 12.18     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Production per Operating Hour         | bcy         | 1,247.07  |                                    |
| Production per Loader Operating Shift | bcy         | 8,729     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,246,406 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 2.27      |                                    |

### Truck

[PRJ] Caterpillar 777 F

|                                       |            |           |  |
|---------------------------------------|------------|-----------|--|
| Availability                          | %          | 100.00    |  |
| Payload in Template                   | bcy        | 76.45     |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |  |
| Average Payload                       | bcy        | 75.22     |  |
| Production per Operating Hour         | bcy        | 415.69    |  |
| Production per Loader Operating Shift | bcy        | 2,910     |  |
| Production per Year                   | bcy        | 1,748,802 |  |
| Queue Time at Loader                  | min/ Cycle | 0.94      |  |
| Spot Time at loader                   | min/ Cycle | 0.40      |  |
| Average Loading Time                  | min/ Cycle | 2.59      |  |
| Travel Time                           | min/ Cycle | 5.72      |  |
| Spot Time at Dump                     | min/ Cycle | 0.30      |  |
| Average Dump Time                     | min/ Cycle | 0.20      |  |
| Average Cycle Time                    | min/ Cycle | 10.15     |  |
| Fleet Size                            |            | 3         |  |
| Average No. of Bucket Passes          |            | 6.18      |  |

### Haulage System

|                                |            |            |                        |
|--------------------------------|------------|------------|------------------------|
| Production per Year            | bcy/Year   | 5,246,406  |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck             |
| Excavation Target              | bcy        | 201,548.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 14.03      |                        |
| Loader Hrs to move Target      | Op. Hours. | 162        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 485        |                        |
| Total cost to move Target      | \$         | 0          |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] E79-6 to Area 1        |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/Ophr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 f                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.94                   | 9.27               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.94               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 25.52              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 2758             | -11.8      | 3.0                     | 0.0                       | Full      | 2.93                   | 28.87              | 11.7               | 0.0                  | Final Sp.         | 10.7                       | -325.4                      | 0.0                         | 0.3             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.96               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.98               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 2758             | 11.8       | 3.0                     | 0.0                       | Empty     | 2.79                   | 27.46              | 12.2               | 0.0                  | Final Sp.         | 11.2                       | 325.4                       | 0.0                         | 89.6            |
| Total                                    |                     | 5,516            |            |                         |                           |           | 10.15                  | 100.00             |                    |                      |                   | 6.2                        | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] E87-12 to Area 3

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 5130 B ME

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.93      |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54     |                                    |
| Average Payload                       | bcy         | 12.17     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Production per Operating Hour         | bcy         | 1,187.11  |                                    |
| Production per Loader Operating Shift | bcy         | 8,310     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 4,994,176 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 4.68      |                                    |

### Truck

[PRJ] Caterpillar 777 F

|                                       |            |           |
|---------------------------------------|------------|-----------|
| Availability                          | %          | 100.00    |
| Payload in Template                   | bcy        | 76.45     |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |
| Average Payload                       | bcy        | 75.23     |
| Production per Operating Hour         | bcy        | 395.70    |
| Production per Loader Operating Shift | bcy        | 2,770     |
| Production per Year                   | bcy        | 1,664,725 |
| Queue Time at Loader                  | min/ Cycle | 0.81      |
| Spot Time at loader                   | min/ Cycle | 0.40      |
| Average Loading Time                  | min/ Cycle | 2.59      |
| Travel Time                           | min/ Cycle | 6.25      |
| Spot Time at Dump                     | min/ Cycle | 0.30      |
| Average Dump Time                     | min/ Cycle | 0.20      |
| Average Cycle Time                    | min/ Cycle | 10.55     |
| Fleet Size                            |            | 3         |
| Average No. of Bucket Passes          |            | 6.18      |

### Haulage System

|                                |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 4,994,176 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 73,278.00 |                                                                             |
| Time to move Excavation Target | Days       | 5.36      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 62        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 185       |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] E87-12 to Area 3       |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S-gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.81                   | 7.71               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.79               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 24.55              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 4236             | -8.9       | 3.0                     | 0.0                       | Full      | 2.73                   | 25.83              | 21.4               | 0.0                  | Final Sp.          | 17.7                       | -377.0                      | 0.0                         | 0.2             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.84               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.89               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 4236             | 8.9        | 3.0                     | 0.0                       | Empty     | 3.52                   | 33.38              | 14.8               | 0.0                  | Final Sp.          | 13.7                       | 377.0                       | 0.0                         | 90.0            |
| Total                                    |                     | 8,472            |            |                         |                           |           | 10.55                  | 100.00             |                    |                      |                    | 9.1                        | 0                           |                             |                 |

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] G1-01 to L Pit Area 5

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

**Loader****[PRJ] Caterpillar 5130 B ME**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.93      |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54     |                                    |
| Average Payload                       | bcy         | 12.17     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Production per Operating Hour         | bcy         | 1,280.15  |                                    |
| Production per Loader Operating Shift | bcy         | 8,961     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,385,593 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 0.97      |                                    |

**Truck****[PRJ] Caterpillar 777 F**

|                                       |            |           |
|---------------------------------------|------------|-----------|
| Availability                          | %          | 100.00    |
| Payload in Template                   | bcy        | 76.45     |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |
| Average Payload                       | bcy        | 75.24     |
| Production per Operating Hour         | bcy        | 426.72    |
| Production per Loader Operating Shift | bcy        | 2,987     |
| Production per Year                   | bcy        | 1,795,198 |
| Queue Time at Loader                  | min/ Cycle | 1.13      |
| Spot Time at loader                   | min/ Cycle | 0.40      |
| Average Loading Time                  | min/ Cycle | 2.59      |
| Travel Time                           | min/ Cycle | 5.19      |
| Spot Time at Dump                     | min/ Cycle | 0.30      |
| Average Dump Time                     | min/ Cycle | 0.20      |
| Average Cycle Time                    | min/ Cycle | 9.81      |
| Fleet Size                            |            | 3         |
| Average No. of Bucket Passes          |            | 6.18      |

**Haulage System**

|                                |            |            |                                                                             |
|--------------------------------|------------|------------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 5,385,593  |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                             |
| Excavation Target              | bcy        | 101,948.00 |                                                                             |
| Time to move Excavation Target | Days       | 6.91       |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 80         |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 239        |                                                                             |
| Total cost to move Target      | \$         | 0          |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.



## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] G1-01 to L Pit Area 5  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/Ophr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.13                   | 11.49              |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 4.08               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 26.43              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 5822             | -0.9       | 3.0                     | 0.0                       | Full      | 2.74                   | 27.90              | 38.3               | 0.0                  | Final Sp.          | 24.2                       | -50.1                       | 0.0                         | 57.8            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 3.06               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 2.04               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 5822             | 0.9        | 3.0                     | 0.0                       | Empty     | 2.45                   | 24.99              | 38.4               | 0.0                  | Final Sp.          | 27.0                       | 50.1                        | 0.0                         | 64.2            |
| Total                                    |                     | 11,644           |            |                         |                           |           | 9.81                   | 100.00             |                    |                      |                    | 13.5                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] G1-03 to L Pit Area 2**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 5130 B ME**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.93      |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54     |                                    |
| Average Payload                       | bcy         | 12.17     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Production per Operating Hour         | bcy         | 1,229.95  |                                    |
| Production per Loader Operating Shift | bcy         | 8,610     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,174,395 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 2.66      |                                    |

### Truck

**[PRJ] Caterpillar 777 F**

|                                       |            |           |  |
|---------------------------------------|------------|-----------|--|
| Availability                          | %          | 100.00    |  |
| Payload in Template                   | bcy        | 76.45     |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |  |
| Average Payload                       | bcy        | 75.24     |  |
| Production per Operating Hour         | bcy        | 307.49    |  |
| Production per Loader Operating Shift | bcy        | 2,152     |  |
| Production per Year                   | bcy        | 1,293,599 |  |
| Queue Time at Loader                  | min/ Cycle | 1.49      |  |
| Spot Time at loader                   | min/ Cycle | 0.40      |  |
| Average Loading Time                  | min/ Cycle | 2.59      |  |
| Travel Time                           | min/ Cycle | 8.56      |  |
| Spot Time at Dump                     | min/ Cycle | 0.30      |  |
| Average Dump Time                     | min/ Cycle | 0.20      |  |
| Average Cycle Time                    | min/ Cycle | 13.54     |  |
| Fleet Size                            |            | 4         |  |
| Average No. of Bucket Passes          |            | 6.18      |  |

### Haulage System

|                                |            |           |                            |
|--------------------------------|------------|-----------|----------------------------|
| Production per Year            | bcy/Year   | 5,174,395 |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck                 |
| Excavation Target              | bcy        | 89,822.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 6.34      |                            |
| Loader Hrs to move Target      | Op. Hours. | 73        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 292       |                            |
| Total cost to move Target      | \$         | 0         |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] G1-03 to L Pit Area 2  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.49                   | 10.99              |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 2.95               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 19.14              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 4500             | 9.3        | 3.0                     | 0.0                       | Full      | 6.56                   | 48.46              | 8.0                | 0.0                  | Final Sp.          | 7.8                        | 418.5                       | 0.0                         | 96.2            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.22               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.48               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 4500             | -9.3       | 3.0                     | 0.0                       | Empty     | 2.00                   | 14.77              | 39.6               | 0.0                  | Final Sp.          | 25.6                       | -418.5                      | 0.0                         | 0.4             |
| Total                                    |                     | 9,000            |            |                         |                           |           | 13.54                  | 100.00             |                    |                      |                    | 7.6                        | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] G4-02 to L Pit Area 2**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 5130 B ME</b> |                                    |
|---------------------------------------|-------------|------------------------------------|------------------------------------|
| Availability                          | %           | 85.00                              |                                    |
| Bucket Fill Factor                    |             | 0.93                               |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.53                              |                                    |
| Average Payload                       | bcy         | 12.17                              |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                           | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                             | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                               |                                    |
| Production per Operating Hour         | bcy         | 1,207.94                           |                                    |
| Production per Loader Operating Shift | bcy         | 8,456                              | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,081,789                          | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 3.47                               |                                    |

| <b>Truck</b>                          |            | <b>[PRJ] Caterpillar 777 F</b> |  |
|---------------------------------------|------------|--------------------------------|--|
| Availability                          | %          | 100.00                         |  |
| Payload in Template                   | bcy        | 76.45                          |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                       |  |
| Average Payload                       | bcy        | 75.24                          |  |
| Production per Operating Hour         | bcy        | 301.98                         |  |
| Production per Loader Operating Shift | bcy        | 2,114                          |  |
| Production per Year                   | bcy        | 1,270,447                      |  |
| Queue Time at Loader                  | min/ Cycle | 1.41                           |  |
| Spot Time at loader                   | min/ Cycle | 0.40                           |  |
| Average Loading Time                  | min/ Cycle | 2.59                           |  |
| Travel Time                           | min/ Cycle | 8.87                           |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                           |  |
| Average Dump Time                     | min/ Cycle | 0.20                           |  |
| Average Cycle Time                    | min/ Cycle | 13.78                          |  |
| Fleet Size                            |            | 4                              |  |
| Average No. of Bucket Passes          |            | 6.18                           |  |

| <b>Haulage System</b>          |            |            |                                                                                    |
|--------------------------------|------------|------------|------------------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 5,081,789  |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                                    |
| Excavation Target              | bcy        | 137,784.00 |                                                                                    |
| Time to move Excavation Target | Days       | 9.90       |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 114        |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 456        |                                                                                    |
| Total cost to move Target      | \$         | 0          |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] G4-02 to L Pit Area 2  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/Ophr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.41                   | 10.27              |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 2.90               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 18.82              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 5240             | 7.7        | 3.0                     | 0.0                       | Full      | 6.66                   | 48.32              | 9.2                | 0.0                  | Final Sp.          | 8.9                        | 403.5                       | 0.0                         | 95.6            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.18               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.45               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 5240             | -7.7       | 3.0                     | 0.0                       | Empty     | 2.21                   | 16.05              | 39.6               | 0.0                  | Final Sp.          | 26.9                       | -403.5                      | 0.0                         | 0.4             |
| Total                                    |                     | 10,480           |            |                         |                           |           | 13.78                  | 100.00             |                    |                      |                    | 8.6                        | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] HRS to L Pit Area 5\_Truck/Exc

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 5130 B ME

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.93      |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.53     |                                    |
| Average Payload                       | bcy         | 12.17     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Production per Operating Hour         | bcy         | 1,277.92  |                                    |
| Production per Loader Operating Shift | bcy         | 8,945     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,376,220 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 0.78      |                                    |

### Truck

[PRJ] Caterpillar 777 F

|                                       |            |           |  |
|---------------------------------------|------------|-----------|--|
| Availability                          | %          | 100.00    |  |
| Payload in Template                   | bcy        | 76.45     |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |  |
| Average Payload                       | bcy        | 75.25     |  |
| Production per Operating Hour         | bcy        | 319.48    |  |
| Production per Loader Operating Shift | bcy        | 2,236     |  |
| Production per Year                   | bcy        | 1,344,055 |  |
| Queue Time at Loader                  | min/ Cycle | 1.87      |  |
| Spot Time at loader                   | min/ Cycle | 0.40      |  |
| Average Loading Time                  | min/ Cycle | 2.59      |  |
| Travel Time                           | min/ Cycle | 7.78      |  |
| Spot Time at Dump                     | min/ Cycle | 0.30      |  |
| Average Dump Time                     | min/ Cycle | 0.20      |  |
| Average Cycle Time                    | min/ Cycle | 13.15     |  |
| Fleet Size                            |            | 4         |  |
| Average No. of Bucket Passes          |            | 6.18      |  |

### Haulage System

|                                |            |           |                        |
|--------------------------------|------------|-----------|------------------------|
| Production per Year            | bcy/Year   | 5,376,220 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck             |
| Excavation Target              | bcy        | 12,390.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 0.84      |                        |
| Loader Hrs to move Target      | Op. Hours. | 10        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 39        |                        |
| Total cost to move Target      | \$         | 0         |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                               |                 |
|-------------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts        |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                               |                 |
| Haulage System: Haulage System-1                |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                               |                 |
| Haul Cycle: [PRJ] HRS to L Pit Area 5 Truck/Exc |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                               |                 |
| Type                                            | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$./gal/Ophr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                               |                 |
| Queue                                           | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.87                   | 14.25              |                    |                      |                   |                            |                             | 0.0                           |                 |
| Spot                                            | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.04               |                    |                      |                   |                            |                             | 0.0                           |                 |
| Load                                            | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 19.72              |                    |                      |                   |                            |                             | 0.0                           |                 |
| 1                                               | Haul Segment        | 6772             | -6.7       | 3.0                     | 0.0                       | Full      | 3.38                   | 25.73              | 27.9               | 0.0                  | Final Sp.         | 22.7                       | -450.3                      | 0.0                           | 1.3             |
| Spot                                            | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.28               |                    |                      |                   |                            |                             | 0.0                           |                 |
| Dump                                            | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.53               |                    |                      |                   |                            |                             | 0.0                           |                 |
| 1                                               | Haul Segment (rev.) | 6772             | 6.7        | 3.0                     | 0.0                       | Empty     | 4.40                   | 33.45              | 19.1               | 0.0                  | Final Sp.         | 17.5                       | 450.3                       | 0.0                           | 89.8            |
| Total                                           |                     | 13,544           |            |                         |                           |           | 13.15                  | 100.00             |                    |                      |                   | 11.7                       | 0                           |                               |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] K2-15 to L Pit Area 1**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 5130 B ME</b> |                                    |
|---------------------------------------|-------------|------------------------------------|------------------------------------|
| Availability                          | %           | 85.00                              |                                    |
| Bucket Fill Factor                    |             | 0.93                               |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54                              |                                    |
| Average Payload                       | bcy         | 12.17                              |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                           | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                             | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                               |                                    |
| Production per Operating Hour         | bcy         | 1,307.08                           |                                    |
| Production per Loader Operating Shift | bcy         | 9,150                              | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,498,904                          | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 0.03                               |                                    |

| <b>Truck</b>                          |            | <b>[PRJ] Caterpillar 777 F</b> |  |
|---------------------------------------|------------|--------------------------------|--|
| Availability                          | %          | 100.00                         |  |
| Payload in Template                   | bcy        | 76.45                          |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                       |  |
| Average Payload                       | bcy        | 75.23                          |  |
| Production per Operating Hour         | bcy        | 435.69                         |  |
| Production per Loader Operating Shift | bcy        | 3,050                          |  |
| Production per Year                   | bcy        | 1,832,968                      |  |
| Queue Time at Loader                  | min/ Cycle | 1.70                           |  |
| Spot Time at loader                   | min/ Cycle | 0.40                           |  |
| Average Loading Time                  | min/ Cycle | 2.59                           |  |
| Travel Time                           | min/ Cycle | 4.42                           |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                           |  |
| Average Dump Time                     | min/ Cycle | 0.20                           |  |
| Average Cycle Time                    | min/ Cycle | 9.62                           |  |
| Fleet Size                            |            | 3                              |  |
| Average No. of Bucket Passes          |            | 6.18                           |  |

| <b>Haulage System</b>          |            |           |                                                                                    |
|--------------------------------|------------|-----------|------------------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 5,498,904 |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                                    |
| Excavation Target              | bcy        | 67,082.00 |                                                                                    |
| Time to move Excavation Target | Days       | 4.46      |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 51        |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 154       |                                                                                    |
| Total cost to move Target      | \$         | 0         |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.



# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                                |                 |  |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|--------------------------------|-----------------|--|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                                |                 |  |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                                |                 |  |
| Haul Cycle: [PRJ] K2-15 to L Pit Area 1  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                                |                 |  |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$./gal/OptHr | % Duty<br>Cycle |  |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                                |                 |  |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.70                   | 17.71              |                    |                      |                    |                            |                             | 0.0                            |                 |  |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 4.16               |                    |                      |                    |                            |                             | 0.0                            |                 |  |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 26.94              |                    |                      |                    |                            |                             | 0.0                            |                 |  |
| 1                                        | Haul Segment        | 4419             | -2.8       | 3.0                     | 0.0                       | Full      | 2.17                   | 22.54              | 40.4               | 0.0                  | Final Sp.          | 23.2                       | -123.7                      | 0.0                            | 33.7            |  |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 3.12               |                    |                      |                    |                            |                             | 0.0                            |                 |  |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 2.08               |                    |                      |                    |                            |                             | 0.0                            |                 |  |
| 1                                        | Haul Segment (rev.) | 4419             | 2.8        | 3.0                     | 0.0                       | Empty     | 2.25                   | 23.45              | 31.1               | 0.0                  | Final Sp.          | 22.3                       | 123.7                       | 0.0                            | 68.7            |  |
| Total                                    |                     | 8,838            |            |                         |                           |           | 9.62                   | 100.00             |                    |                      |                    | 10.4                       | 0                           |                                |                 |  |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] L20-2 to L Pit Area 2**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

| Loader                                |             | [PRJ] Caterpillar 5130 B ME |                                    |
|---------------------------------------|-------------|-----------------------------|------------------------------------|
| Availability                          | %           | 85.00                       |                                    |
| Bucket Fill Factor                    |             | 0.93                        |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54                       |                                    |
| Average Payload                       | bcy         | 12.18                       |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                    | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                      | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                        |                                    |
| Production per Operating Hour         | bcy         | 1,280.59                    |                                    |
| Production per Loader Operating Shift | bcy         | 8,964                       | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,387,432                   | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 1.00                        |                                    |

| Truck                                 |            | [PRJ] Caterpillar 777 F |  |
|---------------------------------------|------------|-------------------------|--|
| Availability                          | %          | 100.00                  |  |
| Payload in Template                   | bcy        | 76.45                   |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                |  |
| Average Payload                       | bcy        | 75.22                   |  |
| Production per Operating Hour         | bcy        | 426.86                  |  |
| Production per Loader Operating Shift | bcy        | 2,988                   |  |
| Production per Year                   | bcy        | 1,795,811               |  |
| Queue Time at Loader                  | min/ Cycle | 1.12                    |  |
| Spot Time at loader                   | min/ Cycle | 0.40                    |  |
| Average Loading Time                  | min/ Cycle | 2.59                    |  |
| Travel Time                           | min/ Cycle | 5.19                    |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                    |  |
| Average Dump Time                     | min/ Cycle | 0.20                    |  |
| Average Cycle Time                    | min/ Cycle | 9.80                    |  |
| Fleet Size                            |            | 3                       |  |
| Average No. of Bucket Passes          |            | 6.18                    |  |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 5,387,432 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 32,400.00 |                                                                             |
| Time to move Excavation Target | Days       | 2.20      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 25        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 76        |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haul Cycle: [PRJ] L20-2 to L Pit Area 2  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$./gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.12                   | 11.44              |                    |                      |                    |                            |                             | 0.0                           |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 4.08               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 26.42              |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment        | 2969             | 7.1        | 3.0                     | 0.0                       | Full      | 3.63                   | 37.04              | 9.9                | 0.0                  | Final Sp.          | 9.3                        | 210.8                       | 0.0                           | 91.4            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 3.06               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 2.04               |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment (rev.) | 2969             | -7.1       | 3.0                     | 0.0                       | Empty     | 1.56                   | 15.92              | 39.6               | 0.0                  | Final Sp.          | 21.6                       | -210.8                      | 0.0                           | 0.8             |
| Total                                    |                     | 5,938            |            |                         |                           |           | 9.80                   | 100.00             |                    |                      |                    | 6.9                        | 0                           |                               |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] N20-2 to L Pit Area 5**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 5130 B ME**

|                                       |             |           |                                    |
|---------------------------------------|-------------|-----------|------------------------------------|
| Availability                          | %           | 85.00     |                                    |
| Bucket Fill Factor                    |             | 0.93      |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54     |                                    |
| Average Payload                       | bcy         | 12.17     |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00  | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00    | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50      |                                    |
| Production per Operating Hour         | bcy         | 1,106.55  |                                    |
| Production per Loader Operating Shift | bcy         | 7,746     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 4,655,250 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 7.93      |                                    |

### Truck

**[PRJ] Caterpillar 777 F**

|                                       |            |           |
|---------------------------------------|------------|-----------|
| Availability                          | %          | 100.00    |
| Payload in Template                   | bcy        | 76.45     |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |
| Average Payload                       | bcy        | 75.23     |
| Production per Operating Hour         | bcy        | 368.85    |
| Production per Loader Operating Shift | bcy        | 2,582     |
| Production per Year                   | bcy        | 1,551,750 |
| Queue Time at Loader                  | min/ Cycle | 0.76      |
| Spot Time at loader                   | min/ Cycle | 0.40      |
| Average Loading Time                  | min/ Cycle | 2.59      |
| Travel Time                           | min/ Cycle | 7.06      |
| Spot Time at Dump                     | min/ Cycle | 0.30      |
| Average Dump Time                     | min/ Cycle | 0.20      |
| Average Cycle Time                    | min/ Cycle | 11.31     |
| Fleet Size                            |            | 3         |
| Average No. of Bucket Passes          |            | 6.18      |

### Haulage System

|                                |            |           |                        |
|--------------------------------|------------|-----------|------------------------|
| Production per Year            | bcy/Year   | 4,655,250 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00      | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00      | Full Truck             |
| Excavation Target              | bcy        | 10,835.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 0.85      |                        |
| Loader Hrs to move Target      | Op. Hours. | 10        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 29        |                        |
| Total cost to move Target      | \$         | 0         |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haul Cycle: [PRJ] N20-2 to L Pit Area 5  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$./gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.76                   | 6.73               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.54               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 22.91              |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment        | 8467             | 0.0        | 3.0                     | 0.0                       | Full      | 3.90                   | 34.53              | 32.9               | 0.0                  | Final Sp.          | 24.6                       | 2.0                         | 0.0                           | 74.6            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.65               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.77               |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment (rev.) | 8467             | 0.0        | 3.0                     | 0.0                       | Empty     | 3.15                   | 27.87              | 39.8               | 0.0                  | Final Sp.          | 30.5                       | -2.0                        | 0.0                           | 70.6            |
| Total                                    |                     | 16,934           |            |                         |                           |           | 11.31                  | 100.00             |                    |                      |                    | 17.0                       | 0                           |                               |                 |

# Productivity

| Production Summary - Full Simulation                                                                  |             |                                          |                                    |              |
|-------------------------------------------------------------------------------------------------------|-------------|------------------------------------------|------------------------------------|--------------|
| Haulage System: Haulage System-1                                                                      |             | Haul Cycle: [PRJ] N20-3 to N Pit Area 3  |                                    |              |
| Material: [PRJ] Topsoil                                                                               |             | Roster: [PRJ] 5 day Week - 8 Hour Shifts |                                    |              |
| <b>Loader</b>                                                                                         |             | <b>[PRJ] Caterpillar 5130 B ME</b>       |                                    |              |
| Availability                                                                                          | %           | 85.00                                    |                                    |              |
| Bucket Fill Factor                                                                                    |             | 0.93                                     |                                    |              |
| Average Bucket Load Volume                                                                            | cu.yards    | 12.54                                    |                                    |              |
| Average Payload                                                                                       | bcy         | 12.17                                    |                                    |              |
| Operating Hours per Year                                                                              | OpHr/Year   | 4,207.00                                 | Op. hrs factored by availability   |              |
| Average Operating Shifts per Year                                                                     | shifts/Year | 601.00                                   | Shifts factored by availability    |              |
| Average Bucket Cycle Time                                                                             | min         | 0.50                                     |                                    |              |
| Production per Operating Hour                                                                         | bcy         | 1,128.15                                 |                                    |              |
| Production per Loader Operating Shift                                                                 | bcy         | 7,897                                    | Max. prod. based on 100% avail.    |              |
| Production per Year                                                                                   | bcy         | 4,746,114                                | Avg. production factored by avail. |              |
| Wait Time per Operating Hour                                                                          | min         | 7.10                                     |                                    |              |
| <b>Truck</b>                                                                                          |             | <b>[PRJ] Caterpillar 777 F</b>           |                                    |              |
| Availability                                                                                          | %           | 100.00                                   |                                    |              |
| Payload in Template                                                                                   | bcy         | 76.45                                    |                                    |              |
| Operating Hours per Year                                                                              | OpHr/Year   | 4,207.00                                 |                                    |              |
| Average Payload                                                                                       | bcy         | 75.22                                    |                                    |              |
| Production per Operating Hour                                                                         | bcy         | 376.05                                   |                                    |              |
| Production per Loader Operating Shift                                                                 | bcy         | 2,632                                    |                                    |              |
| Production per Year                                                                                   | bcy         | 1,582,038                                |                                    |              |
| Queue Time at Loader                                                                                  | min/ Cycle  | 0.76                                     |                                    |              |
| Spot Time at loader                                                                                   | min/ Cycle  | 0.40                                     |                                    |              |
| Average Loading Time                                                                                  | min/ Cycle  | 2.59                                     |                                    |              |
| Travel Time                                                                                           | min/ Cycle  | 6.84                                     |                                    |              |
| Spot Time at Dump                                                                                     | min/ Cycle  | 0.30                                     |                                    |              |
| Average Dump Time                                                                                     | min/ Cycle  | 0.20                                     |                                    |              |
| Average Cycle Time                                                                                    | min/ Cycle  | 11.09                                    |                                    |              |
| Fleet Size                                                                                            |             | 3                                        |                                    |              |
| Average No. of Bucket Passes                                                                          |             | 6.18                                     |                                    |              |
| <b>Haulage System</b>                                                                                 |             |                                          |                                    |              |
| Production per Year                                                                                   | bcy/Year    | 4,746,114                                |                                    |              |
| Discounted Capital Cost                                                                               | \$/bcy      | 0.00                                     | Loading Methodology                |              |
| Discounted Operating Cost                                                                             | \$/bcy      | 0.00                                     |                                    | Single Sided |
| Discounted Average Cost                                                                               | \$/bcy      | 0.00                                     |                                    | Full Truck   |
| Excavation Target                                                                                     | bcy         | 19,770.00                                | Average for 150 Shifts             |              |
| Time to move Excavation Target                                                                        | Days        | 1.52                                     |                                    |              |
| Loader Hrs to move Target                                                                             | Op. Hours.  | 18                                       |                                    |              |
| Total Truck Hrs to move Target                                                                        | Op. Hours.  | 53                                       |                                    |              |
| Total cost to move Target                                                                             | \$          | 0                                        |                                    |              |
| Productivity estimates allow for insufficient time at the end of the shift to complete another cycle. |             |                                          |                                    |              |
| Time for the first bucket pass coincides with the truck queuing and maneuvering times.                |             |                                          |                                    |              |
| This simulation is based on data provided by the equipment manufacturer.                              |             |                                          |                                    |              |
| Equipment data should be checked to ensure it is valid for this site.                                 |             |                                          |                                    |              |

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] N20-3 to N Pit Area 3  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/Ophr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.76                   | 6.85               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.61               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 23.35              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 3220             | 10.3       | 3.0                     | 0.0                       | Full      | 5.03                   | 45.36              | 7.5                | 0.0                  | Final Sp.          | 7.3                        | 331.7                       | 0.0                         | 95.3            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.70               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.81               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 2                                        | Haul Segment (rev.) | 3220             | -10.3      | 3.0                     | 0.0                       | Empty     | 1.81                   | 16.33              | 27.9               | 0.0                  | Final Sp.          | 20.2                       | -331.7                      | 0.0                         | 0.5             |
| Total                                    |                     | 6,440            |            |                         |                           |           | 11.09                  | 100.00             |                    |                      |                    | 6.6                        | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] N20-4 to L Pit Area 5**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

|                                       |             |                                    |                                    |
|---------------------------------------|-------------|------------------------------------|------------------------------------|
| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 5130 B ME</b> |                                    |
| Availability                          | %           | 85.00                              |                                    |
| Bucket Fill Factor                    |             | 0.93                               |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54                              |                                    |
| Average Payload                       | bcy         | 12.17                              |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                           | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                             | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                               |                                    |
| Production per Operating Hour         | bcy         | 1,283.39                           |                                    |
| Production per Loader Operating Shift | bcy         | 8,984                              | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,399,214                          | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 0.61                               |                                    |

|                                       |            |                                |  |
|---------------------------------------|------------|--------------------------------|--|
| <b>Truck</b>                          |            | <b>[PRJ] Caterpillar 777 F</b> |  |
| Availability                          | %          | 100.00                         |  |
| Payload in Template                   | bcy        | 76.45                          |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                       |  |
| Average Payload                       | bcy        | 75.24                          |  |
| Production per Operating Hour         | bcy        | 320.85                         |  |
| Production per Loader Operating Shift | bcy        | 2,246                          |  |
| Production per Year                   | bcy        | 1,349,804                      |  |
| Queue Time at Loader                  | min/ Cycle | 1.95                           |  |
| Spot Time at loader                   | min/ Cycle | 0.40                           |  |
| Average Loading Time                  | min/ Cycle | 2.59                           |  |
| Travel Time                           | min/ Cycle | 7.57                           |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                           |  |
| Average Dump Time                     | min/ Cycle | 0.20                           |  |
| Average Cycle Time                    | min/ Cycle | 13.02                          |  |
| Fleet Size                            |            | 4                              |  |
| Average No. of Bucket Passes          |            | 6.18                           |  |

|                                |            |           |                                                                                    |
|--------------------------------|------------|-----------|------------------------------------------------------------------------------------|
| <b>Haulage System</b>          |            |           |                                                                                    |
| Production per Year            | bcy/Year   | 5,399,214 |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                                    |
| Excavation Target              | bcy        | 8,659.00  |                                                                                    |
| Time to move Excavation Target | Days       | 0.59      |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 7         |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 27        |                                                                                    |
| Total cost to move Target      | \$         | 0         |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.



# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] N20-4 to L Pit Area 5  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.95                   | 14.99              |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.07               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 19.91              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 9915             | -1.8       | 3.0                     | 0.0                       | Full      | 3.76                   | 28.92              | 40.4               | 0.0                  | Final Sp.         | 29.9                       | -178.5                      | 0.0                         | 61.7            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.30               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.54               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 9915             | 1.8        | 3.0                     | 0.0                       | Empty     | 3.81                   | 29.26              | 36.8               | 0.0                  | Final Sp.         | 29.6                       | 178.5                       | 0.0                         | 78.3            |
| Total                                    |                     | 19,830           |            |                         |                           |           | 13.02                  | 100.00             |                    |                      |                   | 17.3                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] N20-5 to L Pit Area 6**

**Material: [PRJ] Topsoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 5130 B ME</b> |                                    |
|---------------------------------------|-------------|------------------------------------|------------------------------------|
| Availability                          | %           | 85.00                              |                                    |
| Bucket Fill Factor                    |             | 0.93                               |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.54                              |                                    |
| Average Payload                       | bcy         | 12.17                              |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                           | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                             | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                               |                                    |
| Production per Operating Hour         | bcy         | 1,186.13                           |                                    |
| Production per Loader Operating Shift | bcy         | 8,303                              | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 4,990,032                          | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 4.37                               |                                    |

| <b>Truck</b>                          |            | <b>[PRJ] Caterpillar 777 F</b> |  |
|---------------------------------------|------------|--------------------------------|--|
| Availability                          | %          | 100.00                         |  |
| Payload in Template                   | bcy        | 76.45                          |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                       |  |
| Average Payload                       | bcy        | 75.25                          |  |
| Production per Operating Hour         | bcy        | 296.53                         |  |
| Production per Loader Operating Shift | bcy        | 2,076                          |  |
| Production per Year                   | bcy        | 1,247,508                      |  |
| Queue Time at Loader                  | min/ Cycle | 1.33                           |  |
| Spot Time at loader                   | min/ Cycle | 0.40                           |  |
| Average Loading Time                  | min/ Cycle | 2.59                           |  |
| Travel Time                           | min/ Cycle | 9.20                           |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                           |  |
| Average Dump Time                     | min/ Cycle | 0.20                           |  |
| Average Cycle Time                    | min/ Cycle | 14.03                          |  |
| Fleet Size                            |            | 4                              |  |
| Average No. of Bucket Passes          |            | 6.18                           |  |

| <b>Haulage System</b>          |            |           |                                                                                    |
|--------------------------------|------------|-----------|------------------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 4,990,032 |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00      | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                                    |
| Excavation Target              | bcy        | 5,620.00  |                                                                                    |
| Time to move Excavation Target | Days       | 0.41      |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 5         |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 19        |                                                                                    |
| Total cost to move Target      | \$         | 0         |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] N20-5 to L Pit Area 6  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 1.33                   | 9.50               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 2.85               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 18.48              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 9462             | 1.8        | 3.0                     | 0.0                       | Full      | 5.82                   | 41.46              | 20.2               | 0.0                  | Final Sp.         | 18.5                       | 170.3                       | 0.0                         | 89.2            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.14               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.43               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 9462             | -1.8       | 3.0                     | 0.0                       | Empty     | 3.39                   | 24.14              | 40.4               | 0.0                  | Final Sp.         | 31.7                       | -170.3                      | 0.0                         | 40.0            |
| Total                                    |                     | 18,924           |            |                         |                           |           | 14.03                  | 100.00             |                    |                      |                   | 15.3                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] N20-6 to L Pit Area 6

Material: [PRJ] Topsoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 5130 B ME |                                    |
|---------------------------------------|-------------|-----------------------------|------------------------------------|
| Availability                          | %           | 85.00                       |                                    |
| Bucket Fill Factor                    |             | 0.93                        |                                    |
| Average Bucket Load Volume            | cu.yards    | 12.53                       |                                    |
| Average Payload                       | bcy         | 12.17                       |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                    | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                      | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                        |                                    |
| Production per Operating Hour         | bcy         | 1,241.37                    |                                    |
| Production per Loader Operating Shift | bcy         | 8,690                       | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 5,222,451                   | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 1.84                        |                                    |

| Truck                                 |            | [PRJ] Caterpillar 777 F |  |
|---------------------------------------|------------|-------------------------|--|
| Availability                          | %          | 100.00                  |  |
| Payload in Template                   | bcy        | 76.45                   |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                |  |
| Average Payload                       | bcy        | 75.23                   |  |
| Production per Operating Hour         | bcy        | 248.27                  |  |
| Production per Loader Operating Shift | bcy        | 1,738                   |  |
| Production per Year                   | bcy        | 1,044,490               |  |
| Queue Time at Loader                  | min/ Cycle | 2.11                    |  |
| Spot Time at loader                   | min/ Cycle | 0.40                    |  |
| Average Loading Time                  | min/ Cycle | 2.59                    |  |
| Travel Time                           | min/ Cycle | 11.24                   |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                    |  |
| Average Dump Time                     | min/ Cycle | 0.20                    |  |
| Average Cycle Time                    | min/ Cycle | 16.83                   |  |
| Fleet Size                            |            | 5                       |  |
| Average No. of Bucket Passes          |            | 6.18                    |  |

| Haulage System                 |            |           |                                                                             |
|--------------------------------|------------|-----------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 5,222,451 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00      | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00      |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00      |                                                                             |
| Excavation Target              | bcy        | 9,970.00  |                                                                             |
| Time to move Excavation Target | Days       | 0.70      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 8         |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 40        |                                                                             |
| Total cost to move Target      | \$         | 0         |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Topsoil                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] N20-6 to L Pit Area 6  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Caterpillar 777 F                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 2.11                   | 12.51              |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 2.38               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 2.59                   | 15.40              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 9678             | 3.2        | 3.0                     | 0.0                       | Full      | 7.75                   | 46.04              | 14.9               | 0.0                  | Final Sp.          | 14.2                       | 309.7                       | 0.0                         | 93.9            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 1.78               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.19               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 9678             | -3.2       | 3.0                     | 0.0                       | Empty     | 3.49                   | 20.70              | 39.6               | 0.0                  | Final Sp.          | 31.6                       | -309.7                      | 0.0                         | 9.4             |
| Total                                    |                     | 19,356           |            |                         |                           |           | 16.83                  | 100.00             |                    |                      |                    | 13.1                       | 0                           |                             |                 |

# **Truck/Excavator – Grading Talpac Haul Simulations**

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] Ash Pit Sec E1

Material: [PRJ] Spoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 6090 |                                    |
|---------------------------------------|-------------|------------------------|------------------------------------|
| Availability                          | %           | 85.00                  |                                    |
| Bucket Fill Factor                    |             | 1.05                   |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.92                  |                                    |
| Average Payload                       | bcy         | 55.38                  |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00               | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                 | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                   |                                    |
| Production per Operating Hour         | bcy         | 4,440.28               |                                    |
| Production per Loader Operating Shift | bcy         | 31,082                 | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 18,680,262             | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 8.52                   |                                    |

| Truck                                 |            | [PRJ] Komatsu (Dresser) 830 E |  |
|---------------------------------------|------------|-------------------------------|--|
| Availability                          | %          | 100.00                        |  |
| Payload in Template                   | bcy        | 143.69                        |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                      |  |
| Average Payload                       | bcy        | 137.34                        |  |
| Production per Operating Hour         | bcy        | 233.70                        |  |
| Production per Loader Operating Shift | bcy        | 1,636                         |  |
| Production per Year                   | bcy        | 983,172                       |  |
| Queue Time at Loader                  | min/ Cycle | 2.44                          |  |
| Spot Time at loader                   | min/ Cycle | 0.40                          |  |
| Average Loading Time                  | min/ Cycle | 0.74                          |  |
| Travel Time                           | min/ Cycle | 27.54                         |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                          |  |
| Average Dump Time                     | min/ Cycle | 0.20                          |  |
| Average Cycle Time                    | min/ Cycle | 31.62                         |  |
| Fleet Size                            |            | 19                            |  |
| Average No. of Bucket Passes          |            | 2.48                          |  |

| Haulage System                 |            |            |                        |
|--------------------------------|------------|------------|------------------------|
| Production per Year            | bcy/Year   | 18,680,262 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck             |
| Excavation Target              | bcy        | 128,454.00 | Average for 145 Shifts |
| Time to move Excavation Target | Days       | 2.51       |                        |
| Loader Hrs to move Target      | Op. Hours. | 29         |                        |
| Total Truck Hrs to move Target | Op. Hours. | 550        |                        |
| Total cost to move Target      | \$         | 0          |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRU] Spoil                    |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
|------------------------------------------|---------------------|----------|-------|-----------------|-------------|-------|--------------|------------|----------|------------|-----------------|------------------|------------------|------------|--------------|
| Roster: [PRU] 5 day Week - 8 Hour Shifts |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Haulage System: Haulage System-1         |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Haul Cycle: [PRU] Ash Pit Sec E1         |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Type                                     | Segment Title       | Distance | Grade | Rolling Resist. | Curve Angle | Load  | Segment Time | Cycle Time | Max Vel. | Final Vel. | Velocity Limit. | Average Velocity | Elevation Change | Fuel Usage | % Duty Cycle |
|                                          |                     | feet     | %     | %               | degrees     | %     | min          | %          | mph      | mph        |                 | mph              | feet             | S.gal/OpHr | %            |
| [PRU] Komatsu (Dresser) 830 E            |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Queue                                    | Queue at Loader     | Auto     | Mins  |                 |             |       | 2.44         | 7.71       |          |            |                 |                  |                  | 0.0        |              |
| Spot                                     | Spot Time at loader | Auto     | Mins  |                 |             |       | 0.40         | 1.26       |          |            |                 |                  |                  | 0.0        |              |
| Load                                     | Loading             | Auto     | Mins  |                 |             |       | 0.74         | 2.34       |          |            |                 |                  |                  | 0.0        |              |
| 1                                        | Haul Segment        | 11428    | 10.0  | 3.0             | 0.0         | Full  | 22.53        | 71.26      | 5.8      | 0.0        | Final Sp.       | 5.8              | 1,142.8          | 0.0        | 99.3         |
| Spot                                     | Spot Time at Dump   | Auto     | Mins  |                 |             |       | 0.30         | 0.95       |          |            |                 |                  |                  | 0.0        |              |
| Dump                                     | Dumping             | Auto     | Mins  |                 |             |       | 0.20         | 0.63       |          |            |                 |                  |                  | 0.0        |              |
| 1                                        | Haul Segment (rev.) | 11428    | -10.0 | 3.0             | 0.0         | Empty | 5.01         | 15.85      | 28.9     | 0.0        | Final Sp.       | 25.9             | -1,142.8         | 0.0        | 0.1          |
| Total                                    |                     | 22,856   |       |                 |             |       | 31.62        | 100.00     |          |            |                 | 8.2              | 0                |            |              |



# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] C Pit Sec 1,406,950

Material: [PRJ] Spoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 6090

|                                       |             |            |                                    |
|---------------------------------------|-------------|------------|------------------------------------|
| Availability                          | %           | 85.00      |                                    |
| Bucket Fill Factor                    |             | 1.05       |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.93      |                                    |
| Average Payload                       | bcy         | 55.40      |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00   | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00     | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50       |                                    |
| Production per Operating Hour         | bcy         | 4,601.42   |                                    |
| Production per Loader Operating Shift | bcy         | 32,210     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 19,358,187 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 10.25      |                                    |

### Truck

[PRJ] Komatsu (Dresser) 830 E

|                                       |            |           |  |
|---------------------------------------|------------|-----------|--|
| Availability                          | %          | 100.00    |  |
| Payload in Template                   | bcy        | 143.69    |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |  |
| Average Payload                       | bcy        | 137.36    |  |
| Production per Operating Hour         | bcy        | 1,150.36  |  |
| Production per Loader Operating Shift | bcy        | 8,052     |  |
| Production per Year                   | bcy        | 4,839,547 |  |
| Queue Time at Loader                  | min/ Cycle | 0.54      |  |
| Spot Time at loader                   | min/ Cycle | 0.40      |  |
| Average Loading Time                  | min/ Cycle | 0.74      |  |
| Travel Time                           | min/ Cycle | 4.45      |  |
| Spot Time at Dump                     | min/ Cycle | 0.30      |  |
| Average Dump Time                     | min/ Cycle | 0.20      |  |
| Average Cycle Time                    | min/ Cycle | 6.63      |  |
| Fleet Size                            |            | 4         |  |
| Average No. of Bucket Passes          |            | 2.48      |  |

### Haulage System

|                                |            |            |                        |
|--------------------------------|------------|------------|------------------------|
| Production per Year            | bcy/Year   | 19,358,187 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck             |
| Excavation Target              | bcy        | 506,033.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 9.55       |                        |
| Loader Hrs to move Target      | Op. Hours. | 110        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 440        |                        |
| Total cost to move Target      | \$         | 0          |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haul Cycle: [PRJ] C Pit Sec 1,406,950    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$./gal/OpHr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.54                   | 8.09               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 6.03               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 11.16              |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment        | 4528             | -2.0       | 3.0                     | 0.0                       | Full      | 2.30                   | 34.65              | 35.3               | 0.0                  | Final Sp.          | 22.4                       | -90.6                       | 0.0                           | 46.4            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 4.52               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 3.02               |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment (rev.) | 4528             | 2.0        | 3.0                     | 0.0                       | Empty     | 2.16                   | 32.53              | 33.5               | 0.0                  | Final Sp.          | 23.9                       | 90.6                        | 0.0                           | 63.7            |
| Total                                    |                     | 9,056            |            |                         |                           |           | 6.63                   | 100.00             |                    |                      |                    | 15.5                       | 0                           |                               |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] C Pit Sec 1,407,450

Material: [PRJ] Spoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 6090 |                                    |
|---------------------------------------|-------------|------------------------|------------------------------------|
| Availability                          | %           | 85.00                  |                                    |
| Bucket Fill Factor                    |             | 1.05                   |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.98                  |                                    |
| Average Payload                       | bcy         | 55.44                  |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00               | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                 | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                   |                                    |
| Production per Operating Hour         | bcy         | 4,833.90               |                                    |
| Production per Loader Operating Shift | bcy         | 33,837                 | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 20,336,204             | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 8.08                   |                                    |

| Truck                                 |            | [PRJ] Komatsu (Dresser) 830 E |  |
|---------------------------------------|------------|-------------------------------|--|
| Availability                          | %          | 100.00                        |  |
| Payload in Template                   | bcy        | 143.69                        |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                      |  |
| Average Payload                       | bcy        | 137.33                        |  |
| Production per Operating Hour         | bcy        | 1,208.47                      |  |
| Production per Loader Operating Shift | bcy        | 8,459                         |  |
| Production per Year                   | bcy        | 5,084,051                     |  |
| Queue Time at Loader                  | min/ Cycle | 0.56                          |  |
| Spot Time at loader                   | min/ Cycle | 0.40                          |  |
| Average Loading Time                  | min/ Cycle | 0.74                          |  |
| Travel Time                           | min/ Cycle | 4.10                          |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                          |  |
| Average Dump Time                     | min/ Cycle | 0.20                          |  |
| Average Cycle Time                    | min/ Cycle | 6.31                          |  |
| Fleet Size                            |            | 4                             |  |
| Average No. of Bucket Passes          |            | 2.48                          |  |

| Haulage System                 |            |              |                                                                             |
|--------------------------------|------------|--------------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 20,336,204   |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00         | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00         |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00         |                                                                             |
| Excavation Target              | bcy        | 1,035,759.00 |                                                                             |
| Time to move Excavation Target | Days       | 18.60        |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 214          |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 857          |                                                                             |
| Total cost to move Target      | \$         | 0            |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Spoil                    |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
|------------------------------------------|---------------------|----------|-------|-----------------|-------------|-------|--------------|------------|----------|------------|-----------------|------------------|------------------|------------|--------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Haulage System: Haulage System-1         |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Haul Cycle: [PRJ] C Pit Sec 1,407,450    |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Type                                     | Segment Title       | Distance | Grade | Rolling Resist. | Curve Angle | Load  | Segment Time | Cycle Time | Max Vel. | Final Vel. | Velocity Limit. | Average Velocity | Elevation Change | Fuel Usage | % Duty Cycle |
|                                          |                     | feet     | %     | %               | degrees     | %     | min          | %          | mph      | mph        |                 | mph              | feet             | S.gal/Ophr | %            |
| [PRJ] Komatsu (Dresser) 830 E            |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Queue                                    | Queue at Loader     | Auto     | Mins  |                 |             |       | 0.56         | 8.92       |          |            |                 |                  |                  | 0.0        |              |
| Spot                                     | Spot Time at loader | Auto     | Mins  |                 |             |       | 0.40         | 6.34       |          |            |                 |                  |                  | 0.0        |              |
| Load                                     | Loading             | Auto     | Mins  |                 |             |       | 0.74         | 11.72      |          |            |                 |                  |                  | 0.0        |              |
| 1                                        | Haul Segment        | 3998     | -2.0  | 3.0             | 0.0         | Full  | 2.13         | 33.73      | 35.3     | 0.0        | Final Sp.       | 21.4             | -80.0            | 0.0        | 45.6         |
| Spot                                     | Spot Time at Dump   | Auto     | Mins  |                 |             |       | 0.30         | 4.76       |          |            |                 |                  |                  | 0.0        |              |
| Dump                                     | Dumping             | Auto     | Mins  |                 |             |       | 0.20         | 3.18       |          |            |                 |                  |                  | 0.0        |              |
| 1                                        | Haul Segment (rev.) | 3998     | 2.0   | 3.0             | 0.0         | Empty | 1.98         | 31.36      | 33.5     | 0.0        | Final Sp.       | 23.0             | 80.0             | 0.0        | 60.4         |
| Total                                    |                     | 7,996    |       |                 |             |       | 6.31         | 100.00     |          |            |                 | 14.4             | 0                |            |              |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] C Pit Sec 1,407,950**

**Material: [PRJ] Spoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

|                                       |             |                               |                                    |
|---------------------------------------|-------------|-------------------------------|------------------------------------|
| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 6090</b> |                                    |
| Availability                          | %           | 85.00                         |                                    |
| Bucket Fill Factor                    |             | 1.05                          |                                    |
| Average Bucket Load Volume            | cu.yards    | 61.00                         |                                    |
| Average Payload                       | bcy         | 55.46                         |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                      | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                        | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                          |                                    |
| Production per Operating Hour         | bcy         | 4,605.79                      |                                    |
| Production per Loader Operating Shift | bcy         | 32,241                        | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 19,376,541                    | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 10.26                         |                                    |

|                                       |            |                                      |  |
|---------------------------------------|------------|--------------------------------------|--|
| <b>Truck</b>                          |            | <b>[PRJ] Komatsu (Dresser) 830 E</b> |  |
| Availability                          | %          | 100.00                               |  |
| Payload in Template                   | bcy        | 143.69                               |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                             |  |
| Average Payload                       | bcy        | 137.29                               |  |
| Production per Operating Hour         | bcy        | 1,151.45                             |  |
| Production per Loader Operating Shift | bcy        | 8,060                                |  |
| Production per Year                   | bcy        | 4,844,135                            |  |
| Queue Time at Loader                  | min/ Cycle | 0.54                                 |  |
| Spot Time at loader                   | min/ Cycle | 0.40                                 |  |
| Average Loading Time                  | min/ Cycle | 0.74                                 |  |
| Travel Time                           | min/ Cycle | 4.44                                 |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                                 |  |
| Average Dump Time                     | min/ Cycle | 0.20                                 |  |
| Average Cycle Time                    | min/ Cycle | 6.62                                 |  |
| Fleet Size                            |            | 4                                    |  |
| Average No. of Bucket Passes          |            | 2.48                                 |  |

|                                |            |              |                                                                                    |
|--------------------------------|------------|--------------|------------------------------------------------------------------------------------|
| <b>Haulage System</b>          |            |              |                                                                                    |
| Production per Year            | bcy/Year   | 19,376,541   |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00         | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00         |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00         |                                                                                    |
| Excavation Target              | bcy        | 1,021,019.00 |                                                                                    |
| Time to move Excavation Target | Days       | 19.25        |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 222          |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 887          |                                                                                    |
| Total cost to move Target      | \$         | 0            |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

Full Simulation Results

| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] C Pit Sec 1,407,950    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.54                   | 8.14               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 6.04               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 11.15              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 4331             | -4.0       | 3.0                     | 0.0                       | Full      | 2.19                   | 33.01              | 35.3               | 0.0                  | Final Sp.          | 22.5                       | -173.2                      | 0.0                         | 20.1            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 4.53               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 3.03               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 4331             | 4.0        | 3.0                     | 0.0                       | Empty     | 2.26                   | 34.10              | 29.0               | 0.0                  | Final Sp.          | 21.8                       | 173.2                       | 0.0                         | 70.5            |
| Total                                    |                     | 8,662            |            |                         |                           |           | 6.62                   | 100.00             |                    |                      |                    | 14.9                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] C Pit Sec 1,408,450

Material: [PRJ] Spoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 6090 |                                    |
|---------------------------------------|-------------|------------------------|------------------------------------|
| Availability                          | %           | 85.00                  |                                    |
| Bucket Fill Factor                    |             | 1.05                   |                                    |
| Average Bucket Load Volume            | cu.yards    | 61.06                  |                                    |
| Average Payload                       | bcy         | 55.51                  |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00               | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                 | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                   |                                    |
| Production per Operating Hour         | bcy         | 4,334.86               |                                    |
| Production per Loader Operating Shift | bcy         | 30,344                 | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 18,236,759             | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 12.60                  |                                    |

| Truck                                 |            | [PRJ] Komatsu (Dresser) 830 E |  |
|---------------------------------------|------------|-------------------------------|--|
| Availability                          | %          | 100.00                        |  |
| Payload in Template                   | bcy        | 143.69                        |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                      |  |
| Average Payload                       | bcy        | 137.25                        |  |
| Production per Operating Hour         | bcy        | 866.97                        |  |
| Production per Loader Operating Shift | bcy        | 6,069                         |  |
| Production per Year                   | bcy        | 3,647,352                     |  |
| Queue Time at Loader                  | min/ Cycle | 0.65                          |  |
| Spot Time at loader                   | min/ Cycle | 0.40                          |  |
| Average Loading Time                  | min/ Cycle | 0.74                          |  |
| Travel Time                           | min/ Cycle | 6.48                          |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                          |  |
| Average Dump Time                     | min/ Cycle | 0.20                          |  |
| Average Cycle Time                    | min/ Cycle | 8.76                          |  |
| Fleet Size                            |            | 5                             |  |
| Average No. of Bucket Passes          |            | 2.47                          |  |

| Haulage System                 |            |            |                                                                             |
|--------------------------------|------------|------------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 18,236,759 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                             |
| Excavation Target              | bcy        | 956,111.00 |                                                                             |
| Time to move Excavation Target | Days       | 19.15      |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 221        |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 1,103      |                                                                             |
| Total cost to move Target      | \$         | 0          |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Spoil                    |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
|------------------------------------------|---------------------|----------|-------|-----------------|-------------|-------|--------------|------------|----------|------------|-----------------|------------------|------------------|------------|--------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Haulage System: Haulage System-1         |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Haul Cycle: [PRJ] C Pit Sec 1,408,450    |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Type                                     | Segment Title       | Distance | Grade | Rolling Resist. | Curve Angle | Load  | Segment Time | Cycle Time | Max Vel. | Final Vel. | Velocity Limit. | Average Velocity | Elevation Change | Fuel Usage | % Duty Cycle |
|                                          |                     | feet     | %     | %               | degrees     | %     | min          | %          | mph      | mph        |                 | mph              | feet             | S.gal/OpHr | %            |
| [PRJ] Komatsu (Dresser) 830 E            |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Queue                                    | Queue at Loader     | Auto     | Mins  |                 |             |       | 0.65         | 7.39       |          |            |                 |                  |                  | 0.0        |              |
| Spot                                     | Spot Time at loader | Auto     | Mins  |                 |             |       | 0.40         | 4.56       |          |            |                 |                  |                  | 0.0        |              |
| Load                                     | Loading             | Auto     | Mins  |                 |             |       | 0.74         | 8.41       |          |            |                 |                  |                  | 0.0        |              |
| 1                                        | Haul Segment        | 5028     | -8.0  | 3.0             | 0.0         | Full  | 3.10         | 35.43      | 21.8     | 0.0        | Final Sp.       | 18.4             | -402.2           | 0.0        | 0.1          |
| Spot                                     | Spot Time at Dump   | Auto     | Mins  |                 |             |       | 0.30         | 3.42       |          |            |                 |                  |                  | 0.0        |              |
| Dump                                     | Dumping             | Auto     | Mins  |                 |             |       | 0.20         | 2.28       |          |            |                 |                  |                  | 0.0        |              |
| 1                                        | Haul Segment (rev.) | 5028     | 8.0   | 3.0             | 0.0         | Empty | 3.37         | 38.51      | 18.9     | 0.0        | Final Sp.       | 16.9             | 402.2            | 0.0        | 87.1         |
| Total                                    |                     | 10,056   |       |                 |             |       | 8.76         | 100.00     |          |            |                 | 13.0             | 0                |            |              |



# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] C Pit Sec 1,408,950**

**Material: [PRJ] Spoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 6090</b> |                                    |
|---------------------------------------|-------------|-------------------------------|------------------------------------|
| Availability                          | %           | 85.00                         |                                    |
| Bucket Fill Factor                    |             | 1.05                          |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.98                         |                                    |
| Average Payload                       | bcy         | 55.44                         |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                      | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                        | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                          |                                    |
| Production per Operating Hour         | bcy         | 4,712.87                      |                                    |
| Production per Loader Operating Shift | bcy         | 32,990                        | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 19,827,033                    | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 9.21                          |                                    |

| <b>Truck</b>                          |            | <b>[PRJ] Komatsu (Dresser) 830 E</b> |  |
|---------------------------------------|------------|--------------------------------------|--|
| Availability                          | %          | 100.00                               |  |
| Payload in Template                   | bcy        | 143.69                               |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                             |  |
| Average Payload                       | bcy        | 137.31                               |  |
| Production per Operating Hour         | bcy        | 1,178.22                             |  |
| Production per Loader Operating Shift | bcy        | 8,248                                |  |
| Production per Year                   | bcy        | 4,956,758                            |  |
| Queue Time at Loader                  | min/ Cycle | 0.55                                 |  |
| Spot Time at loader                   | min/ Cycle | 0.40                                 |  |
| Average Loading Time                  | min/ Cycle | 0.74                                 |  |
| Travel Time                           | min/ Cycle | 4.28                                 |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                                 |  |
| Average Dump Time                     | min/ Cycle | 0.20                                 |  |
| Average Cycle Time                    | min/ Cycle | 6.47                                 |  |
| Fleet Size                            |            | 4                                    |  |
| Average No. of Bucket Passes          |            | 2.48                                 |  |

| <b>Haulage System</b>          |            |            |                                                                                    |
|--------------------------------|------------|------------|------------------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 19,827,033 |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                                    |
| Excavation Target              | bcy        | 738,667.00 |                                                                                    |
| Time to move Excavation Target | Days       | 13.61      |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 157        |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 627        |                                                                                    |
| Total cost to move Target      | \$         | 0          |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

| Full Simulation Results                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-------------------------------|-----------------|
| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Haul Cycle: [PRJ] C Pit Sec 1,408,950    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$./gal/OpHr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                               |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.55                   | 8.49               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 6.19               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 11.42              |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment        | 3596             | -6.0       | 3.0                     | 0.0                       | Full      | 2.07                   | 32.01              | 28.5               | 0.0                  | Final Sp.          | 19.7                       | -215.8                      | 0.0                           | 5.4             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 4.64               |                    |                      |                    |                            |                             | 0.0                           |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 3.10               |                    |                      |                    |                            |                             | 0.0                           |                 |
| 1                                        | Haul Segment (rev.) | 3596             | 6.0        | 3.0                     | 0.0                       | Empty     | 2.21                   | 34.15              | 23.0               | 0.0                  | Final Sp.          | 18.5                       | 215.8                       | 0.0                           | 75.9            |
| Total                                    |                     | 7,192            |            |                         |                           |           | 6.47                   | 100.00             |                    |                      |                    | 12.6                       | 0                           |                               |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] C Pit Sec 1,409,450**

**Material: [PRJ] Spoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

|                                       |             |                               |                                    |
|---------------------------------------|-------------|-------------------------------|------------------------------------|
| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 6090</b> |                                    |
| Availability                          | %           | 85.00                         |                                    |
| Bucket Fill Factor                    |             | 1.05                          |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.99                         |                                    |
| Average Payload                       | bcy         | 55.45                         |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                      | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                        | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                          |                                    |
| Production per Operating Hour         | bcy         | 4,680.84                      |                                    |
| Production per Loader Operating Shift | bcy         | 32,766                        | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 19,692,305                    | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 9.52                          |                                    |

|                                       |            |                                      |  |
|---------------------------------------|------------|--------------------------------------|--|
| <b>Truck</b>                          |            | <b>[PRJ] Komatsu (Dresser) 830 E</b> |  |
| Availability                          | %          | 100.00                               |  |
| Payload in Template                   | bcy        | 143.69                               |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                             |  |
| Average Payload                       | bcy        | 137.31                               |  |
| Production per Operating Hour         | bcy        | 1,170.21                             |  |
| Production per Loader Operating Shift | bcy        | 8,191                                |  |
| Production per Year                   | bcy        | 4,923,076                            |  |
| Queue Time at Loader                  | min/ Cycle | 0.55                                 |  |
| Spot Time at loader                   | min/ Cycle | 0.40                                 |  |
| Average Loading Time                  | min/ Cycle | 0.74                                 |  |
| Travel Time                           | min/ Cycle | 4.32                                 |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                                 |  |
| Average Dump Time                     | min/ Cycle | 0.20                                 |  |
| Average Cycle Time                    | min/ Cycle | 6.51                                 |  |
| Fleet Size                            |            | 4                                    |  |
| Average No. of Bucket Passes          |            | 2.48                                 |  |

|                                |            |            |                                                                                    |
|--------------------------------|------------|------------|------------------------------------------------------------------------------------|
| <b>Haulage System</b>          |            |            |                                                                                    |
| Production per Year            | bcy/Year   | 19,692,305 |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                                    |
| Excavation Target              | bcy        | 845,574.00 |                                                                                    |
| Time to move Excavation Target | Days       | 15.68      |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 181        |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 723        |                                                                                    |
| Total cost to move Target      | \$         | 0          |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] C Pit Sec 1,409,450    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.55                   | 8.44               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 6.15               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 11.35              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 3103             | -8.0       | 3.0                     | 0.0                       | Full      | 2.10                   | 32.31              | 21.8               | 0.0                  | Final Sp.          | 16.8                       | -248.2                      | 0.0                         | 0.1             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 4.61               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 3.08               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 3103             | 8.0        | 3.0                     | 0.0                       | Empty     | 2.22                   | 34.07              | 18.9               | 0.0                  | Final Sp.          | 15.9                       | 248.2                       | 0.0                         | 80.3            |
| Total                                    |                     | 6,206            |            |                         |                           |           | 6.51                   | 100.00             |                    |                      |                    | 10.8                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] C Pit Sec 1,409,950**

**Material: [PRJ] Spoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 6090</b> |                                    |
|---------------------------------------|-------------|-------------------------------|------------------------------------|
| Availability                          | %           | 85.00                         |                                    |
| Bucket Fill Factor                    |             | 1.05                          |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.97                         |                                    |
| Average Payload                       | bcy         | 55.43                         |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                      | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                        | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                          |                                    |
| Production per Operating Hour         | bcy         | 5,098.52                      |                                    |
| Production per Loader Operating Shift | bcy         | 35,690                        | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 21,449,453                    | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 5.55                          |                                    |

| <b>Truck</b>                          |            | <b>[PRJ] Komatsu (Dresser) 830 E</b> |  |
|---------------------------------------|------------|--------------------------------------|--|
| Availability                          | %          | 100.00                               |  |
| Payload in Template                   | bcy        | 143.69                               |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                             |  |
| Average Payload                       | bcy        | 137.33                               |  |
| Production per Operating Hour         | bcy        | 1,274.63                             |  |
| Production per Loader Operating Shift | bcy        | 8,922                                |  |
| Production per Year                   | bcy        | 5,362,363                            |  |
| Queue Time at Loader                  | min/ Cycle | 0.60                                 |  |
| Spot Time at loader                   | min/ Cycle | 0.40                                 |  |
| Average Loading Time                  | min/ Cycle | 0.74                                 |  |
| Travel Time                           | min/ Cycle | 3.74                                 |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                                 |  |
| Average Dump Time                     | min/ Cycle | 0.20                                 |  |
| Average Cycle Time                    | min/ Cycle | 5.98                                 |  |
| Fleet Size                            |            | 4                                    |  |
| Average No. of Bucket Passes          |            | 2.48                                 |  |

| <b>Haulage System</b>          |            |            |                                                                                    |
|--------------------------------|------------|------------|------------------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 21,449,453 |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                                    |
| Excavation Target              | bcy        | 857,674.00 |                                                                                    |
| Time to move Excavation Target | Days       | 14.60      |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 168        |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 673        |                                                                                    |
| Total cost to move Target      | \$         | 0          |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] C Pit Sec 1,409,950    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.60                   | 10.05              |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 6.68               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 12.35              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 2998             | -6.0       | 3.0                     | 0.0                       | Full      | 1.83                   | 30.60              | 28.5               | 0.0                  | Final Sp.          | 18.6                       | -179.9                      | 0.0                         | 6.1             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 5.01               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 3.34               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 2998             | 6.0        | 3.0                     | 0.0                       | Empty     | 1.91                   | 31.96              | 23.0               | 0.0                  | Final Sp.          | 17.8                       | 179.9                       | 0.0                         | 72.2            |
| Total                                    |                     | 5,996            |            |                         |                           |           | 5.98                   | 100.00             |                    |                      |                    | 11.4                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] I Pit Section**

**Material: [PRJ] Spoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

|                                       |             |                               |                                    |
|---------------------------------------|-------------|-------------------------------|------------------------------------|
| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 6090</b> |                                    |
| Availability                          | %           | 85.00                         |                                    |
| Bucket Fill Factor                    |             | 1.05                          |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.96                         |                                    |
| Average Payload                       | bcy         | 55.42                         |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                      | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                        | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                          |                                    |
| Production per Operating Hour         | bcy         | 4,810.33                      |                                    |
| Production per Loader Operating Shift | bcy         | 33,672                        | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 20,237,038                    | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 8.27                          |                                    |

|                                       |            |                                      |  |
|---------------------------------------|------------|--------------------------------------|--|
| <b>Truck</b>                          |            | <b>[PRJ] Komatsu (Dresser) 830 E</b> |  |
| Availability                          | %          | 100.00                               |  |
| Payload in Template                   | bcy        | 143.69                               |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                             |  |
| Average Payload                       | bcy        | 137.36                               |  |
| Production per Operating Hour         | bcy        | 1,202.58                             |  |
| Production per Loader Operating Shift | bcy        | 8,418                                |  |
| Production per Year                   | bcy        | 5,059,260                            |  |
| Queue Time at Loader                  | min/ Cycle | 0.56                                 |  |
| Spot Time at loader                   | min/ Cycle | 0.40                                 |  |
| Average Loading Time                  | min/ Cycle | 0.74                                 |  |
| Travel Time                           | min/ Cycle | 4.15                                 |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                                 |  |
| Average Dump Time                     | min/ Cycle | 0.20                                 |  |
| Average Cycle Time                    | min/ Cycle | 6.34                                 |  |
| Fleet Size                            |            | 4                                    |  |
| Average No. of Bucket Passes          |            | 2.48                                 |  |

|                                |            |            |                                                                                    |
|--------------------------------|------------|------------|------------------------------------------------------------------------------------|
| <b>Haulage System</b>          |            |            |                                                                                    |
| Production per Year            | bcy/Year   | 20,237,038 |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                                    |
| Excavation Target              | bcy        | 477,772.00 |                                                                                    |
| Time to move Excavation Target | Days       | 8.62       |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 99         |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 397        |                                                                                    |
| Total cost to move Target      | \$         | 0          |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                     |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|---------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Material: [PRU] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                     |                            |                             |                             |                 |
| Roster: [PRU] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                     |                            |                             |                             |                 |
| Haul Cycle: [PRU] 1 Pit Section          |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                     |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Ulimit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/Ophr | % Duty<br>Cycle |
| [PRU] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                     |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.56                   | 8.79               |                    |                      |                     |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 6.30               |                    |                      |                     |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 11.66              |                    |                      |                     |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 4063             | -2.0       | 3.0                     | 0.0                       | Full      | 2.15                   | 33.85              | 35.3               | 0.0                  | Final Sp.           | 21.5                       | -81.3                       | 0.0                         | 45.7            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 4.73               |                    |                      |                     |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 3.16               |                    |                      |                     |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 4063             | 2.0        | 3.0                     | 0.0                       | Empty     | 2.00                   | 31.51              | 33.5               | 0.0                  | Final Sp.           | 23.1                       | 81.3                        | 0.0                         | 60.8            |
| Total                                    |                     | 8,126            |            |                         |                           |           | 6.34                   | 100.00             |                    |                      |                     | 14.6                       | 0                           |                             |                 |



# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] L Pit Sec 401,700**

**Material: [PRJ] Spoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 6090**

|                                       |             |            |                                    |
|---------------------------------------|-------------|------------|------------------------------------|
| Availability                          | %           | 85.00      |                                    |
| Bucket Fill Factor                    |             | 1.05       |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.99      |                                    |
| Average Payload                       | bcy         | 55.45      |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00   | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00     | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50       |                                    |
| Production per Operating Hour         | bcy         | 4,995.86   |                                    |
| Production per Loader Operating Shift | bcy         | 34,971     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 21,017,591 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 6.71       |                                    |

### Truck

**[PRJ] Komatsu (Dresser) 830 E**

|                                       |            |           |
|---------------------------------------|------------|-----------|
| Availability                          | %          | 100.00    |
| Payload in Template                   | bcy        | 143.69    |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |
| Average Payload                       | bcy        | 137.32    |
| Production per Operating Hour         | bcy        | 1,665.29  |
| Production per Loader Operating Shift | bcy        | 11,657    |
| Production per Year                   | bcy        | 7,005,864 |
| Queue Time at Loader                  | min/ Cycle | 0.42      |
| Spot Time at loader                   | min/ Cycle | 0.40      |
| Average Loading Time                  | min/ Cycle | 0.74      |
| Travel Time                           | min/ Cycle | 2.52      |
| Spot Time at Dump                     | min/ Cycle | 0.30      |
| Average Dump Time                     | min/ Cycle | 0.20      |
| Average Cycle Time                    | min/ Cycle | 4.58      |
| Fleet Size                            |            | 3         |
| Average No. of Bucket Passes          |            | 2.48      |

### Haulage System

|                                |            |            |                        |
|--------------------------------|------------|------------|------------------------|
| Production per Year            | bcy/Year   | 21,017,591 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck             |
| Excavation Target              | bcy        | 628,074.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 10.91      |                        |
| Loader Hrs to move Target      | Op. Hours. | 126        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 377        |                        |
| Total cost to move Target      | \$         | 0          |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|------------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Haul Cycle: [PRJ] L Pit Sec 401,700      |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>\$/gal/OpHr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                              |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.42                   | 9.18               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 8.72               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 16.11              |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment        | 1502             | -8.0       | 3.0                     | 0.0                       | Full      | 1.27                   | 27.70              | 21.8               | 0.0                  | Final Sp.          | 13.4                       | -120.2                      | 0.0                          | 0.1             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 6.54               |                    |                      |                    |                            |                             | 0.0                          |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 4.37               |                    |                      |                    |                            |                             | 0.0                          |                 |
| 1                                        | Haul Segment (rev.) | 1502             | 8.0        | 3.0                     | 0.0                       | Empty     | 1.25                   | 27.37              | 18.9               | 0.0                  | Final Sp.          | 13.6                       | 120.2                       | 0.0                          | 65.2            |
| Total                                    |                     | 3,004            |            |                         |                           |           | 4.58                   | 100.00             |                    |                      |                    | 7.4                        | 0                           |                              |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] L Pit Sec 402,200**

**Material: [PRJ] Spoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 6090**

|                                       |             |            |                                    |
|---------------------------------------|-------------|------------|------------------------------------|
| Availability                          | %           | 85.00      |                                    |
| Bucket Fill Factor                    |             | 1.05       |                                    |
| Average Bucket Load Volume            | cu.yards    | 61.01      |                                    |
| Average Payload                       | bcy         | 55.46      |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00   | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00     | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50       |                                    |
| Production per Operating Hour         | bcy         | 4,522.56   |                                    |
| Production per Loader Operating Shift | bcy         | 31,658     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 19,026,398 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 11.24      |                                    |

### Truck

**[PRJ] Komatsu (Dresser) 830 E**

|                                       |            |           |
|---------------------------------------|------------|-----------|
| Availability                          | %          | 100.00    |
| Payload in Template                   | bcy        | 143.69    |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |
| Average Payload                       | bcy        | 137.27    |
| Production per Operating Hour         | bcy        | 1,507.52  |
| Production per Loader Operating Shift | bcy        | 10,553    |
| Production per Year                   | bcy        | 6,342,133 |
| Queue Time at Loader                  | min/ Cycle | 0.39      |
| Spot Time at loader                   | min/ Cycle | 0.40      |
| Average Loading Time                  | min/ Cycle | 0.74      |
| Travel Time                           | min/ Cycle | 3.03      |
| Spot Time at Dump                     | min/ Cycle | 0.30      |
| Average Dump Time                     | min/ Cycle | 0.20      |
| Average Cycle Time                    | min/ Cycle | 5.06      |
| Fleet Size                            |            | 3         |
| Average No. of Bucket Passes          |            | 2.47      |

### Haulage System

|                                |            |            |                            |
|--------------------------------|------------|------------|----------------------------|
| Production per Year            | bcy/Year   | 19,026,398 |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck                 |
| Excavation Target              | bcy        | 463,296.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 8.89       |                            |
| Loader Hrs to move Target      | Op. Hours. | 102        |                            |
| Total Truck Hrs to move Target | Op. Hours. | 307        |                            |
| Total cost to move Target      | \$         | 0          |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] L Pit Sec 402,200      |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.39                   | 7.76               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 7.91               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 14.59              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 1950             | -8.0       | 3.0                     | 0.0                       | Full      | 1.50                   | 29.72              | 21.8               | 0.0                  | Final Sp.          | 14.7                       | -156.0                      | 0.0                         | 0.1             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 5.93               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 3.96               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 1950             | 8.0        | 3.0                     | 0.0                       | Empty     | 1.52                   | 30.14              | 18.9               | 0.0                  | Final Sp.          | 14.5                       | 156.0                       | 0.0                         | 71.3            |
| Total                                    |                     | 3,900            |            |                         |                           |           | 5.06                   | 100.00             |                    |                      |                    | 8.8                        | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] L Pit Sec 402,700

Material: [PRJ] Spoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 6090

|                                       |             |            |                                    |
|---------------------------------------|-------------|------------|------------------------------------|
| Availability                          | %           | 85.00      |                                    |
| Bucket Fill Factor                    |             | 1.05       |                                    |
| Average Bucket Load Volume            | cu.yards    | 61.05      |                                    |
| Average Payload                       | bcy         | 55.50      |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00   | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00     | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50       |                                    |
| Production per Operating Hour         | bcy         | 4,661.47   |                                    |
| Production per Loader Operating Shift | bcy         | 32,630     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 19,610,808 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 9.95       |                                    |

### Truck

[PRJ] Komatsu (Dresser) 830 E

|                                       |            |           |
|---------------------------------------|------------|-----------|
| Availability                          | %          | 100.00    |
| Payload in Template                   | bcy        | 143.69    |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |
| Average Payload                       | bcy        | 137.23    |
| Production per Operating Hour         | bcy        | 1,553.82  |
| Production per Loader Operating Shift | bcy        | 10,877    |
| Production per Year                   | bcy        | 6,536,936 |
| Queue Time at Loader                  | min/ Cycle | 0.40      |
| Spot Time at loader                   | min/ Cycle | 0.40      |
| Average Loading Time                  | min/ Cycle | 0.74      |
| Travel Time                           | min/ Cycle | 2.87      |
| Spot Time at Dump                     | min/ Cycle | 0.30      |
| Average Dump Time                     | min/ Cycle | 0.20      |
| Average Cycle Time                    | min/ Cycle | 4.91      |
| Fleet Size                            |            | 3         |
| Average No. of Bucket Passes          |            | 2.47      |

### Haulage System

|                                |            |            |                        |
|--------------------------------|------------|------------|------------------------|
| Production per Year            | bcy/Year   | 19,610,808 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck             |
| Excavation Target              | bcy        | 399,981.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 7.45       |                        |
| Loader Hrs to move Target      | Op. Hours. | 86         |                        |
| Total Truck Hrs to move Target | Op. Hours. | 257        |                        |
| Total cost to move Target      | \$         | 0          |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Spoil                    |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
|------------------------------------------|---------------------|----------|-------|-----------------|-------------|-------|--------------|------------|----------|------------|-----------------|------------------|------------------|------------|--------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Haulage System: Haulage System-1         |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Haul Cycle: [PRJ] L Pit Sec 402,700      |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Type                                     | Segment Title       | Distance | Grade | Rolling Resist. | Curve Angle | Load  | Segment Time | Cycle Time | Max Vel. | Final Vel. | Velocity Limit. | Average Velocity | Elevation Change | Fuel Usage | % Duty Cycle |
|                                          |                     | feet     | %     | %               | degrees     | %     | min          | %          | mph      | mph        |                 | mph              | feet             | S.gal/OpHr | %            |
| [PRJ] Komatsu (Dresser) 830 E            |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Queue                                    | Queue at Loader     | Auto     | Mins  |                 |             |       | 0.40         | 8.12       |          |            |                 |                  |                  | 0.0        |              |
| Spot                                     | Spot Time at loader | Auto     | Mins  |                 |             |       | 0.40         | 8.15       |          |            |                 |                  |                  | 0.0        |              |
| Load                                     | Loading             | Auto     | Mins  |                 |             |       | 0.74         | 15.01      |          |            |                 |                  |                  | 0.0        |              |
| 1                                        | Haul Segment        | 1813     | -8.0  | 3.0             | 0.0         | Full  | 1.43         | 29.16      | 21.8     | 0.0        | Final Sp.       | 14.4             | -145.0           | 0.0        | 0.1          |
| Spot                                     | Spot Time at Dump   | Auto     | Mins  |                 |             |       | 0.30         | 6.11       |          |            |                 |                  |                  | 0.0        |              |
| Dump                                     | Dumping             | Auto     | Mins  |                 |             |       | 0.20         | 4.08       |          |            |                 |                  |                  | 0.0        |              |
| 1                                        | Haul Segment (rev.) | 1813     | 8.0   | 3.0             | 0.0         | Empty | 1.44         | 29.37      | 18.9     | 0.0        | Final Sp.       | 14.3             | 145.0            | 0.0        | 69.7         |
| Total                                    |                     | 3,626    |       |                 |             |       | 4.91         | 100.00     |          |            |                 | 8.4              | 0                |            |              |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] L Pit Sec 403,200**

**Material: [PRJ] Spoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

|                                       |             |                               |                                    |
|---------------------------------------|-------------|-------------------------------|------------------------------------|
| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 6090</b> |                                    |
| Availability                          | %           | 85.00                         |                                    |
| Bucket Fill Factor                    |             | 1.05                          |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.94                         |                                    |
| Average Payload                       | bcy         | 55.40                         |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                      | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                        | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                          |                                    |
| Production per Operating Hour         | bcy         | 4,477.35                      |                                    |
| Production per Loader Operating Shift | bcy         | 31,341                        | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 18,836,197                    | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 11.63                         |                                    |

|                                       |            |                                      |  |
|---------------------------------------|------------|--------------------------------------|--|
| <b>Truck</b>                          |            | <b>[PRJ] Komatsu (Dresser) 830 E</b> |  |
| Availability                          | %          | 100.00                               |  |
| Payload in Template                   | bcy        | 143.69                               |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                             |  |
| Average Payload                       | bcy        | 137.37                               |  |
| Production per Operating Hour         | bcy        | 1,492.45                             |  |
| Production per Loader Operating Shift | bcy        | 10,447                               |  |
| Production per Year                   | bcy        | 6,278,732                            |  |
| Queue Time at Loader                  | min/ Cycle | 0.39                                 |  |
| Spot Time at loader                   | min/ Cycle | 0.40                                 |  |
| Average Loading Time                  | min/ Cycle | 0.74                                 |  |
| Travel Time                           | min/ Cycle | 3.08                                 |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                                 |  |
| Average Dump Time                     | min/ Cycle | 0.20                                 |  |
| Average Cycle Time                    | min/ Cycle | 5.11                                 |  |
| Fleet Size                            |            | 3                                    |  |
| Average No. of Bucket Passes          |            | 2.48                                 |  |

|                                |            |            |                                                                                    |
|--------------------------------|------------|------------|------------------------------------------------------------------------------------|
| <b>Haulage System</b>          |            |            |                                                                                    |
| Production per Year            | bcy/Year   | 18,836,197 |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                                    |
| Excavation Target              | bcy        | 418,926.00 |                                                                                    |
| Time to move Excavation Target | Days       | 8.12       |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 94         |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 281        |                                                                                    |
| Total cost to move Target      | \$         | 0          |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] L Pit Sec 403.200      |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/Ophr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.39                   | 7.62               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 7.82               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 14.47              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 2000             | -8.0       | 3.0                     | 0.0                       | Full      | 1.53                   | 29.90              | 21.8               | 0.0                  | Final Sp.          | 14.9                       | -160.0                      | 0.0                         | 0.1             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 5.87               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 3.92               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 2000             | 8.0        | 3.0                     | 0.0                       | Empty     | 1.55                   | 30.40              | 18.9               | 0.0                  | Final Sp.          | 14.6                       | 160.0                       | 0.0                         | 71.9            |
| Total                                    |                     | 4,000            |            |                         |                           |           | 5.11                   | 100.00             |                    |                      |                    | 8.9                        | 0                           |                             |                 |



# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] L Pit Sec 403,700

Material: [PRJ] Spoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 6090

|                                       |             |            |                                    |
|---------------------------------------|-------------|------------|------------------------------------|
| Availability                          | %           | 85.00      |                                    |
| Bucket Fill Factor                    |             | 1.05       |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.99      |                                    |
| Average Payload                       | bcy         | 55.45      |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00   | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00     | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50       |                                    |
| Production per Operating Hour         | bcy         | 4,360.69   |                                    |
| Production per Loader Operating Shift | bcy         | 30,525     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 18,345,403 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 12.79      |                                    |

### Truck

[PRJ] Komatsu (Dresser) 830 E

|                                       |            |           |
|---------------------------------------|------------|-----------|
| Availability                          | %          | 100.00    |
| Payload in Template                   | bcy        | 143.69    |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |
| Average Payload                       | bcy        | 137.30    |
| Production per Operating Hour         | bcy        | 1,453.56  |
| Production per Loader Operating Shift | bcy        | 10,175    |
| Production per Year                   | bcy        | 6,115,134 |
| Queue Time at Loader                  | min/ Cycle | 0.39      |
| Spot Time at loader                   | min/ Cycle | 0.40      |
| Average Loading Time                  | min/ Cycle | 0.74      |
| Travel Time                           | min/ Cycle | 3.22      |
| Spot Time at Dump                     | min/ Cycle | 0.30      |
| Average Dump Time                     | min/ Cycle | 0.20      |
| Average Cycle Time                    | min/ Cycle | 5.25      |
| Fleet Size                            |            | 3         |
| Average No. of Bucket Passes          |            | 2.48      |

### Haulage System

|                                |            |            |                        |
|--------------------------------|------------|------------|------------------------|
| Production per Year            | bcy/Year   | 18,345,403 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck             |
| Excavation Target              | bcy        | 511,111.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 10.18      |                        |
| Loader Hrs to move Target      | Op. Hours. | 117        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 352        |                        |
| Total cost to move Target      | \$         | 0          |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] L Pit Sec 403,700      |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.39                   | 7.41               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 7.62               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 14.06              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 2125             | -8.0       | 3.0                     | 0.0                       | Full      | 1.59                   | 30.35              | 21.8               | 0.0                  | Final Sp.          | 15.1                       | -170.0                      | 0.0                         | 0.1             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 5.71               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 3.82               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 2125             | 8.0        | 3.0                     | 0.0                       | Empty     | 1.63                   | 31.03              | 18.9               | 0.0                  | Final Sp.          | 14.8                       | 170.0                       | 0.0                         | 73.2            |
| Total                                    |                     | 4,250            |            |                         |                           |           | 5.25                   | 100.00             |                    |                      |                    | 9.2                        | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] L Pit Sec 407,200

Material: [PRJ] Spoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 6090 |                                    |
|---------------------------------------|-------------|------------------------|------------------------------------|
| Availability                          | %           | 85.00                  |                                    |
| Bucket Fill Factor                    |             | 1.05                   |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.99                  |                                    |
| Average Payload                       | bcy         | 55.44                  |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00               | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                 | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                   |                                    |
| Production per Operating Hour         | bcy         | 4,623.70               |                                    |
| Production per Loader Operating Shift | bcy         | 32,366                 | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 19,451,899             | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 10.27                  |                                    |

| Truck                                 |            | [PRJ] Komatsu (Dresser) 830 E |  |
|---------------------------------------|------------|-------------------------------|--|
| Availability                          | %          | 100.00                        |  |
| Payload in Template                   | bcy        | 143.69                        |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                      |  |
| Average Payload                       | bcy        | 137.30                        |  |
| Production per Operating Hour         | bcy        | 1,541.23                      |  |
| Production per Loader Operating Shift | bcy        | 10,789                        |  |
| Production per Year                   | bcy        | 6,483,966                     |  |
| Queue Time at Loader                  | min/ Cycle | 0.39                          |  |
| Spot Time at loader                   | min/ Cycle | 0.40                          |  |
| Average Loading Time                  | min/ Cycle | 0.74                          |  |
| Travel Time                           | min/ Cycle | 2.92                          |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                          |  |
| Average Dump Time                     | min/ Cycle | 0.20                          |  |
| Average Cycle Time                    | min/ Cycle | 4.95                          |  |
| Fleet Size                            |            | 3                             |  |
| Average No. of Bucket Passes          |            | 2.48                          |  |

| Haulage System                 |            |            |                                                                             |
|--------------------------------|------------|------------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 19,451,899 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                             |
| Excavation Target              | bcy        | 89,164.00  |                                                                             |
| Time to move Excavation Target | Days       | 1.67       |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 19         |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 58         |                                                                             |
| Total cost to move Target      | \$         | 0          |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

| Full Simulation Results                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] L Pit Sec 407 200      |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.39                   | 7.94               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 8.08               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 14.91              |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 1855             | -8.0       | 3.0                     | 0.0                       | Full      | 1.45                   | 29.35              | 21.8               | 0.0                  | Final Sp.          | 14.5                       | -148.4                      | 0.0                         | 0.1             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 6.06               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 4.04               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 1855             | 8.0        | 3.0                     | 0.0                       | Empty     | 1.47                   | 29.63              | 18.9               | 0.0                  | Final Sp.          | 14.4                       | 148.4                       | 0.0                         | 70.2            |
| Total                                    |                     | 3,710            |            |                         |                           |           | 4.95                   | 100.00             |                    |                      |                    | 8.5                        | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] N Pit Sec 1,426,750

Material: [PRJ] Spoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

### Loader

[PRJ] Caterpillar 6090

|                                       |             |            |                                    |
|---------------------------------------|-------------|------------|------------------------------------|
| Availability                          | %           | 85.00      |                                    |
| Bucket Fill Factor                    |             | 1.05       |                                    |
| Average Bucket Load Volume            | cu.yards    | 61.00      |                                    |
| Average Payload                       | bcy         | 55.46      |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00   | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00     | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50       |                                    |
| Production per Operating Hour         | bcy         | 4,682.26   |                                    |
| Production per Loader Operating Shift | bcy         | 32,776     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 19,698,282 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 9.31       |                                    |

### Truck

[PRJ] Komatsu (Dresser) 830 E

|                                       |            |           |  |
|---------------------------------------|------------|-----------|--|
| Availability                          | %          | 100.00    |  |
| Payload in Template                   | bcy        | 143.69    |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |  |
| Average Payload                       | bcy        | 137.27    |  |
| Production per Operating Hour         | bcy        | 936.45    |  |
| Production per Loader Operating Shift | bcy        | 6,555     |  |
| Production per Year                   | bcy        | 3,939,656 |  |
| Queue Time at Loader                  | min/ Cycle | 0.68      |  |
| Spot Time at loader                   | min/ Cycle | 0.40      |  |
| Average Loading Time                  | min/ Cycle | 0.74      |  |
| Travel Time                           | min/ Cycle | 5.81      |  |
| Spot Time at Dump                     | min/ Cycle | 0.30      |  |
| Average Dump Time                     | min/ Cycle | 0.20      |  |
| Average Cycle Time                    | min/ Cycle | 8.13      |  |
| Fleet Size                            |            | 5         |  |
| Average No. of Bucket Passes          |            | 2.48      |  |

### Haulage System

|                                |            |            |                        |
|--------------------------------|------------|------------|------------------------|
| Production per Year            | bcy/Year   | 19,698,282 |                        |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology    |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided           |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck             |
| Excavation Target              | bcy        | 473,933.00 | Average for 150 Shifts |
| Time to move Excavation Target | Days       | 8.79       |                        |
| Loader Hrs to move Target      | Op. Hours. | 101        |                        |
| Total Truck Hrs to move Target | Op. Hours. | 506        |                        |
| Total cost to move Target      | \$         | 0          |                        |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] N Pit Sec 1,426,750    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.68                   | 8.35               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 4.92               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 9.08               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 4432             | -8.0       | 3.0                     | 0.0                       | Full      | 2.79                   | 34.38              | 21.8               | 0.0                  | Final Sp.          | 18.0                       | -354.6                      | 0.0                         | 0.1             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 3.69               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 2.47               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 2                                        | Haul Segment (rev.) | 4432             | 8.0        | 3.0                     | 0.0                       | Empty     | 3.02                   | 37.11              | 18.9               | 0.0                  | Final Sp.          | 16.7                       | 354.6                       | 0.0                         | 85.5            |
| Total                                    |                     | 8,864            |            |                         |                           |           | 8.13                   | 100.00             |                    |                      |                    | 12.4                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] N Pit Sec 1,427,250

Material: [PRJ] Spoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 6090 |                                    |
|---------------------------------------|-------------|------------------------|------------------------------------|
| Availability                          | %           | 85.00                  |                                    |
| Bucket Fill Factor                    |             | 1.05                   |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.96                  |                                    |
| Average Payload                       | bcy         | 55.42                  |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00               | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                 | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                   |                                    |
| Production per Operating Hour         | bcy         | 5,373.14               |                                    |
| Production per Loader Operating Shift | bcy         | 37,612                 | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 22,604,807             | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 3.25                   |                                    |

| Truck                                 |            | [PRJ] Komatsu (Dresser) 830 E |  |
|---------------------------------------|------------|-------------------------------|--|
| Availability                          | %          | 100.00                        |  |
| Payload in Template                   | bcy        | 143.69                        |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                      |  |
| Average Payload                       | bcy        | 137.33                        |  |
| Production per Operating Hour         | bcy        | 2,686.57                      |  |
| Production per Loader Operating Shift | bcy        | 18,806                        |  |
| Production per Year                   | bcy        | 11,302,404                    |  |
| Queue Time at Loader                  | min/ Cycle | 0.30                          |  |
| Spot Time at loader                   | min/ Cycle | 0.40                          |  |
| Average Loading Time                  | min/ Cycle | 0.74                          |  |
| Travel Time                           | min/ Cycle | 0.91                          |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                          |  |
| Average Dump Time                     | min/ Cycle | 0.20                          |  |
| Average Cycle Time                    | min/ Cycle | 2.85                          |  |
| Fleet Size                            |            | 2                             |  |
| Average No. of Bucket Passes          |            | 2.48                          |  |

| Haulage System                 |            |            |                                                                             |
|--------------------------------|------------|------------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 22,604,807 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                             |
| Excavation Target              | bcy        | 117,759.00 |                                                                             |
| Time to move Excavation Target | Days       | 1.90       |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 22         |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 44         |                                                                             |
| Total cost to move Target      | \$         | 0          |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] N Pit Sec 1,427,250    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/Optr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.30                   | 10.46              |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 14.04              |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 25.94              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 221              | 6.0        | 3.0                     | 0.0                       | Full      | 0.49                   | 17.13              | 9.1                | 0.0                  | Final Sp.         | 5.1                        | 13.3                        | 0.0                         | 44.5            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 10.53              |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 7.03               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 221              | -6.0       | 3.0                     | 0.0                       | Empty     | 0.42                   | 14.87              | 12.4               | 0.0                  | Final Sp.         | 5.9                        | -13.3                       | 0.0                         | 2.0             |
| Total                                    |                     | 442              |            |                         |                           |           | 2.85                   | 100.00             |                    |                      |                   | 1.8                        | 0                           |                             |                 |



# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] N Pit Sec 1,427,250a**

**Material: [PRJ] Spoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

|                                       |             |                               |                                    |
|---------------------------------------|-------------|-------------------------------|------------------------------------|
| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 6090</b> |                                    |
| Availability                          | %           | 85.00                         |                                    |
| Bucket Fill Factor                    |             | 1.05                          |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.98                         |                                    |
| Average Payload                       | bcy         | 55.44                         |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                      | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                        | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                          |                                    |
| Production per Operating Hour         | bcy         | 4,515.31                      |                                    |
| Production per Loader Operating Shift | bcy         | 31,607                        | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 18,995,900                    | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 10.89                         |                                    |

|                                       |            |                                      |  |
|---------------------------------------|------------|--------------------------------------|--|
| <b>Truck</b>                          |            | <b>[PRJ] Komatsu (Dresser) 830 E</b> |  |
| Availability                          | %          | 100.00                               |  |
| Payload in Template                   | bcy        | 143.69                               |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                             |  |
| Average Payload                       | bcy        | 137.31                               |  |
| Production per Operating Hour         | bcy        | 903.06                               |  |
| Production per Loader Operating Shift | bcy        | 6,321                                |  |
| Production per Year                   | bcy        | 3,799,180                            |  |
| Queue Time at Loader                  | min/ Cycle | 0.67                                 |  |
| Spot Time at loader                   | min/ Cycle | 0.40                                 |  |
| Average Loading Time                  | min/ Cycle | 0.74                                 |  |
| Travel Time                           | min/ Cycle | 6.11                                 |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                                 |  |
| Average Dump Time                     | min/ Cycle | 0.20                                 |  |
| Average Cycle Time                    | min/ Cycle | 8.42                                 |  |
| Fleet Size                            |            | 5                                    |  |
| Average No. of Bucket Passes          |            | 2.48                                 |  |

|                                |            |            |                                                                                    |
|--------------------------------|------------|------------|------------------------------------------------------------------------------------|
| <b>Haulage System</b>          |            |            |                                                                                    |
| Production per Year            | bcy/Year   | 18,995,900 |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                                    |
| Excavation Target              | bcy        | 847,352.00 |                                                                                    |
| Time to move Excavation Target | Days       | 16.29      |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 188        |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 938        |                                                                                    |
| Total cost to move Target      | \$         | 0          |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

## Full Simulation Results

| Material: [PRJ] Spoil                    |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
|------------------------------------------|---------------------|----------|-------|-----------------|-------------|-------|--------------|------------|----------|------------|-----------------|------------------|------------------|------------|--------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Haulage System: Haulage System-1         |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Haul Cycle: [PRJ] N Pit Sec 1,427,250a   |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Type                                     | Segment Title       | Distance | Grade | Rolling Resist. | Curve Angle | Load  | Segment Time | Cycle Time | Max Vel. | Final Vel. | Velocity Limit. | Average Velocity | Elevation Change | Fuel Usage | % Duty Cycle |
|                                          |                     | feet     | %     | %               | degrees     | %     | min          | %          | mph      | mph        |                 | mph              | feet S.gal/OpHr  |            | %            |
| [PRJ] Komatsu (Dresser) 830 E            |                     |          |       |                 |             |       |              |            |          |            |                 |                  |                  |            |              |
| Queue                                    | Queue at Loader     | Auto     | Mins  |                 |             |       | 0.67         | 7.91       |          |            |                 |                  |                  | 0.0        |              |
| Spot                                     | Spot Time at loader | Auto     | Mins  |                 |             |       | 0.40         | 4.75       |          |            |                 |                  |                  | 0.0        |              |
| Load                                     | Loading             | Auto     | Mins  |                 |             |       | 0.74         | 8.78       |          |            |                 |                  |                  | 0.0        |              |
| 1                                        | Haul Segment        | 4701     | -8.0  | 3.0             | 0.0         | Full  | 2.93         | 34.86      | 21.8     | 0.0        | Final Sp.       | 18.2             | -376.1           | 0.0        | 0.1          |
| Spot                                     | Spot Time at Dump   | Auto     | Mins  |                 |             |       | 0.30         | 3.56       |          |            |                 |                  |                  | 0.0        |              |
| Dump                                     | Dumping             | Auto     | Mins  |                 |             |       | 0.20         | 2.38       |          |            |                 |                  |                  | 0.0        |              |
| 2                                        | Haul Segment (rev.) | 4701     | 8.0   | 3.0             | 0.0         | Empty | 3.18         | 37.76      | 18.9     | 0.0        | Final Sp.       | 16.8             | 376.1            | 0.0        | 86.2         |
| Total                                    |                     | 9,402    |       |                 |             |       | 8.42         | 100.00     |          |            |                 | 12.7             | 0                |            |              |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] N Pit Sec 1,427,750**

**Material: [PRJ] Spoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

|                                       |             |                               |                                    |
|---------------------------------------|-------------|-------------------------------|------------------------------------|
| <b>Loader</b>                         |             | <b>[PRJ] Caterpillar 6090</b> |                                    |
| Availability                          | %           | 85.00                         |                                    |
| Bucket Fill Factor                    |             | 1.05                          |                                    |
| Average Bucket Load Volume            | cu.yards    | 61.02                         |                                    |
| Average Payload                       | bcy         | 55.47                         |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00                      | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                        | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                          |                                    |
| Production per Operating Hour         | bcy         | 4,175.71                      |                                    |
| Production per Loader Operating Shift | bcy         | 29,230                        | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 17,567,225                    | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 14.31                         |                                    |

|                                       |            |                                      |  |
|---------------------------------------|------------|--------------------------------------|--|
| <b>Truck</b>                          |            | <b>[PRJ] Komatsu (Dresser) 830 E</b> |  |
| Availability                          | %          | 100.00                               |  |
| Payload in Template                   | bcy        | 143.69                               |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                             |  |
| Average Payload                       | bcy        | 137.26                               |  |
| Production per Operating Hour         | bcy        | 1,043.93                             |  |
| Production per Loader Operating Shift | bcy        | 7,307                                |  |
| Production per Year                   | bcy        | 4,391,806                            |  |
| Queue Time at Loader                  | min/ Cycle | 0.52                                 |  |
| Spot Time at loader                   | min/ Cycle | 0.40                                 |  |
| Average Loading Time                  | min/ Cycle | 0.74                                 |  |
| Travel Time                           | min/ Cycle | 5.14                                 |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                                 |  |
| Average Dump Time                     | min/ Cycle | 0.20                                 |  |
| Average Cycle Time                    | min/ Cycle | 7.29                                 |  |
| Fleet Size                            |            | 4                                    |  |
| Average No. of Bucket Passes          |            | 2.47                                 |  |

|                                |            |            |                                                                                    |
|--------------------------------|------------|------------|------------------------------------------------------------------------------------|
| <b>Haulage System</b>          |            |            |                                                                                    |
| Production per Year            | bcy/Year   | 17,567,225 |                                                                                    |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b><br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                                    |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                                    |
| Excavation Target              | bcy        | 681,519.00 |                                                                                    |
| Time to move Excavation Target | Days       | 14.17      |                                                                                    |
| Loader Hrs to move Target      | Op. Hours. | 163        |                                                                                    |
| Total Truck Hrs to move Target | Op. Hours. | 653        |                                                                                    |
| Total cost to move Target      | \$         | 0          |                                                                                    |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

| Full Simulation Results                  |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] N Pit Sec 1,427,750    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Umit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.52                   | 7.10               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 5.49               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 10.11              |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 5124             | 0.0        | 3.0                     | 0.0                       | Full      | 2.85                   | 39.11              | 28.3               | 0.0                  | Final Sp.         | 20.4                       | 0.0                         | 0.0                         | 70.5            |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 4.11               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 2.75               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 5124             | 0.0        | 3.0                     | 0.0                       | Empty     | 2.28                   | 31.33              | 35.3               | 0.0                  | Final Sp.         | 25.5                       | 0.0                         | 0.0                         | 49.3            |
| Total                                    |                     | 10,248           |            |                         |                           |           | 7.29                   | 100.00             |                    |                      |                   | 16.0                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

Haulage System: Haulage System-1

Haul Cycle: [PRJ] N Pit Sec 1,428,250

Material: [PRJ] Spoil

Roster: [PRJ] 5 day Week - 8 Hour Shifts

| Loader                                |             | [PRJ] Caterpillar 6090 |                                    |
|---------------------------------------|-------------|------------------------|------------------------------------|
| Availability                          | %           | 85.00                  |                                    |
| Bucket Fill Factor                    |             | 1.05                   |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.97                  |                                    |
| Average Payload                       | bcy         | 55.43                  |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00               | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00                 | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50                   |                                    |
| Production per Operating Hour         | bcy         | 4,821.10               |                                    |
| Production per Loader Operating Shift | bcy         | 33,748                 | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 20,282,371             | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 7.80                   |                                    |

| Truck                                 |            | [PRJ] Komatsu (Dresser) 830 E |  |
|---------------------------------------|------------|-------------------------------|--|
| Availability                          | %          | 100.00                        |  |
| Payload in Template                   | bcy        | 143.69                        |  |
| Operating Hours per Year              | OpHr/Year  | 4,207.00                      |  |
| Average Payload                       | bcy        | 137.34                        |  |
| Production per Operating Hour         | bcy        | 803.52                        |  |
| Production per Loader Operating Shift | bcy        | 5,625                         |  |
| Production per Year                   | bcy        | 3,380,395                     |  |
| Queue Time at Loader                  | min/ Cycle | 0.85                          |  |
| Spot Time at loader                   | min/ Cycle | 0.40                          |  |
| Average Loading Time                  | min/ Cycle | 0.74                          |  |
| Travel Time                           | min/ Cycle | 6.96                          |  |
| Spot Time at Dump                     | min/ Cycle | 0.30                          |  |
| Average Dump Time                     | min/ Cycle | 0.20                          |  |
| Average Cycle Time                    | min/ Cycle | 9.45                          |  |
| Fleet Size                            |            | 6                             |  |
| Average No. of Bucket Passes          |            | 2.48                          |  |

| Haulage System                 |            |            |                                                                             |
|--------------------------------|------------|------------|-----------------------------------------------------------------------------|
| Production per Year            | bcy/Year   | 20,282,371 |                                                                             |
| Discounted Capital Cost        | \$/bcy     | 0.00       | Loading Methodology<br>Single Sided<br>Full Truck<br>Average for 150 Shifts |
| Discounted Operating Cost      | \$/bcy     | 0.00       |                                                                             |
| Discounted Average Cost        | \$/bcy     | 0.00       |                                                                             |
| Excavation Target              | bcy        | 244,259.00 |                                                                             |
| Time to move Excavation Target | Days       | 4.40       |                                                                             |
| Loader Hrs to move Target      | Op. Hours. | 51         |                                                                             |
| Total Truck Hrs to move Target | Op. Hours. | 304        |                                                                             |
| Total cost to move Target      | \$         | 0          |                                                                             |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|-------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Haul Cycle: [PRJ] N Pit Sec 1,428,250    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                   |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.85                   | 9.00               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 4.23               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 7.83               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 5452             | -8.0       | 3.0                     | 0.0                       | Full      | 3.33                   | 35.21              | 21.8               | 0.0                  | Final Sp.         | 18.6                       | -436.2                      | 0.0                         | 0.0             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 3.18               |                    |                      |                   |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 2.12               |                    |                      |                   |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 5452             | 8.0        | 3.0                     | 0.0                       | Empty     | 3.63                   | 38.43              | 18.9               | 0.0                  | Final Sp.         | 17.1                       | 436.2                       | 0.0                         | 88.0            |
| Total                                    |                     | 10,904           |            |                         |                           |           | 9.45                   | 100.00             |                    |                      |                   | 13.1                       | 0                           |                             |                 |

# Productivity

## Production Summary - Full Simulation

**Haulage System: Haulage System-1**

**Haul Cycle: [PRJ] N Pit Sec 1,428,750**

**Material: [PRJ] Spoil**

**Roster: [PRJ] 5 day Week - 8 Hour Shifts**

### Loader

**[PRJ] Caterpillar 6090**

|                                       |             |            |                                    |
|---------------------------------------|-------------|------------|------------------------------------|
| Availability                          | %           | 85.00      |                                    |
| Bucket Fill Factor                    |             | 1.05       |                                    |
| Average Bucket Load Volume            | cu.yards    | 60.93      |                                    |
| Average Payload                       | bcy         | 55.39      |                                    |
| Operating Hours per Year              | OpHr/Year   | 4,207.00   | Op. hrs factored by availability   |
| Average Operating Shifts per Year     | shifts/Year | 601.00     | Shifts factored by availability    |
| Average Bucket Cycle Time             | min         | 0.50       |                                    |
| Production per Operating Hour         | bcy         | 4,333.43   |                                    |
| Production per Loader Operating Shift | bcy         | 30,334     | Max. prod. based on 100% avail.    |
| Production per Year                   | bcy         | 18,230,727 | Avg. production factored by avail. |
| Wait Time per Operating Hour          | min         | 12.33      |                                    |

### Truck

**[PRJ] Komatsu (Dresser) 830 E**

|                                       |            |           |
|---------------------------------------|------------|-----------|
| Availability                          | %          | 100.00    |
| Payload in Template                   | bcy        | 143.69    |
| Operating Hours per Year              | OpHr/Year  | 4,207.00  |
| Average Payload                       | bcy        | 137.38    |
| Production per Operating Hour         | bcy        | 722.24    |
| Production per Loader Operating Shift | bcy        | 5,056     |
| Production per Year                   | bcy        | 3,038,455 |
| Queue Time at Loader                  | min/ Cycle | 0.77      |
| Spot Time at loader                   | min/ Cycle | 0.40      |
| Average Loading Time                  | min/ Cycle | 0.74      |
| Travel Time                           | min/ Cycle | 8.10      |
| Spot Time at Dump                     | min/ Cycle | 0.30      |
| Average Dump Time                     | min/ Cycle | 0.20      |
| Average Cycle Time                    | min/ Cycle | 10.51     |
| Fleet Size                            |            | 6         |
| Average No. of Bucket Passes          |            | 2.48      |

### Haulage System

|                                |            |            |                            |
|--------------------------------|------------|------------|----------------------------|
| Production per Year            | bcy/Year   | 18,230,727 |                            |
| Discounted Capital Cost        | \$/bcy     | 0.00       | <b>Loading Methodology</b> |
| Discounted Operating Cost      | \$/bcy     | 0.00       | Single Sided               |
| Discounted Average Cost        | \$/bcy     | 0.00       | Full Truck                 |
| Excavation Target              | bcy        | 154,648.00 | Average for 150 Shifts     |
| Time to move Excavation Target | Days       | 3.10       |                            |
| Loader Hrs to move Target      | Op. Hours. | 36         |                            |
| Total Truck Hrs to move Target | Op. Hours. | 214        |                            |
| Total cost to move Target      | \$         | 0          |                            |

Productivity estimates allow for insufficient time at the end of the shift to complete another cycle.

Time for the first bucket pass coincides with the truck queuing and maneuvering times.

This simulation is based on data provided by the equipment manufacturer.

Equipment data should be checked to ensure it is valid for this site.

# Full Simulation Results

| Material: [PRJ] Spoil                    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
|------------------------------------------|---------------------|------------------|------------|-------------------------|---------------------------|-----------|------------------------|--------------------|--------------------|----------------------|--------------------|----------------------------|-----------------------------|-----------------------------|-----------------|
| Roster: [PRJ] 5 day Week - 8 Hour Shifts |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haulage System: Haulage System-1         |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Haul Cycle: [PRJ] N Pit Sec 1,428,750    |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Type                                     | Segment Title       | Distance<br>feet | Grade<br>% | Rolling<br>Resist.<br>% | Curve<br>Angle<br>degrees | Load<br>% | Segment<br>Time<br>min | Cycle<br>Time<br>% | Max<br>Vel.<br>mph | Final<br>Vel.<br>mph | Velocity<br>Limit. | Average<br>Velocity<br>mph | Elevation<br>Change<br>feet | Fuel<br>Usage<br>S.gal/OpHr | % Duty<br>Cycle |
| [PRJ] Komatsu (Dresser) 830 E            |                     |                  |            |                         |                           |           |                        |                    |                    |                      |                    |                            |                             |                             |                 |
| Queue                                    | Queue at Loader     | Auto             | Mins       |                         |                           |           | 0.77                   | 7.29               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Spot                                     | Spot Time at loader | Auto             | Mins       |                         |                           |           | 0.40                   | 3.81               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Load                                     | Loading             | Auto             | Mins       |                         |                           |           | 0.74                   | 7.05               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment        | 6471             | -8.0       | 3.0                     | 0.0                       | Full      | 3.86                   | 36.71              | 21.8               | 0.0                  | Final Sp.          | 19.1                       | -517.7                      | 0.0                         | 0.0             |
| Spot                                     | Spot Time at Dump   | Auto             | Mins       |                         |                           |           | 0.30                   | 2.86               |                    |                      |                    |                            |                             | 0.0                         |                 |
| Dump                                     | Dumping             | Auto             | Mins       |                         |                           |           | 0.20                   | 1.90               |                    |                      |                    |                            |                             | 0.0                         |                 |
| 1                                        | Haul Segment (rev.) | 6471             | 8.0        | 3.0                     | 0.0                       | Empty     | 4.24                   | 40.38              | 18.9               | 0.0                  | Final Sp.          | 17.3                       | 517.7                       | 0.0                         | 89.7            |
| Total                                    |                     | 12,942           |            |                         |                           |           | 10.51                  | 100.00             |                    |                      |                    | 14.0                       | 0                           |                             |                 |