# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #1
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

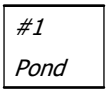
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | Disturbed Area | Undisturbed Area |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Pond #1, 10yr During Mining |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 29.700 | 29.700 | 57.50 | 5.56 | 610.5 | 194,439 | 124.08 | 48.93 |
| | Out | | | 16.60 | 5.04 | 91.3 | 36,131 | 0.05 | 0.02 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 14.49 |
| | Out | 0.01 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.167% | 100.000% |
| 1.0000 | 86.318% | 100.000% |
| 0.5000 | 78.481% | 100.000% |
| 0.3000 | 73.516% | 100.000% |
| 0.2000 | 67.557% | 100.000% |
| 0.1000 | 55.467% | 100.000% |
| 0.0500 | 44.379% | 100.000% |
| 0.0300 | 35.305% | 100.000% |
| 0.0200 | 27.240% | 100.000% |
| 0.0100 | 18.166% | 100.000% |
| 0.0050 | 14.123% | 94.439% |
| 0.0030 | 9.081% | 60.725% |
| 0.0010 | 3.026% | 20.232% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Pond #1, 10yr During Mining*

### Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,261.00 ft |
| Initial Pool: | 0.32 ac-ft |
| *Sediment Storage: | 1.44 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,261.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,268.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

### Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,268.61 ft |
| H'graph Detention Time: | 9.89 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.15 days |
| Trap Efficiency: | 85.05 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,260.00 | 0.312 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,260.00 | 0.312 | 0.000 | 0.000 | | |
| 2,260.50 | 0.317 | 0.158 | 0.000 | | |
| 2,261.00 | 0.322 | 0.317 | 0.000 | | Spillway #1 |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,261.50 | 0.327 | 0.480 | 0.271 | 7.24* | |
| 2,262.00 | 0.332 | 0.644 | 0.565 | 3.53* | |
| 2,262.50 | 0.337 | 0.812 | 0.651 | 3.11* | |
| 2,263.00 | 0.342 | 0.982 | 0.709 | 2.90* | |
| 2,263.50 | 0.347 | 1.154 | 0.766 | 2.80 | |
| 2,264.00 | 0.353 | 1.329 | 0.824 | 2.70 | |
| 2,264.50 | 0.358 | 1.507 | 0.882 | 2.50 | |
| 2,265.00 | 0.363 | 1.687 | 0.939 | 2.40 | |
| 2,265.50 | 0.368 | 1.870 | 0.997 | 2.30 | |
| 2,266.00 | 0.374 | 2.055 | 1.055 | 2.20 | |
| 2,266.50 | 0.379 | 2.244 | 1.108 | 2.10 | |
| 2,267.00 | 0.385 | 2.435 | 1.144 | 2.05 | |
| 2,267.50 | 0.390 | 2.628 | 1.181 | 2.00 | |
| 2,268.00 | 0.396 | 2.825 | 1.217 | 2.15 | Spillway #2 |
| 2,268.50 | 0.401 | 3.024 | 5.133 | 10.40 | |
| 2,268.61 | 0.402 | 3.069 | 16.597 | 1.20 | Peak Stage |
| 2,269.00 | 0.407 | 3.226 | 56.060 | | |
| 2,269.50 | 0.412 | 3.431 | 119.163 | | |
| 2,270.00 | 0.418 | 3.638 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.50 | 0.000 | 0.000 | 0.000 |
| 2,261.00 | 0.000 | 0.000 | 0.000 |
| 2,261.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,262.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,262.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,263.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,263.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,264.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,264.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,265.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,265.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,266.00 | (6)>1.055 | 0.000 | 1.055 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,266.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,267.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,267.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,268.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,268.50 | (6)>1.253 | 3.880 | 5.133 |
| 2,269.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,269.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,270.00 | (6)>1.362 | 203.173 | 204.536 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 4.100 | 0.184 | 0.190 | 0.396 | 74.000 | M | 5.67 | 0.544 |
| | 2 | 3.800 | 0.047 | 0.267 | 0.413 | 73.000 | M | 7.87 | 0.600 |
| | 3 | 4.700 | 0.087 | 0.190 | 0.396 | 79.000 | M | 11.67 | 0.930 |
| | 4 | 5.700 | 0.164 | 0.000 | 0.000 | 74.000 | S | 5.92 | 0.632 |
| | 5 | 5.700 | 0.109 | 0.000 | 0.000 | 86.000 | F | 16.70 | 1.425 |
| | 6 | 5.700 | 0.107 | 0.092 | 0.234 | 86.000 | F | 16.70 | 1.425 |
| | Σ | **29.700** | | | | | | **57.50** | **5.556** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 1 | 6.4 | 16,242 | 9.74 | 5.17 |
| | 2 | 0.170 | 100.00 | 42.00 | 0.0030 | 1.0000 | 2 | 0.9 | 2,017 | 1.09 | 0.57 |
| | 3 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 1 | 25.1 | 37,239 | 23.81 | 12.56 |
| | 4 | 0.220 | 50.00 | 20.00 | 0.0500 | 1.0000 | 1 | 6.2 | 13,597 | 7.75 | 4.07 |
| | 5 | 0.220 | 50.00 | 20.00 | 0.9000 | 1.0000 | 1 | 250.6 | 215,223 | 137.64 | 77.03 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 1 | 321.5 | 274,240 | 175.38 | 97.08 |
| | Σ | | | | | | | **610.5** | **194,439** | **124.08** | **48.93** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 2. Minimum tillage cultivation | 51.43 | 180.00 | 350.00 | 3.580 | 0.027 |
| | | 6. Grassed waterway | 1.00 | 8.50 | 850.00 | 1.500 | 0.157 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.184** |
| #1 | 2 | 1. Forest with heavy ground litter | 42.86 | 120.00 | 280.00 | 1.650 | 0.047 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.047** |
| #1 | 3 | 3. Short grass pasture | 60.00 | 180.00 | 300.00 | 6.190 | 0.013 |
| | | 6. Grassed waterway | 1.00 | 4.00 | 400.00 | 1.500 | 0.074 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.087** |
| #1 | 4 | 2. Minimum tillage cultivation | 40.00 | 160.00 | 400.00 | 3.160 | 0.035 |
| | | 6. Grassed waterway | 1.00 | 7.00 | 700.00 | 1.500 | 0.129 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.164** |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 5 | 5. Nearly bare and untilled, and alluvial valley fans | 40.00 | 160.00 | 400.00 | 6.320 | 0.017 |
| | | 6. Grassed waterway | 1.00 | 5.00 | 500.00 | 1.500 | 0.092 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.109** |
| #1 | 6 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 200.00 | 400.00 | 7.070 | 0.015 |
| | | 6. Grassed waterway | 1.00 | 5.00 | 500.00 | 1.500 | 0.092 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.107** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 160.00 | 400.00 | 18.970 | 0.005 |
| | | 6. Grassed waterway | 1.00 | 10.00 | 1,000.00 | 1.500 | 0.185 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.190** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 6. Grassed waterway | 1.00 | 4.00 | 400.00 | 1.500 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 6. Grassed waterway | 1.00 | 10.00 | 1,000.00 | 1.500 | 0.185 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.267** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 160.00 | 400.00 | 18.970 | 0.005 |
| | | 6. Grassed waterway | 1.00 | 10.00 | 1,000.00 | 1.500 | 0.185 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.190** |
| #1 | 6 | 6. Grassed waterway | 1.00 | 5.00 | 500.00 | 1.500 | 0.092 |
| **#1** | **6** | **Muskingum K:** | | | | | **0.092** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #1
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

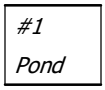
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | Disturbed Area | Undisturbed Area |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Pond #1, 10yr During Mining |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 29.700 | 29.700 | 71.20 | 6.91 | 754.4 | 196,922 | 125.66 | 48.63 |
| | Out | | | 42.79 | 6.39 | 137.4 | 36,274 | 0.71 | 0.37 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 14.74 |
| | Out | 0.19 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.177% | 100.000% |
| 1.0000 | 86.339% | 100.000% |
| 0.5000 | 78.499% | 100.000% |
| 0.3000 | 73.538% | 100.000% |
| 0.2000 | 67.573% | 100.000% |
| 0.1000 | 55.477% | 100.000% |
| 0.0500 | 44.388% | 100.000% |
| 0.0300 | 35.312% | 100.000% |
| 0.0200 | 27.246% | 100.000% |
| 0.0100 | 18.170% | 99.748% |
| 0.0050 | 14.126% | 77.550% |
| 0.0030 | 9.083% | 49.866% |
| 0.0010 | 3.026% | 16.614% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Pond #1, 10yr During Mining*

### Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,261.00 ft |
| Initial Pool: | 0.32 ac-ft |
| *Sediment Storage: | 1.44 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,261.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,268.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

### Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,268.87 ft |
| H'graph Detention Time: | 7.91 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.16 days |
| Trap Efficiency: | 81.78 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,260.00 | 0.312 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,260.00 | 0.312 | 0.000 | 0.000 | | |
| 2,260.50 | 0.317 | 0.158 | 0.000 | | |
| 2,261.00 | 0.322 | 0.317 | 0.000 | | Spillway #1 |
| 2,261.50 | 0.327 | 0.480 | 0.271 | 7.24* | |
| 2,262.00 | 0.332 | 0.644 | 0.565 | 3.53* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,262.50 | 0.337 | 0.812 | 0.651 | 3.11* | |
| 2,263.00 | 0.342 | 0.982 | 0.709 | 2.90* | |
| 2,263.50 | 0.347 | 1.154 | 0.766 | 2.85 | |
| 2,264.00 | 0.353 | 1.329 | 0.824 | 2.65 | |
| 2,264.50 | 0.358 | 1.507 | 0.882 | 2.55 | |
| 2,265.00 | 0.363 | 1.687 | 0.939 | 2.40 | |
| 2,265.50 | 0.368 | 1.870 | 0.997 | 2.25 | |
| 2,266.00 | 0.374 | 2.055 | 1.055 | 2.20 | |
| 2,266.50 | 0.379 | 2.244 | 1.108 | 2.10 | |
| 2,267.00 | 0.385 | 2.435 | 1.144 | 2.05 | |
| 2,267.50 | 0.390 | 2.628 | 1.181 | 2.05 | |
| 2,268.00 | 0.396 | 2.825 | 1.217 | 2.00 | Spillway #2 |
| 2,268.50 | 0.401 | 3.024 | 5.133 | 10.25 | |
| 2,268.87 | 0.405 | 3.173 | 42.786 | 1.80 | Peak Stage |
| 2,269.00 | 0.407 | 3.226 | 56.060 | | |
| 2,269.50 | 0.412 | 3.431 | 119.163 | | |
| 2,270.00 | 0.418 | 3.638 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.50 | 0.000 | 0.000 | 0.000 |
| 2,261.00 | 0.000 | 0.000 | 0.000 |
| 2,261.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,262.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,262.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,263.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,263.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,264.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,264.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,265.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,265.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,266.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,266.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,267.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,267.50 | (6)>1.181 | 0.000 | 1.181 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,268.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,268.50 | (6)>1.253 | 3.880 | 5.133 |
| 2,269.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,269.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,270.00 | (6)>1.362 | 203.173 | 204.536 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 4.100 | 0.184 | 0.190 | 0.396 | 74.000 | M | 7.27 | 0.696 |
| | 2 | 3.800 | 0.047 | 0.267 | 0.413 | 73.000 | M | 9.93 | 0.771 |
| | 3 | 4.700 | 0.087 | 0.190 | 0.396 | 79.000 | M | 14.31 | 1.164 |
| | 4 | 5.700 | 0.164 | 0.000 | 0.000 | 74.000 | S | 7.61 | 0.809 |
| | 5 | 5.700 | 0.109 | 0.000 | 0.000 | 86.000 | F | 19.92 | 1.734 |
| | 6 | 5.700 | 0.107 | 0.092 | 0.234 | 86.000 | F | 19.92 | 1.734 |
| | Σ | **29.700** | | | | | | **71.20** | **6.909** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 1 | 8.5 | 16,654 | 10.02 | 5.35 |
| | 2 | 0.170 | 100.00 | 42.00 | 0.0030 | 1.0000 | 2 | 1.1 | 2,029 | 1.09 | 0.58 |
| | 3 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 1 | 31.9 | 37,486 | 23.97 | 12.75 |
| | 4 | 0.220 | 50.00 | 20.00 | 0.0500 | 1.0000 | 1 | 8.1 | 13,973 | 8.00 | 4.21 |
| | 5 | 0.220 | 50.00 | 20.00 | 0.9000 | 1.0000 | 1 | 308.8 | 216,872 | 138.69 | 77.92 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 1 | 396.1 | 276,981 | 177.13 | 98.17 |
| | Σ | | | | | | | **754.4** | **196,922** | **125.66** | **48.63** |

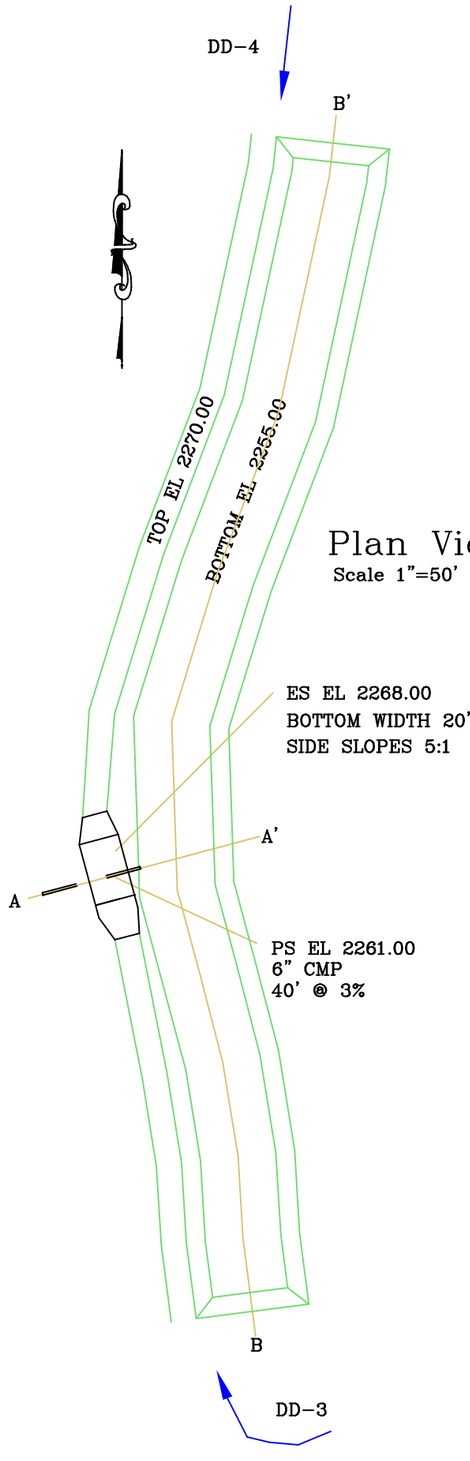
# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 2. Minimum tillage cultivation | 51.43 | 180.00 | 350.00 | 3.580 | 0.027 |
| | | 6. Grassed waterway | 1.00 | 8.50 | 850.00 | 1.500 | 0.157 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.184** |
| #1 | 2 | 1. Forest with heavy ground litter | 42.86 | 120.00 | 280.00 | 1.650 | 0.047 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.047** |
| #1 | 3 | 3. Short grass pasture | 60.00 | 180.00 | 300.00 | 6.190 | 0.013 |
| | | 6. Grassed waterway | 1.00 | 4.00 | 400.00 | 1.500 | 0.074 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.087** |
| #1 | 4 | 2. Minimum tillage cultivation | 40.00 | 160.00 | 400.00 | 3.160 | 0.035 |
| | | 6. Grassed waterway | 1.00 | 7.00 | 700.00 | 1.500 | 0.129 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.164** |
| #1 | 5 | 5. Nearly bare and untilled, and alluvial valley fans | 40.00 | 160.00 | 400.00 | 6.320 | 0.017 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| | | 6. Grassed waterway | 1.00 | 5.00 | 500.00 | 1.500 | 0.092 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.109** |
| #1 | 6 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 200.00 | 400.00 | 7.070 | 0.015 |
| | | 6. Grassed waterway | 1.00 | 5.00 | 500.00 | 1.500 | 0.092 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.107** |

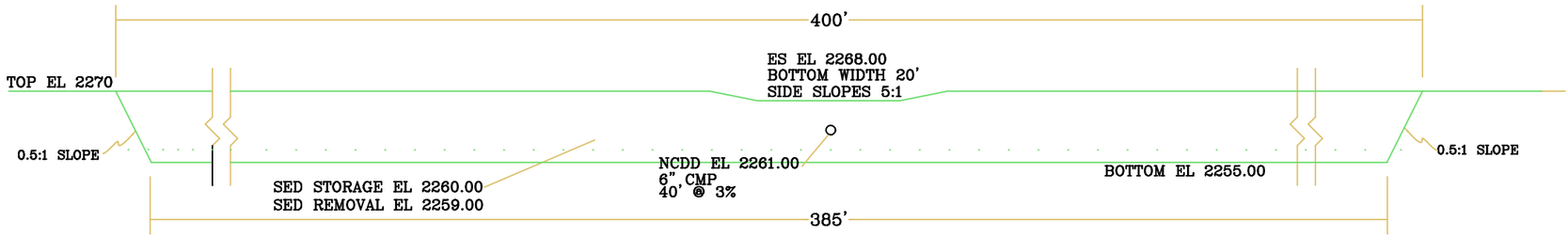
## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 160.00 | 400.00 | 18.970 | 0.005 |
| | | 6. Grassed waterway | 1.00 | 10.00 | 1,000.00 | 1.500 | 0.185 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.190** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 6. Grassed waterway | 1.00 | 4.00 | 400.00 | 1.500 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 6. Grassed waterway | 1.00 | 10.00 | 1,000.00 | 1.500 | 0.185 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.267** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 160.00 | 400.00 | 18.970 | 0.005 |
| | | 6. Grassed waterway | 1.00 | 10.00 | 1,000.00 | 1.500 | 0.185 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.190** |
| #1 | 6 | 6. Grassed waterway | 1.00 | 5.00 | 500.00 | 1.500 | 0.092 |
| **#1** | **6** | **Muskingum K:** | | | | | **0.092** |

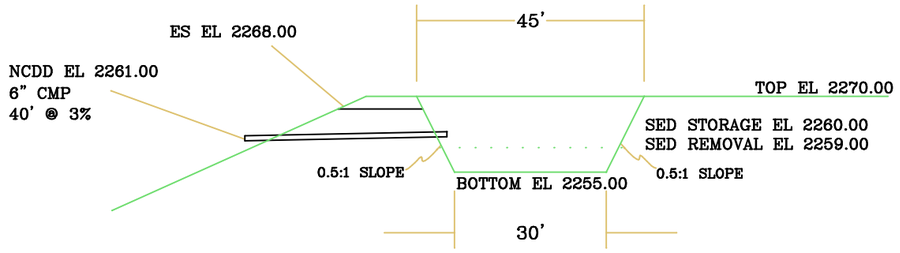



## Plan View
Scale 1"=50'

## Section B-B'
Scale 1"=30'




## Section A-A'
Scale 1"=30'



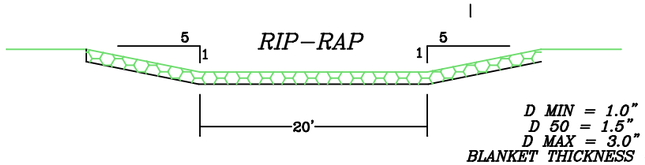

*LEGEND*

*Ground Line* ———————

*Sediment Storage Level* . . . . . .

| | |
|---|---|
| *Top of Pond* | *2270.00* |
| *E.S.* | *2268.00* |
| *P.S.* | *2261.00* |
| *Sed. Storage* | *2260.00* |
| *Sed. Removal* | *2259.00* |
| *Bottom* | *2255.00* |

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE _____ DATE _____

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 1

| | |
|---|---|
| DATE: 02/17/2023 | FILENAME: POND 01.dwg |
| SCALE: AS SHOWN | DRAWN BY: |

Prepared By:

HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543

HOWARD
Engineering and Geology, Inc.

# Hurricane Creek Mining< LLC

# OSMRE Permit #3341

# Proposed Pond #2

# 10yr. - 24hr.

# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

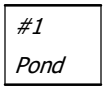
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #2 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 56.300 | 56.300 | 126.88 | 10.15 | 500.1 | 78,008 | 42.13 | 19.17 |
| | Out | | | 57.65 | 8.45 | 132.7 | 21,624 | 0.36 | 0.22 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 6.40 |
| | Out | 0.13 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.928% | 100.000% |
| 1.0000 | 97.848% | 100.000% |
| 0.5000 | 91.821% | 100.000% |
| 0.3000 | 86.821% | 100.000% |
| 0.2000 | 79.833% | 100.000% |
| 0.1000 | 69.806% | 100.000% |
| 0.0500 | 59.792% | 100.000% |
| 0.0300 | 49.804% | 100.000% |
| 0.0200 | 41.804% | 100.000% |
| 0.0100 | 31.816% | 100.000% |
| 0.0050 | 20.909% | 78.779% |
| 0.0030 | 14.921% | 56.221% |
| 0.0010 | 3.987% | 15.022% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #2*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,261.00 ft |
| Initial Pool: | 0.50 ac-ft |
| *Sediment Storage: | 2.31 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,261.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,268.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,269.01 ft |
| H'graph Detention Time: | 7.18 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 3.08 days |
| Trap Efficiency: | 73.46 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,260.00 | 0.493 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,260.00 | 0.493 | 0.000 | 0.000 | | |
| 2,260.50 | 0.499 | 0.248 | 0.000 | | |
| 2,261.00 | 0.506 | 0.499 | 0.000 | | Spillway #1 |
| 2,261.50 | 0.512 | 0.754 | 0.271 | 11.36* | |
| 2,262.00 | 0.519 | 1.012 | 0.565 | 5.52* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,262.50 | 0.526 | 1.273 | 0.651 | 4.86* | |
| 2,263.00 | 0.532 | 1.537 | 0.709 | 4.52* | |
| 2,263.50 | 0.539 | 1.805 | 0.766 | 4.23* | |
| 2,264.00 | 0.546 | 2.077 | 0.824 | 3.98* | |
| 2,264.50 | 0.553 | 2.351 | 0.882 | 3.77* | |
| 2,265.00 | 0.560 | 2.630 | 0.939 | 3.70 | |
| 2,265.50 | 0.567 | 2.911 | 0.997 | 3.55 | |
| 2,266.00 | 0.574 | 3.196 | 1.055 | 3.35 | |
| 2,266.50 | 0.581 | 3.485 | 1.108 | 3.25 | |
| 2,267.00 | 0.588 | 3.777 | 1.144 | 3.10 | |
| 2,267.50 | 0.595 | 4.072 | 1.181 | 3.10 | |
| 2,268.00 | 0.602 | 4.372 | 1.217 | 3.00 | Spillway #2 |
| 2,268.50 | 0.609 | 4.674 | 5.133 | 9.10 | |
| 2,269.00 | 0.616 | 4.981 | 56.060 | | |
| 2,269.01 | 0.617 | 4.989 | 57.651 | 3.50 | Peak Stage |
| 2,269.50 | 0.624 | 5.291 | 119.163 | | |
| 2,270.00 | 0.631 | 5.605 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.50 | 0.000 | 0.000 | 0.000 |
| 2,261.00 | 0.000 | 0.000 | 0.000 |
| 2,261.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,262.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,262.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,263.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,263.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,264.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,264.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,265.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,265.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,266.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,266.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,267.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,267.50 | (6)>1.181 | 0.000 | 1.181 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,268.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,268.50 | (6)>1.253 | 3.880 | 5.133 |
| 2,269.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,269.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,270.00 | (6)>1.362 | 203.173 | 204.536 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 20.600 | 0.088 | 0.054 | 0.445 | 73.000 | S | 42.68 | 3.251 |
| | 2 | 8.100 | 0.077 | 0.003 | 0.463 | 74.000 | M | 17.34 | 1.330 |
| | 3 | 5.600 | 0.065 | 0.025 | 0.437 | 79.000 | M | 13.90 | 1.108 |
| | 4 | 6.600 | 0.061 | 0.053 | 0.420 | 86.000 | F | 19.33 | 1.650 |
| | 5 | 7.100 | 0.023 | 0.000 | 0.000 | 74.000 | M | 15.20 | 1.166 |
| | 6 | 8.300 | 0.074 | 0.000 | 0.000 | 79.000 | M | 20.60 | 1.642 |
| | Σ | **56.300** | | | | | | **126.88** | **10.147** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 6.6 | 2,903 | 1.86 | 0.96 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 17.6 | 18,566 | 10.00 | 5.20 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 39.2 | 47,794 | 25.75 | 13.81 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 378.9 | 273,776 | 147.49 | 83.03 |
| | 5 | 0.220 | 50.00 | 50.00 | 0.0500 | 1.0000 | 2 | 29.9 | 35,789 | 19.28 | 10.04 |
| | 6 | 0.220 | 50.00 | 13.00 | 0.1400 | 1.0000 | 2 | 28.0 | 23,298 | 12.55 | 6.72 |
| | Σ | | | | | | | **500.1** | **78,008** | **42.13** | **19.17** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 40.00 | 200.00 | 500.00 | 1.600 | 0.086 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 100.00 | 200.00 | 21.210 | 0.002 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.088** |
| #1 | 2 | 2. Minimum tillage cultivation | 50.00 | 200.00 | 400.00 | 3.530 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.077** |
| #1 | 3 | 3. Short grass pasture | 50.00 | 200.00 | 400.00 | 5.650 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.065** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 200.00 | 400.00 | 7.070 | 0.015 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.061** |
| #1 | 5 | 2. Minimum tillage cultivation | 50.00 | 150.00 | 300.00 | 3.530 | 0.023 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.023** |
| #1 | 6 | 3. Short grass pasture | 27.91 | 120.00 | 430.00 | 4.220 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.074** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.054** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.003** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 27.91 | 120.00 | 430.00 | 15.840 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.025** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 27.91 | 120.00 | 430.00 | 15.840 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.053** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #2
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

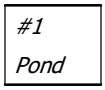
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #2 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 56.300 | 56.300 | 157.75 | 12.83 | 622.8 | 75,919 | 41.01 | 18.89 |
| | Out | | | 133.28 | 11.12 | 196.6 | 23,574 | 0.68 | 0.42 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 6.38 |
| | Out | 0.20 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.923% | 100.000% |
| 1.0000 | 97.839% | 100.000% |
| 0.5000 | 91.811% | 100.000% |
| 0.3000 | 86.811% | 100.000% |
| 0.2000 | 79.824% | 100.000% |
| 0.1000 | 69.795% | 100.000% |
| 0.0500 | 59.781% | 100.000% |
| 0.0300 | 49.794% | 100.000% |
| 0.0200 | 41.793% | 100.000% |
| 0.0100 | 31.807% | 100.000% |
| 0.0050 | 20.904% | 66.221% |
| 0.0030 | 14.917% | 47.257% |
| 0.0010 | 3.986% | 12.628% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #2*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,261.00 ft |
| Initial Pool: | 0.50 ac-ft |
| *Sediment Storage: | 2.31 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,261.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,268.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,269.58 ft |
| H'graph Detention Time: | 5.54 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 3.09 days |
| Trap Efficiency: | 68.43 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,260.00 | 0.493 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,260.00 | 0.493 | 0.000 | 0.000 | | |
| 2,260.50 | 0.499 | 0.248 | 0.000 | | |
| 2,261.00 | 0.506 | 0.499 | 0.000 | | Spillway #1 |
| 2,261.50 | 0.512 | 0.754 | 0.271 | 11.36* | |
| 2,262.00 | 0.519 | 1.012 | 0.565 | 5.52* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,262.50 | 0.526 | 1.273 | 0.651 | 4.86* | |
| 2,263.00 | 0.532 | 1.537 | 0.709 | 4.52* | |
| 2,263.50 | 0.539 | 1.805 | 0.766 | 4.23* | |
| 2,264.00 | 0.546 | 2.077 | 0.824 | 3.98* | |
| 2,264.50 | 0.553 | 2.351 | 0.882 | 3.77* | |
| 2,265.00 | 0.560 | 2.630 | 0.939 | 3.70 | |
| 2,265.50 | 0.567 | 2.911 | 0.997 | 3.50 | |
| 2,266.00 | 0.574 | 3.196 | 1.055 | 3.40 | |
| 2,266.50 | 0.581 | 3.485 | 1.108 | 3.20 | |
| 2,267.00 | 0.588 | 3.777 | 1.144 | 3.15 | |
| 2,267.50 | 0.595 | 4.072 | 1.181 | 3.05 | |
| 2,268.00 | 0.602 | 4.372 | 1.217 | 3.05 | Spillway #2 |
| 2,268.50 | 0.609 | 4.674 | 5.133 | 7.75 | |
| 2,269.00 | 0.616 | 4.981 | 56.060 | 4.90 | |
| 2,269.50 | 0.624 | 5.291 | 119.163 | 0.10 | |
| 2,269.58 | 0.625 | 5.343 | 133.283 | 0.05 | Peak Stage |
| 2,270.00 | 0.631 | 5.605 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.50 | 0.000 | 0.000 | 0.000 |
| 2,261.00 | 0.000 | 0.000 | 0.000 |
| 2,261.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,262.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,262.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,263.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,263.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,264.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,264.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,265.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,265.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,266.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,266.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,267.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,267.50 | (6)>1.181 | 0.000 | 1.181 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,268.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,268.50 | (6)>1.253 | 3.880 | 5.133 |
| 2,269.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,269.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,270.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 20.600 | 0.088 | 0.054 | 0.445 | 73.000 | S | 53.83 | 4.182 |
| | 2 | 8.100 | 0.077 | 0.003 | 0.463 | 74.000 | M | 21.76 | 1.702 |
| | 3 | 5.600 | 0.065 | 0.025 | 0.437 | 79.000 | M | 17.05 | 1.387 |
| | 4 | 6.600 | 0.061 | 0.053 | 0.420 | 86.000 | F | 23.07 | 2.008 |
| | 5 | 7.100 | 0.023 | 0.000 | 0.000 | 74.000 | M | 19.08 | 1.492 |
| | 6 | 8.300 | 0.074 | 0.000 | 0.000 | 79.000 | M | 25.27 | 2.056 |
| | Σ | **56.300** | | | | | | **157.75** | **12.827** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 8.7 | 2,909 | 1.86 | 0.98 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 22.9 | 18,607 | 10.02 | 5.30 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 49.8 | 48,018 | 25.87 | 14.02 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 466.8 | 276,183 | 148.79 | 83.96 |
| | 5 | 0.220 | 50.00 | 50.00 | 0.0500 | 1.0000 | 2 | 38.9 | 35,867 | 19.32 | 10.23 |
| | 6 | 0.220 | 50.00 | 13.00 | 0.1400 | 1.0000 | 2 | 35.6 | 23,409 | 12.61 | 6.82 |
| | Σ | | | | | | | **622.8** | **75,919** | **41.01** | **18.89** |

# Subwatershed Time of Concentration Details:

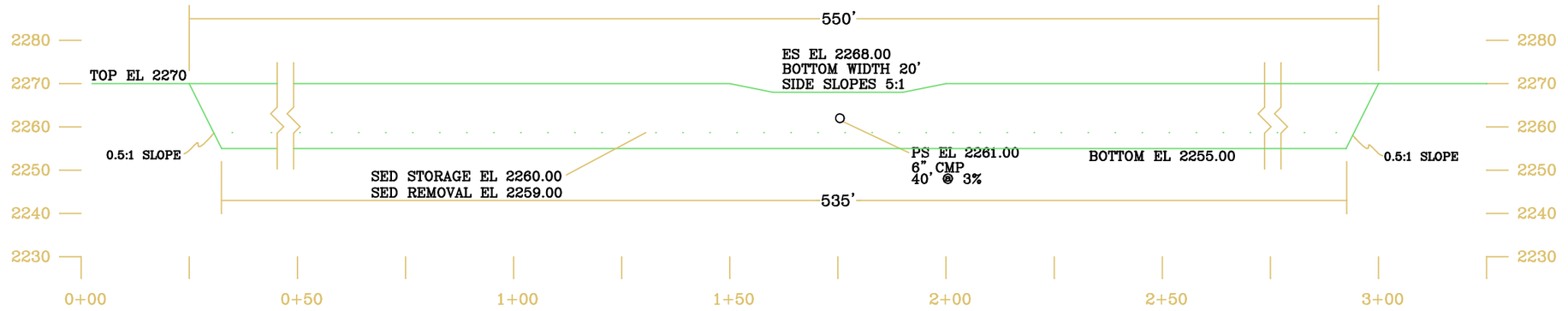
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 40.00 | 200.00 | 500.00 | 1.600 | 0.086 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 100.00 | 200.00 | 21.210 | 0.002 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.088** |
| #1 | 2 | 2. Minimum tillage cultivation | 50.00 | 200.00 | 400.00 | 3.530 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.077** |
| #1 | 3 | 3. Short grass pasture | 50.00 | 200.00 | 400.00 | 5.650 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.065** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 200.00 | 400.00 | 7.070 | 0.015 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.061** |
| #1 | 5 | 2. Minimum tillage cultivation | 50.00 | 150.00 | 300.00 | 3.530 | 0.023 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.023** |
| #1 | 6 | 3. Short grass pasture | 27.91 | 120.00 | 430.00 | 4.220 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.074** |

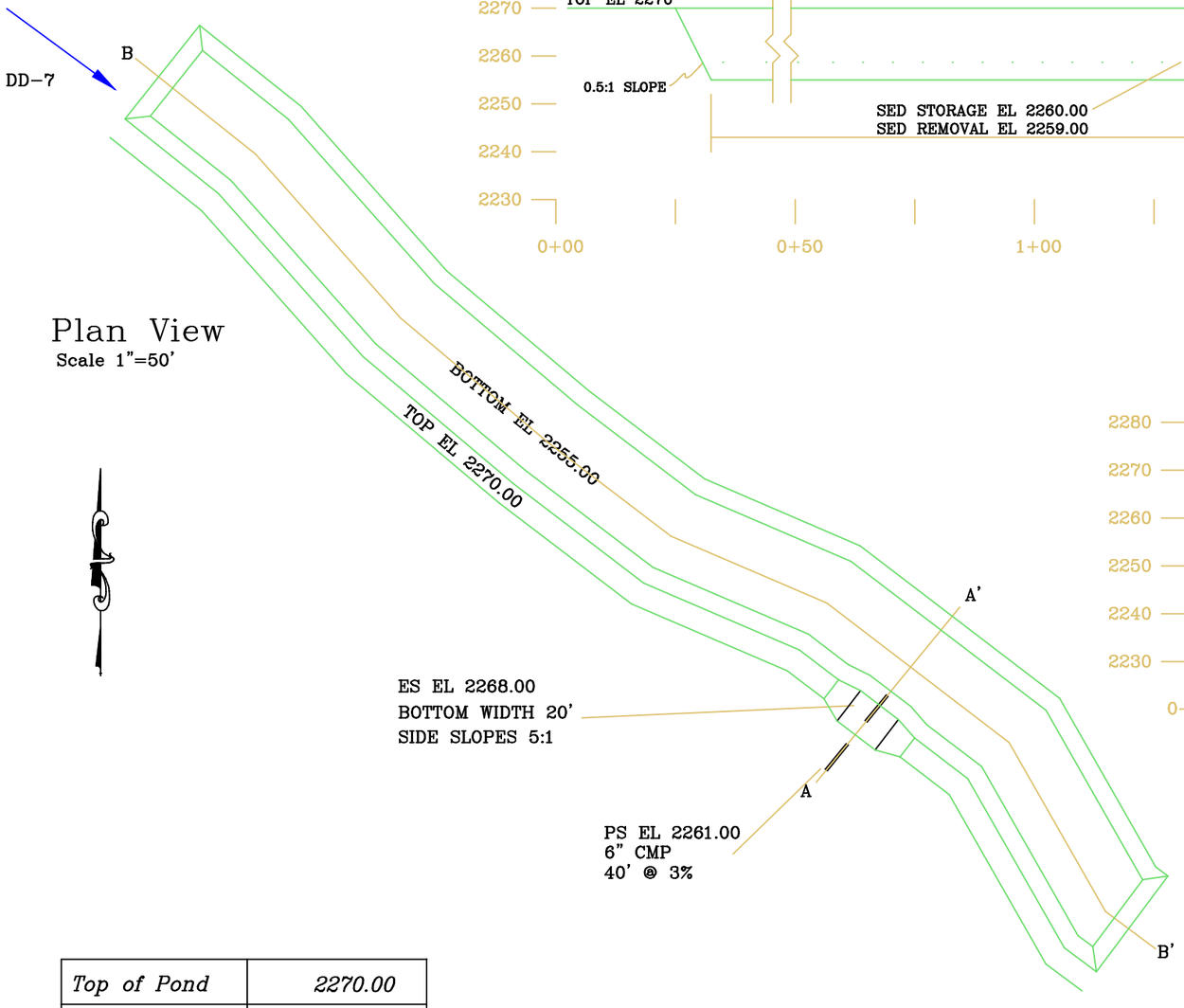
## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.054** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.003** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 27.91 | 120.00 | 430.00 | 15.840 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.025** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 27.91 | 120.00 | 430.00 | 15.840 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.053** |

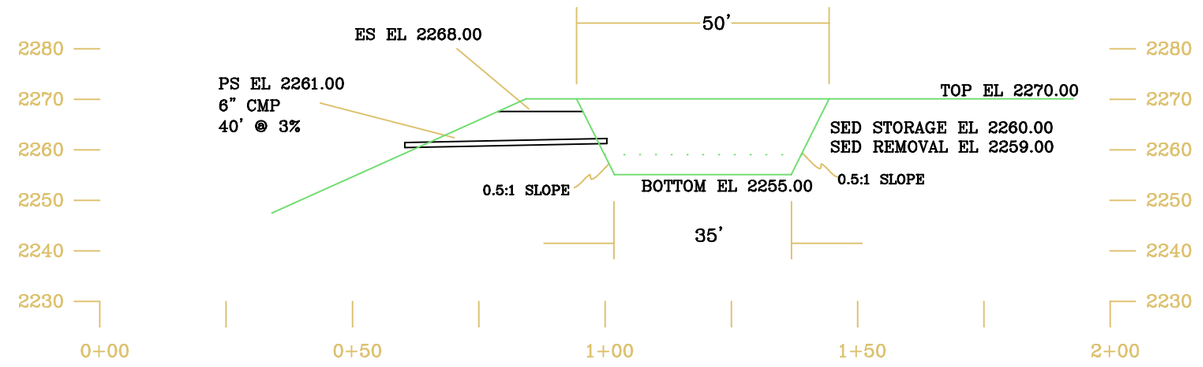
## Section B–B'
Scale 1"=30'




## Plan View
Scale 1"=50'




## Section A–A'
Scale 1"=30'



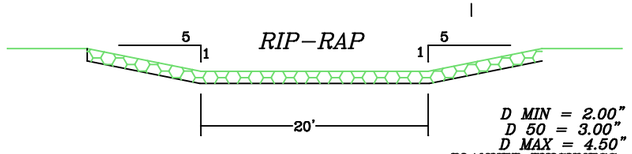

| | |
|---|---|
| *Top of Pond* | *2270.00* |
| *E.S.* | *2268.00* |
| *P.S.* | *2261.00* |
| *Sed. Storage* | *2260.00* |
| *Sed. Removal* | *2259.00* |
| *Bottom* | *2255.00* |

*LEGEND*

*Ground Line*

*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 2.00"*
*D 50 = 3.00"*
*D MAX = 4.50"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 2

DATE: 02/17/2023 FILENAME: POND 02.dwg

SCALE: AS SHOWN DRAWN BY:

Prepared By:


HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543


HOWARD
Engineering and Geology, Inc.

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #3
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

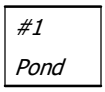
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #3 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 11.400 | 11.400 | 30.03 | 2.50 | 273.6 | 163,908 | 88.30 | 41.32 |
| | Out | | | 1.19 | 2.48 | 50.5 | 39,067 | 0.01 | 0.01 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 11.29 |
| | Out | 0.01 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.000% | 100.000% |
| 1.0000 | 98.000% | 100.000% |
| 0.5000 | 92.000% | 100.000% |
| 0.3000 | 87.000% | 100.000% |
| 0.2000 | 80.000% | 100.000% |
| 0.1000 | 70.000% | 100.000% |
| 0.0500 | 60.000% | 100.000% |
| 0.0300 | 50.000% | 100.000% |
| 0.0200 | 42.000% | 100.000% |
| 0.0100 | 32.000% | 100.000% |
| 0.0050 | 21.000% | 100.000% |
| 0.0030 | 15.000% | 81.210% |
| 0.0010 | 4.000% | 21.656% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #3*

### Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,261.00 ft |
| Initial Pool: | 0.21 ac-ft |
| *Sediment Storage: | 0.98 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,261.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,268.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

### Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,267.64 ft |
| H'graph Detention Time: | 11.77 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.35 days |
| Trap Efficiency: | 81.53 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,260.00 | 0.211 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,260.50 | 0.215 | 0.106 | 0.000 | | |
| 2,261.00 | 0.218 | 0.214 | 0.000 | | Spillway #1 |
| 2,261.50 | 0.222 | 0.324 | 0.271 | 4.91* | |
| 2,262.00 | 0.225 | 0.436 | 0.565 | 3.35 | |
| 2,262.50 | 0.228 | 0.549 | 0.651 | 2.30 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,263.00 | 0.232 | 0.664 | 0.709 | 2.05 | |
| 2,263.50 | 0.236 | 0.781 | 0.766 | 1.90 | |
| 2,264.00 | 0.239 | 0.900 | 0.824 | 1.80 | |
| 2,264.50 | 0.243 | 1.020 | 0.882 | 1.70 | |
| 2,265.00 | 0.246 | 1.143 | 0.939 | 1.65 | |
| 2,265.50 | 0.250 | 1.267 | 0.997 | 1.55 | |
| 2,266.00 | 0.254 | 1.393 | 1.055 | 1.50 | |
| 2,266.50 | 0.257 | 1.520 | 1.108 | 1.70 | |
| 2,267.00 | 0.261 | 1.650 | 1.144 | 2.65 | |
| 2,267.50 | 0.265 | 1.781 | 1.181 | 3.10 | |
| 2,267.64 | 0.266 | 1.819 | 1.191 | 2.15 | Peak Stage |
| 2,268.00 | 0.269 | 1.915 | 1.217 | | Spillway #2 |
| 2,268.50 | 0.272 | 2.050 | 5.133 | | |
| 2,269.00 | 0.276 | 2.187 | 56.060 | | |
| 2,269.50 | 0.280 | 2.326 | 119.163 | | |
| 2,270.00 | 0.284 | 2.467 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.50 | 0.000 | 0.000 | 0.000 |
| 2,261.00 | 0.000 | 0.000 | 0.000 |
| 2,261.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,262.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,262.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,263.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,263.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,264.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,264.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,265.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,265.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,266.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,266.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,267.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,267.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,268.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,268.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,269.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,269.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,270.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 1.600 | 0.028 | 0.060 | 0.415 | 86.000 | F | 4.69 | 0.400 |
| | 2 | 2.200 | 0.071 | 0.055 | 0.319 | 74.000 | M | 4.71 | 0.361 |
| | 3 | 3.000 | 0.056 | 0.018 | 0.319 | 79.000 | M | 7.45 | 0.593 |
| | 4 | 4.600 | 0.034 | 0.000 | 0.000 | 86.000 | F | 13.47 | 1.150 |
| | Σ | **11.400** | | | | | | **30.03** | **2.504** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 50.00 | 0.25 | 0.9000 | 1.0000 | 2 | 1.2 | 4,189 | 2.26 | 1.23 |
| | 2 | 0.220 | 50.00 | 0.25 | 0.0500 | 1.0000 | 2 | 0.1 | 255 | 0.14 | 0.07 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 19.5 | 44,406 | 23.92 | 12.83 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 252.9 | 263,398 | 141.90 | 79.79 |
| | Σ | | | | | | | **273.6** | **163,908** | **88.30** | **41.32** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 5. Nearly bare and untilled, and alluvial valley fans | 40.00 | 100.00 | 250.00 | 6.320 | 0.010 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.028** |
| #1 | 2 | 2. Minimum tillage cultivation | 25.00 | 100.00 | 400.00 | 2.500 | 0.044 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.071** |
| #1 | 3 | 3. Short grass pasture | 36.36 | 120.00 | 330.00 | 4.820 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.056** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 34.29 | 120.00 | 350.00 | 5.850 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.034** |

# *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 36.36 | 120.00 | 330.00 | 18.090 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.060** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.055** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.018** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #3
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

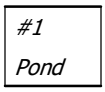
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #3 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 11.400 | 11.400 | 36.41 | 3.09 | 337.9 | 166,140 | 89.51 | 41.34 |
| | Out | | | 3.66 | 3.05 | 70.3 | 40,630 | 0.02 | 0.01 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 11.53 |
| | Out | 0.01 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.000% | 100.000% |
| 1.0000 | 98.000% | 100.000% |
| 0.5000 | 92.000% | 100.000% |
| 0.3000 | 87.000% | 100.000% |
| 0.2000 | 80.000% | 100.000% |
| 0.1000 | 70.000% | 100.000% |
| 0.0500 | 60.000% | 100.000% |
| 0.0300 | 50.000% | 100.000% |
| 0.0200 | 42.000% | 100.000% |
| 0.0100 | 32.000% | 100.000% |
| 0.0050 | 21.000% | 100.000% |
| 0.0030 | 15.000% | 72.131% |
| 0.0010 | 4.000% | 19.235% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #3*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,261.00 ft |
| Initial Pool: | 0.21 ac-ft |
| *Sediment Storage: | 0.98 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,261.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,268.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,268.31 ft |
| H'graph Detention Time: | 10.85 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.52 days |
| Trap Efficiency: | 79.20 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,260.00 | 0.211 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,260.50 | 0.215 | 0.106 | 0.000 | | |
| 2,261.00 | 0.218 | 0.214 | 0.000 | | Spillway #1 |
| 2,261.50 | 0.222 | 0.324 | 0.271 | 4.91* | |
| 2,262.00 | 0.225 | 0.436 | 0.565 | 3.40 | |
| 2,262.50 | 0.228 | 0.549 | 0.651 | 2.25 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,263.00 | 0.232 | 0.664 | 0.709 | 2.05 | |
| 2,263.50 | 0.236 | 0.781 | 0.766 | 1.95 | |
| 2,264.00 | 0.239 | 0.900 | 0.824 | 1.80 | |
| 2,264.50 | 0.243 | 1.020 | 0.882 | 1.70 | |
| 2,265.00 | 0.246 | 1.143 | 0.939 | 1.60 | |
| 2,265.50 | 0.250 | 1.267 | 0.997 | 1.55 | |
| 2,266.00 | 0.254 | 1.393 | 1.055 | 1.50 | |
| 2,266.50 | 0.257 | 1.520 | 1.108 | 1.45 | |
| 2,267.00 | 0.261 | 1.650 | 1.144 | 1.40 | |
| 2,267.50 | 0.265 | 1.781 | 1.181 | 2.95 | |
| 2,268.00 | 0.269 | 1.915 | 1.217 | 4.25 | Spillway #2 |
| 2,268.31 | 0.271 | 1.999 | 3.655 | 3.80 | Peak Stage |
| 2,268.50 | 0.272 | 2.050 | 5.133 | | |
| 2,269.00 | 0.276 | 2.187 | 56.060 | | |
| 2,269.50 | 0.280 | 2.326 | 119.163 | | |
| 2,270.00 | 0.284 | 2.467 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.50 | 0.000 | 0.000 | 0.000 |
| 2,261.00 | 0.000 | 0.000 | 0.000 |
| 2,261.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,262.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,262.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,263.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,263.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,264.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,264.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,265.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,265.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,266.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,266.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,267.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,267.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,268.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,268.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,269.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,269.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,270.00 | (6)>1.362 | 203.173 | 204.536 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 1.600 | 0.028 | 0.060 | 0.415 | 86.000 | F | 5.59 | 0.487 |
| | 2 | 2.200 | 0.071 | 0.055 | 0.319 | 74.000 | M | 5.91 | 0.462 |
| | 3 | 3.000 | 0.056 | 0.018 | 0.319 | 79.000 | M | 9.13 | 0.743 |
| | 4 | 4.600 | 0.034 | 0.000 | 0.000 | 86.000 | F | 16.08 | 1.399 |
| | Σ | **11.400** | | | | | | **36.41** | **3.091** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 50.00 | 0.25 | 0.9000 | 1.0000 | 2 | 1.5 | 4,226 | 2.28 | 1.25 |
| | 2 | 0.220 | 50.00 | 0.25 | 0.0500 | 1.0000 | 2 | 0.1 | 257 | 0.14 | 0.07 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 24.8 | 44,615 | 24.04 | 13.03 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 311.6 | 265,373 | 142.96 | 80.69 |
| | Σ | | | | | | | **337.9** | **166,140** | **89.51** | **41.34** |

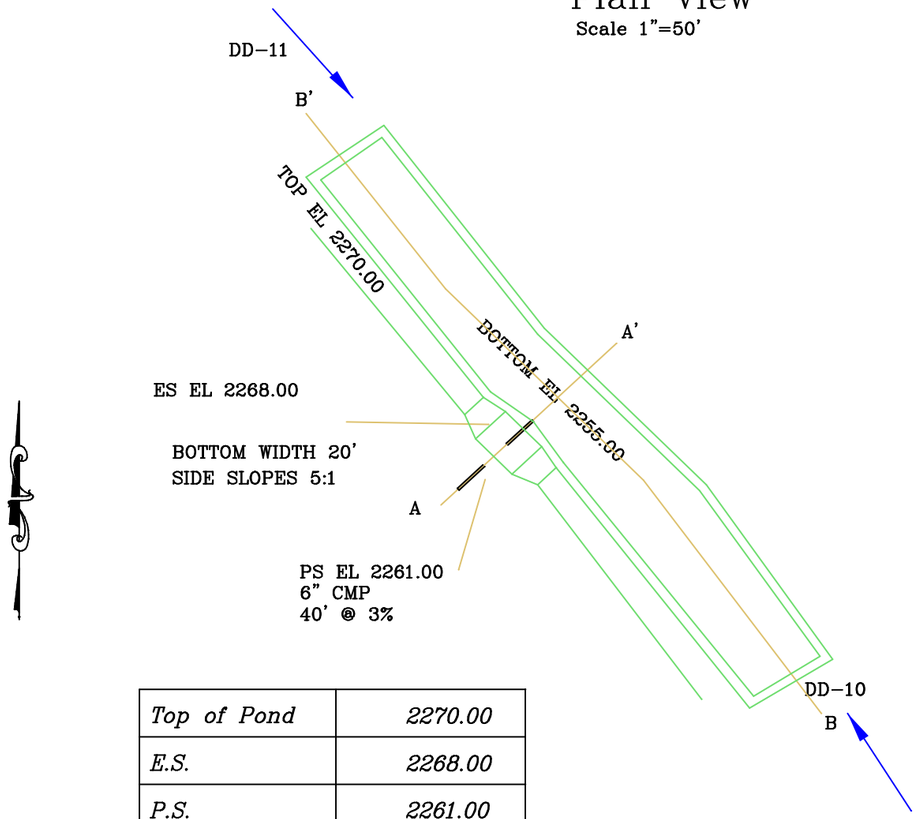
# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 5. Nearly bare and untilled, and alluvial valley fans | 40.00 | 100.00 | 250.00 | 6.320 | 0.010 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.028** |
| #1 | 2 | 2. Minimum tillage cultivation | 25.00 | 100.00 | 400.00 | 2.500 | 0.044 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.071** |
| #1 | 3 | 3. Short grass pasture | 36.36 | 120.00 | 330.00 | 4.820 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.056** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 34.29 | 120.00 | 350.00 | 5.850 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.034** |

# *Subwatershed Muskingum Routing Details:*

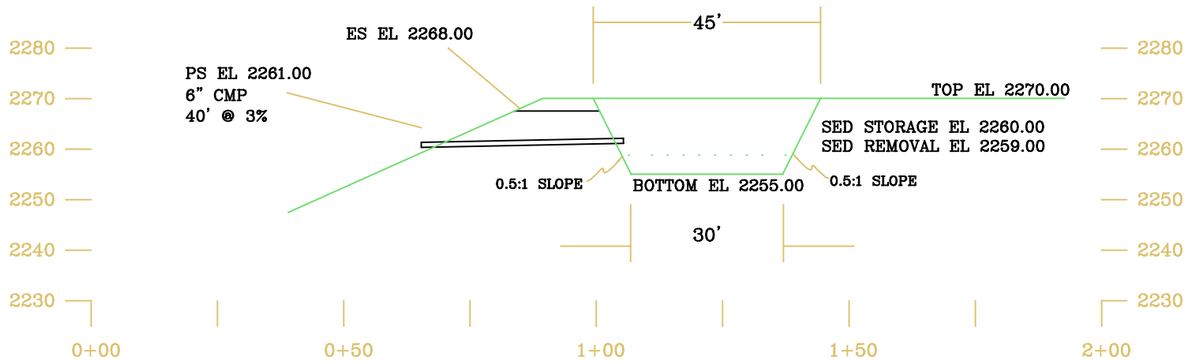
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 36.36 | 120.00 | 330.00 | 18.090 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.060** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.055** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.018** |

## Plan View
Scale 1"=50'




| | |
|---|---|
| *Top of Pond* | *2270.00* |
| *E.S.* | *2268.00* |
| *P.S.* | *2261.00* |
| *Sed. Storage* | *2260.00* |
| *Sed. Removal* | *2259.00* |
| *Bottom* | *2255.00* |

## Section A–A'
Scale 1"=30'

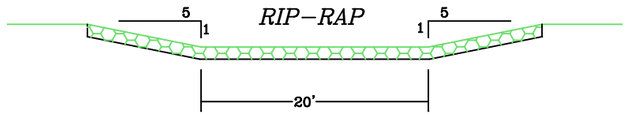



*LEGEND*

*Ground Line*

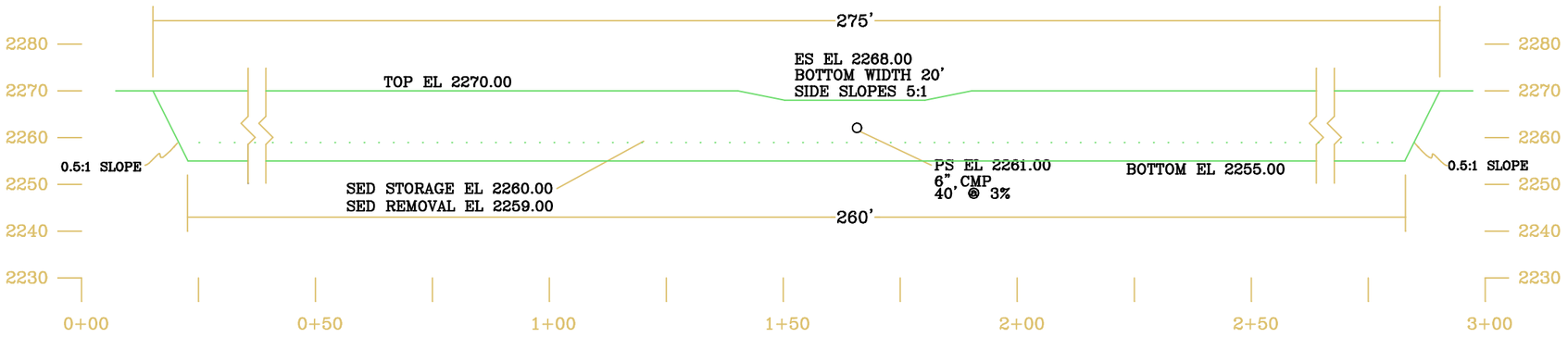
*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 0.50"*
*D 50 = 0.75"*
*D MAX = 1.50"*
*BLANKET THICKNESS = 1.0'*

## Section B–B'
Scale 1"=30'




*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 3

DATE: 02/17/2023

FILENAME: POND 03.DWG

SCALE: AS SHOWN

DRAWN BY:

Prepared By:


HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-8924
Fax: (606) 573-9543


HOWARD
Engineering and Geology, Inc.

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #4
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

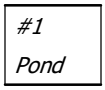
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #4 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 12.900 | 12.900 | 33.82 | 2.78 | 248.3 | 111,406 | 60.02 | 34.16 |
| | Out | | | 1.96 | 2.74 | 47.6 | 32,178 | 0.01 | 0.01 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 9.35 |
| | Out | 0.01 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.001% | 100.000% |
| 1.0000 | 98.001% | 100.000% |
| 0.5000 | 92.001% | 100.000% |
| 0.3000 | 87.001% | 100.000% |
| 0.2000 | 80.001% | 100.000% |
| 0.1000 | 70.001% | 100.000% |
| 0.0500 | 60.001% | 100.000% |
| 0.0300 | 50.000% | 100.000% |
| 0.0200 | 42.000% | 100.000% |
| 0.0100 | 32.000% | 100.000% |
| 0.0050 | 21.000% | 100.000% |
| 0.0030 | 15.000% | 78.288% |
| 0.0010 | 4.000% | 20.877% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #4*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,261.00 ft |
| Initial Pool: | 0.21 ac-ft |
| *Sediment Storage: | 0.98 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,261.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,268.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,268.10 ft |
| H'graph Detention Time: | 11.78 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.47 days |
| Trap Efficiency: | 80.84 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,260.00 | 0.211 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,260.50 | 0.215 | 0.106 | 0.000 | | |
| 2,261.00 | 0.218 | 0.214 | 0.000 | | Spillway #1 |
| 2,261.50 | 0.222 | 0.324 | 0.271 | 4.91* | |
| 2,262.00 | 0.225 | 0.436 | 0.565 | 3.40 | |
| 2,262.50 | 0.228 | 0.549 | 0.651 | 2.25 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,263.00 | 0.232 | 0.664 | 0.709 | 2.05 | |
| 2,263.50 | 0.236 | 0.781 | 0.766 | 1.95 | |
| 2,264.00 | 0.239 | 0.900 | 0.824 | 1.80 | |
| 2,264.50 | 0.243 | 1.020 | 0.882 | 1.70 | |
| 2,265.00 | 0.246 | 1.143 | 0.939 | 1.60 | |
| 2,265.50 | 0.250 | 1.267 | 0.997 | 1.55 | |
| 2,266.00 | 0.254 | 1.393 | 1.055 | 1.50 | |
| 2,266.50 | 0.257 | 1.520 | 1.108 | 1.45 | |
| 2,267.00 | 0.261 | 1.650 | 1.144 | 1.65 | |
| 2,267.50 | 0.265 | 1.781 | 1.181 | 2.85 | |
| 2,268.00 | 0.269 | 1.915 | 1.217 | 4.30 | Spillway #2 |
| 2,268.10 | 0.269 | 1.941 | 1.964 | 2.30 | Peak Stage |
| 2,268.50 | 0.272 | 2.050 | 5.133 | | |
| 2,269.00 | 0.276 | 2.187 | 56.060 | | |
| 2,269.50 | 0.280 | 2.326 | 119.163 | | |
| 2,270.00 | 0.284 | 2.467 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.50 | 0.000 | 0.000 | 0.000 |
| 2,261.00 | 0.000 | 0.000 | 0.000 |
| 2,261.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,262.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,262.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,263.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,263.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,264.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,264.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,265.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,265.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,266.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,266.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,267.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,267.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,268.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,268.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,269.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,269.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,270.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 2.400 | 0.059 | 0.004 | 0.455 | 79.000 | M | 5.96 | 0.475 |
| | 2 | 2.500 | 0.034 | 0.004 | 0.455 | 86.000 | F | 7.32 | 0.625 |
| | 3 | 2.200 | 0.065 | 0.000 | 0.000 | 74.000 | M | 4.71 | 0.361 |
| | 4 | 2.600 | 0.027 | 0.000 | 0.000 | 79.000 | M | 6.45 | 0.514 |
| | 5 | 3.200 | 0.065 | 0.009 | 0.319 | 86.000 | F | 9.37 | 0.800 |
| | Σ | **12.900** | | | | | | **33.82** | **2.775** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 15.2 | 43,254 | 23.30 | 12.50 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 127.7 | 246,652 | 132.88 | 74.61 |
| | 3 | 0.220 | 50.00 | 16.00 | 0.0500 | 1.0000 | 2 | 2.4 | 9,537 | 5.14 | 2.67 |
| | 4 | 0.220 | 50.00 | 16.00 | 0.1400 | 1.0000 | 2 | 9.9 | 26,316 | 14.18 | 7.59 |
| | 5 | 0.220 | 50.00 | 15.00 | 0.9000 | 1.0000 | 2 | 93.1 | 146,644 | 79.00 | 43.94 |
| | Σ | | | | | | | **248.3** | **111,406** | **60.02** | **34.16** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 3. Short grass pasture | 40.00 | 100.00 | 250.00 | 5.050 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.059** |
| #1 | 2 | 5. Nearly bare and untilled, and alluvial valley fans | 42.11 | 160.00 | 380.00 | 6.480 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.034** |
| #1 | 3 | 2. Minimum tillage cultivation | 33.33 | 100.00 | 300.00 | 2.880 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.065** |
| #1 | 4 | 3. Short grass pasture | 33.33 | 100.00 | 300.00 | 4.610 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.027** |
| #1 | 5 | 5. Nearly bare and untilled, and alluvial valley fans | 31.25 | 125.00 | 400.00 | 5.590 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.065** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 33.33 | 100.00 | 300.00 | 17.320 | 0.004 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.004** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 33.33 | 100.00 | 300.00 | 17.320 | 0.004 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.004** |
| #1 | 5 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Muskingum K:** | | | | | **0.009** |

# Hurricane Creek Minng, LLC
# OSMRE Permit #3341
# Proposed Pond #4
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

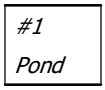
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #4 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 12.900 | 12.900 | 41.05 | 3.43 | 307.2 | 110,795 | 59.69 | 34.14 |
| | Out | | | 8.05 | 3.39 | 68.9 | 32,884 | 0.06 | 0.03 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 9.53 |
| | Out | 0.02 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.001% | 100.000% |
| 1.0000 | 98.001% | 100.000% |
| 0.5000 | 92.001% | 100.000% |
| 0.3000 | 87.001% | 100.000% |
| 0.2000 | 80.001% | 100.000% |
| 0.1000 | 70.001% | 100.000% |
| 0.0500 | 60.001% | 100.000% |
| 0.0300 | 50.000% | 100.000% |
| 0.0200 | 42.000% | 100.000% |
| 0.0100 | 32.000% | 100.000% |
| 0.0050 | 21.000% | 93.613% |
| 0.0030 | 15.000% | 66.866% |
| 0.0010 | 4.000% | 17.831% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #4*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,261.00 ft |
| Initial Pool: | 0.21 ac-ft |
| *Sediment Storage: | 0.98 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,261.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,268.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,268.53 ft |
| H'graph Detention Time: | 10.06 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.56 days |
| Trap Efficiency: | 77.57 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,260.00 | 0.211 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,260.50 | 0.215 | 0.106 | 0.000 | | |
| 2,261.00 | 0.218 | 0.214 | 0.000 | | Spillway #1 |
| 2,261.50 | 0.222 | 0.324 | 0.271 | 4.91* | |
| 2,262.00 | 0.225 | 0.436 | 0.565 | 3.40 | |
| 2,262.50 | 0.228 | 0.549 | 0.651 | 2.25 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,263.00 | 0.232 | 0.664 | 0.709 | 2.05 | |
| 2,263.50 | 0.236 | 0.781 | 0.766 | 1.90 | |
| 2,264.00 | 0.239 | 0.900 | 0.824 | 1.80 | |
| 2,264.50 | 0.243 | 1.020 | 0.882 | 1.75 | |
| 2,265.00 | 0.246 | 1.143 | 0.939 | 1.60 | |
| 2,265.50 | 0.250 | 1.267 | 0.997 | 1.55 | |
| 2,266.00 | 0.254 | 1.393 | 1.055 | 1.50 | |
| 2,266.50 | 0.257 | 1.520 | 1.108 | 1.45 | |
| 2,267.00 | 0.261 | 1.650 | 1.144 | 1.35 | |
| 2,267.50 | 0.265 | 1.781 | 1.181 | 2.65 | |
| 2,268.00 | 0.269 | 1.915 | 1.217 | 4.35 | Spillway #2 |
| 2,268.50 | 0.272 | 2.050 | 5.133 | 5.00 | |
| 2,268.53 | 0.273 | 2.058 | 8.047 | 0.05 | Peak Stage |
| 2,269.00 | 0.276 | 2.187 | 56.060 | | |
| 2,269.50 | 0.280 | 2.326 | 119.163 | | |
| 2,270.00 | 0.284 | 2.467 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.50 | 0.000 | 0.000 | 0.000 |
| 2,261.00 | 0.000 | 0.000 | 0.000 |
| 2,261.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,262.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,262.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,263.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,263.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,264.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,264.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,265.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,265.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,266.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,266.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,267.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,267.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,268.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,268.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,269.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,269.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,270.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 2.400 | 0.059 | 0.004 | 0.455 | 79.000 | M | 7.31 | 0.594 |
| | 2 | 2.500 | 0.034 | 0.004 | 0.455 | 86.000 | F | 8.74 | 0.760 |
| | 3 | 2.200 | 0.065 | 0.000 | 0.000 | 74.000 | M | 5.91 | 0.462 |
| | 4 | 2.600 | 0.027 | 0.000 | 0.000 | 79.000 | M | 7.91 | 0.644 |
| | 5 | 3.200 | 0.065 | 0.009 | 0.319 | 86.000 | F | 11.18 | 0.973 |
| | Σ | **12.900** | | | | | | **41.05** | **3.434** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 19.3 | 43,457 | 23.41 | 12.69 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 157.4 | 248,513 | 133.88 | 75.46 |
| | 3 | 0.220 | 50.00 | 16.00 | 0.0500 | 1.0000 | 2 | 3.2 | 9,558 | 5.15 | 2.72 |
| | 4 | 0.220 | 50.00 | 16.00 | 0.1400 | 1.0000 | 2 | 12.6 | 26,441 | 14.24 | 7.71 |
| | 5 | 0.220 | 50.00 | 15.00 | 0.9000 | 1.0000 | 2 | 114.7 | 147,801 | 79.63 | 44.46 |
| | Σ | | | | | | | **307.2** | **110,795** | **59.69** | **34.14** |

# Subwatershed Time of Concentration Details:

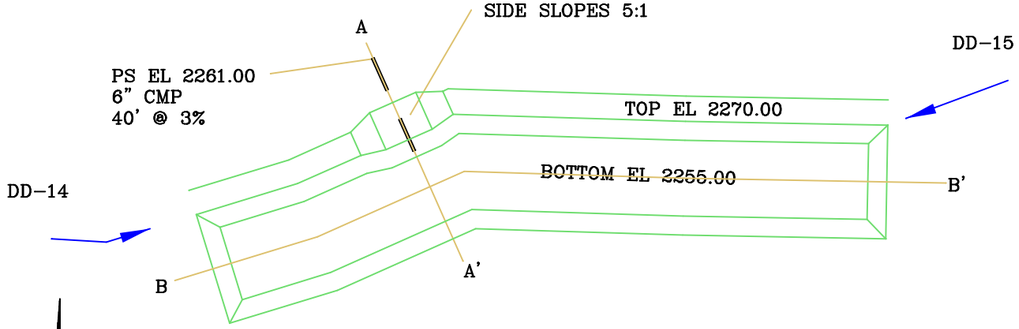
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 3. Short grass pasture | 40.00 | 100.00 | 250.00 | 5.050 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.059** |
| #1 | 2 | 5. Nearly bare and untilled, and alluvial valley fans | 42.11 | 160.00 | 380.00 | 6.480 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.034** |
| #1 | 3 | 2. Minimum tillage cultivation | 33.33 | 100.00 | 300.00 | 2.880 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.065** |
| #1 | 4 | 3. Short grass pasture | 33.33 | 100.00 | 300.00 | 4.610 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.027** |
| #1 | 5 | 5. Nearly bare and untilled, and alluvial valley fans | 31.25 | 125.00 | 400.00 | 5.590 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.065** |

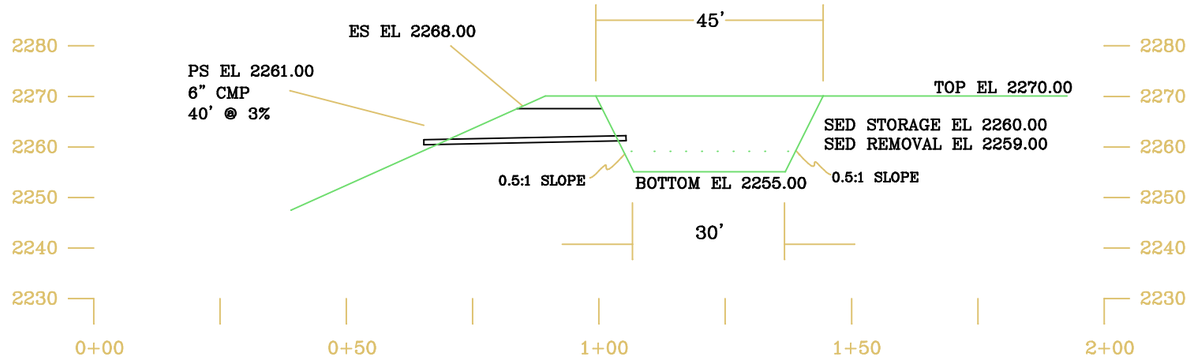
## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 33.33 | 100.00 | 300.00 | 17.320 | 0.004 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.004** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 33.33 | 100.00 | 300.00 | 17.320 | 0.004 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.004** |
| #1 | 5 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Muskingum K:** | | | | | **0.009** |

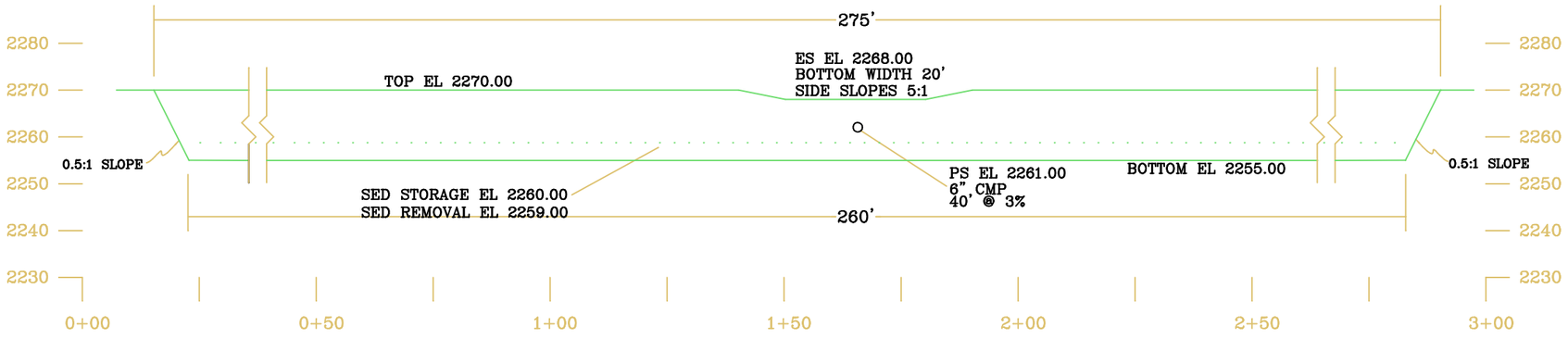
## Plan View
Scale 1"=50'




## Section A-A'
Scale 1"=30'




## Section B-B'
Scale 1"=30'



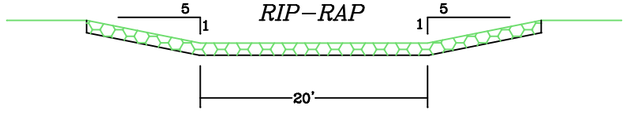

| | |
|---|---|
| *Top of Pond* | *2270.00* |
| *E.S.* | *2268.00* |
| *P.S.* | *2261.00* |
| *Sed. Storage* | *2260.00* |
| *Sed. Removal* | *2259.00* |
| *Bottom* | *2255.00* |

*LEGEND*

*Ground Line*

*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 0.50"*
*D 50 = 0.75"*
*D MAX = 1.50"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 4

DATE: 09/11/12

FILENAME: POND 04.dwg

SCALE: AS SHOWN

DRAWN BY:

Prepared By:


HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543


HOWARD
Engineering and Geology, In

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #5
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

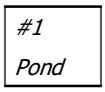
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #5 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 23.500 | 23.500 | 60.80 | 5.00 | 653.4 | 160,349 | 86.40 | 49.05 |
| | Out | | | 11.95 | 4.54 | 143.0 | 50,362 | 0.04 | 0.02 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 13.59 |
| | Out | 0.02 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.995% | 100.000% |
| 1.0000 | 97.990% | 100.000% |
| 0.5000 | 91.988% | 100.000% |
| 0.3000 | 86.988% | 100.000% |
| 0.2000 | 79.989% | 100.000% |
| 0.1000 | 69.987% | 100.000% |
| 0.0500 | 59.986% | 100.000% |
| 0.0300 | 49.987% | 100.000% |
| 0.0200 | 41.987% | 100.000% |
| 0.0100 | 31.988% | 100.000% |
| 0.0050 | 20.994% | 95.939% |
| 0.0030 | 14.995% | 68.524% |
| 0.0010 | 3.999% | 18.275% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #5*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,261.00 ft |
| Initial Pool: | 0.32 ac-ft |
| *Sediment Storage: | 1.44 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,261.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,268.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,268.57 ft |
| H'graph Detention Time: | 10.93 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.11 days |
| Trap Efficiency: | 78.12 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,260.00 | 0.311 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,260.50 | 0.315 | 0.156 | 0.000 | | |
| 2,261.00 | 0.320 | 0.315 | 0.000 | | Spillway #1 |
| 2,261.50 | 0.325 | 0.477 | 0.271 | 7.20* | |
| 2,262.00 | 0.330 | 0.640 | 0.565 | 3.51* | |
| 2,262.50 | 0.335 | 0.807 | 0.651 | 3.09* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,263.00 | 0.340 | 0.975 | 0.709 | 3.00 | |
| 2,263.50 | 0.345 | 1.146 | 0.766 | 2.80 | |
| 2,264.00 | 0.350 | 1.320 | 0.824 | 2.65 | |
| 2,264.50 | 0.355 | 1.496 | 0.882 | 2.50 | |
| 2,265.00 | 0.360 | 1.675 | 0.939 | 2.40 | |
| 2,265.50 | 0.365 | 1.856 | 0.997 | 2.25 | |
| 2,266.00 | 0.370 | 2.040 | 1.055 | 2.20 | |
| 2,266.50 | 0.376 | 2.227 | 1.108 | 2.05 | |
| 2,267.00 | 0.381 | 2.416 | 1.144 | 2.05 | |
| 2,267.50 | 0.386 | 2.608 | 1.181 | 2.00 | |
| 2,268.00 | 0.391 | 2.802 | 1.217 | 5.20 | Spillway #2 |
| 2,268.50 | 0.397 | 2.999 | 5.133 | 7.30 | |
| 2,268.57 | 0.397 | 3.026 | 11.948 | 0.55 | Peak Stage |
| 2,269.00 | 0.402 | 3.199 | 56.060 | | |
| 2,269.50 | 0.408 | 3.401 | 119.163 | | |
| 2,270.00 | 0.413 | 3.606 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.50 | 0.000 | 0.000 | 0.000 |
| 2,261.00 | 0.000 | 0.000 | 0.000 |
| 2,261.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,262.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,262.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,263.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,263.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,264.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,264.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,265.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,265.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,266.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,266.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,267.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,267.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,268.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,268.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,269.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,269.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,270.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 2.300 | 0.060 | 0.053 | 0.443 | 73.000 | S | 4.77 | 0.363 |
| | 2 | 2.800 | 0.042 | 0.025 | 0.438 | 79.000 | M | 6.95 | 0.554 |
| | 3 | 5.600 | 0.092 | 0.005 | 0.449 | 86.000 | F | 16.40 | 1.400 |
| | 4 | 3.400 | 0.064 | 0.000 | 0.000 | 74.000 | M | 7.28 | 0.558 |
| | 5 | 4.300 | 0.020 | 0.000 | 0.000 | 79.000 | M | 10.67 | 0.851 |
| | 6 | 5.100 | 0.079 | 0.000 | 0.000 | 86.000 | F | 14.94 | 1.275 |
| | Σ | **23.500** | | | | | | **60.80** | **5.001** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 0.6 | 2,223 | 1.42 | 0.74 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 18.0 | 44,047 | 23.73 | 12.72 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 315.2 | 269,012 | 144.93 | 81.53 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 6.6 | 16,742 | 9.02 | 4.69 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 29.2 | 46,330 | 24.96 | 13.39 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 283.8 | 266,330 | 143.48 | 80.69 |
| | Σ | | | | | | | **653.4** | **160,349** | **86.40** | **49.05** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 45.95 | 170.00 | 370.00 | 1.710 | 0.060 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.060** |
| #1 | 2 | 3. Short grass pasture | 50.00 | 200.00 | 400.00 | 5.650 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.042** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 44.44 | 200.00 | 450.00 | 6.660 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.092** |
| #1 | 4 | 2. Minimum tillage cultivation | 28.89 | 130.00 | 450.00 | 2.680 | 0.046 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.064** |
| #1 | 5 | 3. Short grass pasture | 25.00 | 75.00 | 300.00 | 4.000 | 0.020 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.020** |
| #1 | 6 | 5. Nearly bare and untilled, and alluvial valley fans | 27.66 | 130.00 | 470.00 | 5.250 | 0.024 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.079** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 28.89 | 130.00 | 450.00 | 16.120 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.053** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 28.89 | 130.00 | 450.00 | 16.120 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.025** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 25.00 | 75.00 | 300.00 | 15.000 | 0.005 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.005** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #5
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

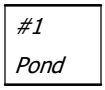
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #5 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 23.500 | 23.500 | 73.94 | 6.19 | 807.5 | 161,483 | 87.01 | 48.94 |
| | Out | | | 51.30 | 5.71 | 214.3 | 53,632 | 0.88 | 0.54 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 13.85 |
| | Out | 0.33 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.995% | 100.000% |
| 1.0000 | 97.989% | 100.000% |
| 0.5000 | 91.988% | 100.000% |
| 0.3000 | 86.988% | 100.000% |
| 0.2000 | 79.988% | 100.000% |
| 0.1000 | 69.986% | 100.000% |
| 0.0500 | 59.986% | 100.000% |
| 0.0300 | 49.986% | 100.000% |
| 0.0200 | 41.986% | 100.000% |
| 0.0100 | 31.987% | 100.000% |
| 0.0050 | 20.994% | 79.108% |
| 0.0030 | 14.995% | 56.502% |
| 0.0010 | 3.999% | 15.069% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #5*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,261.00 ft |
| Initial Pool: | 0.32 ac-ft |
| *Sediment Storage: | 1.44 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,261.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,268.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,268.95 ft |
| H'graph Detention Time: | 8.81 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.15 days |
| Trap Efficiency: | 73.46 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,260.00 | 0.311 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,260.50 | 0.315 | 0.156 | 0.000 | | |
| 2,261.00 | 0.320 | 0.315 | 0.000 | | Spillway #1 |
| 2,261.50 | 0.325 | 0.477 | 0.271 | 7.20* | |
| 2,262.00 | 0.330 | 0.640 | 0.565 | 3.51* | |
| 2,262.50 | 0.335 | 0.807 | 0.651 | 3.09* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,263.00 | 0.340 | 0.975 | 0.709 | 3.00 | |
| 2,263.50 | 0.345 | 1.146 | 0.766 | 2.80 | |
| 2,264.00 | 0.350 | 1.320 | 0.824 | 2.65 | |
| 2,264.50 | 0.355 | 1.496 | 0.882 | 2.50 | |
| 2,265.00 | 0.360 | 1.675 | 0.939 | 2.40 | |
| 2,265.50 | 0.365 | 1.856 | 0.997 | 2.25 | |
| 2,266.00 | 0.370 | 2.040 | 1.055 | 2.20 | |
| 2,266.50 | 0.376 | 2.227 | 1.108 | 2.05 | |
| 2,267.00 | 0.381 | 2.416 | 1.144 | 2.05 | |
| 2,267.50 | 0.386 | 2.608 | 1.181 | 2.00 | |
| 2,268.00 | 0.391 | 2.802 | 1.217 | 1.95 | Spillway #2 |
| 2,268.50 | 0.397 | 2.999 | 5.133 | 10.45 | |
| 2,268.95 | 0.402 | 3.180 | 51.299 | 1.55 | Peak Stage |
| 2,269.00 | 0.402 | 3.199 | 56.060 | | |
| 2,269.50 | 0.408 | 3.401 | 119.163 | | |
| 2,270.00 | 0.413 | 3.606 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,260.00 | 0.000 | 0.000 | 0.000 |
| 2,260.50 | 0.000 | 0.000 | 0.000 |
| 2,261.00 | 0.000 | 0.000 | 0.000 |
| 2,261.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,262.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,262.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,263.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,263.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,264.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,264.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,265.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,265.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,266.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,266.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,267.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,267.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,268.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,268.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,269.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,269.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,270.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 2.300 | 0.060 | 0.053 | 0.443 | 73.000 | S | 6.01 | 0.467 |
| | 2 | 2.800 | 0.042 | 0.025 | 0.438 | 79.000 | M | 8.52 | 0.693 |
| | 3 | 5.600 | 0.092 | 0.005 | 0.449 | 86.000 | F | 19.57 | 1.704 |
| | 4 | 3.400 | 0.064 | 0.000 | 0.000 | 74.000 | M | 9.14 | 0.715 |
| | 5 | 4.300 | 0.020 | 0.000 | 0.000 | 79.000 | M | 13.09 | 1.065 |
| | 6 | 5.100 | 0.079 | 0.000 | 0.000 | 86.000 | F | 17.82 | 1.552 |
| | Σ | **23.500** | | | | | | **73.94** | **6.195** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 0.7 | 2,228 | 1.42 | 0.75 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 22.9 | 44,254 | 23.84 | 12.92 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 388.4 | 271,023 | 146.01 | 82.45 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 8.7 | 16,778 | 9.04 | 4.77 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 37.1 | 46,548 | 25.08 | 13.59 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 349.7 | 268,324 | 144.55 | 81.61 |
| | Σ | | | | | | | **807.5** | **161,483** | **87.01** | **48.94** |

# Subwatershed Time of Concentration Details:

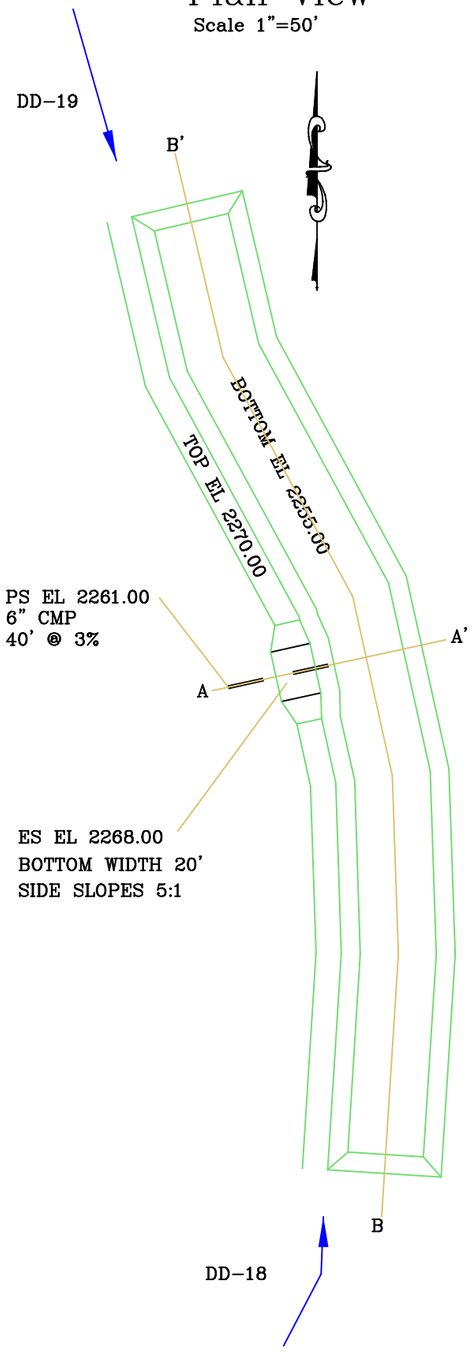
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 45.95 | 170.00 | 370.00 | 1.710 | 0.060 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.060** |
| #1 | 2 | 3. Short grass pasture | 50.00 | 200.00 | 400.00 | 5.650 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.042** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 44.44 | 200.00 | 450.00 | 6.660 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.092** |
| #1 | 4 | 2. Minimum tillage cultivation | 28.89 | 130.00 | 450.00 | 2.680 | 0.046 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.064** |
| #1 | 5 | 3. Short grass pasture | 25.00 | 75.00 | 300.00 | 4.000 | 0.020 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.020** |
| #1 | 6 | 5. Nearly bare and untilled, and alluvial valley fans | 27.66 | 130.00 | 470.00 | 5.250 | 0.024 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.079** |

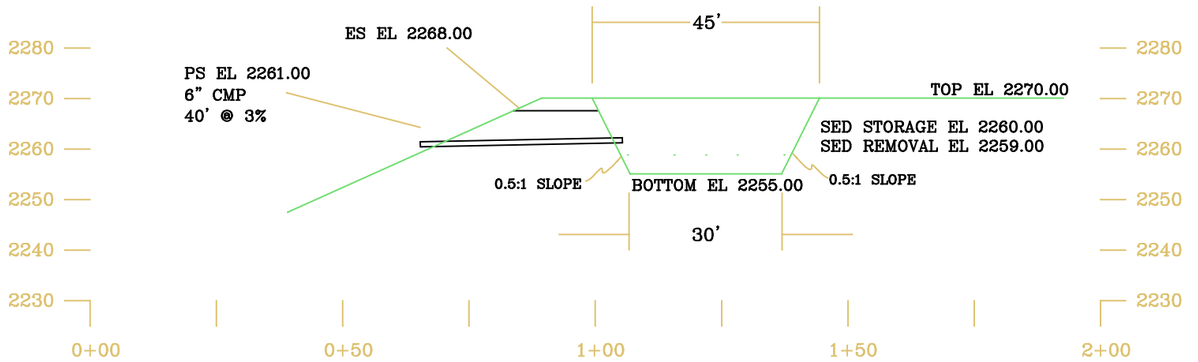
## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 28.89 | 130.00 | 450.00 | 16.120 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.053** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 28.89 | 130.00 | 450.00 | 16.120 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.025** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 25.00 | 75.00 | 300.00 | 15.000 | 0.005 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.005** |

## Plan View
Scale 1"=50'

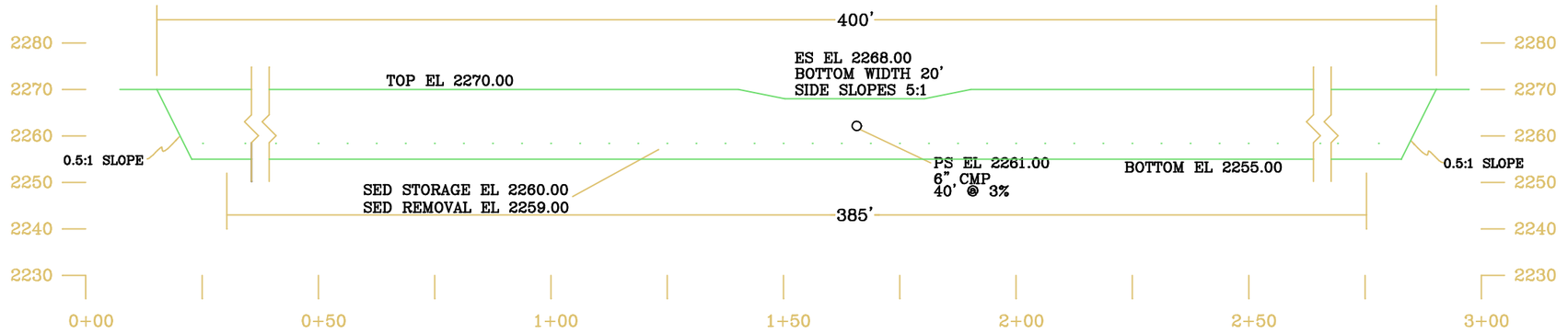



## Section A-A'
Scale 1"=30'




| | |
|---|---|
| *Top of Pond* | *2270.00* |
| *E.S.* | *2268.00* |
| *P.S.* | *2261.00* |
| *Sed. Storage* | *2260.00* |
| *Sed. Removal* | *2259.00* |
| *Bottom* | *2255.00* |

## Section B-B'
Scale 1"=30'

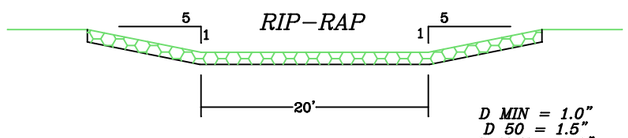



*LEGEND*

*Ground Line*

*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 5

DATE: 02/17/2023 | FILENAME: POND 05.dwg

SCALE: AS SHOWN | DRAWN BY:

Prepared By:

HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543

HOWARD
Engineering and Geology, In

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #6
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

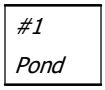
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #6 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 40.200 | 40.200 | 96.03 | 7.95 | 639.7 | 146,222 | 78.83 | 30.76 |
| | Out | | | 49.15 | 6.94 | 167.3 | 31,841 | 0.49 | 0.31 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 8.92 |
| | Out | 0.20 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.984% | 100.000% |
| 1.0000 | 97.962% | 100.000% |
| 0.5000 | 91.954% | 100.000% |
| 0.3000 | 86.954% | 100.000% |
| 0.2000 | 79.957% | 100.000% |
| 0.1000 | 69.949% | 100.000% |
| 0.0500 | 59.945% | 100.000% |
| 0.0300 | 49.948% | 100.000% |
| 0.0200 | 41.947% | 100.000% |
| 0.0100 | 31.950% | 100.000% |
| 0.0050 | 20.975% | 80.199% |
| 0.0030 | 14.979% | 57.271% |
| 0.0010 | 3.997% | 15.281% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #6*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,271.00 ft |
| Initial Pool: | 1.03 ac-ft |
| *Sediment Storage: | 1.18 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,271.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,278.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,278.93 ft |
| H'graph Detention Time: | 8.00 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.57 days |
| Trap Efficiency: | 73.85 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,268.35 | 0.371 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,268.50 | 0.373 | 0.056 | 0.000 | | |
| 2,269.00 | 0.379 | 0.244 | 0.000 | | |
| 2,269.50 | 0.385 | 0.435 | 0.000 | | |
| 2,270.00 | 0.391 | 0.629 | 0.000 | | |
| 2,270.50 | 0.396 | 0.826 | 0.000 | | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,271.00 | 0.402 | 1.025 | 0.000 | | Spillway #1 |
| 2,271.50 | 0.408 | 1.228 | 0.271 | 9.05* | |
| 2,272.00 | 0.414 | 1.434 | 0.565 | 4.41* | |
| 2,272.50 | 0.421 | 1.643 | 0.651 | 3.88* | |
| 2,273.00 | 0.427 | 1.854 | 0.709 | 3.62* | |
| 2,273.50 | 0.433 | 2.069 | 0.766 | 3.39* | |
| 2,274.00 | 0.439 | 2.287 | 0.824 | 3.30 | |
| 2,274.50 | 0.445 | 2.508 | 0.882 | 3.15 | |
| 2,275.00 | 0.452 | 2.732 | 0.939 | 2.95 | |
| 2,275.50 | 0.458 | 2.960 | 0.997 | 2.85 | |
| 2,276.00 | 0.464 | 3.190 | 1.055 | 2.75 | |
| 2,276.50 | 0.471 | 3.424 | 1.108 | 2.60 | |
| 2,277.00 | 0.477 | 3.661 | 1.144 | 2.55 | |
| 2,277.50 | 0.484 | 3.901 | 1.181 | 2.50 | |
| 2,278.00 | 0.490 | 4.145 | 1.217 | 2.45 | Spillway #2 |
| 2,278.50 | 0.497 | 4.392 | 5.133 | 9.80 | |
| 2,278.93 | 0.503 | 4.608 | 49.147 | 2.45 | Peak Stage |
| 2,279.00 | 0.504 | 4.642 | 56.060 | | |
| 2,279.50 | 0.510 | 4.895 | 119.163 | | |
| 2,280.00 | 0.517 | 5.152 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,268.35 | 0.000 | 0.000 | 0.000 |
| 2,268.50 | 0.000 | 0.000 | 0.000 |
| 2,269.00 | 0.000 | 0.000 | 0.000 |
| 2,269.50 | 0.000 | 0.000 | 0.000 |
| 2,270.00 | 0.000 | 0.000 | 0.000 |
| 2,270.50 | 0.000 | 0.000 | 0.000 |
| 2,271.00 | 0.000 | 0.000 | 0.000 |
| 2,271.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,272.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,272.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,273.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,273.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,274.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,274.50 | (6)>0.882 | 0.000 | 0.882 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,275.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,275.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,276.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,276.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,277.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,277.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,278.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,278.50 | (6)>1.253 | 3.880 | 5.133 |
| 2,279.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,279.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,280.00 | (6)>1.362 | 203.173 | 204.536 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 12.600 | 0.100 | 0.089 | 0.433 | 73.000 | S | 26.11 | 1.988 |
| | 2 | 7.200 | 0.109 | 0.069 | 0.406 | 79.000 | M | 17.87 | 1.424 |
| | 3 | 7.700 | 0.056 | 0.046 | 0.423 | 86.000 | F | 22.55 | 1.925 |
| | 4 | 4.000 | 0.086 | 0.009 | 0.319 | 74.000 | M | 8.56 | 0.657 |
| | 5 | 4.200 | 0.025 | 0.000 | 0.000 | 79.000 | M | 10.42 | 0.831 |
| | 6 | 4.500 | 0.056 | 0.000 | 0.000 | 86.000 | F | 13.18 | 1.125 |
| | Σ | **40.200** | | | | | | **96.03** | **7.951** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 30.00 | 0.0030 | 1.0000 | 1 | 2.4 | 1,805 | 1.15 | 0.18 |
| | 2 | 0.220 | 50.00 | 24.00 | 0.1400 | 1.0000 | 2 | 49.7 | 48,314 | 26.03 | 13.62 |
| | 3 | 0.220 | 50.00 | 22.00 | 0.9000 | 1.0000 | 2 | 391.1 | 245,335 | 132.17 | 74.18 |
| | 4 | 0.220 | 50.00 | 15.00 | 0.0500 | 1.0000 | 2 | 4.4 | 9,462 | 5.10 | 2.65 |
| | 5 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 2 | 22.1 | 36,164 | 19.48 | 10.44 |
| | 6 | 0.220 | 50.00 | 18.00 | 0.9000 | 1.0000 | 2 | 170.1 | 187,298 | 100.90 | 56.33 |
| | Σ | | | | | | | **639.7** | **146,222** | **78.83** | **30.76** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 30.00 | 150.00 | 500.00 | 1.380 | 0.100 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.100** |
| #1 | 2 | 3. Short grass pasture | 48.57 | 170.00 | 350.00 | 5.570 | 0.017 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.109** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 45.83 | 220.00 | 480.00 | 6.770 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.056** |
| #1 | 4 | 2. Minimum tillage cultivation | 31.25 | 100.00 | 320.00 | 2.790 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.086** |
| #1 | 5 | 3. Short grass pasture | 40.00 | 120.00 | 300.00 | 5.050 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.025** |
| #1 | 6 | 5. Nearly bare and untilled, and alluvial valley fans | 36.36 | 120.00 | 330.00 | 6.030 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.50 | 450.00 | 3.000 | 0.041 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.056** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 45.83 | 220.00 | 480.00 | 20.310 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 36.36 | 120.00 | 330.00 | 18.090 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.50 | 450.00 | 3.000 | 0.041 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.089** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 31.25 | 100.00 | 320.00 | 16.770 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 7.00 | 700.00 | 3.000 | 0.064 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.069** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 36.36 | 120.00 | 330.00 | 18.090 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.50 | 450.00 | 3.000 | 0.041 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.046** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.009** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #6
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

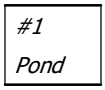
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #6 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 40.200 | 40.200 | 118.17 | 9.93 | 791.5 | 147,579 | 79.56 | 30.48 |
| | Out | | | 103.89 | 8.91 | 246.6 | 36,549 | 1.02 | 0.64 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 9.03 |
| | Out | 0.34 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.982% | 100.000% |
| 1.0000 | 97.959% | 100.000% |
| 0.5000 | 91.951% | 100.000% |
| 0.3000 | 86.951% | 100.000% |
| 0.2000 | 79.954% | 100.000% |
| 0.1000 | 69.946% | 100.000% |
| 0.0500 | 59.941% | 100.000% |
| 0.0300 | 49.944% | 100.000% |
| 0.0200 | 41.944% | 100.000% |
| 0.0100 | 31.947% | 100.000% |
| 0.0050 | 20.974% | 67.320% |
| 0.0030 | 14.977% | 48.073% |
| 0.0010 | 3.996% | 12.827% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #6*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,271.00 ft |
| Initial Pool: | 1.03 ac-ft |
| *Sediment Storage: | 1.18 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,271.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,278.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,279.38 ft |
| H'graph Detention Time: | 6.32 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.58 days |
| Trap Efficiency: | 68.84 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,268.35 | 0.371 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,268.50 | 0.373 | 0.056 | 0.000 | | |
| 2,269.00 | 0.379 | 0.244 | 0.000 | | |
| 2,269.50 | 0.385 | 0.435 | 0.000 | | |
| 2,270.00 | 0.391 | 0.629 | 0.000 | | |
| 2,270.50 | 0.396 | 0.826 | 0.000 | | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,271.00 | 0.402 | 1.025 | 0.000 | | Spillway #1 |
| 2,271.50 | 0.408 | 1.228 | 0.271 | 9.05* | |
| 2,272.00 | 0.414 | 1.434 | 0.565 | 4.41* | |
| 2,272.50 | 0.421 | 1.643 | 0.651 | 3.88* | |
| 2,273.00 | 0.427 | 1.854 | 0.709 | 3.62* | |
| 2,273.50 | 0.433 | 2.069 | 0.766 | 3.39* | |
| 2,274.00 | 0.439 | 2.287 | 0.824 | 3.30 | |
| 2,274.50 | 0.445 | 2.508 | 0.882 | 3.15 | |
| 2,275.00 | 0.452 | 2.732 | 0.939 | 3.00 | |
| 2,275.50 | 0.458 | 2.960 | 0.997 | 2.85 | |
| 2,276.00 | 0.464 | 3.190 | 1.055 | 2.70 | |
| 2,276.50 | 0.471 | 3.424 | 1.108 | 2.60 | |
| 2,277.00 | 0.477 | 3.661 | 1.144 | 2.55 | |
| 2,277.50 | 0.484 | 3.901 | 1.181 | 2.50 | |
| 2,278.00 | 0.490 | 4.145 | 1.217 | 2.45 | Spillway #2 |
| 2,278.50 | 0.497 | 4.392 | 5.133 | 9.35 | |
| 2,279.00 | 0.504 | 4.642 | 56.060 | 3.00 | |
| 2,279.38 | 0.509 | 4.834 | 103.892 | 0.10 | Peak Stage |
| 2,279.50 | 0.510 | 4.895 | 119.163 | | |
| 2,280.00 | 0.517 | 5.152 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,268.35 | 0.000 | 0.000 | 0.000 |
| 2,268.50 | 0.000 | 0.000 | 0.000 |
| 2,269.00 | 0.000 | 0.000 | 0.000 |
| 2,269.50 | 0.000 | 0.000 | 0.000 |
| 2,270.00 | 0.000 | 0.000 | 0.000 |
| 2,270.50 | 0.000 | 0.000 | 0.000 |
| 2,271.00 | 0.000 | 0.000 | 0.000 |
| 2,271.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,272.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,272.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,273.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,273.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,274.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,274.50 | (6)>0.882 | 0.000 | 0.882 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,275.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,275.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,276.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,276.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,277.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,277.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,278.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,278.50 | (6)>1.253 | 3.880 | 5.133 |
| 2,279.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,279.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,280.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 12.600 | 0.100 | 0.089 | 0.433 | 73.000 | S | 32.93 | 2.558 |
| | 2 | 7.200 | 0.109 | 0.069 | 0.406 | 79.000 | M | 21.92 | 1.783 |
| | 3 | 7.700 | 0.056 | 0.046 | 0.423 | 86.000 | F | 26.91 | 2.343 |
| | 4 | 4.000 | 0.086 | 0.009 | 0.319 | 74.000 | M | 10.75 | 0.841 |
| | 5 | 4.200 | 0.025 | 0.000 | 0.000 | 79.000 | M | 12.79 | 1.040 |
| | 6 | 4.500 | 0.056 | 0.000 | 0.000 | 86.000 | F | 15.73 | 1.369 |
| | Σ | **40.200** | | | | | | **118.17** | **9.933** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 30.00 | 0.0030 | 1.0000 | 1 | 3.1 | 1,811 | 1.16 | 0.19 |
| | 2 | 0.220 | 50.00 | 24.00 | 0.1400 | 1.0000 | 2 | 63.2 | 48,577 | 26.17 | 13.83 |
| | 3 | 0.220 | 50.00 | 22.00 | 0.9000 | 1.0000 | 2 | 481.9 | 247,190 | 133.17 | 75.03 |
| | 4 | 0.220 | 50.00 | 15.00 | 0.0500 | 1.0000 | 2 | 5.7 | 9,483 | 5.11 | 2.70 |
| | 5 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 2 | 28.1 | 36,335 | 19.57 | 10.60 |
| | 6 | 0.220 | 50.00 | 18.00 | 0.9000 | 1.0000 | 2 | 209.6 | 188,750 | 101.69 | 56.99 |
| | Σ | | | | | | | **791.5** | **147,579** | **79.56** | **30.48** |

# Subwatershed Time of Concentration Details:

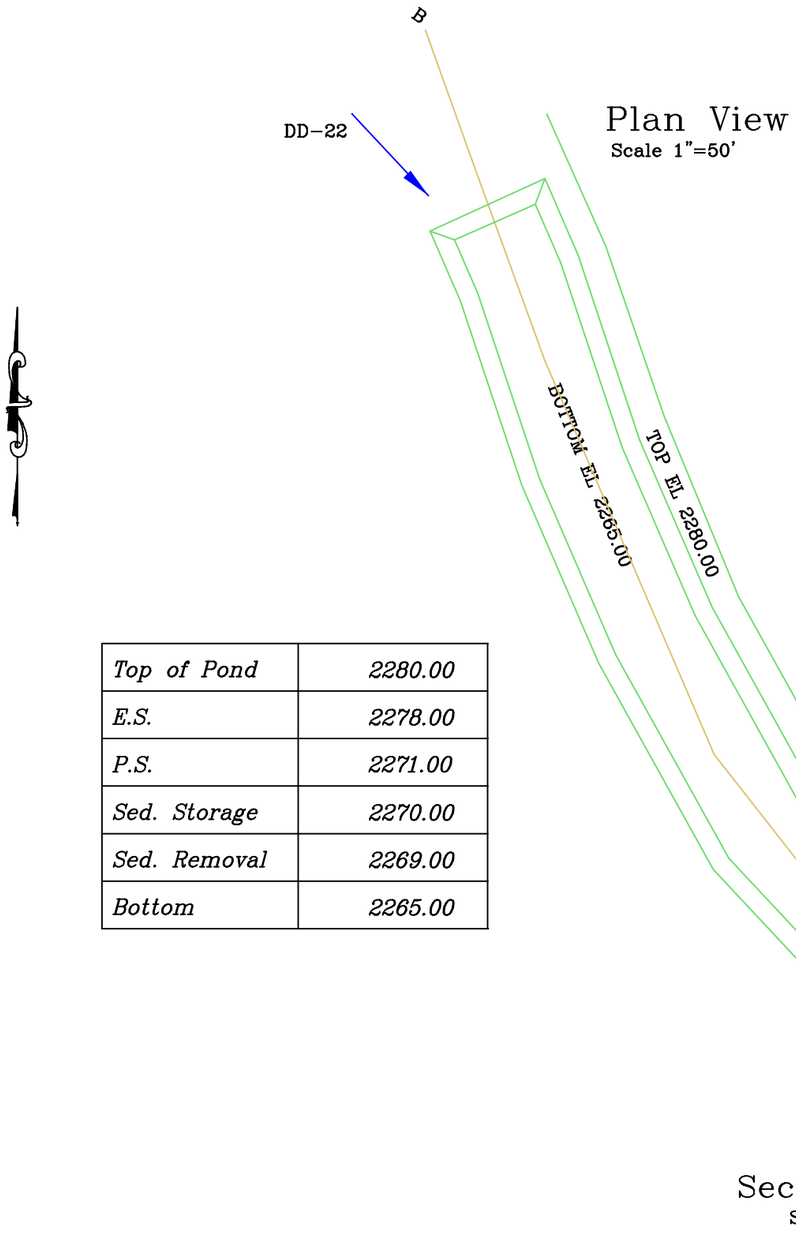
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 30.00 | 150.00 | 500.00 | 1.380 | 0.100 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.100** |
| #1 | 2 | 3. Short grass pasture | 48.57 | 170.00 | 350.00 | 5.570 | 0.017 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.109** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 45.83 | 220.00 | 480.00 | 6.770 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.056** |
| #1 | 4 | 2. Minimum tillage cultivation | 31.25 | 100.00 | 320.00 | 2.790 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.086** |
| #1 | 5 | 3. Short grass pasture | 40.00 | 120.00 | 300.00 | 5.050 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.025** |
| #1 | 6 | 5. Nearly bare and untilled, and alluvial valley fans | 36.36 | 120.00 | 330.00 | 6.030 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.50 | 450.00 | 3.000 | 0.041 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.056** |

## *Subwatershed Muskingum Routing Details:*

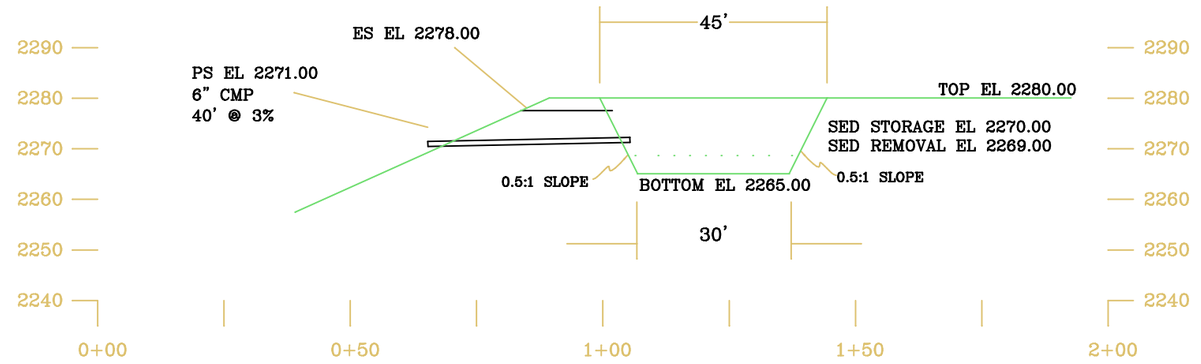
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 45.83 | 220.00 | 480.00 | 20.310 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 36.36 | 120.00 | 330.00 | 18.090 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.50 | 450.00 | 3.000 | 0.041 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.089** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 31.25 | 100.00 | 320.00 | 16.770 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 7.00 | 700.00 | 3.000 | 0.064 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.069** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 36.36 | 120.00 | 330.00 | 18.090 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.50 | 450.00 | 3.000 | 0.041 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.046** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.009** |

## Plan View
Scale 1"=50'




| | |
|---|---|
| *Top of Pond* | *2280.00* |
| *E.S.* | *2278.00* |
| *P.S.* | *2271.00* |
| *Sed. Storage* | *2270.00* |
| *Sed. Removal* | *2269.00* |
| *Bottom* | *2265.00* |

## Section A–A'
Scale 1"=30'

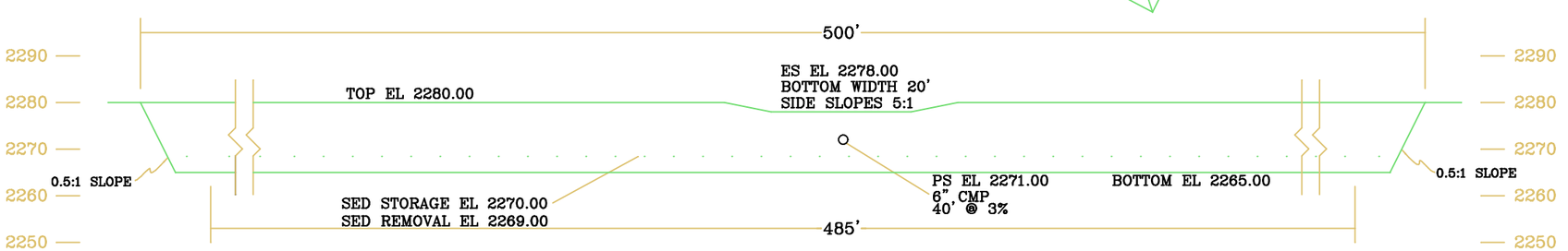



*LEGEND*

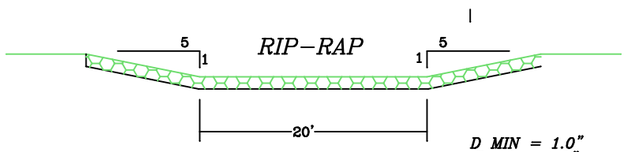
*Ground Line*

*Sediment Storage Level*

## Section B–B'
Scale 1"=30'




## *EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 6

DATE: 02/17/2023 | FILENAME: POND 06.dwg

SCALE: AS SHOWN | DRAWN BY:

Prepared By:

HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831–0271
Phone: (606) 573–6924
Fax: (606) 573–9543

HOWARD
Engineering and Geology, Inc.

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #7
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

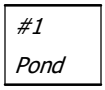
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond#7 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 31.200 | 31.200 | 70.47 | 5.65 | 236.8 | 57,860 | 31.25 | 16.34 |
| | Out | | | 24.45 | 5.28 | 60.5 | 17,617 | 0.24 | 0.14 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 5.42 |
| | Out | 0.09 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.927% | 100.000% |
| 1.0000 | 97.846% | 100.000% |
| 0.5000 | 91.819% | 100.000% |
| 0.3000 | 86.818% | 100.000% |
| 0.2000 | 79.831% | 100.000% |
| 0.1000 | 69.803% | 100.000% |
| 0.0500 | 59.789% | 100.000% |
| 0.0300 | 49.802% | 100.000% |
| 0.0200 | 41.801% | 100.000% |
| 0.0100 | 31.814% | 100.000% |
| 0.0050 | 20.907% | 81.787% |
| 0.0030 | 14.920% | 58.367% |
| 0.0010 | 3.987% | 15.596% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond#7*

### Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,271.00 ft |
| Initial Pool: | 0.30 ac-ft |
| *Sediment Storage: | 1.35 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,271.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,278.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

### Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,278.69 ft |
| H'graph Detention Time: | 9.15 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.04 days |
| Trap Efficiency: | 74.44 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,270.00 | 0.291 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,270.50 | 0.295 | 0.146 | 0.000 | | |
| 2,271.00 | 0.300 | 0.295 | 0.000 | | Spillway #1 |
| 2,271.50 | 0.304 | 0.446 | 0.271 | 6.75* | |
| 2,272.00 | 0.309 | 0.600 | 0.565 | 3.29* | |
| 2,272.50 | 0.314 | 0.755 | 0.651 | 2.89* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,273.00 | 0.318 | 0.913 | 0.709 | 2.80 | |
| 2,273.50 | 0.323 | 1.074 | 0.766 | 2.65 | |
| 2,274.00 | 0.328 | 1.236 | 0.824 | 2.45 | |
| 2,274.50 | 0.332 | 1.401 | 0.882 | 2.35 | |
| 2,275.00 | 0.337 | 1.569 | 0.939 | 2.25 | |
| 2,275.50 | 0.342 | 1.739 | 0.997 | 2.10 | |
| 2,276.00 | 0.347 | 1.911 | 1.055 | 2.05 | |
| 2,276.50 | 0.352 | 2.086 | 1.108 | 1.95 | |
| 2,277.00 | 0.357 | 2.263 | 1.144 | 1.90 | |
| 2,277.50 | 0.362 | 2.442 | 1.181 | 1.85 | |
| 2,278.00 | 0.367 | 2.624 | 1.217 | 1.85 | Spillway #2 |
| 2,278.50 | 0.372 | 2.809 | 5.133 | 10.50 | |
| 2,278.69 | 0.374 | 2.880 | 24.452 | 1.45 | Peak Stage |
| 2,279.00 | 0.377 | 2.996 | 56.060 | | |
| 2,279.50 | 0.382 | 3.186 | 119.163 | | |
| 2,280.00 | 0.387 | 3.378 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,270.00 | 0.000 | 0.000 | 0.000 |
| 2,270.50 | 0.000 | 0.000 | 0.000 |
| 2,271.00 | 0.000 | 0.000 | 0.000 |
| 2,271.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,272.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,272.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,273.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,273.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,274.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,274.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,275.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,275.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,276.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,276.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,277.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,277.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,278.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,278.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,279.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,279.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,280.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 12.800 | 0.092 | 0.058 | 0.412 | 73.000 | M | 26.52 | 2.020 |
| | 2 | 6.700 | 0.054 | 0.015 | 0.370 | 79.000 | M | 16.63 | 1.326 |
| | 3 | 3.000 | 0.039 | 0.060 | 0.343 | 86.000 | F | 8.79 | 0.750 |
| | 4 | 4.800 | 0.024 | 0.000 | 0.000 | 74.000 | M | 10.28 | 0.788 |
| | 5 | 3.900 | 0.060 | 0.000 | 0.000 | 79.000 | M | 9.68 | 0.771 |
| | Σ | **31.200** | | | | | | **70.47** | **5.655** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 40.00 | 0.0030 | 1.0000 | 1 | 3.2 | 2,245 | 1.44 | 0.74 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 47.9 | 48,813 | 26.30 | 14.11 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 156.7 | 253,015 | 136.31 | 76.15 |
| | 4 | 0.220 | 50.00 | 37.00 | 0.0500 | 1.0000 | 2 | 14.6 | 26,009 | 14.01 | 7.29 |
| | 5 | 0.220 | 50.00 | 15.00 | 0.1400 | 1.0000 | 2 | 14.4 | 25,521 | 13.75 | 7.36 |
| | Σ | | | | | | | **236.8** | **57,860** | **31.25** | **16.34** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 40.00 | 200.00 | 500.00 | 1.600 | 0.086 |
| | | 8. Large gullies, diversions, and low flowing streams | 46.67 | 210.00 | 450.00 | 20.490 | 0.006 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.092** |
| #1 | 2 | 3. Short grass pasture | 54.05 | 200.00 | 370.00 | 5.880 | 0.017 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.054** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 55.56 | 250.00 | 450.00 | 7.450 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.039** |
| #1 | 4 | 2. Minimum tillage cultivation | 37.04 | 100.00 | 270.00 | 3.040 | 0.024 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.024** |
| #1 | 5 | 3. Short grass pasture | 31.58 | 120.00 | 380.00 | 4.490 | 0.023 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.060** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 3. Short grass pasture | 54.05 | 200.00 | 370.00 | 5.880 | 0.017 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.04 | 100.00 | 270.00 | 18.250 | 0.004 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.058** |
| #1 | 2 | 3. Short grass pasture | 37.04 | 100.00 | 270.00 | 4.860 | 0.015 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.015** |
| #1 | 3 | 3. Short grass pasture | 31.58 | 120.00 | 380.00 | 4.490 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.060** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #7
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

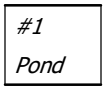
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond#7 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 31.200 | 31.200 | 87.59 | 7.14 | 295.5 | 56,215 | 30.37 | 16.15 |
| | Out | | | 75.11 | 6.77 | 89.7 | 19,386 | 0.51 | 0.30 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 5.41 |
| | Out | 0.16 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.923% | 100.000% |
| 1.0000 | 97.838% | 100.000% |
| 0.5000 | 91.809% | 100.000% |
| 0.3000 | 86.809% | 100.000% |
| 0.2000 | 79.822% | 100.000% |
| 0.1000 | 69.793% | 100.000% |
| 0.0500 | 59.778% | 100.000% |
| 0.0300 | 49.792% | 100.000% |
| 0.0200 | 41.791% | 100.000% |
| 0.0100 | 31.804% | 100.000% |
| 0.0050 | 20.903% | 68.857% |
| 0.0030 | 14.916% | 49.137% |
| 0.0010 | 3.986% | 13.131% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond#7*

### Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,271.00 ft |
| Initial Pool: | 0.30 ac-ft |
| *Sediment Storage: | 1.35 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,271.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,278.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

### Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,279.15 ft |
| H'graph Detention Time: | 7.23 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.05 days |
| Trap Efficiency: | 69.64 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,270.00 | 0.291 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,270.50 | 0.295 | 0.146 | 0.000 | | |
| 2,271.00 | 0.300 | 0.295 | 0.000 | | Spillway #1 |
| 2,271.50 | 0.304 | 0.446 | 0.271 | 6.75* | |
| 2,272.00 | 0.309 | 0.600 | 0.565 | 3.29* | |
| 2,272.50 | 0.314 | 0.755 | 0.651 | 2.89* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,273.00 | 0.318 | 0.913 | 0.709 | 2.80 | |
| 2,273.50 | 0.323 | 1.074 | 0.766 | 2.65 | |
| 2,274.00 | 0.328 | 1.236 | 0.824 | 2.45 | |
| 2,274.50 | 0.332 | 1.401 | 0.882 | 2.35 | |
| 2,275.00 | 0.337 | 1.569 | 0.939 | 2.25 | |
| 2,275.50 | 0.342 | 1.739 | 0.997 | 2.10 | |
| 2,276.00 | 0.347 | 1.911 | 1.055 | 2.05 | |
| 2,276.50 | 0.352 | 2.086 | 1.108 | 1.95 | |
| 2,277.00 | 0.357 | 2.263 | 1.144 | 1.90 | |
| 2,277.50 | 0.362 | 2.442 | 1.181 | 1.85 | |
| 2,278.00 | 0.367 | 2.624 | 1.217 | 1.85 | Spillway #2 |
| 2,278.50 | 0.372 | 2.809 | 5.133 | 10.10 | |
| 2,279.00 | 0.377 | 2.996 | 56.060 | 2.00 | |
| 2,279.15 | 0.378 | 3.053 | 75.107 | 0.05 | Peak Stage |
| 2,279.50 | 0.382 | 3.186 | 119.163 | | |
| 2,280.00 | 0.387 | 3.378 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,270.00 | 0.000 | 0.000 | 0.000 |
| 2,270.50 | 0.000 | 0.000 | 0.000 |
| 2,271.00 | 0.000 | 0.000 | 0.000 |
| 2,271.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,272.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,272.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,273.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,273.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,274.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,274.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,275.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,275.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,276.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,276.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,277.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,277.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,278.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,278.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,279.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,279.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,280.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 12.800 | 0.092 | 0.058 | 0.412 | 73.000 | M | 33.45 | 2.598 |
| | 2 | 6.700 | 0.054 | 0.015 | 0.370 | 79.000 | M | 20.40 | 1.659 |
| | 3 | 3.000 | 0.039 | 0.060 | 0.343 | 86.000 | F | 10.49 | 0.913 |
| | 4 | 4.800 | 0.024 | 0.000 | 0.000 | 74.000 | M | 12.90 | 1.009 |
| | 5 | 3.900 | 0.060 | 0.000 | 0.000 | 79.000 | M | 11.87 | 0.966 |
| | Σ | **31.200** | | | | | | **87.59** | **7.145** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 40.00 | 0.0030 | 1.0000 | 1 | 4.2 | 2,250 | 1.44 | 0.76 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 60.9 | 49,042 | 26.42 | 14.32 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 193.0 | 255,317 | 137.55 | 77.02 |
| | 4 | 0.220 | 50.00 | 37.00 | 0.0500 | 1.0000 | 2 | 19.1 | 26,066 | 14.04 | 7.42 |
| | 5 | 0.220 | 50.00 | 15.00 | 0.1400 | 1.0000 | 2 | 18.4 | 25,642 | 13.81 | 7.47 |
| | Σ | | | | | | | **295.5** | **56,215** | **30.37** | **16.15** |

# Subwatershed Time of Concentration Details:

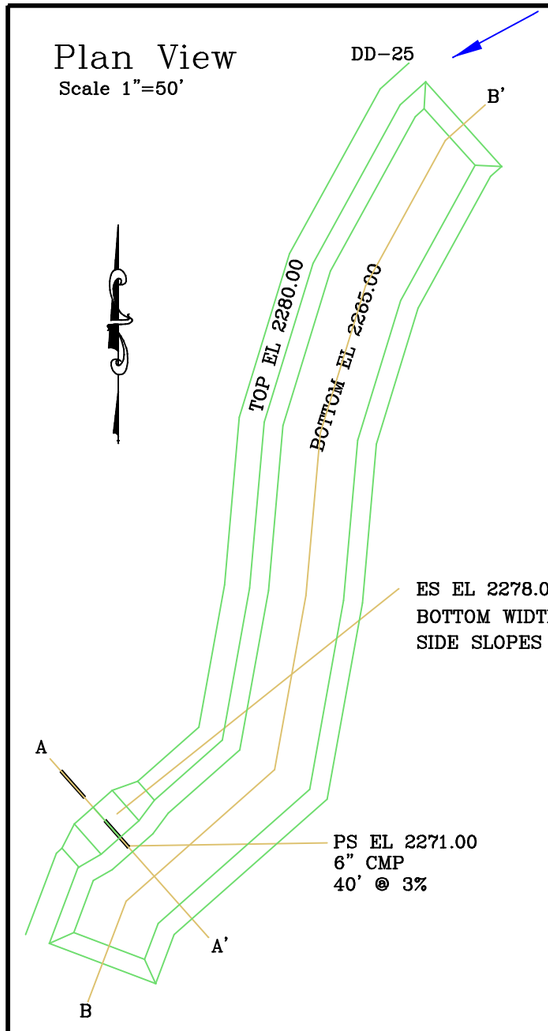
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 40.00 | 200.00 | 500.00 | 1.600 | 0.086 |
| | | 8. Large gullies, diversions, and low flowing streams | 46.67 | 210.00 | 450.00 | 20.490 | 0.006 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.092** |
| #1 | 2 | 3. Short grass pasture | 54.05 | 200.00 | 370.00 | 5.880 | 0.017 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.054** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 55.56 | 250.00 | 450.00 | 7.450 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.039** |
| #1 | 4 | 2. Minimum tillage cultivation | 37.04 | 100.00 | 270.00 | 3.040 | 0.024 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.024** |
| #1 | 5 | 3. Short grass pasture | 31.58 | 120.00 | 380.00 | 4.490 | 0.023 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.060** |

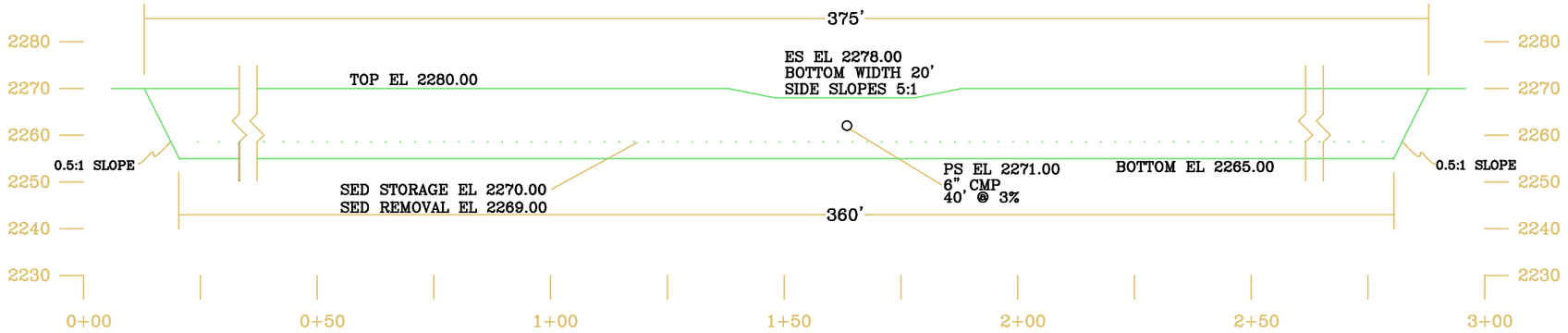
## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 3. Short grass pasture | 54.05 | 200.00 | 370.00 | 5.880 | 0.017 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.04 | 100.00 | 270.00 | 18.250 | 0.004 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.058** |
| #1 | 2 | 3. Short grass pasture | 37.04 | 100.00 | 270.00 | 4.860 | 0.015 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.015** |
| #1 | 3 | 3. Short grass pasture | 31.58 | 120.00 | 380.00 | 4.490 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.060** |

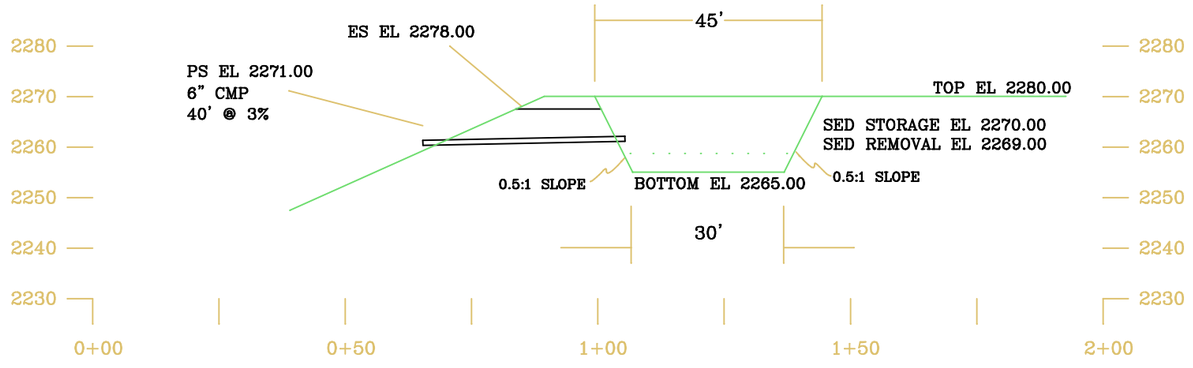
## Plan View
Scale 1"=50'




## Section B–B'
Scale 1"=30'




## Section A–A'
Scale 1"=30'



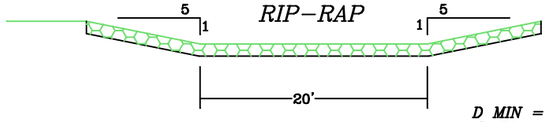

| | |
|---|---|
| *Top of Pond* | *2280.00* |
| *E.S.* | *2278.00* |
| *P.S.* | *2271.00* |
| *Sed. Storage* | *2270.00* |
| *Sed. Removal* | *2269.00* |
| *Bottom* | *2265.00* |

*LEGEND*

*Ground Line* ———

*Sediment Storage Level* . . . . . .

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 7

DATE: 02/17/2023

FILENAME: POND 07.dwg

SCALE: AS SHOWN

DRAWN BY:

Prepared By:

HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831–0271
Phone: (606) 573–6924
Fax: (606) 573–9543

HOWARD
Engineering and Geology, In

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #8
# 10yr. - 6hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

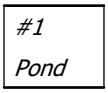
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 6 hr |
| Rainfall Depth: | 3.400 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #8 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 35.800 | 35.800 | 74.64 | 3.94 | 202.5 | 89,429 | 48.39 | 20.03 |
| | Out | | | 14.63 | 3.91 | 46.8 | 24,035 | 0.12 | 0.05 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 2.13 |
| | Out | 0.04 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.866% | 100.000% |
| 1.0000 | 97.729% | 100.000% |
| 0.5000 | 91.683% | 100.000% |
| 0.3000 | 86.683% | 100.000% |
| 0.2000 | 79.705% | 100.000% |
| 0.1000 | 69.659% | 100.000% |
| 0.0500 | 59.636% | 100.000% |
| 0.0300 | 49.659% | 100.000% |
| 0.0200 | 41.659% | 100.000% |
| 0.0100 | 31.681% | 100.000% |
| 0.0050 | 20.841% | 90.092% |
| 0.0030 | 14.863% | 64.253% |
| 0.0010 | 3.977% | 17.193% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #8*

### Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,281.00 ft |
| Initial Pool: | 0.29 ac-ft |
| *Sediment Storage: | 1.32 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,281.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,288.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

### Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,288.59 ft |
| H'graph Detention Time: | 10.73 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.73 days |
| Trap Efficiency: | 76.87 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,280.00 | 0.286 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,280.50 | 0.291 | 0.144 | 0.000 | | |
| 2,281.00 | 0.295 | 0.290 | 0.000 | | Spillway #1 |
| 2,281.50 | 0.300 | 0.439 | 0.271 | 6.64* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,282.00 | 0.305 | 0.590 | 0.565 | 4.55 | |
| 2,282.50 | 0.310 | 0.744 | 0.651 | 3.10 | |
| 2,283.00 | 0.315 | 0.900 | 0.709 | 2.75 | |
| 2,283.50 | 0.320 | 1.058 | 0.766 | 2.60 | |
| 2,284.00 | 0.324 | 1.219 | 0.824 | 2.45 | |
| 2,284.50 | 0.329 | 1.383 | 0.882 | 2.35 | |
| 2,285.00 | 0.335 | 1.549 | 0.939 | 2.20 | |
| 2,285.50 | 0.340 | 1.717 | 0.997 | 2.10 | |
| 2,286.00 | 0.345 | 1.888 | 1.055 | 2.00 | |
| 2,286.50 | 0.350 | 2.062 | 1.108 | 1.95 | |
| 2,287.00 | 0.355 | 2.238 | 1.144 | 1.90 | |
| 2,287.50 | 0.360 | 2.417 | 1.181 | 1.85 | |
| 2,288.00 | 0.366 | 2.599 | 1.217 | 1.85 | Spillway #2 |
| 2,288.50 | 0.371 | 2.783 | 5.133 | 2.05 | |
| 2,288.59 | 0.372 | 2.818 | 14.634 | 1.15 | Peak Stage |
| 2,289.00 | 0.376 | 2.969 | 56.060 | | |
| 2,289.50 | 0.382 | 3.159 | 119.163 | | |
| 2,290.00 | 0.387 | 3.351 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,280.00 | 0.000 | 0.000 | 0.000 |
| 2,280.50 | 0.000 | 0.000 | 0.000 |
| 2,281.00 | 0.000 | 0.000 | 0.000 |
| 2,281.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,282.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,282.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,283.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,283.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,284.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,284.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,285.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,285.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,286.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,286.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,287.00 | (6)>1.144 | 0.000 | 1.144 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,287.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,288.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,288.50 | (6)>1.253 | 3.880 | 5.133 |
| 2,289.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,289.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,290.00 | (6)>1.362 | 203.173 | 204.536 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 20.200 | 0.077 | 0.065 | 0.438 | 73.000 | S | 38.83 | 1.865 |
| | 2 | 4.000 | 0.074 | 0.022 | 0.440 | 79.000 | M | 9.63 | 0.494 |
| | 3 | 5.500 | 0.061 | 0.014 | 0.446 | 86.000 | M | 16.32 | 0.918 |
| | 4 | 3.500 | 0.044 | 0.009 | 0.319 | 74.000 | M | 7.01 | 0.340 |
| | 5 | 2.600 | 0.027 | 0.000 | 0.000 | 79.000 | M | 6.26 | 0.321 |
| | Σ | **35.800** | | | | | | **74.64** | **3.939** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 4.6 | 3,107 | 1.99 | 1.17 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 20.3 | 46,990 | 25.31 | 16.07 |
| | 3 | 0.220 | 50.00 | 17.00 | 0.9000 | 1.0000 | 2 | 160.1 | 178,700 | 96.27 | 65.04 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 4.9 | 17,484 | 9.42 | 5.72 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 12.6 | 44,665 | 24.06 | 15.27 |
| | Σ | | | | | | | **202.5** | **89,429** | **48.39** | **20.03** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 52.00 | 260.00 | 500.00 | 1.820 | 0.076 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 75.00 | 150.00 | 21.210 | 0.001 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.077** |
| #1 | 2 | 3. Short grass pasture | 50.00 | 200.00 | 400.00 | 5.650 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.074** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 200.00 | 400.00 | 7.070 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.061** |
| #1 | 4 | 2. Minimum tillage cultivation | 40.00 | 120.00 | 300.00 | 3.160 | 0.026 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.044** |
| #1 | 5 | 3. Short grass pasture | 34.38 | 110.00 | 320.00 | 4.690 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.027** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| | | 8. Large gullies, diversions, and low flowing streams | 34.38 | 110.00 | 320.00 | 17.580 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.065** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 120.00 | 300.00 | 18.970 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.022** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 34.38 | 110.00 | 320.00 | 17.580 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.014** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.009** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #8
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

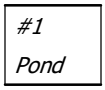
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #8 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 35.800 | 35.800 | 99.11 | 8.14 | 317.9 | 86,960 | 47.09 | 15.27 |
| | Out | | | 94.42 | 7.78 | 105.8 | 21,251 | 1.32 | 0.73 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 4.99 |
| | Out | 0.31 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.842% | 100.000% |
| 1.0000 | 97.681% | 100.000% |
| 0.5000 | 91.627% | 100.000% |
| 0.3000 | 86.627% | 100.000% |
| 0.2000 | 79.654% | 100.000% |
| 0.1000 | 69.600% | 100.000% |
| 0.0500 | 59.573% | 100.000% |
| 0.0300 | 49.599% | 100.000% |
| 0.0200 | 41.599% | 100.000% |
| 0.0100 | 31.626% | 94.992% |
| 0.0050 | 20.813% | 62.514% |
| 0.0030 | 14.840% | 44.573% |
| 0.0010 | 3.973% | 11.934% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #8*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,281.00 ft |
| Initial Pool: | 0.29 ac-ft |
| *Sediment Storage: | 1.32 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,281.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,288.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,289.30 ft |
| H'graph Detention Time: | 6.31 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.04 days |
| Trap Efficiency: | 66.71 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,280.00 | 0.286 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,280.50 | 0.291 | 0.144 | 0.000 | | |
| 2,281.00 | 0.295 | 0.290 | 0.000 | | Spillway #1 |
| 2,281.50 | 0.300 | 0.439 | 0.271 | 6.64* | |
| 2,282.00 | 0.305 | 0.590 | 0.565 | 3.24* | |
| 2,282.50 | 0.310 | 0.744 | 0.651 | 2.86* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,283.00 | 0.315 | 0.900 | 0.709 | 2.80 | |
| 2,283.50 | 0.320 | 1.058 | 0.766 | 2.60 | |
| 2,284.00 | 0.324 | 1.219 | 0.824 | 2.45 | |
| 2,284.50 | 0.329 | 1.383 | 0.882 | 2.30 | |
| 2,285.00 | 0.335 | 1.549 | 0.939 | 2.20 | |
| 2,285.50 | 0.340 | 1.717 | 0.997 | 2.10 | |
| 2,286.00 | 0.345 | 1.888 | 1.055 | 2.05 | |
| 2,286.50 | 0.350 | 2.062 | 1.108 | 1.95 | |
| 2,287.00 | 0.355 | 2.238 | 1.144 | 1.90 | |
| 2,287.50 | 0.360 | 2.417 | 1.181 | 1.85 | |
| 2,288.00 | 0.366 | 2.599 | 1.217 | 1.80 | Spillway #2 |
| 2,288.50 | 0.371 | 2.783 | 5.133 | 9.70 | |
| 2,289.00 | 0.376 | 2.969 | 56.060 | 2.50 | |
| 2,289.30 | 0.379 | 3.085 | 94.420 | 0.05 | Peak Stage |
| 2,289.50 | 0.382 | 3.159 | 119.163 | | |
| 2,290.00 | 0.387 | 3.351 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,280.00 | 0.000 | 0.000 | 0.000 |
| 2,280.50 | 0.000 | 0.000 | 0.000 |
| 2,281.00 | 0.000 | 0.000 | 0.000 |
| 2,281.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,282.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,282.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,283.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,283.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,284.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,284.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,285.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,285.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,286.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,286.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,287.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,287.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,288.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,288.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,289.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,289.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,290.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 20.200 | 0.077 | 0.065 | 0.438 | 73.000 | S | 52.79 | 4.100 |
| | 2 | 4.000 | 0.074 | 0.022 | 0.440 | 79.000 | M | 12.18 | 0.991 |
| | 3 | 5.500 | 0.061 | 0.014 | 0.446 | 86.000 | M | 19.22 | 1.673 |
| | 4 | 3.500 | 0.044 | 0.009 | 0.319 | 74.000 | M | 9.40 | 0.736 |
| | 5 | 2.600 | 0.027 | 0.000 | 0.000 | 79.000 | M | 7.91 | 0.644 |
| | Σ | **35.800** | | | | | | **99.11** | **8.143** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 8.5 | 2,987 | 1.91 | 0.98 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 34.2 | 46,153 | 24.86 | 13.48 |
| | 3 | 0.220 | 50.00 | 17.00 | 0.9000 | 1.0000 | 2 | 245.1 | 181,211 | 97.62 | 54.67 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 8.9 | 16,837 | 9.07 | 4.79 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 21.1 | 43,869 | 23.63 | 12.81 |
| | Σ | | | | | | | **317.9** | **86,960** | **47.09** | **15.27** |

# Subwatershed Time of Concentration Details:

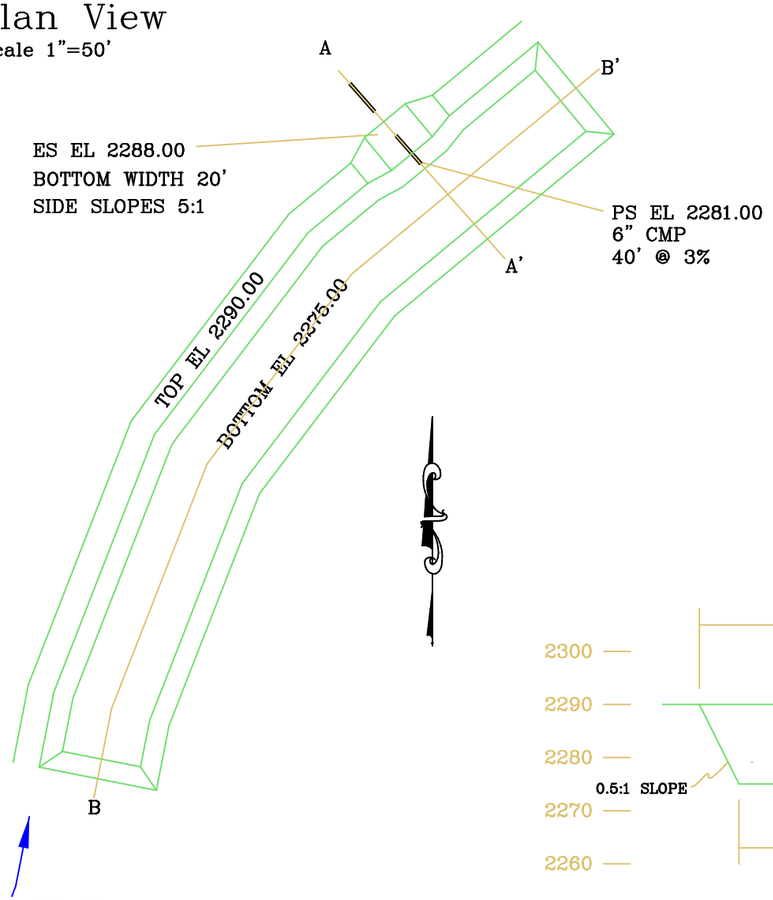
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 52.00 | 260.00 | 500.00 | 1.820 | 0.076 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 75.00 | 150.00 | 21.210 | 0.001 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.077** |
| #1 | 2 | 3. Short grass pasture | 50.00 | 200.00 | 400.00 | 5.650 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.074** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 200.00 | 400.00 | 7.070 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.061** |
| #1 | 4 | 2. Minimum tillage cultivation | 40.00 | 120.00 | 300.00 | 3.160 | 0.026 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.044** |
| #1 | 5 | 3. Short grass pasture | 34.38 | 110.00 | 320.00 | 4.690 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.027** |

## *Subwatershed Muskingum Routing Details:*

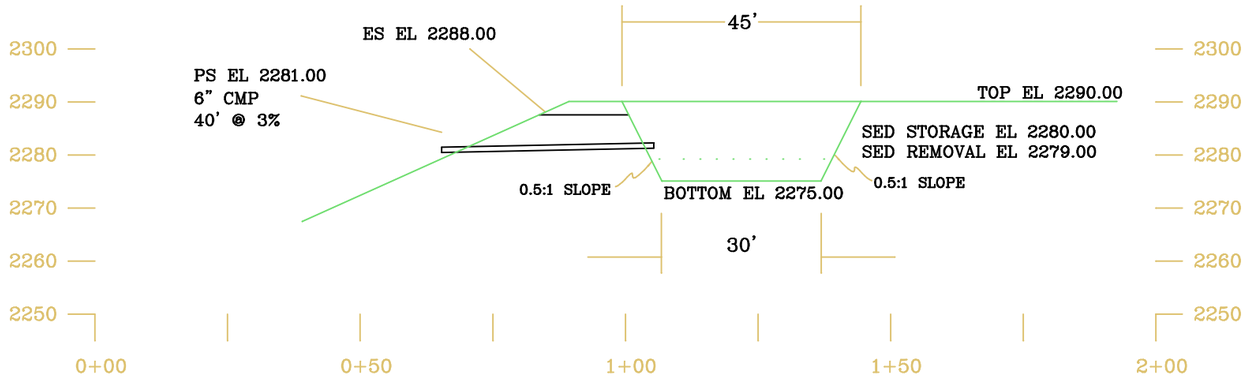
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| | | 8. Large gullies, diversions, and low flowing streams | 34.38 | 110.00 | 320.00 | 17.580 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.065** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 120.00 | 300.00 | 18.970 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.022** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 34.38 | 110.00 | 320.00 | 17.580 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.014** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.009** |

## Plan View
Scale 1"=50'

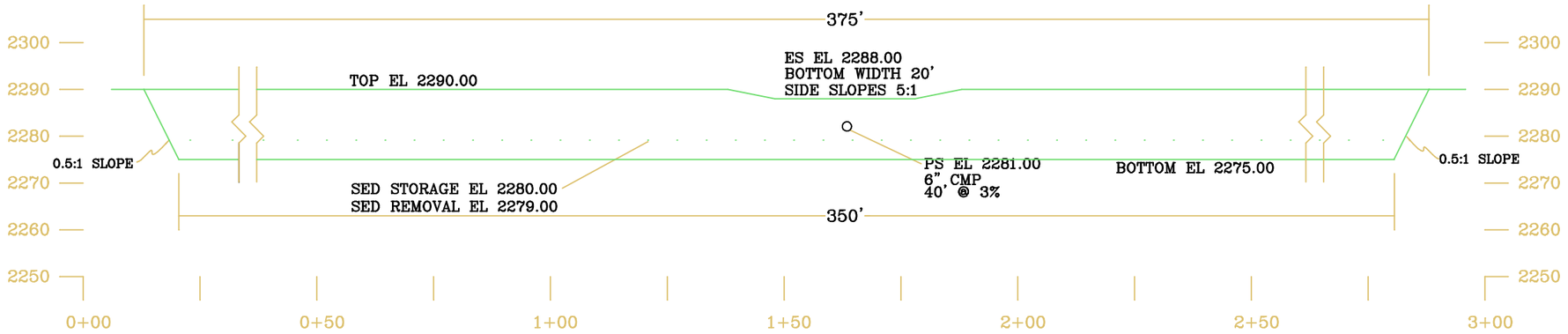



DD-28

## Section A-A'
Scale 1"=30'




## Section B-B'
Scale 1"=30'



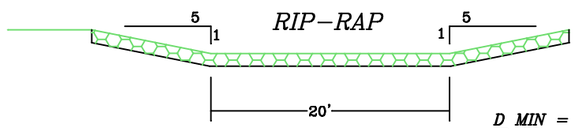

| | |
|---|---|
| *Top of Pond* | *2290.00* |
| *E.S.* | *2288.00* |
| *P.S.* | *2281.00* |
| *Sed. Storage* | *2280.00* |
| *Sed. Removal* | *2279.00* |
| *Bottom* | *2275.00* |

*LEGEND*

*Ground Line*

*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 8

DATE: 02/17/2023 | FILENAME: POND 08.dwg

SCALE: AS SHOWN | DRAWN BY:

Prepared By:

HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-8924
Fax: (606) 573-9543

HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #9
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

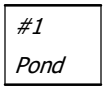
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #9 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 26.400 | 26.400 | 58.52 | 4.72 | 222.0 | 104,358 | 56.44 | 18.29 |
| | Out | | | 25.74 | 4.62 | 59.8 | 23,106 | 0.42 | 0.21 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 6.13 |
| | Out | 0.12 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.878% | 100.000% |
| 1.0000 | 97.753% | 100.000% |
| 0.5000 | 91.711% | 100.000% |
| 0.3000 | 86.711% | 100.000% |
| 0.2000 | 79.731% | 100.000% |
| 0.1000 | 69.689% | 100.000% |
| 0.0500 | 59.668% | 100.000% |
| 0.0300 | 49.689% | 100.000% |
| 0.0200 | 41.689% | 100.000% |
| 0.0100 | 31.709% | 100.000% |
| 0.0050 | 20.855% | 77.361% |
| 0.0030 | 14.875% | 55.181% |
| 0.0010 | 3.979% | 14.761% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #9*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,271.00 ft |
| Initial Pool: | 0.23 ac-ft |
| *Sediment Storage: | 1.07 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,271.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,278.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,278.70 ft |
| H'graph Detention Time: | 8.80 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.77 days |
| Trap Efficiency: | 73.04 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,270.00 | 0.231 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,270.50 | 0.235 | 0.116 | 0.000 | | |
| 2,271.00 | 0.238 | 0.234 | 0.000 | | Spillway #1 |
| 2,271.50 | 0.242 | 0.355 | 0.271 | 5.36* | |
| 2,272.00 | 0.246 | 0.477 | 0.565 | 3.70 | |
| 2,272.50 | 0.250 | 0.601 | 0.651 | 2.50 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,273.00 | 0.254 | 0.726 | 0.709 | 2.20 | |
| 2,273.50 | 0.257 | 0.854 | 0.766 | 2.10 | |
| 2,274.00 | 0.261 | 0.984 | 0.824 | 2.00 | |
| 2,274.50 | 0.265 | 1.115 | 0.882 | 1.85 | |
| 2,275.00 | 0.269 | 1.249 | 0.939 | 1.80 | |
| 2,275.50 | 0.273 | 1.384 | 0.997 | 1.70 | |
| 2,276.00 | 0.277 | 1.522 | 1.055 | 1.60 | |
| 2,276.50 | 0.281 | 1.662 | 1.108 | 1.55 | |
| 2,277.00 | 0.285 | 1.803 | 1.144 | 1.55 | |
| 2,277.50 | 0.289 | 1.947 | 1.181 | 1.50 | |
| 2,278.00 | 0.293 | 2.092 | 1.217 | 4.80 | Spillway #2 |
| 2,278.50 | 0.297 | 2.240 | 5.133 | 7.30 | |
| 2,278.70 | 0.299 | 2.301 | 25.743 | 1.00 | Peak Stage |
| 2,279.00 | 0.302 | 2.390 | 56.060 | | |
| 2,279.50 | 0.306 | 2.542 | 119.163 | | |
| 2,280.00 | 0.310 | 2.696 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,270.00 | 0.000 | 0.000 | 0.000 |
| 2,270.50 | 0.000 | 0.000 | 0.000 |
| 2,271.00 | 0.000 | 0.000 | 0.000 |
| 2,271.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,272.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,272.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,273.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,273.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,274.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,274.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,275.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,275.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,276.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,276.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,277.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,277.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,278.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,278.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,279.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,279.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,280.00 | (6)>1.362 | 203.173 | 204.536 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 14.900 | 0.082 | 0.064 | 0.440 | 73.000 | S | 30.87 | 2.351 |
| | 2 | 3.200 | 0.028 | 0.024 | 0.443 | 79.000 | M | 7.94 | 0.633 |
| | 3 | 3.300 | 0.059 | 0.014 | 0.451 | 86.000 | F | 9.67 | 0.825 |
| | 4 | 2.200 | 0.045 | 0.009 | 0.319 | 74.000 | M | 4.71 | 0.361 |
| | 5 | 2.800 | 0.028 | 0.000 | 0.000 | 79.000 | M | 6.95 | 0.554 |
| | Σ | **26.400** | | | | | | **58.52** | **4.724** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 4.6 | 2,869 | 1.83 | 0.92 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 20.9 | 44,745 | 24.11 | 12.93 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 174.3 | 254,155 | 136.92 | 76.92 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 4.1 | 15,895 | 8.56 | 4.45 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 18.0 | 44,047 | 23.73 | 12.72 |
| | Σ | | | | | | | **222.0** | **104,358** | **56.44** | **18.29** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 48.00 | 240.00 | 500.00 | 1.750 | 0.079 |
| | | 8. Large gullies, diversions, and low flowing streams | 48.00 | 120.00 | 250.00 | 20.780 | 0.003 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.082** |
| #1 | 2 | 3. Short grass pasture | 50.00 | 200.00 | 400.00 | 5.650 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.028** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 51.43 | 180.00 | 350.00 | 7.170 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.059** |
| #1 | 4 | 2. Minimum tillage cultivation | 37.50 | 150.00 | 400.00 | 3.060 | 0.036 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.045** |
| #1 | 5 | 3. Short grass pasture | 47.37 | 180.00 | 380.00 | 5.500 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.028** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 51.43 | 180.00 | 350.00 | 21.510 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| | | 8. Large gullies, diversions, and low flowing streams | 39.47 | 150.00 | 380.00 | 18.840 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.064** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 37.50 | 150.00 | 400.00 | 18.370 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.024** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 39.47 | 150.00 | 380.00 | 18.840 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.014** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.009** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #9
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

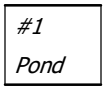
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #9 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 26.400 | 26.400 | 72.91 | 5.98 | 275.7 | 103,635 | 56.06 | 17.97 |
| | Out | | | 68.31 | 5.86 | 87.2 | 24,239 | 0.70 | 0.38 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 6.10 |
| | Out | 0.18 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.871% | 100.000% |
| 1.0000 | 97.739% | 100.000% |
| 0.5000 | 91.695% | 100.000% |
| 0.3000 | 86.695% | 100.000% |
| 0.2000 | 79.716% | 100.000% |
| 0.1000 | 69.672% | 100.000% |
| 0.0500 | 59.650% | 100.000% |
| 0.0300 | 49.672% | 100.000% |
| 0.0200 | 41.671% | 100.000% |
| 0.0100 | 31.693% | 100.000% |
| 0.0050 | 20.847% | 65.947% |
| 0.0030 | 14.868% | 47.035% |
| 0.0010 | 3.978% | 12.585% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #1 (Pond)*

*Proposed Pond #9*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,271.00 ft |
| Initial Pool: | 0.23 ac-ft |
| *Sediment Storage: | 1.07 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,271.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,278.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,279.10 ft |
| H'graph Detention Time: | 7.06 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.79 days |
| Trap Efficiency: | 68.39 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,270.00 | 0.231 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,270.50 | 0.235 | 0.116 | 0.000 | | |
| 2,271.00 | 0.238 | 0.234 | 0.000 | | Spillway #1 |
| 2,271.50 | 0.242 | 0.355 | 0.271 | 5.36* | |
| 2,272.00 | 0.246 | 0.477 | 0.565 | 3.70 | |
| 2,272.50 | 0.250 | 0.601 | 0.651 | 2.50 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,273.00 | 0.254 | 0.726 | 0.709 | 2.25 | |
| 2,273.50 | 0.257 | 0.854 | 0.766 | 2.05 | |
| 2,274.00 | 0.261 | 0.984 | 0.824 | 2.00 | |
| 2,274.50 | 0.265 | 1.115 | 0.882 | 1.85 | |
| 2,275.00 | 0.269 | 1.249 | 0.939 | 1.80 | |
| 2,275.50 | 0.273 | 1.384 | 0.997 | 1.70 | |
| 2,276.00 | 0.277 | 1.522 | 1.055 | 1.60 | |
| 2,276.50 | 0.281 | 1.662 | 1.108 | 1.55 | |
| 2,277.00 | 0.285 | 1.803 | 1.144 | 1.55 | |
| 2,277.50 | 0.289 | 1.947 | 1.181 | 1.50 | |
| 2,278.00 | 0.293 | 2.092 | 1.217 | 1.45 | Spillway #2 |
| 2,278.50 | 0.297 | 2.240 | 5.133 | 10.50 | |
| 2,279.00 | 0.302 | 2.390 | 56.060 | 1.50 | |
| 2,279.10 | 0.302 | 2.419 | 68.310 | 0.05 | Peak Stage |
| 2,279.50 | 0.306 | 2.542 | 119.163 | | |
| 2,280.00 | 0.310 | 2.696 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,270.00 | 0.000 | 0.000 | 0.000 |
| 2,270.50 | 0.000 | 0.000 | 0.000 |
| 2,271.00 | 0.000 | 0.000 | 0.000 |
| 2,271.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,272.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,272.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,273.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,273.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,274.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,274.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,275.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,275.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,276.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,276.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,277.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,277.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,278.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,278.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,279.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,279.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,280.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 14.900 | 0.082 | 0.064 | 0.440 | 73.000 | S | 38.94 | 3.024 |
| | 2 | 3.200 | 0.028 | 0.024 | 0.443 | 79.000 | M | 9.74 | 0.792 |
| | 3 | 3.300 | 0.059 | 0.014 | 0.451 | 86.000 | F | 11.53 | 1.004 |
| | 4 | 2.200 | 0.045 | 0.009 | 0.319 | 74.000 | M | 5.91 | 0.462 |
| | 5 | 2.800 | 0.028 | 0.000 | 0.000 | 79.000 | M | 8.52 | 0.693 |
| | Σ | **26.400** | | | | | | **72.91** | **5.976** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 6.1 | 2,875 | 1.84 | 0.94 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 26.6 | 44,956 | 24.22 | 13.12 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 214.8 | 256,068 | 137.95 | 77.80 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 5.3 | 15,930 | 8.58 | 4.53 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 22.9 | 44,254 | 23.84 | 12.92 |
| | Σ | | | | | | | **275.7** | **103,635** | **56.06** | **17.97** |

# Subwatershed Time of Concentration Details:

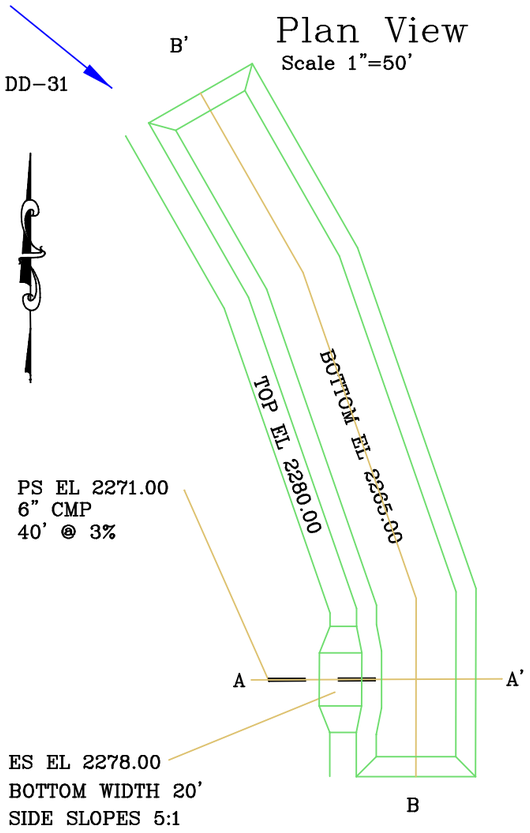
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 48.00 | 240.00 | 500.00 | 1.750 | 0.079 |
| | | 8. Large gullies, diversions, and low flowing streams | 48.00 | 120.00 | 250.00 | 20.780 | 0.003 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.082** |
| #1 | 2 | 3. Short grass pasture | 50.00 | 200.00 | 400.00 | 5.650 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.028** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 51.43 | 180.00 | 350.00 | 7.170 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.059** |
| #1 | 4 | 2. Minimum tillage cultivation | 37.50 | 150.00 | 400.00 | 3.060 | 0.036 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.045** |
| #1 | 5 | 3. Short grass pasture | 47.37 | 180.00 | 380.00 | 5.500 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.028** |

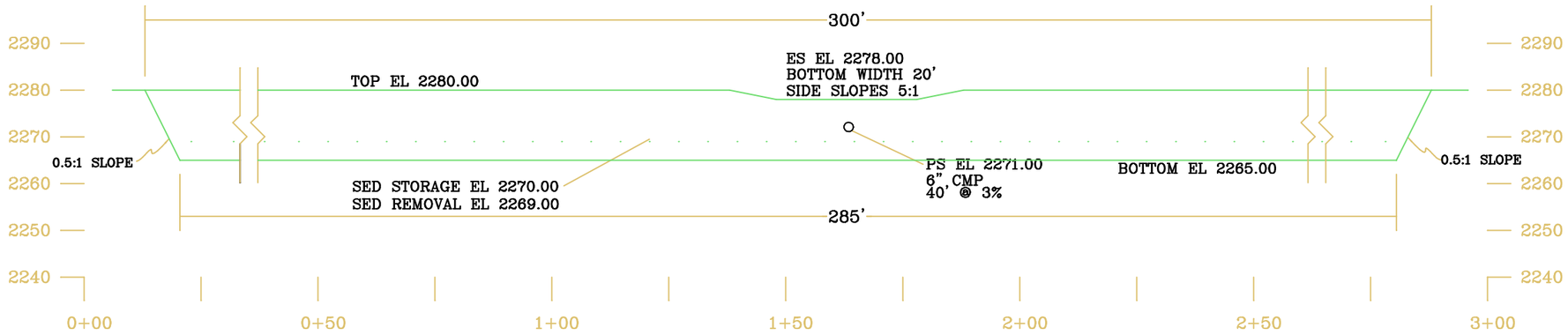
## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 51.43 | 180.00 | 350.00 | 21.510 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| | | 8. Large gullies, diversions, and low flowing streams | 39.47 | 150.00 | 380.00 | 18.840 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.064** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 37.50 | 150.00 | 400.00 | 18.370 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.024** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 39.47 | 150.00 | 380.00 | 18.840 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.014** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.009** |

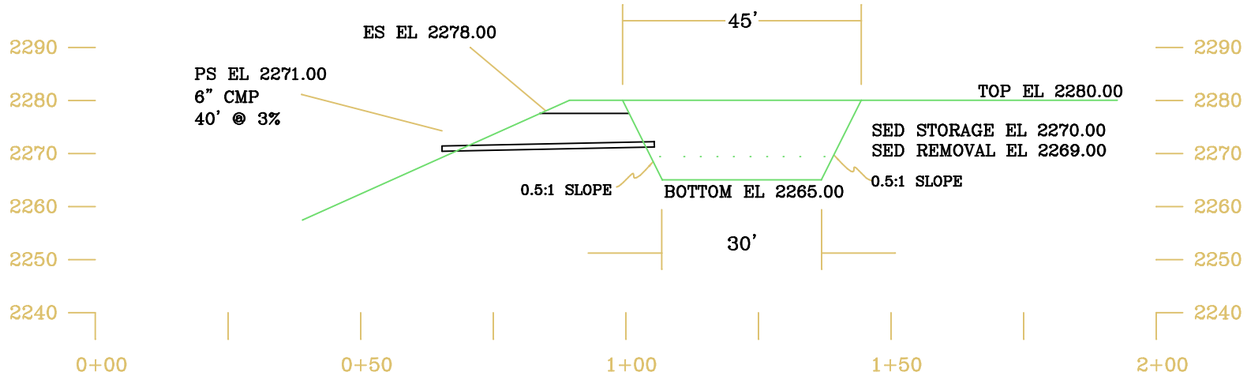
## Plan View
Scale 1"=50'




## Section B-B'
Scale 1"=30'




## Section A-A'
Scale 1"=30'



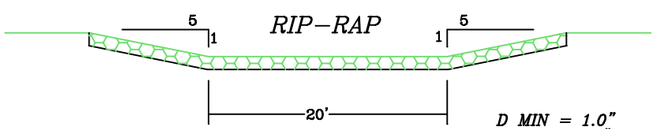

| | |
|---|---|
| *Top of Pond* | *2280.00* |
| *E.S.* | *2278.00* |
| *P.S.* | *2271.00* |
| *Sed. Storage* | *2270.00* |
| *Sed. Removal* | *2269.00* |
| *Bottom* | *2265.00* |

*LEGEND*

*Ground Line*

*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 9

DATE: 02/17/2023 | FILENAME: POND 09.dwg

SCALE: AS SHOWN | DRAWN BY:

Prepared By:

HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543

HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #10
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

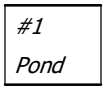
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #10 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 38.900 | 38.900 | 90.33 | 7.15 | 503.1 | 93,951 | 50.72 | 27.12 |
| | Out | | | 41.21 | 7.12 | 132.1 | 30,708 | 0.48 | 0.25 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 8.48 |
| | Out | 0.16 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.937% | 100.000% |
| 1.0000 | 97.873% | 100.000% |
| 0.5000 | 91.852% | 100.000% |
| 0.3000 | 86.852% | 100.000% |
| 0.2000 | 79.863% | 100.000% |
| 0.1000 | 69.842% | 100.000% |
| 0.0500 | 59.831% | 100.000% |
| 0.0300 | 49.841% | 100.000% |
| 0.0200 | 41.841% | 100.000% |
| 0.0100 | 31.852% | 100.000% |
| 0.0050 | 20.926% | 79.699% |
| 0.0030 | 14.937% | 56.887% |
| 0.0010 | 3.989% | 15.194% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #10*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,271.00 ft |
| Initial Pool: | 0.36 ac-ft |
| *Sediment Storage: | 1.63 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 8.00 | 40.00 | 3.00 | 0.0240 | 2,271.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,278.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,278.84 ft |
| H'graph Detention Time: | 7.56 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.39 days |
| Trap Efficiency: | 73.74 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,270.00 | 0.351 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,270.50 | 0.356 | 0.177 | 0.000 | | |
| 2,271.00 | 0.362 | 0.356 | 0.000 | | Spillway #1 |
| 2,271.50 | 0.367 | 0.538 | 0.512 | 4.30* | |
| 2,272.00 | 0.373 | 0.723 | 1.140 | 2.85 | |
| 2,272.50 | 0.378 | 0.911 | 1.307 | 1.85 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,273.00 | 0.384 | 1.101 | 1.474 | 1.70 | |
| 2,273.50 | 0.389 | 1.294 | 1.628 | 1.50 | |
| 2,274.00 | 0.395 | 1.490 | 1.743 | 1.40 | |
| 2,274.50 | 0.400 | 1.689 | 1.858 | 1.35 | |
| 2,275.00 | 0.406 | 1.891 | 1.973 | 1.25 | |
| 2,275.50 | 0.412 | 2.095 | 2.088 | 1.25 | |
| 2,276.00 | 0.417 | 2.302 | 2.181 | 1.15 | |
| 2,276.50 | 0.423 | 2.513 | 2.271 | 1.15 | |
| 2,277.00 | 0.429 | 2.726 | 2.362 | 1.10 | |
| 2,277.50 | 0.435 | 2.942 | 2.452 | 2.25 | |
| 2,278.00 | 0.441 | 3.161 | 2.543 | 4.00 | Spillway #2 |
| 2,278.50 | 0.447 | 3.383 | 6.508 | 4.75 | |
| 2,278.84 | 0.451 | 3.536 | 41.205 | 1.50 | Peak Stage |
| 2,279.00 | 0.453 | 3.608 | 57.473 | | |
| 2,279.50 | 0.459 | 3.836 | 120.614 | | |
| 2,280.00 | 0.465 | 4.067 | 206.024 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,270.00 | 0.000 | 0.000 | 0.000 |
| 2,270.50 | 0.000 | 0.000 | 0.000 |
| 2,271.00 | 0.000 | 0.000 | 0.000 |
| 2,271.50 | (3)>0.512 | 0.000 | 0.512 |
| 2,272.00 | (5)>1.140 | 0.000 | 1.140 |
| 2,272.50 | (5)>1.307 | 0.000 | 1.307 |
| 2,273.00 | (6)>1.474 | 0.000 | 1.474 |
| 2,273.50 | (6)>1.628 | 0.000 | 1.628 |
| 2,274.00 | (6)>1.743 | 0.000 | 1.743 |
| 2,274.50 | (6)>1.858 | 0.000 | 1.858 |
| 2,275.00 | (6)>1.973 | 0.000 | 1.973 |
| 2,275.50 | (6)>2.088 | 0.000 | 2.088 |
| 2,276.00 | (6)>2.181 | 0.000 | 2.181 |
| 2,276.50 | (6)>2.271 | 0.000 | 2.271 |
| 2,277.00 | (6)>2.362 | 0.000 | 2.362 |
| 2,277.50 | (6)>2.452 | 0.000 | 2.452 |
| 2,278.00 | (6)>2.543 | 0.000 | 2.543 |
| 2,278.50 | (6)>2.627 | 3.880 | 6.508 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,279.00 | (6)>2.702 | 54.771 | 57.473 |
| 2,279.50 | (6)>2.776 | 117.837 | 120.614 |
| 2,280.00 | (6)>2.851 | 203.173 | 206.024 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 16.900 | 0.083 | 0.044 | 0.445 | 73.000 | S | 35.02 | 2.667 |
| | 2 | 4.400 | 0.065 | 0.004 | 0.460 | 74.000 | M | 9.42 | 0.722 |
| | 3 | 3.600 | 0.051 | 0.004 | 0.460 | 79.000 | M | 8.93 | 0.712 |
| | 4 | 2.100 | 0.040 | 0.004 | 0.460 | 86.000 | F | 6.15 | 0.525 |
| | 5 | 3.100 | 0.056 | 0.018 | 0.319 | 74.000 | M | 6.64 | 0.509 |
| | 6 | 3.600 | 0.036 | 0.000 | 0.000 | 79.000 | M | 8.93 | 0.712 |
| | 7 | 5.200 | 0.078 | 0.000 | 0.000 | 86.000 | F | 15.23 | 1.300 |
| | Σ | **38.900** | | | | | | **90.33** | **7.147** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 5.3 | 2,845 | 1.82 | 0.94 |
| | 2 | 0.220 | 50.00 | 26.00 | 0.0500 | 1.0000 | 2 | 9.2 | 18,005 | 9.70 | 5.04 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 23.9 | 45,371 | 24.44 | 13.11 |
| | 4 | 0.220 | 50.00 | 34.00 | 0.9000 | 1.0000 | 2 | 144.7 | 321,533 | 173.22 | 97.99 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 6.0 | 16,559 | 8.92 | 4.64 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 23.9 | 45,371 | 24.44 | 13.11 |
| | 7 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 290.1 | 266,885 | 143.78 | 80.87 |
| | Σ | | | | | | | **503.1** | **93,951** | **50.72** | **27.12** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 45.00 | 225.00 | 500.00 | 1.690 | 0.082 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 40.00 | 80.00 | 21.210 | 0.001 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.083** |
| #1 | 2 | 2. Minimum tillage cultivation | 54.05 | 200.00 | 370.00 | 3.670 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.065** |
| #1 | 3 | 3. Short grass pasture | 50.00 | 150.00 | 300.00 | 5.650 | 0.014 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **3** | **Time of Concentration:** | | | | | **0.051** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 68.00 | 170.00 | 250.00 | 8.240 | 0.008 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.040** |
| #1 | 5 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.056** |
| #1 | 6 | 3. Short grass pasture | 42.86 | 150.00 | 350.00 | 5.230 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.036** |
| #1 | 7 | 5. Nearly bare and untilled, and alluvial valley fans | 42.86 | 150.00 | 350.00 | 6.540 | 0.014 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 7.00 | 700.00 | 3.000 | 0.064 |
| **#1** | **7** | **Time of Concentration:** | | | | | **0.078** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.044** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.004** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.004** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.004** |
| #1 | 5 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **5** | **Muskingum K:** | | | | | **0.018** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #10
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

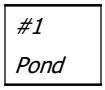
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #10 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 38.900 | 38.900 | 111.75 | 9.01 | 623.3 | 90,756 | 49.00 | 26.67 |
| | Out | | | 102.83 | 8.98 | 190.7 | 32,999 | 0.88 | 0.48 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 8.50 |
| | Out | 0.24 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.933% | 100.000% |
| 1.0000 | 97.866% | 100.000% |
| 0.5000 | 91.844% | 100.000% |
| 0.3000 | 86.844% | 100.000% |
| 0.2000 | 79.855% | 100.000% |
| 0.1000 | 69.832% | 100.000% |
| 0.0500 | 59.821% | 100.000% |
| 0.0300 | 49.832% | 100.000% |
| 0.0200 | 41.832% | 100.000% |
| 0.0100 | 31.843% | 100.000% |
| 0.0050 | 20.922% | 68.368% |
| 0.0030 | 14.933% | 48.798% |
| 0.0010 | 3.989% | 13.035% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #10*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,271.00 ft |
| Initial Pool: | 0.36 ac-ft |
| *Sediment Storage: | 1.63 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 8.00 | 40.00 | 3.00 | 0.0240 | 2,271.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,278.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,279.36 ft |
| H'graph Detention Time: | 6.33 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.42 days |
| Trap Efficiency: | 69.40 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,270.00 | 0.351 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,270.50 | 0.356 | 0.177 | 0.000 | | |
| 2,271.00 | 0.362 | 0.356 | 0.000 | | Spillway #1 |
| 2,271.50 | 0.367 | 0.538 | 0.512 | 4.30* | |
| 2,272.00 | 0.373 | 0.723 | 1.140 | 2.85 | |
| 2,272.50 | 0.378 | 0.911 | 1.307 | 1.85 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,273.00 | 0.384 | 1.101 | 1.474 | 1.65 | |
| 2,273.50 | 0.389 | 1.294 | 1.628 | 1.50 | |
| 2,274.00 | 0.395 | 1.490 | 1.743 | 1.40 | |
| 2,274.50 | 0.400 | 1.689 | 1.858 | 1.35 | |
| 2,275.00 | 0.406 | 1.891 | 1.973 | 1.25 | |
| 2,275.50 | 0.412 | 2.095 | 2.088 | 1.25 | |
| 2,276.00 | 0.417 | 2.302 | 2.181 | 1.15 | |
| 2,276.50 | 0.423 | 2.513 | 2.271 | 1.15 | |
| 2,277.00 | 0.429 | 2.726 | 2.362 | 1.10 | |
| 2,277.50 | 0.435 | 2.942 | 2.452 | 1.10 | |
| 2,278.00 | 0.441 | 3.161 | 2.543 | 4.65 | Spillway #2 |
| 2,278.50 | 0.447 | 3.383 | 6.508 | 5.60 | |
| 2,279.00 | 0.453 | 3.608 | 57.473 | 1.95 | |
| 2,279.36 | 0.457 | 3.771 | 102.828 | 0.05 | Peak Stage |
| 2,279.50 | 0.459 | 3.836 | 120.614 | | |
| 2,280.00 | 0.465 | 4.067 | 206.024 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,270.00 | 0.000 | 0.000 | 0.000 |
| 2,270.50 | 0.000 | 0.000 | 0.000 |
| 2,271.00 | 0.000 | 0.000 | 0.000 |
| 2,271.50 | (3)>0.512 | 0.000 | 0.512 |
| 2,272.00 | (5)>1.140 | 0.000 | 1.140 |
| 2,272.50 | (5)>1.307 | 0.000 | 1.307 |
| 2,273.00 | (6)>1.474 | 0.000 | 1.474 |
| 2,273.50 | (6)>1.628 | 0.000 | 1.628 |
| 2,274.00 | (6)>1.743 | 0.000 | 1.743 |
| 2,274.50 | (6)>1.858 | 0.000 | 1.858 |
| 2,275.00 | (6)>1.973 | 0.000 | 1.973 |
| 2,275.50 | (6)>2.088 | 0.000 | 2.088 |
| 2,276.00 | (6)>2.181 | 0.000 | 2.181 |
| 2,276.50 | (6)>2.271 | 0.000 | 2.271 |
| 2,277.00 | (6)>2.362 | 0.000 | 2.362 |
| 2,277.50 | (6)>2.452 | 0.000 | 2.452 |
| 2,278.00 | (6)>2.543 | 0.000 | 2.543 |
| 2,278.50 | (6)>2.627 | 3.880 | 6.508 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,279.00 | (6)>2.702 | 54.771 | 57.473 |
| 2,279.50 | (6)>2.776 | 117.837 | 120.614 |
| 2,280.00 | (6)>2.851 | 203.173 | 206.024 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 16.900 | 0.083 | 0.044 | 0.445 | 73.000 | S | 44.17 | 3.430 |
| | 2 | 4.400 | 0.065 | 0.004 | 0.460 | 74.000 | M | 11.82 | 0.925 |
| | 3 | 3.600 | 0.051 | 0.004 | 0.460 | 79.000 | M | 10.96 | 0.891 |
| | 4 | 2.100 | 0.040 | 0.004 | 0.460 | 86.000 | F | 7.34 | 0.639 |
| | 5 | 3.100 | 0.056 | 0.018 | 0.319 | 74.000 | M | 8.33 | 0.651 |
| | 6 | 3.600 | 0.036 | 0.000 | 0.000 | 79.000 | M | 10.96 | 0.891 |
| | 7 | 5.200 | 0.078 | 0.000 | 0.000 | 86.000 | F | 18.17 | 1.582 |
| | Σ | **38.900** | | | | | | **111.75** | **9.010** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 7.0 | 2,849 | 1.82 | 0.96 |
| | 2 | 0.220 | 50.00 | 26.00 | 0.0500 | 1.0000 | 2 | 12.1 | 18,044 | 9.72 | 5.14 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 30.4 | 45,584 | 24.56 | 13.31 |
| | 4 | 0.220 | 50.00 | 34.00 | 0.9000 | 1.0000 | 2 | 178.3 | 323,876 | 174.48 | 99.05 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 7.8 | 16,595 | 8.94 | 4.72 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 30.4 | 45,584 | 24.56 | 13.31 |
| | 7 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 357.4 | 268,882 | 144.86 | 81.78 |
| | Σ | | | | | | | **623.3** | **90,756** | **49.00** | **26.67** |

# *Subwatershed Time of Concentration Details:*

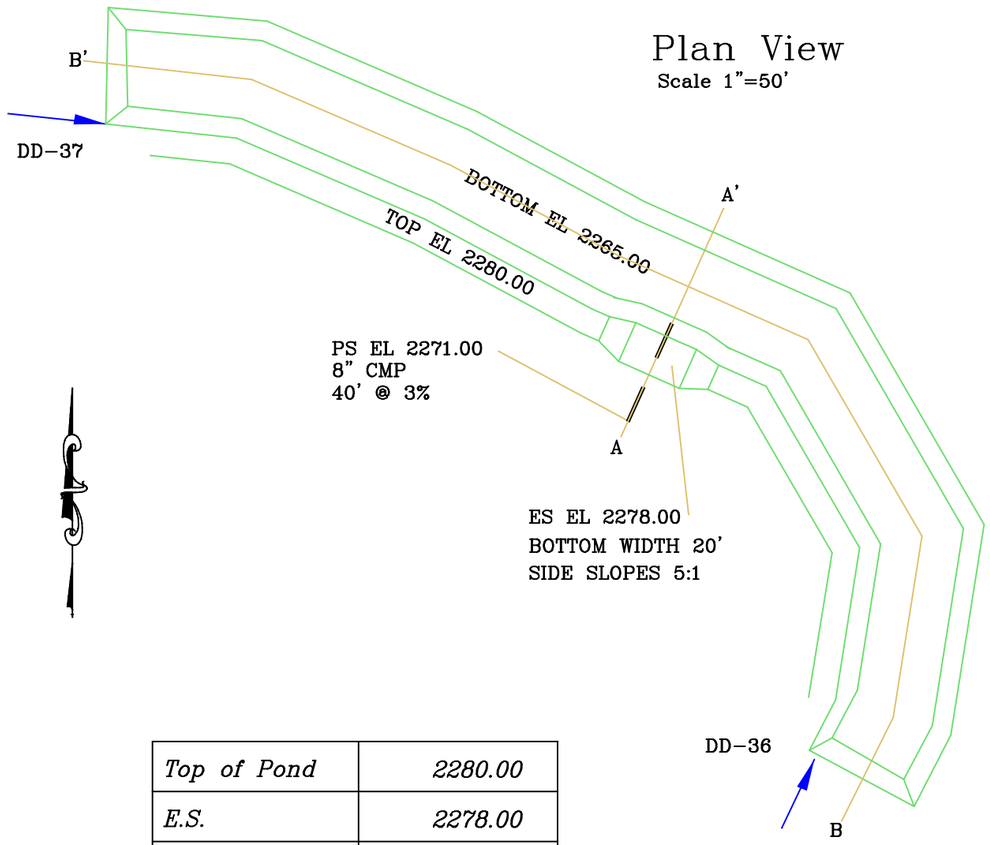
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 45.00 | 225.00 | 500.00 | 1.690 | 0.082 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 40.00 | 80.00 | 21.210 | 0.001 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.083** |
| #1 | 2 | 2. Minimum tillage cultivation | 54.05 | 200.00 | 370.00 | 3.670 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.065** |
| #1 | 3 | 3. Short grass pasture | 50.00 | 150.00 | 300.00 | 5.650 | 0.014 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **3** | **Time of Concentration:** | | | | | **0.051** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 68.00 | 170.00 | 250.00 | 8.240 | 0.008 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.040** |
| #1 | 5 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.056** |
| #1 | 6 | 3. Short grass pasture | 42.86 | 150.00 | 350.00 | 5.230 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.036** |
| #1 | 7 | 5. Nearly bare and untilled, and alluvial valley fans | 42.86 | 150.00 | 350.00 | 6.540 | 0.014 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 7.00 | 700.00 | 3.000 | 0.064 |
| **#1** | **7** | **Time of Concentration:** | | | | | **0.078** |

## *Subwatershed Muskingum Routing Details:*

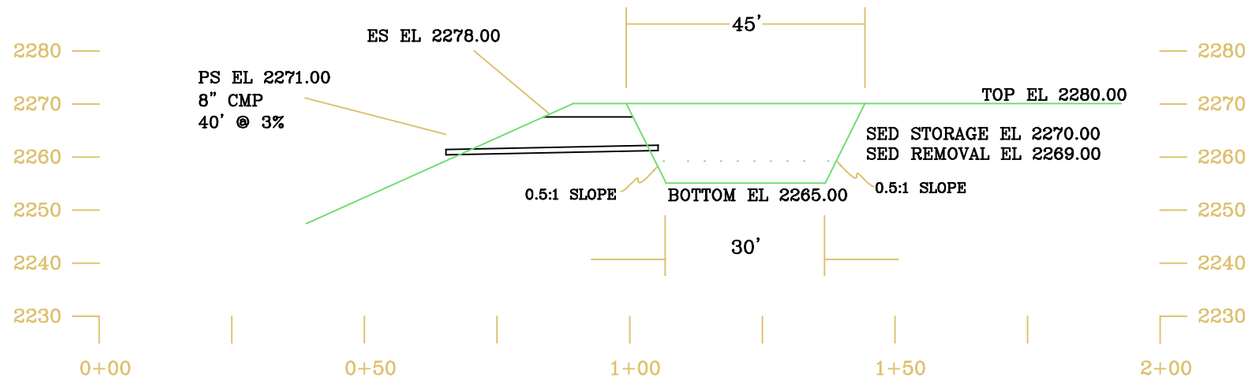
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.044** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.004** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.004** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.004** |
| #1 | 5 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **5** | **Muskingum K:** | | | | | **0.018** |

## Plan View
Scale 1"=50'




| | |
|---|---|
| *Top of Pond* | *2280.00* |
| *E.S.* | *2278.00* |
| *P.S.* | *2271.00* |
| *Sed. Storage* | *2270.00* |
| *Sed. Removal* | *2269.00* |
| *Bottom* | *2265.00* |

## Section A–A'
Scale 1"=30'

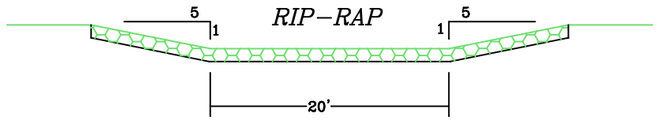



*LEGEND*

*Ground Line*

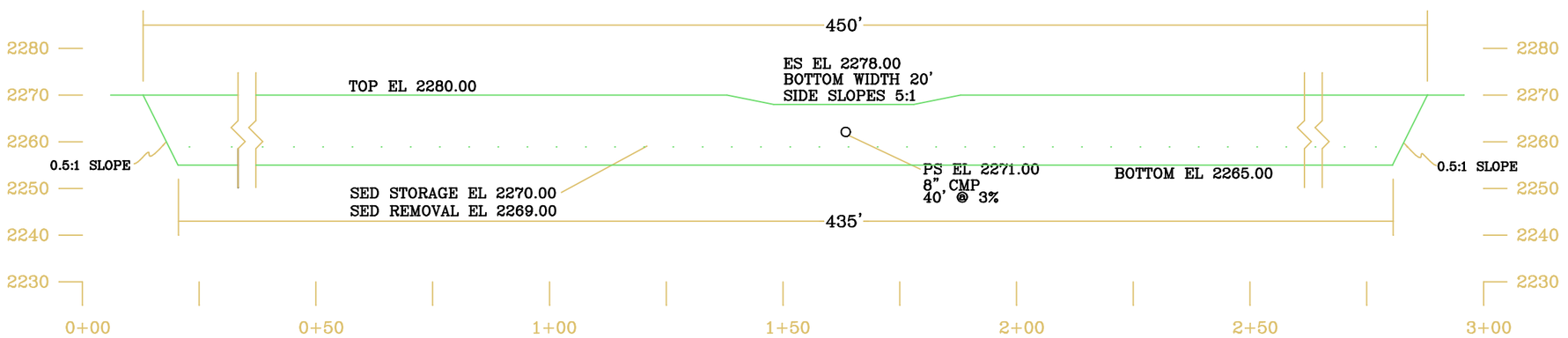
*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

## Section B–B'
Scale 1"=30'




*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

# HURRICANE CREEK MINING, LLC

## OSMRE APPLICATION #3341

Pond 10

| | |
|---|---|
| DATE: 02/17/2023 | FILENAME: POND 10.dwg |
| SCALE: AS SHOWN | DRAWN BY: |


Prepared By:
HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543


HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #11
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

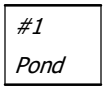
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #11 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 78.800 | 78.800 | 164.52 | 13.25 | 381.0 | 91,190 | 49.62 | 11.35 |
| | Out | | | 132.13 | 13.19 | 115.2 | 14,329 | 0.39 | 0.18 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 4.32 |
| | Out | 0.07 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.685% | 100.000% |
| 1.0000 | 97.365% | 100.000% |
| 0.5000 | 91.259% | 100.000% |
| 0.3000 | 86.258% | 100.000% |
| 0.2000 | 79.311% | 100.000% |
| 0.1000 | 69.204% | 100.000% |
| 0.0500 | 59.151% | 100.000% |
| 0.0300 | 49.204% | 100.000% |
| 0.0200 | 41.203% | 100.000% |
| 0.0100 | 31.256% | 100.000% |
| 0.0050 | 20.628% | 68.253% |
| 0.0030 | 14.681% | 48.576% |
| 0.0010 | 3.947% | 13.059% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #1 (Pond)*

*Proposed Pond #11*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,271.00 ft |
| Initial Pool: | 0.48 ac-ft |
| *Sediment Storage: | 2.20 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,271.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,278.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 18.00 | 40.00 | 3.00 | 0.0240 | 2,272.00 | 0.90 | 0.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,279.46 ft |
| H'graph Detention Time: | 2.23 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.42 days |
| Trap Efficiency: | 69.78 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,270.00 | 0.470 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,270.00 | 0.470 | 0.000 | 0.000 | | |
| 2,270.50 | 0.476 | 0.237 | 0.000 | | |
| 2,271.00 | 0.482 | 0.476 | 0.000 | | Spillway #1 |
| 2,271.50 | 0.489 | 0.719 | 0.271 | 10.84* | |
| 2,272.00 | 0.495 | 0.965 | 0.565 | 7.45 | Spillway #3 |
| 2,272.50 | 0.501 | 1.214 | 1.762 | 2.85 | |
| 2,273.00 | 0.508 | 1.466 | 3.850 | 3.95 | |
| 2,273.50 | 0.514 | 1.722 | 6.540 | 2.45 | |
| 2,274.00 | 0.521 | 1.981 | 9.249 | 1.00 | |
| 2,274.50 | 0.527 | 2.243 | 11.354 | 0.65 | |
| 2,275.00 | 0.534 | 2.508 | 12.517 | 0.55 | |
| 2,275.50 | 0.541 | 2.777 | 13.524 | 0.50 | |
| 2,276.00 | 0.547 | 3.049 | 14.462 | 0.45 | |
| 2,276.50 | 0.554 | 3.324 | 15.342 | 0.45 | |
| 2,277.00 | 0.561 | 3.602 | 16.148 | 0.45 | |
| 2,277.50 | 0.567 | 3.885 | 16.919 | 0.50 | |
| 2,278.00 | 0.574 | 4.170 | 17.690 | 0.55 | Spillway #2 |
| 2,278.50 | 0.581 | 4.459 | 22.272 | 0.80 | |
| 2,279.00 | 0.588 | 4.751 | 73.850 | 0.55 | |
| 2,279.46 | 0.594 | 5.021 | 132.128 | 0.05 | Peak Stage |
| 2,279.50 | 0.595 | 5.047 | 137.604 | | |
| 2,280.00 | 0.602 | 5.346 | 223.577 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,270.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,270.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,270.50 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,271.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,271.50 | (4)>0.271 | 0.000 | 0.000 | 0.271 |
| 2,272.00 | (6)>0.565 | 0.000 | 0.000 | 0.565 |
| 2,272.50 | (6)>0.651 | 0.000 | (3)>1.111 | 1.762 |
| 2,273.00 | (6)>0.709 | 0.000 | (3)>3.142 | 3.850 |
| 2,273.50 | (6)>0.766 | 0.000 | (3)>5.774 | 6.540 |
| 2,274.00 | (6)>0.824 | 0.000 | (5)>8.425 | 9.249 |
| 2,274.50 | (6)>0.882 | 0.000 | (5)>10.472 | 11.354 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,275.00 | (6)>0.939 | 0.000 | (6)>11.578 | 12.517 |
| 2,275.50 | (6)>0.997 | 0.000 | (6)>12.527 | 13.524 |
| 2,276.00 | (6)>1.055 | 0.000 | (6)>13.408 | 14.462 |
| 2,276.50 | (6)>1.108 | 0.000 | (6)>14.234 | 15.342 |
| 2,277.00 | (6)>1.144 | 0.000 | (6)>15.004 | 16.148 |
| 2,277.50 | (6)>1.181 | 0.000 | (6)>15.738 | 16.919 |
| 2,278.00 | (6)>1.217 | 0.000 | (6)>16.473 | 17.690 |
| 2,278.50 | (6)>1.253 | 3.880 | (6)>17.139 | 22.272 |
| 2,279.00 | (6)>1.290 | 54.771 | (6)>17.790 | 73.850 |
| 2,279.50 | (6)>1.326 | 117.837 | (6)>18.441 | 137.604 |
| 2,280.00 | (6)>1.362 | 203.173 | (6)>19.042 | 223.577 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 55.800 | 0.116 | 0.060 | 0.434 | 73.000 | S | 115.62 | 8.805 |
| | 2 | 4.800 | 0.068 | 0.130 | 0.322 | 74.000 | M | 10.28 | 0.788 |
| | 3 | 5.000 | 0.058 | 0.030 | 0.429 | 79.000 | M | 12.41 | 0.989 |
| | 4 | 3.900 | 0.060 | 0.030 | 0.429 | 86.000 | F | 11.42 | 0.975 |
| | 5 | 4.400 | 0.121 | 0.027 | 0.319 | 74.000 | M | 9.42 | 0.722 |
| | 6 | 4.900 | 0.040 | 0.000 | 0.000 | 79.000 | M | 12.16 | 0.969 |
| | Σ | **78.800** | | | | | | **164.52** | **13.249** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 20.3 | 3,319 | 2.12 | 1.08 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 9.8 | 17,356 | 9.35 | 4.88 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 34.5 | 47,160 | 25.41 | 13.63 |
| | 4 | 0.220 | 50.00 | 21.00 | 0.9000 | 1.0000 | 2 | 173.2 | 217,230 | 117.03 | 65.51 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 8.9 | 17,264 | 9.30 | 4.83 |
| | 6 | 0.220 | 500.00 | 25.00 | 0.1400 | 1.0000 | 2 | 134.4 | 177,345 | 95.54 | 51.93 |
| | Σ | | | | | | | **381.0** | **91,190** | **49.62** | **11.35** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 24.00 | 120.00 | 500.00 | 1.230 | 0.112 |
| | | 8. Large gullies, diversions, and low flowing streams | 170.00 | 1,020.00 | 600.00 | 39.110 | 0.004 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.116** |
| #1 | 2 | 2. Minimum tillage cultivation | 50.00 | 200.00 | 400.00 | 3.530 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.068** |
| #1 | 3 | 3. Short grass pasture | 30.00 | 150.00 | 500.00 | 4.380 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.058** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 42.86 | 150.00 | 350.00 | 6.540 | 0.014 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.060** |
| #1 | 5 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.121** |
| #1 | 6 | 3. Short grass pasture | 40.00 | 100.00 | 250.00 | 5.050 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.040** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 40.00 | 100.00 | 250.00 | 18.970 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.060** |
| #1 | 2 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 11.00 | 1,100.00 | 3.000 | 0.101 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.130** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 100.00 | 250.00 | 18.970 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.030** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 100.00 | 250.00 | 18.970 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.030** |
| #1 | 5 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **5** | **Muskingum K:** | | | | | **0.027** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #11
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

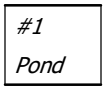
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #11 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 78.800 | 78.800 | 207.02 | 16.90 | 479.0 | 90,642 | 49.35 | 11.19 |
| | Out | | | 195.39 | 16.83 | 158.9 | 14,945 | 1.01 | 0.48 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 4.26 |
| | Out | 0.16 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.671% | 100.000% |
| 1.0000 | 97.338% | 100.000% |
| 0.5000 | 91.227% | 100.000% |
| 0.3000 | 86.226% | 100.000% |
| 0.2000 | 79.282% | 100.000% |
| 0.1000 | 69.170% | 100.000% |
| 0.0500 | 59.114% | 100.000% |
| 0.0300 | 49.169% | 100.000% |
| 0.0200 | 41.169% | 100.000% |
| 0.0100 | 31.224% | 94.140% |
| 0.0050 | 20.612% | 62.145% |
| 0.0030 | 14.668% | 44.222% |
| 0.0010 | 3.945% | 11.893% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #1 (Pond)*

*Proposed Pond #11*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,271.00 ft |
| Initial Pool: | 0.48 ac-ft |
| *Sediment Storage: | 2.20 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,271.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,278.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 18.00 | 40.00 | 3.00 | 0.0240 | 2,272.00 | 0.90 | 0.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,279.84 ft |
| H'graph Detention Time: | 1.93 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.43 days |
| Trap Efficiency: | 66.83 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,270.00 | 0.470 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,270.00 | 0.470 | 0.000 | 0.000 | | |
| 2,270.50 | 0.476 | 0.237 | 0.000 | | |
| 2,271.00 | 0.482 | 0.476 | 0.000 | | Spillway #1 |
| 2,271.50 | 0.489 | 0.719 | 0.271 | 10.84* | |
| 2,272.00 | 0.495 | 0.965 | 0.565 | 7.45 | Spillway #3 |
| 2,272.50 | 0.501 | 1.214 | 1.762 | 2.85 | |
| 2,273.00 | 0.508 | 1.466 | 3.850 | 1.15 | |
| 2,273.50 | 0.514 | 1.722 | 6.540 | 4.60 | |
| 2,274.00 | 0.521 | 1.981 | 9.249 | 1.10 | |
| 2,274.50 | 0.527 | 2.243 | 11.354 | 0.70 | |
| 2,275.00 | 0.534 | 2.508 | 12.517 | 0.60 | |
| 2,275.50 | 0.541 | 2.777 | 13.524 | 0.55 | |
| 2,276.00 | 0.547 | 3.049 | 14.462 | 0.50 | |
| 2,276.50 | 0.554 | 3.324 | 15.342 | 0.50 | |
| 2,277.00 | 0.561 | 3.602 | 16.148 | 0.50 | |
| 2,277.50 | 0.567 | 3.885 | 16.919 | 0.55 | |
| 2,278.00 | 0.574 | 4.170 | 17.690 | 0.65 | Spillway #2 |
| 2,278.50 | 0.581 | 4.459 | 22.272 | 0.80 | |
| 2,279.00 | 0.588 | 4.751 | 73.850 | 0.85 | |
| 2,279.50 | 0.595 | 5.047 | 137.604 | 0.10 | |
| 2,279.84 | 0.600 | 5.248 | 195.389 | 0.05 | Peak Stage |
| 2,280.00 | 0.602 | 5.346 | 223.577 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,270.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,270.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,270.50 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,271.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,271.50 | (4)>0.271 | 0.000 | 0.000 | 0.271 |
| 2,272.00 | (6)>0.565 | 0.000 | 0.000 | 0.565 |
| 2,272.50 | (6)>0.651 | 0.000 | (3)>1.111 | 1.762 |
| 2,273.00 | (6)>0.709 | 0.000 | (3)>3.142 | 3.850 |
| 2,273.50 | (6)>0.766 | 0.000 | (3)>5.774 | 6.540 |
| 2,274.00 | (6)>0.824 | 0.000 | (5)>8.425 | 9.249 |
| 2,274.50 | (6)>0.882 | 0.000 | (5)>10.472 | 11.354 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,275.00 | (6)>0.939 | 0.000 | (6)>11.578 | 12.517 |
| 2,275.50 | (6)>0.997 | 0.000 | (6)>12.527 | 13.524 |
| 2,276.00 | (6)>1.055 | 0.000 | (6)>13.408 | 14.462 |
| 2,276.50 | (6)>1.108 | 0.000 | (6)>14.234 | 15.342 |
| 2,277.00 | (6)>1.144 | 0.000 | (6)>15.004 | 16.148 |
| 2,277.50 | (6)>1.181 | 0.000 | (6)>15.738 | 16.919 |
| 2,278.00 | (6)>1.217 | 0.000 | (6)>16.473 | 17.690 |
| 2,278.50 | (6)>1.253 | 3.880 | (6)>17.139 | 22.272 |
| 2,279.00 | (6)>1.290 | 54.771 | (6)>17.790 | 73.850 |
| 2,279.50 | (6)>1.326 | 117.837 | (6)>18.441 | 137.604 |
| 2,280.00 | (6)>1.362 | 203.173 | (6)>19.042 | 223.577 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 55.800 | 0.116 | 0.060 | 0.434 | 73.000 | S | 145.82 | 11.327 |
| | 2 | 4.800 | 0.068 | 0.130 | 0.322 | 74.000 | M | 12.90 | 1.009 |
| | 3 | 5.000 | 0.058 | 0.030 | 0.429 | 79.000 | M | 15.22 | 1.238 |
| | 4 | 3.900 | 0.060 | 0.030 | 0.429 | 86.000 | F | 13.63 | 1.186 |
| | 5 | 4.400 | 0.121 | 0.027 | 0.319 | 74.000 | M | 11.82 | 0.925 |
| | 6 | 4.900 | 0.040 | 0.000 | 0.000 | 79.000 | M | 14.92 | 1.213 |
| | Σ | **78.800** | | | | | | **207.02** | **16.898** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 26.6 | 3,326 | 2.13 | 1.10 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 12.7 | 17,484 | 9.42 | 4.98 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 43.9 | 47,382 | 25.53 | 13.84 |
| | 4 | 0.220 | 50.00 | 21.00 | 0.9000 | 1.0000 | 2 | 213.4 | 218,892 | 117.92 | 66.27 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 11.6 | 17,302 | 9.32 | 4.92 |
| | 6 | 0.220 | 500.00 | 25.00 | 0.1400 | 1.0000 | 2 | 170.8 | 178,135 | 95.97 | 52.68 |
| | Σ | | | | | | | **479.0** | **90,642** | **49.35** | **11.19** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 24.00 | 120.00 | 500.00 | 1.230 | 0.112 |
| | | 8. Large gullies, diversions, and low flowing streams | 170.00 | 1,020.00 | 600.00 | 39.110 | 0.004 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.116** |
| #1 | 2 | 2. Minimum tillage cultivation | 50.00 | 200.00 | 400.00 | 3.530 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.068** |
| #1 | 3 | 3. Short grass pasture | 30.00 | 150.00 | 500.00 | 4.380 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.058** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 42.86 | 150.00 | 350.00 | 6.540 | 0.014 |

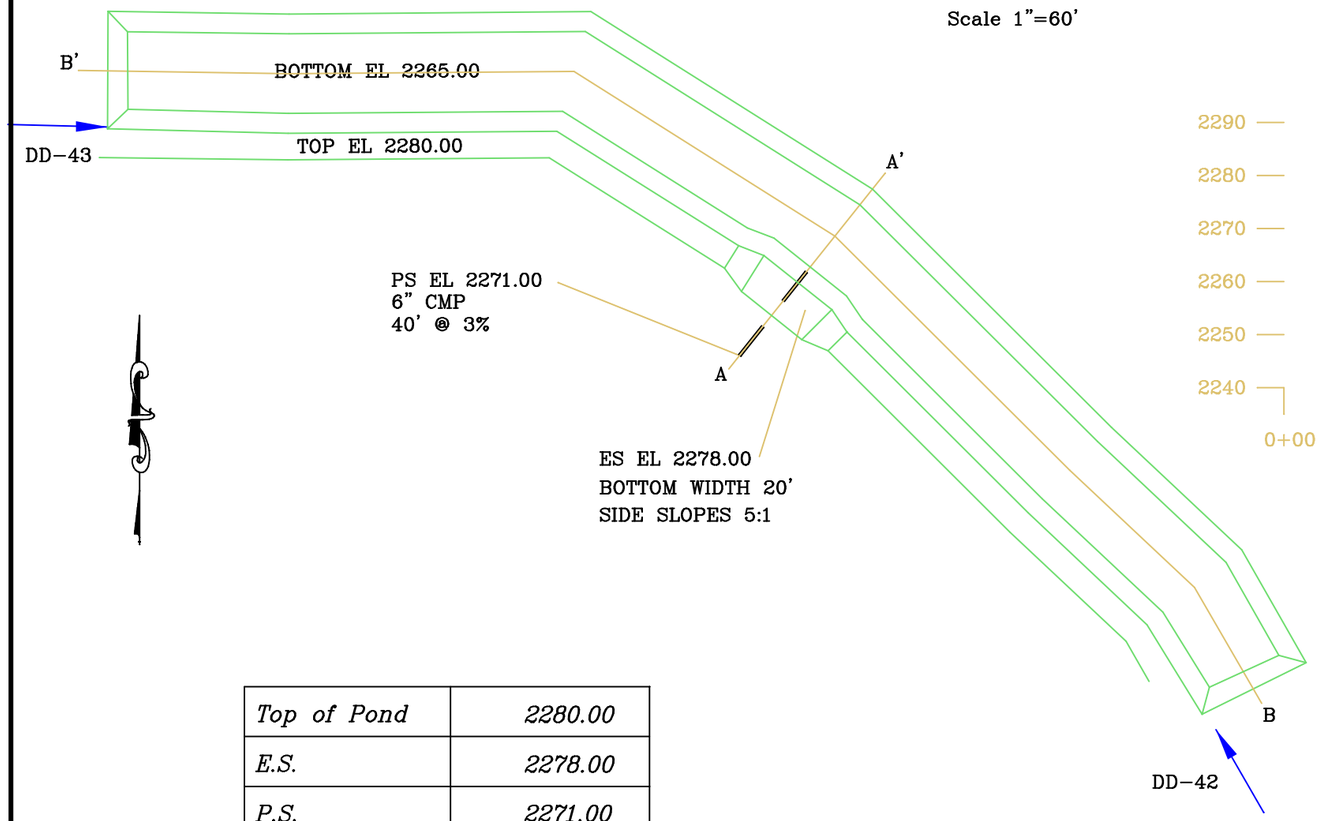
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.060** |
| #1 | 5 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.121** |
| #1 | 6 | 3. Short grass pasture | 40.00 | 100.00 | 250.00 | 5.050 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.040** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 40.00 | 100.00 | 250.00 | 18.970 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.060** |
| #1 | 2 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 11.00 | 1,100.00 | 3.000 | 0.101 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.130** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 100.00 | 250.00 | 18.970 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.030** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 100.00 | 250.00 | 18.970 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.030** |
| #1 | 5 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **5** | **Muskingum K:** | | | | | **0.027** |

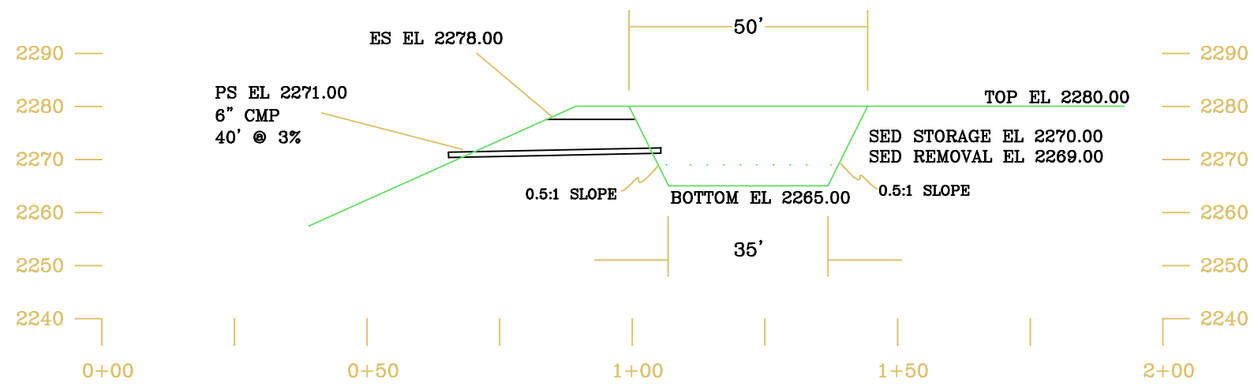
# Plan View

Scale 1"=60'




# Section A-A'

Scale 1"=30'



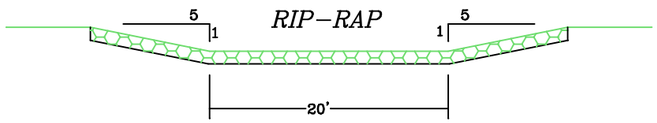

| | |
|---|---|
| *Top of Pond* | *2280.00* |
| *E.S.* | *2278.00* |
| *P.S.* | *2271.00* |
| *Sed. Storage* | *2270.00* |
| *Sed. Removal* | *2269.00* |
| *Bottom* | *2265.00* |

*LEGEND*

*Ground Line*

*Sediment Storage Level*

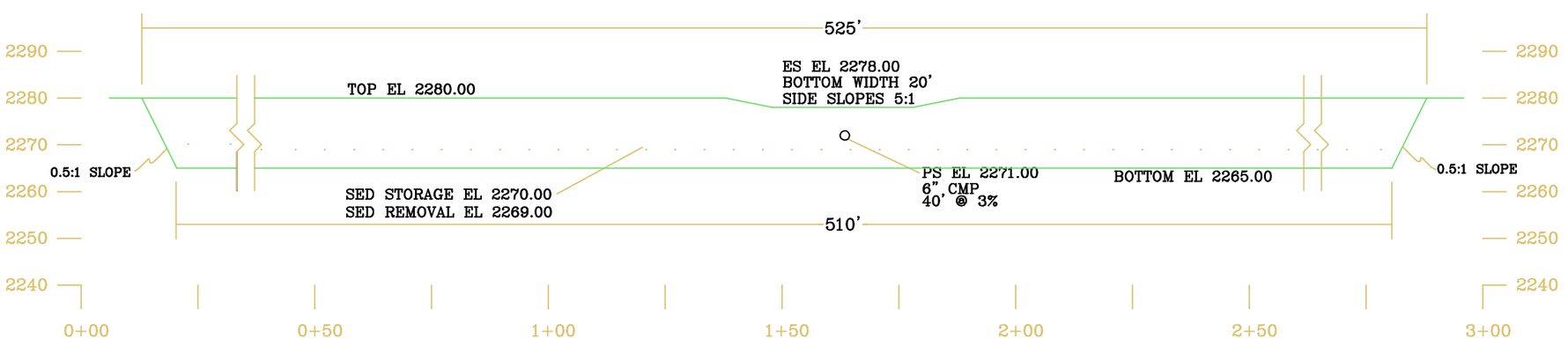
*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 2.00"*
*D 50 = 3.00"*
*D MAX = 4.50"*
*BLANKET THICKNESS = 1.0'*

# Section B-B'

Scale 1"=30'




*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 11

| | |
|---|---|
| DATE: 02/17/2023 | FILENAME: POND 11.dwg |
| SCALE: AS SHOWN | DRAWN BY: |


Prepared By:

HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543


HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC
# OSMRE #3341
# Proposed Pond #12
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

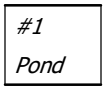
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #12 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 45.200 | 45.200 | 97.12 | 8.08 | 392.3 | 90,267 | 48.79 | 18.88 |
| | Out | | | 91.66 | 7.93 | 120.7 | 18,277 | 0.50 | 0.32 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 6.26 |
| | Out | 0.18 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.904% | 100.000% |
| 1.0000 | 97.799% | 100.000% |
| 0.5000 | 91.764% | 100.000% |
| 0.3000 | 86.764% | 100.000% |
| 0.2000 | 79.780% | 100.000% |
| 0.1000 | 69.745% | 100.000% |
| 0.0500 | 59.727% | 100.000% |
| 0.0300 | 49.743% | 100.000% |
| 0.0200 | 41.742% | 100.000% |
| 0.0100 | 31.759% | 100.000% |
| 0.0050 | 20.880% | 67.884% |
| 0.0030 | 14.897% | 48.432% |
| 0.0010 | 3.983% | 12.949% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #12*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,221.00 ft |
| Initial Pool: | 2.90 ac-ft |
| *Sediment Storage: | 2.09 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,221.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,223.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,224.29 ft |
| H'graph Detention Time: | 3.06 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.78 days |
| Trap Efficiency: | 69.24 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,215.00 | 0.447 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,215.50 | 0.453 | 0.225 | 0.000 | | |
| 2,216.00 | 0.459 | 0.453 | 0.000 | | |
| 2,216.50 | 0.465 | 0.684 | 0.000 | | |
| 2,217.00 | 0.471 | 0.919 | 0.000 | | |
| 2,217.50 | 0.478 | 1.156 | 0.000 | | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,218.00 | 0.484 | 1.396 | 0.000 | | |
| 2,218.50 | 0.490 | 1.640 | 0.000 | | |
| 2,219.00 | 0.496 | 1.886 | 0.000 | | |
| 2,219.50 | 0.502 | 2.136 | 0.000 | | |
| 2,220.00 | 0.509 | 2.389 | 0.000 | | |
| 2,220.50 | 0.515 | 2.645 | 0.000 | | |
| 2,221.00 | 0.521 | 2.904 | 0.000 | | Spillway #1 |
| 2,221.50 | 0.528 | 3.166 | 0.271 | 11.71* | |
| 2,222.00 | 0.534 | 3.432 | 0.565 | 8.00 | |
| 2,222.50 | 0.541 | 3.700 | 0.651 | 5.35 | |
| 2,223.00 | 0.547 | 3.972 | 0.709 | 4.85 | Spillway #2 |
| 2,223.50 | 0.554 | 4.248 | 4.647 | 9.80 | |
| 2,224.00 | 0.561 | 4.526 | 55.595 | 2.95 | |
| 2,224.29 | 0.564 | 4.688 | 91.661 | 0.15 | Peak Stage |
| 2,224.50 | 0.567 | 4.808 | 118.719 | | |
| 2,225.00 | 0.574 | 5.094 | 204.113 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,215.00 | 0.000 | 0.000 | 0.000 |
| 2,215.50 | 0.000 | 0.000 | 0.000 |
| 2,216.00 | 0.000 | 0.000 | 0.000 |
| 2,216.50 | 0.000 | 0.000 | 0.000 |
| 2,217.00 | 0.000 | 0.000 | 0.000 |
| 2,217.50 | 0.000 | 0.000 | 0.000 |
| 2,218.00 | 0.000 | 0.000 | 0.000 |
| 2,218.50 | 0.000 | 0.000 | 0.000 |
| 2,219.00 | 0.000 | 0.000 | 0.000 |
| 2,219.50 | 0.000 | 0.000 | 0.000 |
| 2,220.00 | 0.000 | 0.000 | 0.000 |
| 2,220.50 | 0.000 | 0.000 | 0.000 |
| 2,221.00 | 0.000 | 0.000 | 0.000 |
| 2,221.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,222.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,222.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,223.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,223.50 | (6)>0.766 | 3.880 | 4.647 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,224.00 | (6)>0.824 | 54.771 | 55.595 |
| 2,224.50 | (6)>0.882 | 117.837 | 118.719 |
| 2,225.00 | (6)>0.939 | 203.173 | 204.113 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 21.100 | 0.092 | 0.137 | 0.417 | 73.000 | S | 43.72 | 3.330 |
| | 2 | 6.200 | 0.121 | 0.041 | 0.432 | 74.000 | M | 13.27 | 1.018 |
| | 3 | 7.000 | 0.099 | 0.050 | 0.430 | 86.000 | F | 20.50 | 1.750 |
| | 4 | 5.300 | 0.066 | 0.000 | 0.000 | 74.000 | M | 11.35 | 0.870 |
| | 5 | 5.600 | 0.063 | 0.000 | 0.000 | 79.000 | M | 13.90 | 1.108 |
| | Σ | **45.200** | | | | | | **97.12** | **8.076** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 6.8 | 3,037 | 1.94 | 0.96 |
| | 2 | 0.220 | 50.00 | 21.00 | 0.0500 | 1.0000 | 2 | 10.7 | 14,841 | 8.00 | 4.15 |
| | 3 | 0.220 | 50.00 | 21.00 | 0.9000 | 1.0000 | 2 | 333.5 | 231,391 | 124.66 | 69.93 |
| | 4 | 0.220 | 50.00 | 21.00 | 0.0500 | 1.0000 | 2 | 9.0 | 14,566 | 7.85 | 4.08 |
| | 5 | 0.220 | 50.00 | 21.00 | 0.1400 | 1.0000 | 2 | 32.3 | 39,524 | 21.29 | 11.41 |
| | Σ | | | | | | | **392.3** | **90,267** | **48.79** | **18.88** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 40.00 | 200.00 | 500.00 | 1.600 | 0.086 |
| | | 8. Large gullies, diversions, and low flowing streams | 41.86 | 180.00 | 430.00 | 19.400 | 0.006 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.092** |
| #1 | 2 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.121** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 43.75 | 175.00 | 400.00 | 6.610 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 9.00 | 900.00 | 3.000 | 0.083 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.099** |
| #1 | 4 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.066** |
| #1 | 5 | 3. Short grass pasture | 48.57 | 170.00 | 350.00 | 5.570 | 0.017 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.063** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| | | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.137** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.041** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 48.57 | 170.00 | 350.00 | 20.900 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.050** |

# Hurricane Creek Mining, LLC

# OSMRE #3341

# Proposed Pond #12

# 25yr. - 24hr.

# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

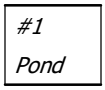
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #12 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 45.200 | 45.200 | 121.50 | 10.22 | 486.6 | 89,522 | 48.40 | 18.53 |
| | Out | | | 116.28 | 10.07 | 170.0 | 21,520 | 1.94 | 1.20 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 6.25 |
| | Out | 0.58 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.898% | 100.000% |
| 1.0000 | 97.787% | 100.000% |
| 0.5000 | 91.750% | 100.000% |
| 0.3000 | 86.750% | 100.000% |
| 0.2000 | 79.767% | 100.000% |
| 0.1000 | 69.730% | 100.000% |
| 0.0500 | 59.711% | 100.000% |
| 0.0300 | 49.728% | 100.000% |
| 0.0200 | 41.728% | 100.000% |
| 0.0100 | 31.745% | 90.860% |
| 0.0050 | 20.873% | 59.742% |
| 0.0030 | 14.891% | 42.620% |
| 0.0010 | 3.982% | 11.397% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #12*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,221.00 ft |
| Initial Pool: | 2.90 ac-ft |
| *Sediment Storage: | 2.09 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,221.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,223.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,224.48 ft |
| H'graph Detention Time: | 2.49 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.79 days |
| Trap Efficiency: | 65.06 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,215.00 | 0.447 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,215.50 | 0.453 | 0.225 | 0.000 | | |
| 2,216.00 | 0.459 | 0.453 | 0.000 | | |
| 2,216.50 | 0.465 | 0.684 | 0.000 | | |
| 2,217.00 | 0.471 | 0.919 | 0.000 | | |
| 2,217.50 | 0.478 | 1.156 | 0.000 | | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,218.00 | 0.484 | 1.396 | 0.000 | | |
| 2,218.50 | 0.490 | 1.640 | 0.000 | | |
| 2,219.00 | 0.496 | 1.886 | 0.000 | | |
| 2,219.50 | 0.502 | 2.136 | 0.000 | | |
| 2,220.00 | 0.509 | 2.389 | 0.000 | | |
| 2,220.50 | 0.515 | 2.645 | 0.000 | | |
| 2,221.00 | 0.521 | 2.904 | 0.000 | | Spillway #1 |
| 2,221.50 | 0.528 | 3.166 | 0.271 | 11.71* | |
| 2,222.00 | 0.534 | 3.432 | 0.565 | 8.05 | |
| 2,222.50 | 0.541 | 3.700 | 0.651 | 5.35 | |
| 2,223.00 | 0.547 | 3.972 | 0.709 | 4.85 | Spillway #2 |
| 2,223.50 | 0.554 | 4.248 | 4.647 | 9.35 | |
| 2,224.00 | 0.561 | 4.526 | 55.595 | 3.55 | |
| 2,224.48 | 0.567 | 4.798 | 116.284 | 0.15 | Peak Stage |
| 2,224.50 | 0.567 | 4.808 | 118.719 | | |
| 2,225.00 | 0.574 | 5.094 | 204.113 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,215.00 | 0.000 | 0.000 | 0.000 |
| 2,215.50 | 0.000 | 0.000 | 0.000 |
| 2,216.00 | 0.000 | 0.000 | 0.000 |
| 2,216.50 | 0.000 | 0.000 | 0.000 |
| 2,217.00 | 0.000 | 0.000 | 0.000 |
| 2,217.50 | 0.000 | 0.000 | 0.000 |
| 2,218.00 | 0.000 | 0.000 | 0.000 |
| 2,218.50 | 0.000 | 0.000 | 0.000 |
| 2,219.00 | 0.000 | 0.000 | 0.000 |
| 2,219.50 | 0.000 | 0.000 | 0.000 |
| 2,220.00 | 0.000 | 0.000 | 0.000 |
| 2,220.50 | 0.000 | 0.000 | 0.000 |
| 2,221.00 | 0.000 | 0.000 | 0.000 |
| 2,221.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,222.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,222.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,223.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,223.50 | (6)>0.766 | 3.880 | 4.647 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,224.00 | (6)>0.824 | 54.771 | 55.595 |
| 2,224.50 | (6)>0.882 | 117.837 | 118.719 |
| 2,225.00 | (6)>0.939 | 203.173 | 204.113 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 21.100 | 0.092 | 0.137 | 0.417 | 73.000 | S | 55.14 | 4.283 |
| | 2 | 6.200 | 0.121 | 0.041 | 0.432 | 74.000 | M | 16.66 | 1.303 |
| | 3 | 7.000 | 0.099 | 0.050 | 0.430 | 86.000 | F | 24.47 | 2.130 |
| | 4 | 5.300 | 0.066 | 0.000 | 0.000 | 74.000 | M | 14.24 | 1.114 |
| | 5 | 5.600 | 0.063 | 0.000 | 0.000 | 79.000 | M | 17.05 | 1.387 |
| | Σ | **45.200** | | | | | | **121.50** | **10.217** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 8.9 | 3,048 | 1.95 | 0.98 |
| | 2 | 0.220 | 50.00 | 21.00 | 0.0500 | 1.0000 | 2 | 14.0 | 14,874 | 8.01 | 4.23 |
| | 3 | 0.220 | 50.00 | 21.00 | 0.9000 | 1.0000 | 2 | 411.0 | 233,447 | 125.77 | 70.74 |
| | 4 | 0.220 | 50.00 | 21.00 | 0.0500 | 1.0000 | 2 | 11.7 | 14,598 | 7.86 | 4.15 |
| | 5 | 0.220 | 50.00 | 21.00 | 0.1400 | 1.0000 | 2 | 41.1 | 39,710 | 21.39 | 11.59 |
| | Σ | | | | | | | **486.6** | **89,522** | **48.40** | **18.53** |

# Subwatershed Time of Concentration Details:

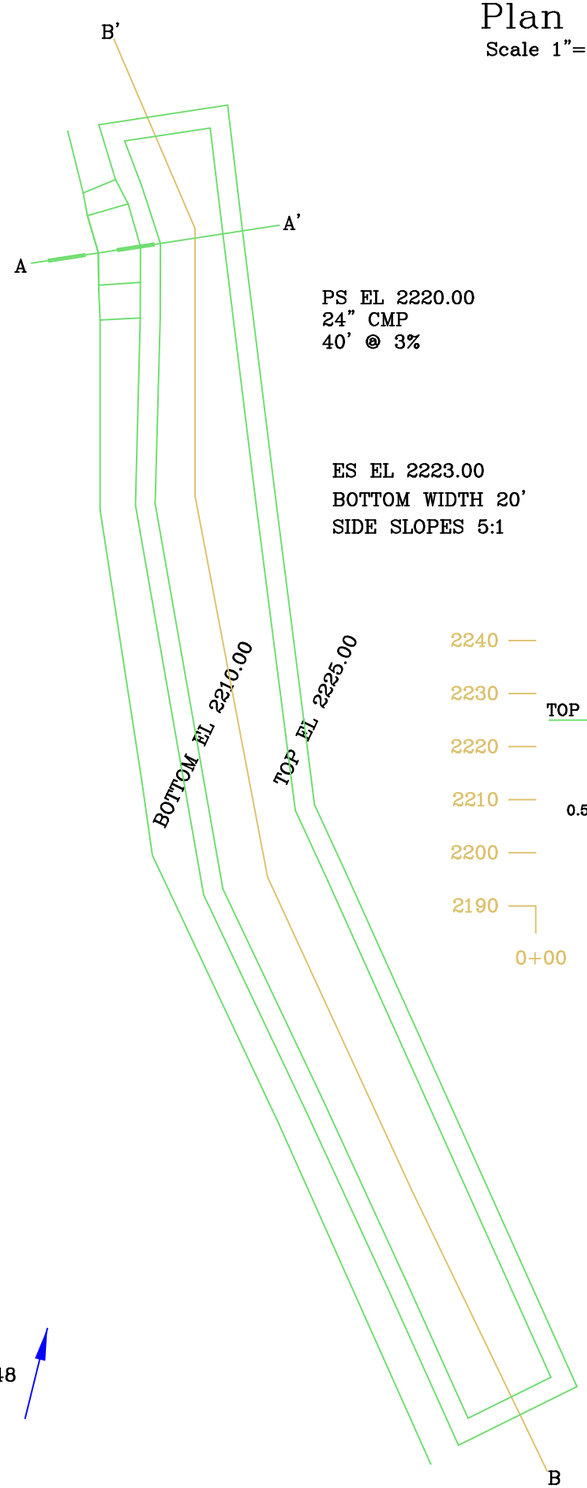
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 40.00 | 200.00 | 500.00 | 1.600 | 0.086 |
| | | 8. Large gullies, diversions, and low flowing streams | 41.86 | 180.00 | 430.00 | 19.400 | 0.006 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.092** |
| #1 | 2 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.121** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 43.75 | 175.00 | 400.00 | 6.610 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 9.00 | 900.00 | 3.000 | 0.083 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.099** |
| #1 | 4 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.066** |
| #1 | 5 | 3. Short grass pasture | 48.57 | 170.00 | 350.00 | 5.570 | 0.017 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.063** |

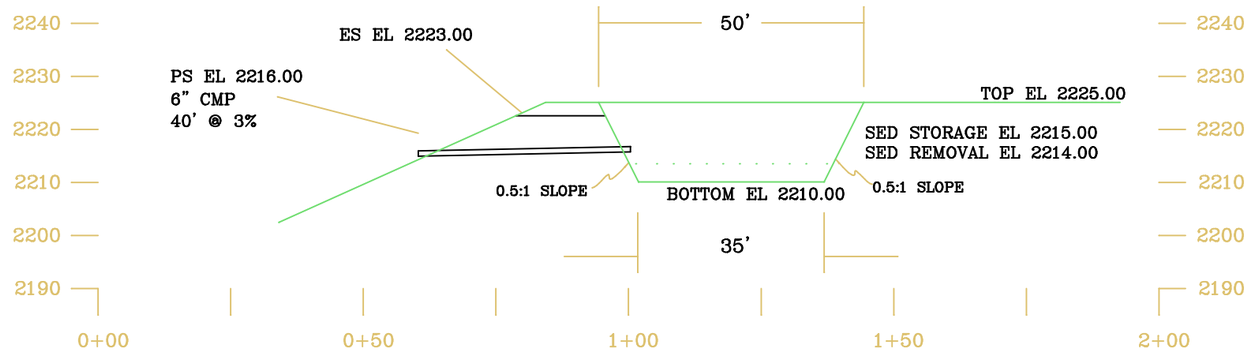
## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| | | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.137** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.041** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 48.57 | 170.00 | 350.00 | 20.900 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.050** |

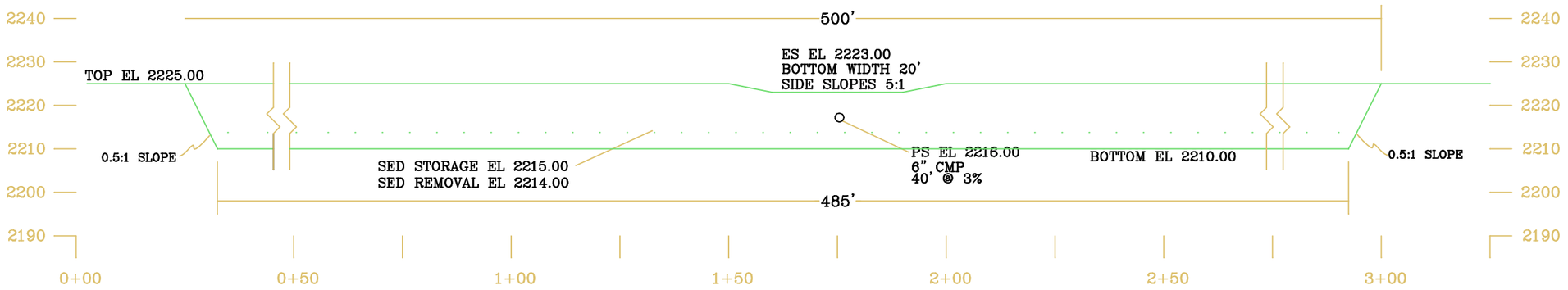
# Plan View
Scale 1"=60'




# Section A–A'
Scale 1"=30'




# Section B–B'
Scale 1"=30'



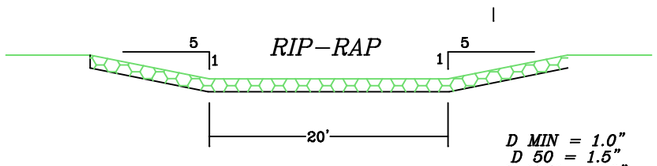

*LEGEND*

*Ground Line*

*Sediment Storage Level*

| | |
|---|---|
| *Top of Pond* | *2225.00* |
| *E.S.* | *2223.00* |
| *P.S.* | *2216.00* |
| *Sed. Storage* | *2215.00* |
| *Sed. Removal* | *2214.00* |
| *Bottom* | *2210.00* |

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

DD–48

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 12

DATE: 02/17/2023 FILENAME: POND 12.dwg

SCALE: AS SHOWN DRAWN BY:

Prepared By:


HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831–0271
Phone: (606) 573–6924
Fax: (606) 573–9543


HOWARD
Engineering and Geology, I

# Hurricane Creek Minning, LLC.

# OSMRE #3341

# Proposed Pond #13

# 10yr. - 24hr.

# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

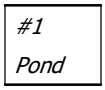
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #13 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 100.100 | 100.100 | 211.93 | 17.00 | 443.9 | 34,752 | 18.93 | 10.34 |
| | Out | | | 173.13 | 16.94 | 136.6 | 11,973 | 0.34 | 0.17 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 4.10 |
| | Out | 0.06 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.664% | 100.000% |
| 1.0000 | 97.317% | 100.000% |
| 0.5000 | 91.202% | 100.000% |
| 0.3000 | 86.201% | 100.000% |
| 0.2000 | 79.258% | 100.000% |
| 0.1000 | 69.142% | 100.000% |
| 0.0500 | 59.083% | 100.000% |
| 0.0300 | 49.140% | 100.000% |
| 0.0200 | 41.139% | 100.000% |
| 0.0100 | 31.196% | 100.000% |
| 0.0050 | 20.598% | 66.931% |
| 0.0030 | 14.655% | 47.620% |
| 0.0010 | 3.943% | 12.811% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #1 (Pond)*

*Proposed Pond #13*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,221.00 ft |
| Initial Pool: | 0.62 ac-ft |
| *Sediment Storage: | 2.92 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 8.00 | 40.00 | 3.00 | 0.0240 | 2,221.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,228.00 | 16.00 | 5.00:1 | 5.00:1 | 25.00 |

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 24.00 | 40.00 | 3.00 | 0.0240 | 2,223.00 | 0.90 | 0.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,229.47 ft |
| H'graph Detention Time: | 2.62 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.36 days |
| Trap Efficiency: | 69.22 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,220.00 | 0.618 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,220.00 | 0.618 | 0.000 | 0.000 | | |
| 2,220.50 | 0.624 | 0.311 | 0.000 | | |
| 2,221.00 | 0.631 | 0.625 | 0.000 | | Spillway #1 |
| 2,221.50 | 0.638 | 0.942 | 0.512 | 7.49* | |
| 2,222.00 | 0.645 | 1.263 | 1.140 | 4.95 | |
| 2,222.50 | 0.651 | 1.587 | 1.307 | 3.20 | |
| 2,223.00 | 0.658 | 1.914 | 1.474 | 2.85 | Spillway #3 |
| 2,223.50 | 0.665 | 2.245 | 3.114 | 1.85 | |
| 2,224.00 | 0.672 | 2.579 | 5.932 | 5.05 | |
| 2,224.50 | 0.679 | 2.917 | 9.553 | 2.60 | |
| 2,225.00 | 0.686 | 3.259 | 13.820 | 1.25 | |
| 2,225.50 | 0.693 | 3.603 | 18.183 | 0.65 | |
| 2,226.00 | 0.700 | 3.952 | 21.678 | 0.45 | |
| 2,226.50 | 0.707 | 4.304 | 24.699 | 0.40 | |
| 2,227.00 | 0.714 | 4.659 | 27.226 | 0.35 | |
| 2,227.50 | 0.722 | 5.018 | 29.043 | 0.35 | |
| 2,228.00 | 0.729 | 5.381 | 30.735 | 0.35 | Spillway #2 |
| 2,228.50 | 0.736 | 5.747 | 37.166 | 0.40 | |
| 2,229.00 | 0.743 | 6.117 | 100.592 | 0.50 | |
| 2,229.47 | 0.750 | 6.471 | 173.134 | 0.05 | Peak Stage |
| 2,229.50 | 0.751 | 6.490 | 177.039 | | |
| 2,230.00 | 0.758 | 6.867 | 278.202 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,220.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,220.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,220.50 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,221.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,221.50 | (3)>0.512 | 0.000 | 0.000 | 0.512 |
| 2,222.00 | (5)>1.140 | 0.000 | 0.000 | 1.140 |
| 2,222.50 | (5)>1.307 | 0.000 | 0.000 | 1.307 |
| 2,223.00 | (6)>1.474 | 0.000 | 0.000 | 1.474 |
| 2,223.50 | (6)>1.628 | 0.000 | (3)>1.486 | 3.114 |
| 2,224.00 | (6)>1.743 | 0.000 | (3)>4.189 | 5.932 |
| 2,224.50 | (6)>1.858 | 0.000 | (3)>7.695 | 9.553 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,225.00 | (6)>1.973 | 0.000 | (3)>11.847 | 13.820 |
| 2,225.50 | (6)>2.088 | 0.000 | (4)>16.095 | 18.183 |
| 2,226.00 | (6)>2.181 | 0.000 | (5)>19.498 | 21.678 |
| 2,226.50 | (6)>2.271 | 0.000 | (5)>22.428 | 24.699 |
| 2,227.00 | (6)>2.362 | 0.000 | (6)>24.864 | 27.226 |
| 2,227.50 | (6)>2.452 | 0.000 | (6)>26.591 | 29.043 |
| 2,228.00 | (6)>2.543 | 0.000 | (6)>28.193 | 30.735 |
| 2,228.50 | (6)>2.627 | 4.826 | (6)>29.713 | 37.166 |
| 2,229.00 | (6)>2.702 | 66.723 | (6)>31.168 | 100.592 |
| 2,229.50 | (6)>2.776 | 141.696 | (6)>32.566 | 177.039 |
| 2,230.00 | (6)>2.851 | 241.467 | (6)>33.884 | 278.202 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 68.700 | 0.104 | 0.055 | 0.443 | 73.000 | S | 142.35 | 10.841 |
| | 2 | 5.400 | 0.068 | 0.013 | 0.452 | 74.000 | M | 11.56 | 0.887 |
| | 3 | 6.400 | 0.067 | 0.061 | 0.422 | 79.000 | M | 15.88 | 1.266 |
| | 4 | 6.900 | 0.064 | 0.062 | 0.422 | 86.000 | F | 20.21 | 1.725 |
| | 5 | 6.800 | 0.038 | 0.000 | 0.000 | 74.000 | M | 14.56 | 1.116 |
| | 6 | 5.900 | 0.068 | 0.013 | 0.271 | 79.000 | M | 14.64 | 1.167 |
| | Σ | **100.100** | | | | | | **211.93** | **17.003** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 25.6 | 3,363 | 2.15 | 1.11 |
| | 2 | 0.220 | 50.00 | 21.00 | 0.0500 | 1.0000 | 2 | 9.2 | 14,599 | 7.86 | 4.09 |
| | 3 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 2 | 35.5 | 38,425 | 20.70 | 10.97 |
| | 4 | 0.220 | 50.00 | 21.00 | 0.9000 | 1.0000 | 2 | 328.2 | 234,404 | 126.28 | 69.83 |
| | 5 | 0.220 | 50.00 | 20.00 | 0.0500 | 1.0000 | 2 | 11.2 | 14,197 | 7.65 | 3.97 |
| | 6 | 0.220 | 50.00 | 21.00 | 0.1400 | 1.0000 | 2 | 34.2 | 39,768 | 21.42 | 11.48 |
| | Σ | | | | | | | **443.9** | **34,752** | **18.93** | **10.34** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 36.00 | 180.00 | 500.00 | 1.510 | 0.091 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.73 | 280.00 | 830.00 | 17.420 | 0.013 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.104** |
| #1 | 2 | 2. Minimum tillage cultivation | 46.05 | 175.00 | 380.00 | 3.390 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.068** |
| #1 | 3 | 3. Short grass pasture | 46.51 | 200.00 | 430.00 | 5.450 | 0.021 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.067** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 46.67 | 210.00 | 450.00 | 6.830 | 0.018 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.064** |
| #1 | 5 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.038** |
| #1 | 6 | 3. Short grass pasture | 37.50 | 150.00 | 400.00 | 4.890 | 0.022 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.068** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 46.05 | 175.00 | 380.00 | 20.350 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.055** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.013** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 37.50 | 150.00 | 400.00 | 18.370 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.061** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 33.33 | 150.00 | 450.00 | 17.320 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.062** |
| #1 | 6 | 7. Paved area and small upland gullies | 1.00 | 1.00 | 100.00 | 2.010 | 0.013 |
| **#1** | **6** | **Muskingum K:** | | | | | **0.013** |

# Hurricane Creek Mining, LLC
# OSMRE #3341
# Proposed Pond #13
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

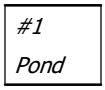
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #13 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 100.100 | 100.100 | 266.12 | 21.65 | 553.2 | 33,452 | 18.23 | 10.13 |
| | Out | | | 249.92 | 21.59 | 185.5 | 12,563 | 0.95 | 0.50 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 4.04 |
| | Out | 0.16 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.646% | 100.000% |
| 1.0000 | 97.281% | 100.000% |
| 0.5000 | 91.159% | 100.000% |
| 0.3000 | 86.159% | 100.000% |
| 0.2000 | 79.219% | 100.000% |
| 0.1000 | 69.097% | 100.000% |
| 0.0500 | 59.035% | 100.000% |
| 0.0300 | 49.095% | 100.000% |
| 0.0200 | 41.094% | 100.000% |
| 0.0100 | 31.153% | 92.910% |
| 0.0050 | 20.577% | 61.368% |
| 0.0030 | 14.637% | 43.653% |
| 0.0010 | 3.940% | 11.750% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #13*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,221.00 ft |
| Initial Pool: | 0.62 ac-ft |
| *Sediment Storage: | 2.92 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 8.00 | 40.00 | 3.00 | 0.0240 | 2,221.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,228.00 | 16.00 | 5.00:1 | 5.00:1 | 25.00 |

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 24.00 | 40.00 | 3.00 | 0.0240 | 2,223.00 | 0.90 | 0.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,229.86 ft |
| H'graph Detention Time: | 2.21 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.38 days |
| Trap Efficiency: | 66.47 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,220.00 | 0.618 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,220.00 | 0.618 | 0.000 | 0.000 | | |
| 2,220.50 | 0.624 | 0.311 | 0.000 | | |
| 2,221.00 | 0.631 | 0.625 | 0.000 | | Spillway #1 |
| 2,221.50 | 0.638 | 0.942 | 0.512 | 7.49* | |
| 2,222.00 | 0.645 | 1.263 | 1.140 | 4.95 | |
| 2,222.50 | 0.651 | 1.587 | 1.307 | 3.20 | |
| 2,223.00 | 0.658 | 1.914 | 1.474 | 2.85 | Spillway #3 |
| 2,223.50 | 0.665 | 2.245 | 3.114 | 1.80 | |
| 2,224.00 | 0.672 | 2.579 | 5.932 | 4.05 | |
| 2,224.50 | 0.679 | 2.917 | 9.553 | 3.00 | |
| 2,225.00 | 0.686 | 3.259 | 13.820 | 1.55 | |
| 2,225.50 | 0.693 | 3.603 | 18.183 | 0.75 | |
| 2,226.00 | 0.700 | 3.952 | 21.678 | 0.55 | |
| 2,226.50 | 0.707 | 4.304 | 24.699 | 0.45 | |
| 2,227.00 | 0.714 | 4.659 | 27.226 | 0.35 | |
| 2,227.50 | 0.722 | 5.018 | 29.043 | 0.40 | |
| 2,228.00 | 0.729 | 5.381 | 30.735 | 0.45 | Spillway #2 |
| 2,228.50 | 0.736 | 5.747 | 37.166 | 0.55 | |
| 2,229.00 | 0.743 | 6.117 | 100.592 | 0.50 | |
| 2,229.50 | 0.751 | 6.490 | 177.039 | 0.05 | |
| 2,229.86 | 0.756 | 6.762 | 249.923 | 0.10 | Peak Stage |
| 2,230.00 | 0.758 | 6.867 | 278.202 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,220.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,220.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,220.50 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,221.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,221.50 | (3)>0.512 | 0.000 | 0.000 | 0.512 |
| 2,222.00 | (5)>1.140 | 0.000 | 0.000 | 1.140 |
| 2,222.50 | (5)>1.307 | 0.000 | 0.000 | 1.307 |
| 2,223.00 | (6)>1.474 | 0.000 | 0.000 | 1.474 |
| 2,223.50 | (6)>1.628 | 0.000 | (3)>1.486 | 3.114 |
| 2,224.00 | (6)>1.743 | 0.000 | (3)>4.189 | 5.932 |
| 2,224.50 | (6)>1.858 | 0.000 | (3)>7.695 | 9.553 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,225.00 | (6)>1.973 | 0.000 | (3)>11.847 | 13.820 |
| 2,225.50 | (6)>2.088 | 0.000 | (4)>16.095 | 18.183 |
| 2,226.00 | (6)>2.181 | 0.000 | (5)>19.498 | 21.678 |
| 2,226.50 | (6)>2.271 | 0.000 | (5)>22.428 | 24.699 |
| 2,227.00 | (6)>2.362 | 0.000 | (6)>24.864 | 27.226 |
| 2,227.50 | (6)>2.452 | 0.000 | (6)>26.591 | 29.043 |
| 2,228.00 | (6)>2.543 | 0.000 | (6)>28.193 | 30.735 |
| 2,228.50 | (6)>2.627 | 4.826 | (6)>29.713 | 37.166 |
| 2,229.00 | (6)>2.702 | 66.723 | (6)>31.168 | 100.592 |
| 2,229.50 | (6)>2.776 | 141.696 | (6)>32.566 | 177.039 |
| 2,230.00 | (6)>2.851 | 241.467 | (6)>33.884 | 278.202 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 68.700 | 0.104 | 0.055 | 0.443 | 73.000 | S | 179.54 | 13.945 |
| | 2 | 5.400 | 0.068 | 0.013 | 0.452 | 74.000 | M | 14.51 | 1.135 |
| | 3 | 6.400 | 0.067 | 0.061 | 0.422 | 79.000 | M | 19.48 | 1.585 |
| | 4 | 6.900 | 0.064 | 0.062 | 0.422 | 86.000 | F | 24.12 | 2.099 |
| | 5 | 6.800 | 0.038 | 0.000 | 0.000 | 74.000 | M | 18.27 | 1.429 |
| | 6 | 5.900 | 0.068 | 0.013 | 0.271 | 79.000 | M | 17.96 | 1.461 |
| | Σ | **100.100** | | | | | | **266.12** | **21.655** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 33.6 | 3,369 | 2.15 | 1.13 |
| | 2 | 0.220 | 50.00 | 21.00 | 0.0500 | 1.0000 | 2 | 12.0 | 14,631 | 7.88 | 4.16 |
| | 3 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 2 | 45.1 | 38,625 | 20.81 | 11.14 |
| | 4 | 0.220 | 50.00 | 21.00 | 0.9000 | 1.0000 | 2 | 404.4 | 236,251 | 127.28 | 70.63 |
| | 5 | 0.220 | 50.00 | 20.00 | 0.0500 | 1.0000 | 2 | 14.7 | 14,229 | 7.67 | 4.05 |
| | 6 | 0.220 | 50.00 | 21.00 | 0.1400 | 1.0000 | 2 | 43.5 | 39,956 | 21.53 | 11.66 |
| | Σ | | | | | | | **553.2** | **33,452** | **18.23** | **10.13** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 36.00 | 180.00 | 500.00 | 1.510 | 0.091 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.73 | 280.00 | 830.00 | 17.420 | 0.013 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.104** |
| #1 | 2 | 2. Minimum tillage cultivation | 46.05 | 175.00 | 380.00 | 3.390 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.068** |
| #1 | 3 | 3. Short grass pasture | 46.51 | 200.00 | 430.00 | 5.450 | 0.021 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.067** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 46.67 | 210.00 | 450.00 | 6.830 | 0.018 |

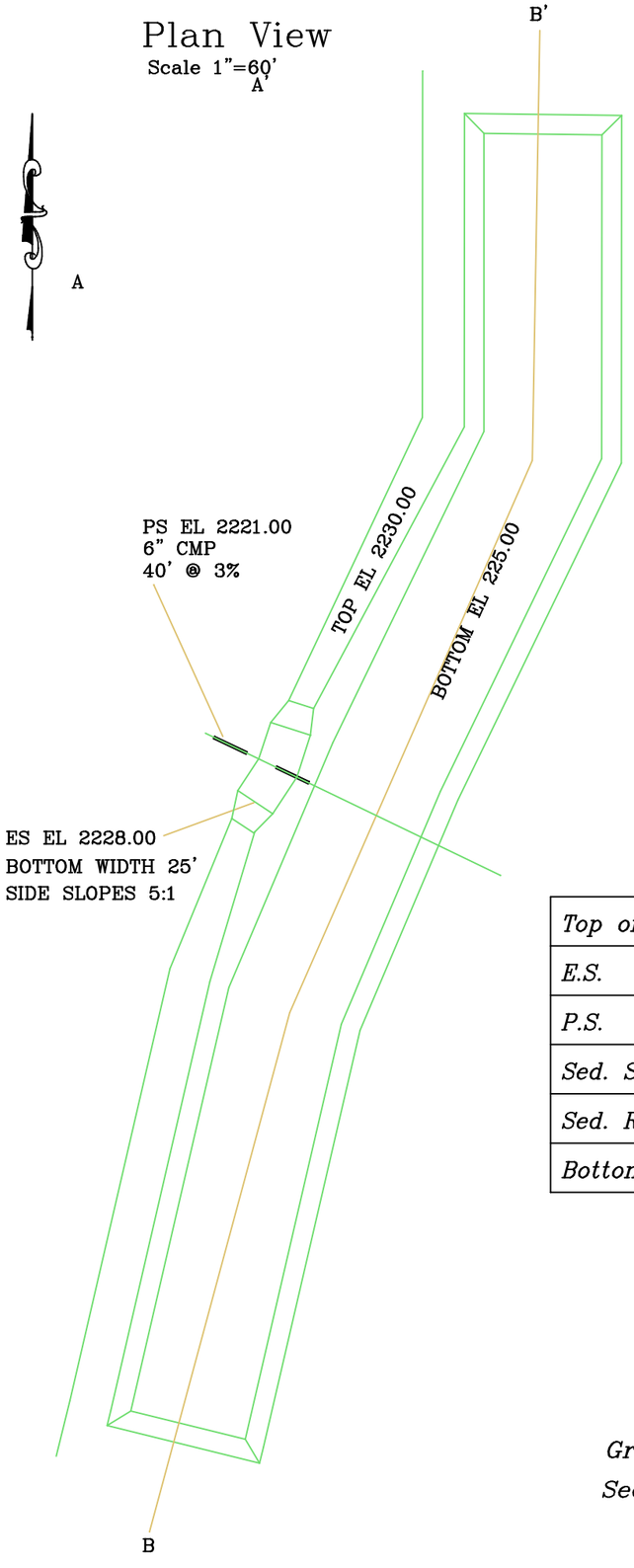
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.064** |
| #1 | 5 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.038** |
| #1 | 6 | 3. Short grass pasture | 37.50 | 150.00 | 400.00 | 4.890 | 0.022 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.068** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 46.05 | 175.00 | 380.00 | 20.350 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.055** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.013** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 37.50 | 150.00 | 400.00 | 18.370 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.061** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 33.33 | 150.00 | 450.00 | 17.320 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.062** |
| #1 | 6 | 7. Paved area and small upland gullies | 1.00 | 1.00 | 100.00 | 2.010 | 0.013 |
| **#1** | **6** | **Muskingum K:** | | | | | **0.013** |

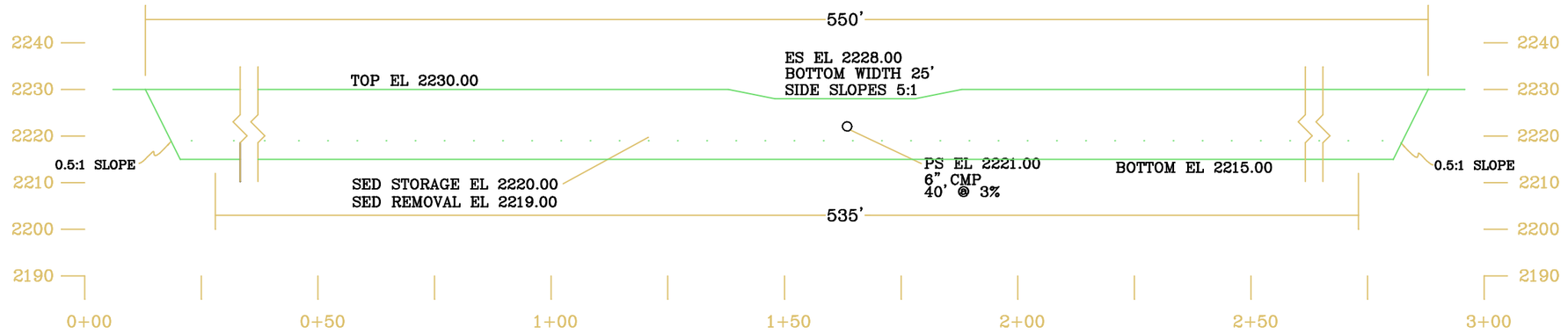
# Plan View

Scale 1"=60'



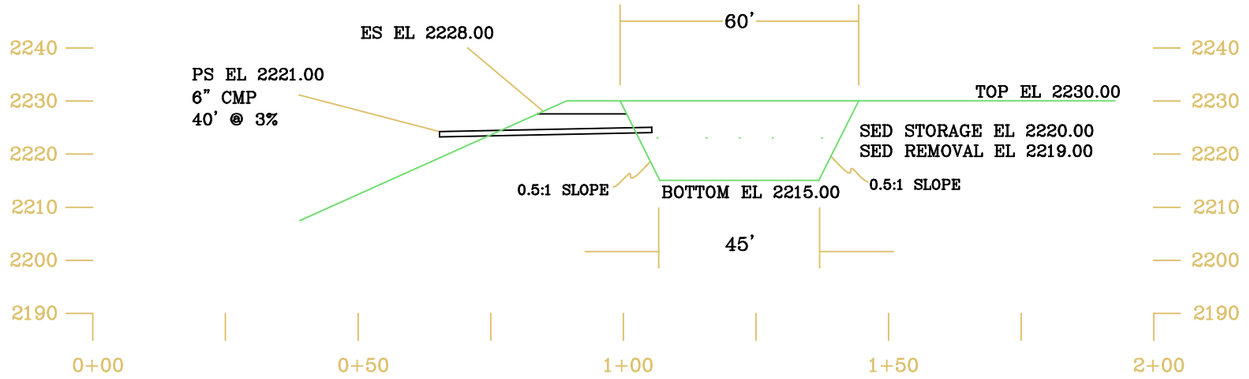

# Section B–B'

Scale 1"=30'




# Section A–A'

Scale 1"=30'




| | |
|---|---|
| *Top of Pond* | *2230.00* |
| *E.S.* | *2228.00* |
| *P.S.* | *2221.00* |
| *Sed. Storage* | *2220.00* |
| *Sed. Removal* | *2219.00* |
| *Bottom* | *2215.00* |

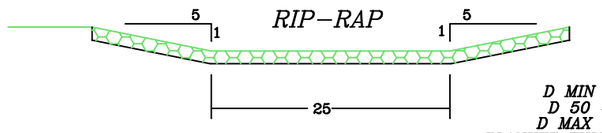
DD–51

*LEGEND*

*Ground Line*

*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 2.0"*
*D 50 = 3.0"*
*D MAX = 4.50"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 13

DATE: 02/17/2023 FILENAME: POND 13.dwg

SCALE: AS SHOWN DRAWN BY:

Prepared By:

HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831–0271
Phone: (606) 573–6924
Fax: (606) 573–9543

HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #14
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

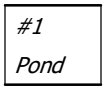
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #14 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 46.900 | 46.900 | 102.38 | 8.28 | 335.9 | 97,307 | 52.63 | 15.83 |
| | Out | | | 38.07 | 7.13 | 88.6 | 20,697 | 0.34 | 0.18 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 5.55 |
| | Out | 0.10 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.881% | 100.000% |
| 1.0000 | 97.754% | 100.000% |
| 0.5000 | 91.712% | 100.000% |
| 0.3000 | 86.712% | 100.000% |
| 0.2000 | 79.732% | 100.000% |
| 0.1000 | 69.689% | 100.000% |
| 0.0500 | 59.668% | 100.000% |
| 0.0300 | 49.688% | 100.000% |
| 0.0200 | 41.687% | 100.000% |
| 0.0100 | 31.708% | 100.000% |
| 0.0050 | 20.854% | 79.058% |
| 0.0030 | 14.875% | 56.390% |
| 0.0010 | 3.979% | 15.085% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #14*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,221.00 ft |
| Initial Pool: | 0.42 ac-ft |
| *Sediment Storage: | 1.90 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,221.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,228.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,228.82 ft |
| H'graph Detention Time: | 7.95 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.67 days |
| Trap Efficiency: | 73.62 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,220.00 | 0.410 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,220.00 | 0.410 | 0.001 | 0.000 | | |
| 2,220.50 | 0.417 | 0.207 | 0.000 | | |
| 2,221.00 | 0.423 | 0.417 | 0.000 | | Spillway #1 |
| 2,221.50 | 0.429 | 0.630 | 0.271 | 9.51* | |
| 2,222.00 | 0.435 | 0.846 | 0.565 | 4.63* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,222.50 | 0.442 | 1.065 | 0.651 | 4.08* | |
| 2,223.00 | 0.448 | 1.288 | 0.709 | 3.80* | |
| 2,223.50 | 0.455 | 1.514 | 0.766 | 3.56* | |
| 2,224.00 | 0.461 | 1.743 | 0.824 | 3.36* | |
| 2,224.50 | 0.468 | 1.975 | 0.882 | 3.30 | |
| 2,225.00 | 0.474 | 2.210 | 0.939 | 3.15 | |
| 2,225.50 | 0.481 | 2.449 | 0.997 | 2.95 | |
| 2,226.00 | 0.488 | 2.691 | 1.055 | 2.85 | |
| 2,226.50 | 0.494 | 2.937 | 1.108 | 2.75 | |
| 2,227.00 | 0.501 | 3.186 | 1.144 | 2.70 | |
| 2,227.50 | 0.508 | 3.438 | 1.181 | 2.60 | |
| 2,228.00 | 0.515 | 3.694 | 1.217 | 2.60 | Spillway #2 |
| 2,228.50 | 0.522 | 3.953 | 5.133 | 9.70 | |
| 2,228.82 | 0.526 | 4.123 | 38.070 | 2.60 | Peak Stage |
| 2,229.00 | 0.529 | 4.216 | 56.060 | | |
| 2,229.50 | 0.536 | 4.482 | 119.163 | | |
| 2,230.00 | 0.543 | 4.752 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,220.00 | 0.000 | 0.000 | 0.000 |
| 2,220.00 | 0.000 | 0.000 | 0.000 |
| 2,220.50 | 0.000 | 0.000 | 0.000 |
| 2,221.00 | 0.000 | 0.000 | 0.000 |
| 2,221.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,222.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,222.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,223.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,223.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,224.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,224.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,225.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,225.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,226.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,226.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,227.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,227.50 | (6)>1.181 | 0.000 | 1.181 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,228.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,228.50 | (6)>1.253 | 3.880 | 5.133 |
| 2,229.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,229.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,230.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 27.200 | 0.089 | 0.073 | 0.436 | 73.000 | S | 56.36 | 4.292 |
| | 2 | 8.200 | 0.068 | 0.013 | 0.445 | 79.000 | M | 20.35 | 1.622 |
| | 3 | 4.400 | 0.059 | 0.048 | 0.426 | 86.000 | F | 12.89 | 1.100 |
| | 4 | 4.200 | 0.037 | 0.000 | 0.000 | 74.000 | M | 8.99 | 0.690 |
| | 5 | 2.900 | 0.057 | 0.000 | 0.000 | 79.000 | M | 7.20 | 0.574 |
| | Σ | **46.900** | | | | | | **102.38** | **8.278** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 38.00 | 0.0030 | 1.0000 | 1 | 7.1 | 2,446 | 1.56 | 0.77 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 60.1 | 49,987 | 26.93 | 14.45 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 240.6 | 262,144 | 141.23 | 79.40 |
| | 4 | 0.220 | 50.00 | 17.00 | 0.0500 | 1.0000 | 2 | 5.4 | 11,085 | 5.97 | 3.10 |
| | 5 | 0.220 | 50.00 | 30.00 | 0.1400 | 1.0000 | 2 | 22.7 | 53,441 | 28.79 | 15.45 |
| | Σ | | | | | | | **335.9** | **97,307** | **52.63** | **15.83** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 40.00 | 200.00 | 500.00 | 1.600 | 0.086 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.50 | 75.00 | 200.00 | 18.370 | 0.003 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.089** |
| #1 | 2 | 3. Short grass pasture | 50.00 | 225.00 | 450.00 | 5.650 | 0.022 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.068** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 175.00 | 350.00 | 7.070 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.059** |
| #1 | 4 | 2. Minimum tillage cultivation | 33.33 | 100.00 | 300.00 | 2.880 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.037** |
| #1 | 5 | 3. Short grass pasture | 60.00 | 150.00 | 249.99 | 6.190 | 0.011 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.057** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 225.00 | 450.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.33 | 100.00 | 300.00 | 17.320 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.073** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 33.33 | 100.00 | 300.00 | 17.320 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.013** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 60.00 | 150.00 | 249.99 | 23.230 | 0.002 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.048** |

# Hurricane Creek Mining. LLC
# OSMRE Permit #3341
# Proposed Pond #14
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

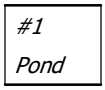
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #14 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 46.900 | 46.900 | 127.87 | 10.49 | 418.0 | 96,759 | 52.35 | 15.56 |
| | Out | | | 104.71 | 9.33 | 131.8 | 21,340 | 0.62 | 0.35 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 5.51 |
| | Out | 0.16 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.874% | 100.000% |
| 1.0000 | 97.741% | 100.000% |
| 0.5000 | 91.696% | 100.000% |
| 0.3000 | 86.696% | 100.000% |
| 0.2000 | 79.717% | 100.000% |
| 0.1000 | 69.672% | 100.000% |
| 0.0500 | 59.650% | 100.000% |
| 0.0300 | 49.671% | 100.000% |
| 0.0200 | 41.671% | 100.000% |
| 0.0100 | 31.692% | 100.000% |
| 0.0050 | 20.846% | 66.107% |
| 0.0030 | 14.868% | 47.149% |
| 0.0010 | 3.978% | 12.615% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #14*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,221.00 ft |
| Initial Pool: | 0.42 ac-ft |
| *Sediment Storage: | 1.90 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,221.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,228.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,229.39 ft |
| H'graph Detention Time: | 6.15 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.68 days |
| Trap Efficiency: | 68.47 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,220.00 | 0.410 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,220.00 | 0.410 | 0.001 | 0.000 | | |
| 2,220.50 | 0.417 | 0.207 | 0.000 | | |
| 2,221.00 | 0.423 | 0.417 | 0.000 | | Spillway #1 |
| 2,221.50 | 0.429 | 0.630 | 0.271 | 9.51* | |
| 2,222.00 | 0.435 | 0.846 | 0.565 | 4.63* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,222.50 | 0.442 | 1.065 | 0.651 | 4.08* | |
| 2,223.00 | 0.448 | 1.288 | 0.709 | 3.80* | |
| 2,223.50 | 0.455 | 1.514 | 0.766 | 3.56* | |
| 2,224.00 | 0.461 | 1.743 | 0.824 | 3.36* | |
| 2,224.50 | 0.468 | 1.975 | 0.882 | 3.30 | |
| 2,225.00 | 0.474 | 2.210 | 0.939 | 3.15 | |
| 2,225.50 | 0.481 | 2.449 | 0.997 | 2.95 | |
| 2,226.00 | 0.488 | 2.691 | 1.055 | 2.85 | |
| 2,226.50 | 0.494 | 2.937 | 1.108 | 2.75 | |
| 2,227.00 | 0.501 | 3.186 | 1.144 | 2.70 | |
| 2,227.50 | 0.508 | 3.438 | 1.181 | 2.60 | |
| 2,228.00 | 0.515 | 3.694 | 1.217 | 2.60 | Spillway #2 |
| 2,228.50 | 0.522 | 3.953 | 5.133 | 8.95 | |
| 2,229.00 | 0.529 | 4.216 | 56.060 | 3.50 | |
| 2,229.39 | 0.534 | 4.421 | 104.705 | 0.05 | Peak Stage |
| 2,229.50 | 0.536 | 4.482 | 119.163 | | |
| 2,230.00 | 0.543 | 4.752 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,220.00 | 0.000 | 0.000 | 0.000 |
| 2,220.00 | 0.000 | 0.000 | 0.000 |
| 2,220.50 | 0.000 | 0.000 | 0.000 |
| 2,221.00 | 0.000 | 0.000 | 0.000 |
| 2,221.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,222.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,222.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,223.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,223.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,224.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,224.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,225.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,225.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,226.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,226.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,227.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,227.50 | (6)>1.181 | 0.000 | 1.181 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,228.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,228.50 | (6)>1.253 | 3.880 | 5.133 |
| 2,229.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,229.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,230.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 27.200 | 0.089 | 0.073 | 0.436 | 73.000 | S | 71.08 | 5.521 |
| | 2 | 8.200 | 0.068 | 0.013 | 0.445 | 79.000 | M | 24.96 | 2.031 |
| | 3 | 4.400 | 0.059 | 0.048 | 0.426 | 86.000 | F | 15.38 | 1.339 |
| | 4 | 4.200 | 0.037 | 0.000 | 0.000 | 74.000 | M | 11.28 | 0.883 |
| | 5 | 2.900 | 0.057 | 0.000 | 0.000 | 79.000 | M | 8.83 | 0.718 |
| | Σ | **46.900** | | | | | | **127.87** | **10.491** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 38.00 | 0.0030 | 1.0000 | 1 | 9.3 | 2,452 | 1.57 | 0.79 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 76.4 | 50,222 | 27.06 | 14.67 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 296.4 | 264,110 | 142.28 | 80.30 |
| | 4 | 0.220 | 50.00 | 17.00 | 0.0500 | 1.0000 | 2 | 7.1 | 11,110 | 5.99 | 3.16 |
| | 5 | 0.220 | 50.00 | 30.00 | 0.1400 | 1.0000 | 2 | 28.9 | 53,692 | 28.93 | 15.69 |
| | Σ | | | | | | | **418.0** | **96,759** | **52.35** | **15.56** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 40.00 | 200.00 | 500.00 | 1.600 | 0.086 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.50 | 75.00 | 200.00 | 18.370 | 0.003 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.089** |
| #1 | 2 | 3. Short grass pasture | 50.00 | 225.00 | 450.00 | 5.650 | 0.022 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.068** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 175.00 | 350.00 | 7.070 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.059** |
| #1 | 4 | 2. Minimum tillage cultivation | 33.33 | 100.00 | 300.00 | 2.880 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |

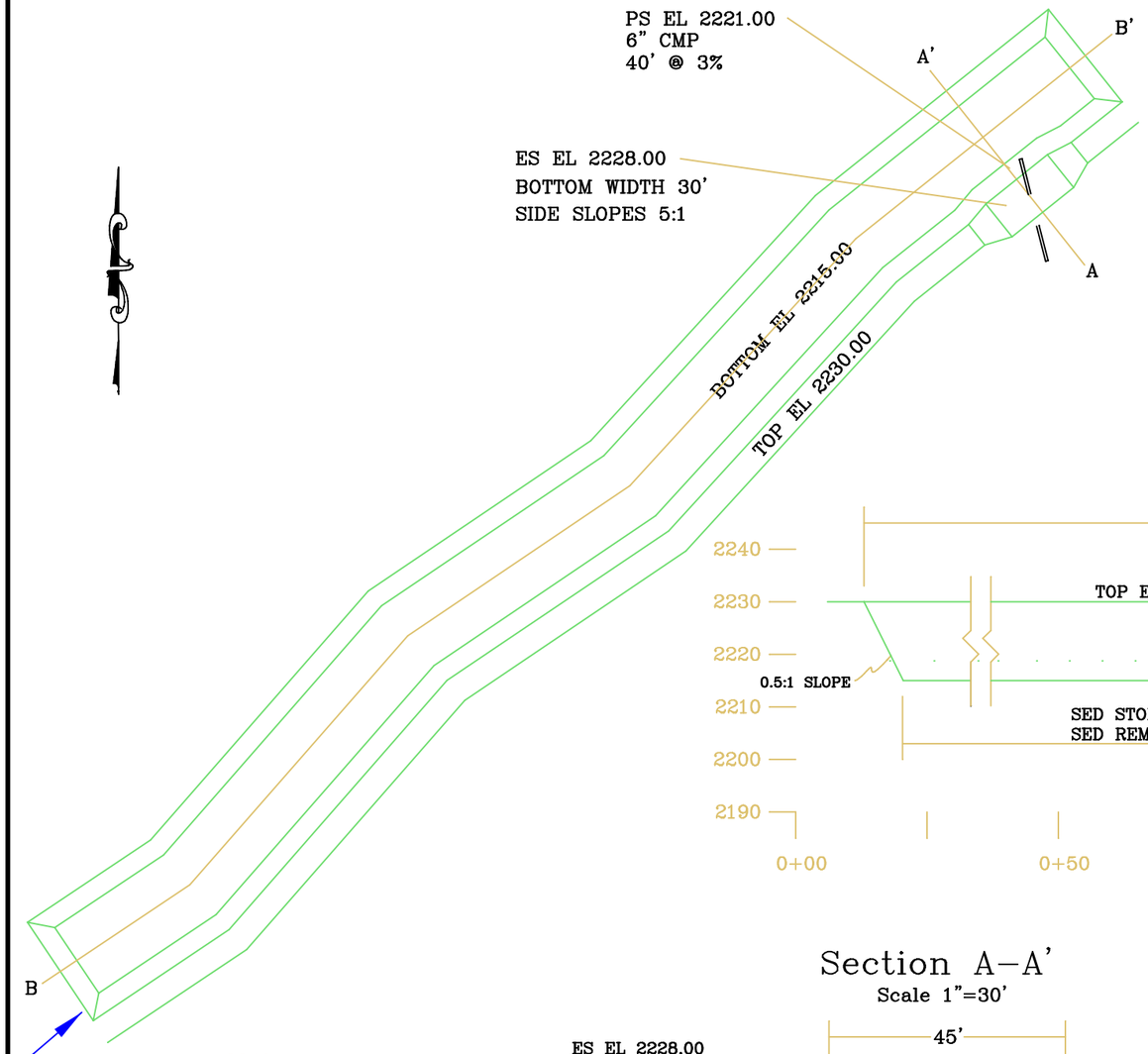
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.037** |
| #1 | 5 | 3. Short grass pasture | 60.00 | 150.00 | 249.99 | 6.190 | 0.011 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.057** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 225.00 | 450.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.33 | 100.00 | 300.00 | 17.320 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.073** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 33.33 | 100.00 | 300.00 | 17.320 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.013** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 60.00 | 150.00 | 249.99 | 23.230 | 0.002 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.048** |

# Plan View

Scale 1"=60'



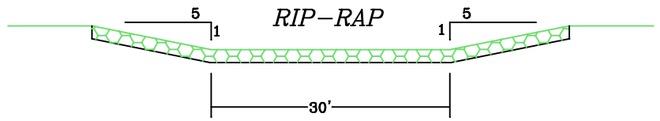

| | |
|---|---|
| *Top of Pond* | *2230.00* |
| *E.S.* | *2228.00* |
| *P.S.* | *2221.00* |
| *Sed. Storage* | *2220.00* |
| *Sed. Removal* | *2219.00* |
| *Bottom* | *2215.00* |

*LEGEND*

*Ground Line*

*Sediment Storage Level*

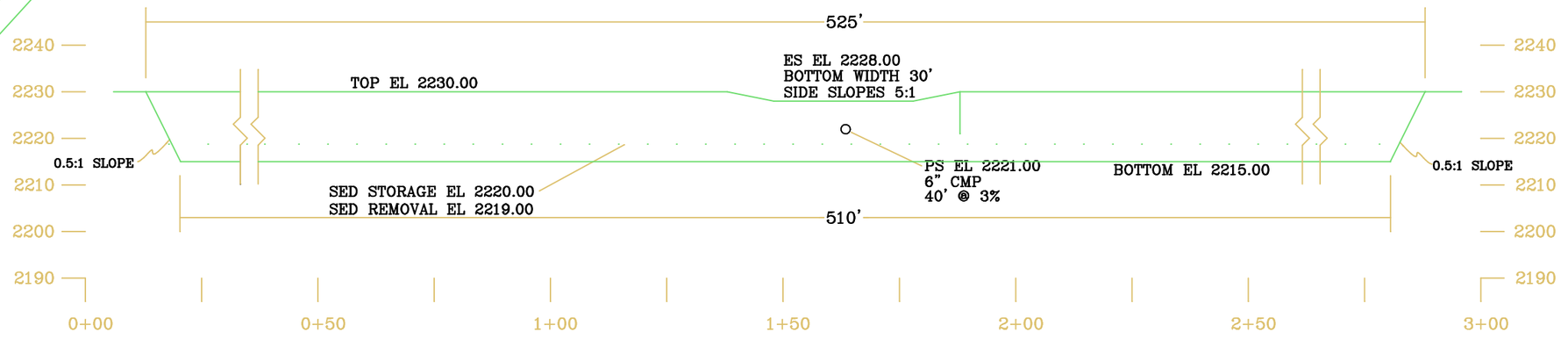
*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

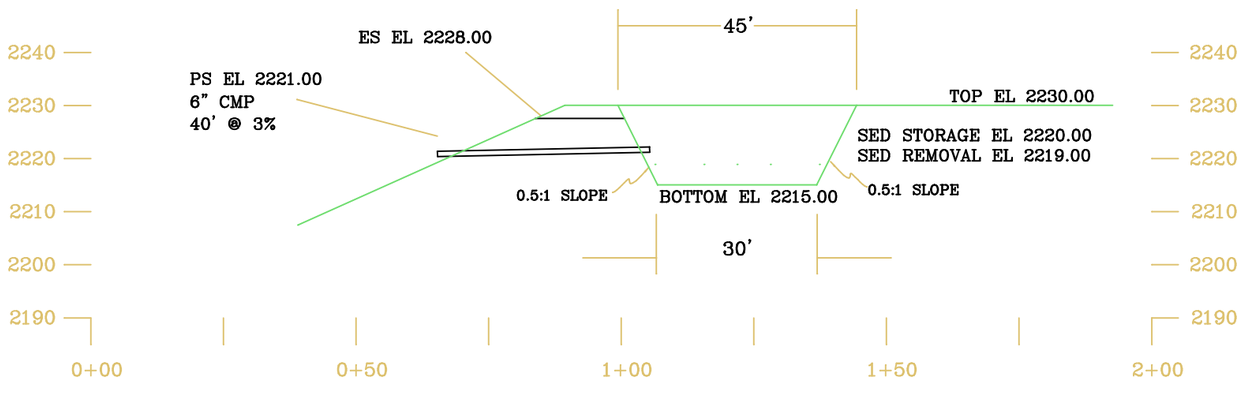
# Section B-B'

Scale 1"=30'




# Section A-A'

Scale 1"=30'




*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

*SIGNATURE* *DATE*

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 14

DATE: 02/17/2023

FILENAME: POND 14.dwg

SCALE: AS SHOWN

DRAWN BY:

Prepared By:


HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543


HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC

# OSMRE #3341

# Proposed Pond #15

# 10yr. - 24hr.

# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

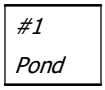
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #15 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 33.300 | 33.300 | 78.00 | 6.44 | 388.5 | 120,002 | 64.70 | 23.30 |
| | Out | | | 19.81 | 5.69 | 95.6 | 27,591 | 0.28 | 0.15 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 6.94 |
| | Out | 0.10 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.977% | 100.000% |
| 1.0000 | 97.951% | 100.000% |
| 0.5000 | 91.942% | 100.000% |
| 0.3000 | 86.942% | 100.000% |
| 0.2000 | 79.946% | 100.000% |
| 0.1000 | 69.937% | 100.000% |
| 0.0500 | 59.933% | 100.000% |
| 0.0300 | 49.937% | 100.000% |
| 0.0200 | 41.937% | 100.000% |
| 0.0100 | 31.941% | 100.000% |
| 0.0050 | 20.970% | 85.225% |
| 0.0030 | 14.975% | 60.857% |
| 0.0010 | 3.996% | 16.239% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #1 (Pond)*

*Proposed Pond #15*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,241.00 ft |
| Initial Pool: | 0.36 ac-ft |
| *Sediment Storage: | 1.66 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,241.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,248.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,248.64 ft |
| H'graph Detention Time: | 9.25 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.36 days |
| Trap Efficiency: | 75.39 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,240.00 | 0.356 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,240.00 | 0.356 | 0.000 | 0.000 | | |
| 2,240.50 | 0.361 | 0.180 | 0.000 | | |
| 2,241.00 | 0.365 | 0.361 | 0.000 | | Spillway #1 |
| 2,241.50 | 0.370 | 0.545 | 0.271 | 8.21* | |
| 2,242.00 | 0.375 | 0.731 | 0.565 | 3.99* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,242.50 | 0.380 | 0.920 | 0.651 | 3.51* | |
| 2,243.00 | 0.385 | 1.112 | 0.709 | 3.27* | |
| 2,243.50 | 0.390 | 1.306 | 0.766 | 3.20 | |
| 2,244.00 | 0.395 | 1.502 | 0.824 | 2.95 | |
| 2,244.50 | 0.401 | 1.701 | 0.882 | 2.85 | |
| 2,245.00 | 0.406 | 1.903 | 0.939 | 2.70 | |
| 2,245.50 | 0.411 | 2.107 | 0.997 | 2.55 | |
| 2,246.00 | 0.416 | 2.314 | 1.055 | 2.40 | |
| 2,246.50 | 0.421 | 2.523 | 1.108 | 2.35 | |
| 2,247.00 | 0.427 | 2.735 | 1.144 | 2.30 | |
| 2,247.50 | 0.432 | 2.950 | 1.181 | 2.25 | |
| 2,248.00 | 0.437 | 3.167 | 1.217 | 2.15 | Spillway #2 |
| 2,248.50 | 0.443 | 3.387 | 5.133 | 10.50 | |
| 2,248.64 | 0.444 | 3.451 | 19.814 | 1.50 | Peak Stage |
| 2,249.00 | 0.448 | 3.610 | 56.060 | | |
| 2,249.50 | 0.454 | 3.835 | 119.163 | | |
| 2,250.00 | 0.459 | 4.063 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,240.00 | 0.000 | 0.000 | 0.000 |
| 2,240.00 | 0.000 | 0.000 | 0.000 |
| 2,240.50 | 0.000 | 0.000 | 0.000 |
| 2,241.00 | 0.000 | 0.000 | 0.000 |
| 2,241.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,242.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,242.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,243.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,243.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,244.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,244.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,245.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,245.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,246.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,246.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,247.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,247.50 | (6)>1.181 | 0.000 | 1.181 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,248.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,248.50 | (6)>1.253 | 3.880 | 5.133 |
| 2,249.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,249.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,250.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 6.000 | 0.078 | 0.101 | 0.426 | 73.000 | S | 12.43 | 0.947 |
| | 2 | 6.300 | 0.060 | 0.061 | 0.422 | 74.000 | M | 13.49 | 1.034 |
| | 3 | 5.200 | 0.071 | 0.061 | 0.422 | 79.000 | M | 12.91 | 1.029 |
| | 4 | 3.200 | 0.063 | 0.055 | 0.319 | 74.000 | M | 6.85 | 0.525 |
| | 5 | 4.800 | 0.077 | 0.000 | 0.000 | 79.000 | M | 11.91 | 0.950 |
| | 6 | 7.800 | 0.087 | 0.009 | 0.319 | 86.000 | F | 22.85 | 1.950 |
| | Σ | **33.300** | | | | | | **78.00** | **6.435** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 1.7 | 2,485 | 1.59 | 0.83 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 13.2 | 18,196 | 9.80 | 5.05 |
| | 3 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 2 | 28.1 | 37,494 | 20.20 | 10.71 |
| | 4 | 0.220 | 50.00 | 20.00 | 0.0500 | 1.0000 | 2 | 4.8 | 12,896 | 6.95 | 3.63 |
| | 5 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 2 | 25.7 | 36,739 | 19.79 | 10.60 |
| | 6 | 0.220 | 50.00 | 18.00 | 0.9000 | 1.0000 | 2 | 315.0 | 199,059 | 107.24 | 59.93 |
| | Σ | | | | | | | **388.5** | **120,002** | **64.70** | **23.30** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 50.00 | 250.00 | 500.00 | 1.780 | 0.078 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.078** |
| #1 | 2 | 2. Minimum tillage cultivation | 50.00 | 150.00 | 300.00 | 3.530 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.060** |
| #1 | 3 | 3. Short grass pasture | 40.00 | 120.00 | 300.00 | 5.050 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.071** |
| #1 | 4 | 2. Minimum tillage cultivation | 40.00 | 120.00 | 300.00 | 3.160 | 0.026 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.063** |
| #1 | 5 | 3. Short grass pasture | 37.50 | 150.00 | 400.00 | 4.890 | 0.022 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.077** |
| #1 | 6 | 5. Nearly bare and untilled, and alluvial valley fans | 36.67 | 110.00 | 300.00 | 6.050 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.087** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.50 | 150.00 | 400.00 | 18.370 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.101** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 37.50 | 150.00 | 400.00 | 18.370 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.061** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 37.50 | 150.00 | 400.00 | 18.370 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.061** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.055** |
| #1 | 6 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **6** | **Muskingum K:** | | | | | **0.009** |

# Hurricane Creek Mining, LLC

# OSMRE #3341

# Proposed Pond #15

# 25yr. - 24hr.

# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

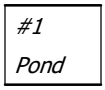
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #15 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 33.300 | 33.300 | 96.30 | 8.06 | 482.3 | 120,830 | 65.15 | 23.09 |
| | Out | | | 76.68 | 7.31 | 142.8 | 29,065 | 0.71 | 0.41 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 7.00 |
| | Out | 0.21 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.975% | 100.000% |
| 1.0000 | 97.948% | 100.000% |
| 0.5000 | 91.939% | 100.000% |
| 0.3000 | 86.939% | 100.000% |
| 0.2000 | 79.943% | 100.000% |
| 0.1000 | 69.934% | 100.000% |
| 0.0500 | 59.929% | 100.000% |
| 0.0300 | 49.933% | 100.000% |
| 0.0200 | 41.933% | 100.000% |
| 0.0100 | 31.937% | 100.000% |
| 0.0050 | 20.969% | 70.817% |
| 0.0030 | 14.973% | 50.569% |
| 0.0010 | 3.996% | 13.494% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #15*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,241.00 ft |
| Initial Pool: | 0.36 ac-ft |
| *Sediment Storage: | 1.66 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,241.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,248.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,249.16 ft |
| H'graph Detention Time: | 7.30 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.37 days |
| Trap Efficiency: | 70.39 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,240.00 | 0.356 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,240.00 | 0.356 | 0.000 | 0.000 | | |
| 2,240.50 | 0.361 | 0.180 | 0.000 | | |
| 2,241.00 | 0.365 | 0.361 | 0.000 | | Spillway #1 |
| 2,241.50 | 0.370 | 0.545 | 0.271 | 8.21* | |
| 2,242.00 | 0.375 | 0.731 | 0.565 | 3.99* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,242.50 | 0.380 | 0.920 | 0.651 | 3.51* | |
| 2,243.00 | 0.385 | 1.112 | 0.709 | 3.27* | |
| 2,243.50 | 0.390 | 1.306 | 0.766 | 3.06* | |
| 2,244.00 | 0.395 | 1.502 | 0.824 | 3.00 | |
| 2,244.50 | 0.401 | 1.701 | 0.882 | 2.80 | |
| 2,245.00 | 0.406 | 1.903 | 0.939 | 2.70 | |
| 2,245.50 | 0.411 | 2.107 | 0.997 | 2.55 | |
| 2,246.00 | 0.416 | 2.314 | 1.055 | 2.45 | |
| 2,246.50 | 0.421 | 2.523 | 1.108 | 2.35 | |
| 2,247.00 | 0.427 | 2.735 | 1.144 | 2.25 | |
| 2,247.50 | 0.432 | 2.950 | 1.181 | 2.25 | |
| 2,248.00 | 0.437 | 3.167 | 1.217 | 2.20 | Spillway #2 |
| 2,248.50 | 0.443 | 3.387 | 5.133 | 10.00 | |
| 2,249.00 | 0.448 | 3.610 | 56.060 | 2.15 | |
| 2,249.16 | 0.450 | 3.683 | 76.681 | 0.05 | Peak Stage |
| 2,249.50 | 0.454 | 3.835 | 119.163 | | |
| 2,250.00 | 0.459 | 4.063 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,240.00 | 0.000 | 0.000 | 0.000 |
| 2,240.00 | 0.000 | 0.000 | 0.000 |
| 2,240.50 | 0.000 | 0.000 | 0.000 |
| 2,241.00 | 0.000 | 0.000 | 0.000 |
| 2,241.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,242.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,242.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,243.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,243.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,244.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,244.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,245.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,245.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,246.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,246.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,247.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,247.50 | (6)>1.181 | 0.000 | 1.181 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,248.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,248.50 | (6)>1.253 | 3.880 | 5.133 |
| 2,249.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,249.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,250.00 | (6)>1.362 | 203.173 | 204.536 |

## *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 6.000 | 0.078 | 0.101 | 0.426 | 73.000 | S | 15.68 | 1.218 |
| | 2 | 6.300 | 0.060 | 0.061 | 0.422 | 74.000 | M | 16.93 | 1.324 |
| | 3 | 5.200 | 0.071 | 0.061 | 0.422 | 79.000 | M | 15.83 | 1.288 |
| | 4 | 3.200 | 0.063 | 0.055 | 0.319 | 74.000 | M | 8.60 | 0.672 |
| | 5 | 4.800 | 0.077 | 0.000 | 0.000 | 79.000 | M | 14.61 | 1.189 |
| | 6 | 7.800 | 0.087 | 0.009 | 0.319 | 86.000 | F | 27.26 | 2.373 |
| | Σ | **33.300** | | | | | | **96.30** | **8.064** |

## *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 2.2 | 2,498 | 1.60 | 0.84 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 17.3 | 18,248 | 9.83 | 5.14 |
| | 3 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 2 | 35.7 | 37,689 | 20.30 | 10.87 |
| | 4 | 0.220 | 50.00 | 20.00 | 0.0500 | 1.0000 | 2 | 6.3 | 12,969 | 6.99 | 3.70 |
| | 5 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 2 | 32.7 | 36,913 | 19.89 | 10.77 |
| | 6 | 0.220 | 50.00 | 18.00 | 0.9000 | 1.0000 | 2 | 388.1 | 200,595 | 108.07 | 60.62 |
| | Σ | | | | | | | **482.3** | **120,830** | **65.15** | **23.09** |

## *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 50.00 | 250.00 | 500.00 | 1.780 | 0.078 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.078** |
| #1 | 2 | 2. Minimum tillage cultivation | 50.00 | 150.00 | 300.00 | 3.530 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.060** |
| #1 | 3 | 3. Short grass pasture | 40.00 | 120.00 | 300.00 | 5.050 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.071** |
| #1 | 4 | 2. Minimum tillage cultivation | 40.00 | 120.00 | 300.00 | 3.160 | 0.026 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |

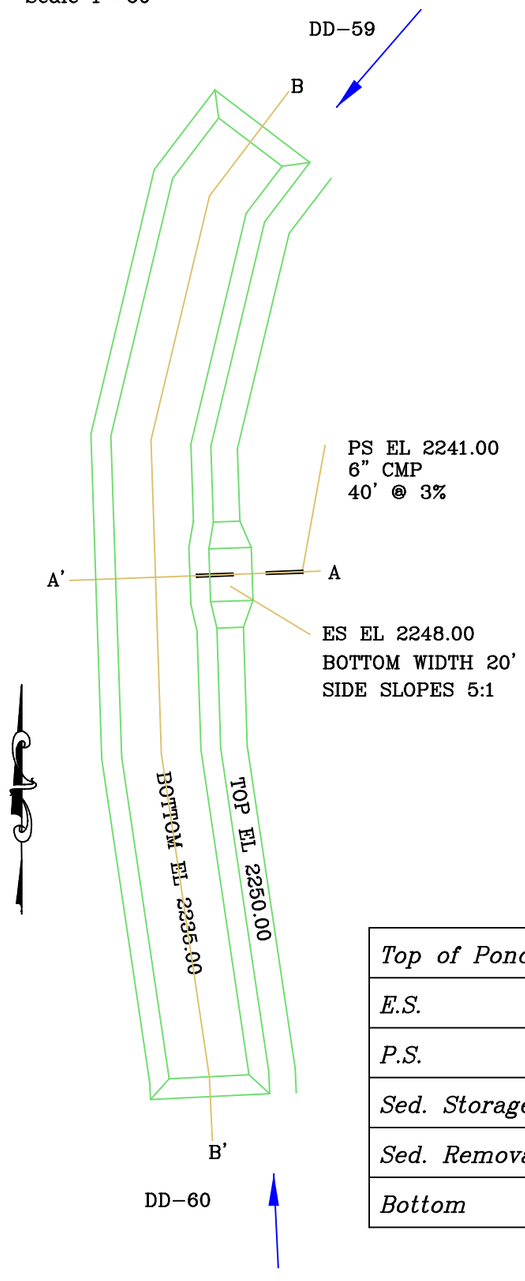
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.063** |
| #1 | 5 | 3. Short grass pasture | 37.50 | 150.00 | 400.00 | 4.890 | 0.022 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.077** |
| #1 | 6 | 5. Nearly bare and untilled, and alluvial valley fans | 36.67 | 110.00 | 300.00 | 6.050 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.087** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.50 | 150.00 | 400.00 | 18.370 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.101** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 37.50 | 150.00 | 400.00 | 18.370 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.061** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 37.50 | 150.00 | 400.00 | 18.370 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.061** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.055** |
| #1 | 6 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **6** | **Muskingum K:** | | | | | **0.009** |

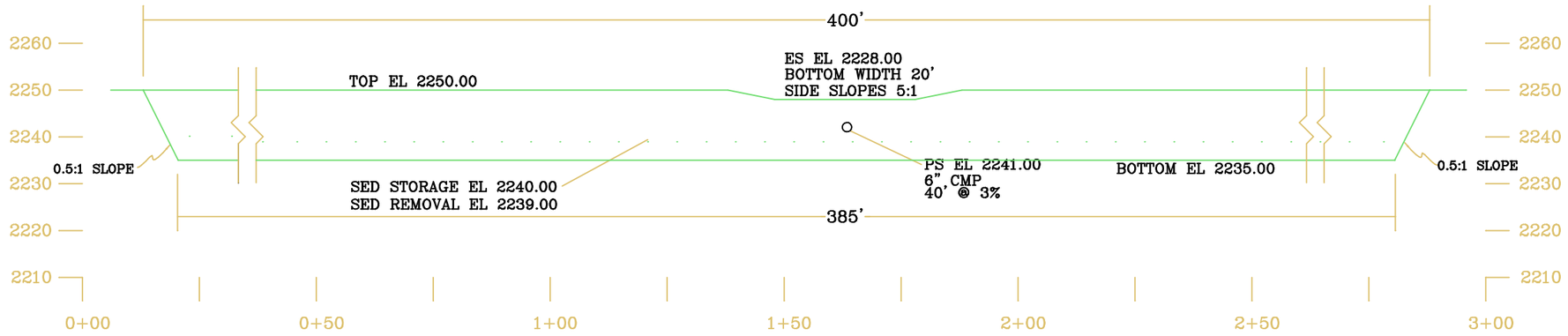
# Plan View

Scale 1"=60'



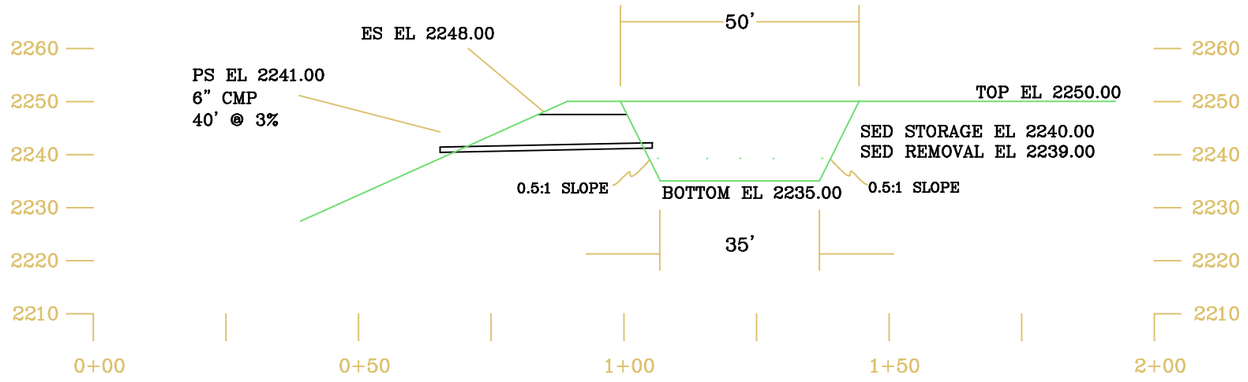

# Section B-B'

Scale 1"=30'




# Section A-A'

Scale 1"=30'



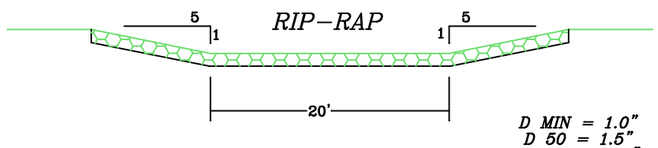

| | |
|---|---|
| *Top of Pond* | *2250.00* |
| *E.S.* | *2248.00* |
| *P.S.* | *2241.00* |
| *Sed. Storage* | *2240.00* |
| *Sed. Removal* | *2239.00* |
| *Bottom* | *2235.00* |

*LEGEND*

*Ground Line*

*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.6"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 15

DATE: 02/17/2023 FILENAME: POND 15.dwg

SCALE: AS SHOWN DRAWN BY:

Prepared By:

HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543

HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC

# OSMRE #3341

# Proposed Pond #16

# 10yr. - 24hr.

# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

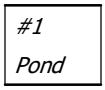
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #16 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 18.800 | 18.800 | 47.50 | 3.88 | 401.0 | 126,682 | 68.25 | 39.25 |
| | Out | | | 3.90 | 3.67 | 80.4 | 37,963 | 0.02 | 0.01 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 11.28 |
| | Out | 0.01 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.005% | 100.000% |
| 1.0000 | 98.005% | 100.000% |
| 0.5000 | 92.005% | 100.000% |
| 0.3000 | 87.004% | 100.000% |
| 0.2000 | 80.004% | 100.000% |
| 0.1000 | 70.004% | 100.000% |
| 0.0500 | 60.003% | 100.000% |
| 0.0300 | 50.003% | 100.000% |
| 0.0200 | 42.002% | 100.000% |
| 0.0100 | 32.002% | 100.000% |
| 0.0050 | 21.001% | 100.000% |
| 0.0030 | 15.001% | 74.812% |
| 0.0010 | 4.000% | 19.950% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #16*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,221.00 ft |
| Initial Pool: | 0.28 ac-ft |
| *Sediment Storage: | 1.25 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,221.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,228.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,228.34 ft |
| H'graph Detention Time: | 12.28 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.85 days |
| Trap Efficiency: | 79.95 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,220.00 | 0.271 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,220.50 | 0.276 | 0.136 | 0.000 | | |
| 2,221.00 | 0.280 | 0.275 | 0.000 | | Spillway #1 |
| 2,221.50 | 0.284 | 0.416 | 0.271 | 6.30* | |
| 2,222.00 | 0.288 | 0.559 | 0.565 | 3.07* | |
| 2,222.50 | 0.293 | 0.705 | 0.651 | 2.90 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,223.00 | 0.297 | 0.852 | 0.709 | 2.60 | |
| 2,223.50 | 0.302 | 1.002 | 0.766 | 2.45 | |
| 2,224.00 | 0.306 | 1.154 | 0.824 | 2.35 | |
| 2,224.50 | 0.311 | 1.308 | 0.882 | 2.15 | |
| 2,225.00 | 0.315 | 1.465 | 0.939 | 2.10 | |
| 2,225.50 | 0.320 | 1.623 | 0.997 | 2.00 | |
| 2,226.00 | 0.324 | 1.784 | 1.055 | 1.90 | |
| 2,226.50 | 0.329 | 1.947 | 1.108 | 1.80 | |
| 2,227.00 | 0.333 | 2.113 | 1.144 | 1.80 | |
| 2,227.50 | 0.338 | 2.281 | 1.181 | 1.75 | |
| 2,228.00 | 0.343 | 2.451 | 1.217 | 5.80 | Spillway #2 |
| 2,228.34 | 0.346 | 2.569 | 3.898 | 5.50 | Peak Stage |
| 2,228.50 | 0.348 | 2.624 | 5.133 | | |
| 2,229.00 | 0.352 | 2.799 | 56.060 | | |
| 2,229.50 | 0.357 | 2.976 | 119.163 | | |
| 2,230.00 | 0.362 | 3.156 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,220.00 | 0.000 | 0.000 | 0.000 |
| 2,220.50 | 0.000 | 0.000 | 0.000 |
| 2,221.00 | 0.000 | 0.000 | 0.000 |
| 2,221.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,222.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,222.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,223.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,223.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,224.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,224.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,225.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,225.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,226.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,226.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,227.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,227.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,228.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,228.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,229.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,229.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,230.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 1.400 | 0.007 | 0.012 | 0.447 | 79.000 | M | 3.47 | 0.277 |
| | 2 | 1.900 | 0.028 | 0.124 | 0.388 | 86.000 | F | 5.57 | 0.475 |
| | 3 | 5.900 | 0.103 | 0.009 | 0.319 | 74.000 | M | 12.63 | 0.969 |
| | 4 | 4.600 | 0.022 | 0.000 | 0.000 | 79.000 | M | 11.42 | 0.910 |
| | 5 | 5.000 | 0.095 | 0.009 | 0.319 | 86.000 | F | 14.65 | 1.250 |
| | Σ | **18.800** | | | | | | **47.50** | **3.880** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 2 | 6.5 | 31,756 | 17.11 | 9.17 |
| | 2 | 0.220 | 50.00 | 20.00 | 0.9000 | 1.0000 | 2 | 73.2 | 192,304 | 103.60 | 57.41 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 12.3 | 17,878 | 9.63 | 5.01 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 31.4 | 46,699 | 25.16 | 13.49 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 277.6 | 265,765 | 143.18 | 80.52 |
| | Σ | | | | | | | **401.0** | **126,682** | **68.25** | **39.25** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 3. Short grass pasture | 20.00 | 20.00 | 100.00 | 3.570 | 0.007 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.007** |
| #1 | 2 | 5. Nearly bare and untilled, and alluvial valley fans | 40.00 | 100.00 | 250.00 | 6.320 | 0.010 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.028** |
| #1 | 3 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.103** |
| #1 | 4 | 3. Short grass pasture | 40.00 | 100.00 | 250.00 | 5.050 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.022** |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 5 | 5. Nearly bare and untilled, and alluvial valley fans | 33.33 | 150.00 | 450.00 | 5.770 | 0.021 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.095** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 100.00 | 250.00 | 18.970 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.012** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 4.00 | 100.00 | 2,500.00 | 6.000 | 0.115 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.124** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.009** |
| #1 | 5 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Muskingum K:** | | | | | **0.009** |

# Hurricane Creek Mining, LLC

# OSMRE #3341

# Proposed Pond #16

# 25yr. - 24hr.

# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

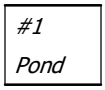
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #16 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 18.800 | 18.800 | 58.00 | 4.82 | 496.5 | 125,644 | 67.69 | 39.10 |
| | Out | | | 14.75 | 4.58 | 119.7 | 38,461 | 0.31 | 0.19 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 11.46 |
| | Out | 0.13 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.005% | 100.000% |
| 1.0000 | 98.005% | 100.000% |
| 0.5000 | 92.005% | 100.000% |
| 0.3000 | 87.004% | 100.000% |
| 0.2000 | 80.004% | 100.000% |
| 0.1000 | 70.004% | 100.000% |
| 0.0500 | 60.003% | 100.000% |
| 0.0300 | 50.003% | 100.000% |
| 0.0200 | 42.002% | 100.000% |
| 0.0100 | 32.002% | 100.000% |
| 0.0050 | 21.001% | 87.117% |
| 0.0030 | 15.001% | 62.227% |
| 0.0010 | 4.000% | 16.594% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #16*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,221.00 ft |
| Initial Pool: | 0.28 ac-ft |
| *Sediment Storage: | 1.25 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,221.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,228.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,228.59 ft |
| H'graph Detention Time: | 10.09 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.92 days |
| Trap Efficiency: | 75.89 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,220.00 | 0.271 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,220.50 | 0.276 | 0.136 | 0.000 | | |
| 2,221.00 | 0.280 | 0.275 | 0.000 | | Spillway #1 |
| 2,221.50 | 0.284 | 0.416 | 0.271 | 6.30* | |
| 2,222.00 | 0.288 | 0.559 | 0.565 | 3.07* | |
| 2,222.50 | 0.293 | 0.705 | 0.651 | 2.90 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,223.00 | 0.297 | 0.852 | 0.709 | 2.65 | |
| 2,223.50 | 0.302 | 1.002 | 0.766 | 2.45 | |
| 2,224.00 | 0.306 | 1.154 | 0.824 | 2.30 | |
| 2,224.50 | 0.311 | 1.308 | 0.882 | 2.20 | |
| 2,225.00 | 0.315 | 1.465 | 0.939 | 2.05 | |
| 2,225.50 | 0.320 | 1.623 | 0.997 | 2.00 | |
| 2,226.00 | 0.324 | 1.784 | 1.055 | 1.90 | |
| 2,226.50 | 0.329 | 1.947 | 1.108 | 1.85 | |
| 2,227.00 | 0.333 | 2.113 | 1.144 | 1.75 | |
| 2,227.50 | 0.338 | 2.281 | 1.181 | 1.75 | |
| 2,228.00 | 0.343 | 2.451 | 1.217 | 5.05 | Spillway #2 |
| 2,228.50 | 0.348 | 2.624 | 5.133 | 7.00 | |
| 2,228.59 | 0.348 | 2.657 | 14.753 | 0.90 | Peak Stage |
| 2,229.00 | 0.352 | 2.799 | 56.060 | | |
| 2,229.50 | 0.357 | 2.976 | 119.163 | | |
| 2,230.00 | 0.362 | 3.156 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,220.00 | 0.000 | 0.000 | 0.000 |
| 2,220.50 | 0.000 | 0.000 | 0.000 |
| 2,221.00 | 0.000 | 0.000 | 0.000 |
| 2,221.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,222.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,222.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,223.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,223.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,224.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,224.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,225.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,225.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,226.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,226.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,227.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,227.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,228.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,228.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,229.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,229.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,230.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 1.400 | 0.007 | 0.012 | 0.447 | 79.000 | M | 4.26 | 0.346 |
| | 2 | 1.900 | 0.028 | 0.124 | 0.388 | 86.000 | F | 6.64 | 0.578 |
| | 3 | 5.900 | 0.103 | 0.009 | 0.319 | 74.000 | M | 15.85 | 1.240 |
| | 4 | 4.600 | 0.022 | 0.000 | 0.000 | 79.000 | M | 14.00 | 1.139 |
| | 5 | 5.000 | 0.095 | 0.009 | 0.319 | 86.000 | F | 17.48 | 1.521 |
| | Σ | **18.800** | | | | | | **58.00** | **4.825** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 2 | 8.2 | 31,906 | 17.19 | 9.31 |
| | 2 | 0.220 | 50.00 | 20.00 | 0.9000 | 1.0000 | 2 | 90.2 | 194,180 | 104.61 | 58.07 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 16.1 | 17,917 | 9.65 | 5.10 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 40.0 | 46,919 | 25.28 | 13.70 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 342.1 | 267,755 | 144.25 | 81.43 |
| | Σ | | | | | | | **496.5** | **125,644** | **67.69** | **39.10** |

# Subwatershed Time of Concentration Details:

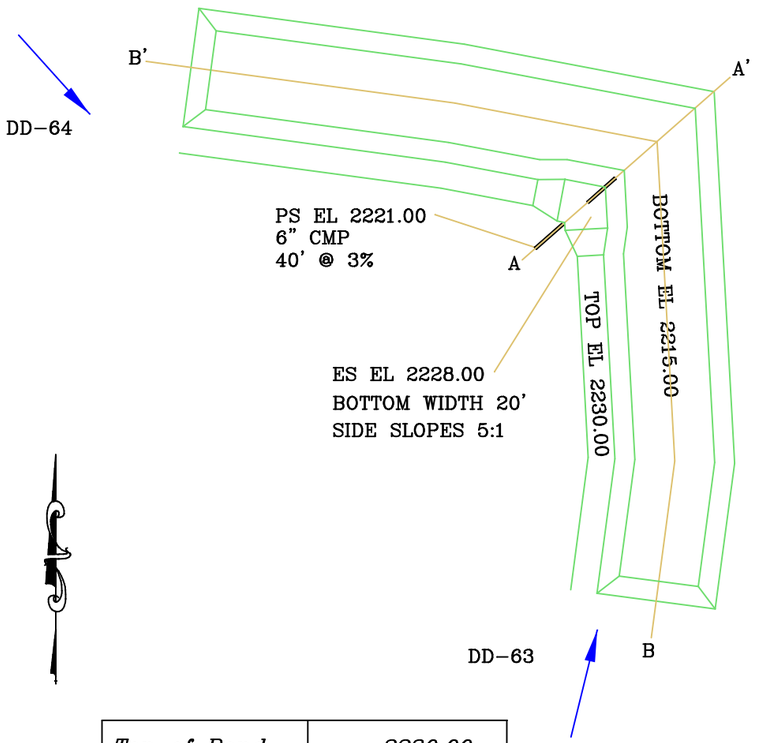
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 3. Short grass pasture | 20.00 | 20.00 | 100.00 | 3.570 | 0.007 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.007** |
| #1 | 2 | 5. Nearly bare and untilled, and alluvial valley fans | 40.00 | 100.00 | 250.00 | 6.320 | 0.010 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.028** |
| #1 | 3 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.103** |
| #1 | 4 | 3. Short grass pasture | 40.00 | 100.00 | 250.00 | 5.050 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.022** |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 5 | 5. Nearly bare and untilled, and alluvial valley fans | 33.33 | 150.00 | 450.00 | 5.770 | 0.021 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.095** |

## *Subwatershed Muskingum Routing Details:*

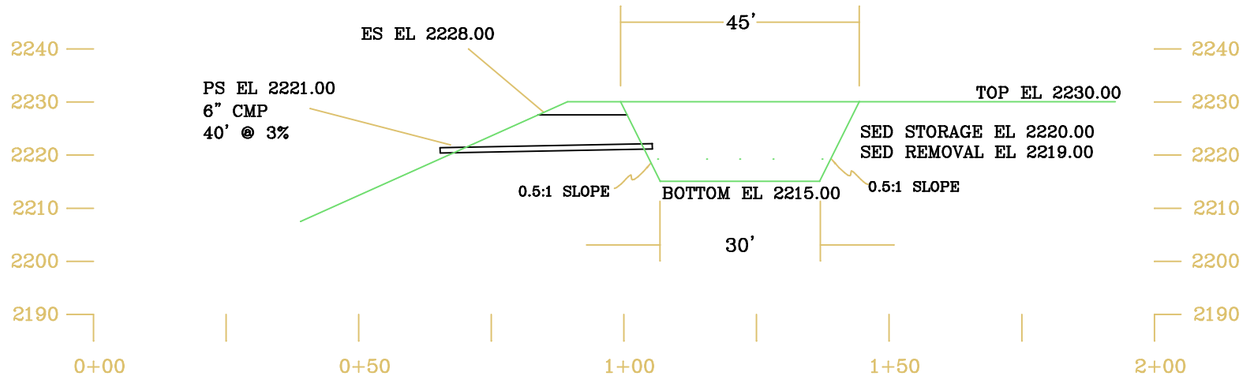
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 100.00 | 250.00 | 18.970 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.012** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 4.00 | 100.00 | 2,500.00 | 6.000 | 0.115 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.124** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.009** |
| #1 | 5 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Muskingum K:** | | | | | **0.009** |

## Plan View
Scale 1"=60'




| | |
|---|---|
| *Top of Pond* | *2230.00* |
| *E.S.* | *2228.00* |
| *P.S.* | *2221.00* |
| *Sed. Storage* | *2220.00* |
| *Sed. Removal* | *2219.00* |
| *Bottom* | *2215.00* |

## Section A–A'
Scale 1"=30'

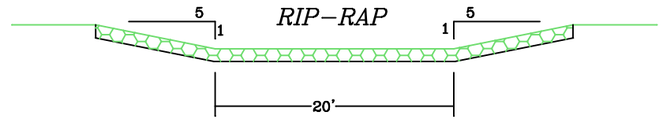



*LEGEND*

*Ground Line*

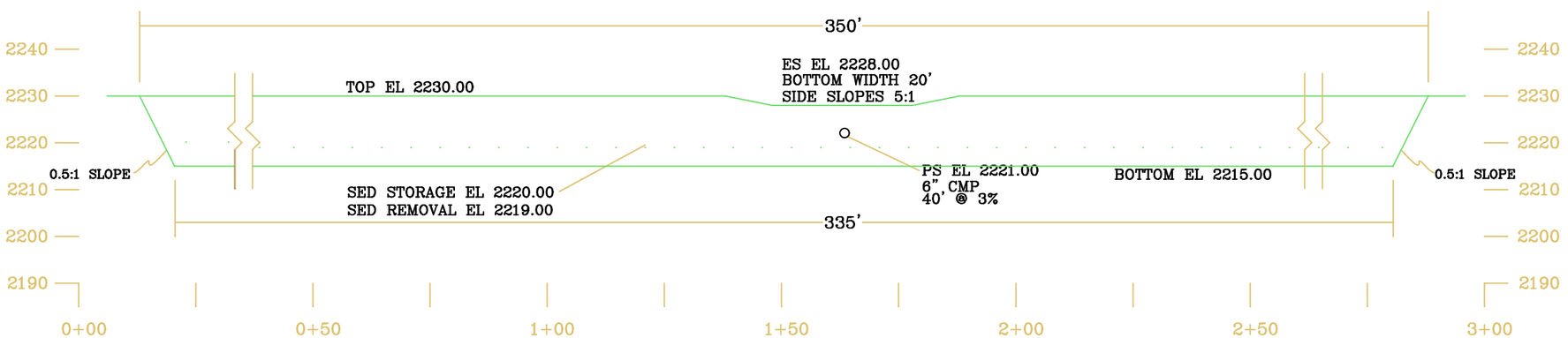
*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 0.50"*
*D 50 = 0.75"*
*D MAX = 1.50"*
*BLANKET THICKNESS = 1.0'*

## Section B–B'
Scale 1"=30'




*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

# HURRICANE CREEK MINING, LLC

## OSMRE APPLICATION #3341

## Pond 16

DATE: 02/17/2023

FILENAME: POND 16.dwg

SCALE: AS SHOWN

DRAWN BY:


Prepared By:
HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543


HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC
# OSMRE #3341
# Proposed Pond #17
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

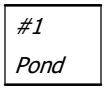
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #17 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 57.000 | 57.000 | 126.72 | 10.44 | 718.4 | 110,211 | 59.50 | 26.51 |
| | Out | | | 56.23 | 10.35 | 191.5 | 29,366 | 0.50 | 0.24 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 8.40 |
| | Out | 0.14 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.939% | 100.000% |
| 1.0000 | 97.869% | 100.000% |
| 0.5000 | 91.845% | 100.000% |
| 0.3000 | 86.845% | 100.000% |
| 0.2000 | 79.856% | 100.000% |
| 0.1000 | 69.832% | 100.000% |
| 0.0500 | 59.819% | 100.000% |
| 0.0300 | 49.830% | 100.000% |
| 0.0200 | 41.829% | 100.000% |
| 0.0100 | 31.840% | 100.000% |
| 0.0050 | 20.920% | 78.483% |
| 0.0030 | 14.931% | 56.016% |
| 0.0010 | 3.989% | 14.964% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #1 (Pond)*

*Proposed Pond #17*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,211.00 ft |
| Initial Pool: | 0.50 ac-ft |
| *Sediment Storage: | 2.31 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,211.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,218.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 12.00 | 40.00 | 3.00 | 0.0240 | 2,212.00 | 0.90 | 0.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,218.93 ft |
| H'graph Detention Time: | 4.45 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.58 days |
| Trap Efficiency: | 73.34 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,210.00 | 0.493 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,210.00 | 0.493 | 0.000 | 0.000 | | |
| 2,210.50 | 0.499 | 0.248 | 0.000 | | |
| 2,211.00 | 0.506 | 0.499 | 0.000 | | Spillway #1 |
| 2,211.50 | 0.512 | 0.754 | 0.271 | 11.36* | |
| 2,212.00 | 0.519 | 1.012 | 0.565 | 7.80 | Spillway #3 |
| 2,212.50 | 0.526 | 1.273 | 1.402 | 3.45 | |
| 2,213.00 | 0.532 | 1.537 | 2.803 | 1.60 | |
| 2,213.50 | 0.539 | 1.805 | 4.107 | 0.95 | |
| 2,214.00 | 0.546 | 2.077 | 4.706 | 0.70 | |
| 2,214.50 | 0.553 | 2.351 | 5.159 | 1.25 | |
| 2,215.00 | 0.560 | 2.630 | 5.580 | 1.15 | |
| 2,215.50 | 0.567 | 2.911 | 5.953 | 1.05 | |
| 2,216.00 | 0.574 | 3.196 | 6.326 | 0.95 | |
| 2,216.50 | 0.581 | 3.485 | 6.695 | 1.00 | |
| 2,217.00 | 0.588 | 3.777 | 6.998 | 1.00 | |
| 2,217.50 | 0.595 | 4.072 | 7.298 | 1.20 | |
| 2,218.00 | 0.602 | 4.372 | 7.598 | 1.50 | Spillway #2 |
| 2,218.50 | 0.609 | 4.674 | 11.772 | 1.90 | |
| 2,218.93 | 0.615 | 4.941 | 56.232 | 1.05 | Peak Stage |
| 2,219.00 | 0.616 | 4.981 | 62.926 | | |
| 2,219.50 | 0.624 | 5.291 | 126.255 | | |
| 2,220.00 | 0.631 | 5.605 | 211.854 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,210.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,210.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,210.50 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,211.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,211.50 | (4)>0.271 | 0.000 | 0.000 | 0.271 |
| 2,212.00 | (6)>0.565 | 0.000 | 0.000 | 0.565 |
| 2,212.50 | (6)>0.651 | 0.000 | (3)>0.751 | 1.402 |
| 2,213.00 | (6)>0.709 | 0.000 | (3)>2.094 | 2.803 |
| 2,213.50 | (6)>0.766 | 0.000 | (5)>3.340 | 4.107 |
| 2,214.00 | (6)>0.824 | 0.000 | (6)>3.882 | 4.706 |
| 2,214.50 | (6)>0.882 | 0.000 | (6)>4.277 | 5.159 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,215.00 | (6)>0.939 | 0.000 | (6)>4.640 | 5.580 |
| 2,215.50 | (6)>0.997 | 0.000 | (6)>4.956 | 5.953 |
| 2,216.00 | (6)>1.055 | 0.000 | (6)>5.272 | 6.326 |
| 2,216.50 | (6)>1.108 | 0.000 | (6)>5.587 | 6.695 |
| 2,217.00 | (6)>1.144 | 0.000 | (6)>5.853 | 6.998 |
| 2,217.50 | (6)>1.181 | 0.000 | (6)>6.117 | 7.298 |
| 2,218.00 | (6)>1.217 | 0.000 | (6)>6.381 | 7.598 |
| 2,218.50 | (6)>1.253 | 3.880 | (6)>6.639 | 11.772 |
| 2,219.00 | (6)>1.290 | 54.771 | (6)>6.865 | 62.926 |
| 2,219.50 | (6)>1.326 | 117.837 | (6)>7.092 | 126.255 |
| 2,220.00 | (6)>1.362 | 203.173 | (6)>7.319 | 211.854 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 25.300 | 0.088 | 0.108 | 0.426 | 73.000 | S | 52.42 | 3.992 |
| | 2 | 6.000 | 0.097 | 0.022 | 0.447 | 74.000 | M | 12.85 | 0.985 |
| | 3 | 5.800 | 0.080 | 0.040 | 0.432 | 79.000 | M | 14.40 | 1.147 |
| | 4 | 6.800 | 0.061 | 0.064 | 0.423 | 86.000 | F | 19.92 | 1.700 |
| | 5 | 6.000 | 0.045 | 0.000 | 0.000 | 74.000 | M | 12.85 | 0.985 |
| | 6 | 2.800 | 0.051 | 0.000 | 0.000 | 79.000 | M | 6.95 | 0.554 |
| | 7 | 4.300 | 0.036 | 0.037 | 0.319 | 86.000 | F | 12.59 | 1.075 |
| | Σ | **57.000** | | | | | | **126.72** | **10.439** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 8.4 | 2,951 | 1.89 | 0.98 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 12.5 | 17,914 | 9.65 | 5.02 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 40.8 | 47,991 | 25.85 | 13.87 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 391.7 | 279,790 | 150.73 | 83.30 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 12.5 | 17,914 | 9.65 | 5.02 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 18.0 | 44,047 | 23.73 | 12.72 |
| | 7 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 234.5 | 261,497 | 140.88 | 79.20 |
| | Σ | | | | | | | **718.4** | **110,211** | **59.50** | **26.51** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 42.00 | 210.00 | 500.00 | 1.630 | 0.085 |
| | | 8. Large gullies, diversions, and low flowing streams | 56.67 | 170.00 | 300.00 | 22.580 | 0.003 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.088** |
| #1 | 2 | 2. Minimum tillage cultivation | 50.00 | 150.00 | 300.00 | 3.530 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.097** |
| #1 | 3 | 3. Short grass pasture | 52.94 | 180.00 | 340.00 | 5.820 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 7.00 | 700.00 | 3.000 | 0.064 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **3** | **Time of Concentration:** | | | | | **0.080** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 200.00 | 400.00 | 7.070 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.061** |
| #1 | 5 | 2. Minimum tillage cultivation | 48.57 | 170.00 | 350.00 | 3.480 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.045** |
| #1 | 6 | 3. Short grass pasture | 50.00 | 150.00 | 300.00 | 5.650 | 0.014 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.051** |
| #1 | 7 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 175.00 | 350.00 | 7.070 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| **#1** | **7** | **Time of Concentration:** | | | | | **0.036** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 52.94 | 180.00 | 340.00 | 21.820 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 7.00 | 700.00 | 3.000 | 0.064 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.108** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 48.57 | 170.00 | 350.00 | 20.900 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.022** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.040** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 175.00 | 350.00 | 21.210 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Muskingum K:** | | | | | **0.064** |
| #1 | 7 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **7** | **Muskingum K:** | | | | | **0.037** |

# Hurricane Creek Mining, LLC
# OSMRE #3341
# Proposed Pond #17
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

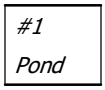
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #17 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 57.000 | 57.000 | 157.71 | 13.16 | 889.9 | 108,938 | 58.82 | 26.07 |
| | Out | | | 125.71 | 13.06 | 270.5 | 31,351 | 0.83 | 0.41 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 8.42 |
| | Out | 0.20 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.935% | 100.000% |
| 1.0000 | 97.861% | 100.000% |
| 0.5000 | 91.836% | 100.000% |
| 0.3000 | 86.835% | 100.000% |
| 0.2000 | 79.847% | 100.000% |
| 0.1000 | 69.821% | 100.000% |
| 0.0500 | 59.808% | 100.000% |
| 0.0300 | 49.820% | 100.000% |
| 0.0200 | 41.819% | 100.000% |
| 0.0100 | 31.830% | 100.000% |
| 0.0050 | 20.916% | 68.818% |
| 0.0030 | 14.927% | 49.115% |
| 0.0010 | 3.988% | 13.122% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #1 (Pond)*

*Proposed Pond #17*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,211.00 ft |
| Initial Pool: | 0.50 ac-ft |
| *Sediment Storage: | 2.31 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,211.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,218.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 12.00 | 40.00 | 3.00 | 0.0240 | 2,212.00 | 0.90 | 0.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,219.50 ft |
| H'graph Detention Time: | 3.86 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.61 days |
| Trap Efficiency: | 69.61 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,210.00 | 0.493 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,210.00 | 0.493 | 0.000 | 0.000 | | |
| 2,210.50 | 0.499 | 0.248 | 0.000 | | |
| 2,211.00 | 0.506 | 0.499 | 0.000 | | Spillway #1 |
| 2,211.50 | 0.512 | 0.754 | 0.271 | 11.36* | |
| 2,212.00 | 0.519 | 1.012 | 0.565 | 7.80 | Spillway #3 |
| 2,212.50 | 0.526 | 1.273 | 1.402 | 3.40 | |
| 2,213.00 | 0.532 | 1.537 | 2.803 | 1.60 | |
| 2,213.50 | 0.539 | 1.805 | 4.107 | 0.95 | |
| 2,214.00 | 0.546 | 2.077 | 4.706 | 0.75 | |
| 2,214.50 | 0.553 | 2.351 | 5.159 | 0.65 | |
| 2,215.00 | 0.560 | 2.630 | 5.580 | 1.15 | |
| 2,215.50 | 0.567 | 2.911 | 5.953 | 1.20 | |
| 2,216.00 | 0.574 | 3.196 | 6.326 | 1.10 | |
| 2,216.50 | 0.581 | 3.485 | 6.695 | 1.00 | |
| 2,217.00 | 0.588 | 3.777 | 6.998 | 1.10 | |
| 2,217.50 | 0.595 | 4.072 | 7.298 | 1.20 | |
| 2,218.00 | 0.602 | 4.372 | 7.598 | 1.80 | Spillway #2 |
| 2,218.50 | 0.609 | 4.674 | 11.772 | 2.15 | |
| 2,219.00 | 0.616 | 4.981 | 62.926 | 1.40 | |
| 2,219.50 | 0.624 | 5.288 | 125.712 | 0.10 | Peak Stage |
| 2,219.50 | 0.624 | 5.291 | 126.255 | | |
| 2,220.00 | 0.631 | 5.605 | 211.854 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,210.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,210.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,210.50 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,211.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,211.50 | (4)>0.271 | 0.000 | 0.000 | 0.271 |
| 2,212.00 | (6)>0.565 | 0.000 | 0.000 | 0.565 |
| 2,212.50 | (6)>0.651 | 0.000 | (3)>0.751 | 1.402 |
| 2,213.00 | (6)>0.709 | 0.000 | (3)>2.094 | 2.803 |
| 2,213.50 | (6)>0.766 | 0.000 | (5)>3.340 | 4.107 |
| 2,214.00 | (6)>0.824 | 0.000 | (6)>3.882 | 4.706 |
| 2,214.50 | (6)>0.882 | 0.000 | (6)>4.277 | 5.159 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,215.00 | (6)>0.939 | 0.000 | (6)>4.640 | 5.580 |
| 2,215.50 | (6)>0.997 | 0.000 | (6)>4.956 | 5.953 |
| 2,216.00 | (6)>1.055 | 0.000 | (6)>5.272 | 6.326 |
| 2,216.50 | (6)>1.108 | 0.000 | (6)>5.587 | 6.695 |
| 2,217.00 | (6)>1.144 | 0.000 | (6)>5.853 | 6.998 |
| 2,217.50 | (6)>1.181 | 0.000 | (6)>6.117 | 7.298 |
| 2,218.00 | (6)>1.217 | 0.000 | (6)>6.381 | 7.598 |
| 2,218.50 | (6)>1.253 | 3.880 | (6)>6.639 | 11.772 |
| 2,219.00 | (6)>1.290 | 54.771 | (6)>6.865 | 62.926 |
| 2,219.50 | (6)>1.326 | 117.837 | (6)>7.092 | 126.255 |
| 2,220.00 | (6)>1.362 | 203.173 | (6)>7.319 | 211.854 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 25.300 | 0.088 | 0.108 | 0.426 | 73.000 | S | 66.12 | 5.136 |
| | 2 | 6.000 | 0.097 | 0.022 | 0.447 | 74.000 | M | 16.12 | 1.261 |
| | 3 | 5.800 | 0.080 | 0.040 | 0.432 | 79.000 | M | 17.66 | 1.436 |
| | 4 | 6.800 | 0.061 | 0.064 | 0.423 | 86.000 | F | 23.77 | 2.069 |
| | 5 | 6.000 | 0.045 | 0.000 | 0.000 | 74.000 | M | 16.12 | 1.261 |
| | 6 | 2.800 | 0.051 | 0.000 | 0.000 | 79.000 | M | 8.52 | 0.693 |
| | 7 | 4.300 | 0.036 | 0.037 | 0.319 | 86.000 | F | 15.03 | 1.308 |
| | Σ | **57.000** | | | | | | **157.71** | **13.165** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 11.0 | 2,967 | 1.90 | 1.00 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 16.4 | 17,953 | 9.67 | 5.11 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 51.8 | 48,217 | 25.98 | 14.08 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 482.7 | 281,957 | 151.90 | 84.24 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 16.4 | 17,953 | 9.67 | 5.11 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 22.9 | 44,254 | 23.84 | 12.92 |
| | 7 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 288.9 | 263,460 | 141.93 | 80.09 |
| | Σ | | | | | | | **889.9** | **108,938** | **58.82** | **26.07** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 42.00 | 210.00 | 500.00 | 1.630 | 0.085 |
| | | 8. Large gullies, diversions, and low flowing streams | 56.67 | 170.00 | 300.00 | 22.580 | 0.003 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.088** |
| #1 | 2 | 2. Minimum tillage cultivation | 50.00 | 150.00 | 300.00 | 3.530 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.097** |
| #1 | 3 | 3. Short grass pasture | 52.94 | 180.00 | 340.00 | 5.820 | 0.016 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 7.00 | 700.00 | 3.000 | 0.064 |

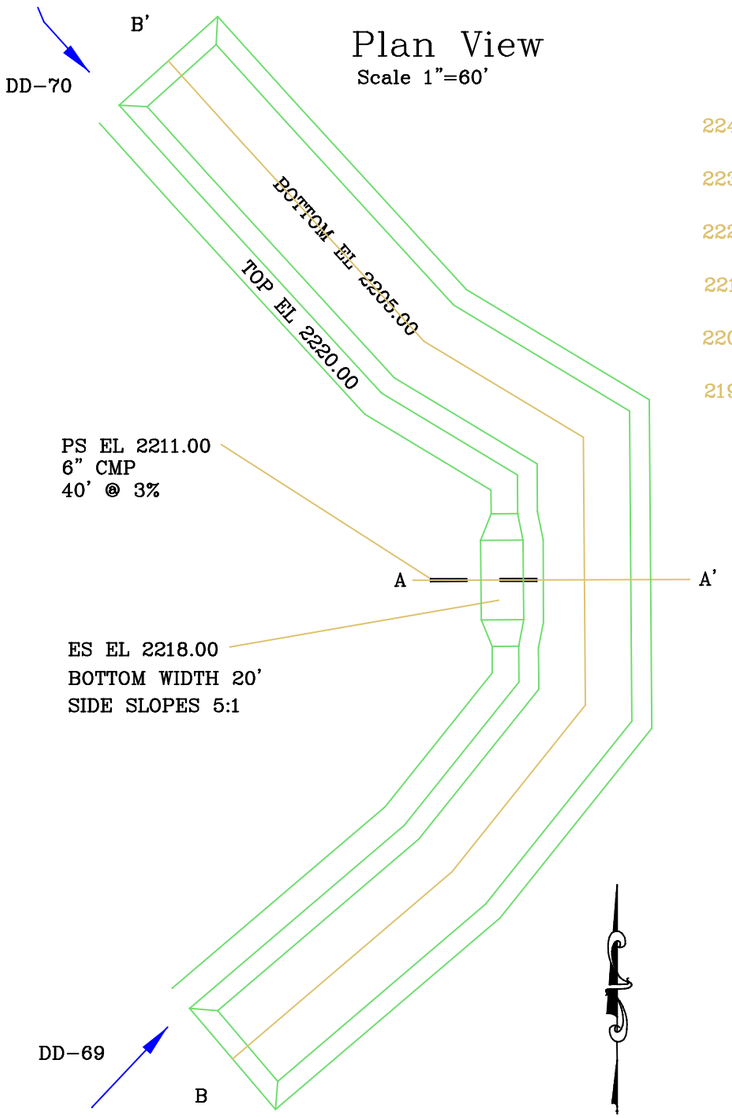
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **3** | **Time of Concentration:** | | | | | **0.080** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 200.00 | 400.00 | 7.070 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.061** |
| #1 | 5 | 2. Minimum tillage cultivation | 48.57 | 170.00 | 350.00 | 3.480 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.045** |
| #1 | 6 | 3. Short grass pasture | 50.00 | 150.00 | 300.00 | 5.650 | 0.014 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.051** |
| #1 | 7 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 175.00 | 350.00 | 7.070 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| **#1** | **7** | **Time of Concentration:** | | | | | **0.036** |

## *Subwatershed Muskingum Routing Details:*

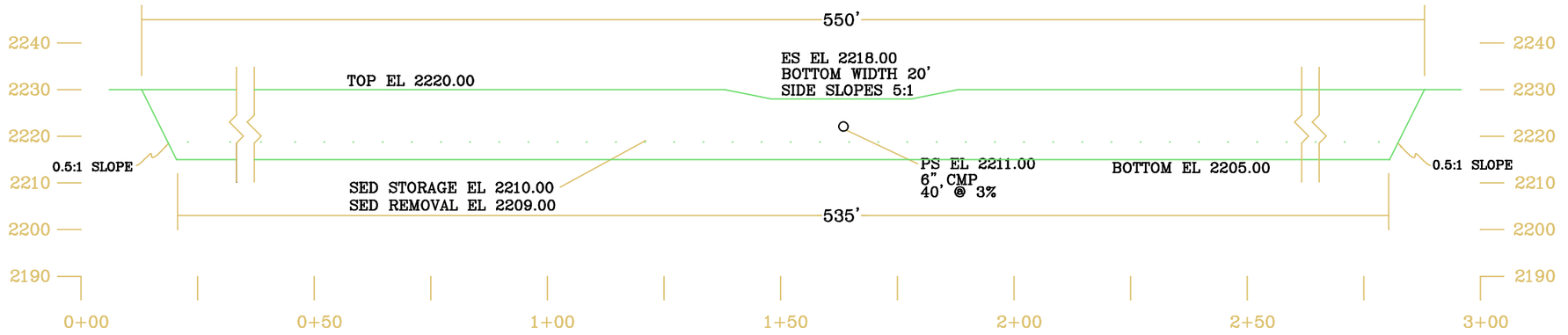
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 52.94 | 180.00 | 340.00 | 21.820 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 7.00 | 700.00 | 3.000 | 0.064 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.108** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 48.57 | 170.00 | 350.00 | 20.900 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.022** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.040** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 175.00 | 350.00 | 21.210 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Muskingum K:** | | | | | **0.064** |
| #1 | 7 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **7** | **Muskingum K:** | | | | | **0.037** |

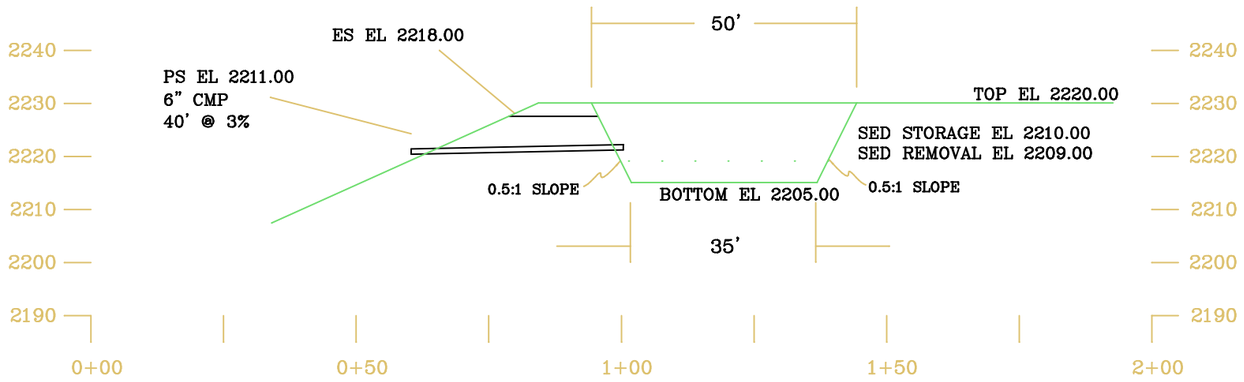
# Plan View
Scale 1"=60'




# Section B-B'
Scale 1"=30'




# Section A-A'
Scale 1"=30'



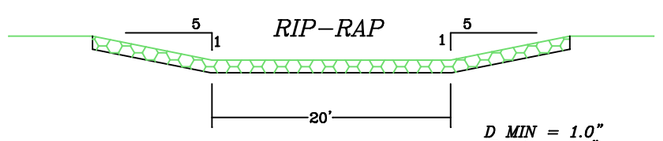

| | |
|---|---|
| *Top of Pond* | *2220.00* |
| *E.S.* | *2218.00* |
| *P.S.* | *2211.00* |
| *Sed. Storage* | *2210.00* |
| *Sed. Removal* | *2209.00* |
| *Bottom* | *2205.00* |

*LEGEND*

*Ground Line*

*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 17

DATE: 02/17/2023 | FILENAME: POND 17.dwg

SCALE: AS SHOWN | DRAWN BY:

Prepared By:


HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543


HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC
# OSMRE #3341
# Proposed Pond #18
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

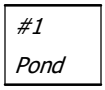
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #18 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 47.000 | 47.000 | 98.91 | 8.36 | 393.9 | 105,086 | 56.86 | 18.30 |
| | Out | | | 29.01 | 6.99 | 99.0 | 26,097 | 0.33 | 0.15 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 6.25 |
| | Out | 0.09 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.864% | 100.000% |
| 1.0000 | 97.726% | 100.000% |
| 0.5000 | 91.680% | 100.000% |
| 0.3000 | 86.680% | 100.000% |
| 0.2000 | 79.703% | 100.000% |
| 0.1000 | 69.656% | 100.000% |
| 0.0500 | 59.633% | 100.000% |
| 0.0300 | 49.656% | 100.000% |
| 0.0200 | 41.656% | 100.000% |
| 0.0100 | 31.678% | 100.000% |
| 0.0050 | 20.839% | 82.917% |
| 0.0030 | 14.862% | 59.134% |
| 0.0010 | 3.977% | 15.824% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #1 (Pond)*

*Proposed Pond #18*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,211.00 ft |
| Initial Pool: | 0.45 ac-ft |
| *Sediment Storage: | 2.09 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,211.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,218.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,218.73 ft |
| H'graph Detention Time: | 8.29 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.84 days |
| Trap Efficiency: | 74.87 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,210.00 | 0.447 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,210.50 | 0.453 | 0.225 | 0.000 | | |
| 2,211.00 | 0.459 | 0.453 | 0.000 | | Spillway #1 |
| 2,211.50 | 0.465 | 0.684 | 0.271 | 10.32* | |
| 2,212.00 | 0.471 | 0.919 | 0.565 | 5.02* | |
| 2,212.50 | 0.478 | 1.156 | 0.651 | 4.41* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,213.00 | 0.484 | 1.396 | 0.709 | 4.10* | |
| 2,213.50 | 0.490 | 1.640 | 0.766 | 3.84* | |
| 2,214.00 | 0.496 | 1.886 | 0.824 | 3.62* | |
| 2,214.50 | 0.502 | 2.136 | 0.882 | 3.55 | |
| 2,215.00 | 0.509 | 2.389 | 0.939 | 3.35 | |
| 2,215.50 | 0.515 | 2.645 | 0.997 | 3.20 | |
| 2,216.00 | 0.521 | 2.904 | 1.055 | 3.05 | |
| 2,216.50 | 0.528 | 3.166 | 1.108 | 2.95 | |
| 2,217.00 | 0.534 | 3.432 | 1.144 | 2.85 | |
| 2,217.50 | 0.541 | 3.700 | 1.181 | 2.80 | |
| 2,218.00 | 0.547 | 3.972 | 1.217 | 2.75 | Spillway #2 |
| 2,218.50 | 0.554 | 4.248 | 5.133 | 9.65 | |
| 2,218.73 | 0.557 | 4.378 | 29.013 | 2.60 | Peak Stage |
| 2,219.00 | 0.561 | 4.526 | 56.060 | | |
| 2,219.50 | 0.567 | 4.808 | 119.163 | | |
| 2,220.00 | 0.574 | 5.094 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,210.00 | 0.000 | 0.000 | 0.000 |
| 2,210.50 | 0.000 | 0.000 | 0.000 |
| 2,211.00 | 0.000 | 0.000 | 0.000 |
| 2,211.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,212.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,212.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,213.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,213.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,214.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,214.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,215.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,215.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,216.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,216.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,217.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,217.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,218.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,218.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,219.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,219.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,220.00 | (6)>1.362 | 203.173 | 204.536 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 27.200 | 0.078 | 0.151 | 0.406 | 73.000 | S | 56.36 | 4.292 |
| | 2 | 4.800 | 0.059 | 0.003 | 0.459 | 74.000 | M | 10.28 | 0.788 |
| | 3 | 5.900 | 0.069 | 0.003 | 0.459 | 79.000 | M | 14.64 | 1.167 |
| | 4 | 3.100 | 0.042 | 0.022 | 0.437 | 86.000 | F | 9.08 | 0.775 |
| | 5 | 3.100 | 0.013 | 0.000 | 0.000 | 79.000 | M | 7.69 | 0.613 |
| | 6 | 2.900 | 0.031 | 0.000 | 0.000 | 86.000 | F | 8.49 | 0.725 |
| | Σ | **47.000** | | | | | | **98.91** | **8.361** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 9.1 | 2,982 | 1.91 | 0.99 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 9.8 | 17,444 | 9.40 | 4.88 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 41.6 | 48,088 | 25.91 | 13.90 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 162.5 | 252,448 | 136.00 | 76.40 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 20.2 | 44,578 | 24.02 | 12.88 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 150.8 | 250,637 | 135.03 | 75.84 |
| | Σ | | | | | | | **393.9** | **105,086** | **56.86** | **18.30** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 50.00 | 250.00 | 500.00 | 1.780 | 0.078 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.078** |
| #1 | 2 | 2. Minimum tillage cultivation | 48.57 | 170.00 | 350.00 | 3.480 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.059** |
| #1 | 3 | 3. Short grass pasture | 46.81 | 220.00 | 470.00 | 5.470 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.069** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 200.00 | 400.00 | 7.070 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.042** |
| #1 | 5 | 3. Short grass pasture | 40.00 | 100.00 | 250.00 | 5.050 | 0.013 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.013** |
| #1 | 6 | 5. Nearly bare and untilled, and alluvial valley fans | 35.71 | 100.00 | 280.00 | 5.970 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.031** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 48.57 | 170.00 | 350.00 | 20.900 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| | | 8. Large gullies, diversions, and low flowing streams | 4.00 | 100.00 | 2,500.00 | 6.000 | 0.115 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.151** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 100.00 | 250.00 | 18.970 | 0.003 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.003** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 100.00 | 250.00 | 18.970 | 0.003 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.003** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 35.71 | 100.00 | 280.00 | 17.920 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.022** |

# Hurricane Creek Mining, LLC
# OSMRE #3341
# Proposed Pond #18
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

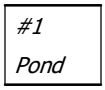
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #18 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 47.000 | 47.000 | 124.08 | 10.58 | 489.2 | 103,652 | 56.10 | 17.96 |
| | Out | | | 76.77 | 9.20 | 148.9 | 25,790 | 0.69 | 0.37 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 6.24 |
| | Out | 0.17 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.857% | 100.000% |
| 1.0000 | 97.711% | 100.000% |
| 0.5000 | 91.662% | 100.000% |
| 0.3000 | 86.662% | 100.000% |
| 0.2000 | 79.686% | 100.000% |
| 0.1000 | 69.637% | 100.000% |
| 0.0500 | 59.613% | 100.000% |
| 0.0300 | 49.637% | 100.000% |
| 0.0200 | 41.636% | 100.000% |
| 0.0100 | 31.660% | 100.000% |
| 0.0050 | 20.830% | 68.441% |
| 0.0030 | 14.855% | 48.807% |
| 0.0010 | 3.976% | 13.063% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #1 (Pond)*

*Proposed Pond #18*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,211.00 ft |
| Initial Pool: | 0.45 ac-ft |
| *Sediment Storage: | 2.09 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,211.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,218.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,219.16 ft |
| H'graph Detention Time: | 6.39 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 2.85 days |
| Trap Efficiency: | 69.56 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,210.00 | 0.447 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,210.50 | 0.453 | 0.225 | 0.000 | | |
| 2,211.00 | 0.459 | 0.453 | 0.000 | | Spillway #1 |
| 2,211.50 | 0.465 | 0.684 | 0.271 | 10.32* | |
| 2,212.00 | 0.471 | 0.919 | 0.565 | 5.02* | |
| 2,212.50 | 0.478 | 1.156 | 0.651 | 4.41* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,213.00 | 0.484 | 1.396 | 0.709 | 4.10* | |
| 2,213.50 | 0.490 | 1.640 | 0.766 | 3.84* | |
| 2,214.00 | 0.496 | 1.886 | 0.824 | 3.62* | |
| 2,214.50 | 0.502 | 2.136 | 0.882 | 3.55 | |
| 2,215.00 | 0.509 | 2.389 | 0.939 | 3.40 | |
| 2,215.50 | 0.515 | 2.645 | 0.997 | 3.20 | |
| 2,216.00 | 0.521 | 2.904 | 1.055 | 3.05 | |
| 2,216.50 | 0.528 | 3.166 | 1.108 | 2.90 | |
| 2,217.00 | 0.534 | 3.432 | 1.144 | 2.85 | |
| 2,217.50 | 0.541 | 3.700 | 1.181 | 2.80 | |
| 2,218.00 | 0.547 | 3.972 | 1.217 | 2.75 | Spillway #2 |
| 2,218.50 | 0.554 | 4.248 | 5.133 | 9.00 | |
| 2,219.00 | 0.561 | 4.526 | 56.060 | 3.45 | |
| 2,219.16 | 0.563 | 4.619 | 76.772 | 0.10 | Peak Stage |
| 2,219.50 | 0.567 | 4.808 | 119.163 | | |
| 2,220.00 | 0.574 | 5.094 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,210.00 | 0.000 | 0.000 | 0.000 |
| 2,210.50 | 0.000 | 0.000 | 0.000 |
| 2,211.00 | 0.000 | 0.000 | 0.000 |
| 2,211.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,212.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,212.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,213.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,213.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,214.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,214.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,215.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,215.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,216.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,216.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,217.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,217.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,218.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,218.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,219.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,219.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,220.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 27.200 | 0.078 | 0.151 | 0.406 | 73.000 | S | 71.08 | 5.521 |
| | 2 | 4.800 | 0.059 | 0.003 | 0.459 | 74.000 | M | 12.90 | 1.009 |
| | 3 | 5.900 | 0.069 | 0.003 | 0.459 | 79.000 | M | 17.96 | 1.461 |
| | 4 | 3.100 | 0.042 | 0.022 | 0.437 | 86.000 | F | 10.83 | 0.943 |
| | 5 | 3.100 | 0.013 | 0.000 | 0.000 | 79.000 | M | 9.44 | 0.768 |
| | 6 | 2.900 | 0.031 | 0.000 | 0.000 | 86.000 | F | 10.14 | 0.882 |
| | Σ | **47.000** | | | | | | **124.08** | **10.584** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 11.9 | 2,997 | 1.92 | 1.01 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 12.7 | 17,482 | 9.42 | 4.98 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 52.8 | 48,314 | 26.03 | 14.11 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 200.3 | 254,349 | 137.03 | 77.26 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 25.7 | 44,788 | 24.13 | 13.08 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 185.8 | 252,527 | 136.04 | 76.70 |
| | Σ | | | | | | | **489.2** | **103,652** | **56.10** | **17.96** |

# Subwatershed Time of Concentration Details:

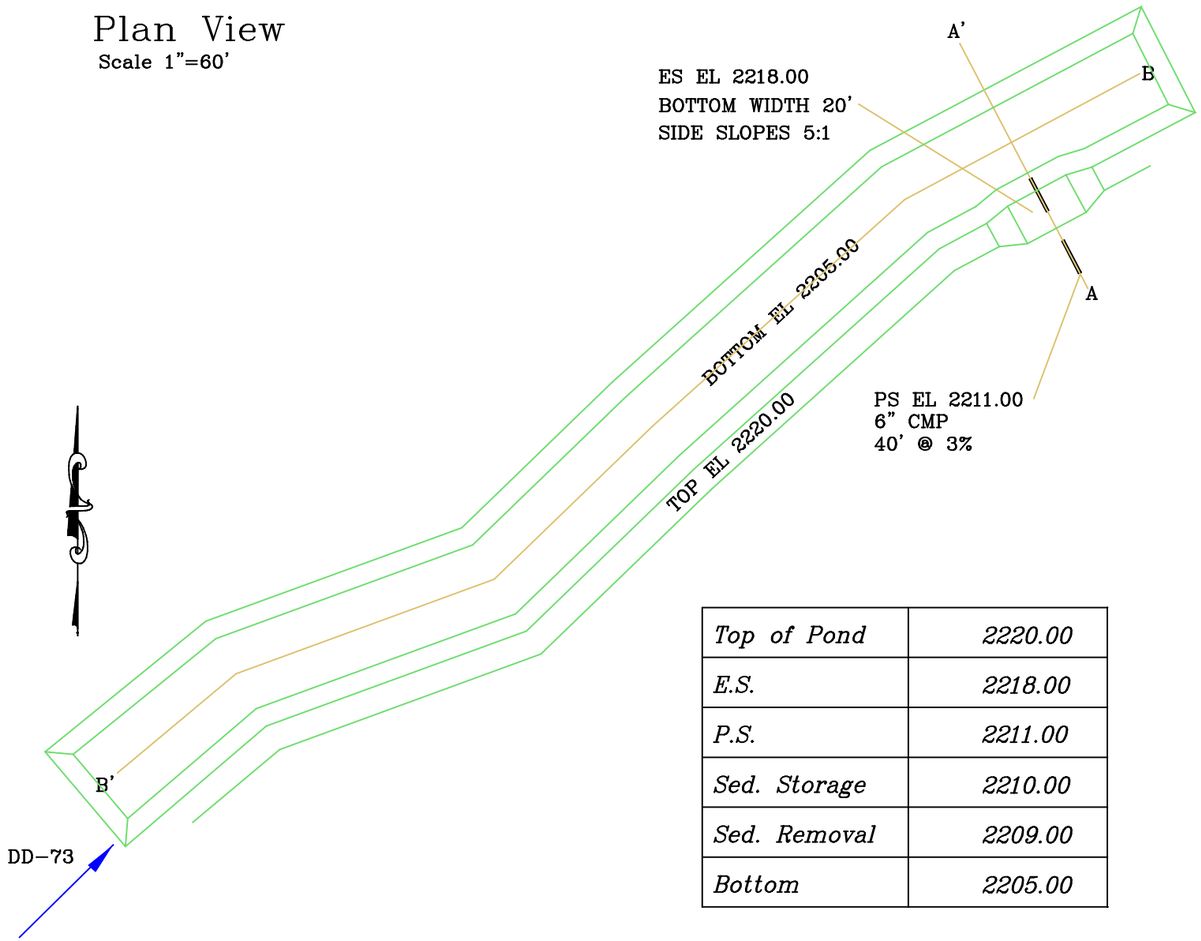
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 50.00 | 250.00 | 500.00 | 1.780 | 0.078 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.078** |
| #1 | 2 | 2. Minimum tillage cultivation | 48.57 | 170.00 | 350.00 | 3.480 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.059** |
| #1 | 3 | 3. Short grass pasture | 46.81 | 220.00 | 470.00 | 5.470 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.069** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 200.00 | 400.00 | 7.070 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.042** |
| #1 | 5 | 3. Short grass pasture | 40.00 | 100.00 | 250.00 | 5.050 | 0.013 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.013** |
| #1 | 6 | 5. Nearly bare and untilled, and alluvial valley fans | 35.71 | 100.00 | 280.00 | 5.970 | 0.013 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.031** |

## *Subwatershed Muskingum Routing Details:*

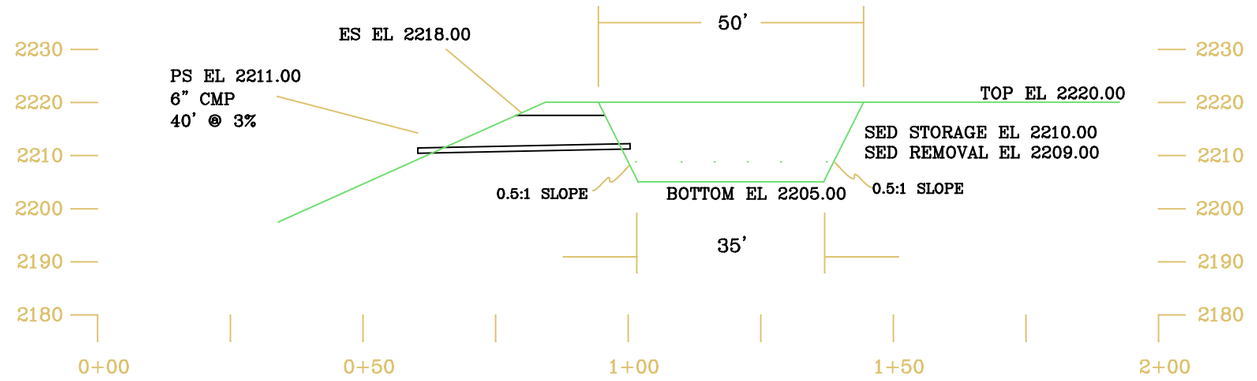
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 48.57 | 170.00 | 350.00 | 20.900 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| | | 8. Large gullies, diversions, and low flowing streams | 4.00 | 100.00 | 2,500.00 | 6.000 | 0.115 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.151** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 100.00 | 250.00 | 18.970 | 0.003 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.003** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 100.00 | 250.00 | 18.970 | 0.003 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.003** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 35.71 | 100.00 | 280.00 | 17.920 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.022** |

## Plan View
Scale 1"=60'




| | |
|---|---|
| *Top of Pond* | *2220.00* |
| *E.S.* | *2218.00* |
| *P.S.* | *2211.00* |
| *Sed. Storage* | *2210.00* |
| *Sed. Removal* | *2209.00* |
| *Bottom* | *2205.00* |

## Section A–A'
Scale 1"=30'

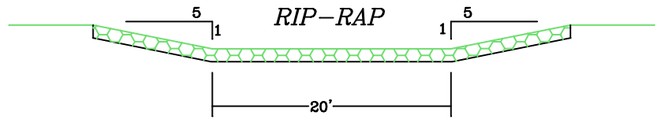



*LEGEND*

*Ground Line*

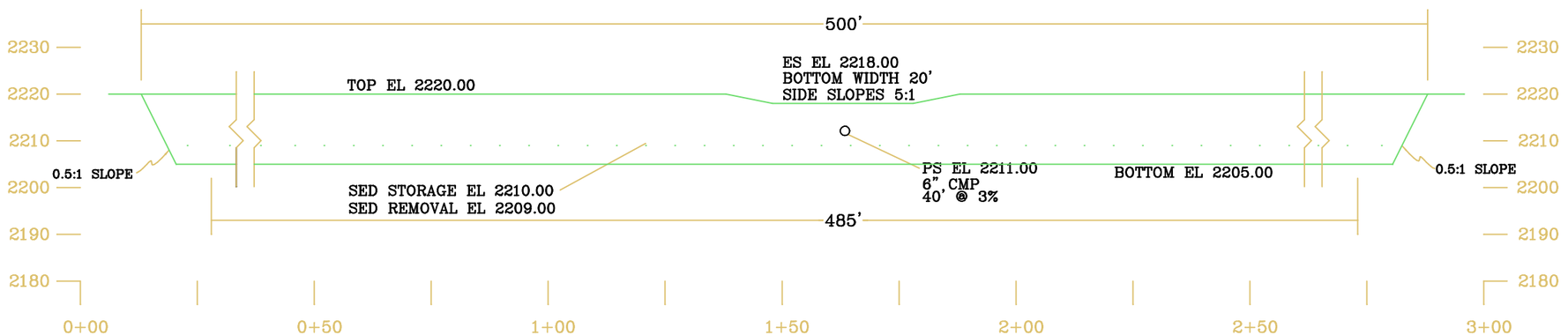
*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

## Section B–B'
Scale 1"=30'




*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

*SIGNATURE* *DATE*

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 18

DATE: 02/17/2023

FILENAME: POND 18.dwg

SCALE: AS SHOWN

DRAWN BY:

Prepared By:


HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543


HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC.

# OSMRE #3341

# Proposed Pond #19

# 10yr. - 24hr.

# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

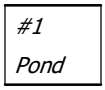
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #19 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 41.500 | 41.500 | 95.24 | 7.77 | 486.1 | 102,330 | 55.17 | 24.13 |
| | Out | | | 16.33 | 6.09 | 101.1 | 28,148 | 0.01 | 0.01 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 7.54 |
| | Out | 0.01 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.982% | 100.000% |
| 1.0000 | 97.959% | 100.000% |
| 0.5000 | 91.951% | 100.000% |
| 0.3000 | 86.951% | 100.000% |
| 0.2000 | 79.954% | 100.000% |
| 0.1000 | 69.946% | 100.000% |
| 0.0500 | 59.941% | 100.000% |
| 0.0300 | 49.945% | 100.000% |
| 0.0200 | 41.944% | 100.000% |
| 0.0100 | 31.947% | 100.000% |
| 0.0050 | 20.974% | 100.000% |
| 0.0030 | 14.978% | 72.011% |
| 0.0010 | 3.996% | 19.214% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #19*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,211.00 ft |
| Initial Pool: | 0.50 ac-ft |
| *Sediment Storage: | 2.31 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,211.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,218.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,218.61 ft |
| H'graph Detention Time: | 9.79 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 3.05 days |
| Trap Efficiency: | 79.20 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,210.00 | 0.493 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,210.00 | 0.493 | 0.000 | 0.000 | | |
| 2,210.50 | 0.499 | 0.248 | 0.000 | | |
| 2,211.00 | 0.506 | 0.499 | 0.000 | | Spillway #1 |
| 2,211.50 | 0.512 | 0.754 | 0.271 | 11.36* | |
| 2,212.00 | 0.519 | 1.012 | 0.565 | 5.52* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,212.50 | 0.526 | 1.273 | 0.651 | 4.86* | |
| 2,213.00 | 0.532 | 1.537 | 0.709 | 4.52* | |
| 2,213.50 | 0.539 | 1.805 | 0.766 | 4.23* | |
| 2,214.00 | 0.546 | 2.077 | 0.824 | 3.98* | |
| 2,214.50 | 0.553 | 2.351 | 0.882 | 3.77* | |
| 2,215.00 | 0.560 | 2.630 | 0.939 | 3.70 | |
| 2,215.50 | 0.567 | 2.911 | 0.997 | 3.50 | |
| 2,216.00 | 0.574 | 3.196 | 1.055 | 3.35 | |
| 2,216.50 | 0.581 | 3.485 | 1.108 | 3.25 | |
| 2,217.00 | 0.588 | 3.777 | 1.144 | 3.15 | |
| 2,217.50 | 0.595 | 4.072 | 1.181 | 3.05 | |
| 2,218.00 | 0.602 | 4.372 | 1.217 | 3.05 | Spillway #2 |
| 2,218.50 | 0.609 | 4.674 | 5.133 | 9.85 | |
| 2,218.61 | 0.611 | 4.742 | 16.335 | 1.95 | Peak Stage |
| 2,219.00 | 0.616 | 4.981 | 56.060 | | |
| 2,219.50 | 0.624 | 5.291 | 119.163 | | |
| 2,220.00 | 0.631 | 5.605 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,210.00 | 0.000 | 0.000 | 0.000 |
| 2,210.00 | 0.000 | 0.000 | 0.000 |
| 2,210.50 | 0.000 | 0.000 | 0.000 |
| 2,211.00 | 0.000 | 0.000 | 0.000 |
| 2,211.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,212.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,212.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,213.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,213.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,214.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,214.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,215.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,215.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,216.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,216.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,217.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,217.50 | (6)>1.181 | 0.000 | 1.181 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,218.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,218.50 | (6)>1.253 | 3.880 | 5.133 |
| 2,219.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,219.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,220.00 | (6)>1.362 | 203.173 | 204.536 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 6.700 | 0.055 | 0.148 | 0.422 | 73.000 | S | 13.88 | 1.057 |
| | 2 | 9.000 | 0.113 | 0.060 | 0.429 | 74.000 | M | 19.27 | 1.478 |
| | 3 | 5.800 | 0.061 | 0.037 | 0.441 | 79.000 | M | 14.40 | 1.147 |
| | 4 | 6.200 | 0.066 | 0.037 | 0.441 | 86.000 | F | 18.16 | 1.550 |
| | 5 | 5.800 | 0.086 | 0.000 | 0.000 | 74.000 | M | 12.42 | 0.952 |
| | 6 | 8.000 | 0.051 | 0.000 | 0.000 | 79.000 | M | 19.86 | 1.583 |
| | Σ | **41.500** | | | | | | **95.24** | **7.768** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 1.9 | 2,692 | 1.72 | 0.27 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 19.8 | 18,979 | 10.22 | 5.27 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 40.8 | 47,991 | 25.85 | 13.87 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 353.2 | 271,958 | 146.51 | 82.44 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 12.1 | 17,842 | 9.61 | 5.00 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 58.4 | 49,842 | 26.85 | 14.40 |
| | Σ | | | | | | | **486.1** | **102,330** | **55.17** | **24.13** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 48.57 | 170.00 | 350.00 | 1.760 | 0.055 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.055** |
| #1 | 2 | 2. Minimum tillage cultivation | 47.37 | 180.00 | 380.00 | 3.440 | 0.030 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 9.00 | 900.00 | 3.000 | 0.083 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.113** |
| #1 | 3 | 3. Short grass pasture | 45.83 | 220.00 | 480.00 | 5.410 | 0.024 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.061** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 41.67 | 200.00 | 480.00 | 6.450 | 0.020 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.066** |
| #1 | 5 | 2. Minimum tillage cultivation | 50.00 | 200.00 | 400.00 | 3.530 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.086** |
| #1 | 6 | 3. Short grass pasture | 50.00 | 200.00 | 400.00 | 5.650 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.051** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 47.37 | 180.00 | 380.00 | 20.640 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 9.00 | 900.00 | 3.000 | 0.083 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.148** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.060** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.037** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.037** |

# Hurricane Creek Mining, LLC

# OSMRE #3341

# Proposed Pond #19

# 25yr. - 24hr.

# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

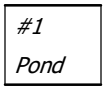
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #19 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 41.500 | 41.500 | 118.00 | 9.77 | 605.3 | 101,712 | 54.84 | 23.89 |
| | Out | | | 52.11 | 8.09 | 159.3 | 28,322 | 0.45 | 0.27 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 7.56 |
| | Out | 0.15 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.981% | 100.000% |
| 1.0000 | 97.957% | 100.000% |
| 0.5000 | 91.948% | 100.000% |
| 0.3000 | 86.948% | 100.000% |
| 0.2000 | 79.951% | 100.000% |
| 0.1000 | 69.943% | 100.000% |
| 0.0500 | 59.938% | 100.000% |
| 0.0300 | 49.942% | 100.000% |
| 0.0200 | 41.941% | 100.000% |
| 0.0100 | 31.945% | 100.000% |
| 0.0050 | 20.973% | 79.711% |
| 0.0030 | 14.976% | 56.921% |
| 0.0010 | 3.996% | 15.188% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #19*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,211.00 ft |
| Initial Pool: | 0.50 ac-ft |
| *Sediment Storage: | 2.31 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,211.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,218.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,218.96 ft |
| H'graph Detention Time: | 7.49 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 3.07 days |
| Trap Efficiency: | 73.69 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,210.00 | 0.493 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,210.00 | 0.493 | 0.000 | 0.000 | | |
| 2,210.50 | 0.499 | 0.248 | 0.000 | | |
| 2,211.00 | 0.506 | 0.499 | 0.000 | | Spillway #1 |
| 2,211.50 | 0.512 | 0.754 | 0.271 | 11.36* | |
| 2,212.00 | 0.519 | 1.012 | 0.565 | 5.52* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,212.50 | 0.526 | 1.273 | 0.651 | 4.86* | |
| 2,213.00 | 0.532 | 1.537 | 0.709 | 4.52* | |
| 2,213.50 | 0.539 | 1.805 | 0.766 | 4.23* | |
| 2,214.00 | 0.546 | 2.077 | 0.824 | 3.98* | |
| 2,214.50 | 0.553 | 2.351 | 0.882 | 3.77* | |
| 2,215.00 | 0.560 | 2.630 | 0.939 | 3.70 | |
| 2,215.50 | 0.567 | 2.911 | 0.997 | 3.50 | |
| 2,216.00 | 0.574 | 3.196 | 1.055 | 3.40 | |
| 2,216.50 | 0.581 | 3.485 | 1.108 | 3.20 | |
| 2,217.00 | 0.588 | 3.777 | 1.144 | 3.15 | |
| 2,217.50 | 0.595 | 4.072 | 1.181 | 3.10 | |
| 2,218.00 | 0.602 | 4.372 | 1.217 | 3.00 | Spillway #2 |
| 2,218.50 | 0.609 | 4.674 | 5.133 | 9.40 | |
| 2,218.96 | 0.616 | 4.957 | 52.111 | 3.10 | Peak Stage |
| 2,219.00 | 0.616 | 4.981 | 56.060 | | |
| 2,219.50 | 0.624 | 5.291 | 119.163 | | |
| 2,220.00 | 0.631 | 5.605 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,210.00 | 0.000 | 0.000 | 0.000 |
| 2,210.00 | 0.000 | 0.000 | 0.000 |
| 2,210.50 | 0.000 | 0.000 | 0.000 |
| 2,211.00 | 0.000 | 0.000 | 0.000 |
| 2,211.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,212.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,212.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,213.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,213.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,214.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,214.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,215.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,215.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,216.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,216.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,217.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,217.50 | (6)>1.181 | 0.000 | 1.181 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,218.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,218.50 | (6)>1.253 | 3.880 | 5.133 |
| 2,219.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,219.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,220.00 | (6)>1.362 | 203.173 | 204.536 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 6.700 | 0.055 | 0.148 | 0.422 | 73.000 | S | 17.51 | 1.360 |
| | 2 | 9.000 | 0.113 | 0.060 | 0.429 | 74.000 | M | 24.18 | 1.892 |
| | 3 | 5.800 | 0.061 | 0.037 | 0.441 | 79.000 | M | 17.66 | 1.436 |
| | 4 | 6.200 | 0.066 | 0.037 | 0.441 | 86.000 | F | 21.67 | 1.886 |
| | 5 | 5.800 | 0.086 | 0.000 | 0.000 | 74.000 | M | 15.58 | 1.219 |
| | 6 | 8.000 | 0.051 | 0.000 | 0.000 | 79.000 | M | 24.35 | 1.981 |
| | Σ | **41.500** | | | | | | **118.00** | **9.775** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 2.5 | 2,703 | 1.73 | 0.29 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 25.8 | 19,031 | 10.25 | 5.36 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 51.8 | 48,217 | 25.98 | 14.08 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 435.2 | 273,988 | 147.61 | 83.37 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 15.7 | 17,881 | 9.63 | 5.09 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 74.3 | 50,076 | 26.98 | 14.62 |
| | Σ | | | | | | | **605.3** | **101,712** | **54.84** | **23.89** |

# *Subwatershed Time of Concentration Details:*

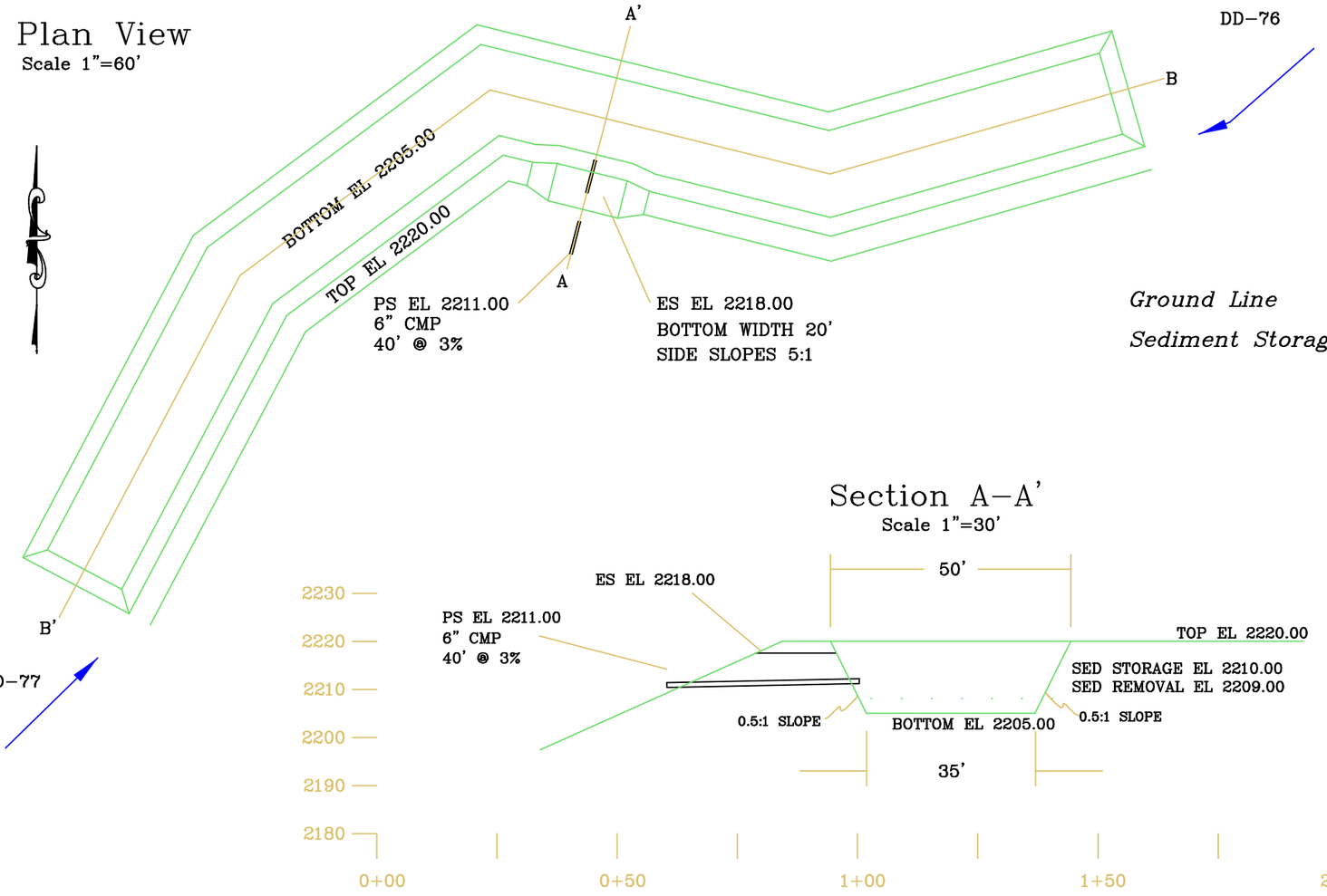
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 48.57 | 170.00 | 350.00 | 1.760 | 0.055 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.055** |
| #1 | 2 | 2. Minimum tillage cultivation | 47.37 | 180.00 | 380.00 | 3.440 | 0.030 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 9.00 | 900.00 | 3.000 | 0.083 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.113** |
| #1 | 3 | 3. Short grass pasture | 45.83 | 220.00 | 480.00 | 5.410 | 0.024 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.061** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 41.67 | 200.00 | 480.00 | 6.450 | 0.020 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.066** |
| #1 | 5 | 2. Minimum tillage cultivation | 50.00 | 200.00 | 400.00 | 3.530 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.086** |
| #1 | 6 | 3. Short grass pasture | 50.00 | 200.00 | 400.00 | 5.650 | 0.019 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.051** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 47.37 | 180.00 | 380.00 | 20.640 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 9.00 | 900.00 | 3.000 | 0.083 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.148** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 6.00 | 600.00 | 3.000 | 0.055 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.060** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.037** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 200.00 | 400.00 | 21.210 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.037** |

## Plan View
Scale 1"=60'

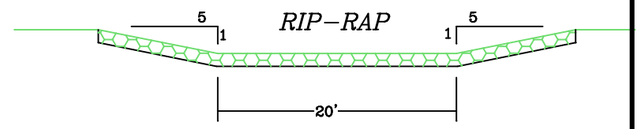



*LEGEND*

*Ground Line*

*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*



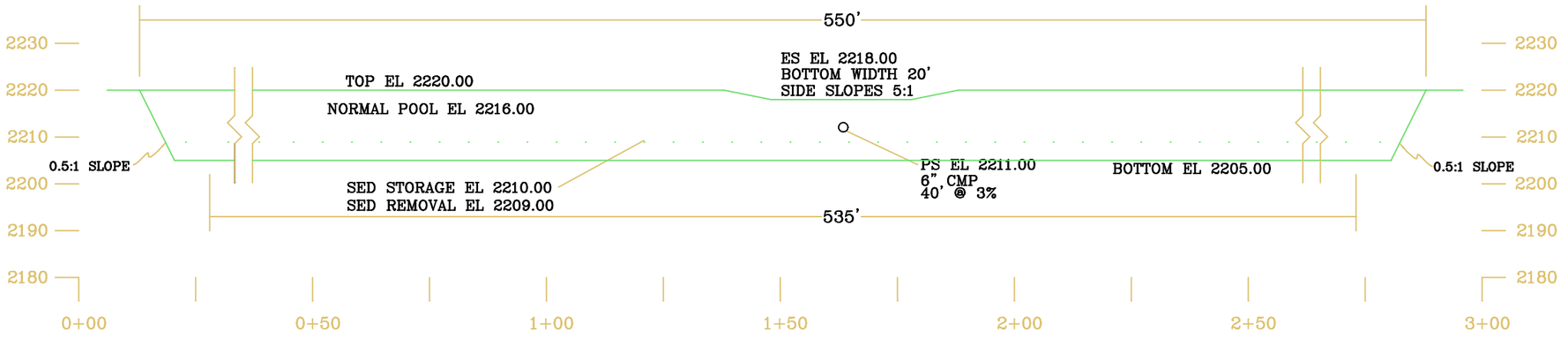

*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

## Section A-A'
Scale 1"=30'




| | |
|---|---|
| *Top of Pond* | *2220.00* |
| *E.S.* | *2218.00* |
| *P.S.* | *2216.00* |
| *Sed. Storage* | *2215.00* |
| *Sed. Removal* | *2213.45* |
| *Bottom* | *2205.00* |

## Section B-B'
Scale 1"=30'




*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

*SIGNATURE* *DATE*

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 19

| | |
|---|---|
| DATE: 02/17/2023 | FILENAME: POND 19.dwg |
| SCALE: AS SHOWN | DRAWN BY: |

Prepared By:


HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543


HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #28
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

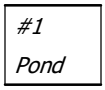
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #28 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 13.500 | 13.500 | 31.69 | 2.54 | 148.5 | 87,025 | 46.91 | 22.55 |
| | Out | | | 1.19 | 2.52 | 27.8 | 22,781 | 0.01 | 0.00 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 6.77 |
| | Out | 0.00 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.984% | 100.000% |
| 1.0000 | 97.965% | 100.000% |
| 0.5000 | 91.958% | 100.000% |
| 0.3000 | 86.958% | 100.000% |
| 0.2000 | 79.961% | 100.000% |
| 0.1000 | 69.954% | 100.000% |
| 0.0500 | 59.950% | 100.000% |
| 0.0300 | 49.953% | 100.000% |
| 0.0200 | 41.953% | 100.000% |
| 0.0100 | 31.956% | 100.000% |
| 0.0050 | 20.978% | 100.000% |
| 0.0030 | 14.981% | 80.105% |
| 0.0010 | 3.997% | 21.372% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #1 (Pond)*

*Proposed Pond #28*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,306.00 ft |
| Initial Pool: | 0.21 ac-ft |
| *Sediment Storage: | 0.98 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,306.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,313.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,312.69 ft |
| H'graph Detention Time: | 11.90 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.37 days |
| Trap Efficiency: | 81.30 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,305.00 | 0.211 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,305.50 | 0.215 | 0.106 | 0.000 | | |
| 2,306.00 | 0.218 | 0.214 | 0.000 | | Spillway #1 |
| 2,306.50 | 0.222 | 0.324 | 0.271 | 4.91* | |
| 2,307.00 | 0.225 | 0.436 | 0.565 | 3.40 | |
| 2,307.50 | 0.228 | 0.549 | 0.651 | 2.25 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,308.00 | 0.232 | 0.664 | 0.709 | 2.05 | |
| 2,308.50 | 0.236 | 0.781 | 0.766 | 1.95 | |
| 2,309.00 | 0.239 | 0.900 | 0.824 | 1.80 | |
| 2,309.50 | 0.243 | 1.020 | 0.882 | 1.70 | |
| 2,310.00 | 0.246 | 1.143 | 0.939 | 1.60 | |
| 2,310.50 | 0.250 | 1.267 | 0.997 | 1.55 | |
| 2,311.00 | 0.254 | 1.393 | 1.055 | 1.50 | |
| 2,311.50 | 0.257 | 1.520 | 1.108 | 1.45 | |
| 2,312.00 | 0.261 | 1.650 | 1.144 | 2.60 | |
| 2,312.50 | 0.265 | 1.781 | 1.181 | 3.10 | |
| 2,312.69 | 0.266 | 1.831 | 1.194 | 3.00 | Peak Stage |
| 2,313.00 | 0.269 | 1.915 | 1.217 | | Spillway #2 |
| 2,313.50 | 0.272 | 2.050 | 5.133 | | |
| 2,314.00 | 0.276 | 2.187 | 56.060 | | |
| 2,314.50 | 0.280 | 2.326 | 119.163 | | |
| 2,315.00 | 0.284 | 2.467 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,305.00 | 0.000 | 0.000 | 0.000 |
| 2,305.50 | 0.000 | 0.000 | 0.000 |
| 2,306.00 | 0.000 | 0.000 | 0.000 |
| 2,306.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,307.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,307.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,308.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,308.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,309.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,309.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,310.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,310.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,311.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,311.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,312.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,312.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,313.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,313.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,314.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,314.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,315.00 | (6)>1.362 | 203.173 | 204.536 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 2.800 | 0.057 | 0.063 | 0.437 | 73.000 | S | 5.80 | 0.442 |
| | 2 | 2.900 | 0.055 | 0.022 | 0.443 | 79.000 | M | 7.20 | 0.574 |
| | 3 | 2.900 | 0.046 | 0.022 | 0.443 | 86.000 | F | 8.49 | 0.725 |
| | 4 | 4.900 | 0.046 | 0.000 | 0.000 | 74.000 | M | 10.49 | 0.804 |
| | Σ | **13.500** | | | | | | **31.69** | **2.545** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 33.00 | 0.0030 | 1.0000 | 1 | 0.5 | 1,586 | 1.01 | 0.51 |
| | 2 | 0.220 | 50.00 | 21.00 | 0.1400 | 1.0000 | 2 | 15.5 | 36,567 | 19.70 | 10.56 |
| | 3 | 0.220 | 50.00 | 21.00 | 0.9000 | 1.0000 | 2 | 124.3 | 210,282 | 113.29 | 63.38 |
| | 4 | 0.220 | 50.00 | 21.00 | 0.0500 | 1.0000 | 2 | 8.2 | 14,430 | 7.77 | 4.04 |
| | Σ | | | | | | | **148.5** | **87,025** | **46.91** | **22.55** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 33.33 | 100.00 | 300.00 | 1.460 | 0.057 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.057** |
| #1 | 2 | 3. Short grass pasture | 42.86 | 150.00 | 350.00 | 5.230 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.055** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 42.86 | 150.00 | 350.00 | 6.540 | 0.014 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.046** |
| #1 | 4 | 2. Minimum tillage cultivation | 42.42 | 140.00 | 330.00 | 3.250 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.046** |

# *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 42.42 | 140.00 | 330.00 | 19.540 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.063** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 42.42 | 140.00 | 330.00 | 19.540 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.022** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 42.42 | 140.00 | 330.00 | 19.540 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.022** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #28
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

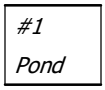
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #28 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 13.500 | 13.500 | 39.12 | 3.20 | 184.2 | 85,789 | 46.25 | 22.27 |
| | Out | | | 3.96 | 3.16 | 39.3 | 23,240 | 0.01 | 0.01 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 6.81 |
| | Out | 0.01 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.983% | 100.000% |
| 1.0000 | 97.962% | 100.000% |
| 0.5000 | 91.955% | 100.000% |
| 0.3000 | 86.955% | 100.000% |
| 0.2000 | 79.958% | 100.000% |
| 0.1000 | 69.951% | 100.000% |
| 0.0500 | 59.947% | 100.000% |
| 0.0300 | 49.950% | 100.000% |
| 0.0200 | 41.950% | 100.000% |
| 0.0100 | 31.953% | 100.000% |
| 0.0050 | 20.977% | 98.245% |
| 0.0030 | 14.980% | 70.159% |
| 0.0010 | 3.997% | 18.719% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #28*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,306.00 ft |
| Initial Pool: | 0.21 ac-ft |
| *Sediment Storage: | 0.98 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,306.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,313.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,313.35 ft |
| H'graph Detention Time: | 10.70 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.54 days |
| Trap Efficiency: | 78.65 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,305.00 | 0.211 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,305.50 | 0.215 | 0.106 | 0.000 | | |
| 2,306.00 | 0.218 | 0.214 | 0.000 | | Spillway #1 |
| 2,306.50 | 0.222 | 0.324 | 0.271 | 4.91* | |
| 2,307.00 | 0.225 | 0.436 | 0.565 | 3.35 | |
| 2,307.50 | 0.228 | 0.549 | 0.651 | 2.25 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,308.00 | 0.232 | 0.664 | 0.709 | 2.05 | |
| 2,308.50 | 0.236 | 0.781 | 0.766 | 1.95 | |
| 2,309.00 | 0.239 | 0.900 | 0.824 | 1.80 | |
| 2,309.50 | 0.243 | 1.020 | 0.882 | 1.70 | |
| 2,310.00 | 0.246 | 1.143 | 0.939 | 1.65 | |
| 2,310.50 | 0.250 | 1.267 | 0.997 | 1.55 | |
| 2,311.00 | 0.254 | 1.393 | 1.055 | 1.45 | |
| 2,311.50 | 0.257 | 1.520 | 1.108 | 1.45 | |
| 2,312.00 | 0.261 | 1.650 | 1.144 | 1.40 | |
| 2,312.50 | 0.265 | 1.781 | 1.181 | 2.65 | |
| 2,313.00 | 0.269 | 1.915 | 1.217 | 4.35 | Spillway #2 |
| 2,313.35 | 0.271 | 2.010 | 3.961 | 4.50 | Peak Stage |
| 2,313.50 | 0.272 | 2.050 | 5.133 | | |
| 2,314.00 | 0.276 | 2.187 | 56.060 | | |
| 2,314.50 | 0.280 | 2.326 | 119.163 | | |
| 2,315.00 | 0.284 | 2.467 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,305.00 | 0.000 | 0.000 | 0.000 |
| 2,305.50 | 0.000 | 0.000 | 0.000 |
| 2,306.00 | 0.000 | 0.000 | 0.000 |
| 2,306.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,307.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,307.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,308.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,308.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,309.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,309.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,310.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,310.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,311.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,311.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,312.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,312.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,313.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,313.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,314.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,314.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,315.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 2.800 | 0.057 | 0.063 | 0.437 | 73.000 | S | 7.32 | 0.568 |
| | 2 | 2.900 | 0.055 | 0.022 | 0.443 | 79.000 | M | 8.83 | 0.718 |
| | 3 | 2.900 | 0.046 | 0.022 | 0.443 | 86.000 | F | 10.14 | 0.882 |
| | 4 | 4.900 | 0.046 | 0.000 | 0.000 | 74.000 | M | 13.17 | 1.030 |
| | Σ | **13.500** | | | | | | **39.12** | **3.198** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 33.00 | 0.0030 | 1.0000 | 1 | 0.6 | 1,589 | 1.02 | 0.52 |
| | 2 | 0.220 | 50.00 | 21.00 | 0.1400 | 1.0000 | 2 | 19.7 | 36,740 | 19.79 | 10.72 |
| | 3 | 0.220 | 50.00 | 21.00 | 0.9000 | 1.0000 | 2 | 153.2 | 211,896 | 114.16 | 64.12 |
| | 4 | 0.220 | 50.00 | 21.00 | 0.0500 | 1.0000 | 2 | 10.7 | 14,462 | 7.79 | 4.11 |
| | Σ | | | | | | | **184.2** | **85,789** | **46.25** | **22.27** |

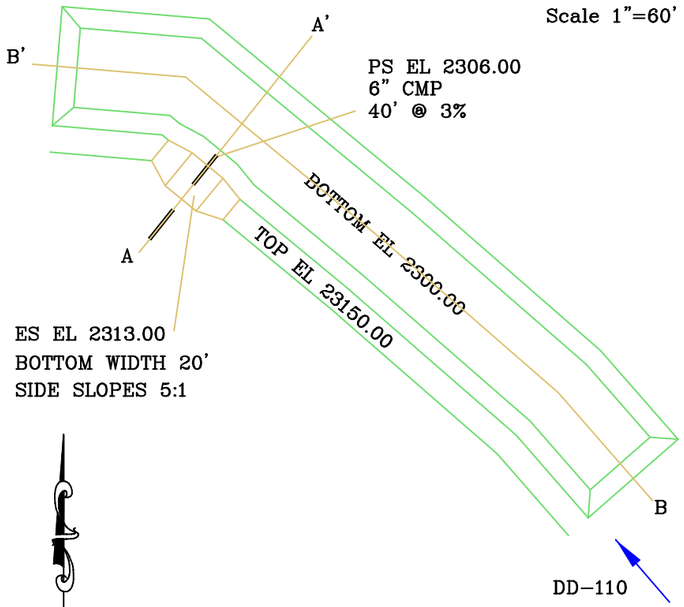
# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 33.33 | 100.00 | 300.00 | 1.460 | 0.057 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.057** |
| #1 | 2 | 3. Short grass pasture | 42.86 | 150.00 | 350.00 | 5.230 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.055** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 42.86 | 150.00 | 350.00 | 6.540 | 0.014 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.50 | 350.00 | 3.000 | 0.032 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.046** |
| #1 | 4 | 2. Minimum tillage cultivation | 42.42 | 140.00 | 330.00 | 3.250 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.046** |

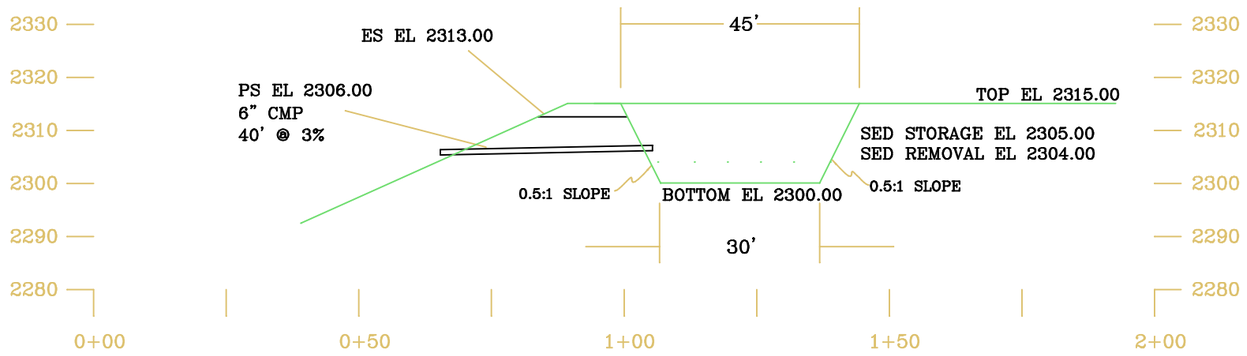
# Subwatershed Muskingum Routing Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 42.42 | 140.00 | 330.00 | 19.540 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.063** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 42.42 | 140.00 | 330.00 | 19.540 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.022** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 42.42 | 140.00 | 330.00 | 19.540 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.022** |

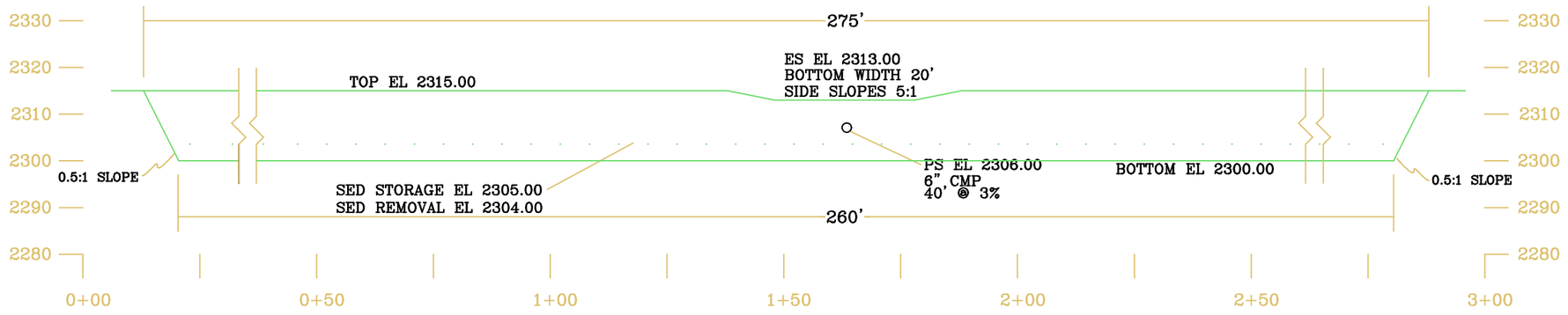
## Plan View
Scale 1"=60'




## Section A–A'
Scale 1"=30'




## Section B–B'
Scale 1"=30'



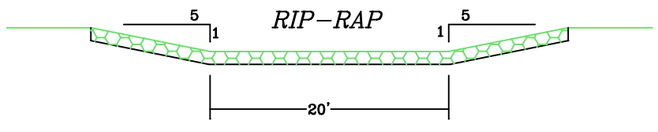

| | |
|---|---|
| *Top of Pond* | *2315.00* |
| *E.S.* | *2313.00* |
| *P.S.* | *2306.00* |
| *Sed. Storage* | *2305.00* |
| *Sed. Removal* | *2304.00* |
| *Bottom* | *2300.00* |

*LEGEND*

*Ground Line* ———

*Sediment Storage Level* . . . . . .

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 0.50"*
*D 50 = 0.75"*
*D MAX = 1.50"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 28

DATE: 02/17/2023 FILENAME: POND 28.dwg

SCALE: AS SHOWN DRAWN BY:

Prepared By:


HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543


HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #29
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

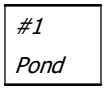
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #29 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 13.700 | 13.700 | 33.72 | 2.72 | 266.7 | 122,590 | 66.09 | 37.29 |
| | Out | | | 1.65 | 2.69 | 50.6 | 36,839 | 0.01 | 0.01 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 10.58 |
| | Out | 0.01 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.980% | 100.000% |
| 1.0000 | 97.959% | 100.000% |
| 0.5000 | 91.951% | 100.000% |
| 0.3000 | 86.951% | 100.000% |
| 0.2000 | 79.955% | 100.000% |
| 0.1000 | 69.947% | 100.000% |
| 0.0500 | 59.944% | 100.000% |
| 0.0300 | 49.947% | 100.000% |
| 0.0200 | 41.947% | 100.000% |
| 0.0100 | 31.950% | 100.000% |
| 0.0050 | 20.975% | 100.000% |
| 0.0030 | 14.979% | 78.884% |
| 0.0010 | 3.996% | 21.047% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #29*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,321.00 ft |
| Initial Pool: | 0.21 ac-ft |
| *Sediment Storage: | 0.98 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,321.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,328.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,328.06 ft |
| H'graph Detention Time: | 12.01 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.45 days |
| Trap Efficiency: | 81.01 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,320.00 | 0.211 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,320.50 | 0.215 | 0.106 | 0.000 | | |
| 2,321.00 | 0.218 | 0.214 | 0.000 | | Spillway #1 |
| 2,321.50 | 0.222 | 0.324 | 0.271 | 4.91* | |
| 2,322.00 | 0.225 | 0.436 | 0.565 | 3.35 | |
| 2,322.50 | 0.228 | 0.549 | 0.651 | 2.25 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,323.00 | 0.232 | 0.664 | 0.709 | 2.05 | |
| 2,323.50 | 0.236 | 0.781 | 0.766 | 1.95 | |
| 2,324.00 | 0.239 | 0.900 | 0.824 | 1.80 | |
| 2,324.50 | 0.243 | 1.020 | 0.882 | 1.70 | |
| 2,325.00 | 0.246 | 1.143 | 0.939 | 1.65 | |
| 2,325.50 | 0.250 | 1.267 | 0.997 | 1.55 | |
| 2,326.00 | 0.254 | 1.393 | 1.055 | 1.45 | |
| 2,326.50 | 0.257 | 1.520 | 1.108 | 1.45 | |
| 2,327.00 | 0.261 | 1.650 | 1.144 | 1.55 | |
| 2,327.50 | 0.265 | 1.781 | 1.181 | 2.90 | |
| 2,328.00 | 0.269 | 1.915 | 1.217 | 4.25 | Spillway #2 |
| 2,328.06 | 0.269 | 1.930 | 1.655 | 1.95 | Peak Stage |
| 2,328.50 | 0.272 | 2.050 | 5.133 | | |
| 2,329.00 | 0.276 | 2.187 | 56.060 | | |
| 2,329.50 | 0.280 | 2.326 | 119.163 | | |
| 2,330.00 | 0.284 | 2.467 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,320.00 | 0.000 | 0.000 | 0.000 |
| 2,320.50 | 0.000 | 0.000 | 0.000 |
| 2,321.00 | 0.000 | 0.000 | 0.000 |
| 2,321.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,322.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,322.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,323.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,323.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,324.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,324.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,325.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,325.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,326.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,326.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,327.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,327.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,328.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,328.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,329.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,329.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,330.00 | (6)>1.362 | 203.173 | 204.536 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 4.100 | 0.058 | 0.043 | 0.443 | 73.000 | S | 8.50 | 0.647 |
| | 2 | 2.600 | 0.047 | 0.021 | 0.440 | 79.000 | M | 6.45 | 0.514 |
| | 3 | 3.000 | 0.057 | 0.012 | 0.452 | 86.000 | F | 8.79 | 0.750 |
| | 4 | 2.200 | 0.036 | 0.009 | 0.319 | 74.000 | M | 4.71 | 0.361 |
| | 5 | 1.800 | 0.018 | 0.000 | 0.000 | 86.000 | F | 5.27 | 0.450 |
| | Σ | **13.700** | | | | | | **33.72** | **2.722** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 43.00 | 0.0030 | 1.0000 | 1 | 1.0 | 2,099 | 1.34 | 0.69 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 16.6 | 43,664 | 23.52 | 12.61 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 156.7 | 251,556 | 135.52 | 76.12 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 4.1 | 15,895 | 8.56 | 4.45 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 88.4 | 238,031 | 128.24 | 71.97 |
| | Σ | | | | | | | **266.7** | **122,590** | **66.09** | **37.29** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 42.86 | 150.00 | 350.00 | 1.650 | 0.058 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.058** |
| #1 | 2 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.047** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 150.00 | 300.00 | 7.070 | 0.011 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.057** |
| #1 | 4 | 2. Minimum tillage cultivation | 47.83 | 110.00 | 230.00 | 3.450 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.036** |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 5 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 120.00 | 240.00 | 7.070 | 0.009 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.018** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 47.83 | 110.00 | 230.00 | 20.740 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.043** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 47.83 | 110.00 | 230.00 | 20.740 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.021** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 120.00 | 240.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.012** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.009** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #29
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

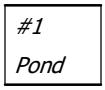
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #29 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 13.700 | 13.700 | 41.32 | 3.40 | 329.6 | 120,832 | 65.14 | 36.94 |
| | Out | | | 7.81 | 3.36 | 73.3 | 37,273 | 0.05 | 0.02 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 10.72 |
| | Out | 0.02 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.979% | 100.000% |
| 1.0000 | 97.956% | 100.000% |
| 0.5000 | 91.948% | 100.000% |
| 0.3000 | 86.948% | 100.000% |
| 0.2000 | 79.952% | 100.000% |
| 0.1000 | 69.944% | 100.000% |
| 0.0500 | 59.940% | 100.000% |
| 0.0300 | 49.944% | 100.000% |
| 0.0200 | 41.944% | 100.000% |
| 0.0100 | 31.947% | 100.000% |
| 0.0050 | 20.974% | 94.278% |
| 0.0030 | 14.977% | 67.324% |
| 0.0010 | 3.996% | 17.963% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #29*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,321.00 ft |
| Initial Pool: | 0.21 ac-ft |
| *Sediment Storage: | 0.98 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,321.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,328.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,328.53 ft |
| H'graph Detention Time: | 10.19 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.57 days |
| Trap Efficiency: | 77.75 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,320.00 | 0.211 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,320.50 | 0.215 | 0.106 | 0.000 | | |
| 2,321.00 | 0.218 | 0.214 | 0.000 | | Spillway #1 |
| 2,321.50 | 0.222 | 0.324 | 0.271 | 4.91* | |
| 2,322.00 | 0.225 | 0.436 | 0.565 | 3.35 | |
| 2,322.50 | 0.228 | 0.549 | 0.651 | 2.30 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,323.00 | 0.232 | 0.664 | 0.709 | 2.05 | |
| 2,323.50 | 0.236 | 0.781 | 0.766 | 1.90 | |
| 2,324.00 | 0.239 | 0.900 | 0.824 | 1.80 | |
| 2,324.50 | 0.243 | 1.020 | 0.882 | 1.70 | |
| 2,325.00 | 0.246 | 1.143 | 0.939 | 1.65 | |
| 2,325.50 | 0.250 | 1.267 | 0.997 | 1.55 | |
| 2,326.00 | 0.254 | 1.393 | 1.055 | 1.50 | |
| 2,326.50 | 0.257 | 1.520 | 1.108 | 1.40 | |
| 2,327.00 | 0.261 | 1.650 | 1.144 | 1.40 | |
| 2,327.50 | 0.265 | 1.781 | 1.181 | 2.50 | |
| 2,328.00 | 0.269 | 1.915 | 1.217 | 4.55 | Spillway #2 |
| 2,328.50 | 0.272 | 2.050 | 5.133 | 5.05 | |
| 2,328.53 | 0.273 | 2.057 | 7.809 | 0.05 | Peak Stage |
| 2,329.00 | 0.276 | 2.187 | 56.060 | | |
| 2,329.50 | 0.280 | 2.326 | 119.163 | | |
| 2,330.00 | 0.284 | 2.467 | 204.536 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,320.00 | 0.000 | 0.000 | 0.000 |
| 2,320.50 | 0.000 | 0.000 | 0.000 |
| 2,321.00 | 0.000 | 0.000 | 0.000 |
| 2,321.50 | (4)>0.271 | 0.000 | 0.271 |
| 2,322.00 | (6)>0.565 | 0.000 | 0.565 |
| 2,322.50 | (6)>0.651 | 0.000 | 0.651 |
| 2,323.00 | (6)>0.709 | 0.000 | 0.709 |
| 2,323.50 | (6)>0.766 | 0.000 | 0.766 |
| 2,324.00 | (6)>0.824 | 0.000 | 0.824 |
| 2,324.50 | (6)>0.882 | 0.000 | 0.882 |
| 2,325.00 | (6)>0.939 | 0.000 | 0.939 |
| 2,325.50 | (6)>0.997 | 0.000 | 0.997 |
| 2,326.00 | (6)>1.055 | 0.000 | 1.055 |
| 2,326.50 | (6)>1.108 | 0.000 | 1.108 |
| 2,327.00 | (6)>1.144 | 0.000 | 1.144 |
| 2,327.50 | (6)>1.181 | 0.000 | 1.181 |
| 2,328.00 | (6)>1.217 | 0.000 | 1.217 |
| 2,328.50 | (6)>1.253 | 3.880 | 5.133 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,329.00 | (6)>1.290 | 54.771 | 56.060 |
| 2,329.50 | (6)>1.326 | 117.837 | 119.163 |
| 2,330.00 | (6)>1.362 | 203.173 | 204.536 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 4.100 | 0.058 | 0.043 | 0.443 | 73.000 | S | 10.71 | 0.832 |
| | 2 | 2.600 | 0.047 | 0.021 | 0.440 | 79.000 | M | 7.91 | 0.644 |
| | 3 | 3.000 | 0.057 | 0.012 | 0.452 | 86.000 | F | 10.49 | 0.913 |
| | 4 | 2.200 | 0.036 | 0.009 | 0.319 | 74.000 | M | 5.91 | 0.462 |
| | 5 | 1.800 | 0.018 | 0.000 | 0.000 | 86.000 | F | 6.29 | 0.547 |
| | Σ | **13.700** | | | | | | **41.32** | **3.398** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 43.00 | 0.0030 | 1.0000 | 1 | 1.2 | 2,102 | 1.34 | 0.71 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 21.1 | 43,869 | 23.63 | 12.81 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 193.0 | 253,452 | 136.54 | 76.99 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 5.3 | 15,930 | 8.58 | 4.53 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 108.9 | 239,831 | 129.20 | 72.77 |
| | Σ | | | | | | | **329.6** | **120,832** | **65.14** | **36.94** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 42.86 | 150.00 | 350.00 | 1.650 | 0.058 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.058** |
| #1 | 2 | 2. Minimum tillage cultivation | 42.86 | 150.00 | 350.00 | 3.270 | 0.029 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.047** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 150.00 | 300.00 | 7.070 | 0.011 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.057** |
| #1 | 4 | 2. Minimum tillage cultivation | 47.83 | 110.00 | 230.00 | 3.450 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.036** |

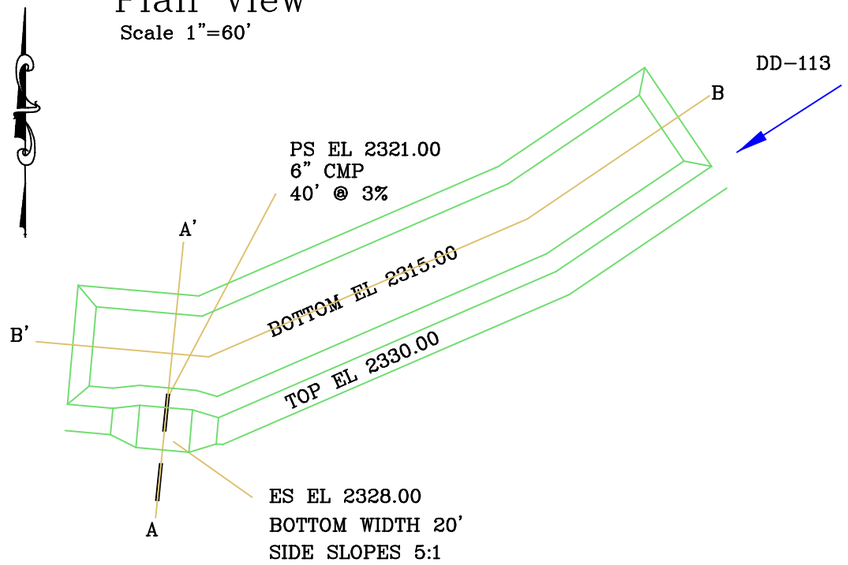
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 5 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 120.00 | 240.00 | 7.070 | 0.009 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.018** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 150.00 | 350.00 | 19.630 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 47.83 | 110.00 | 230.00 | 20.740 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.043** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 47.83 | 110.00 | 230.00 | 20.740 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.021** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 120.00 | 240.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.012** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.009** |

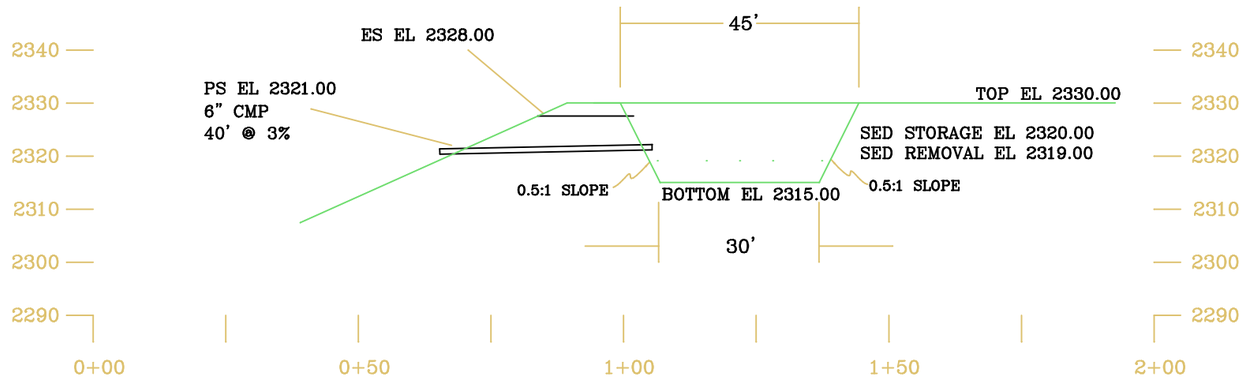
## Plan View

Scale 1"=60'



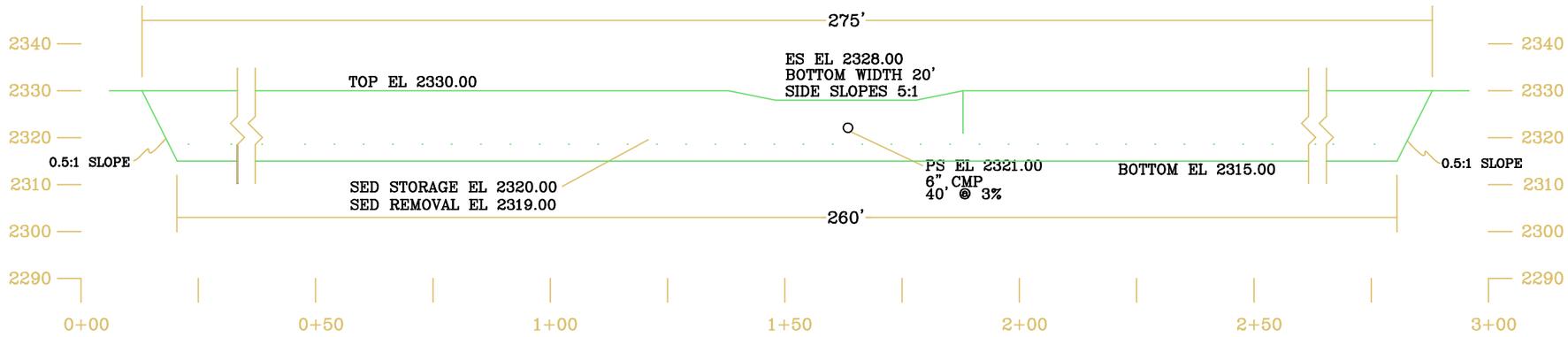

## Section A-A'

Scale 1"=30'




## Section B-B'

Scale 1"=30'



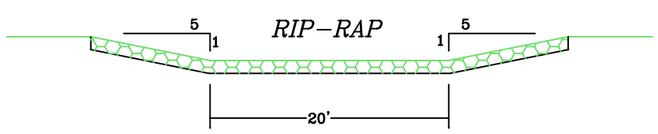

| | |
|---|---|
| *Top of Pond* | *2330.00* |
| *E.S.* | *2328.00* |
| *P.S.* | *2321.00* |
| *Sed. Storage* | *2320.00* |
| *Sed. Removal* | *2319.00* |
| *Bottom* | *2315.00* |

*LEGEND*

*Ground Line*

*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 0.5"*
*D 50 = 0.75"*
*D MAX = 1.5"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 29

DATE: 02/17/2023 | FILENAME: POND 29.dwg

SCALE: AS SHOWN | DRAWN BY:

Prepared By:

HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-8924
Fax: (606) 573-8543

HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #30
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

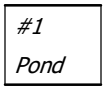
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #30 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 27.600 | 27.600 | 64.46 | 5.22 | 312.4 | 101,072 | 54.54 | 23.11 |
| | Out | | | 27.09 | 5.22 | 83.4 | 24,935 | 0.42 | 0.21 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 6.87 |
| | Out | 0.10 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.949% | 100.000% |
| 1.0000 | 97.894% | 100.000% |
| 0.5000 | 91.876% | 100.000% |
| 0.3000 | 86.876% | 100.000% |
| 0.2000 | 79.885% | 100.000% |
| 0.1000 | 69.867% | 100.000% |
| 0.0500 | 59.857% | 100.000% |
| 0.0300 | 49.866% | 100.000% |
| 0.0200 | 41.866% | 100.000% |
| 0.0100 | 31.875% | 100.000% |
| 0.0050 | 20.937% | 78.470% |
| 0.0030 | 14.946% | 56.017% |
| 0.0010 | 3.991% | 14.958% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond #30*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,336.00 ft |
| Initial Pool: | 0.26 ac-ft |
| *Sediment Storage: | 1.16 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,336.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,343.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 12.00 | 40.00 | 3.00 | 0.0240 | 2,338.00 | 0.90 | 0.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,343.65 ft |
| H'graph Detention Time: | 3.54 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.17 days |
| Trap Efficiency: | 73.32 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,335.00 | 0.252 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,335.50 | 0.256 | 0.127 | 0.000 | | |
| 2,336.00 | 0.260 | 0.255 | 0.000 | | Spillway #1 |
| 2,336.50 | 0.264 | 0.386 | 0.271 | 5.84* | |
| 2,337.00 | 0.268 | 0.519 | 0.565 | 4.00 | |
| 2,337.50 | 0.272 | 0.654 | 0.651 | 2.70 | |
| 2,338.00 | 0.276 | 0.790 | 0.709 | 2.45 | Spillway #3 |
| 2,338.50 | 0.280 | 0.929 | 1.517 | 4.20 | |
| 2,339.00 | 0.284 | 1.070 | 2.918 | 2.40 | |
| 2,339.50 | 0.288 | 1.213 | 4.222 | 0.95 | |
| 2,340.00 | 0.292 | 1.358 | 4.821 | 0.70 | |
| 2,340.50 | 0.297 | 1.506 | 5.274 | 0.65 | |
| 2,341.00 | 0.301 | 1.655 | 5.695 | 0.55 | |
| 2,341.50 | 0.305 | 1.806 | 6.064 | 0.55 | |
| 2,342.00 | 0.309 | 1.960 | 6.416 | 0.60 | |
| 2,342.50 | 0.314 | 2.116 | 6.768 | 0.60 | |
| 2,343.00 | 0.318 | 2.274 | 7.070 | 0.75 | Spillway #2 |
| 2,343.50 | 0.323 | 2.434 | 11.251 | 0.70 | |
| 2,343.65 | 0.324 | 2.484 | 27.092 | 0.50 | Peak Stage |
| 2,344.00 | 0.327 | 2.596 | 62.441 | | |
| 2,344.50 | 0.331 | 2.761 | 125.802 | | |
| 2,345.00 | 0.336 | 2.928 | 211.401 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,335.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,335.50 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,336.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,336.50 | (4)>0.271 | 0.000 | 0.000 | 0.271 |
| 2,337.00 | (6)>0.565 | 0.000 | 0.000 | 0.565 |
| 2,337.50 | (6)>0.651 | 0.000 | 0.000 | 0.651 |
| 2,338.00 | (6)>0.709 | 0.000 | 0.000 | 0.709 |
| 2,338.50 | (6)>0.766 | 0.000 | (3)>0.751 | 1.517 |
| 2,339.00 | (6)>0.824 | 0.000 | (3)>2.094 | 2.918 |
| 2,339.50 | (6)>0.882 | 0.000 | (5)>3.340 | 4.222 |
| 2,340.00 | (6)>0.939 | 0.000 | (6)>3.882 | 4.821 |
| 2,340.50 | (6)>0.997 | 0.000 | (6)>4.277 | 5.274 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,341.00 | (6)>1.055 | 0.000 | (6)>4.640 | 5.695 |
| 2,341.50 | (6)>1.108 | 0.000 | (6)>4.956 | 6.064 |
| 2,342.00 | (6)>1.144 | 0.000 | (6)>5.272 | 6.416 |
| 2,342.50 | (6)>1.181 | 0.000 | (6)>5.587 | 6.768 |
| 2,343.00 | (6)>1.217 | 0.000 | (6)>5.853 | 7.070 |
| 2,343.50 | (6)>1.253 | 3.880 | (6)>6.117 | 11.251 |
| 2,344.00 | (6)>1.290 | 54.771 | (6)>6.381 | 62.441 |
| 2,344.50 | (6)>1.326 | 117.837 | (6)>6.639 | 125.802 |
| 2,345.00 | (6)>1.362 | 203.173 | (6)>6.865 | 211.401 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 10.800 | 0.000 | 0.061 | 0.439 | 73.000 | S | 22.38 | 1.704 |
| | 2 | 2.400 | 0.024 | 0.018 | 0.447 | 86.000 | F | 7.03 | 0.600 |
| | 3 | 3.700 | 0.055 | 0.018 | 0.447 | 86.000 | F | 10.84 | 0.925 |
| | 4 | 2.700 | 0.064 | 0.004 | 0.457 | 79.000 | M | 6.70 | 0.534 |
| | 5 | 3.600 | 0.026 | 0.013 | 0.319 | 74.000 | M | 7.71 | 0.591 |
| | 6 | 4.400 | 0.033 | 0.000 | 0.000 | 79.000 | M | 10.92 | 0.870 |
| | Σ | **27.600** | | | | | | **64.46** | **5.225** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 43.00 | 0.0030 | 1.0000 | 1 | 2.8 | 2,394 | 1.53 | 0.78 |
| | 2 | 0.220 | 50.00 | 22.00 | 0.9000 | 1.0000 | 2 | 106.0 | 216,082 | 116.41 | 65.17 |
| | 3 | 0.220 | 50.00 | 19.00 | 0.9000 | 1.0000 | 2 | 145.6 | 194,338 | 104.70 | 58.48 |
| | 4 | 0.220 | 50.00 | 43.00 | 0.1400 | 1.0000 | 2 | 29.9 | 74,672 | 40.23 | 21.64 |
| | 5 | 0.220 | 50.00 | 18.00 | 0.0500 | 1.0000 | 2 | 4.9 | 11,646 | 6.27 | 3.26 |
| | 6 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 2 | 23.3 | 36,363 | 19.59 | 10.50 |
| | Σ | | | | | | | **312.4** | **101,072** | **54.54** | **23.11** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 40.00 | 200.00 | 500.00 | 1.600 | 0.086 |
| | | 8. Large gullies, diversions, and low flowing streams | 46.15 | 60.00 | 130.00 | 20.380 | 0.001 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.000** |
| #1 | 2 | 5. Nearly bare and untilled, and alluvial valley fans | 44.74 | 170.00 | 380.00 | 6.680 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.024** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 37.50 | 150.00 | 400.00 | 6.120 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.055** |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 4 | 3. Short grass pasture | 42.86 | 150.00 | 350.00 | 5.230 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.064** |
| #1 | 5 | 2. Minimum tillage cultivation | 35.71 | 100.00 | 280.00 | 2.980 | 0.026 |
| | | 8. Large gullies, diversions, and low flowing streams | 0.00 | 0.00 | 500.00 | 0.000 | 0.000 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.026** |
| #1 | 6 | 3. Short grass pasture | 40.54 | 150.00 | 370.00 | 5.090 | 0.020 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.50 | 150.00 | 3.000 | 0.013 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.033** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 37.50 | 150.00 | 400.00 | 18.370 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 40.54 | 150.00 | 370.00 | 19.100 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.50 | 150.00 | 3.000 | 0.013 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.061** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 40.54 | 150.00 | 370.00 | 19.100 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.50 | 150.00 | 3.000 | 0.013 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.018** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 40.54 | 150.00 | 370.00 | 19.100 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.50 | 150.00 | 3.000 | 0.013 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.018** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 35.71 | 100.00 | 280.00 | 17.920 | 0.004 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.004** |
| #1 | 5 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.50 | 150.00 | 3.000 | 0.013 |
| **#1** | **5** | **Muskingum K:** | | | | | **0.013** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #30
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

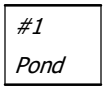
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond #30 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 27.600 | 27.600 | 79.63 | 6.56 | 387.6 | 101,046 | 54.53 | 22.84 |
| | Out | | | 76.13 | 6.55 | 115.9 | 26,829 | 0.68 | 0.34 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 6.92 |
| | Out | 0.14 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.946% | 100.000% |
| 1.0000 | 97.888% | 100.000% |
| 0.5000 | 91.869% | 100.000% |
| 0.3000 | 86.869% | 100.000% |
| 0.2000 | 79.878% | 100.000% |
| 0.1000 | 69.859% | 100.000% |
| 0.0500 | 59.849% | 100.000% |
| 0.0300 | 49.858% | 100.000% |
| 0.0200 | 41.858% | 100.000% |
| 0.0100 | 31.867% | 100.000% |
| 0.0050 | 20.934% | 69.977% |
| 0.0030 | 14.943% | 49.952% |
| 0.0010 | 3.991% | 13.340% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #1 (Pond)*

*Proposed Pond #30*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,336.00 ft |
| Initial Pool: | 0.26 ac-ft |
| *Sediment Storage: | 1.16 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0240 | 2,336.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,343.00 | 16.00 | 5.00:1 | 5.00:1 | 20.00 |

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 12.00 | 40.00 | 3.00 | 0.0240 | 2,338.00 | 0.90 | 0.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,344.11 ft |
| H'graph Detention Time: | 3.04 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.19 days |
| Trap Efficiency: | 70.08 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,335.00 | 0.252 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,335.50 | 0.256 | 0.127 | 0.000 | | |
| 2,336.00 | 0.260 | 0.255 | 0.000 | | Spillway #1 |
| 2,336.50 | 0.264 | 0.386 | 0.271 | 5.84* | |
| 2,337.00 | 0.268 | 0.519 | 0.565 | 4.05 | |
| 2,337.50 | 0.272 | 0.654 | 0.651 | 2.65 | |
| 2,338.00 | 0.276 | 0.790 | 0.709 | 2.45 | Spillway #3 |
| 2,338.50 | 0.280 | 0.929 | 1.517 | 2.05 | |
| 2,339.00 | 0.284 | 1.070 | 2.918 | 4.15 | |
| 2,339.50 | 0.288 | 1.213 | 4.222 | 1.05 | |
| 2,340.00 | 0.292 | 1.358 | 4.821 | 0.70 | |
| 2,340.50 | 0.297 | 1.506 | 5.274 | 0.70 | |
| 2,341.00 | 0.301 | 1.655 | 5.695 | 0.65 | |
| 2,341.50 | 0.305 | 1.806 | 6.064 | 0.60 | |
| 2,342.00 | 0.309 | 1.960 | 6.416 | 0.60 | |
| 2,342.50 | 0.314 | 2.116 | 6.768 | 0.65 | |
| 2,343.00 | 0.318 | 2.274 | 7.070 | 0.85 | Spillway #2 |
| 2,343.50 | 0.323 | 2.434 | 11.251 | 1.00 | |
| 2,344.00 | 0.327 | 2.596 | 62.441 | | |
| 2,344.11 | 0.328 | 2.632 | 76.131 | 0.55 | Peak Stage |
| 2,344.50 | 0.331 | 2.761 | 125.802 | | |
| 2,345.00 | 0.336 | 2.928 | 211.401 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,335.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,335.50 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,336.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 2,336.50 | (4)>0.271 | 0.000 | 0.000 | 0.271 |
| 2,337.00 | (6)>0.565 | 0.000 | 0.000 | 0.565 |
| 2,337.50 | (6)>0.651 | 0.000 | 0.000 | 0.651 |
| 2,338.00 | (6)>0.709 | 0.000 | 0.000 | 0.709 |
| 2,338.50 | (6)>0.766 | 0.000 | (3)>0.751 | 1.517 |
| 2,339.00 | (6)>0.824 | 0.000 | (3)>2.094 | 2.918 |
| 2,339.50 | (6)>0.882 | 0.000 | (5)>3.340 | 4.222 |
| 2,340.00 | (6)>0.939 | 0.000 | (6)>3.882 | 4.821 |
| 2,340.50 | (6)>0.997 | 0.000 | (6)>4.277 | 5.274 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 2,341.00 | (6)>1.055 | 0.000 | (6)>4.640 | 5.695 |
| 2,341.50 | (6)>1.108 | 0.000 | (6)>4.956 | 6.064 |
| 2,342.00 | (6)>1.144 | 0.000 | (6)>5.272 | 6.416 |
| 2,342.50 | (6)>1.181 | 0.000 | (6)>5.587 | 6.768 |
| 2,343.00 | (6)>1.217 | 0.000 | (6)>5.853 | 7.070 |
| 2,343.50 | (6)>1.253 | 3.880 | (6)>6.117 | 11.251 |
| 2,344.00 | (6)>1.290 | 54.771 | (6)>6.381 | 62.441 |
| 2,344.50 | (6)>1.326 | 117.837 | (6)>6.639 | 125.802 |
| 2,345.00 | (6)>1.362 | 203.173 | (6)>6.865 | 211.401 |

# *Subwatershed Hydrology Detail:*

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 10.800 | 0.000 | 0.061 | 0.439 | 73.000 | S | 28.22 | 2.192 |
| | 2 | 2.400 | 0.024 | 0.018 | 0.447 | 86.000 | F | 8.39 | 0.730 |
| | 3 | 3.700 | 0.055 | 0.018 | 0.447 | 86.000 | F | 12.93 | 1.126 |
| | 4 | 2.700 | 0.064 | 0.004 | 0.457 | 79.000 | M | 8.22 | 0.669 |
| | 5 | 3.600 | 0.026 | 0.013 | 0.319 | 74.000 | M | 9.67 | 0.757 |
| | 6 | 4.400 | 0.033 | 0.000 | 0.000 | 79.000 | M | 13.39 | 1.090 |
| | Σ | **27.600** | | | | | | **79.63** | **6.563** |

# *Subwatershed Sedimentology Detail:*

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 43.00 | 0.0030 | 1.0000 | 1 | 3.7 | 2,399 | 1.53 | 0.79 |
| | 2 | 0.220 | 50.00 | 22.00 | 0.9000 | 1.0000 | 2 | 130.6 | 217,736 | 117.30 | 65.93 |
| | 3 | 0.220 | 50.00 | 19.00 | 0.9000 | 1.0000 | 2 | 179.4 | 195,840 | 105.51 | 59.17 |
| | 4 | 0.220 | 50.00 | 43.00 | 0.1400 | 1.0000 | 2 | 38.0 | 75,019 | 40.42 | 21.97 |
| | 5 | 0.220 | 50.00 | 18.00 | 0.0500 | 1.0000 | 2 | 6.4 | 11,672 | 6.29 | 3.32 |
| | 6 | 0.220 | 50.00 | 20.00 | 0.1400 | 1.0000 | 2 | 29.6 | 36,535 | 19.68 | 10.66 |
| | Σ | | | | | | | **387.6** | **101,046** | **54.53** | **22.84** |

# *Subwatershed Time of Concentration Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 40.00 | 200.00 | 500.00 | 1.600 | 0.086 |
| | | 8. Large gullies, diversions, and low flowing streams | 46.15 | 60.00 | 130.00 | 20.380 | 0.001 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.000** |
| #1 | 2 | 5. Nearly bare and untilled, and alluvial valley fans | 44.74 | 170.00 | 380.00 | 6.680 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.00 | 100.00 | 3.000 | 0.009 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.024** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 37.50 | 150.00 | 400.00 | 6.120 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.055** |

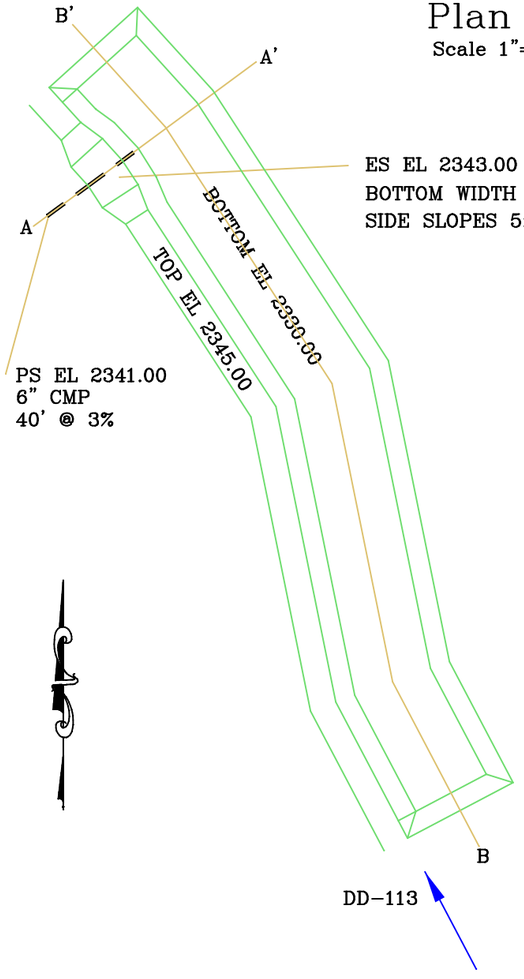
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 4 | 3. Short grass pasture | 42.86 | 150.00 | 350.00 | 5.230 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.064** |
| #1 | 5 | 2. Minimum tillage cultivation | 35.71 | 100.00 | 280.00 | 2.980 | 0.026 |
| | | 8. Large gullies, diversions, and low flowing streams | 0.00 | 0.00 | 500.00 | 0.000 | 0.000 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.026** |
| #1 | 6 | 3. Short grass pasture | 40.54 | 150.00 | 370.00 | 5.090 | 0.020 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.50 | 150.00 | 3.000 | 0.013 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.033** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 37.50 | 150.00 | 400.00 | 18.370 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 40.54 | 150.00 | 370.00 | 19.100 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.50 | 150.00 | 3.000 | 0.013 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.061** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 40.54 | 150.00 | 370.00 | 19.100 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.50 | 150.00 | 3.000 | 0.013 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.018** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 40.54 | 150.00 | 370.00 | 19.100 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.50 | 150.00 | 3.000 | 0.013 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.018** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 35.71 | 100.00 | 280.00 | 17.920 | 0.004 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.004** |
| #1 | 5 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 1.50 | 150.00 | 3.000 | 0.013 |
| **#1** | **5** | **Muskingum K:** | | | | | **0.013** |

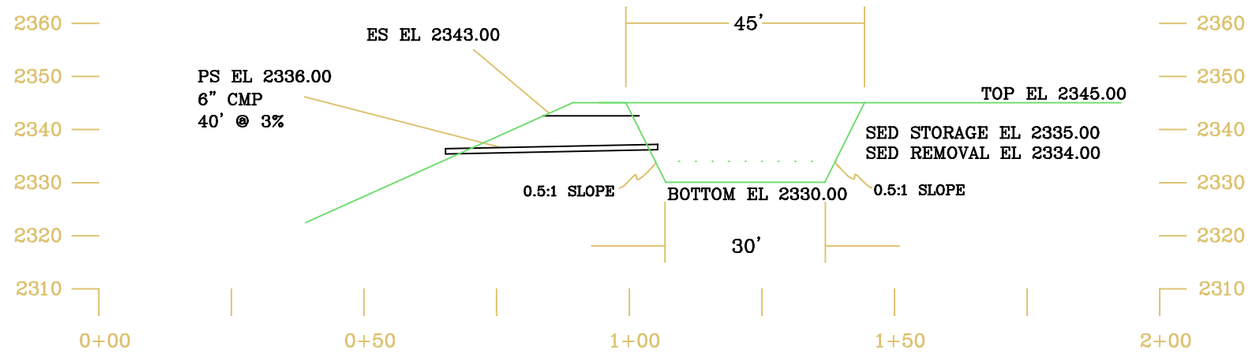
# Plan View

Scale 1"=60'



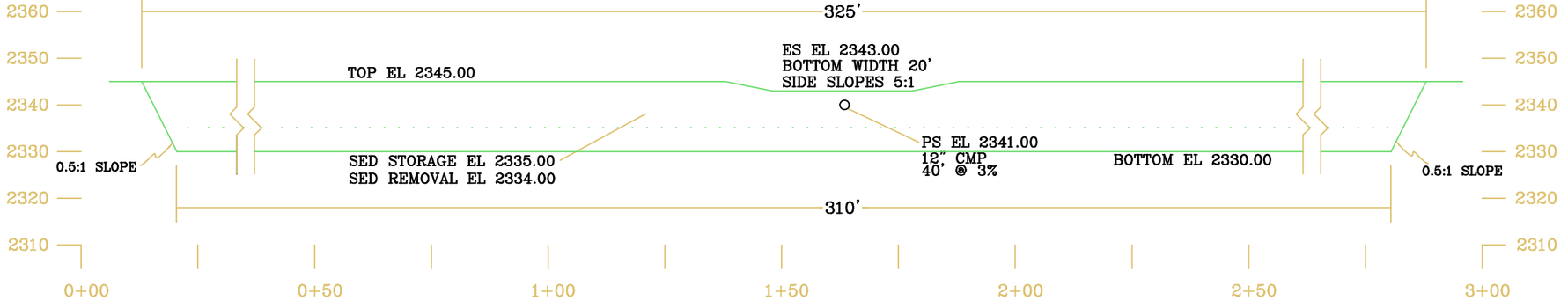

# Section A-A'

Scale 1"=30'




# Section B-B'

Scale 1"=30'



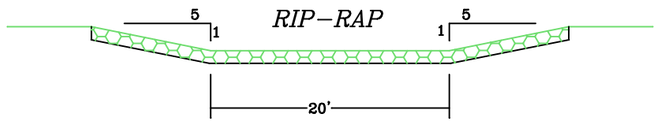

| | |
|---|---|
| *Top of Pond* | *2345.00* |
| *E.S.* | *2343.00* |
| *P.S.* | *2341.00* |
| *Sed. Storage* | *2335.00* |
| *Sed. Removal* | *2338.00* |
| *Bottom* | *2330.00* |

*LEGEND*

*Ground Line*

*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 30

DATE: 02/17/2023 | FILENAME: POND 30.dwg

SCALE: AS SHOWN | DRAWN BY:

Prepared By:

HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543

HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #31
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# Hurricane Creek mining, LLC
# OSMRE Permit #3341
# Proposed Pond #31
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

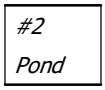
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #2 | ==> | End | 0.000 | 0.000 | Proposed Pond #31 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #2 | In | 23.800 | 23.800 | 67.58 | 5.54 | 289.6 | 92,140 | 49.75 | 20.27 |
| | Out | | | 66.32 | 5.54 | 94.8 | 25,635 | 1.21 | 0.64 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #2 | In | 6.49 |
| | Out | 0.35 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #2:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.932% | 100.000% |
| 1.0000 | 97.859% | 100.000% |
| 0.5000 | 91.834% | 100.000% |
| 0.3000 | 86.834% | 100.000% |
| 0.2000 | 79.846% | 100.000% |
| 0.1000 | 69.821% | 100.000% |
| 0.0500 | 59.808% | 100.000% |
| 0.0300 | 49.820% | 100.000% |
| 0.0200 | 41.819% | 100.000% |
| 0.0100 | 31.831% | 97.248% |
| 0.0050 | 20.916% | 63.901% |
| 0.0030 | 14.928% | 45.606% |
| 0.0010 | 3.988% | 12.184% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #2 (Pond)*

*Proposed Pond #31*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,374.00 ft |
| Initial Pool: | 0.40 ac-ft |
| *Sediment Storage: | 0.19 ac-ft |
| Dead Space: | 0.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 40.00 | 3.00 | 0.0140 | 2,374.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,383.00 | 16.00 | 5.00:1 | 5.00:1 | 15.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,384.21 ft |
| H'graph Detention Time: | 5.01 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.47 days |
| Trap Efficiency: | 67.27 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,371.35 | 0.143 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,371.50 | 0.143 | 0.022 | 0.000 | | |
| 2,372.00 | 0.146 | 0.094 | 0.000 | | |
| 2,372.50 | 0.149 | 0.168 | 0.000 | | |
| 2,373.00 | 0.152 | 0.243 | 0.000 | | |
| 2,373.50 | 0.155 | 0.320 | 0.000 | | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,374.00 | 0.158 | 0.398 | 0.000 | | Spillway #1 |
| 2,374.50 | 0.161 | 0.478 | 0.375 | 11.10 | |
| 2,375.00 | 0.164 | 0.559 | 0.710 | 1.85 | |
| 2,375.50 | 0.167 | 0.642 | 0.918 | 1.25 | |
| 2,376.00 | 0.170 | 0.726 | 1.111 | 1.00 | |
| 2,376.50 | 0.173 | 0.812 | 1.193 | 0.90 | |
| 2,377.00 | 0.176 | 0.899 | 1.276 | 0.85 | |
| 2,377.50 | 0.179 | 0.988 | 1.359 | 0.85 | |
| 2,378.00 | 0.183 | 1.079 | 1.441 | 0.75 | |
| 2,378.50 | 0.186 | 1.171 | 1.524 | 0.75 | |
| 2,379.00 | 0.189 | 1.264 | 1.605 | 0.75 | |
| 2,379.50 | 0.192 | 1.360 | 1.665 | 0.70 | |
| 2,380.00 | 0.196 | 1.457 | 1.726 | 0.70 | |
| 2,380.50 | 0.199 | 1.555 | 1.786 | 0.65 | |
| 2,381.00 | 0.202 | 1.655 | 1.846 | 0.70 | |
| 2,381.50 | 0.206 | 1.757 | 1.907 | 0.80 | |
| 2,382.00 | 0.209 | 1.861 | 1.967 | 1.80 | |
| 2,382.50 | 0.212 | 1.966 | 2.027 | 1.70 | |
| 2,383.00 | 0.216 | 2.073 | 2.088 | 2.65 | Spillway #2 |
| 2,383.50 | 0.219 | 2.182 | 5.073 | 4.10 | |
| 2,384.00 | 0.223 | 2.293 | 45.016 | 1.45 | |
| 2,384.21 | 0.224 | 2.339 | 66.324 | 0.05 | Peak Stage |
| 2,384.50 | 0.226 | 2.405 | 96.257 | | |
| 2,385.00 | 0.230 | 2.519 | 167.268 | | |

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,371.35 | 0.000 | 0.000 | 0.000 |
| 2,371.50 | 0.000 | 0.000 | 0.000 |
| 2,372.00 | 0.000 | 0.000 | 0.000 |
| 2,372.50 | 0.000 | 0.000 | 0.000 |
| 2,373.00 | 0.000 | 0.000 | 0.000 |
| 2,373.50 | 0.000 | 0.000 | 0.000 |
| 2,374.00 | 0.000 | 0.000 | 0.000 |
| 2,374.50 | (4)>0.375 | 0.000 | 0.375 |
| 2,375.00 | (5)>0.710 | 0.000 | 0.710 |
| 2,375.50 | (6)>0.918 | 0.000 | 0.918 |
| 2,376.00 | (6)>1.111 | 0.000 | 1.111 |
| 2,376.50 | (6)>1.193 | 0.000 | 1.193 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,377.00 | (6)>1.276 | 0.000 | 1.276 |
| 2,377.50 | (6)>1.359 | 0.000 | 1.359 |
| 2,378.00 | (6)>1.441 | 0.000 | 1.441 |
| 2,378.50 | (6)>1.524 | 0.000 | 1.524 |
| 2,379.00 | (6)>1.605 | 0.000 | 1.605 |
| 2,379.50 | (6)>1.665 | 0.000 | 1.665 |
| 2,380.00 | (6)>1.726 | 0.000 | 1.726 |
| 2,380.50 | (6)>1.786 | 0.000 | 1.786 |
| 2,381.00 | (6)>1.846 | 0.000 | 1.846 |
| 2,381.50 | (6)>1.907 | 0.000 | 1.907 |
| 2,382.00 | (6)>1.967 | 0.000 | 1.967 |
| 2,382.50 | (6)>2.027 | 0.000 | 2.027 |
| 2,383.00 | (6)>2.088 | 0.000 | 2.088 |
| 2,383.50 | (6)>2.138 | 2.935 | 5.073 |
| 2,384.00 | (6)>2.185 | 42.831 | 45.016 |
| 2,384.50 | (6)>2.233 | 94.024 | 96.257 |
| 2,385.00 | (6)>2.280 | 164.988 | 167.268 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #2 | 1 | 9.200 | 0.076 | 0.071 | 0.433 | 73.000 | S | 24.04 | 1.867 |
| | 2 | 3.200 | 0.038 | 0.030 | 0.438 | 86.000 | F | 11.18 | 0.973 |
| | 3 | 5.000 | 0.041 | 0.043 | 0.402 | 79.000 | M | 15.22 | 1.238 |
| | 4 | 3.200 | 0.060 | 0.000 | 0.000 | 74.000 | M | 8.60 | 0.672 |
| | 5 | 3.200 | 0.041 | 0.000 | 0.000 | 79.000 | M | 9.74 | 0.792 |
| | Σ | **23.800** | | | | | | **67.58** | **5.544** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #2 | 1 | 0.170 | 100.00 | 50.00 | 0.0030 | 1.0000 | 1 | 3.5 | 2,751 | 1.76 | 0.89 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 207.5 | 255,220 | 137.50 | 77.53 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 43.9 | 47,382 | 25.53 | 13.84 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 8.1 | 16,658 | 8.97 | 4.74 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 26.6 | 44,956 | 24.22 | 13.12 |
| | Σ | | | | | | | **289.6** | **92,140** | **49.75** | **20.27** |

# Subwatershed Time of Concentration Details:

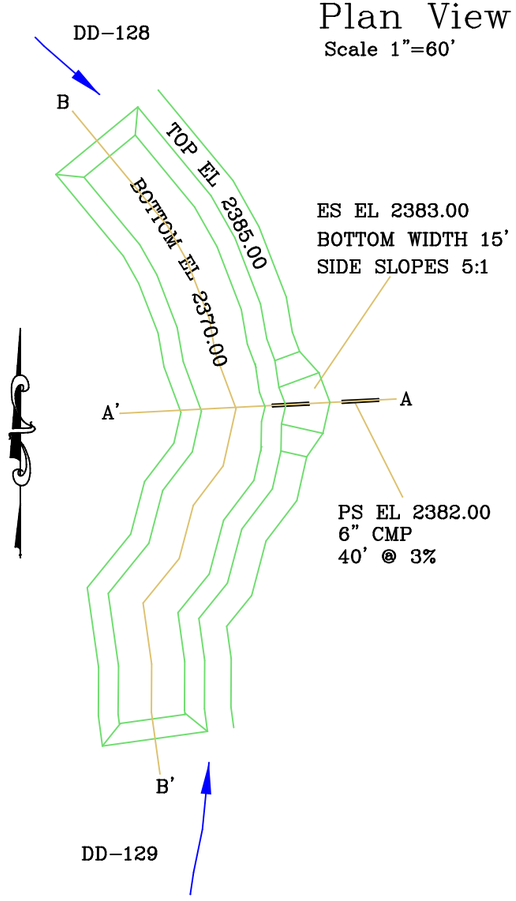
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #2 | 1 | 1. Forest with heavy ground litter | 52.00 | 260.00 | 500.00 | 1.820 | 0.076 |
| **#2** | **1** | **Time of Concentration:** | | | | | **0.076** |
| #2 | 2 | 5. Nearly bare and untilled, and alluvial valley fans | 51.72 | 150.00 | 290.00 | 7.190 | 0.011 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#2** | **2** | **Time of Concentration:** | | | | | **0.038** |
| #2 | 3 | 3. Short grass pasture | 50.00 | 150.00 | 300.00 | 5.650 | 0.014 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#2** | **3** | **Time of Concentration:** | | | | | **0.041** |
| #2 | 4 | 2. Minimum tillage cultivation | 50.00 | 150.00 | 300.00 | 3.530 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#2** | **4** | **Time of Concentration:** | | | | | **0.060** |
| #2 | 5 | 3. Short grass pasture | 50.00 | 150.00 | 300.00 | 5.650 | 0.014 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#2** | **5** | **Time of Concentration:** | | | | | **0.041** |

## *Subwatershed Muskingum Routing Details:*

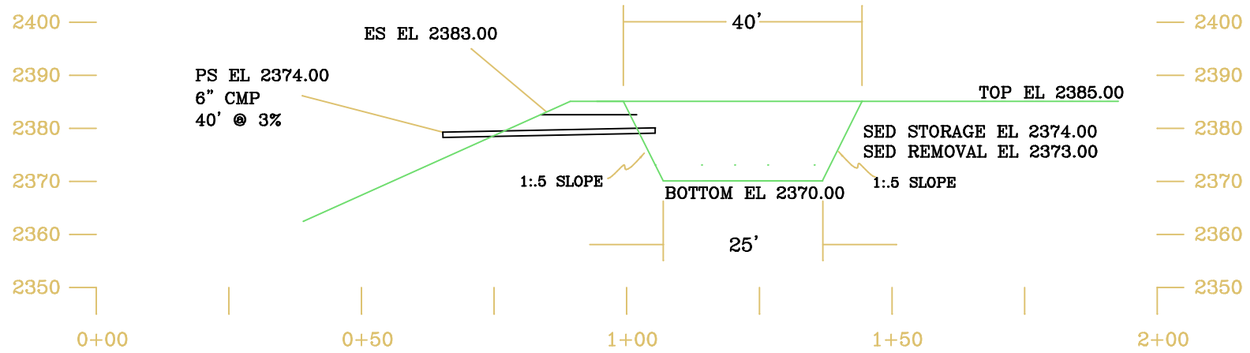
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #2 | 1 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 43.33 | 130.00 | 300.00 | 19.740 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#2** | **1** | **Muskingum K:** | | | | | **0.071** |
| #2 | 2 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#2** | **2** | **Muskingum K:** | | | | | **0.030** |
| #2 | 3 | 8. Large gullies, diversions, and low flowing streams | 16.67 | 50.00 | 300.00 | 12.240 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#2** | **3** | **Muskingum K:** | | | | | **0.043** |

# Plan View
Scale 1"=60'




NOTE:
DISCHARGE FROM POND 31 DRAINS TO EXISTING POND 3191 1B VIA DC-2.

# Section A-A'
Scale 1"=30'




# Section B-B'
Scale 1"=30'




| | |
|---|---|
| *Top of Pond* | *2385.00* |
| *E.S.* | *2383.00* |
| *P.S.* | *2382.00* |
| *Sed. Storage* | *2381.00* |
| *Sed. Removal* | *2377.75* |
| *Bottom* | *2370.00* |

*LEGEND*

*Ground Line* ———

*Sediment Storage Level* . . . . . .

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

*SIGNATURE* *DATE*

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 31

DATE: 02/17/2023 | FILENAME: POND 31.dwg

SCALE: AS SHOWN | DRAWN BY:

Prepared By:

HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543

HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #32
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

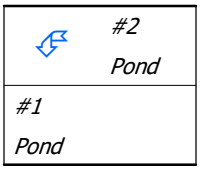
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Existing Pond 1A |
| Pond | #2 | ==> | #1 | 0.044 | 0.328 | Proposed Pond #32 |




# *Structure Routing Details:*

| Stru # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|
| #2 | 2. Minimum tillage cultivation | 42.31 | 220.00 | 520.00 | 3.25 | 0.044 |
| **#2** | **Muskingum K:** | | | | | **0.044** |

# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #2 | In | 51.000 | 51.000 | 108.09 | 8.69 | 201.2 | 64,746 | 35.07 | 9.12 |
| | Out | | | 102.95 | 8.69 | 68.6 | 13,803 | 1.07 | 0.46 |
| #1 | In | 13.000 | 64.000 | 120.02 | 10.43 | 98.2 | 18,171 | 3.59 | 1.38 |
| | Out | | | 102.59 | 10.42 | 73.6 | 12,154 | 0.34 | 0.15 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #2 | In | 3.66 |
| | Out | 0.20 |
| #1 | In | 0.54 |
| | Out | 0.05 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #2 (Proposed Pond #32):*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.839% | 100.000% |
| 1.0000 | 97.671% | 100.000% |
| 0.5000 | 91.614% | 100.000% |
| 0.3000 | 86.614% | 100.000% |
| 0.2000 | 79.641% | 100.000% |
| 0.1000 | 69.585% | 100.000% |
| 0.0500 | 59.556% | 100.000% |
| 0.0300 | 49.583% | 100.000% |
| 0.0200 | 41.583% | 100.000% |
| 0.0100 | 31.610% | 92.706% |
| 0.0050 | 20.805% | 61.018% |
| 0.0030 | 14.833% | 43.502% |
| 0.0010 | 3.972% | 11.650% |
| 0.0001 | 0.000% | 0.000% |

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 100.000% | 100.000% |
| 1.0000 | 100.000% | 100.000% |
| 0.5000 | 100.000% | 100.000% |
| 0.3000 | 100.000% | 100.000% |
| 0.2000 | 100.000% | 100.000% |
| 0.1000 | 96.382% | 100.000% |
| 0.0500 | 92.590% | 100.000% |
| 0.0300 | 88.797% | 100.000% |
| 0.0200 | 85.764% | 100.000% |
| 0.0100 | 76.882% | 100.000% |
| 0.0050 | 50.579% | 67.529% |
| 0.0030 | 36.071% | 48.158% |
| 0.0010 | 9.653% | 12.888% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #2 (Pond)*

*Proposed Pond #32*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,374.00 ft |
| Initial Pool: | 0.20 ac-ft |
| *Sediment Storage: | 0.56 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 8.00 | 40.00 | 3.00 | 0.0140 | 2,374.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,383.00 | 16.00 | 5.00:1 | 5.00:1 | 15.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,384.53 ft |
| H'graph Detention Time: | 3.42 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.28 days |
| Trap Efficiency: | 65.90 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,372.99 | 0.200 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,373.00 | 0.200 | 0.001 | 0.000 | | |
| 2,373.50 | 0.203 | 0.102 | 0.000 | | |
| 2,374.00 | 0.207 | 0.204 | 0.000 | | Spillway #1 |
| 2,374.50 | 0.211 | 0.309 | 0.512 | 11.40 | |
| 2,375.00 | 0.215 | 0.415 | 1.233 | 1.60 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,375.50 | 0.218 | 0.523 | 1.740 | 0.85 | |
| 2,376.00 | 0.222 | 0.634 | 2.124 | 0.70 | |
| 2,376.50 | 0.226 | 0.746 | 2.330 | 0.60 | |
| 2,377.00 | 0.230 | 0.860 | 2.537 | 0.60 | |
| 2,377.50 | 0.234 | 0.976 | 2.709 | 0.55 | |
| 2,378.00 | 0.238 | 1.094 | 2.865 | 0.50 | |
| 2,378.50 | 0.242 | 1.214 | 3.022 | 0.50 | |
| 2,379.00 | 0.246 | 1.336 | 3.167 | 0.45 | |
| 2,379.50 | 0.250 | 1.460 | 3.300 | 0.50 | |
| 2,380.00 | 0.255 | 1.587 | 3.433 | 0.45 | |
| 2,380.50 | 0.259 | 1.715 | 3.566 | 1.10 | |
| 2,381.00 | 0.263 | 1.845 | 3.687 | 1.05 | |
| 2,381.50 | 0.267 | 1.978 | 3.803 | 1.00 | |
| 2,382.00 | 0.272 | 2.113 | 3.919 | 1.00 | |
| 2,382.50 | 0.276 | 2.249 | 4.034 | 1.20 | |
| 2,383.00 | 0.280 | 2.388 | 4.145 | 1.90 | Spillway #2 |
| 2,383.50 | 0.285 | 2.530 | 7.182 | 3.10 | |
| 2,384.00 | 0.289 | 2.673 | 47.181 | 1.55 | |
| 2,384.50 | 0.294 | 2.819 | 98.477 | | |
| 2,384.53 | 0.294 | 2.828 | 102.951 | 0.10 | Peak Stage |
| 2,385.00 | 0.298 | 2.967 | 169.543 | | |

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,372.99 | 0.000 | 0.000 | 0.000 |
| 2,373.00 | 0.000 | 0.000 | 0.000 |
| 2,373.50 | 0.000 | 0.000 | 0.000 |
| 2,374.00 | 0.000 | 0.000 | 0.000 |
| 2,374.50 | (3)>0.512 | 0.000 | 0.512 |
| 2,375.00 | (5)>1.233 | 0.000 | 1.233 |
| 2,375.50 | (5)>1.740 | 0.000 | 1.740 |
| 2,376.00 | (5)>2.124 | 0.000 | 2.124 |
| 2,376.50 | (5)>2.330 | 0.000 | 2.330 |
| 2,377.00 | (6)>2.537 | 0.000 | 2.537 |
| 2,377.50 | (6)>2.709 | 0.000 | 2.709 |
| 2,378.00 | (6)>2.865 | 0.000 | 2.865 |
| 2,378.50 | (6)>3.022 | 0.000 | 3.022 |
| 2,379.00 | (6)>3.167 | 0.000 | 3.167 |
| 2,379.50 | (6)>3.300 | 0.000 | 3.300 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,380.00 | (6)>3.433 | 0.000 | 3.433 |
| 2,380.50 | (6)>3.566 | 0.000 | 3.566 |
| 2,381.00 | (6)>3.687 | 0.000 | 3.687 |
| 2,381.50 | (6)>3.803 | 0.000 | 3.803 |
| 2,382.00 | (6)>3.919 | 0.000 | 3.919 |
| 2,382.50 | (6)>4.034 | 0.000 | 4.034 |
| 2,383.00 | (6)>4.145 | 0.000 | 4.145 |
| 2,383.50 | (6)>4.247 | 2.935 | 7.182 |
| 2,384.00 | (6)>4.350 | 42.831 | 47.181 |
| 2,384.50 | (6)>4.452 | 94.024 | 98.477 |
| 2,385.00 | (6)>4.555 | 164.988 | 169.543 |

## *Structure #1 (Pond)*

### *Existing Pond 1A*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,150.00 ft |
| Initial Pool: | 0.31 ac-ft |
| *Sediment Storage: | 1.89 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 12.00 | 40.00 | 2.00 | 0.0240 | 2,150.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,151.30 | 32.00 | 2.00:1 | 2.00:1 | 21.50 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,152.77 ft |
| H'graph Detention Time: | 0.94 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.40 days |
| Trap Efficiency: | 25.10 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,149.00 | 0.297 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,149.00 | 0.297 | 0.001 | 0.000 | | |
| 2,149.50 | 0.312 | 0.153 | 0.000 | | |
| 2,150.00 | 0.327 | 0.313 | 0.000 | | Spillway #1 |
| 2,150.50 | 0.343 | 0.480 | 1.201 | 13.25 | |
| 2,151.00 | 0.359 | 0.656 | 1.805 | 2.40 | |
| 2,151.30 | 0.369 | 0.765 | 2.696 | 3.30 | Spillway #2 |
| 2,151.50 | 0.376 | 0.840 | 9.819 | 12.90 | |
| 2,152.00 | 0.393 | 1.032 | 27.308 | 1.15 | |
| 2,152.50 | 0.410 | 1.232 | 70.528 | 0.40 | |
| 2,152.77 | 0.420 | 1.345 | 102.594 | 0.10 | Peak Stage |
| 2,153.00 | 0.428 | 1.442 | 129.987 | | |
| 2,153.50 | 0.446 | 1.660 | 200.393 | | |
| 2,154.00 | 0.464 | 1.887 | 287.510 | | |

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,149.00 | 0.000 | 0.000 | 0.000 |
| 2,149.00 | 0.000 | 0.000 | 0.000 |
| 2,149.50 | 0.000 | 0.000 | 0.000 |
| 2,150.00 | 0.000 | 0.000 | 0.000 |
| 2,150.50 | (1)>1.201 | 0.000 | 1.201 |
| 2,151.00 | (1)>1.805 | 0.000 | 1.805 |
| 2,151.30 | (2)>2.696 | 0.000 | 2.696 |
| 2,151.50 | (5)>3.029 | 6.790 | 9.819 |
| 2,152.00 | (6)>3.540 | 23.768 | 27.308 |
| 2,152.50 | (6)>3.966 | 66.562 | 70.528 |
| 2,153.00 | (6)>4.351 | 125.635 | 129.987 |
| 2,153.50 | (6)>4.704 | 195.690 | 200.393 |
| 2,154.00 | (6)>5.019 | 282.491 | 287.510 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #2 | 1 | 32.600 | 0.106 | 0.071 | 0.437 | 73.000 | S | 67.55 | 5.144 |
| | 2 | 2.300 | 0.038 | 0.044 | 0.429 | 86.000 | F | 6.74 | 0.575 |
| | 3 | 4.400 | 0.038 | 0.021 | 0.442 | 79.000 | M | 10.92 | 0.870 |
| | 4 | 2.400 | 0.061 | 0.021 | 0.442 | 74.000 | M | 5.14 | 0.394 |
| | 5 | 5.300 | 0.060 | 0.041 | 0.319 | 79.000 | M | 13.15 | 1.049 |
| | 6 | 4.000 | 0.036 | 0.000 | 0.000 | 74.000 | M | 8.56 | 0.657 |
| | Σ | **51.000** | | | | | | **108.09** | **8.689** |
| #1 | 1 | 13.000 | 0.127 | 0.000 | 0.000 | 74.000 | M | 18.49 | 1.736 |
| | Σ | **64.000** | | | | | | **120.02** | **10.425** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #2 | 1 | 0.170 | 100.00 | 25.00 | 0.0030 | 1.0000 | 1 | 5.6 | 1,623 | 1.04 | 0.51 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 116.3 | 244,437 | 131.69 | 73.93 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 29.9 | 46,456 | 25.03 | 13.42 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 4.5 | 16,061 | 8.65 | 4.50 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 36.9 | 47,485 | 25.58 | 13.72 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 8.0 | 17,069 | 9.20 | 4.78 |
| | Σ | | | | | | | **201.2** | **64,746** | **35.07** | **9.12** |
| #1 | 1 | 0.220 | 100.00 | 21.00 | 0.0500 | 1.0000 | 2 | 29.6 | 23,627 | 11.24 | 5.93 |
| | Σ | | | | | | | **98.2** | **18,171** | **3.59** | **1.38** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 2. Minimum tillage cultivation | 42.31 | 220.00 | 520.00 | 3.250 | 0.044 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 9.00 | 900.00 | 3.000 | 0.083 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.127** |
| #2 | 1 | 1. Forest with heavy ground litter | 30.00 | 150.00 | 499.99 | 1.380 | 0.100 |
| | | 8. Large gullies, diversions, and low flowing streams | 28.21 | 110.00 | 390.00 | 15.930 | 0.006 |
| **#2** | **1** | **Time of Concentration:** | | | | | **0.106** |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #2 | 2 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 150.00 | 300.00 | 7.070 | 0.011 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#2** | **2** | **Time of Concentration:** | | | | | **0.038** |
| #2 | 3 | 3. Short grass pasture | 51.52 | 170.00 | 330.00 | 5.740 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| **#2** | **3** | **Time of Concentration:** | | | | | **0.038** |
| #2 | 4 | 2. Minimum tillage cultivation | 54.55 | 180.00 | 330.00 | 3.690 | 0.024 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#2** | **4** | **Time of Concentration:** | | | | | **0.061** |
| #2 | 5 | 3. Short grass pasture | 50.00 | 150.00 | 300.00 | 5.650 | 0.014 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#2** | **5** | **Time of Concentration:** | | | | | **0.060** |
| #2 | 6 | 2. Minimum tillage cultivation | 50.00 | 120.00 | 240.00 | 3.530 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#2** | **6** | **Time of Concentration:** | | | | | **0.036** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #2 | 1 | 8. Large gullies, diversions, and low flowing streams | 53.13 | 170.00 | 320.00 | 21.860 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#2** | **1** | **Muskingum K:** | | | | | **0.071** |
| #2 | 2 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.50 | 450.00 | 3.000 | 0.041 |
| **#2** | **2** | **Muskingum K:** | | | | | **0.044** |
| #2 | 3 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 120.00 | 240.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#2** | **3** | **Muskingum K:** | | | | | **0.021** |
| #2 | 4 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 120.00 | 240.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#2** | **4** | **Muskingum K:** | | | | | **0.021** |
| #2 | 5 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.50 | 450.00 | 3.000 | 0.041 |
| **#2** | **5** | **Muskingum K:** | | | | | **0.041** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #32
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

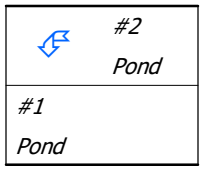
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Existing Pond 1A |
| Pond | #2 | ==> | #1 | 0.044 | 0.328 | Proposed Pond #32 |




# *Structure Routing Details:*

| Stru # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|
| #2 | 2. Minimum tillage cultivation | 42.31 | 220.00 | 520.00 | 3.25 | 0.044 |
| **#2** | **Muskingum K:** | | | | | **0.044** |

# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #2 | In | 51.000 | 51.000 | 135.70 | 11.06 | 251.8 | 64,059 | 34.70 | 8.97 |
| | Out | | | 133.25 | 11.06 | 94.9 | 14,114 | 1.97 | 0.90 |
| #1 | In | 13.000 | 64.000 | 155.32 | 13.29 | 133.9 | 17,264 | 4.12 | 1.80 |
| | Out | | | 147.99 | 13.29 | 102.3 | 12,676 | 0.96 | 0.44 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #2 | In | 3.60 |
| | Out | 0.32 |
| #1 | In | 0.62 |
| | Out | 0.13 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #2 (Proposed Pond #32):*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 98.831% | 100.000% |
| 1.0000 | 97.655% | 100.000% |
| 0.5000 | 91.596% | 100.000% |
| 0.3000 | 86.595% | 100.000% |
| 0.2000 | 79.624% | 100.000% |
| 0.1000 | 69.565% | 100.000% |
| 0.0500 | 59.535% | 100.000% |
| 0.0300 | 49.563% | 100.000% |
| 0.0200 | 41.563% | 100.000% |
| 0.0100 | 31.592% | 83.803% |
| 0.0050 | 20.796% | 55.166% |
| 0.0030 | 14.825% | 39.326% |
| 0.0010 | 3.971% | 10.534% |
| 0.0001 | 0.000% | 0.000% |

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 100.000% | 100.000% |
| 1.0000 | 100.000% | 100.000% |
| 0.5000 | 100.000% | 100.000% |
| 0.3000 | 100.000% | 100.000% |
| 0.2000 | 100.000% | 100.000% |
| 0.1000 | 96.285% | 100.000% |
| 0.0500 | 92.657% | 100.000% |
| 0.0300 | 89.030% | 100.000% |
| 0.0200 | 86.128% | 100.000% |
| 0.0100 | 71.023% | 92.926% |
| 0.0050 | 46.729% | 61.141% |
| 0.0030 | 33.323% | 43.600% |
| 0.0010 | 8.919% | 11.670% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

*Structure #2 (Pond)*

*Proposed Pond #32*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,374.00 ft |
| Initial Pool: | 0.20 ac-ft |
| *Sediment Storage: | 0.56 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

## Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 8.00 | 40.00 | 3.00 | 0.0140 | 2,374.00 | 0.90 | 0.00 |

## Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,383.00 | 16.00 | 5.00:1 | 5.00:1 | 15.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,384.74 ft |
| H'graph Detention Time: | 2.94 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.31 days |
| Trap Efficiency: | 62.30 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,372.99 | 0.200 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,373.00 | 0.200 | 0.001 | 0.000 | | |
| 2,373.50 | 0.203 | 0.102 | 0.000 | | |
| 2,374.00 | 0.207 | 0.204 | 0.000 | | Spillway #1 |
| 2,374.50 | 0.211 | 0.309 | 0.512 | 11.40 | |
| 2,375.00 | 0.215 | 0.415 | 1.233 | 1.55 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,375.50 | 0.218 | 0.523 | 1.740 | 0.90 | |
| 2,376.00 | 0.222 | 0.634 | 2.124 | 0.70 | |
| 2,376.50 | 0.226 | 0.746 | 2.330 | 0.60 | |
| 2,377.00 | 0.230 | 0.860 | 2.537 | 0.55 | |
| 2,377.50 | 0.234 | 0.976 | 2.709 | 0.55 | |
| 2,378.00 | 0.238 | 1.094 | 2.865 | 0.50 | |
| 2,378.50 | 0.242 | 1.214 | 3.022 | 0.50 | |
| 2,379.00 | 0.246 | 1.336 | 3.167 | 0.50 | |
| 2,379.50 | 0.250 | 1.460 | 3.300 | 0.45 | |
| 2,380.00 | 0.255 | 1.587 | 3.433 | 0.45 | |
| 2,380.50 | 0.259 | 1.715 | 3.566 | 0.45 | |
| 2,381.00 | 0.263 | 1.845 | 3.687 | 0.55 | |
| 2,381.50 | 0.267 | 1.978 | 3.803 | 1.40 | |
| 2,382.00 | 0.272 | 2.113 | 3.919 | 1.30 | |
| 2,382.50 | 0.276 | 2.249 | 4.034 | 1.20 | |
| 2,383.00 | 0.280 | 2.388 | 4.145 | 2.00 | Spillway #2 |
| 2,383.50 | 0.285 | 2.530 | 7.182 | 3.40 | |
| 2,384.00 | 0.289 | 2.673 | 47.181 | 2.45 | |
| 2,384.50 | 0.294 | 2.819 | 98.477 | 0.05 | |
| 2,384.74 | 0.296 | 2.891 | 133.254 | 0.05 | Peak Stage |
| 2,385.00 | 0.298 | 2.967 | 169.543 | | |

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,372.99 | 0.000 | 0.000 | 0.000 |
| 2,373.00 | 0.000 | 0.000 | 0.000 |
| 2,373.50 | 0.000 | 0.000 | 0.000 |
| 2,374.00 | 0.000 | 0.000 | 0.000 |
| 2,374.50 | (3)>0.512 | 0.000 | 0.512 |
| 2,375.00 | (5)>1.233 | 0.000 | 1.233 |
| 2,375.50 | (5)>1.740 | 0.000 | 1.740 |
| 2,376.00 | (5)>2.124 | 0.000 | 2.124 |
| 2,376.50 | (5)>2.330 | 0.000 | 2.330 |
| 2,377.00 | (6)>2.537 | 0.000 | 2.537 |
| 2,377.50 | (6)>2.709 | 0.000 | 2.709 |
| 2,378.00 | (6)>2.865 | 0.000 | 2.865 |
| 2,378.50 | (6)>3.022 | 0.000 | 3.022 |
| 2,379.00 | (6)>3.167 | 0.000 | 3.167 |
| 2,379.50 | (6)>3.300 | 0.000 | 3.300 |

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,380.00 | (6)>3.433 | 0.000 | 3.433 |
| 2,380.50 | (6)>3.566 | 0.000 | 3.566 |
| 2,381.00 | (6)>3.687 | 0.000 | 3.687 |
| 2,381.50 | (6)>3.803 | 0.000 | 3.803 |
| 2,382.00 | (6)>3.919 | 0.000 | 3.919 |
| 2,382.50 | (6)>4.034 | 0.000 | 4.034 |
| 2,383.00 | (6)>4.145 | 0.000 | 4.145 |
| 2,383.50 | (6)>4.247 | 2.935 | 7.182 |
| 2,384.00 | (6)>4.350 | 42.831 | 47.181 |
| 2,384.50 | (6)>4.452 | 94.024 | 98.477 |
| 2,385.00 | (6)>4.555 | 164.988 | 169.543 |

## *Structure #1 (Pond)*

### *Existing Pond 1A*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,150.00 ft |
| Initial Pool: | 0.31 ac-ft |
| *Sediment Storage: | 1.89 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 12.00 | 40.00 | 2.00 | 0.0240 | 2,150.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,151.30 | 32.00 | 2.00:1 | 2.00:1 | 21.50 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,153.13 ft |
| H'graph Detention Time: | 0.79 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.43 days |
| Trap Efficiency: | 23.57 % |

*Dewatering time is calculated from peak stage to lowest spillway*

## Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,149.00 | 0.297 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,149.00 | 0.297 | 0.001 | 0.000 | | |
| 2,149.50 | 0.312 | 0.153 | 0.000 | | |
| 2,150.00 | 0.327 | 0.313 | 0.000 | | Spillway #1 |
| 2,150.50 | 0.343 | 0.480 | 1.201 | 13.30 | |
| 2,151.00 | 0.359 | 0.656 | 1.805 | 2.35 | |
| 2,151.30 | 0.369 | 0.765 | 2.696 | 3.35 | Spillway #2 |
| 2,151.50 | 0.376 | 0.840 | 9.819 | 13.25 | |
| 2,152.00 | 0.393 | 1.032 | 27.308 | 1.50 | |
| 2,152.50 | 0.410 | 1.232 | 70.528 | 0.50 | |
| 2,153.00 | 0.428 | 1.442 | 129.987 | | |
| 2,153.13 | 0.432 | 1.497 | 147.994 | 0.10 | Peak Stage |
| 2,153.50 | 0.446 | 1.660 | 200.393 | | |
| 2,154.00 | 0.464 | 1.887 | 287.510 | | |

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,149.00 | 0.000 | 0.000 | 0.000 |
| 2,149.00 | 0.000 | 0.000 | 0.000 |
| 2,149.50 | 0.000 | 0.000 | 0.000 |
| 2,150.00 | 0.000 | 0.000 | 0.000 |
| 2,150.50 | (1)>1.201 | 0.000 | 1.201 |
| 2,151.00 | (1)>1.805 | 0.000 | 1.805 |
| 2,151.30 | (2)>2.696 | 0.000 | 2.696 |
| 2,151.50 | (5)>3.029 | 6.790 | 9.819 |
| 2,152.00 | (6)>3.540 | 23.768 | 27.308 |
| 2,152.50 | (6)>3.966 | 66.562 | 70.528 |
| 2,153.00 | (6)>4.351 | 125.635 | 129.987 |
| 2,153.50 | (6)>4.704 | 195.690 | 200.393 |
| 2,154.00 | (6)>5.019 | 282.491 | 287.510 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #2 | 1 | 32.600 | 0.106 | 0.071 | 0.437 | 73.000 | S | 85.19 | 6.617 |
| | 2 | 2.300 | 0.038 | 0.044 | 0.429 | 86.000 | F | 8.04 | 0.700 |
| | 3 | 4.400 | 0.038 | 0.021 | 0.442 | 79.000 | M | 13.39 | 1.090 |
| | 4 | 2.400 | 0.061 | 0.021 | 0.442 | 74.000 | M | 6.45 | 0.504 |
| | 5 | 5.300 | 0.060 | 0.041 | 0.319 | 79.000 | M | 16.13 | 1.312 |
| | 6 | 4.000 | 0.036 | 0.000 | 0.000 | 74.000 | M | 10.75 | 0.841 |
| | Σ | **51.000** | | | | | | **135.70** | **11.064** |
| #1 | 1 | 13.000 | 0.127 | 0.000 | 0.000 | 74.000 | M | 23.58 | 2.223 |
| | Σ | **64.000** | | | | | | **155.32** | **13.286** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #2 | 1 | 0.170 | 100.00 | 25.00 | 0.0030 | 1.0000 | 1 | 7.4 | 1,627 | 1.04 | 0.52 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 143.3 | 246,284 | 132.68 | 74.77 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 38.0 | 46,674 | 25.14 | 13.63 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 5.9 | 16,096 | 8.67 | 4.58 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 46.8 | 47,708 | 25.70 | 13.93 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 10.4 | 17,107 | 9.22 | 4.87 |
| | Σ | | | | | | | **251.8** | **64,059** | **34.70** | **8.97** |
| #1 | 1 | 0.220 | 100.00 | 21.00 | 0.0500 | 1.0000 | 2 | 39.0 | 24,079 | 11.52 | 6.12 |
| | Σ | | | | | | | **133.9** | **17,264** | **4.12** | **1.80** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 2. Minimum tillage cultivation | 42.31 | 220.00 | 520.00 | 3.250 | 0.044 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 9.00 | 900.00 | 3.000 | 0.083 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.127** |
| #2 | 1 | 1. Forest with heavy ground litter | 30.00 | 150.00 | 499.99 | 1.380 | 0.100 |
| | | 8. Large gullies, diversions, and low flowing streams | 28.21 | 110.00 | 390.00 | 15.930 | 0.006 |
| **#2** | **1** | **Time of Concentration:** | | | | | **0.106** |

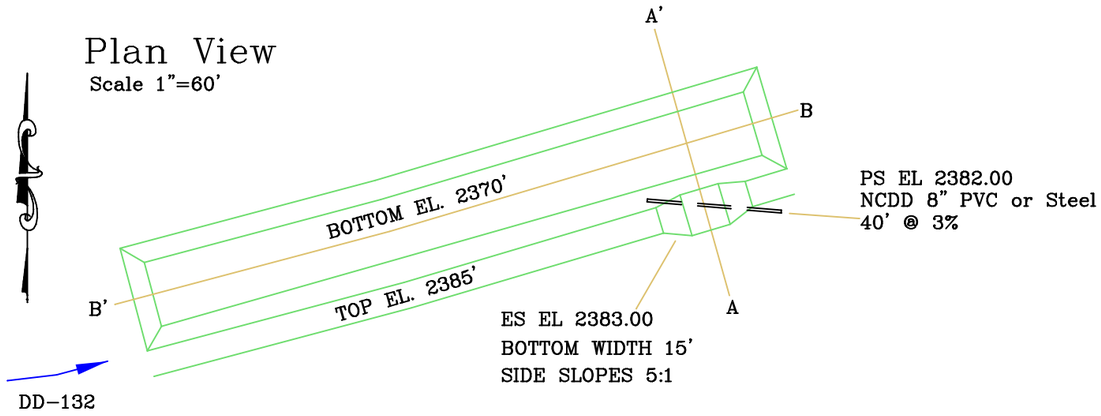
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #2 | 2 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 150.00 | 300.00 | 7.070 | 0.011 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#2** | **2** | **Time of Concentration:** | | | | | **0.038** |
| #2 | 3 | 3. Short grass pasture | 51.52 | 170.00 | 330.00 | 5.740 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| **#2** | **3** | **Time of Concentration:** | | | | | **0.038** |
| #2 | 4 | 2. Minimum tillage cultivation | 54.55 | 180.00 | 330.00 | 3.690 | 0.024 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#2** | **4** | **Time of Concentration:** | | | | | **0.061** |
| #2 | 5 | 3. Short grass pasture | 50.00 | 150.00 | 300.00 | 5.650 | 0.014 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#2** | **5** | **Time of Concentration:** | | | | | **0.060** |
| #2 | 6 | 2. Minimum tillage cultivation | 50.00 | 120.00 | 240.00 | 3.530 | 0.018 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#2** | **6** | **Time of Concentration:** | | | | | **0.036** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #2 | 1 | 8. Large gullies, diversions, and low flowing streams | 53.13 | 170.00 | 320.00 | 21.860 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| | | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#2** | **1** | **Muskingum K:** | | | | | **0.071** |
| #2 | 2 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 150.00 | 300.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.50 | 450.00 | 3.000 | 0.041 |
| **#2** | **2** | **Muskingum K:** | | | | | **0.044** |
| #2 | 3 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 120.00 | 240.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#2** | **3** | **Muskingum K:** | | | | | **0.021** |
| #2 | 4 | 8. Large gullies, diversions, and low flowing streams | 50.00 | 120.00 | 240.00 | 21.210 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |

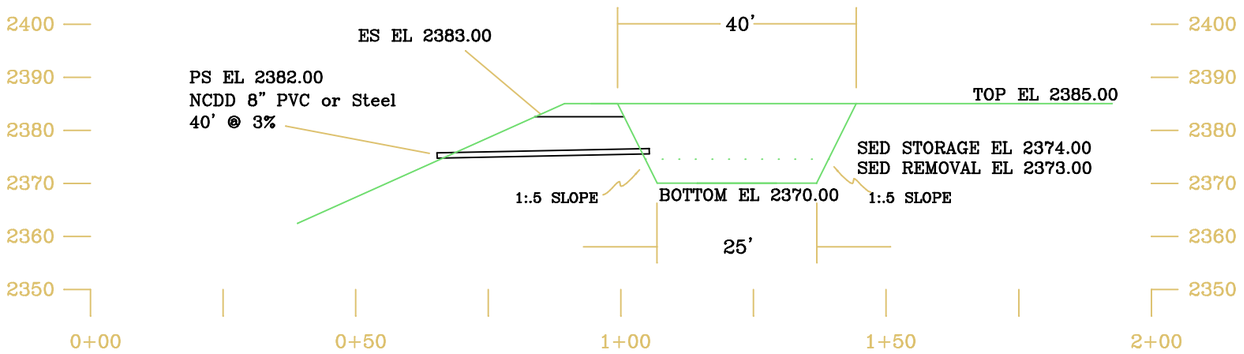
| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#2** | **4** | **Muskingum K:** | | | | | **0.021** |
| #2 | 5 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.50 | 450.00 | 3.000 | 0.041 |
| **#2** | **5** | **Muskingum K:** | | | | | **0.041** |

## Plan View
Scale 1"=60'

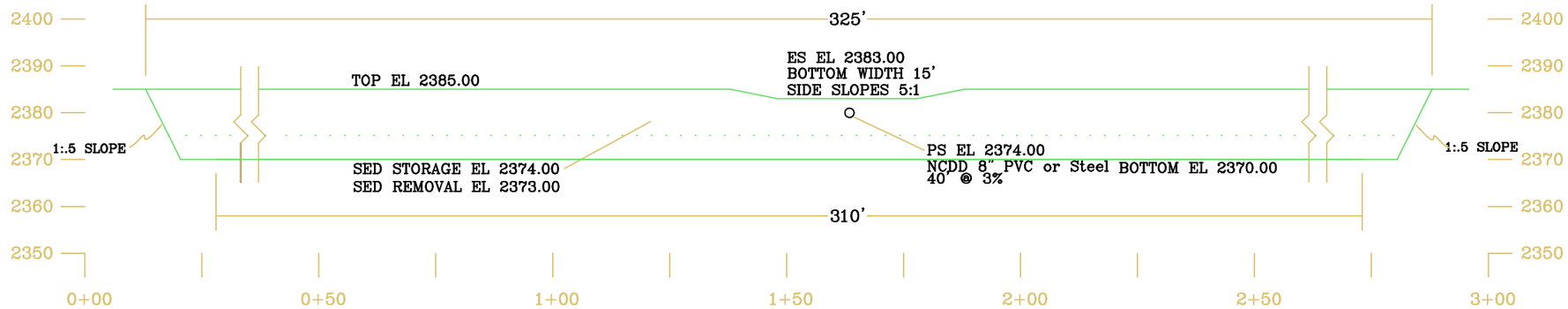



NOTE:
DISCHARGE FROM POND 32
ENTERS POND 3191 1A
VIA DC-1 AND 36ø INLET PIPE

## Section A-A'
Scale 1"=30'




## Section B-B'
Scale 1"=30'



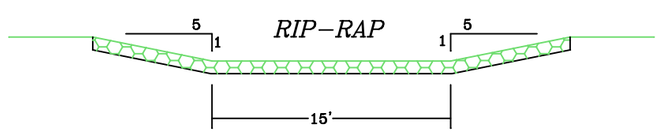

| | |
|---|---|
| *Top of Pond* | *2385.00* |
| *E.S.* | *2383.00* |
| *N.C.D.D* | *2374.00* |
| *Sed. Storage* | *2374.00* |
| *Sed. Removal* | *2373.00* |
| *Bottom* | *2370.00* |

*LEGEND*

*Ground Line*

*Sediment Storage Level*

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D MIN = 2.00"*
*D 50 = 3.00"*
*D MAX = 4.50"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

HURRICANE CREEK MINING, LLC

OSMRE APPLICATION #3341

Pond 32

DATE: 02/17/2023 | FILENAME: POND 32.dwg

SCALE: AS SHOWN | DRAWN BY:

Prepared By:

HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543

HOWARD
Engineering and Geology, I

# Hurricane Creek Mining, LLC
# OSMRE Permit #3241
# Proposed Pond SS-1
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

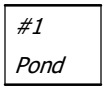
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Existing Pond SS-1 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 76.500 | 76.500 | 135.66 | 11.67 | 447.2 | 57,507 | 30.08 | 14.48 |
| | Out | | | 100.95 | 11.67 | 144.6 | 18,637 | 0.49 | 0.24 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 5.34 |
| | Out | 0.08 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.250% | 100.000% |
| 1.0000 | 98.486% | 100.000% |
| 0.5000 | 93.998% | 100.000% |
| 0.3000 | 90.263% | 100.000% |
| 0.2000 | 85.038% | 100.000% |
| 0.1000 | 74.525% | 100.000% |
| 0.0500 | 63.869% | 100.000% |
| 0.0300 | 53.219% | 100.000% |
| 0.0200 | 44.697% | 100.000% |
| 0.0100 | 34.047% | 100.000% |
| 0.0050 | 22.350% | 69.099% |
| 0.0030 | 15.961% | 49.347% |
| 0.0010 | 4.258% | 13.165% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Existing Pond SS-1*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 1,845.00 ft |
| Initial Pool: | 0.68 ac-ft |
| *Sediment Storage: | 4.67 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 60.00 | 2.00 | 0.0240 | 1,845.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 1,847.00 | 19.00 | 2.00:1 | 2.00:1 | 10.00 |

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 15.00 | 60.00 | 3.00 | 0.0240 | 1,845.00 | 0.90 | 0.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 1,848.97 ft |
| H'graph Detention Time: | 1.68 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.36 days |
| Trap Efficiency: | 67.65 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 1,844.00 | 0.660 | 0.000 | 0.000 | | Top of Sed. Storage |
| 1,844.50 | 0.678 | 0.334 | 0.000 | | |
| 1,845.00 | 0.695 | 0.677 | 0.000 | | Spillway #1<br>Spillway #3 |
| 1,845.50 | 0.712 | 1.029 | 1.278 | 18.45 | |
| 1,846.00 | 0.730 | 1.390 | 3.056 | 2.25 | |
| 1,846.50 | 0.748 | 1.759 | 5.288 | 4.80 | |
| 1,847.00 | 0.766 | 2.138 | 6.720 | 2.40 | Spillway #2 |
| 1,847.50 | 0.785 | 2.526 | 9.364 | 2.70 | |
| 1,848.00 | 0.803 | 2.923 | 33.844 | 1.50 | |
| 1,848.50 | 0.822 | 3.329 | 63.173 | 0.40 | |
| 1,848.97 | 0.840 | 3.724 | 100.946 | 0.15 | Peak Stage |
| 1,849.00 | 0.841 | 3.745 | 102.989 | | |
| 1,849.50 | 0.861 | 4.170 | 152.597 | | |
| 1,850.00 | 0.880 | 4.605 | 212.243 | | |

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 1,844.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1,844.50 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1,845.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1,845.50 | (3)>0.342 | 0.000 | (3)>0.936 | 1.278 |
| 1,846.00 | (4)>0.438 | 0.000 | (3)>2.618 | 3.056 |
| 1,846.50 | (5)>0.535 | 0.000 | (3)>4.753 | 5.288 |
| 1,847.00 | (6)>0.613 | 0.000 | (6)>6.107 | 6.720 |
| 1,847.50 | (6)>0.654 | 1.855 | (6)>6.855 | 9.364 |
| 1,848.00 | (6)>0.694 | 25.783 | (6)>7.368 | 33.844 |
| 1,848.50 | (6)>0.735 | 54.592 | (6)>7.846 | 63.173 |
| 1,849.00 | (6)>0.775 | 93.918 | (6)>8.296 | 102.989 |
| 1,849.50 | (6)>0.816 | 143.052 | (6)>8.730 | 152.597 |
| 1,850.00 | (6)>0.856 | 202.256 | (6)>9.130 | 212.243 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 5.900 | 0.086 | 0.159 | 0.439 | 73.000 | S | 12.23 | 0.931 |
| | 2 | 4.600 | 0.058 | 0.125 | 0.439 | 86.000 | F | 13.47 | 1.150 |
| | 3 | 5.500 | 0.055 | 0.094 | 0.442 | 79.000 | M | 13.65 | 1.088 |
| | 4 | 2.800 | 0.048 | 0.094 | 0.442 | 74.000 | M | 5.99 | 0.460 |
| | 5 | 5.200 | 0.061 | 0.094 | 0.442 | 79.000 | M | 12.91 | 1.029 |
| | 6 | 52.500 | 0.130 | 0.000 | 0.000 | 74.000 | M | 74.69 | 7.012 |
| | Σ | **76.500** | | | | | | **135.66** | **11.670** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 40.00 | 0.0030 | 1.0000 | 1 | 1.3 | 2,028 | 1.30 | 0.68 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 252.9 | 272,259 | 146.67 | 79.82 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 38.4 | 51,494 | 27.74 | 4.75 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 5.3 | 17,641 | 9.50 | 1.48 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 36.1 | 51,155 | 27.56 | 4.71 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 113.2 | 22,373 | 10.64 | 5.61 |
| | Σ | | | | | | | **447.2** | **57,507** | **30.08** | **14.48** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 40.00 | 200.00 | 500.00 | 1.600 | 0.086 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.086** |
| #1 | 2 | 5. Nearly bare and untilled, and alluvial valley fans | 33.33 | 150.00 | 450.00 | 5.770 | 0.021 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.058** |
| #1 | 3 | 3. Short grass pasture | 36.00 | 180.00 | 499.99 | 4.800 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.055** |
| #1 | 4 | 2. Minimum tillage cultivation | 40.00 | 100.00 | 250.00 | 3.160 | 0.021 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.048** |
| #1 | 5 | 3. Short grass pasture | 30.00 | 75.00 | 250.00 | 4.380 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.061** |
| #1 | 6 | 2. Minimum tillage cultivation | 40.00 | 200.00 | 500.00 | 3.160 | 0.043 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.78 | 340.00 | 900.00 | 18.430 | 0.013 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.130** |

# *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 36.00 | 180.00 | 500.00 | 18.000 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 30.00 | 75.00 | 250.00 | 16.430 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 40.00 | 200.00 | 500.00 | 18.970 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.78 | 340.00 | 900.00 | 18.430 | 0.013 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.159** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 30.00 | 75.00 | 249.99 | 16.430 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 40.00 | 200.00 | 500.00 | 18.970 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.78 | 340.00 | 900.00 | 18.430 | 0.013 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.125** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 200.00 | 500.00 | 18.970 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.78 | 340.00 | 900.00 | 18.430 | 0.013 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.094** |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 200.00 | 500.00 | 18.970 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.78 | 340.00 | 900.00 | 18.430 | 0.013 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.094** |
| #1 | 5 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 200.00 | 500.00 | 18.970 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.78 | 340.00 | 900.00 | 18.430 | 0.013 |
| **#1** | **5** | **Muskingum K:** | | | | | **0.094** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond SS-1
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

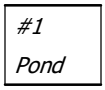
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Existing Pond SS-1 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 76.500 | 76.500 | 171.06 | 14.81 | 563.9 | 56,163 | 29.38 | 14.39 |
| | Out | | | 141.87 | 14.81 | 195.6 | 19,785 | 0.82 | 0.41 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 5.31 |
| | Out | 0.12 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.260% | 100.000% |
| 1.0000 | 98.506% | 100.000% |
| 0.5000 | 94.084% | 100.000% |
| 0.3000 | 90.404% | 100.000% |
| 0.2000 | 85.176% | 100.000% |
| 0.1000 | 74.517% | 100.000% |
| 0.0500 | 63.862% | 100.000% |
| 0.0300 | 53.213% | 100.000% |
| 0.0200 | 44.692% | 100.000% |
| 0.0100 | 34.043% | 98.160% |
| 0.0050 | 22.347% | 64.437% |
| 0.0030 | 15.959% | 46.018% |
| 0.0010 | 4.258% | 12.277% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Existing Pond SS-1*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 1,845.00 ft |
| Initial Pool: | 0.68 ac-ft |
| *Sediment Storage: | 4.67 ac-ft |
| Dead Space: | 20.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 60.00 | 2.00 | 0.0240 | 1,845.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 1,847.00 | 19.00 | 2.00:1 | 2.00:1 | 10.00 |

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 15.00 | 60.00 | 3.00 | 0.0240 | 1,845.00 | 0.90 | 0.00 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 1,849.39 ft |
| H'graph Detention Time: | 1.48 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.38 days |
| Trap Efficiency: | 65.32 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 1,844.00 | 0.660 | 0.000 | 0.000 | | Top of Sed. Storage |
| 1,844.50 | 0.678 | 0.334 | 0.000 | | |
| 1,845.00 | 0.695 | 0.677 | 0.000 | | Spillway #1<br>Spillway #3 |
| 1,845.50 | 0.712 | 1.029 | 1.278 | 18.50 | |
| 1,846.00 | 0.730 | 1.390 | 3.056 | 2.15 | |
| 1,846.50 | 0.748 | 1.759 | 5.288 | 4.05 | |
| 1,847.00 | 0.766 | 2.138 | 6.720 | 2.50 | Spillway #2 |
| 1,847.50 | 0.785 | 2.526 | 9.364 | 3.20 | |
| 1,848.00 | 0.803 | 2.923 | 33.844 | 2.00 | |
| 1,848.50 | 0.822 | 3.329 | 63.173 | 0.40 | |
| 1,849.00 | 0.841 | 3.745 | 102.989 | 0.15 | |
| 1,849.39 | 0.856 | 4.078 | 141.866 | 0.15 | Peak Stage |
| 1,849.50 | 0.861 | 4.170 | 152.597 | | |
| 1,850.00 | 0.880 | 4.605 | 212.243 | | |

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Straight Pipe (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|---|
| 1,844.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1,844.50 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1,845.00 | 0.000 | 0.000 | 0.000 | 0.000 |
| 1,845.50 | (3)>0.342 | 0.000 | (3)>0.936 | 1.278 |
| 1,846.00 | (4)>0.438 | 0.000 | (3)>2.618 | 3.056 |
| 1,846.50 | (5)>0.535 | 0.000 | (3)>4.753 | 5.288 |
| 1,847.00 | (6)>0.613 | 0.000 | (6)>6.107 | 6.720 |
| 1,847.50 | (6)>0.654 | 1.855 | (6)>6.855 | 9.364 |
| 1,848.00 | (6)>0.694 | 25.783 | (6)>7.368 | 33.844 |
| 1,848.50 | (6)>0.735 | 54.592 | (6)>7.846 | 63.173 |
| 1,849.00 | (6)>0.775 | 93.918 | (6)>8.296 | 102.989 |
| 1,849.50 | (6)>0.816 | 143.052 | (6)>8.730 | 152.597 |
| 1,850.00 | (6)>0.856 | 202.256 | (6)>9.130 | 212.243 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 5.900 | 0.086 | 0.159 | 0.439 | 73.000 | S | 15.42 | 1.198 |
| | 2 | 4.600 | 0.058 | 0.125 | 0.439 | 86.000 | F | 16.08 | 1.399 |
| | 3 | 5.500 | 0.055 | 0.094 | 0.442 | 79.000 | M | 16.74 | 1.362 |
| | 4 | 2.800 | 0.048 | 0.094 | 0.442 | 74.000 | M | 7.52 | 0.588 |
| | 5 | 5.200 | 0.061 | 0.094 | 0.442 | 79.000 | M | 15.83 | 1.288 |
| | 6 | 52.500 | 0.130 | 0.000 | 0.000 | 74.000 | M | 95.21 | 8.976 |
| | Σ | **76.500** | | | | | | **171.06** | **14.811** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.170 | 100.00 | 40.00 | 0.0030 | 1.0000 | 1 | 1.8 | 2,039 | 1.30 | 0.69 |
| | 2 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 311.6 | 274,434 | 147.85 | 80.72 |
| | 3 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 48.8 | 51,784 | 27.90 | 4.92 |
| | 4 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 7.0 | 17,702 | 9.54 | 1.56 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 45.9 | 51,444 | 27.71 | 4.89 |
| | 6 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 149.0 | 22,801 | 10.91 | 5.80 |
| | Σ | | | | | | | **563.9** | **56,163** | **29.38** | **14.39** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 1. Forest with heavy ground litter | 40.00 | 200.00 | 500.00 | 1.600 | 0.086 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.086** |
| #1 | 2 | 5. Nearly bare and untilled, and alluvial valley fans | 33.33 | 150.00 | 450.00 | 5.770 | 0.021 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.058** |
| #1 | 3 | 3. Short grass pasture | 36.00 | 180.00 | 499.99 | 4.800 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.055** |
| #1 | 4 | 2. Minimum tillage cultivation | 40.00 | 100.00 | 250.00 | 3.160 | 0.021 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.048** |
| #1 | 5 | 3. Short grass pasture | 30.00 | 75.00 | 250.00 | 4.380 | 0.015 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.061** |
| #1 | 6 | 2. Minimum tillage cultivation | 40.00 | 200.00 | 500.00 | 3.160 | 0.043 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.78 | 340.00 | 900.00 | 18.430 | 0.013 |
| **#1** | **6** | **Time of Concentration:** | | | | | **0.130** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 36.00 | 180.00 | 500.00 | 18.000 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 30.00 | 75.00 | 250.00 | 16.430 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 40.00 | 200.00 | 500.00 | 18.970 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.78 | 340.00 | 900.00 | 18.430 | 0.013 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.159** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 30.00 | 75.00 | 249.99 | 16.430 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 40.00 | 200.00 | 500.00 | 18.970 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.78 | 340.00 | 900.00 | 18.430 | 0.013 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.125** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 200.00 | 500.00 | 18.970 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.78 | 340.00 | 900.00 | 18.430 | 0.013 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.094** |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 200.00 | 500.00 | 18.970 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.78 | 340.00 | 900.00 | 18.430 | 0.013 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.094** |
| #1 | 5 | 8. Large gullies, diversions, and low flowing streams | 40.00 | 200.00 | 500.00 | 18.970 | 0.007 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 8.00 | 800.00 | 3.000 | 0.074 |
| | | 8. Large gullies, diversions, and low flowing streams | 37.78 | 340.00 | 900.00 | 18.430 | 0.013 |
| **#1** | **5** | **Muskingum K:** | | | | | **0.094** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond SS-2
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

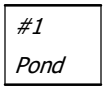
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond SS-2 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 54.920 | 54.920 | 90.64 | 8.17 | 325.4 | 63,566 | 33.09 | 14.98 |
| | Out | | | 17.38 | 5.93 | 53.1 | 11,324 | 0.00 | 0.00 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 5.33 |
| | Out | 0.00 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.302% | 100.000% |
| 1.0000 | 98.588% | 100.000% |
| 0.5000 | 94.306% | 100.000% |
| 0.3000 | 90.737% | 100.000% |
| 0.2000 | 85.741% | 100.000% |
| 0.1000 | 75.168% | 100.000% |
| 0.0500 | 64.430% | 100.000% |
| 0.0300 | 53.691% | 100.000% |
| 0.0200 | 45.101% | 100.000% |
| 0.0100 | 34.362% | 100.000% |
| 0.0050 | 22.550% | 100.000% |
| 0.0030 | 16.107% | 98.739% |
| 0.0010 | 4.295% | 26.330% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond SS-2*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 1,855.20 ft |
| Initial Pool: | 1.42 ac-ft |
| *Sediment Storage: | 4.40 ac-ft |
| Dead Space: | 0.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 60.00 | 2.00 | 0.0240 | 1,855.20 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 1,858.00 | 17.00 | 4.00:1 | 4.00:1 | 23.50 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 1,858.61 ft |
| H'graph Detention Time: | 7.22 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 4.08 days |
| Trap Efficiency: | 83.69 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 1,854.00 | 1.163 | 0.000 | 0.000 | | Top of Sed. Storage |
| 1,854.00 | 1.163 | 0.000 | 0.000 | | |
| 1,854.50 | 1.179 | 0.586 | 0.000 | | |
| 1,855.00 | 1.195 | 1.179 | 0.000 | | |
| 1,855.20 | 1.201 | 1.419 | 0.000 | | Spillway #1 |
| 1,855.50 | 1.211 | 1.780 | 0.303 | 14.43* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 1,856.00 | 1.227 | 2.390 | 0.400 | 18.45* | |
| 1,856.50 | 1.243 | 3.007 | 0.496 | 15.06* | |
| 1,857.00 | 1.260 | 3.633 | 0.592 | 12.78* | |
| 1,857.50 | 1.276 | 4.267 | 0.637 | 12.03* | |
| 1,858.00 | 1.293 | 4.909 | 0.678 | 11.80 | Spillway #2 |
| 1,858.50 | 1.309 | 5.560 | 5.182 | 11.25 | |
| 1,858.61 | 1.313 | 5.701 | 17.382 | 2.20 | Peak Stage |
| 1,859.00 | 1.326 | 6.218 | 61.812 | | |
| 1,859.50 | 1.343 | 6.886 | 129.290 | | |
| 1,860.00 | 1.360 | 7.561 | 218.858 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 1,854.00 | 0.000 | 0.000 | 0.000 |
| 1,854.00 | 0.000 | 0.000 | 0.000 |
| 1,854.50 | 0.000 | 0.000 | 0.000 |
| 1,855.00 | 0.000 | 0.000 | 0.000 |
| 1,855.20 | 0.000 | 0.000 | 0.000 |
| 1,855.50 | (3)>0.303 | 0.000 | 0.303 |
| 1,856.00 | (4)>0.400 | 0.000 | 0.400 |
| 1,856.50 | (5)>0.496 | 0.000 | 0.496 |
| 1,857.00 | (6)>0.592 | 0.000 | 0.592 |
| 1,857.50 | (6)>0.637 | 0.000 | 0.637 |
| 1,858.00 | (6)>0.678 | 0.000 | 0.678 |
| 1,858.50 | (6)>0.718 | 4.464 | 5.182 |
| 1,859.00 | (6)>0.759 | 61.053 | 61.812 |
| 1,859.50 | (6)>0.799 | 128.491 | 129.290 |
| 1,860.00 | (6)>0.840 | 218.018 | 218.858 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 2.000 | 0.029 | 0.142 | 0.437 | 79.000 | M | 4.96 | 0.395 |
| | 2 | 1.600 | 0.047 | 0.152 | 0.436 | 86.000 | F | 4.69 | 0.400 |
| | 3 | 3.700 | 0.050 | 0.112 | 0.438 | 74.000 | M | 7.92 | 0.607 |
| | 4 | 3.500 | 0.048 | 0.112 | 0.438 | 86.000 | F | 10.25 | 0.875 |
| | 5 | 44.120 | 0.146 | 0.000 | 0.000 | 74.000 | M | 62.77 | 5.893 |
| | Σ | **54.920** | | | | | | **90.64** | **8.171** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 12.4 | 44,980 | 24.23 | 4.28 |
| | 2 | 0.220 | 50.00 | 20.00 | 0.9000 | 1.0000 | 2 | 60.4 | 187,805 | 101.18 | 56.32 |
| | 3 | 0.220 | 50.00 | 21.00 | 0.0500 | 1.0000 | 2 | 6.0 | 13,969 | 7.53 | 3.91 |
| | 4 | 0.220 | 50.00 | 21.00 | 0.9000 | 1.0000 | 2 | 153.4 | 215,510 | 116.10 | 64.74 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 93.2 | 21,915 | 10.42 | 5.50 |
| | Σ | | | | | | | **325.4** | **63,566** | **33.09** | **14.98** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 3. Short grass pasture | 50.00 | 120.00 | 240.00 | 5.650 | 0.011 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.029** |
| #1 | 2 | 5. Nearly bare and untilled, and alluvial valley fans | 41.67 | 100.00 | 240.00 | 6.450 | 0.010 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.047** |
| #1 | 3 | 2. Minimum tillage cultivation | 42.86 | 120.00 | 280.00 | 3.270 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.050** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 42.31 | 110.00 | 260.00 | 6.500 | 0.011 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.048** |
| #1 | 5 | 2. Minimum tillage cultivation | 48.00 | 240.00 | 500.00 | 3.460 | 0.040 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.33 | 300.00 | 900.00 | 17.320 | 0.014 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.146** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 120.00 | 280.00 | 19.630 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 48.00 | 240.00 | 500.00 | 20.780 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.33 | 300.00 | 900.00 | 17.320 | 0.014 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.142** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 42.31 | 110.00 | 260.00 | 19.510 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 48.00 | 240.00 | 500.00 | 20.780 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.33 | 300.00 | 900.00 | 17.320 | 0.014 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.152** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 48.00 | 240.00 | 500.00 | 20.780 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.33 | 300.00 | 900.00 | 17.320 | 0.014 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.112** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 48.00 | 240.00 | 500.00 | 20.780 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.33 | 300.00 | 900.00 | 17.320 | 0.014 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.112** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond SS-2
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

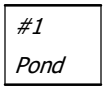
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond SS-2 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 54.920 | 54.920 | 113.99 | 10.37 | 409.6 | 61,730 | 32.14 | 14.86 |
| | Out | | | 39.62 | 8.11 | 88.3 | 12,755 | 0.01 | 0.00 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 5.32 |
| | Out | 0.00 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.314% | 100.000% |
| 1.0000 | 98.613% | 100.000% |
| 0.5000 | 94.408% | 100.000% |
| 0.3000 | 90.904% | 100.000% |
| 0.2000 | 85.908% | 100.000% |
| 0.1000 | 75.169% | 100.000% |
| 0.0500 | 64.431% | 100.000% |
| 0.0300 | 53.692% | 100.000% |
| 0.0200 | 45.102% | 100.000% |
| 0.0100 | 34.363% | 100.000% |
| 0.0050 | 22.551% | 100.000% |
| 0.0030 | 16.108% | 74.728% |
| 0.0010 | 4.295% | 19.927% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond SS-2*

Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 1,855.20 ft |
| Initial Pool: | 1.42 ac-ft |
| *Sediment Storage: | 4.40 ac-ft |
| Dead Space: | 0.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 6.00 | 60.00 | 2.00 | 0.0240 | 1,855.20 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 1,858.00 | 17.00 | 4.00:1 | 4.00:1 | 23.50 |

Pond Results:

| | |
|---|---|
| Peak Elevation: | 1,858.80 ft |
| H'graph Detention Time: | 5.43 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 4.11 days |
| Trap Efficiency: | 78.44 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 1,854.00 | 1.163 | 0.000 | 0.000 | | Top of Sed. Storage |
| 1,854.00 | 1.163 | 0.000 | 0.000 | | |
| 1,854.50 | 1.179 | 0.586 | 0.000 | | |
| 1,855.00 | 1.195 | 1.179 | 0.000 | | |
| 1,855.20 | 1.201 | 1.419 | 0.000 | | Spillway #1 |
| 1,855.50 | 1.211 | 1.780 | 0.303 | 14.43* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 1,856.00 | 1.227 | 2.390 | 0.400 | 18.45* | |
| 1,856.50 | 1.243 | 3.007 | 0.496 | 15.06* | |
| 1,857.00 | 1.260 | 3.633 | 0.592 | 12.78* | |
| 1,857.50 | 1.276 | 4.267 | 0.637 | 12.03* | |
| 1,858.00 | 1.293 | 4.909 | 0.678 | 11.80 | Spillway #2 |
| 1,858.50 | 1.309 | 5.560 | 5.182 | 10.75 | |
| 1,858.80 | 1.320 | 5.960 | 39.625 | 3.45 | Peak Stage |
| 1,859.00 | 1.326 | 6.218 | 61.812 | | |
| 1,859.50 | 1.343 | 6.886 | 129.290 | | |
| 1,860.00 | 1.360 | 7.561 | 218.858 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 1,854.00 | 0.000 | 0.000 | 0.000 |
| 1,854.00 | 0.000 | 0.000 | 0.000 |
| 1,854.50 | 0.000 | 0.000 | 0.000 |
| 1,855.00 | 0.000 | 0.000 | 0.000 |
| 1,855.20 | 0.000 | 0.000 | 0.000 |
| 1,855.50 | (3)>0.303 | 0.000 | 0.303 |
| 1,856.00 | (4)>0.400 | 0.000 | 0.400 |
| 1,856.50 | (5)>0.496 | 0.000 | 0.496 |
| 1,857.00 | (6)>0.592 | 0.000 | 0.592 |
| 1,857.50 | (6)>0.637 | 0.000 | 0.637 |
| 1,858.00 | (6)>0.678 | 0.000 | 0.678 |
| 1,858.50 | (6)>0.718 | 4.464 | 5.182 |
| 1,859.00 | (6)>0.759 | 61.053 | 61.812 |
| 1,859.50 | (6)>0.799 | 128.491 | 129.290 |
| 1,860.00 | (6)>0.840 | 218.018 | 218.858 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 2.000 | 0.029 | 0.142 | 0.437 | 79.000 | M | 6.09 | 0.495 |
| | 2 | 1.600 | 0.047 | 0.152 | 0.436 | 86.000 | F | 5.59 | 0.487 |
| | 3 | 3.700 | 0.050 | 0.112 | 0.438 | 74.000 | M | 9.94 | 0.778 |
| | 4 | 3.500 | 0.048 | 0.112 | 0.438 | 86.000 | F | 12.23 | 1.065 |
| | 5 | 44.120 | 0.146 | 0.000 | 0.000 | 74.000 | M | 80.02 | 7.543 |
| | Σ | **54.920** | | | | | | **113.99** | **10.367** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 50.00 | 25.00 | 0.1400 | 1.0000 | 2 | 15.7 | 45,254 | 24.38 | 4.43 |
| | 2 | 0.220 | 50.00 | 20.00 | 0.9000 | 1.0000 | 2 | 74.4 | 189,524 | 102.10 | 56.96 |
| | 3 | 0.220 | 50.00 | 21.00 | 0.0500 | 1.0000 | 2 | 7.8 | 14,011 | 7.55 | 3.98 |
| | 4 | 0.220 | 50.00 | 21.00 | 0.9000 | 1.0000 | 2 | 189.1 | 217,237 | 117.03 | 65.49 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.0500 | 1.0000 | 2 | 122.6 | 22,335 | 10.68 | 5.68 |
| | Σ | | | | | | | **409.6** | **61,730** | **32.14** | **14.86** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 3. Short grass pasture | 50.00 | 120.00 | 240.00 | 5.650 | 0.011 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.029** |
| #1 | 2 | 5. Nearly bare and untilled, and alluvial valley fans | 41.67 | 100.00 | 240.00 | 6.450 | 0.010 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.047** |
| #1 | 3 | 2. Minimum tillage cultivation | 42.86 | 120.00 | 280.00 | 3.270 | 0.023 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.050** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 42.31 | 110.00 | 260.00 | 6.500 | 0.011 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| **#1** | **4** | **Time of Concentration:** | | | | | **0.048** |
| #1 | 5 | 2. Minimum tillage cultivation | 48.00 | 240.00 | 500.00 | 3.460 | 0.040 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.33 | 300.00 | 900.00 | 17.320 | 0.014 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.146** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 42.86 | 120.00 | 280.00 | 19.630 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| | | 8. Large gullies, diversions, and low flowing streams | 48.00 | 240.00 | 500.00 | 20.780 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.33 | 300.00 | 900.00 | 17.320 | 0.014 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.142** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 42.31 | 110.00 | 260.00 | 19.510 | 0.003 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 4.00 | 400.00 | 3.000 | 0.037 |
| | | 8. Large gullies, diversions, and low flowing streams | 48.00 | 240.00 | 500.00 | 20.780 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.33 | 300.00 | 900.00 | 17.320 | 0.014 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.152** |
| #1 | 3 | 8. Large gullies, diversions, and low flowing streams | 48.00 | 240.00 | 500.00 | 20.780 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.33 | 300.00 | 900.00 | 17.320 | 0.014 |
| **#1** | **3** | **Muskingum K:** | | | | | **0.112** |
| #1 | 4 | 8. Large gullies, diversions, and low flowing streams | 48.00 | 240.00 | 500.00 | 20.780 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| | | 8. Large gullies, diversions, and low flowing streams | 33.33 | 300.00 | 900.00 | 17.320 | 0.014 |
| **#1** | **4** | **Muskingum K:** | | | | | **0.112** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #SS-20
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

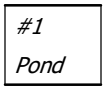
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond SS-20 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 23.400 | 23.400 | 55.68 | 4.63 | 646.4 | 233,232 | 125.65 | 52.01 |
| | Out | | | 2.67 | 4.32 | 87.4 | 37,019 | 0.00 | 0.00 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 15.26 |
| | Out | 0.00 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.001% | 100.000% |
| 1.0000 | 98.001% | 100.000% |
| 0.5000 | 92.001% | 100.000% |
| 0.3000 | 87.001% | 100.000% |
| 0.2000 | 80.001% | 100.000% |
| 0.1000 | 70.001% | 100.000% |
| 0.0500 | 60.000% | 100.000% |
| 0.0300 | 50.000% | 100.000% |
| 0.0200 | 42.000% | 100.000% |
| 0.0100 | 32.000% | 100.000% |
| 0.0050 | 21.000% | 100.000% |
| 0.0030 | 15.000% | 100.000% |
| 0.0010 | 4.000% | 29.587% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond SS-20*

### Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,319.10 ft |
| Initial Pool: | 0.73 ac-ft |
| *Sediment Storage: | 3.17 ac-ft |
| Dead Space: | 0.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 8.00 | 40.00 | 2.00 | 0.0240 | 2,319.10 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,322.50 | 34.00 | 2.00:1 | 2.00:1 | 20.00 |

### Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,322.52 ft |
| H'graph Detention Time: | 13.39 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.70 days |
| Trap Efficiency: | 86.48 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,318.10 | 0.698 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,318.50 | 0.724 | 0.282 | 0.000 | | |
| 2,319.00 | 0.757 | 0.652 | 0.000 | | |
| 2,319.10 | 0.764 | 0.729 | 0.000 | | Spillway #1 |
| 2,319.50 | 0.791 | 1.040 | 0.508 | 7.40* | |
| 2,320.00 | 0.826 | 1.444 | 0.843 | 5.80* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,320.50 | 0.862 | 1.866 | 1.166 | 5.10 | |
| 2,321.00 | 0.898 | 2.305 | 1.324 | 4.30 | |
| 2,321.50 | 0.935 | 2.764 | 1.481 | 3.95 | |
| 2,322.00 | 0.973 | 3.240 | 1.628 | 3.70 | |
| 2,322.50 | 1.011 | 3.736 | 1.743 | 7.95 | Spillway #2 |
| 2,322.52 | 1.013 | 3.759 | 2.673 | 2.55 | Peak Stage |
| 2,323.00 | 1.050 | 4.252 | 23.280 | | |
| 2,323.50 | 1.090 | 4.787 | 44.818 | | |
| 2,324.00 | 1.131 | 5.342 | 96.180 | | |
| 2,324.50 | 1.173 | 5.918 | 156.617 | | |
| 2,325.00 | 1.215 | 6.515 | 230.597 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,318.10 | 0.000 | 0.000 | 0.000 |
| 2,318.50 | 0.000 | 0.000 | 0.000 |
| 2,319.00 | 0.000 | 0.000 | 0.000 |
| 2,319.10 | 0.000 | 0.000 | 0.000 |
| 2,319.50 | (1)>0.508 | 0.000 | 0.508 |
| 2,320.00 | (3)>0.843 | 0.000 | 0.843 |
| 2,320.50 | (6)>1.166 | 0.000 | 1.166 |
| 2,321.00 | (6)>1.324 | 0.000 | 1.324 |
| 2,321.50 | (6)>1.481 | 0.000 | 1.481 |
| 2,322.00 | (6)>1.628 | 0.000 | 1.628 |
| 2,322.50 | (6)>1.743 | 0.000 | 1.743 |
| 2,323.00 | (6)>1.858 | 21.422 | 23.280 |
| 2,323.50 | (6)>1.973 | 42.845 | 44.818 |
| 2,324.00 | (6)>2.088 | 94.093 | 96.180 |
| 2,324.50 | (6)>2.181 | 154.436 | 156.617 |
| 2,325.00 | (6)>2.271 | 228.325 | 230.597 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 5.400 | 0.024 | 0.096 | 0.394 | 74.000 | S | 11.56 | 0.887 |
| | 2 | 5.700 | 0.074 | 0.092 | 0.319 | 74.000 | S | 12.20 | 0.936 |
| | 3 | 5.100 | 0.100 | 0.000 | 0.000 | 79.000 | M | 12.66 | 1.009 |
| | 4 | 5.500 | 0.054 | 0.000 | 0.000 | 86.000 | F | 16.11 | 1.375 |
| | 5 | 1.700 | 0.024 | 0.000 | 0.000 | 86.000 | F | 4.98 | 0.425 |
| | Σ | **23.400** | | | | | | **55.68** | **4.631** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 100.00 | 40.00 | 0.0500 | 1.0000 | 2 | 27.2 | 45,459 | 24.49 | 3.93 |
| | 2 | 0.220 | 100.00 | 15.00 | 0.0050 | 1.0000 | 2 | 1.0 | 1,548 | 0.83 | 0.42 |
| | 3 | 0.220 | 100.00 | 31.00 | 0.1400 | 1.0000 | 2 | 67.1 | 88,367 | 47.61 | 25.64 |
| | 4 | 0.220 | 100.00 | 25.00 | 0.9000 | 1.0000 | 2 | 468.2 | 385,586 | 207.73 | 118.22 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 82.9 | 236,560 | 127.44 | 71.52 |
| | Σ | | | | | | | **646.4** | **233,232** | **125.65** | **52.01** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 2. Minimum tillage cultivation | 39.29 | 110.00 | 280.00 | 3.130 | 0.024 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.024** |
| #1 | 2 | 2. Minimum tillage cultivation | 33.33 | 100.00 | 300.00 | 2.880 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.074** |
| #1 | 3 | 3. Short grass pasture | 62.50 | 125.00 | 200.00 | 6.320 | 0.008 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.100** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 20.00 | 100.00 | 500.00 | 4.470 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.054** |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 5 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 87.50 | 175.00 | 7.070 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.024** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 33.33 | 100.00 | 300.00 | 17.320 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.096** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.092** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #SS-20
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

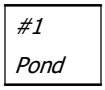
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond SS-20 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 23.400 | 23.400 | 68.55 | 5.79 | 801.2 | 236,783 | 127.56 | 51.63 |
| | Out | | | 9.92 | 5.44 | 134.5 | 39,684 | 0.01 | 0.00 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 15.45 |
| | Out | 0.00 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.001% | 100.000% |
| 1.0000 | 98.001% | 100.000% |
| 0.5000 | 92.001% | 100.000% |
| 0.3000 | 87.001% | 100.000% |
| 0.2000 | 80.001% | 100.000% |
| 0.1000 | 70.001% | 100.000% |
| 0.0500 | 60.000% | 100.000% |
| 0.0300 | 50.000% | 100.000% |
| 0.0200 | 42.000% | 100.000% |
| 0.0100 | 32.000% | 100.000% |
| 0.0050 | 21.000% | 100.000% |
| 0.0030 | 15.000% | 89.343% |
| 0.0010 | 4.000% | 23.825% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond SS-20*

### Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,319.10 ft |
| Initial Pool: | 0.73 ac-ft |
| *Sediment Storage: | 3.17 ac-ft |
| Dead Space: | 0.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 8.00 | 40.00 | 2.00 | 0.0240 | 2,319.10 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,322.50 | 34.00 | 2.00:1 | 2.00:1 | 20.00 |

### Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,322.69 ft |
| H'graph Detention Time: | 11.05 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 1.84 days |
| Trap Efficiency: | 83.21 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,318.10 | 0.698 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,318.50 | 0.724 | 0.282 | 0.000 | | |
| 2,319.00 | 0.757 | 0.652 | 0.000 | | |
| 2,319.10 | 0.764 | 0.729 | 0.000 | | Spillway #1 |
| 2,319.50 | 0.791 | 1.040 | 0.508 | 7.40* | |
| 2,320.00 | 0.826 | 1.444 | 0.843 | 5.80* | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,320.50 | 0.862 | 1.866 | 1.166 | 5.15 | |
| 2,321.00 | 0.898 | 2.305 | 1.324 | 4.25 | |
| 2,321.50 | 0.935 | 2.764 | 1.481 | 4.00 | |
| 2,322.00 | 0.973 | 3.240 | 1.628 | 3.70 | |
| 2,322.50 | 1.011 | 3.736 | 1.743 | 7.95 | Spillway #2 |
| 2,322.69 | 1.026 | 3.932 | 9.916 | 5.80 | Peak Stage |
| 2,323.00 | 1.050 | 4.252 | 23.280 | | |
| 2,323.50 | 1.090 | 4.787 | 44.818 | | |
| 2,324.00 | 1.131 | 5.342 | 96.180 | | |
| 2,324.50 | 1.173 | 5.918 | 156.617 | | |
| 2,325.00 | 1.215 | 6.515 | 230.597 | | |

**Designates time(s) to dewater have been extrapolated beyond the 50 hour hydrograph limit.*

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,318.10 | 0.000 | 0.000 | 0.000 |
| 2,318.50 | 0.000 | 0.000 | 0.000 |
| 2,319.00 | 0.000 | 0.000 | 0.000 |
| 2,319.10 | 0.000 | 0.000 | 0.000 |
| 2,319.50 | (1)>0.508 | 0.000 | 0.508 |
| 2,320.00 | (3)>0.843 | 0.000 | 0.843 |
| 2,320.50 | (6)>1.166 | 0.000 | 1.166 |
| 2,321.00 | (6)>1.324 | 0.000 | 1.324 |
| 2,321.50 | (6)>1.481 | 0.000 | 1.481 |
| 2,322.00 | (6)>1.628 | 0.000 | 1.628 |
| 2,322.50 | (6)>1.743 | 0.000 | 1.743 |
| 2,323.00 | (6)>1.858 | 21.422 | 23.280 |
| 2,323.50 | (6)>1.973 | 42.845 | 44.818 |
| 2,324.00 | (6)>2.088 | 94.093 | 96.180 |
| 2,324.50 | (6)>2.181 | 154.436 | 156.617 |
| 2,325.00 | (6)>2.271 | 228.325 | 230.597 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 5.400 | 0.024 | 0.096 | 0.394 | 74.000 | S | 14.51 | 1.135 |
| | 2 | 5.700 | 0.074 | 0.092 | 0.319 | 74.000 | S | 15.32 | 1.198 |
| | 3 | 5.100 | 0.100 | 0.000 | 0.000 | 79.000 | M | 15.52 | 1.263 |
| | 4 | 5.500 | 0.054 | 0.000 | 0.000 | 86.000 | F | 19.22 | 1.673 |
| | 5 | 1.700 | 0.024 | 0.000 | 0.000 | 86.000 | F | 5.94 | 0.517 |
| | Σ | **23.400** | | | | | | **68.55** | **5.786** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 100.00 | 40.00 | 0.0500 | 1.0000 | 2 | 35.5 | 45,646 | 24.59 | 4.14 |
| | 2 | 0.220 | 100.00 | 15.00 | 0.0050 | 1.0000 | 2 | 1.3 | 1,555 | 0.84 | 0.43 |
| | 3 | 0.220 | 100.00 | 31.00 | 0.1400 | 1.0000 | 2 | 85.3 | 88,776 | 47.83 | 26.03 |
| | 4 | 0.220 | 100.00 | 25.00 | 0.9000 | 1.0000 | 2 | 576.9 | 388,318 | 209.20 | 119.48 |
| | 5 | 0.220 | 50.00 | 25.00 | 0.9000 | 1.0000 | 2 | 102.2 | 238,350 | 128.41 | 72.31 |
| | Σ | | | | | | | **801.2** | **236,783** | **127.56** | **51.63** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 2. Minimum tillage cultivation | 39.29 | 110.00 | 280.00 | 3.130 | 0.024 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.024** |
| #1 | 2 | 2. Minimum tillage cultivation | 33.33 | 100.00 | 300.00 | 2.880 | 0.028 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.074** |
| #1 | 3 | 3. Short grass pasture | 62.50 | 125.00 | 200.00 | 6.320 | 0.008 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.100** |
| #1 | 4 | 5. Nearly bare and untilled, and alluvial valley fans | 20.00 | 100.00 | 500.00 | 4.470 | 0.031 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.50 | 250.00 | 3.000 | 0.023 |
| **#1** | **4** | **Time of Concentration:** | | | | | **0.054** |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 5 | 5. Nearly bare and untilled, and alluvial valley fans | 50.00 | 87.50 | 175.00 | 7.070 | 0.006 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 2.00 | 200.00 | 3.000 | 0.018 |
| **#1** | **5** | **Time of Concentration:** | | | | | **0.024** |

## *Subwatershed Muskingum Routing Details:*

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 33.33 | 100.00 | 300.00 | 17.320 | 0.004 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.096** |
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 10.00 | 1,000.00 | 3.000 | 0.092 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.092** |

# Hurricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #SS-21
# 10yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

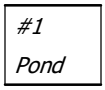
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 10 yr - 24 hr |
| Rainfall Depth: | 4.500 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond SS-21 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 11.900 | 11.900 | 31.28 | 2.59 | 815.1 | 362,919 | 195.52 | 109.99 |
| | Out | | | 9.55 | 2.59 | 182.0 | 91,864 | 0.14 | 0.08 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 31.64 |
| | Out | 0.04 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.000% | 100.000% |
| 1.0000 | 98.000% | 100.000% |
| 0.5000 | 92.000% | 100.000% |
| 0.3000 | 87.000% | 100.000% |
| 0.2000 | 80.000% | 100.000% |
| 0.1000 | 70.000% | 100.000% |
| 0.0500 | 60.000% | 100.000% |
| 0.0300 | 50.000% | 100.000% |
| 0.0200 | 42.000% | 100.000% |
| 0.0100 | 32.000% | 100.000% |
| 0.0050 | 21.000% | 94.031% |
| 0.0030 | 15.000% | 67.165% |
| 0.0010 | 4.000% | 17.911% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond SS-21*

### Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,319.00 ft |
| Initial Pool: | 0.26 ac-ft |
| *Sediment Storage: | 1.32 ac-ft |
| Dead Space: | 0.00 % |

**Sediment capacity was entered by user*

### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 12.00 | 40.00 | 2.00 | 0.0240 | 2,319.00 | 0.90 | 0.00 |

### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,322.20 | 25.00 | 2.00:1 | 2.00:1 | 10.00 |

### Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,322.45 ft |
| H'graph Detention Time: | 1.91 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 0.77 days |
| Trap Efficiency: | 77.67 % |

*Dewatering time is calculated from peak stage to lowest spillway*

### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,317.98 | 0.241 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,318.00 | 0.242 | 0.005 | 0.000 | | |
| 2,318.50 | 0.254 | 0.129 | 0.000 | | |
| 2,319.00 | 0.267 | 0.259 | 0.000 | | Spillway #1 |
| 2,319.50 | 0.280 | 0.396 | 1.201 | 10.85 | |
| 2,320.00 | 0.294 | 0.539 | 1.805 | 2.35 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,320.50 | 0.307 | 0.689 | 3.029 | 1.35 | |
| 2,321.00 | 0.322 | 0.847 | 3.540 | 0.95 | |
| 2,321.50 | 0.336 | 1.011 | 3.966 | 0.85 | |
| 2,322.00 | 0.351 | 1.183 | 4.351 | 0.95 | |
| 2,322.20 | 0.357 | 1.253 | 4.499 | 0.55 | Spillway #2 |
| 2,322.45 | 0.364 | 1.342 | 9.553 | 0.65 | Peak Stage |
| 2,322.50 | 0.366 | 1.362 | 10.677 | | |
| 2,323.00 | 0.381 | 1.549 | 20.947 | | |
| 2,323.50 | 0.397 | 1.743 | 45.637 | | |
| 2,324.00 | 0.413 | 1.946 | 79.471 | | |
| 2,324.50 | 0.429 | 2.156 | 122.562 | | |
| 2,325.00 | 0.446 | 2.375 | 176.364 | | |

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,317.98 | 0.000 | 0.000 | 0.000 |
| 2,318.00 | 0.000 | 0.000 | 0.000 |
| 2,318.50 | 0.000 | 0.000 | 0.000 |
| 2,319.00 | 0.000 | 0.000 | 0.000 |
| 2,319.50 | (1)>1.201 | 0.000 | 1.201 |
| 2,320.00 | (1)>1.805 | 0.000 | 1.805 |
| 2,320.50 | (5)>3.029 | 0.000 | 3.029 |
| 2,321.00 | (6)>3.540 | 0.000 | 3.540 |
| 2,321.50 | (6)>3.966 | 0.000 | 3.966 |
| 2,322.00 | (6)>4.351 | 0.000 | 4.351 |
| 2,322.20 | (6)>4.499 | 0.000 | 4.499 |
| 2,322.50 | (6)>4.704 | 5.973 | 10.677 |
| 2,323.00 | (6)>5.019 | 15.927 | 20.947 |
| 2,323.50 | (6)>5.335 | 40.302 | 45.637 |
| 2,324.00 | (6)>5.642 | 73.829 | 79.471 |
| 2,324.50 | (6)>5.906 | 116.656 | 122.562 |
| 2,325.00 | (6)>6.170 | 170.194 | 176.364 |

# Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 2.200 | 0.017 | 0.051 | 0.418 | 74.000 | S | 4.71 | 0.361 |
| | 2 | 3.700 | 0.067 | 0.027 | 0.319 | 79.000 | M | 9.18 | 0.732 |
| | 3 | 6.000 | 0.018 | 0.000 | 0.000 | 86.000 | F | 17.57 | 1.500 |
| | Σ | **11.900** | | | | | | **31.28** | **2.593** |

# Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 100.00 | 50.00 | 0.0500 | 1.0000 | 2 | 12.2 | 46,358 | 24.97 | 13.18 |
| | 2 | 0.220 | 100.00 | 15.00 | 0.1400 | 1.0000 | 2 | 20.6 | 38,241 | 20.60 | 11.04 |
| | 3 | 0.220 | 100.00 | 37.50 | 0.9000 | 1.0000 | 2 | 782.3 | 545,785 | 294.03 | 170.21 |
| | Σ | | | | | | | **815.1** | **362,919** | **195.52** | **109.99** |

# Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 2. Minimum tillage cultivation | 50.00 | 110.00 | 220.00 | 3.530 | 0.017 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.017** |
| #1 | 2 | 3. Short grass pasture | 31.43 | 110.00 | 350.00 | 4.480 | 0.021 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.067** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 37.50 | 150.00 | 400.00 | 6.120 | 0.018 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.018** |

# Subwatershed Muskingum Routing Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 31.43 | 110.00 | 350.00 | 16.810 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.051** |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.027** |

# Huuricane Creek Mining, LLC
# OSMRE Permit #3341
# Proposed Pond #SS-21
# 25yr. - 24hr.
# During Mining Storm Event

Timothy W. Messer

# *General Information*

## *Storm Information:*

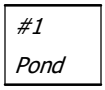
| | |
|---|---|
| Storm Type: | NRCS Type II |
| Design Storm: | 25 yr - 24 hr |
| Rainfall Depth: | 5.200 inches |

## *Particle Size Distribution:*

| Size (mm) | undisturbed | disturbed |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 93.000% | 99.000% |
| 1.0000 | 86.000% | 98.000% |
| 0.5000 | 78.000% | 92.000% |
| 0.3000 | 73.000% | 87.000% |
| 0.2000 | 67.000% | 80.000% |
| 0.1000 | 55.000% | 70.000% |
| 0.0500 | 44.000% | 60.000% |
| 0.0300 | 35.000% | 50.000% |
| 0.0200 | 27.000% | 42.000% |
| 0.0100 | 18.000% | 32.000% |
| 0.0050 | 14.000% | 21.000% |
| 0.0030 | 9.000% | 15.000% |
| 0.0010 | 3.000% | 4.000% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Networking:*

| Type | Stru # | (flows into) | Stru # | Musk. K (hrs) | Musk. X | Description |
|---|---|---|---|---|---|---|
| Pond | #1 | ==> | End | 0.000 | 0.000 | Proposed Pond SS-21 |



# *Structure Summary:*

| | | Immediate Contributing Area (ac) | Total Contributing Area (ac) | Peak Discharge (cfs) | Total Runoff Volume (ac-ft) | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc. (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | In | 11.900 | 11.900 | 37.95 | 3.20 | 1,006.0 | 367,126 | 197.78 | 109.89 |
| | Out | | | 19.61 | 3.20 | 245.5 | 100,453 | 0.93 | 0.53 |

The 24 hour Arithmetic Average (24AA) is under review. It is anticipated that the 24AA will be replaced by the peak settleable solids concentration (ml/l) with the addition of new sediment input factor values.

The 24AA is provided for your convenience during this transition period.

| | | 24AA (ml/l) |
|---|---|---|
| #1 | In | 32.32 |
| | Out | 0.23 |

# *Particle Size Distribution(s) at Each Structure*

## *Structure #1:*

| Size (mm) | In | Out |
|---|---|---|
| 3.0000 | 100.000% | 100.000% |
| 2.0000 | 99.000% | 100.000% |
| 1.0000 | 98.000% | 100.000% |
| 0.5000 | 92.000% | 100.000% |
| 0.3000 | 87.000% | 100.000% |
| 0.2000 | 80.000% | 100.000% |
| 0.1000 | 70.000% | 100.000% |
| 0.0500 | 60.000% | 100.000% |
| 0.0300 | 50.000% | 100.000% |
| 0.0200 | 42.000% | 100.000% |
| 0.0100 | 32.000% | 100.000% |
| 0.0050 | 21.000% | 86.055% |
| 0.0030 | 15.000% | 61.468% |
| 0.0010 | 4.000% | 16.391% |
| 0.0001 | 0.000% | 0.000% |

# *Structure Detail:*

## *Structure #1 (Pond)*

*Proposed Pond SS-21*

### Pond Inputs:

| | |
|---|---|
| Initial Pool Elev: | 2,319.00 ft |
| Initial Pool: | 0.26 ac-ft |
| *Sediment Storage: | 1.32 ac-ft |
| Dead Space: | 0.00 % |

**Sediment capacity was entered by user*

#### Straight Pipe

| Barrel Diameter (in) | Barrel Length (ft) | Barrel Slope (%) | Manning's n | Spillway Elev (ft) | Entrance Loss Coefficient | Tailwater Depth (ft) |
|---|---|---|---|---|---|---|
| 12.00 | 40.00 | 2.00 | 0.0240 | 2,319.00 | 0.90 | 0.00 |

#### Emergency Spillway

| Spillway Elev | Crest Length (ft) | Left Sideslope | Right Sideslope | Bottom Width (ft) |
|---|---|---|---|---|
| 2,322.20 | 25.00 | 2.00:1 | 2.00:1 | 10.00 |

### Pond Results:

| | |
|---|---|
| Peak Elevation: | 2,322.94 ft |
| H'graph Detention Time: | 1.75 hrs |
| Pond Model: | CSTRS |
| Dewater Time: | 0.78 days |
| Trap Efficiency: | 75.60 % |

*Dewatering time is calculated from peak stage to lowest spillway*

#### Elevation-Capacity-Discharge Table

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,317.98 | 0.241 | 0.000 | 0.000 | | Top of Sed. Storage |
| 2,318.00 | 0.242 | 0.005 | 0.000 | | |
| 2,318.50 | 0.254 | 0.129 | 0.000 | | |
| 2,319.00 | 0.267 | 0.259 | 0.000 | | Spillway #1 |
| 2,319.50 | 0.280 | 0.396 | 1.201 | 10.35 | |
| 2,320.00 | 0.294 | 0.539 | 1.805 | 2.55 | |

| Elevation | Area (ac) | Capacity (ac-ft) | Discharge (cfs) | Dewater Time (hrs) | |
|---|---|---|---|---|---|
| 2,320.50 | 0.307 | 0.689 | 3.029 | 1.45 | |
| 2,321.00 | 0.322 | 0.847 | 3.540 | 1.00 | |
| 2,321.50 | 0.336 | 1.011 | 3.966 | 0.95 | |
| 2,322.00 | 0.351 | 1.183 | 4.351 | 1.00 | |
| 2,322.20 | 0.357 | 1.253 | 4.499 | 0.55 | Spillway #2 |
| 2,322.50 | 0.366 | 1.362 | 10.677 | 0.65 | |
| 2,322.94 | 0.379 | 1.524 | 19.613 | 0.25 | Peak Stage |
| 2,323.00 | 0.381 | 1.549 | 20.947 | | |
| 2,323.50 | 0.397 | 1.743 | 45.637 | | |
| 2,324.00 | 0.413 | 1.946 | 79.471 | | |
| 2,324.50 | 0.429 | 2.156 | 122.562 | | |
| 2,325.00 | 0.446 | 2.375 | 176.364 | | |

## Detailed Discharge Table

| Elevation (ft) | Straight Pipe (cfs) | Emergency Spillway (cfs) | Combined Total Discharge (cfs) |
|---|---|---|---|
| 2,317.98 | 0.000 | 0.000 | 0.000 |
| 2,318.00 | 0.000 | 0.000 | 0.000 |
| 2,318.50 | 0.000 | 0.000 | 0.000 |
| 2,319.00 | 0.000 | 0.000 | 0.000 |
| 2,319.50 | (1)>1.201 | 0.000 | 1.201 |
| 2,320.00 | (1)>1.805 | 0.000 | 1.805 |
| 2,320.50 | (5)>3.029 | 0.000 | 3.029 |
| 2,321.00 | (6)>3.540 | 0.000 | 3.540 |
| 2,321.50 | (6)>3.966 | 0.000 | 3.966 |
| 2,322.00 | (6)>4.351 | 0.000 | 4.351 |
| 2,322.20 | (6)>4.499 | 0.000 | 4.499 |
| 2,322.50 | (6)>4.704 | 5.973 | 10.677 |
| 2,323.00 | (6)>5.019 | 15.927 | 20.947 |
| 2,323.50 | (6)>5.335 | 40.302 | 45.637 |
| 2,324.00 | (6)>5.642 | 73.829 | 79.471 |
| 2,324.50 | (6)>5.906 | 116.656 | 122.562 |
| 2,325.00 | (6)>6.170 | 170.194 | 176.364 |

## Subwatershed Hydrology Detail:

| Stru # | SWS # | SWS Area (ac) | Time of Conc (hrs) | Musk K (hrs) | Musk X | Curve Number | UHS | Peak Discharge (cfs) | Runoff Volume (ac-ft) |
|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 2.200 | 0.017 | 0.051 | 0.418 | 74.000 | S | 5.91 | 0.462 |
| | 2 | 3.700 | 0.067 | 0.027 | 0.319 | 79.000 | M | 11.26 | 0.916 |
| | 3 | 6.000 | 0.018 | 0.000 | 0.000 | 86.000 | F | 20.97 | 1.826 |
| | Σ | **11.900** | | | | | | **37.95** | **3.204** |

## Subwatershed Sedimentology Detail:

| Stru # | SWS # | Soil K | L (ft) | S (%) | C | P | PS # | Sediment (tons) | Peak Sediment Conc. (mg/l) | Peak Settleable Conc (ml/l) | 24VW (ml/l) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 1 | 0.220 | 100.00 | 50.00 | 0.0500 | 1.0000 | 2 | 15.9 | 46,601 | 25.11 | 13.43 |
| | 2 | 0.220 | 100.00 | 15.00 | 0.1400 | 1.0000 | 2 | 26.2 | 38,421 | 20.70 | 11.21 |
| | 3 | 0.220 | 100.00 | 37.50 | 0.9000 | 1.0000 | 2 | 963.9 | 549,356 | 295.96 | 171.88 |
| | Σ | | | | | | | **1,006.0** | **367,126** | **197.78** | **109.89** |

## Subwatershed Time of Concentration Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 2. Minimum tillage cultivation | 50.00 | 110.00 | 220.00 | 3.530 | 0.017 |
| **#1** | **1** | **Time of Concentration:** | | | | | **0.017** |
| #1 | 2 | 3. Short grass pasture | 31.43 | 110.00 | 350.00 | 4.480 | 0.021 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **2** | **Time of Concentration:** | | | | | **0.067** |
| #1 | 3 | 5. Nearly bare and untilled, and alluvial valley fans | 37.50 | 150.00 | 400.00 | 6.120 | 0.018 |
| **#1** | **3** | **Time of Concentration:** | | | | | **0.018** |

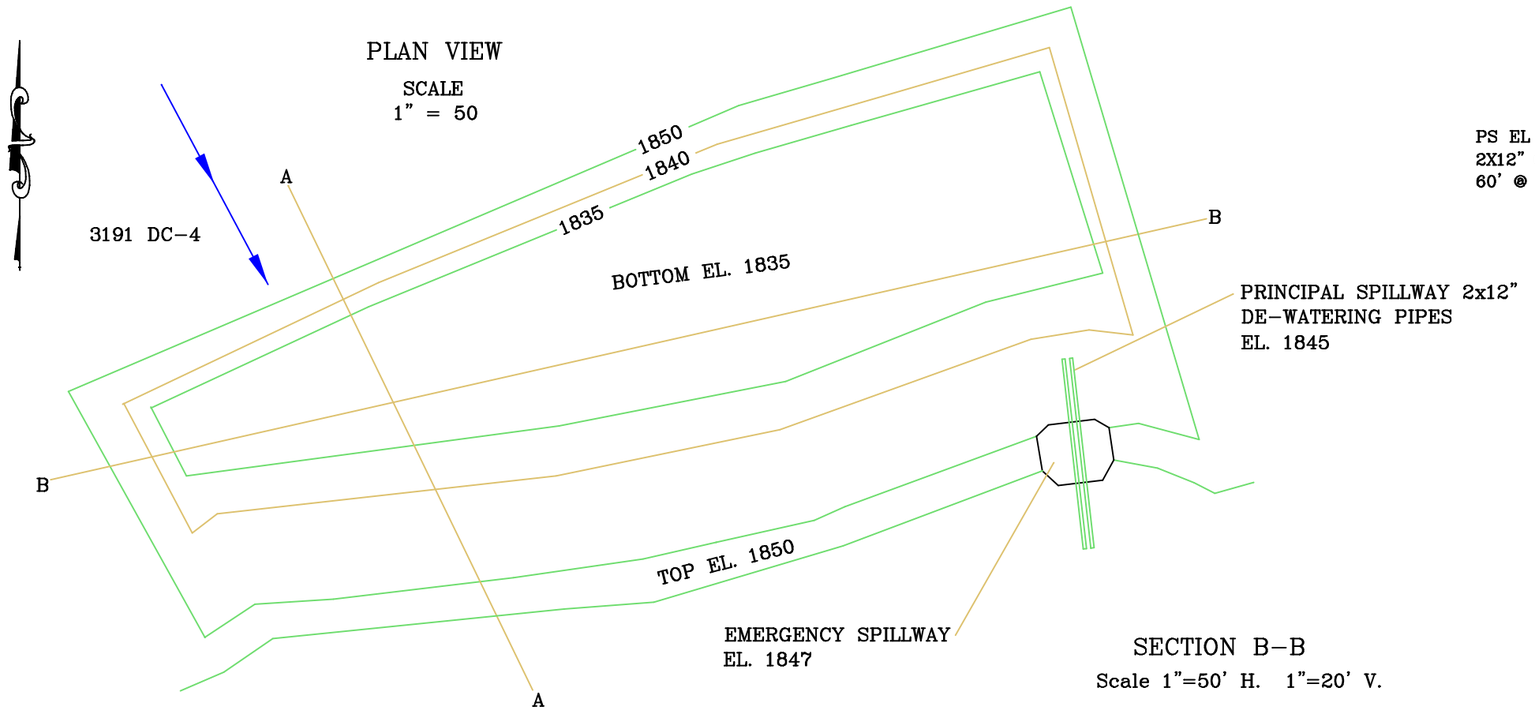
## Subwatershed Muskingum Routing Details:

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 1 | 8. Large gullies, diversions, and low flowing streams | 31.43 | 110.00 | 350.00 | 16.810 | 0.005 |
| | | 8. Large gullies, diversions, and low flowing streams | 1.00 | 5.00 | 500.00 | 3.000 | 0.046 |
| **#1** | **1** | **Muskingum K:** | | | | | **0.051** |

| Stru # | SWS # | Land Flow Condition | Slope (%) | Vert. Dist. (ft) | Horiz. Dist. (ft) | Velocity (fps) | Time (hrs) |
|---|---|---|---|---|---|---|---|
| #1 | 2 | 8. Large gullies, diversions, and low flowing streams | 1.00 | 3.00 | 300.00 | 3.000 | 0.027 |
| **#1** | **2** | **Muskingum K:** | | | | | **0.027** |

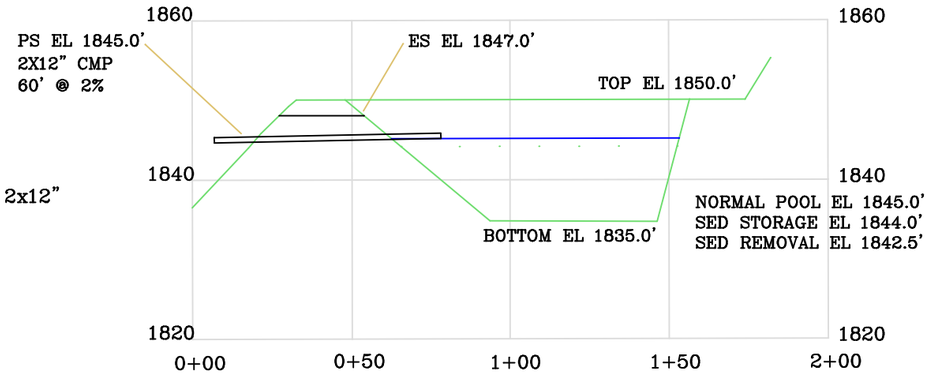
## PLAN VIEW

SCALE
1" = 50



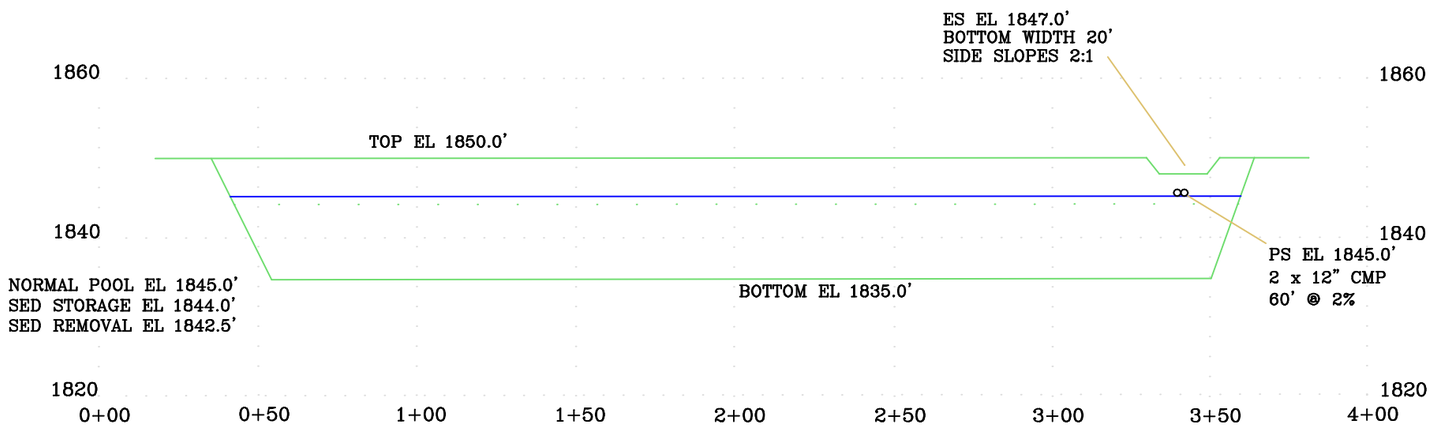

## SECTION A–A

Scale 1"=50' H. 1"=20' V.




## SECTION B–B

Scale 1"=50' H. 1"=20' V.




NOTE: THE EMBANKMENT OF THE BASIN WILL HAVE A COMBINED SLOPE OF 5H : 1V FOR THAT PORTION OF THE EMBANKMENT CONSTRUCTED OF SOIL. ROCK CUT SLOPES WILL BE AT 1H : 4V (ie BELOW THE PRINCIPAL SPILLWAY INLET)

*LEGEND*

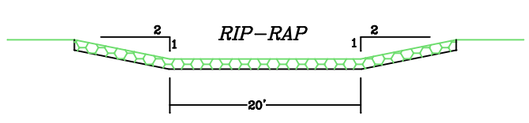
*Ground Line*

*Normal Pool Level*

*Sediment Storage Level*

| | |
|---|---|
| *Top of Pond* | *1850.0'* |
| *E.S.* | *1847.0'* |
| *P.S. (2x12")* | *1845.0'* |
| *Sed. Storage* | *1844.0'* |
| *Sed. Removal* | *1842.5'* |
| *Bottom* | *1835.0'* |

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D 50 = 3"*
*D MAX = 4.5"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

*SIGNATURE* *DATE*

# HURRICANE CREEK MINING, LLC

## OSMRE APPLICATION #3341

## POND SS-1

DATE: 02/17/2023

FILENAME: POND SS-1.DWG

SCALE: AS SHOWN

DRAWN BY:

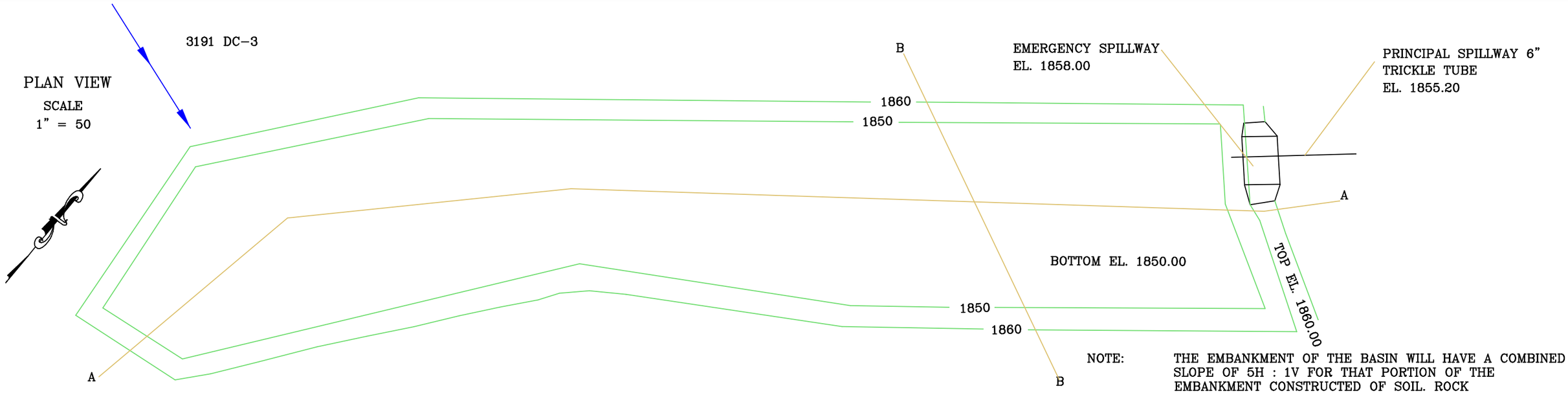
Prepared By:


HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543


HOWARD
Engineering and Geology, I

## PLAN VIEW

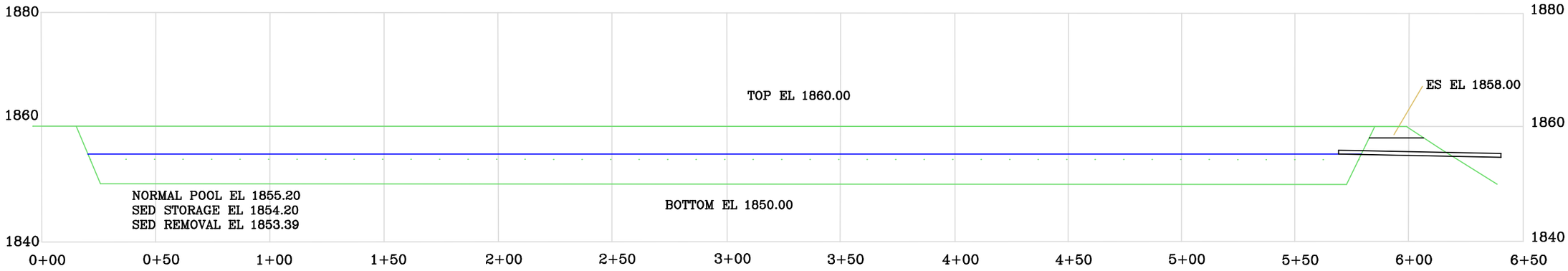
SCALE
1" = 50




NOTE: THE EMBANKMENT OF THE BASIN WILL HAVE A COMBINED SLOPE OF 5H : 1V FOR THAT PORTION OF THE EMBANKMENT CONSTRUCTED OF SOIL. ROCK CUT SLOPES WILL BE AT 1H : 4V (ie BELOW THE PRINCIPAL SPILLWAY INLET)

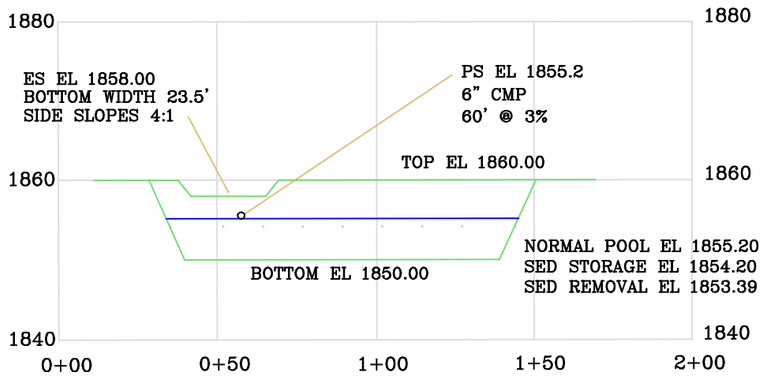
## SECTION A–A

Scale 1"=50' H. 1"=20' V.




## SECTION B–B

Scale 1"=50' H. 1"=20' V.




## *LEGEND*

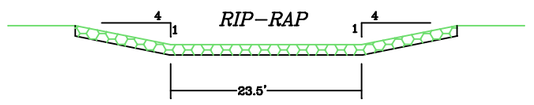
*Ground Line*

*Normal Pool Level*

*Sediment Storage Level*

| | |
|---|---|
| *Top of Pond* | *1860.00* |
| *E.S.* | *1858.00* |
| *P.S.* | *1855.20* |
| *Sed. Storage* | *1854.20* |
| *Sed. Removal* | *1853.39* |
| *Bottom* | *1850.00* |

*EMERGENCY SPILLWAY DETAIL*
*N.T.S.*




*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

# HURRICANE CREEK MINING, LLC

## OSMRE APPLICATION #3341

## PROPOSED POND SS–2

DATE: 02/20/2023

FILENAME: POND SS-2.DWG

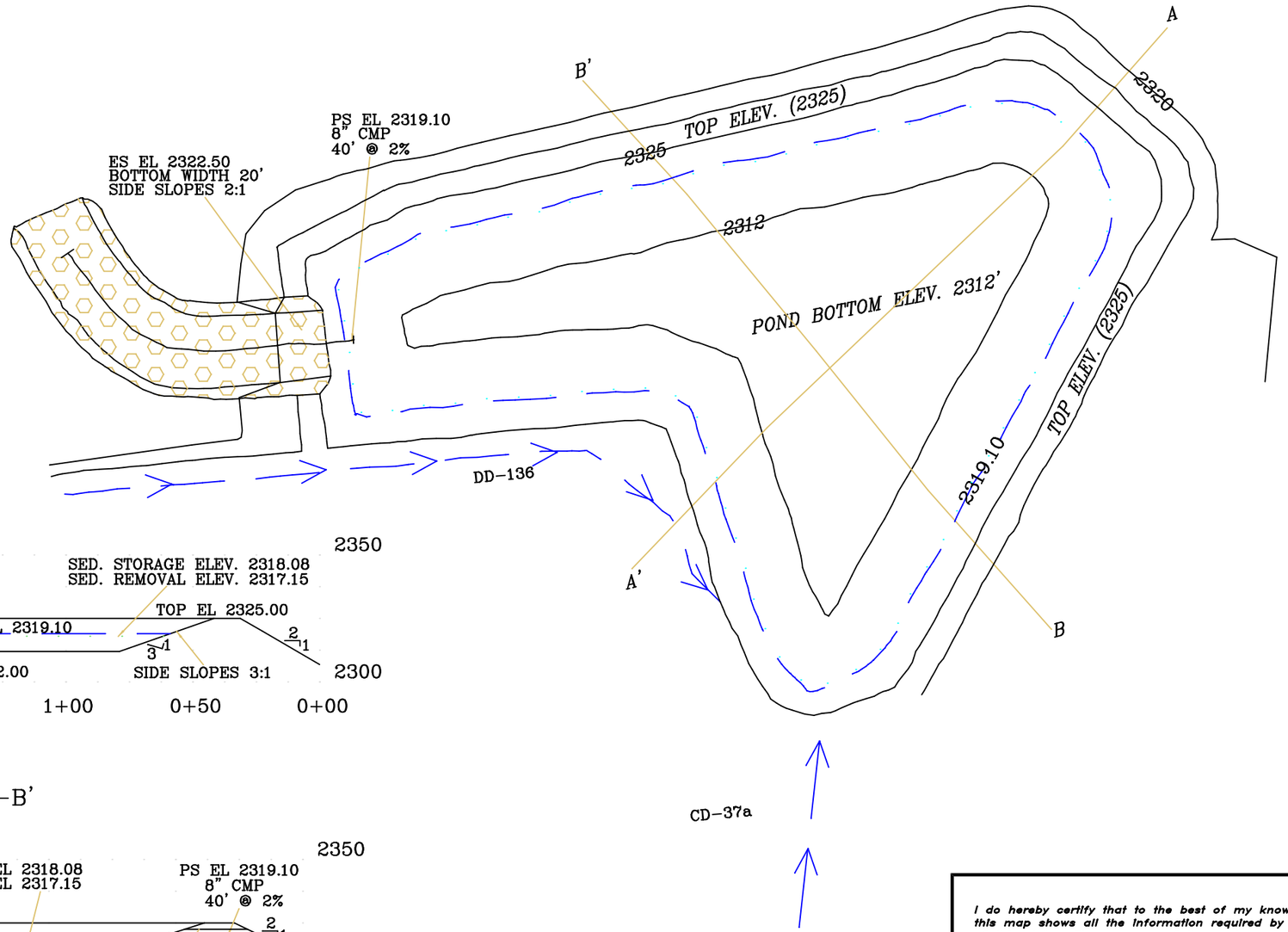
SCALE: AS SHOWN

DRAWN BY:

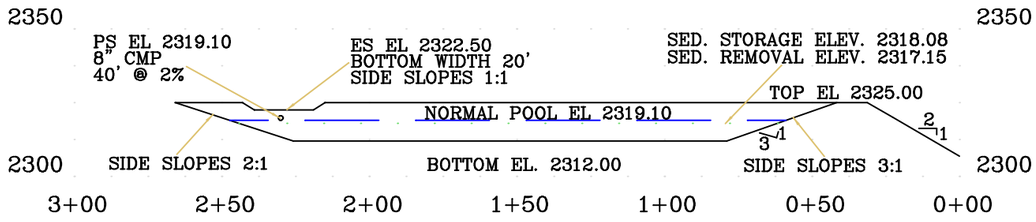

Prepared By:
HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831–0271
Phone: (606) 573–6924
Fax: (606) 573–9543



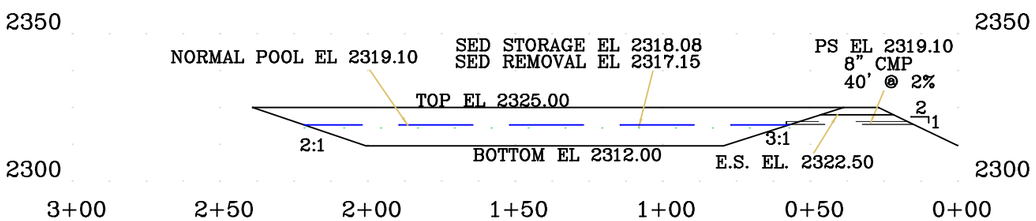
HOWARD
Engineering and Geology, I




## Section A–A'




## Section B–B'



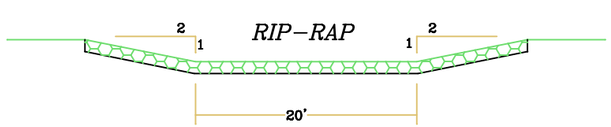

## LEGEND

- Ground Line
- Normal Pool Level
- Sediment Storage Level

| | |
|---|---|
| Top of Pond | 2325.00 |
| ES | 2322.50 |
| PS | 2319.10 |
| Sed. Storage | 2318.08 |
| Sed. Removal | 2317.15 |
| Bottom | 2312.00 |

## EMERGENCY SPILLWAY DETAIL

N.T.S.




D MIN. = .5"
D 50 = .75"
D MAX = 1.50"
BLANKET THICKNESS = 13.5"(1.5 X DMAX)

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

# HURRICANE CREEK MINING, LLC

## OSMRE APPLICATION #3341

## PROPOSED POND SS-20

DATE: 02/20/2023

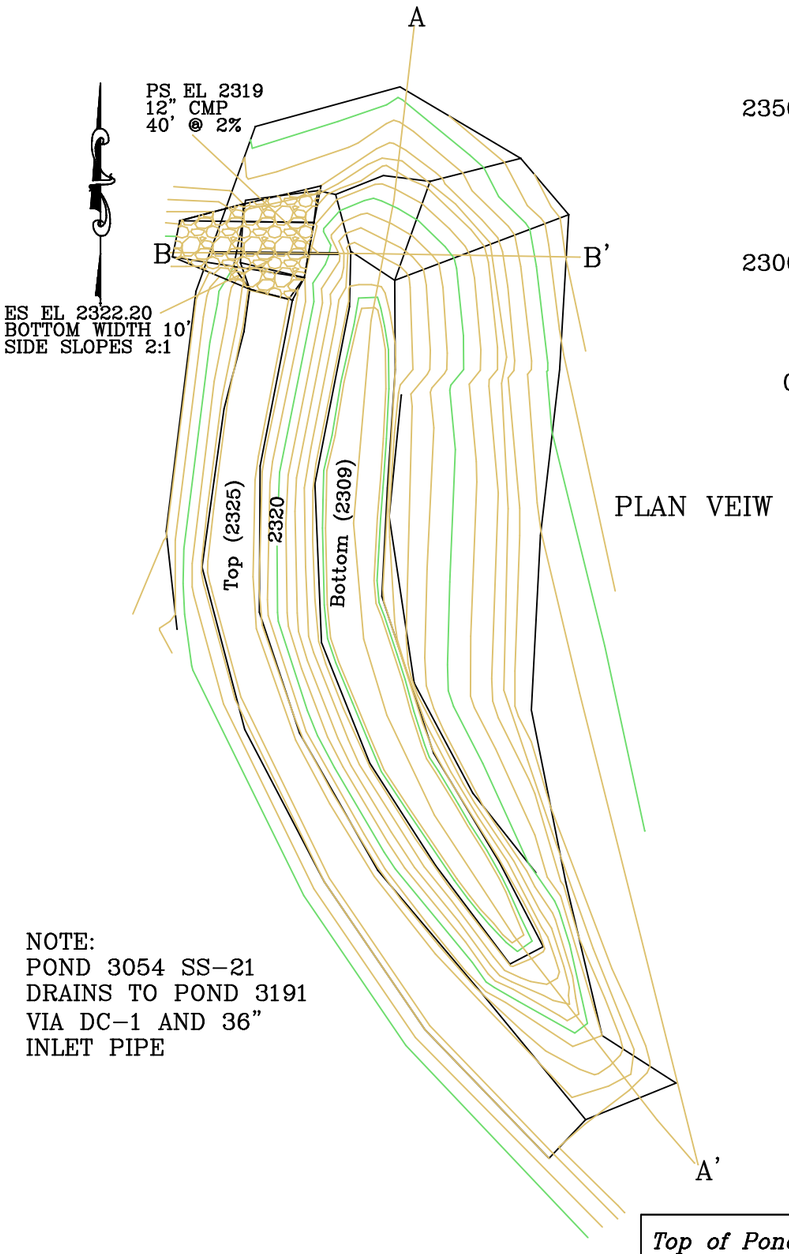
FILENAME: POND SS-20.DWG

SCALE: 1"=50'

DRAWN BY:

Prepared By:
HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543

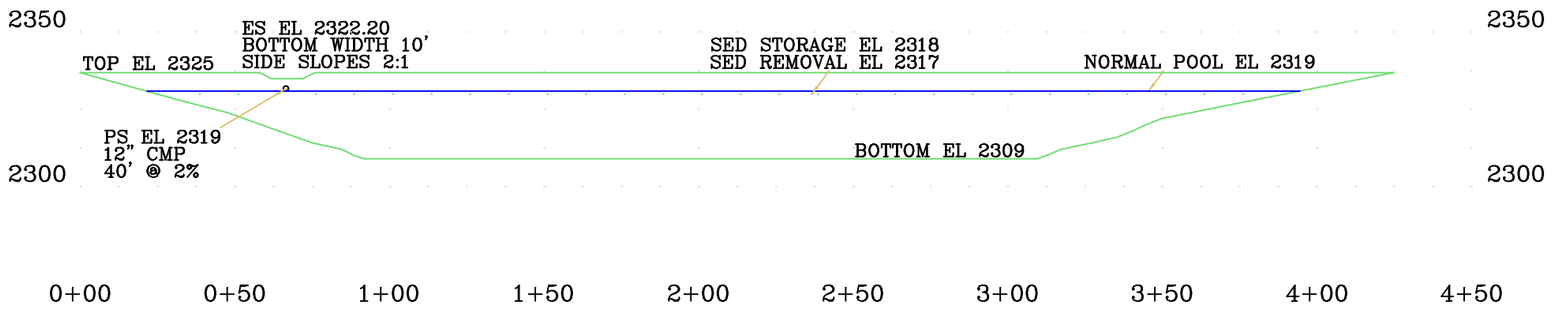
HOWARD
Engineering and Geology, Inc.



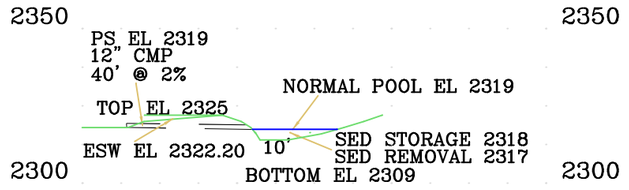

PLAN VEIW

NOTE:
POND 3054 SS-21
DRAINS TO POND 3191
VIA DC-1 AND 36"
INLET PIPE

Section A-A'




Section B-B'



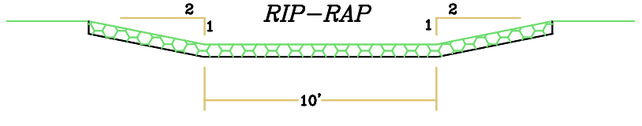

## LEGEND

| | |
|---|---|
| *Ground Line* | |
| *Normal Pool Level* | |
| *Sediment Storage Level* | |

| | |
|---|---|
| *Top of Pond* | *2325.00* |
| *ES* | *2322.20* |
| *PS* | *2319.00* |
| *Sed. Storage* | *2318.00* |
| *Sed. Removal* | *2317.00* |
| *Bottom* | *2309.00* |

## *EMERGENCY SPILLWAY DETAIL*

*N.T.S.*




*D MIN = 1.0"*
*D 50 = 1.5"*
*D MAX = 3.0"*
*BLANKET THICKNESS = 1.0'*

*I do hereby certify that to the best of my knowledge and belief, this map shows all the information required by the mining laws of this state. The accuracy of the contours is based upon the U.S.G.S. Quadrangle sheet(s) listed.*

SIGNATURE DATE

# HURRICANE CREEK MINING, LLC

## OSMRE APPLICATION #3341

## PROPOSED POND SS-21

DATE: 02/17/2023

FILENAME: POND SS-1.DWG

SCALE: 1"=50'

DRAWN BY:

Prepared By:
HOWARD
Engineering and Geology, Inc.
Post Office Box 271
2550West Hwy.72 Suite 1
Harlan, Kentucky 40831-0271
Phone: (606) 573-6924
Fax: (606) 573-9543

HOWARD
Engineering and Geology, I