

# 2019 ANNUAL REPORT

Report 2019

North Troy Quarry

Mill Creek, OK

Vulcan Materials Company

## VMC North Troy 2019 Monitoring Report

All volumes are in acre-feet.

	All Water Pumped	Total Stormwater Entering Pit note(a)	Total Groundwater Diverted	Pit Water Sent To Holding Basin	Groundwater Augmentation	Streamwater Augmentation	Defined Elements of Consumptive Use of Pit Water	Streamwater Pumped From Mill Creek	Groundwater Pumped From Wells	Total Annual Groundwater Allocation, Ac-ft
January-19	527.45	20.72	506.73	268.19	261.76	0.00	4.94	0.00	0.00	219.50
February-19	495.32	16.28	479.04	85.04	415.52	0.00	5.37	0.00	0.00	219.50
March-19	554.33	19.15	535.18	139.14	417.25	0.00	7.10	0.00	0.00	219.50
1st QTR Totals	1577.10	56.15	1520.95	492.37	1094.53	0.00	17.41	0.00	0.00	N/A
April-19	511.37	17.11	494.26	5.43	471.90	0.00	7.56	0.00	0.00	219.50
May-19	569.55	64.81	504.74	67.18	474.80	0.00	5.48	0.00	0.00	219.50
June-19	499.89	43.57	456.32	95.10	382.90	0.00	5.45	0.00	0.00	219.50
2nd QTR Totals	1580.81	125.49	1455.32	167.71	1329.60	0.00	18.49	0.00	0.00	N/A
July-19	470.83	7.03	463.80	54.78	388.75	0.00	12.29	0.00	0.00	219.50
August-19	510.85	77.35	433.50	67.39	375.03	0.00	8.23	0.00	0.00	219.50
September-19	418.41	33.98	384.43	120.73	288.79	0.00	12.96	0.00	0.00	219.50
3rd QTR Totals	1400.09	118.36	1281.73	242.90	1052.57	0.00	33.48	0.00	0.00	N/A
October-19	552.71	97.01	455.70	99.74	404.11	0.00	8.15	0.00	0.00	219.50
November-19	515.48	40.04	475.44	63.89	453.98	0.00	1.46	0.00	0.00	219.50
December-19	501.92	8.42	493.50	242.10	266.51	0.00	4.15	0.00	0.00	219.50
4th QTR Totals	1570.11	145.47	1424.64	405.73	1124.61	0.00	13.76	0.00	0.00	N/A
2019 Totals	6128.11	445.47	5682.64	1308.71	4601.30	0.00	83.14	0.00	0.00	219.50
2019 Total (adj)	6128.11	445.47	5682.64	1308.71	4601.30	0.00	83.14	0.00	0.00	219.50

1st Qtr notes

2nd Qtr notes

3rd Qtr notes

4th Qtr notes

(a) Total Stormwater = Volume of precipitation that falls into producing mine pit and volume of precipitation that falls onto producing mine and flows over the land surface into the mine pit.  
(adj) Annual total adjustment for stormwater carried over to next calendar year

Water Balance =	-227.37	Total Net Reported Consumptive Use
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## 2019 4th Quarter Report

Report 2019

North Troy Quarry

Mill Creek, OK

Vulcan Materials Company

### VMC North Troy 2019 Monitoring Report

All volumes are in acre-feet.

	All Water Pumped	Total Stormwater Entering Pit note(a)	Total Groundwater Diverted	Pit Water Sent To Holding Basin	Groundwater Augmentation	Streamwater Augmentation	Defined Elements of Consumptive Use of Pit Water	Streamwater Pumped From Mill Creek	Groundwater Pumped From Wells	Total Annual Groundwater Allocation, Ac-ft
January-19	527.45	20.72	506.73	268.19	261.76	0.00	4.94	0.00	0.00	219.50
February-19	495.32	16.28	479.04	85.04	415.52	0.00	5.37	0.00	0.00	219.50
March-19	554.33	19.15	535.18	139.14	417.25	0.00	7.10	0.00	0.00	219.50
1st QTR Totals	1577.10	56.15	1520.95	492.37	1094.53	0.00	17.41	0.00	0.00	N/A
April-19	511.37	17.11	494.26	5.43	471.90	0.00	7.56	0.00	0.00	219.50
May-19	569.55	64.81	504.74	67.18	474.80	0.00	5.48	0.00	0.00	219.50
June-19	499.89	43.57	456.32	95.10	382.90	0.00	5.45	0.00	0.00	219.50
2nd QTR Totals	1580.81	125.49	1455.32	167.71	1329.60	0.00	18.49	0.00	0.00	N/A
July-19	470.83	7.03	463.80	54.78	388.75	0.00	12.29	0.00	0.00	219.50
August-19	510.85	77.35	433.50	67.39	375.03	0.00	8.23	0.00	0.00	219.50
September-19	418.41	33.98	384.43	120.73	288.79	0.00	12.96	0.00	0.00	219.50
3rd QTR Totals	1400.09	118.36	1281.73	242.90	1052.57	0.00	33.48	0.00	0.00	N/A
October-19	552.71	97.01	455.70	99.74	404.11	0.00	8.15	0.00	0.00	219.50
November-19	515.48	40.04	475.44	63.89	453.98	0.00	1.46	0.00	0.00	219.50
December-19	501.92	8.42	493.50	242.10	266.51	0.00	4.15	0.00	0.00	219.50
4th QTR Totals	1570.11	145.47	1424.64	405.73	1124.61	0.00	13.76	0.00	0.00	N/A
2019 Totals	6128.11	445.47	5682.64	1308.71	4601.30	0.00	83.14	0.00	0.00	219.50
2019 Total (adj)	6128.11	445.47	5682.64	1308.71	4601.30	0.00	83.14	0.00	0.00	219.50

1st Qtr notes      Production well electric issue - unable pump / no sample  
                          New pond - transducer offline

2nd Qtr notes  
 3rd Qtr notes  
 4th Qtr notes

(a)      Total Stormwater = Volume of precipitation that falls into producing mine pit and volume of precipitation that falls onto producing mine and flows over the land surface into the mine pit.

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**MILL CREEK 2019 AUGMENTATION and GAUGE DATA**

Start Date	Start Time	Stop Date	Stop Time	Begin Reading	End Reading	Augmentation Ac - Ft pumped	Stormwater Pumped AF	Mill Creek Stream gauge Reading		Time Read	Stream height	Stream flow
January 2019	No water Pumped to Mill creek					0.00						
February 2019	No water Pumped to Mill creek					0.00						
March 2019	No water Pumped to Mill creek					0.00						
April 2019	No water Pumped to Mill creek					0.00						
May 2019	No water Pumped to Mill creek					0.00						
June 2019	No water Pumped to Mill creek					0.00						
July 2019	No water Pumped to Mill creek					0.00						
August 2019	No water Pumped to Mill creek					0.00						
September 2019	No water Pumped to Mill creek					0.00						
October 2019	No water Pumped to Mill creek					0.00						
November 2019	No water Pumped to Mill creek					0.00						
December 2019	No water Pumped to Mill creek					0.00						
Total						0.00						

0.00 Pumped to Mill Creek

0.00 Augmented to Mill Creek

Stormwater collected entering pit

0 Stormwater pumped to Mill Creek

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## October Precipitation/Evaporation Data

PIT RUNOFF ASSUMPTIONS			
Hydrologic Soil Group	D		
Land Use	gravel road		
AMC Condition	II (ave)		
CN (pit fringe)	88	area draining into pit	
CN (pit)	100	area with direct interception	
S (pit fringe)	1.363636	area draining into pit	
S (pit)	0	area with direct interception	
Pit - Direct Interception (>95 ft deep)	111.00	subject to refinement	**
Pit fringe (area drains to pit)	77.00	subject to refinement	**
Drainage to Pit (total area)	188.00	subject to refinement	

Date	Precip, in.	Runoff, in.	Runoff, in.	Runoff, in.	Runoff, in.
1-Oct	0.00	0.00	0.00	0.24	Runoff formula
2-Oct	0.00	0.00	0.00	0.24	Pe = (P-0.2S)^2/(P+0.8S)
3-Oct	0.00	0.00	0.00	0.18	S = (1000/CN)-10
4-Oct	0.00	0.00	0.00	0.15	
5-Oct	0.00	0.00	0.00	0.21	Blue cells contain formulas
6-Oct	0.00	0.00	0.00	0.22	
7-Oct	0.00	0.00	0.00	0.2	
8-Oct	0.00	0.00	0.00	0.18	
9-Oct	0.00	0.00	0.00	0.23	
10-Oct	0.47	0.47	0.00	0.09	Oct. Precip
11-Oct	0.47	0.47	0.00	0.17	N. Troy Rain gauge
12-Oct	0.00	0.00	0.00	0.12	
13-Oct	0.00	0.00	0.00	0.17	
14-Oct	0.00	0.00	0.00	0.16	
15-Oct	0.00	0.00	0.00	0.21	
16-Oct	0.00	0.00	0.00	0.18	
17-Oct	0.00	0.00	0.00	0.15	
18-Oct	0.00	0.00	0.00	0.2	
19-Oct	0.00	0.00	0.00	0.16	
20-Oct	0.00	0.00	0.00	0.19	
21-Oct	0.00	0.00	0.00	0.16	
22-Oct	0.00	0.00	0.00	0.11	
23-Oct	0.00	0.00	0.00	0.23	
24-Oct	4.47	4.47	3.17	0.05	
25-Oct	0.68	0.68	0.00	0.03	
26-Oct	0.60	0.60	0.00	0.1	
27-Oct	0.00	0.00	0.00	0.17	
28-Oct	0.00	0.00	0.00	0.04	
29-Oct	0.64	0.64	0.00	0.02	
30-Oct	0.96	0.96	0.00	0.03	
31-Oct	0.00	0.00	0.00	0.04	
sum	8.29	8.29	3.17	4.63	
Volume, ac-ft		76.68	20.33		
Total Vol, ac-ft		97.01			Pan Evaporation from Sulphur Mesonet

\* Used Mesonet Pan Evaporation - Sulphur

## November Precipitation/Evaporation Data

PIT RUNOFF ASSUMPTIONS			
Hydrologic Soil Group	D		
Land Use	gravel road		
AMC Condition	II (ave)		
CN (pit fringe)	88	area draining into pit	
CN (pit)	100	area with direct interception	
S (pit fringe)	1.363636	area draining into pit	
S (pit)	0	area with direct interception	
Pit - Direct Interception (>95 ft deep)	111.00	subject to refinement	**
Pit fringe (area drains to pit)	77.00	subject to refinement	**
Drainage to Pit (total area)	188.00	subject to refinement	

Date	Precip, in.	Runoff, in.	Runoff, in.	Runoff, in.	Runoff, in.
1-Nov	0.00	0.00	0.00	0.11	Runoff formula
2-Nov	0.00	0.00	0.00	0.09	Pe = (P-0.2S)^2/(P+0.8S)
3-Nov	0.00	0.00	0.00	0.14	S = (1000/CN)-10
4-Nov	0.00	0.00	0.00	0.13	
5-Nov	0.00	0.00	0.00	0.09	Blue cells contain formulas
6-Nov	1.78	1.78	0.79	0.03	
7-Nov	0.68	0.68	0.00	0.13	
8-Nov	0.00	0.00	0.00	0.06	
9-Nov	0.00	0.00	0.00	0.1	
10-Nov	0.00	0.00	0.00	0.14	Nov. Precip
11-Nov	0.00	0.00	0.00	0.13	N. Troy Rain gauge
12-Nov	0.00	0.00	0.00	0.07	
13-Nov	0.00	0.00	0.00	0.12	
14-Nov	0.00	0.00	0.00	0.08	
15-Nov	0.00	0.00	0.00	0.06	
16-Nov	0.00	0.00	0.00	0.11	
17-Nov	0.00	0.00	0.00	0.1	
18-Nov	0.00	0.00	0.00	0.12	
19-Nov	0.00	0.00	0.00	0.16	
20-Nov	0.16	0.16	0.00	0.09	
21-Nov	0.24	0.24	0.00	0.05	
22-Nov	0.04	0.04	0.00	0.02	
23-Nov	0.00	0.00	0.00	0.06	
24-Nov	0.00	0.00	0.00	0.1	
25-Nov	0.00	0.00	0.00	0.09	
26-Nov	0.00	0.00	0.00	0.23	
27-Nov	0.00	0.00	0.00	0.08	
28-Nov	0.56	0.56	0.00	0.02	
29-Nov	0.12	0.12	0.00	0.05	
30-Nov	0.20	0.20	0.00	0.17	
sum	3.78	3.78	0.79	2.93	
Volume, ac-ft		34.97	5.08		
Total Vol, ac-ft		40.04			Pan Evaporation from Sulphur Mesonet

\* Used Mesonet Pan Evaporation - Sulphur

## December Precipitation/Evaporation Data

PIT RUNOFF ASSUMPTIONS			
Hydrologic Soil Group	D		
Land Use	gravel road		
AMC Condition	II (ave)		
CN (pit fringe)	88	area draining into pit	
CN (pit)	100	area with direct interception	
S (pit fringe)	1.363636	area draining into pit	
S (pit)	0	area with direct interception	
Pit - Direct Interception (>95 ft deep)	111.00	subject to refinement	**
Pit fringe (area drains to pit)	77.00	subject to refinement	**
Drainage to Pit (total area)	188.00	subject to refinement	

Date	Precip, in.	Runoff, in.	Runoff, in.	Runoff, in.	Runoff, in.
1-Dec	0.00	0.00	0.00	0.13	Runoff formula
2-Dec	0.00	0.00	0.00	0.06	Pe = (P-0.2S)^2/(P+0.8S)
3-Dec	0.00	0.00	0.00	0.1	S = (1000/CN)-10
4-Dec	0.00	0.00	0.00	0.05	
5-Dec	0.00	0.00	0.00	0.16	Blue cells contain form
6-Dec	0.00	0.00	0.00	0.09	
7-Dec	0.00	0.00	0.00	0.07	
8-Dec	0.00	0.00	0.00	0.12	
9-Dec	0.00	0.00	0.00	0.14	Dec. Precip
10-Dec	0.00	0.00	0.00	0.08	N. Troy Rain gauge
11-Dec	0.00	0.00	0.00	0.07	
12-Dec	0.00	0.00	0.00	0.1	
13-Dec	0.00	0.00	0.00	0.05	
14-Dec	0.00	0.00	0.00	0.06	
15-Dec	0.00	0.00	0.00	0.03	
16-Dec	0.00	0.00	0.00	0.03	
17-Dec	0.00	0.00	0.00	0.06	
18-Dec	0.00	0.00	0.00	0.06	
19-Dec	0.00	0.00	0.00	0.11	
20-Dec	0.04	0.04	0.00	0.07	
21-Dec	0.00	0.00	0.00	0.03	
22-Dec	0.00	0.00	0.00	0.04	
23-Dec	0.00	0.00	0.00	0.07	
24-Dec	0.00	0.00	0.00	0.14	
25-Dec	0.00	0.00	0.00	0.16	
26-Dec	0.00	0.00	0.00	0.04	
27-Dec	0.00	0.00	0.00	0.07	
28-Dec	0.87	0.87	0.00	0.02	
29-Dec	0.00	0.00	0.00	0.05	
30-Dec	0.00	0.00	0.00	0.07	
31-Dec	0.00	0.00	0.00	0.05	
sum	0.91	0.91	0.00	2.38	
Volume, ac-ft		8.42	0.00		
Total Vol, ac-ft		8.42			Pan Evaporation from Sulphur Mesonet

\* Used Mesonet Pan Evaporation - Sulphur

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Monthly Water Data, ac-ft

	Water Diverted From Pit	Storm Water Entering Pit	Net Sump Volume Change	Groundwater Sent To Holding Basin	Groundwater Sent To Infiltration Areas	Groundwater Used For Stream Augmentation	Evaporation	Moisture Content of Product Shipped	Water Truck Usage	Misc Pit Water Use On Site	Misc Pit Water Use Off Site	Production Well Permit 2002-602	North Well Permit 20060601A
January-19	527.45	20.72	-3.98	268.19	259.26	0.00	0.29	3.78	0.87	0.00	0.00	0.00	0.00
February-19	495.32	16.28	-1.40	85.04	410.28	0.00	0.39	4.09	0.88	0.00	0.00	0.00	0.00
March-19	554.33	19.15	-1.12	139.14	415.19	0.00	0.70	4.20	2.21	0.00	0.00	0.00	0.00
April-19	511.37	17.11	1.12	5.43	464.91	0.00	1.47	3.80	2.28	0.00	0.00	0.00	0.00
May-19	569.55	64.81	0.00	67.18	472.09	0.00	1.39	3.15	0.94	0.00	0.00	0.00	0.00
June-19	499.89	43.57	0.00	95.10	377.41	0.00	1.64	2.78	1.03	0.00	0.00	0.00	0.00
July-19	470.83	7.03	0.00	54.78	386.04	0.00	2.05	2.45	7.79	0.00	0.00	0.00	0.00
August-19	510.85	77.35	0.00	67.39	368.79	0.00	1.81	3.26	3.17	0.00	0.00	0.00	0.00
September-19	418.41	33.98	0.00	120.73	286.51	0.00	1.47	3.71	7.79	0.00	0.00	0.00	0.00
October-19	552.71	97.01	0.00	99.74	396.19	0.00	1.03	3.44	3.68	0.00	0.00	0.00	0.00
November-19	515.48	40.04	0.00	63.89	451.59	0.00	0.66	0.62	0.18	0.00	0.00	0.00	0.00
December-19	501.92	8.42	0.00	242.10	259.81	0.00	0.53	3.16	0.46	0.00	0.00	0.00	0.00

Pit Sump Volumes

	West Sump						905 Sump						New Freshwater Pond						Pit area	
	Month End Depth-to- Water, Ft	Width, Ft	Length, Ft	Sump Volume Change, Ac-ft	Evaporation, ac- ft		Month End Depth-to- Water, Ft	Width, Ft	Length, Ft	Sump Volume Change, Ac-ft	Evaporation, ac- ft		Month End Depth-to- Water, Ft	Width, Ft	Length, Ft	Pond Volume Change, Ac-ft	Evaporation, ac-ft	Total Evaporation, ac-ft	Acres	Evaporation, ac-ft
January-19	8	125	325	-3.98	0.16		4	50	50	0.00	0.01		4		750	0.00	0.00	0.17	1.7	0.29
February-19	9.5	125	325	-1.40	0.22		4	50	50	0.00	0.01		4		750	0.00	0.00	0.23	1.7	0.39
March-19	10.7	125	325	-1.12	0.38		4	50	50	0.00	0.02		4		750	0.00	0.00	0.41	1.7	0.70
April-19	9.5	125	325	1.12	0.51		4	50	50	0.00	0.03		4		750	0.00	0.00	0.54	1.7	0.93
May-19	9.5	125	325	0.00	0.48		4	50	50	0.00	0.03		4		750	0.00	0.00	0.51	1.7	0.88
June-19	9.5	125	325	0.00	0.57		4	50	50	0.00	0.04		4		750	0.00	0.00	0.60	1.7	1.04
July-19	9.5	125	325	0.00	0.71		4	50	50	0.00	0.04		4		750	0.00	0.00	0.75	1.7	1.30
August-19	9.5	125	325	0.00	0.63		4	50	50	0.00	0.04		4		750	0.00	0.00	0.66	1.7	1.14
September-19	9.5	125	325	0.00	0.51		4	50	50	0.00	0.03		4		750	0.00	0.00	0.54	1.7	0.93
October-19	9.5	125	325	0.00	0.36		4	50	50	0.00	0.02		4		750	0.00	0.00	0.38	1.7	0.65
November-19	9.5	125	325	0.00	0.23		4	50	50	0.00	0.01		4		750	0.00	0.00	0.24	1.7	0.42
December-19	9.5	125	325	0.00	0.18		4	50	50	0.00	0.01		4		750	0.00	0.00	0.20	1.7	0.34

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October Shipments			November Shipments			December Shipments		
	Tons Shipped	Ac-ft of water shipped		Tons Shipped	Ac-ft of water shipped		Tons Shipped	Ac-ft of water shipped
Base Products Coarse	1,121	0.027	Base Products Coarse	2,197	0.054	Base Products Coarse	1,198	0.029
Aggregates Fine	210,419	2.529	Aggregates Fine	17,256	0.207	Aggregates Fine	242,192	2.911
Aggregates	27,731	0.881	Aggregates	11,303	0.359	Aggregates	6,904	0.219
	239,271	3.438		30,756	0.620		250,294	3.160

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