Jesse Martindale
Sr. Environmental Engineer

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Oklahoma Water Resources Board

March 24, 2023

Matt Cogburn
Oklahoma Water Resources Board
3800 N. Classen
Oklahoma City, OK 73118

Re: Martin Marietta/Material Producers Davis Quarry Q4 and Annual 2022 Monitoring Report

Dear Mr. Cogburn:

Attached please find the Q4 and Annual 2022 monitoring report and associated data and calculations for Martin Marietta/Material Producers' Davis Quarry.

Sincerely,

Jesse Martindale

Jesse Martindale
Sr. Environmental Engineer

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MMM Davis Quarry 2022 Monitoring Report

All volumes are in acre-feet.

	Total Groundwater Entering Pit	Total Stormwater Entering Pit	Total Stormwater Diverted from Pit	Total Water Diverted	Water Sent To Holding Basin	Groundwater Augmentation	Streamwater Augmentation	Consumptive Use of Stormwater	Consumptive Use of Groundwater	Groundwater Pumped From Well
January-22	-2.81	2.26	2.26	-0.55	N/A	-2.81	0.00	2.65	0.00	0.00
February-22	-9.83	8.80	8.80	-1.03	N/A	-9.83	0.00	2.09	0.00	0.00
March-22	-8.97	4.89	4.89	-4.08	N/A	-8.97	0.00	3.84	0.00	0.00
1st QTR Totals	-21.61	15.95	15.95	-5.66	0.00	-21.61	0.00	8.59	0.00	0.00
April-22	-21.50	33.01	33.01	11.52	N/A	-21.50	0.00	4.56	0.00	0.00
May-22	-25.68	49.97	49.97	24.29	N/A	-25.68	0.00	3.01	0.00	0.00
June-22	-14.88	28.74	28.74	13.86	N/A	-14.88	0.00	4.59	0.00	0.00
2nd QTR Totals	-62.05	111.72	111.72	49.67	0.00	-62.05	0.00	12.17	0.00	0.00
July-22	-6.16	2.02	2.02	-4.15	N/A	-6.16	0.00	4.42	0.00	0.00
August-22	-16.79	15.03	15.03	-1.76	N/A	-16.79	0.00	6.44	0.00	0.00
September-22	-6.31	1.10	1.10	-5.21	N/A	-6.31	0.00	5.18	0.00	0.00
3rd QTR Totals	-29.26	18.15	18.15	-11.12	0.00	-29.26	0.00	16.04	0.00	0.00
October-22	-9.42	20.22	20.22	10.81	N/A	-9.42	0.00	4.12	0.00	0.00
November-22	5.90	10.20	10.20	16.11	N/A	5.90	0.00	3.11	0.00	0.00
December-22	4.69	17.16	17.16	21.85	N/A	4.69	0.00	2.53	0.00	0.00
4th QTR Totals	1.17	47.59	47.59	48.76	0.00	1.17	0.00	9.77	0.00	0.00
2022 Totals	-111.75	193.40	193.40	81.65	0.00	-111.75	0.00	46.56	0.00	0.00

Note: Negative entries for Total Groundwater Entering Pit indicate that stormwater is entering the rock formation via the pit.

Total groundwater entering the pit = total stormwater entering the pit - total water diverted

Groundwater Right Value (MEPS): 68 acre-feet

Davis Water Balance

	Dec-21	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
Monitoring Period, Days		31	28	31	30	31	30	31	31	30	31	30	31
Monthly Production, tons	90,917	117,157	75,519	127,567	150,402	181,882	167,041	163,734	191,203	168,026	182,242	157,103	120,624
Product Moisture Content		3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Water Truck Loads		18	12	39	80	54	195	184	216	179	109	52	55
***Month End* Water Elevs.**													
1) Freshwater pond, depth to water	14.899	15.293	16.836	14.479	14.156	14.355	15.395	14.947	15.593	14.025	16.21914	15.06675	14.19505
2) Pit Sump, depth to water	51.109	50.028	49.035	47.565	48.051	51.35	52.204	49.414	46.791	44.182	44.44305	47.05798	51.07803
Pond Surface Acres													
1) Freshwater pond		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
2) Pit Sump		4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58	4.58
Total surface acres		5.580703	5.580703	5.58070271	5.58070271	5.5807027	5.580703	5.580703	5.580703	5.5807027	5.58070271	5.580703	5.580703
Pond Water Volume Change													
1) Freshwater pond		0.394	1.543	-2.357	-0.323	0.199	1.040	-0.448	0.646	-1.568	2.194	-1.152	-0.872
2) Pit Sump		-4.952	-4.549	-6.734	2.226	15.112	3.912	-12.780	-12.015	-11.951	1.196	11.978	18.415
3) Change in settling pond storage		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Net Volume Change		**-4.558**	**-3.006**	**-9.091**	**1.903**	**15.311**	**4.952**	**-13.228**	**-11.369**	**-13.519**	**3.390**	**10.826**	**17.543**
Water Inputs, ac-ft													
Rural Water		0.280	1.111	0.135	0.084	0.113	0.000	0.067	0.007	0.005	0.012	0.034	0.068
Lake Water		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Well Water		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Precipitation		2.261	8.799	4.888	33.013	49.970	28.737	2.016	15.031	1.100	20.225	10.204	17.161
Total Water Input		**2.541**	**9.910**	**5.023**	**33.097**	**50.083**	**28.737**	**2.084**	**15.038**	**1.105**	**20.237**	**10.238**	**17.229**
Water Usage, ac-ft													
Product moisture content		3.017	1.945	3.285	3.873	4.684	4.302	4.217	4.924	4.327	4.693	4.046	3.106
Haul road dust control		0.552	0.368	0.829	2.216	0.663	2.394	2.259	2.652	2.197	1.522	0.638	0.675
Evaporation losses		0.722	0.771	1.029	3.609	3.744	2.214	2.675	2.037	1.791	1.214	0.630	0.594
Misc usage		-	-	-	-	-	-	-	-	-	-	-	-
Total Water Usage, Ac-ft		**4.291**	**3.084**	**5.143**	**9.698**	**9.091**	**8.909**	**9.150**	**9.613**	**8.315**	**7.429**	**5.314**	**4.375**
Net Water Input		**-1.751**	**6.825**	**-0.119**	**23.399**	**40.992**	**19.827**	**-7.067**	**5.426**	**-7.211**	**12.807**	**4.924**	**12.854**
emergency storage of precipitation and runoff, ac-ft													
Groundwater Inflow		-2.807	-9.831	-8.971	-21.496	-25.681	-14.875	-6.161	-16.795	-6.308	-9.417	5.902	4.689
Groundwater Inflow, Avg Ac-ft/Day		-0.091	-0.351	-0.289	-0.717	-0.828	-0.496	-0.199	-0.542	-0.210	-0.304	0.197	0.151
Groundwater Inflow, Avg Gallons/Day		-29,506	-114,409	-94,300	-233,482	-269,945	-161,573	-64,764	-176,537	-68,520	-98,989	64,108	49,290

Consumptive Use

	January	February	March	April	May	June	July	August	September	October	November	December
Water Truck Usage	0.55	0.37	0.83	2.22	0.66	2.39	2.26	2.65	2.20	1.52	0.64	0.68
Moisture Content of Product Shipped	2.10	1.72	3.02	2.35	2.35	2.20	2.16	3.79	2.98	2.60	2.48	1.85
Misc on site use	-	-	-	-	-	-	-	-	-	-	-	-
Misc off site	-	-	-	-	-	-	-	-	-	-	-	-
Total	2.65	2.09	3.84	4.56	3.01	4.59	4.42	6.44	5.18	4.12	3.11	2.53

Shipped Tons	January	February	March	April	May	June	July	August	September	October	November	December
Base	17,299	17,631	31,368	17,121	18,426	17,805	10,800	25,313	15,370	19,457	17,331	17,124
Coarse Aggregate	73,939	59,143	84,918	80,070	66,001	68,431	89,290	122,978	102,313	136,675	78,862	70,219
Fine Aggregate	17,057	12,157	28,695	21,894	26,857	21,872	17,371	39,587	32,222	3,772	25,969	11,657
Total	108,295	88,931	144,980	119,086	111,284	108,108	117,461	187,878	149,905	159,903	122,161	99,000
Moisture Shipped	2.10	1.72	3.02	2.35	2.35	2.20	2.16	3.79	2.98	2.60	2.48	1.85

October Precipitation 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)	1.364	area draining into pit
S (pit)	0.000	area with direct interception
Pit - Direct Interception (>95 ft deep)	73.32	subject to refinement
Pit fringe (area drains to pit)	91.38	subject to refinement
Drainage to Pit (total area)	164.70	subject to refinement

Runoff formula
Pe = (P-0.2S)^2/(P+0.8S)
S = (1000/CN)-10

		Quarry area	Fringe area	
Date	Precip, in.	Runoff, in.	Runoff, in.	Evapor, in/day
1-Oct	0.00	0.00	0.00	0.12
2-Oct	0.00	0.00	0.00	0.12
3-Oct	0.00	0.00	0.00	0.11
4-Oct	0.00	0.00	0.00	0.11
5-Oct	0.00	0.00	0.00	0.10
6-Oct	0.00	0.00	0.00	0.09
7-Oct	0.00	0.00	0.00	0.04
8-Oct	0.09	0.09	0.00	0.03
9-Oct	0.01	0.01	0.00	0.07
10-Oct	0.02	0.02	0.00	0.07
11-Oct	0.13	0.13	0.00	0.05
12-Oct	0.00	0.00	0.00	0.11
13-Oct	0.00	0.00	0.00	0.12
14-Oct	0.00	0.00	0.00	0.18
15-Oct	0.00	0.00	0.00	0.13
16-Oct	0.50	0.50	0.00	0.03
17-Oct	0.00	0.00	0.00	0.08
18-Oct	0.00	0.00	0.00	0.09
19-Oct	0.00	0.00	0.00	0.09
20-Oct	0.00	0.00	0.00	0.09
21-Oct	0.00	0.00	0.00	0.12
22-Oct	0.00	0.00	0.00	0.11
23-Oct	0.00	0.00	0.00	0.10
24-Oct	0.94	0.94	0.00	0.03
25-Oct	0.88	0.88	0.00	0.10
26-Oct	0.00	0.00	0.00	0.09
27-Oct	0.00	0.00	0.00	0.08
28-Oct	0.64	0.64	0.00	0.01
29-Oct	0.10	0.10	0.00	0.02
30-Oct	0.00	0.00	0.00	0.06
31-Oct	0.00	0.00	0.00	0.08
		3.31	0.00	
Volume, ac-ft		**20.22**	**0.00**	**2.61**
Total Vol, ac-ft		**20.22**		

November Precipitation 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)	1.364	area draining into pit
S (pit)	0.000	area with direct interception
Pit - Direct Interception (>95 ft deep)	73.32	subject to refinement
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Runoff formula
Pe = (P-0.2S)^2/(P+0.8S)
S = (1000/CN)-10

		Quarry area	Fringe area	
Date	Precip, in.	Runoff, in.	Runoff, in.	Evapor, in/day
1-Nov	0.00	0.00	0.00	0.07
2-Nov	0.00	0.00	0.00	0.06
3-Nov	0.00	0.00	0.00	0.05
4-Nov	0.15	0.15	0.00	0.04
5-Nov	0.00	0.00	0.00	0.06
6-Nov	0.00	0.00	0.00	0.08
7-Nov	0.00	0.00	0.00	0.03
8-Nov	0.02	0.02	0.00	0.05
9-Nov	0.00	0.00	0.00	0.07
10-Nov	0.01	0.01	0.00	0.04
11-Nov	0.03	0.03	0.00	0.02
12-Nov	0.00	0.00	0.00	0.05
13-Nov	0.00	0.00	0.00	0.06
14-Nov	0.53	0.53	0.00	0.01
15-Nov	0.01	0.01	0.00	0.05
16-Nov	0.00	0.00	0.00	0.05
17-Nov	0.00	0.00	0.00	0.06
18-Nov	0.00	0.00	0.00	0.04
19-Nov	0.00	0.00	0.00	0.06
20-Nov	0.00	0.00	0.00	0.05
21-Nov	0.00	0.00	0.00	0.05
22-Nov	0.00	0.00	0.00	0.04
23-Nov	0.06	0.06	0.00	0.02
24-Nov	0.08	0.08	0.00	0.01
25-Nov	0.00	0.00	0.00	0.03
26-Nov	0.78	0.78	0.00	0.02
27-Nov	0.00	0.00	0.00	0.05
28-Nov	0.00	0.00	0.00	0.04
29-Nov	0.00	0.00	0.00	0.09
30-Nov	0.00	0.00	0.00	0.04
		0.00	0.00	
		1.67	0.00	
Volume, ac-ft		**10.20**	**0.00**	
Total Vol, ac-ft		**10.20**		

December Precipitation 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)	1.364	area draining into pit
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Pit - Direct Interception (>95 ft deep)	73.32	subject to refinement
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Drainage to Pit (total area)	164.70	subject to refinement

Runoff formula
Pe = (P-0.2S)^2/(P+0.8S)
S = (1000/CN)-10

formulas
input data

		Quarry area	Fringe area	
Date	**Precip, in.**	**Runoff, in.**	**Runoff, in.**	**Evapor, in/day**
1-Dec	0.00	0.00	0.00	0.04
2-Dec	0.00	0.00	0.00	0.03
3-Dec	0.00	0.00	0.00	0.05
4-Dec	0.06	0.06	0.00	0.03
5-Dec	0.01	0.01	0.00	0.07
6-Dec	0.00	0.00	0.00	0.02
7-Dec	0.02	0.02	0.00	0.01
8-Dec	1.46	1.46	0.55	0.02
9-Dec	0.00	0.00	0.00	0.04
10-Dec	0.01	0.01	0.00	0.02
11-Dec	0.02	0.02	0.00	0.01
12-Dec	0.02	0.02	0.00	0.01
13-Dec	0.52	0.52	0.00	0.09
14-Dec	0.00	0.00	0.00	0.08
15-Dec	0.00	0.00	0.00	0.08
16-Dec	0.00	0.00	0.00	0.07
17-Dec	0.00	0.00	0.00	0.06
18-Dec	0.00	0.00	0.00	0.04
19-Dec	0.00	0.00	0.00	0.04
20-Dec	0.00	0.00	0.00	0.02
21-Dec	0.00	0.00	0.00	0.03
22-Dec	0.00	0.00	0.00	0.01
23-Dec	0.00	0.00	0.00	0.03
24-Dec	0.00	0.00	0.00	0.04
25-Dec	0.00	0.00	0.00	0.05
26-Dec	0.00	0.00	0.00	0.06
27-Dec	0.00	0.00	0.00	0.04
28-Dec	0.00	0.00	0.00	0.05
29-Dec	0.00	0.00	0.00	0.06
30-Dec	0.00	0.00	0.00	0.04
31-Dec	0.00	0.00	0.00	0.05
		2.12	0.55	
Volume, ac-ft		**12.95**	**4.21**	**1.277**
Total Vol, ac-ft		**17.16**		