

23

MMM Davis Quarry 2013 Monitoring Report

All volumes are in acre-feet.

	Total Groundwater Entering Pit	Total Stormwater Entering Pit	Total Pit Stormwater Diverted	Total Pit Water Diverted	Pit Water Sent To Holding Basin	Groundwater Augmentation	Streamwater Augmentation	Consumptive Use of Pit Water	Consumptive Use of Groundwater	Groundwater Pumped From Well
January-13	-4.39	5.07	5.07	0.68	N/A	-4.39	0.00	2.46	0.00	0.00
February-13	-17.25	29.87	29.87	12.62	N/A	-17.25	0.00	1.87	0.00	0.00
March-13	-1.07	2.90	2.90	1.83	N/A	-1.07	0.00	3.77	0.00	0.00
1st QTR Totals	-22.71	37.84	37.84	15.14	0.00	-22.71	0.00	8.10	0.00	0.00
April-13	-5.13	7.88	7.88	2.76	N/A	-5.13	0.00	3.31	0.00	0.00
May-13	-11.93	19.84	19.84	7.91	N/A	-11.93	0.00	3.20	0.00	0.00
June-13	-8.06	15.04	15.04	6.97	N/A	-8.06	0.00	3.24	0.00	0.00
2nd QTR Totals	-25.12	42.76	42.76	17.64	0.00	-25.12	0.00	9.76	0.00	0.00
July-13	-11.05	14.09	14.09	3.03	N/A	-11.05	0.00	3.91	0.00	0.00
August-13	-10.00	8.47	8.47	-1.53	N/A	-10.00	0.00	4.56	0.00	0.00
September-13	-3.41	5.09	5.09	1.69	N/A	-3.41	0.00	4.68	0.00	0.00
3rd QTR Totals	-24.46	27.65	27.65	3.19	0.00	-24.46	0.00	13.15	0.00	0.00
October-13										
November-13										
December-13										
4th QTR Totals	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013 Totals	-72.29	108.25	108.25	35.96	0.00	-72.29	0.00	31.01	0.00	0.00

July 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)	54.36	subject to refinement
Pit fringe (area drains to pit)	68.34	subject to refinement
Drainage to Pit (total area)	122.70	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-Jul	0.00	0.00	0.00	0.208
2-Jul	0.00	0.00	0.00	0.207
3-Jul	0.00	0.00	0.00	0.198
4-Jul	0.00	0.00	0.00	0.229
5-Jul	0.00	0.00	0.00	0.228
6-Jul	0.00	0.00	0.00	0.246
7-Jul	0.00	0.00	0.00	0.23
8-Jul	0.00	0.00	0.00	0.031
9-Jul	0.00	0.00	0.00	0.004
10-Jul	0.00	0.00	0.00	0.031
11-Jul	0.00	0.00	0.00	0.107
12-Jul	0.00	0.00	0.00	0.025
13-Jul	0.00	0.00	0.00	0.061
14-Jul	0.59	0.59	0.00	0.06
15-Jul	0.50	0.50	0.00	0.024
16-Jul	0.28	0.28	0.00	0.138
17-Jul	0.20	0.20	0.00	0.133
18-Jul	0.07	0.07	0.00	0.205
19-Jul	0.00	0.00	0.00	0.234
20-Jul	0.01	0.01	0.00	0.198
21-Jul	0.00	0.00	0.00	0.241
22-Jul	0.00	0.00	0.00	0.242
23-Jul	0.00	0.00	0.00	0.278
24-Jul	0.47	0.47	0.00	0.123
25-Jul	0.00	0.00	0.00	0.139
26-Jul	0.89	0.89	0.00	0.134
27-Jul	0.04	0.04	0.00	0.176
28-Jul	0.00	0.00	0.00	0.219
29-Jul	0.01	0.01	0.00	0.156
30-Jul	0.05	0.05	0.00	0.21
31-Jul	0.00	0.00	0.00	0.187
		3.11	0.00	
Volume, ac-ft		14.09	0.00	4.902
Total Vol, ac-ft		14.09		

August Precipitation Data

PIT RUNOFF ASSUMPTIONS

Hydrologic Soil Group	D	
Land Use	gravel roac	
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)	54.36	subject to refinement
Pit fringe (area drains to pit)	68.34	subject to refinement
Drainage to Pit (total area)	122.70	subject to refinement

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

Quarry area Fringe area

Date	Precip, in.	Runoff, in.	Runoff, in.	Evapor, in/day
1-Aug	0.00	0.00	0.00	0.203
2-Aug	0.00	0.00	0.00	0.272
3-Aug	0.00	0.00	0.00	0.254
4-Aug	0.00	0.00	0.00	0.238
5-Aug	0.00	0.00	0.00	0.279
6-Aug	0.00	0.00	0.00	0.294
7-Aug	0.00	0.00	0.00	0.294
8-Aug	0.03	0.03	0.00	0.202
9-Aug	0.01	0.01	0.00	0.202
10-Aug	0.00	0.00	0.00	0.193
11-Aug	0.00	0.00	0.00	0.208
12-Aug	0.00	0.00	0.00	0.226
13-Aug	0.17	0.17	0.00	0.117
14-Aug	0.00	0.00	0.00	0.146
15-Aug	0.00	0.00	0.00	0.161
16-Aug	0.22	0.22	0.00	0.172
17-Aug	0.00	0.00	0.00	0.19
18-Aug	0.00	0.00	0.00	0.179
19-Aug	0.00	0.00	0.00	0.195
20-Aug	0.00	0.00	0.00	0.175
21-Aug	0.00	0.00	0.00	0.232
22-Aug	0.00	0.00	0.00	0.194
23-Aug	0.60	0.60	0.00	0.111
24-Aug	0.68	0.68	0.00	0.124
25-Aug	0.16	0.16	0.00	0.172
26-Aug	0.00	0.00	0.00	0.192
27-Aug	0.00	0.00	0.00	0.141
28-Aug	0.00	0.00	0.00	0.176
29-Aug	0.00	0.00	0.00	0.21
30-Aug	0.00	0.00	0.00	0.223
31-Aug	0.00	0.00	0.00	0.216
		1.87	0.00	
Volume, ac-ft		8.47	0.00	6.191
Total Vol, ac-ft		8.47		

September 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)	54.36	subject to refinement
Pit fringe (area drains to pit)	68.34	subject to refinement
Drainage to Pit (total area)	122.70	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-Sep	0.00	0.00	0.00	0.2
2-Sep	0.00	0.00	0.00	0.18
3-Sep	0.00	0.00	0.00	0.194
4-Sep	0.00	0.00	0.00	0.183
5-Sep	0.00	0.00	0.00	0.178
6-Sep	0.00	0.00	0.00	0.16
7-Sep	0.00	0.00	0.00	0.196
8-Sep	0.00	0.00	0.00	0.212
9-Sep	0.00	0.00	0.00	0.219
10-Sep	0.00	0.00	0.00	0.195
11-Sep	0.00	0.00	0.00	0.188
12-Sep	0.00	0.00	0.00	0.107
13-Sep	0.00	0.00	0.00	0.117
14-Sep	0.00	0.00	0.00	0.164
15-Sep	0.04	0.04	0.00	0.155
16-Sep	0.00	0.00	0.00	0.143
17-Sep	0.03	0.03	0.00	0.159
18-Sep	0.01	0.01	0.00	0.168
19-Sep	0.00	0.00	0.00	0.159
20-Sep	0.33	0.33	0.00	0.027
21-Sep	0.09	0.09	0.00	0.163
22-Sep	0.00	0.00	0.00	0.173
23-Sep	0.00	0.00	0.00	0.175
24-Sep	0.00	0.00	0.00	0.214
25-Sep	0.00	0.00	0.00	0.19
26-Sep	0.00	0.00	0.00	0.216
27-Sep	0.00	0.00	0.00	0.145
28-Sep	0.36	0.36	0.00	0.048
29-Sep	0.26	0.26	0.00	0.144
30-Sep	0.00	0.00	0.00	0.165
		0.00	0.00	
		1.12	0.00	
Volume, ac-ft		5.09	0.00	4.937
Total Vol, ac-ft		5.09		

Consumptive Use									
	January	February	March	April	May	June	July	August	September
Water Truck Usage	0.12	0.03	0.92	0.80	0.51	0.92	0.89	1.27	1.17
Moisture Content of Product Shipped	2.34	1.87	2.85	2.52	2.70	2.32	3.02	3.29	3.51
Misc on site use	-	-	-	-	-	-	-	-	-
Misc off site	-	-	-	-	-	-	-	-	-
Total	2.46	1.90	3.77	3.31	3.20	3.24	3.91	4.56	4.68

Shipped Tons									
	January	February	March	April	May	June	July	August	September
Base	29,313	29,777	34,737	35,105	40,579	30,251	32,817	42,687	41,418
Coarse Aggregate	76,170	56,027	101,036	78,103	81,067	82,605	110,004	111,176	100,539
Fine Aggregate	14,275	8,731	14,477	14,257	14,244	10,229	17,310	17,200	29,036
Total	119,758	94,535	150,250	127,465	135,890	123,085	160,131	171,063	170,993
Moisture Shipped	2.34	1.87	2.85	2.52	2.70	2.32	3.02	3.29	3.51

Davis Water Balance

Monitoring Period, Days	Dec-12 31	Jan-13 31	Feb-13 28	Mar-13 31	Apr-13 30	May-13 31	Jun-13 30	Jul-13 31	Aug-13 31	Sep-13 30
Monthly Production, tons	66,679	117,073	135,696	134,342	158,653	159,534	139,973	163,602	155,896	146,200
Product Moisture Content	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%	3.5%
Water Truck Loads	12.5	4	1	12	26	21	30	29	45	41
Month End Water Elevs.										
1) Freshwater pond, depth to water	13.025	15.987	6.484	8.911	11.664	8.817	6.942	10.004	17.759	13.172
2) Pit Sump, depth to water	9.349	9.035	9.265	9.693	9.724	9.972	9.945	9.057	10.028	10.028
Pond Surface Acres										
1) Freshwater pond	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937	0.937
2) Pit Sump	0.322	0.322	0.322	0.322	0.322	0.322	0.322	0.322	0.322	0.322
Total surface acres	1.259	1.259	1.259	1.259	1.259	1.259	1.259	1.259	1.259	1.259
Pond Water Volume Change										
1) Freshwater pond	-2.775	8.904	-2.274	-2.580	2.668	1.757	-2.869	-7.266	4.298	
2) Pit Sump	0.101	-0.074	-0.138	-0.010	-0.080	0.009	0.286	-0.313	0.000	
3) Change in settling pond storage	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Net Volume Change	-2.674	8.830	-2.412	-2.590	2.588	1.766	-2.583	-7.579	4.298	
Water Inputs, ac-ft										
Rural Water	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Lake Water	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	8.154
Well Water	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Precipitation	5.074	29.868	2.899	7.882	19.841	15.039	14.088	8.471	5.092	
Total Water Input	5.074	29.868	2.899	7.882	19.841	15.039	14.088	8.471	5.092	13.246
Water Usage, ac-ft										
Product moisture content	1.717	3.015	3.495	3.460	4.086	4.108	3.605	4.213	4.015	3.765
Haul road dust control	0.384	0.123	0.031	0.368	0.798	0.644	0.921	0.890	1.381	1.258
Evaporation losses	0.218	0.218	0.265	0.417	0.462	0.571	0.684	0.514	0.650	0.518
Misc usage	0	0	0	0	0	0	0	0	0	0
Total Water Usage, Ac-ft	3.355	3.790	3.790	4.245	5.346	5.324	5.209	5.617	6.045	5.541
Net Water Input	1.718	26.078	-1.346	-1.346	2.536	14.517	9.830	8.471	2.426	7.704
Groundwater Inflow	-4.392	-17.247	-1.066	-5.126	-11.930	-8.065	-11.054	-10.005	-3.406	
Groundwater Inflow, Avg Ac-ft/Day	-0.142	-0.616	-0.034	-0.171	-0.385	-0.269	-0.357	-0.323	-0.114	
Groundwater Inflow, Avg Gallons/Day	-46,170	-200,717	-11,202	-55,677	-125,396	-87,598	-116,189	-105,163	-36,999	