

ROSEMONT COPPER PROJECT EMPIRE GULCH CROSS SECTIONS

Prepared for: Rosemont Copper Company
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WestLand Resources, Inc. (WestLand) conducted field measurements of channel cross-sections along Empire Gulch within the Las Cienegas National Riparian Conservation Area. These data were collected as part of a review by a working group of cooperating agencies of potential effects of the Rosemont Copper Project on Upper Cienega Creek and Empire Gulch.

WestLand collected channel cross-sections at three locations: 1 location at Empire Gulch Springs and 2 locations in Lower Empire Gulch (*Figure 1*). At each location, at least three cross-section transects were conducted that focused on the low-flow channels in the stretches of Empire Gulch that contained surface water. At the Empire Gulch 2 location, we performed cross sections in both a run (Empire Gulch 2A) and a pool (Empire Gulch 2B) that were in close proximity to each other (*Figure 1*).

The data collected allows for the illustration of channel cross-sections (*Exhibit 1*) and can be used in future modeling efforts. The digital data collected during field efforts is included as *Attachment 1* of this memorandum.

Attachments: Figure 1. Location of Cross-Sections
Exhibit 1. Empire Gulch Spring Profile
Attachment 1. UTM Nat 83 Coordinates and Elevations for Cross Sections

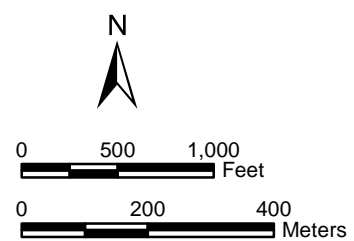


FIGURE 1



T19S, R17E, Portion of Sections 3 and 18,
 Pima County, Arizona,
 Photo Source: ESRI Online Microsoft November 2010

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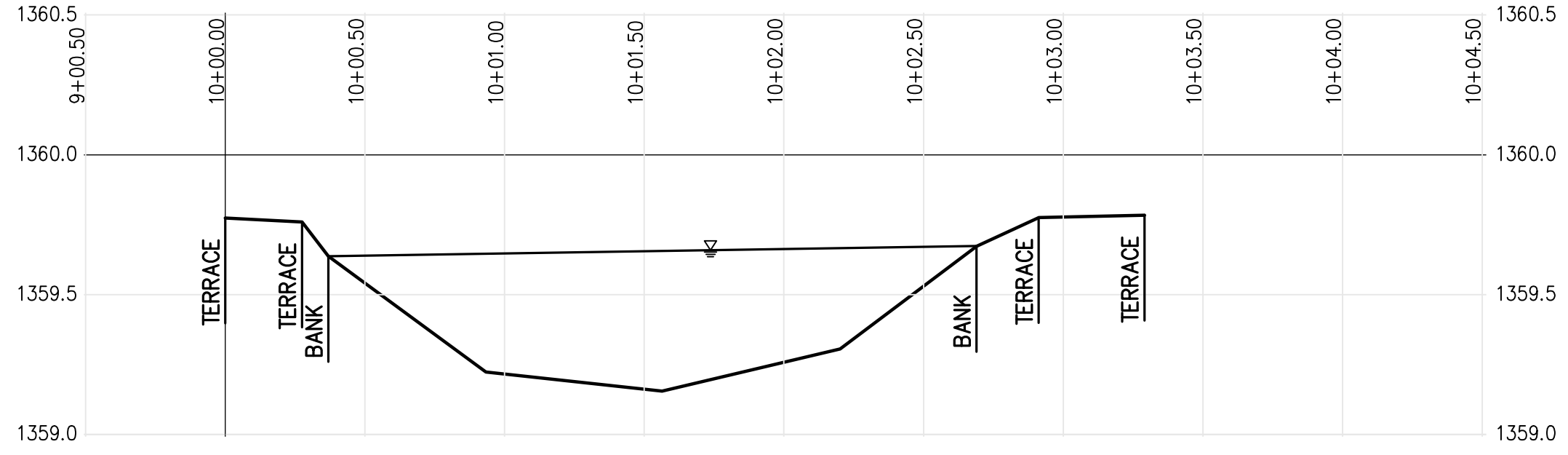
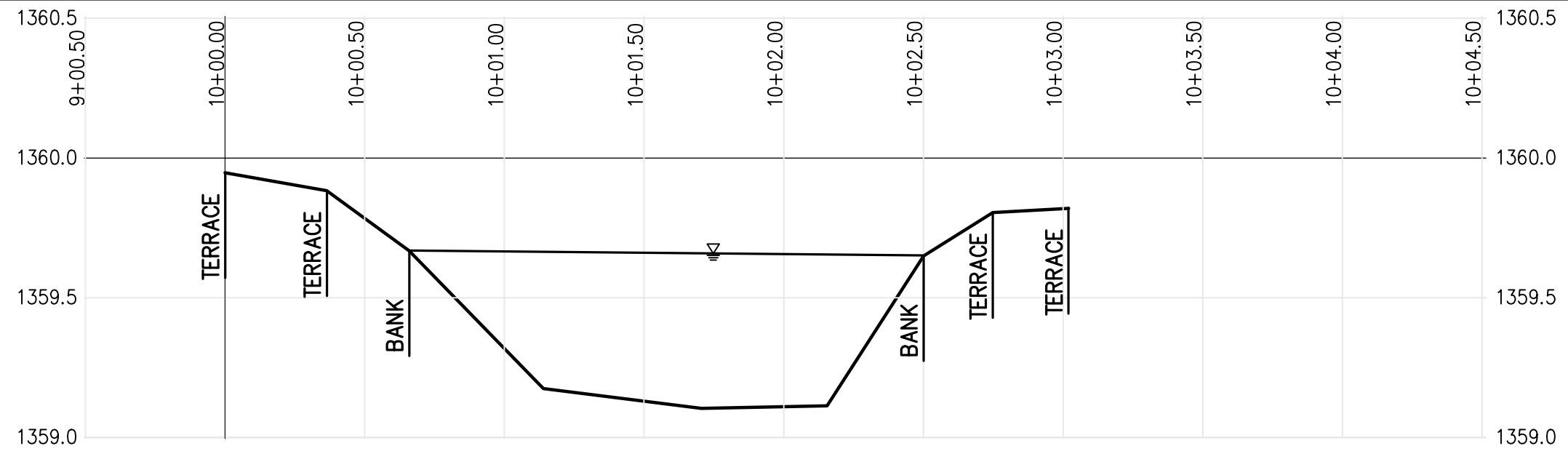
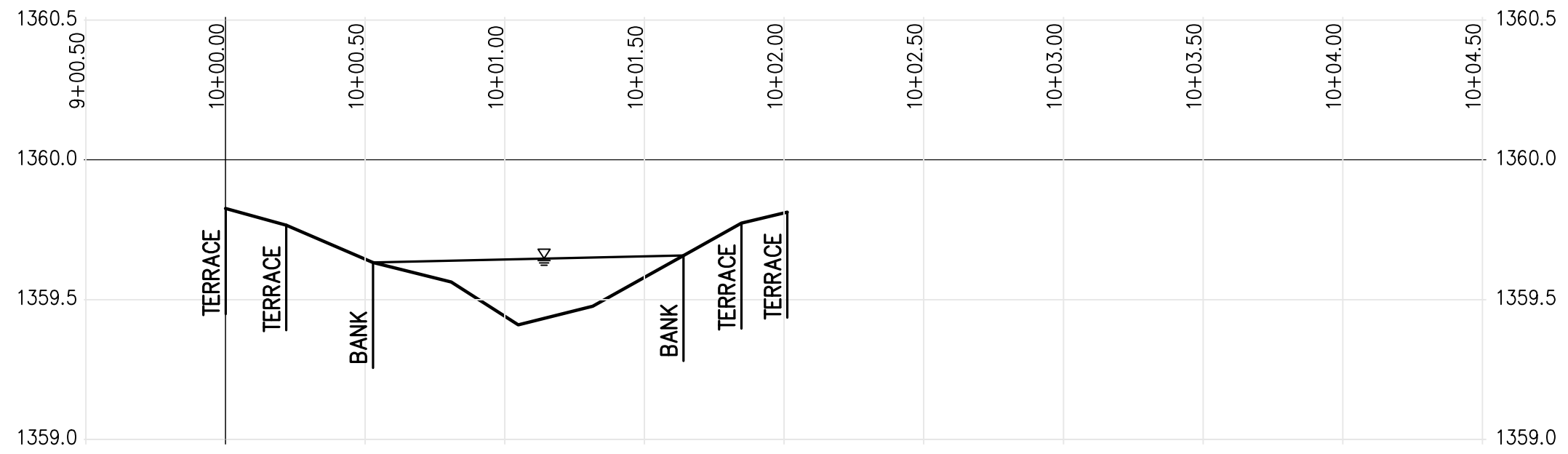
Legend

★ Location of Cross-sections

ROSEMONT COPPER COMPANY
 Cross-sectional Data Collected Along Empire Gulch
 LOCATION OF CROSS-SECTIONS
 Figure 1

EXHIBIT 1

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Note: All elevations and stationing are in meters.
EMPIRE GULCH SPRING
PROFILE EXHIBIT
SCALE: 1 : 60
JUNE 27, 2014

ATTACHMENT 1

Shot	Type	Site	Northing	Easting	Elevation
1	Terrace	Empire Gulch Spring	3516975.967	534231.366	1359.813
2	Terrace	Empire Gulch Spring	3516976.071	534231.239	1359.774
3	Bank (Waters Edge)	Empire Gulch Spring	3516976.183	534231.064	1359.657
4	Water	Empire Gulch Spring	3516976.375	534230.802	1359.476
5	Water	Empire Gulch Spring	3516976.537	534230.591	1359.41
6	Water	Empire Gulch Spring	3516976.648	534230.378	1359.563
7	Bank (Waters Edge)	Empire Gulch Spring	3516976.807	534230.147	1359.633
8	Terrace	Empire Gulch Spring	3516977.043	534229.945	1359.766
9	Terrace	Empire Gulch Spring	3516977.222	534229.822	1359.826
10	Terrace	Empire Gulch Spring	3516982.367	534230.95	1359.947
11	Terrace	Empire Gulch Spring	3516982.189	534231.268	1359.883
12	Bank (Waters Edge)	Empire Gulch Spring	3516982.025	534231.513	1359.668
13	Water	Empire Gulch Spring	3516981.738	534231.898	1359.175
14	Water	Empire Gulch Spring	3516981.56	534232.435	1359.104
15	Water	Empire Gulch Spring	3516981.377	534232.846	1359.113
16	Bank (Waters Edge)	Empire Gulch Spring	3516981.272	534233.176	1359.65
17	Terrace	Empire Gulch Spring	3516981.143	534233.387	1359.805
18	Terrace	Empire Gulch Spring	3516981.033	534233.635	1359.82
19	Terrace	Empire Gulch Spring	3516985.81	534232.354	1359.774
20	Terrace	Empire Gulch Spring	3516985.627	534232.559	1359.76
21	Bank (Waters Edge)	Empire Gulch Spring	3516985.574	534232.637	1359.637
22	Water	Empire Gulch Spring	3516985.226	534233.081	1359.223
23	Water	Empire Gulch Spring	3516984.879	534233.608	1359.155
24	Water	Empire Gulch Spring	3516984.663	534234.207	1359.306
25	Bank (Waters Edge)	Empire Gulch Spring	3516984.521	534234.675	1359.673
26	Terrace	Empire Gulch Spring	3516984.46	534234.889	1359.776
27	Terrace	Empire Gulch Spring	3516984.283	534235.224	1359.784
28	River Left	Empire Gulch Spring	3516982.979	534231.826	1359.641
29	River Right	Empire Gulch Spring	3516982.398	534233.461	1359.639
30	River Left	Empire Gulch Spring	3516981.503	534231.367	1359.657
31	River Right	Empire Gulch Spring	3516980.776	534233.086	1359.653
32	River Left	Empire Gulch Spring	3516979.92	534231.155	1359.632
33	River Right	Empire Gulch Spring	3516979.692	534232.662	1359.638
34	River Left	Empire Gulch Spring	3516979.371	534231.065	1359.662
35	River Right	Empire Gulch Spring	3516978.969	534232.469	1359.639
36	River Left	Empire Gulch Spring	3516978.556	534230.872	1359.632
37	River Right	Empire Gulch Spring	3516978.034	534232.138	1359.658
38	River Left	Empire Gulch Spring	3516977.684	534230.683	1359.636
39	River Right	Empire Gulch Spring	3516977.17	534231.527	1359.637
40	Terrace	Empire Gulch 2A	3518869.992	538726.251	1297.377
41	Bank (Waters Edge)	Empire Gulch 2A	3518869.888	538726.079	1297.225
42	Water	Empire Gulch 2A	3518869.729	538725.857	1296.073
43	Water	Empire Gulch 2A	3518869.628	538725.634	1296.04
44	Water	Empire Gulch 2A	3518869.499	538725.232	1296.021
44	Bank (Waters Edge)	Empire Gulch 2A	3518869.245	538724.924	1297.232
45	Terrace	Empire Gulch 2A	3518869.195	538724.643	1297.289

Shot	Type	Site	Northing	Easting	Elevation
46	River Left	Empire Gulch 2A	3518870.532	538724.497	1297.231
47	River Left	Empire Gulch 2A	3518871.359	538724.217	1297.228
48	River left	Empire Gulch 2A	3518872.675	538724.01	1297.259
49	Terrace	Empire Gulch 2A	3518874.265	538724.181	1297.295
50	Bank (Waters Edge)	Empire Gulch 2A	3518874.117	538724.45	1297.221
51	Water	Empire Gulch 2A	3518874.047	538724.707	1296.317
52	Water	Empire Gulch 2A	3518873.817	538724.819	1296.109
53	Water	Empire Gulch 2A	3518873.694	538725.133	1296.317
54	Water	Empire Gulch 2A	3518873.611	538725.289	1296.559
55	Bank (Waters Edge)	Empire Gulch 2A	3518873.592	538725.47	1297.214
56	Terrace	Empire Gulch 2A	3518873.458	538725.589	1297.334
57	River Right	Empire Gulch 2A	3518870.793	538725.89	1297.286
58	River Right	Empire Gulch 2A	3518871.764	538725.709	1297.242
59	River Right	Empire Gulch 2A	3518872.621	538725.403	1297.231
60	River Right	Empire Gulch 2A	3518873.067	538725.383	1297.177
61	River Right	Empire Gulch 2A	3518874.337	538725.77	1297.235
62	River Right	Empire Gulch 2A	3518875.168	538725.958	1297.189
63	River Right	Empire Gulch 2A	3518876.042	538725.703	1297.227
64	River Right	Empire Gulch 2A	3518877.197	538725.187	1297.254
65	Terrace	Empire Gulch 2A	3518876.555	538725.818	1297.3
66	Bank (Waters Edge)	Empire Gulch 2A	3518876.419	538725.626	1297.226
67	Water	Empire Gulch 2A	3518876.341	538725.336	1296.192
68	Water	Empire Gulch 2A	3518876.111	538724.952	1295.992
69	Water	Empire Gulch 2A	3518875.833	538724.761	1295.761
70	Bank (Waters Edge)	Empire Gulch 2A	3518875.629	538724.502	1297.118
71	Terrace	Empire Gulch 2A	3518875.579	538724.344	1297.323
72	River Left	Empire Gulch 2A	3518875.03	538724.768	1297.188
73	River left	Empire Gulch 2A	3518874.631	538724.596	1297.214
74	Terrace	Empire Gulch 2B	3518903.91	538725.195	1297.255
75	Bank (Waters Edge)	Empire Gulch 2B	3518903.9	538725.391	1297.125
76	Water	Empire Gulch 2B	3518903.853	538726.209	1296.359
77	Water	Empire Gulch 2B	3518904.17	538727.076	1296.4
78	Water	Empire Gulch 2B	3518904.473	538727.784	1296.376
79	Bank (Waters Edge)	Empire Gulch 2B	3518904.792	538728.565	1297.115
80	Terrace	Empire Gulch 2B	3518904.787	538728.731	1297.295
81	Terrace	Empire Gulch 2B	3518900.901	538729.139	1297.381
82	Bank (Waters Edge)	Empire Gulch 2B	3518900.942	538729.088	1297.111
83	Water	Empire Gulch 2B	3518901.127	538728.23	1296.411
84	Water	Empire Gulch 2B	3518901.033	538727.586	1296.428
85	Water	Empire Gulch 2B	3518900.793	538726.701	1296.401
86	Bank (Waters Edge)	Empire Gulch 2B	3518900.939	538725.698	1297.088
87	Terrace	Empire Gulch 2B	3518900.95	538725.547	1297.202
88					
89	Terrace	Empire Gulch 2B	3518898.433	538725.123	1297.189
90	Bank (Waters Edge)	Empire Gulch 2B	3518898.48	538725.348	1297.118
91	Water	Empire Gulch 2B	3518898.29	538726.242	1296.491

Shot	Type	Site	Northing	Easting	Elevation
92	Water	Empire Gulch 2B	3518898.489	538727.239	1296.414
93	Water	Empire Gulch 2B	3518898.346	538728.069	1296.256
94	Bank (Waters Edge)	Empire Gulch 2B	3518898.376	538728.834	1297.051
95	Terrace	Empire Gulch 2B	3518898.396	538729.084	1297.12
96	Terrace	Empire Gulch 3	3519150.652	538787.043	1298.234
97	Bank (Waters Edge)	Empire Gulch 3	3519150.114	538786.103	1297.997
98					
99	Water	Empire Gulch 3	3519148.524	538784.872	1297.165
100	Water	Empire Gulch 3	3519147.243	538783.839	1297.027
101	Water	Empire Gulch 3	3519146.727	538782.337	1296.882
102	Bank (Waters Edge)	Empire Gulch 3	3519145.862	538781.46	1298.005
103	Terrace	Empire Gulch 3	3519145.56	538780.752	1298.277
104	Terrace	Empire Gulch 3	3519139.162	538785.071	1298.291
105	Bank (Waters Edge)	Empire Gulch 3	3519139.66	538785.46	1298.004
106	Terrace	Empire Gulch 3	3519134.302	538790.74	1298.277
107	Bank (Waters Edge)	Empire Gulch 3	3519134.468	538791.16	1298.025
108	Water	Empire Gulch 3	3519140.577	538786.52	1297.012
109	Water	Empire Gulch 3	3519141.264	538787.635	1296.943
110	Water	Empire Gulch 3	3519142.295	538788.677	1297.109
111	Bank (Waters Edge)	Empire Gulch 3	3519142.886	538789.836	1298.027
112	Water	Empire Gulch 3	3519134.853	538792.216	1296.885
113	Water	Empire Gulch 3	3519135.608	538793.15	1296.86
114	Water	Empire Gulch 3	3519136.259	538793.982	1296.952
115	Bank (Waters Edge)	Empire Gulch 3	3519136.327	538794.795	1298.016
116	Terrace	Empire Gulch 3	3519136.874	538795.721	1298.149
117	Terrace	Empire Gulch 3	3519143.202	538790.594	1298.16