Appendix A

Projected Groundwater Elevation Time Series for Selected Wells for Scenarios 1 and 3

Table A-1
Sustainability Metrics and First Occurrence of Failure

Figure #	Owner	Well Name	Top of Screen Elevation	Pump Setting Elevation	Constraint Type	Sustainability Metric Elevation	First Occurrence of Breaking the Sustainability Metric (Year)									
							Scenario 1	Scenario 1A	Scenario 1B	Scenario 1C	Scenario 1D	Scenario 3	Scenario 3A	Scenario 3B	Scenario 3C	Scenario 3D
1	City of Chino Hills	1A	462	383	Pump Setting Elev. + 20 ft	403	-	-	-	-	-	-	-	-	-	-
2	City of Chino Hills	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	City of Chino Hills	7A	529	443	Pump Setting Elev. + 20 ft	463	-	-	-	-	-	-	-	-	-	-
4	City of Chino Hills	7B	545	443	Pump Setting Elev. + 20 ft	463	-	-	-	-	-	-	-	-	-	-
5	City of Chino Hills	15	269	383	Pump Setting Elev. + 20 ft	403	-	-	-	-	-	-	-	-	-	-
6	City of Chino Hills	17	394	172	Pump Setting Elev. + 20 ft	192	-	-	-	-	-	-	-	-	-	-
7	City of Chino	5	425	505	Pump Setting Elev. + 40 ft	545	2024	2024	2024	2024	2024	2021	2021	2021	2021	2021
8	City of Chino	6	499	449	Pump Setting Elev. + 40 ft	489	-	-	-	-	-	-	-	-	-	-
9	City of Chino	9	543	453	Pump Setting Elev. + 40 ft	493	-	-	-	-	-	-	-	-	-	-
10	City of Chino	10	530	435	Pump Setting Elev. + 40 ft	475	-	-	-	-	-	-	-	-	-	-
11	City of Chino	11	431	415	Pump Setting Elev. + 40 ft	455	-	-	-	-	-	-	-	-	-	-
12	City of Chino	12	469	-	-	-	-	-	-	-	-	-	-	-	-	-
13	City of Chino	13	448	308	Pump Setting Elev. + 40 ft	348	-	-	-	-	-	-	-	-	-	-
14	City of Chino	14	476	-	-	-	-	-	-	-	-	-	-	-	-	-
15	City of Chino	16	486	-	-	-	-	-	-	-	-	-	-	-	-	-
16	City of Chino	17	489	-	-	-	-	-	-	-	-	-	-	-	-	-
17	MVWD	MVWD-33	444	-	-	-	-	-	-	-	-	-	-	-	-	-
18	City of Chino	18	512	-	-	-	-	-	-	-	-	-	-	-	-	-
19	City of Chino	NEW-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	City of Chino	NEW-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
21	CVWD	CB-1	651	-	-	-	-	-	-	-	-	-	-	-	-	-
22	CVWD	CB-2C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
23	CVWD	CB-3	722	513	Pump Setting Elev. + 40 ft	553	-	-	-	-	-	-	-	-	-	-
24	CVWD	CB-4	599	453	Pump Setting Elev. + 40 ft	493	-	-	-	-	-	-	-	-	-	-
25	CVWD	CB-5	555	573	Pump Setting Elev. + 40 ft	613	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
26	CVWD	CB-30	619	449	Pump Setting Elev. + 40 ft	489	-	-	-	-	-	-	-	-	-	-
27	CVWD	CB-38	479	469	Pump Setting Elev. + 40 ft	509	-	-	-	-	-	-	-	-	-	-
28	CVWD	CB-39	530	615	Pump Setting Elev. + 40 ft	655	-	-	-	-	-	-	-	-	-	-
29	CVWD	CB-40	526	401	Pump Setting Elev. + 40 ft	441	-	-	-	-	-	-	-	-	-	-
30	CVWD	CB-41	451	435	Pump Setting Elev. + 40 ft	475	-	-	-	-	-	-	-	-	-	-
31	CVWD	CB-42	443	471	Pump Setting Elev. + 40 ft	511	-	-	-	-	-	-	-	-	-	-
32	CVWD	CB-43	549	394	Pump Setting Elev. + 40 ft	434	-	-	-	-	-	-	-	-	-	-
33	CVWD	CB-46	433	461	Pump Setting Elev. + 40 ft	501	-	-	-	-	-	-	-	-	-	-
34	CVWD	ASR1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	CVWD	ASR2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
36	CVWD	ASR3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	CVWD	ASR4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
38	FWC	F2A	683	676	Pump Setting Elev. + 50 ft	726	2016	2016	2016	2016	2016	2015	2015	2015	2015	2015
39	FWC	F7A	619	644	Pump Setting Elev. + 50 ft	694	-	-	-	-	-	-	-	-	-	-
40	FWC	F7B	608	583	Pump Setting Elev. + 50 ft	633	-	-	-	-	-	-	-	-	-	-
41	FWC	F17B	578	565	Pump Setting Elev. + 50 ft	615	-	-	-	-	-	-	-	-	-	-
42	FWC	F17C	573	510	Pump Setting Elev. + 50 ft	560	-	-	-	-	-	-	-	-	-	-
43	FWC	F21A	793	582	Pump Setting Elev. + 50 ft	632	-	-	-	-	-	-	-	-	-	-
44	FWC	F23A	623	-	-	-	-	-	-	-	-	-	-	-	-	-
45	FWC	F30A	740	632	Pump Setting Elev. + 50 ft	682	-	-	-	-	-	-	-	-	-	-
46	FWC	F31A	694	621	Pump Setting Elev. + 50 ft	671	-	-	-	-	-	-	-	-	-	-
47	FWC	F44A	713	671	Pump Setting Elev. + 50 ft	721	2024	2024	2024	2025	2026	2022	2022	2023	2023	2024
48	FWC	F44B	633	641	Pump Setting Elev. + 50 ft	691	-	-	-	-	-	2030	2030	-	-	-
49	FWC	F44C	633	641	Pump Setting Elev. + 50 ft	691	-	-	-	-	-	2030	2030	-	-	-
50	GSWC	#1	879	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A-1
Sustainability Metrics and First Occurrence of Failure

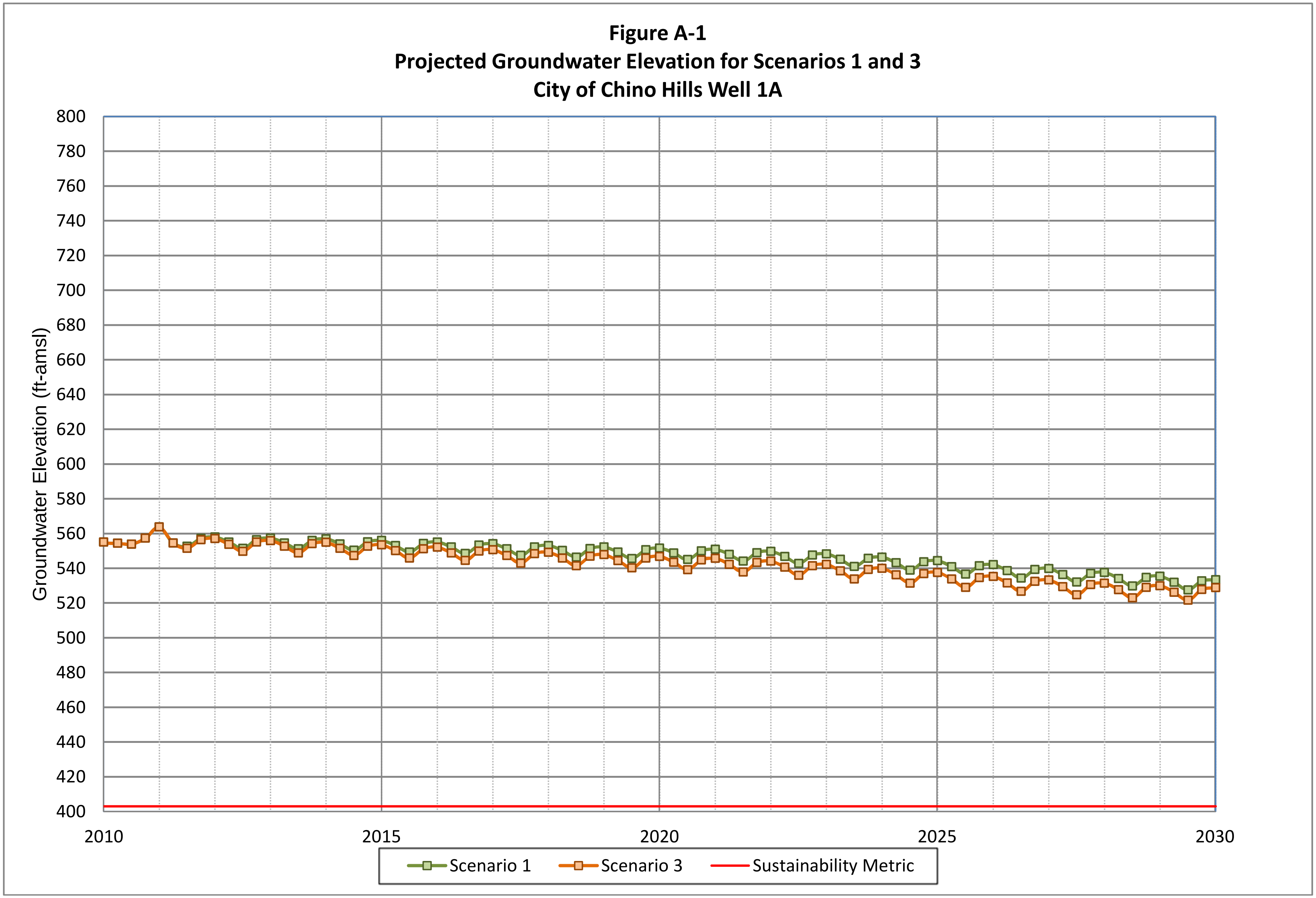
Figure #	Owner	Well Name	Top of Screen Elevation	Pump Setting Elevation	Constraint Type	Sustainability Metric Elevation	First Occurrence of Breaking the Sustainability Metric (Year)									
							Scenario 1	Scenario 1A	Scenario 1B	Scenario 1C	Scenario 1D	Scenario 3	Scenario 3A	Scenario 3B	Scenario 3C	Scenario 3D
51	JCSD	6	610	-	Top of screens	610	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
52	JCSD	8	581	459	Top of screens	581	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
53	JCSD	11	559	497	Top of screens	559	2029	-	-	-	-	2025	-	2028	-	-
54	JCSD	12	557	479	Top of screens	557	2014	2014	2014	2014	2014	2013	2013	2013	2013	2013
55	JCSD	13	627	526	Top of screens	627	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
56	JCSD	14	560	402	Top of screens	560	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
57	JCSD	15	565	518	Top of screens	565	2024	-	2028	-	-	2020	2028	2024	-	2030
58	JCSD	16	552	504	Top of screens	552	2028	-	-	-	-	2024	-	2028	-	-
59	JCSD	17	566	545	Top of screens	566	2025	-	2030	-	-	2020	2029	2024	-	-
60	JCSD	18	580	495	Top of screens	580	2013	2013	2013	2013	2013	2013	2013	2013	2013	2013
61	JCSD	19	546	474	Top of screens	546	-	-	-	-	-	-	-	-	-	-
62	JCSD	20	580	496	Top of screens	580	2021	2028	2026	-	-	2018	2024	2021	-	2030
63	JCSD	22	537	498	Top of screens	537	-	-	-	-	-	-	-	-	-	-
64	JCSD	23	492	462	Top of screens	492	-	-	-	-	-	-	-	-	-	-
65	JCSD	24	-	477	Top of screens	547	-	-	-	-	-	-	-	-	-	-
66	JCSD	25	525	485	Top of screens	525	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
67	JCSD	Galleano	490	-	Top of screens	490	-	-	-	-	-	-	-	-	-	-
68	JCSD	ODA	496	-	Top of screens	496	-	-	-	-	-	-	-	-	-	-
69	JCSD	IDI-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
70	JCSD	IDI-2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
71	MMWC	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
72	MMWC	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
73	MMWC	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
74	MVWD	4	707	501	Pump Setting Elev. + 20 ft	521	-	-	-	-	-	-	-	-	-	-
75	MVWD	5	572	432	Pump Setting Elev. + 20 ft	452	-	-	-	-	-	-	-	-	-	-
76	MVWD	6	762	502	Pump Setting Elev. + 20 ft	522	-	-	-	-	-	-	-	-	-	-
77	MVWD	10	537	357	Pump Setting Elev. + 20 ft	377	-	-	-	-	-	-	-	-	-	-
78	MVWD	19	423	423	Pump Setting Elev. + 20 ft	443	-	-	-	-	-	-	-	-	-	-
79	MVWD	26	434	434	Pump Setting Elev. + 20 ft	454	-	-	-	-	-	-	-	-	-	-
80	MVWD	27	478	488	Pump Setting Elev. + 20 ft	508	-	-	-	-	-	-	-	-	-	-
81	MVWD	28	418	293	Pump Setting Elev. + 20 ft	313	-	-	-	-	-	-	-	-	-	-
82	MVWD	30	446	489	Pump Setting Elev. + 20 ft	509	-	-	-	-	-	-	-	-	-	-
83	MVWD	31	416	316	Pump Setting Elev. + 20 ft	336	-	-	-	-	-	-	-	-	-	-
84	MVWD	32	407	432	Pump Setting Elev. + 20 ft	452	-	-	-	-	-	-	-	-	-	-
85	MVWD	MVWD-33	444	479	Pump Setting Elev. + 20 ft	499	-	-	-	-	-	-	-	-	-	-
86	MVWD	34	398	362	Pump Setting Elev. + 20 ft	382	-	-	-	-	-	-	-	-	-	-
87	City of Ontario	9	543	-	-	-	-	-	-	-	-	-	-	-	-	-
88	City of Ontario	16	540	-	-	-	-	-	-	-	-	-	-	-	-	-
89	City of Ontario	17	543	510	Pump Setting Elev. + 20 ft	530	-	-	-	-	-	-	-	-	-	-
90	City of Ontario	20	-	532	Pump Setting Elev. + 20 ft	552	-	-	-	-	-	-	-	-	-	-
91	City of Ontario	24	507	561	Pump Setting Elev. + 20 ft	581	2029	2030	-	-	-	2028	2029	2030	-	-
92	City of Ontario	25	611	497	Pump Setting Elev. + 20 ft	517	-	-	-	-	-	-	-	-	-	-
93	City of Ontario	26	628	518	Pump Setting Elev. + 20 ft	538	-	-	-	-	-	-	-	-	-	-
94	City of Ontario	27	500	551	Pump Setting Elev. + 20 ft	571	2030	-	-	-	-	2029	-	-	-	-
95	City of Ontario	29	561	521	Pump Setting Elev. + 20 ft	541	-	-	-	-	-	-	-	-	-	-
96	City of Ontario	30	548	538	Pump Setting Elev. + 20 ft	558	-	-	-	-	-	-	-	-	-	-
97	City of Ontario	31	538	615	Pump Setting Elev. + 20 ft	635	2029	-	-	-	-	2027	2030	2030	-	-
98	City of Ontario	34	398	431	Pump Setting Elev. + 20 ft	451	-	-	-	-	-	-	-	-	-	-
99	City of Ontario	35	397	478	Pump Setting Elev. + 20 ft	498	-	-	-	-	-	-	-	-	-	-
100	City of Ontario	36	362	497	Pump Setting Elev. + 20 ft	517	-	-	-	-	-	-	-	-	-	-

Table A-1
Sustainability Metrics and First Occurrence of Failure

Figure #	Owner	Well Name	Top of Screen Elevation	Pump Setting Elevation	Constraint Type	Sustainability Metric Elevation	First Occurrence of Breaking the Sustainability Metric (Year)									
							Scenario 1	Scenario 1A	Scenario 1B	Scenario 1C	Scenario 1D	Scenario 3	Scenario 3A	Scenario 3B	Scenario 3C	Scenario 3D
101	City of Ontario	37	578	589	Pump Setting Elev. + 20 ft	609	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
102	City of Ontario	38	-	569	Pump Setting Elev. + 20 ft	589	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
103	City of Ontario	39	-	589	Pump Setting Elev. + 20 ft	609	2016	2016	2016	2016	2016	2016	2016	2016	2016	2016
104	City of Ontario	40	489	472	Pump Setting Elev. + 20 ft	492	-	-	-	-	-	-	-	-	-	-
105	City of Ontario	41	430	463	Pump Setting Elev. + 20 ft	483	-	-	-	-	-	-	-	-	-	-
106	City of Ontario	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-
107	City of Ontario	43	523	-	-	-	-	-	-	-	-	-	-	-	-	-
108	City of Ontario	44	475	553	Pump Setting Elev. + 20 ft	573	2027	2027	2028	2028	2028	2025	2026	2027	2028	2028
109	City of Ontario	45	409	480	Pump Setting Elev. + 20 ft	500	-	-	-	-	-	-	-	-	-	-
110	City of Ontario	46	482	521	Pump Setting Elev. + 20 ft	541	-	-	-	-	-	-	-	-	-	-
111	City of Ontario	47	496	539	Pump Setting Elev. + 20 ft	559	-	-	-	-	-	-	-	-	-	-
112	City of Ontario	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-
113	City of Ontario	49	491	518	Pump Setting Elev. + 20 ft	538	-	-	-	-	-	-	-	-	-	-
114	City of Ontario	50	472	499	Pump Setting Elev. + 20 ft	519	-	-	-	-	-	2028	-	-	-	-
115	City of Ontario	51	-	-	-	-	-	-	-	-	-	-	-	-	-	-
116	City of Ontario	52	485	465	Pump Setting Elev. + 20 ft	485	-	-	-	-	-	-	-	-	-	-
117	City of Ontario	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-
118	City of Ontario	101	-	-	-	-	-	-	-	-	-	-	-	-	-	-
119	City of Ontario	103	-	-	-	-	-	-	-	-	-	-	-	-	-	-
120	City of Ontario	104	-	-	-	-	-	-	-	-	-	-	-	-	-	-
121	City of Ontario	105	-	-	-	-	-	-	-	-	-	-	-	-	-	-
122	City of Ontario	106	-	-	-	-	-	-	-	-	-	-	-	-	-	-
123	City of Ontario	109	-	-	-	-	-	-	-	-	-	-	-	-	-	-
124	City of Ontario	111	-	-	-	-	-	-	-	-	-	-	-	-	-	-
125	City of Ontario	119	-	-	-	-	-	-	-	-	-	-	-	-	-	-
126	City of Ontario	115	-	-	-	-	-	-	-	-	-	-	-	-	-	-
127	City of Ontario	120	-	-	-	-	-	-	-	-	-	-	-	-	-	-
128	City of Ontario	126	-	-	-	-	-	-	-	-	-	-	-	-	-	-
129	City of Ontario	134	-	-	-	-	-	-	-	-	-	-	-	-	-	-
130	City of Ontario	136	-	-	-	-	-	-	-	-	-	-	-	-	-	-
131	City of Ontario	138	-	-	-	-	-	-	-	-	-	-	-	-	-	-
132	City of Pomona	2	886	-	-	-	-	-	-	-	-	-	-	-	-	-
133	City of Pomona	5B	433	-	-	-	-	-	-	-	-	-	-	-	-	-
134	City of Pomona	6	699	-	-	-	-	-	-	-	-	-	-	-	-	-
135	City of Pomona	10	611	-	-	-	-	-	-	-	-	-	-	-	-	-
136	City of Pomona	11	701	-	-	-	-	-	-	-	-	-	-	-	-	-
137	City of Pomona	12	630	-	-	-	-	-	-	-	-	-	-	-	-	-
138	City of Pomona	14	541	-	-	-	-	-	-	-	-	-	-	-	-	-
139	City of Pomona	15	649	-	-	-	-	-	-	-	-	-	-	-	-	-
140	City of Pomona	16	615	-	-	-	-	-	-	-	-	-	-	-	-	-
141	City of Pomona	17	417	-	-	-	-	-	-	-	-	-	-	-	-	-
142	City of Pomona	18	555	-	-	-	-	-	-	-	-	-	-	-	-	-
143	City of Pomona	21	678	-	-	-	-	-	-	-	-	-	-	-	-	-
144	City of Pomona	23	607	-	-	-	-	-	-	-	-	-	-	-	-	-
145	City of Pomona	24	-	-	-	-	-	-	-	-	-	-	-	-	-	-
146	City of Pomona	25	589	-	-	-	-	-	-	-	-	-	-	-	-	-
147	City of Pomona	26	539	-	-	-	-	-	-	-	-	-	-	-	-	-
148	City of Pomona	27	534	-	-	-	-	-	-	-	-	-	-	-	-	-
149	City of Pomona	29	510	-	-	-	-	-	-	-	-	-	-	-	-	-
150	City of Pomona	30	380	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A-1
Sustainability Metrics and First Occurrence of Failure

Figure #	Owner	Well Name	Top of Screen Elevation	Pump Setting Elevation	Constraint Type	Sustainability Metric Elevation	First Occurrence of Breaking the Sustainability Metric (Year)									
							Scenario 1	Scenario 1A	Scenario 1B	Scenario 1C	Scenario 1D	Scenario 3	Scenario 3A	Scenario 3B	Scenario 3C	Scenario 3D
151	City of Pomona	34	531	-	-	-	-	-	-	-	-	-	-	-	-	-
152	City of Pomona	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
153	City of Pomona	36	507	-	-	-	-	-	-	-	-	-	-	-	-	-
154	SARWCo	01A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
155	SARWCo	03A	547	-	-	-	-	-	-	-	-	-	-	-	-	-
156	City of Upland	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
157	City of Upland	7A	575	-	-	-	-	-	-	-	-	-	-	-	-	-
158	City of Upland	8	700	-	-	-	-	-	-	-	-	-	-	-	-	-
159	City of Upland	20	1326	-	-	-	-	-	-	-	-	-	-	-	-	-
160	City of Upland	21A	610	-	-	-	-	-	-	-	-	-	-	-	-	-
161	CDA	CDA I-1	332	362	Pump Setting Elev. + 40 ft	402	-	-	-	-	-	-	-	-	-	-
162	CDA	CDA I-2	374	264	Pump Setting Elev. + 40 ft	304	-	-	-	-	-	-	-	-	-	-
163	CDA	CDA I-3	363	313	Pump Setting Elev. + 40 ft	353	-	-	-	-	-	-	-	-	-	-
164	CDA	CDA I-4	406	316	Pump Setting Elev. + 40 ft	356	-	-	-	-	-	-	-	-	-	-
165	CDA	CDA I-5	465	370	Pump Setting Elev. + 40 ft	410	-	-	-	-	-	-	-	-	-	-
166	CDA	CDA I-6	451	456	Pump Setting Elev. + 40 ft	496	-	-	-	-	-	-	-	-	-	-
167	CDA	CDA I-7	446	451	Pump Setting Elev. + 40 ft	491	-	-	-	-	-	-	-	-	-	-
168	CDA	CDA I-8	455	350	Pump Setting Elev. + 40 ft	390	-	-	-	-	-	-	-	-	-	-
169	CDA	CDA I-9	454	459	Pump Setting Elev. + 40 ft	499	2026	2028	2028	-	-	2024	2026	2026	2029	2029
170	CDA	CDA I-10	466	471	Pump Setting Elev. + 40 ft	511	2015	2015	2015	2015	2015	2014	2014	2014	2014	2014
171	CDA	CDA I-11	484	369	Pump Setting Elev. + 40 ft	409	-	-	-	-	-	-	-	-	-	-
172	CDA	CDA I-13	448	436	Pump Setting Elev. + 40 ft	476	-	-	-	-	-	-	-	-	-	-
173	CDA	CDA I-14	533	493	Pump Setting Elev. + 40 ft	533	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
174	CDA	CDA I-15	538	488	Pump Setting Elev. + 40 ft	528	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
175	CDA	CDA I-16	469	-	-	-	-	-	-	-	-	-	-	-	-	-
176	CDA	CDA I-17	445	-	-	-	-	-	-	-	-	-	-	-	-	-
177	CDA	CDA I-18	492	-	-	-	-	-	-	-	-	-	-	-	-	-
178	CDA	CDA I-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
179	CDA	CDA I-20	508	-	-	-	-	-	-	-	-	-	-	-	-	-
180	CDA	CDA I-21	520	-	-	-	-	-	-	-	-	-	-	-	-	-
181	CDA	CDA II-1	529	534	Pump Setting Elev. + 40 ft	574	2010	2010	2010	2010	2010	2010	2010	2010	2010	2010
182	CDA	CDA II-2	533	418	Pump Setting Elev. + 40 ft	458	-	-	-	-	-	-	-	-	-	-
183	CDA	CDA II-3	532	417	Pump Setting Elev. + 40 ft	457	-	-	-	-	-	-	-	-	-	-
184	CDA	CDA II-4	542	428	Pump Setting Elev. + 40 ft	468	-	-	-	-	-	-	-	-	-	-
185	CDA	CDA-II-6	562	437	Pump Setting Elev. + 40 ft	477	-	-	-	-	-	-	-	-	-	-
186	CDA	CDA II-7	554	421	Pump Setting Elev. + 40 ft	461	-	-	-	-	-	-	-	-	-	-
187	CDA	CDA-II-8	560	432	Pump Setting Elev. + 40 ft	472	-	-	-	-	-	-	-	-	-	-
188	CDA	CDA-II-9a	557	470	Pump Setting Elev. + 40 ft	510	-	-	-	-	-	-	-	-	-	-
189	CBWM	AP-PA/7	-	-	Guidance Level	398	-	-	-	-	-	-	-	-	-	-



20120503_Projected_Hydrographs.xlsx

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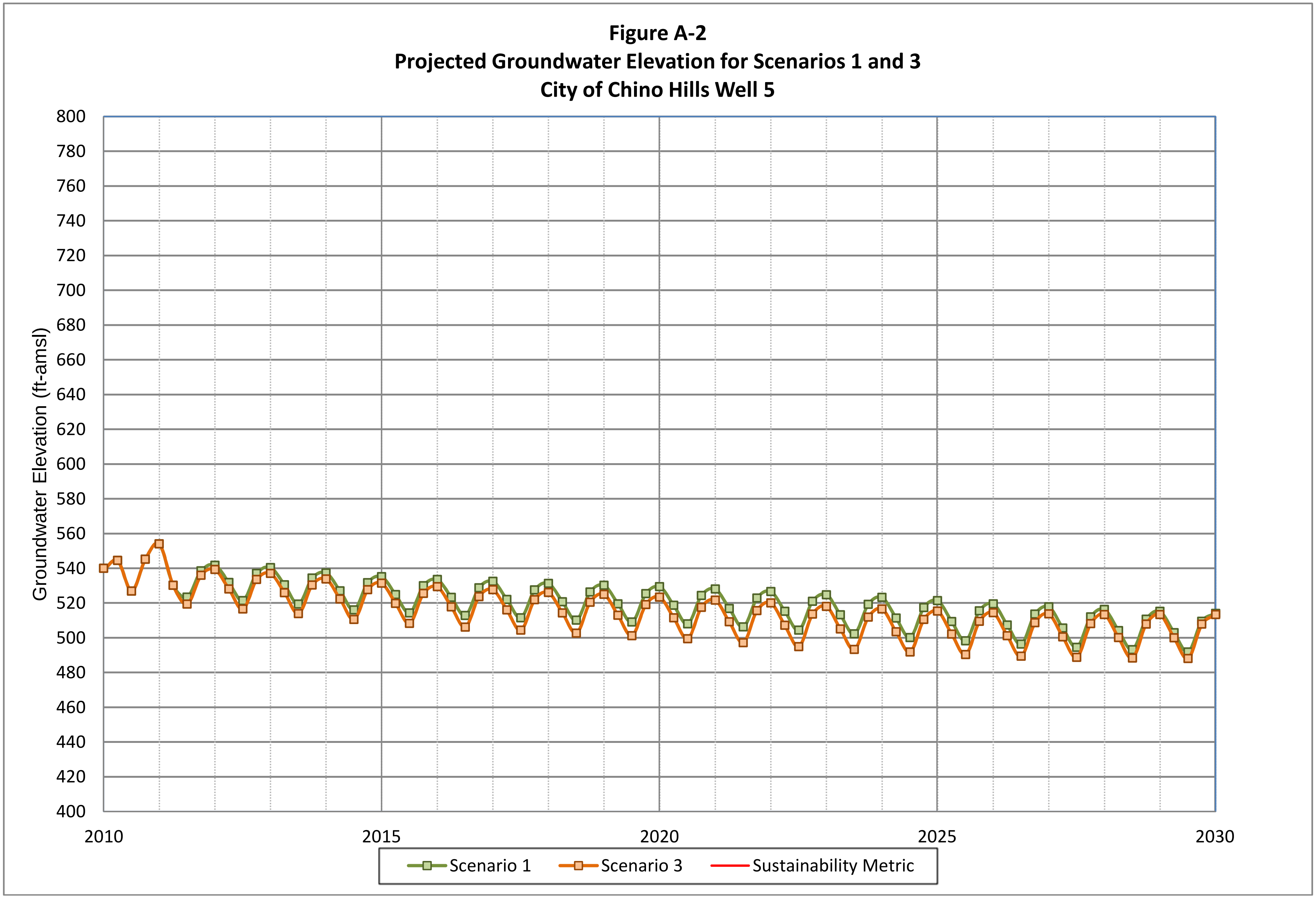
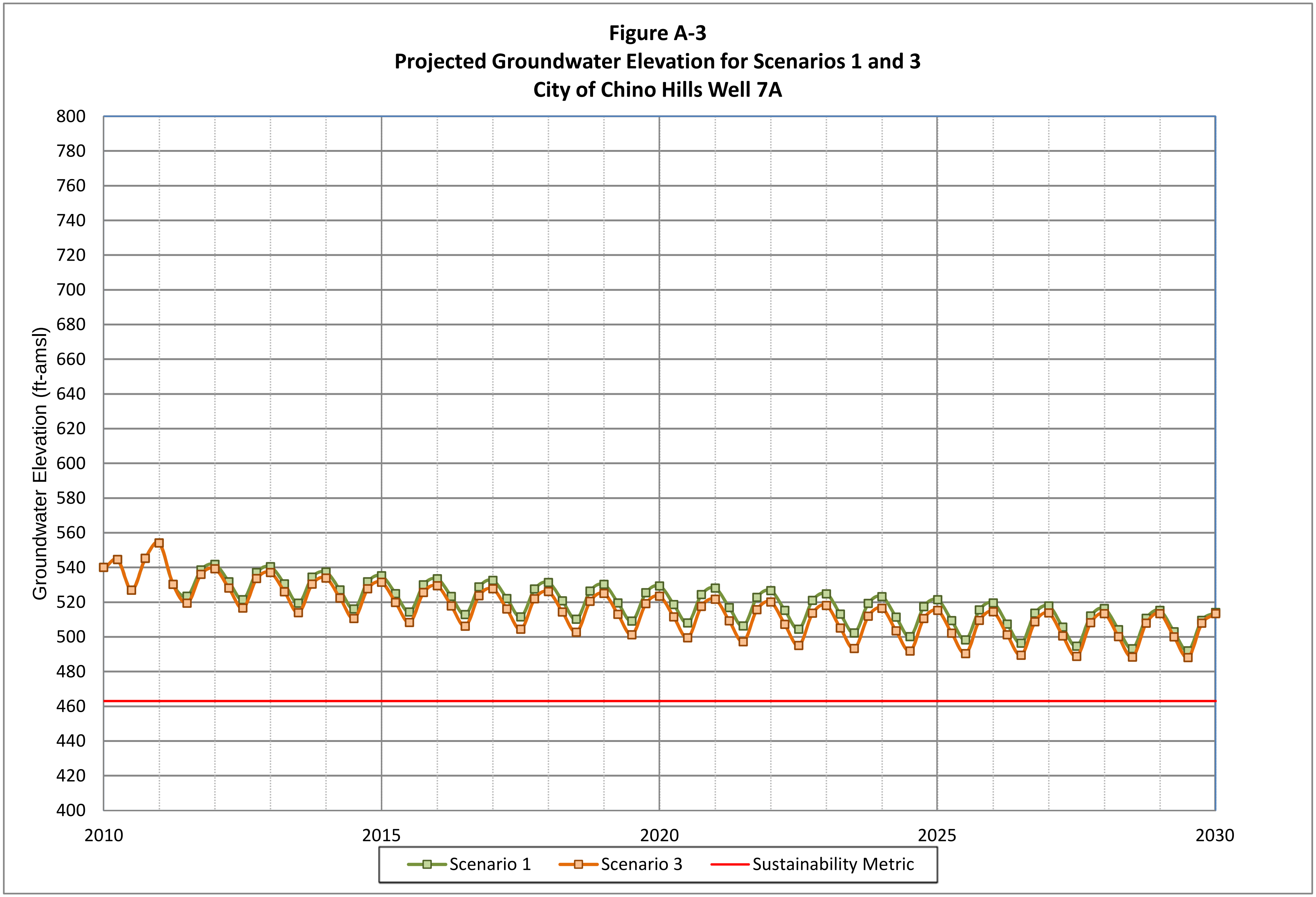


Figure A-2
Projected Groundwater Elevation for Scenarios 1 and 3
City of Chino Hills Well 5
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



20120503_Projected_Hydrographs.xlsx

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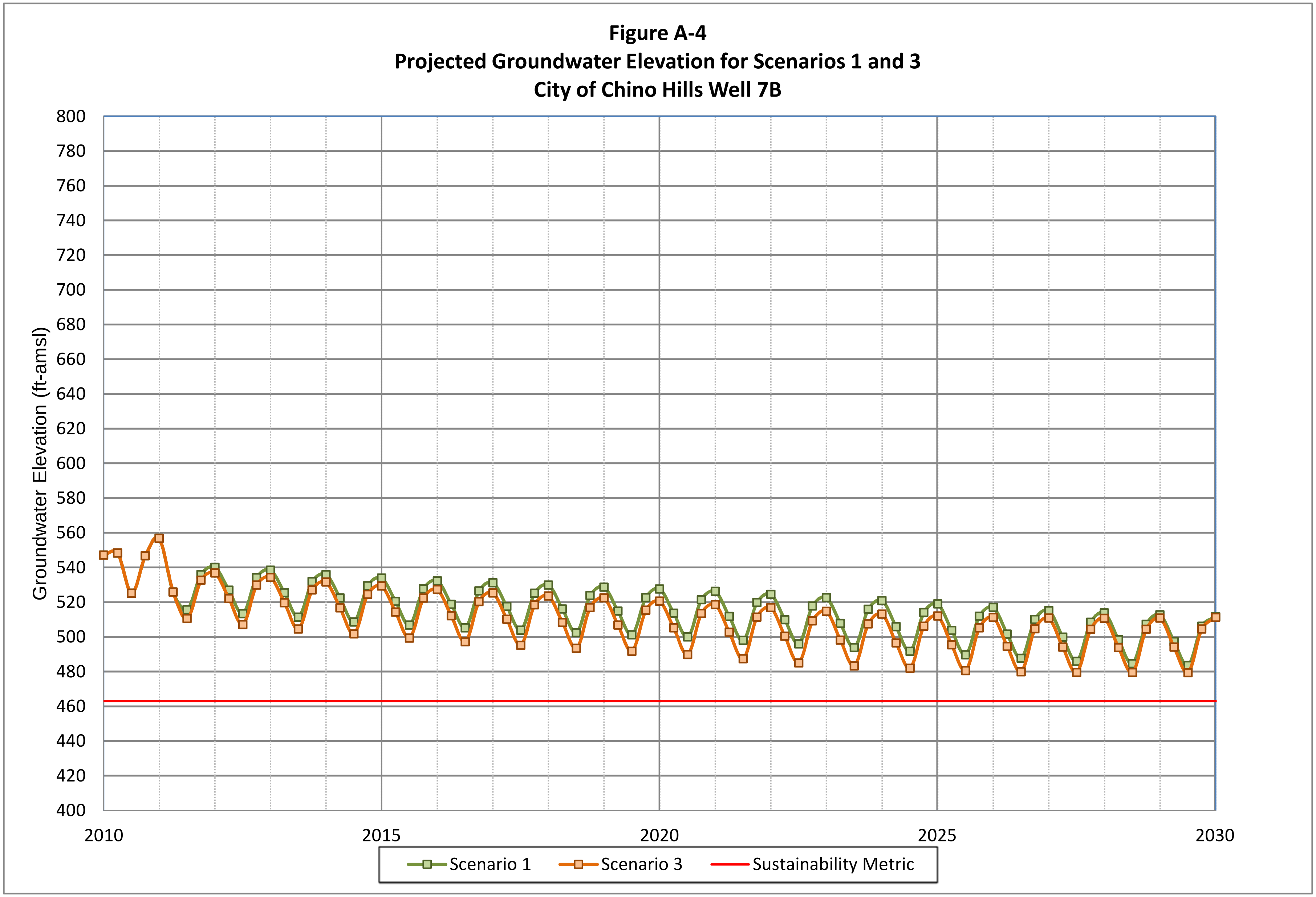

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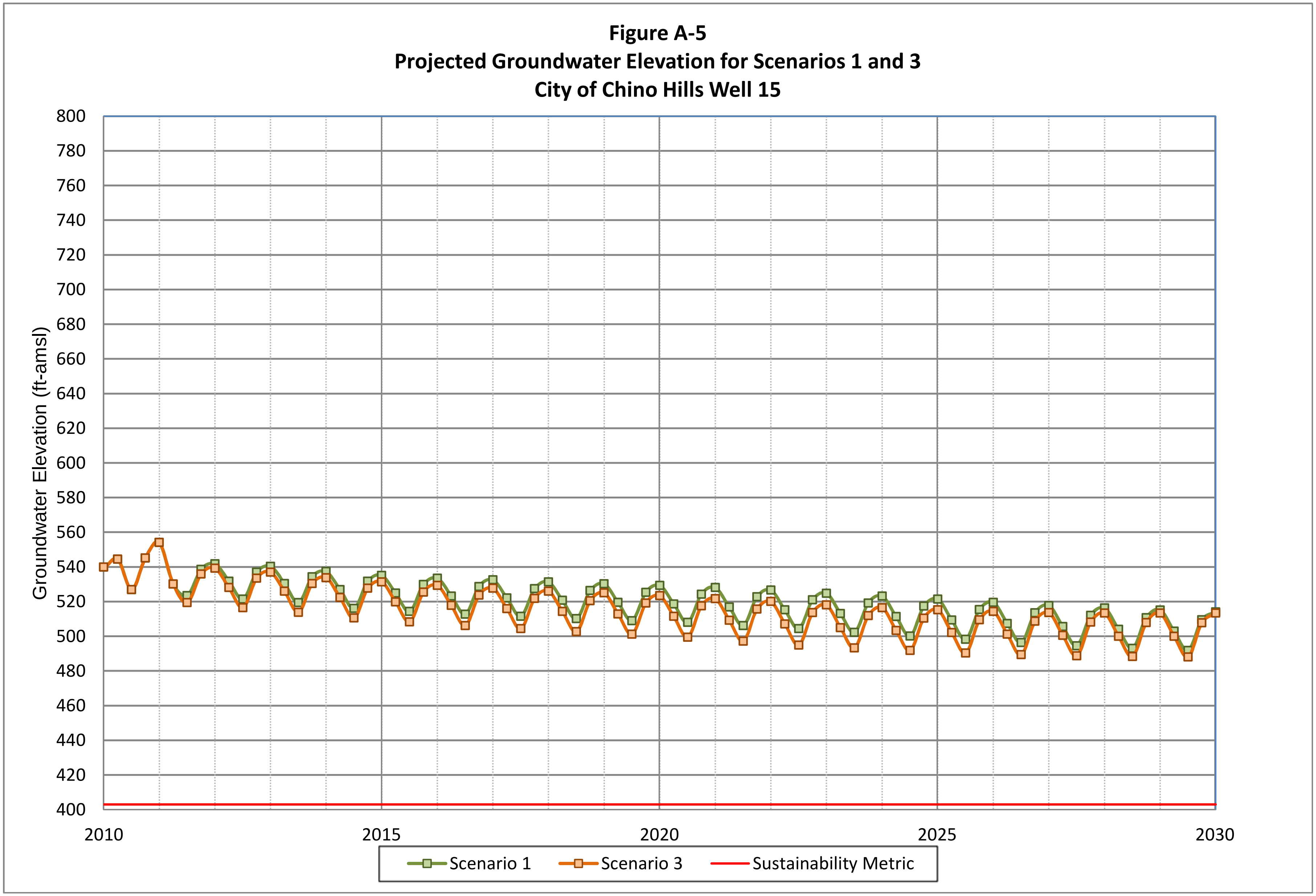
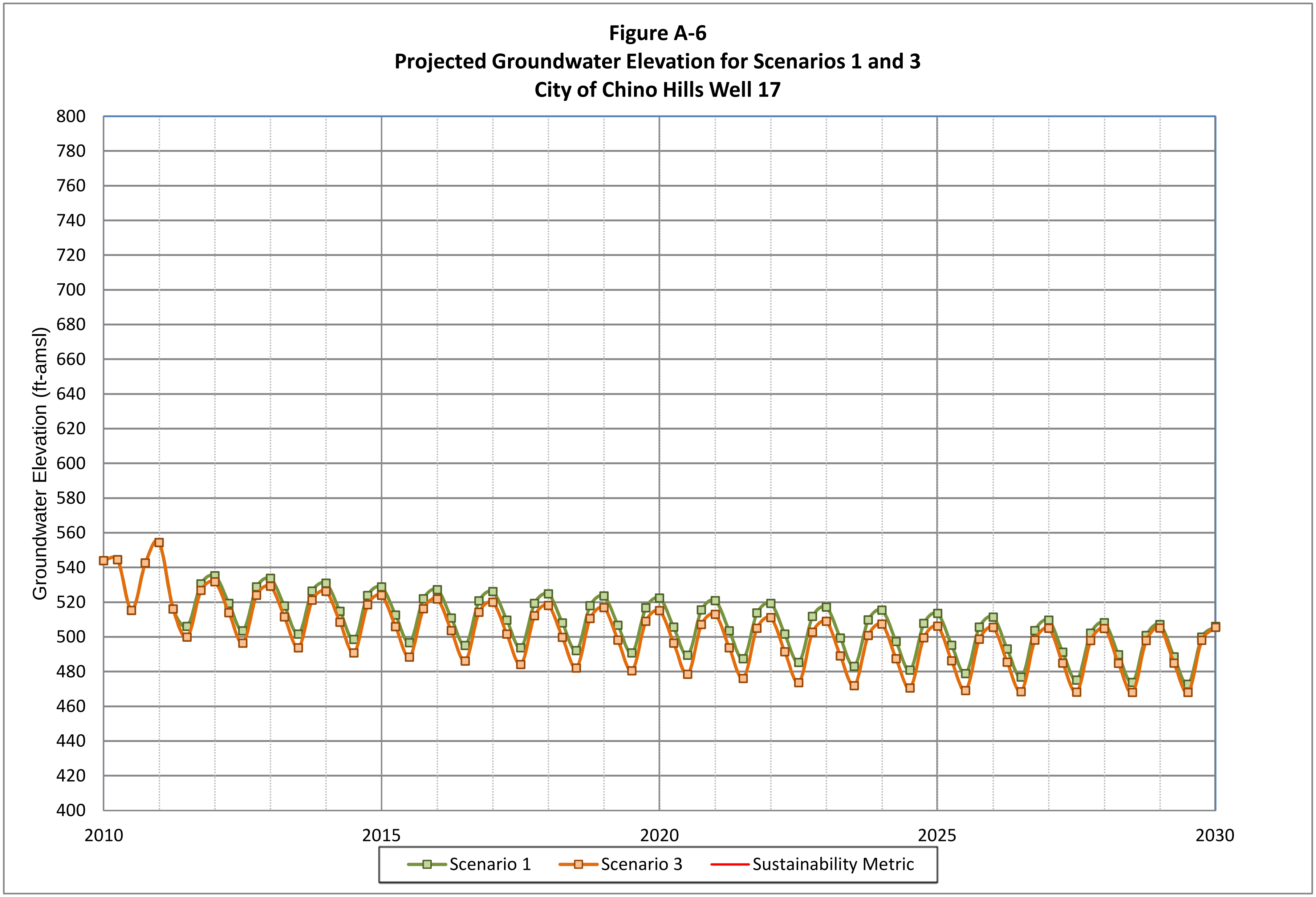


Figure A-5
Projected Groundwater Elevation for Scenarios 1 and 3
City of Chino Hills Well 15
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



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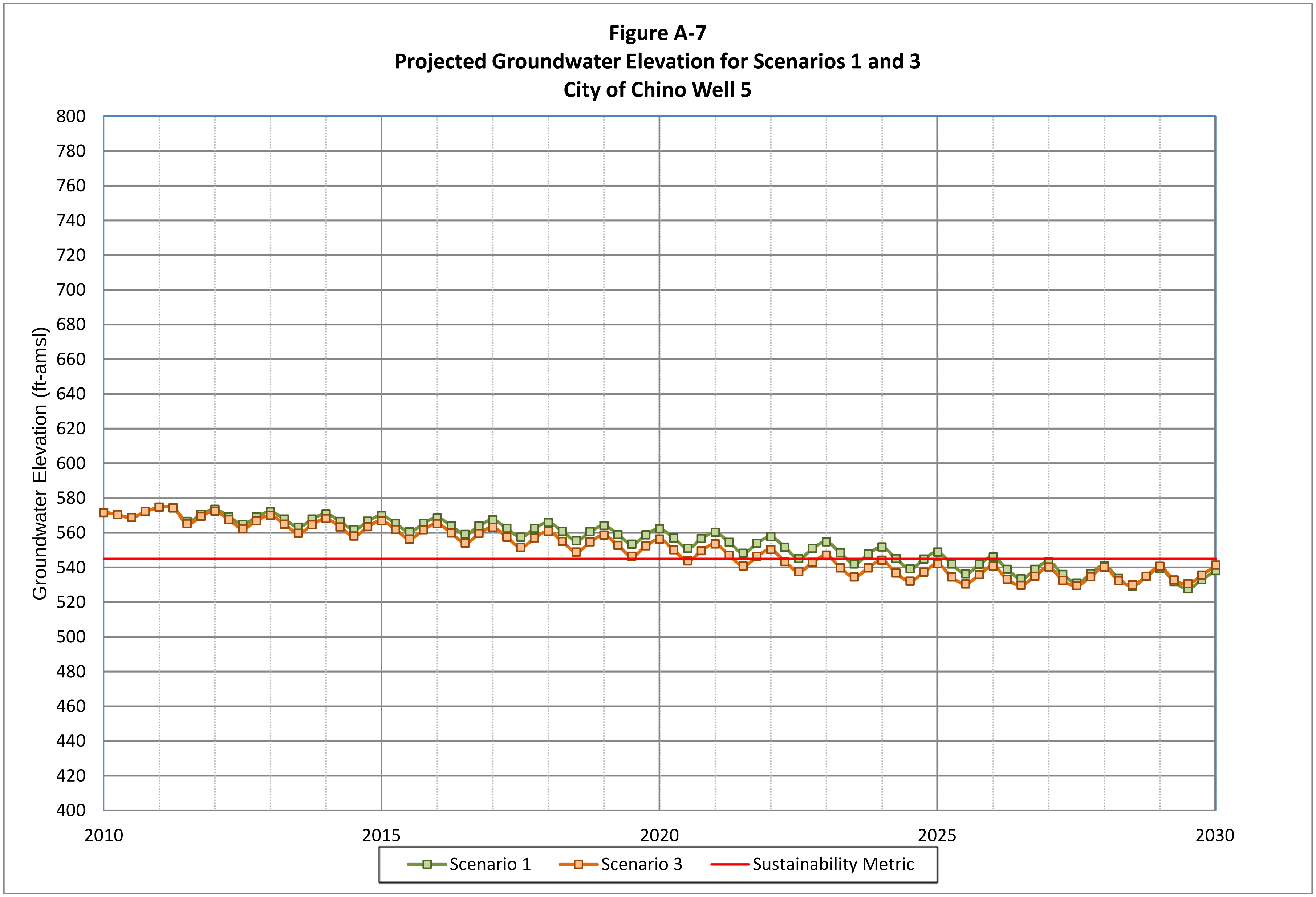

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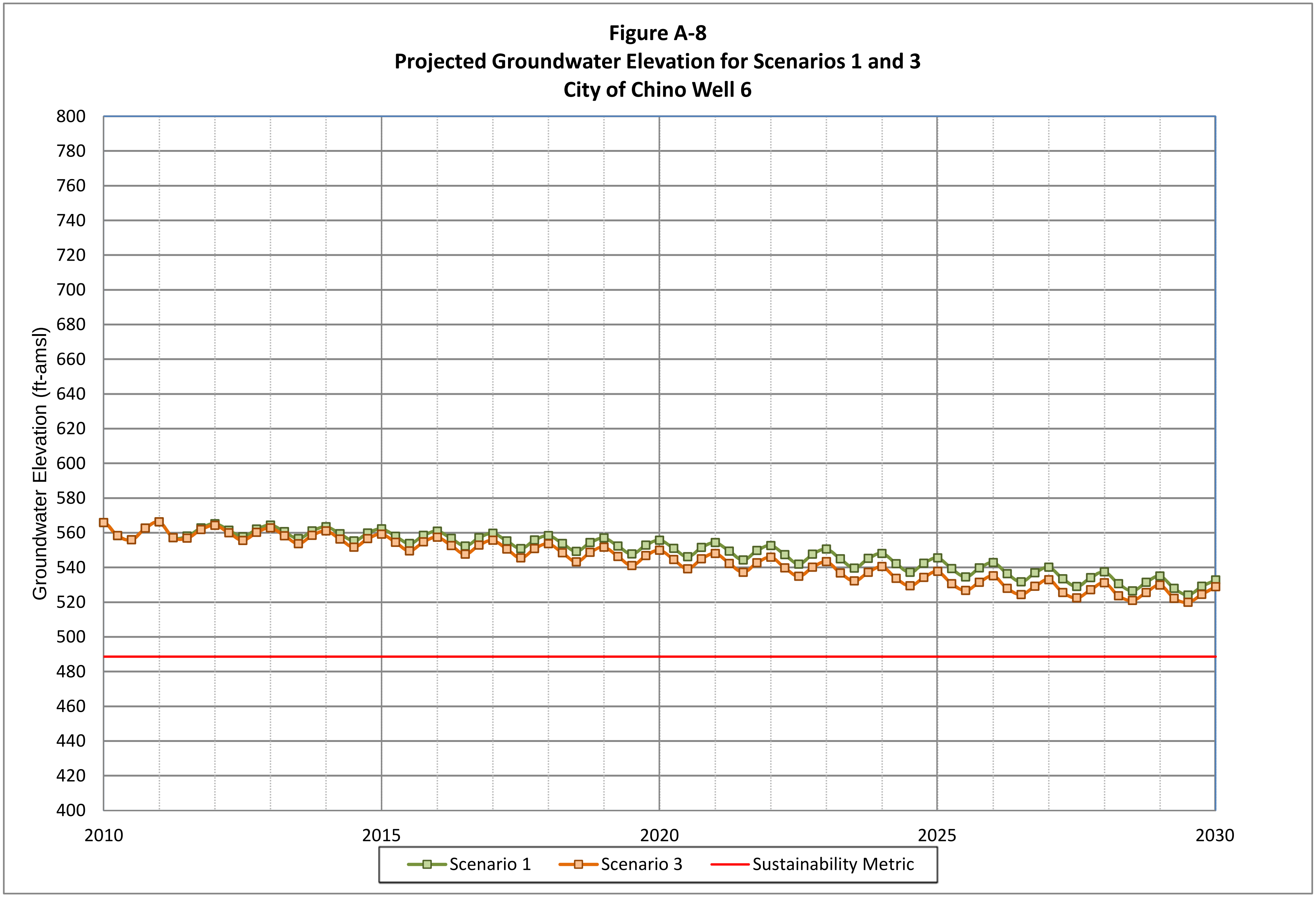

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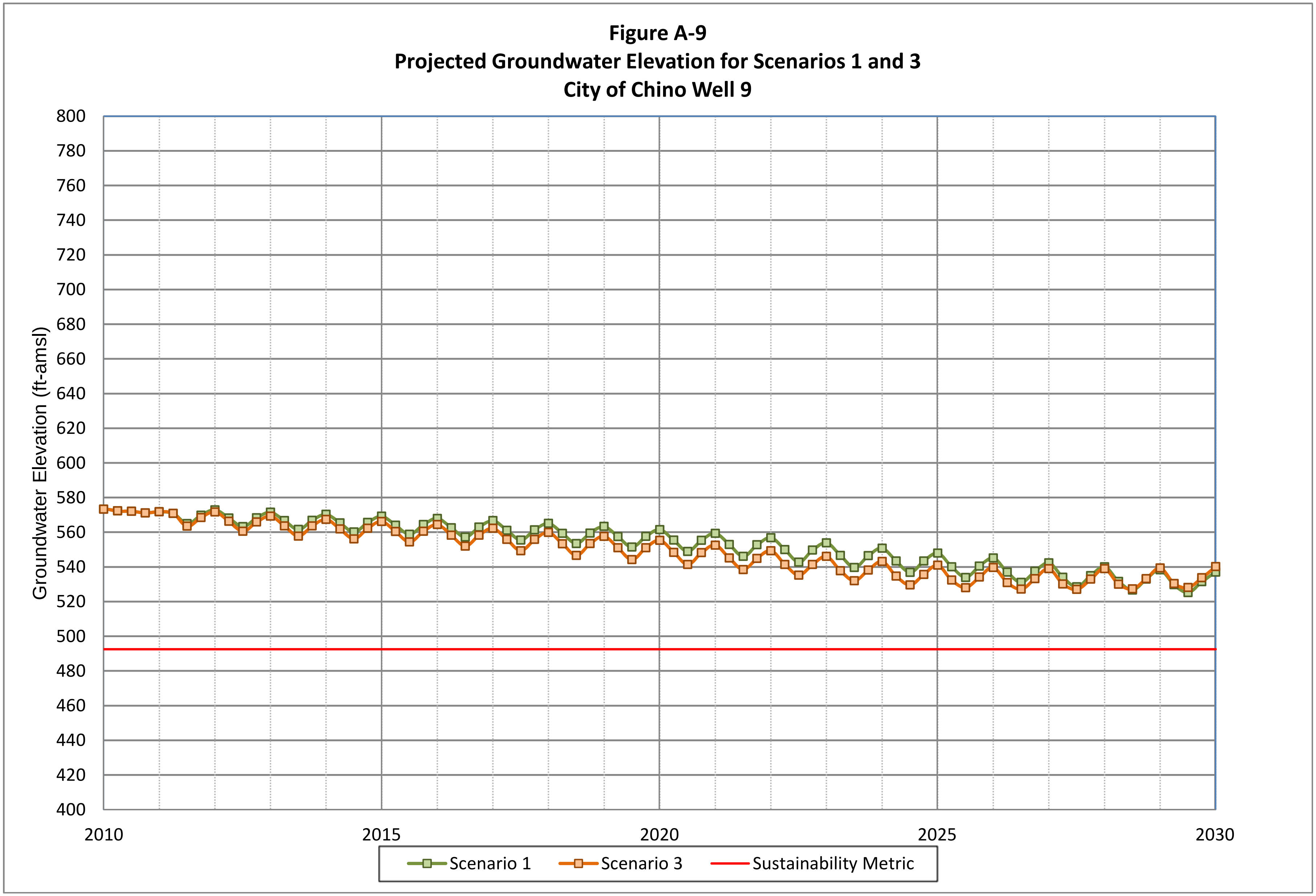
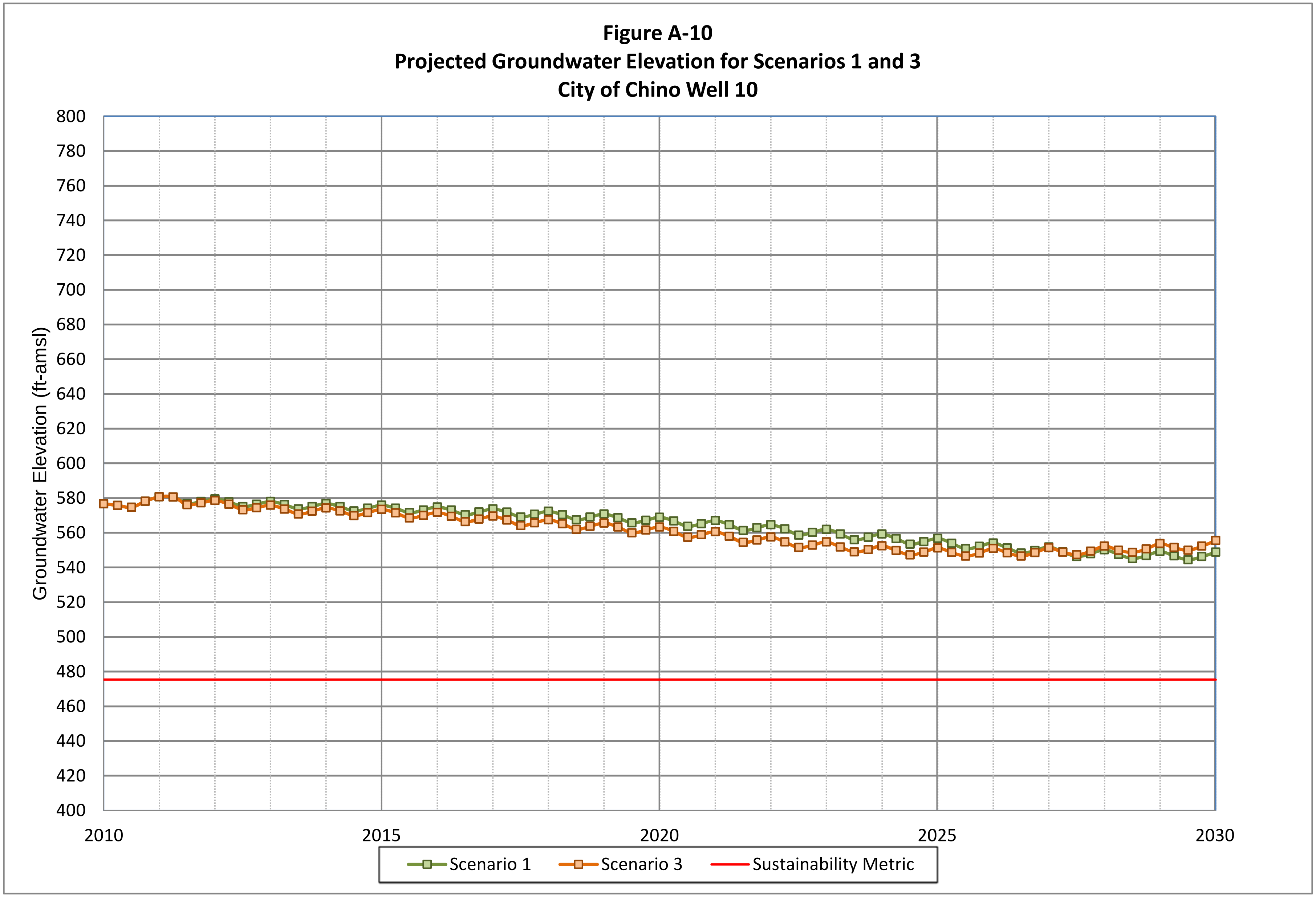


Figure A-9
Projected Groundwater Elevation for Scenarios 1 and 3
City of Chino Well 9
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



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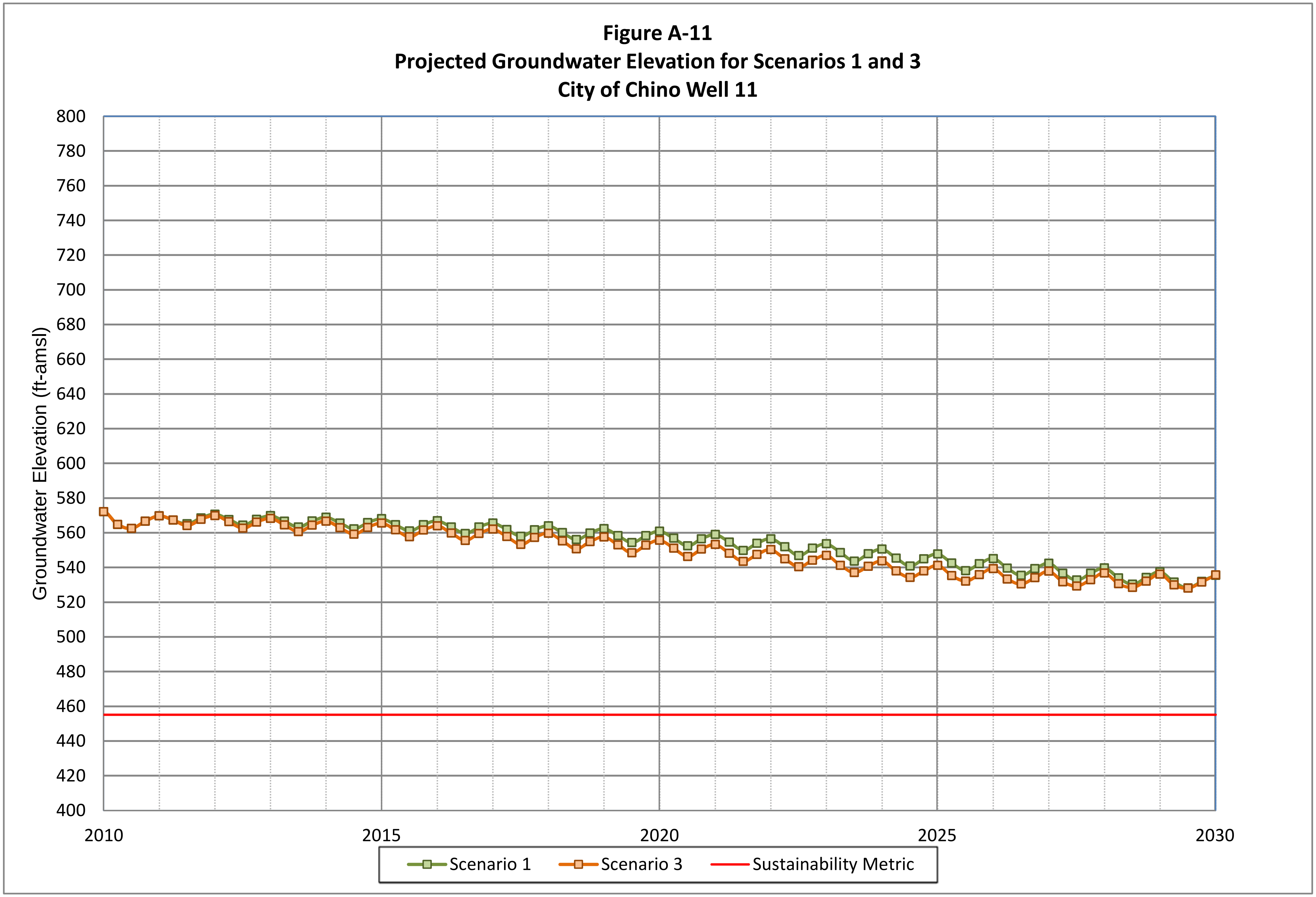

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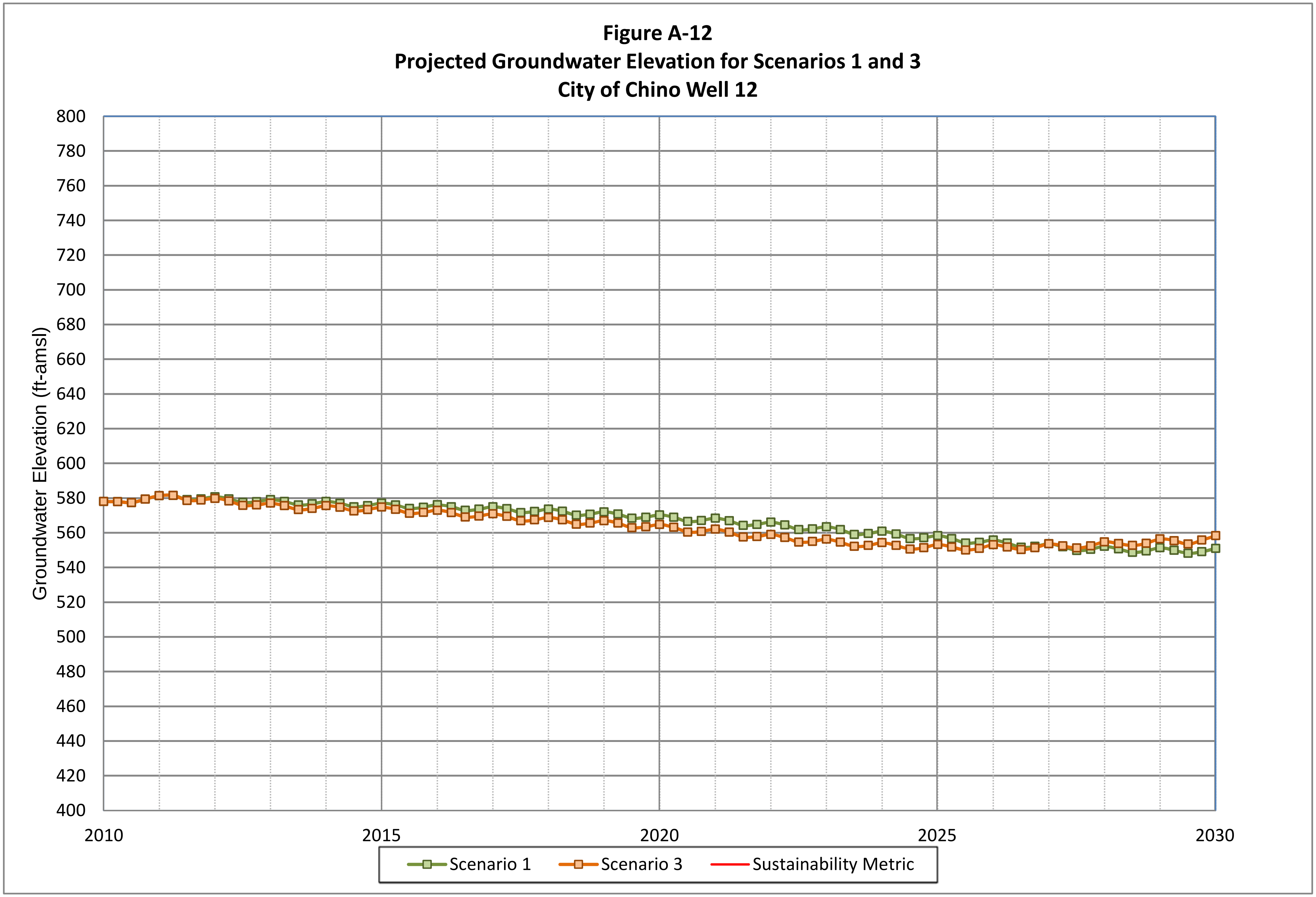

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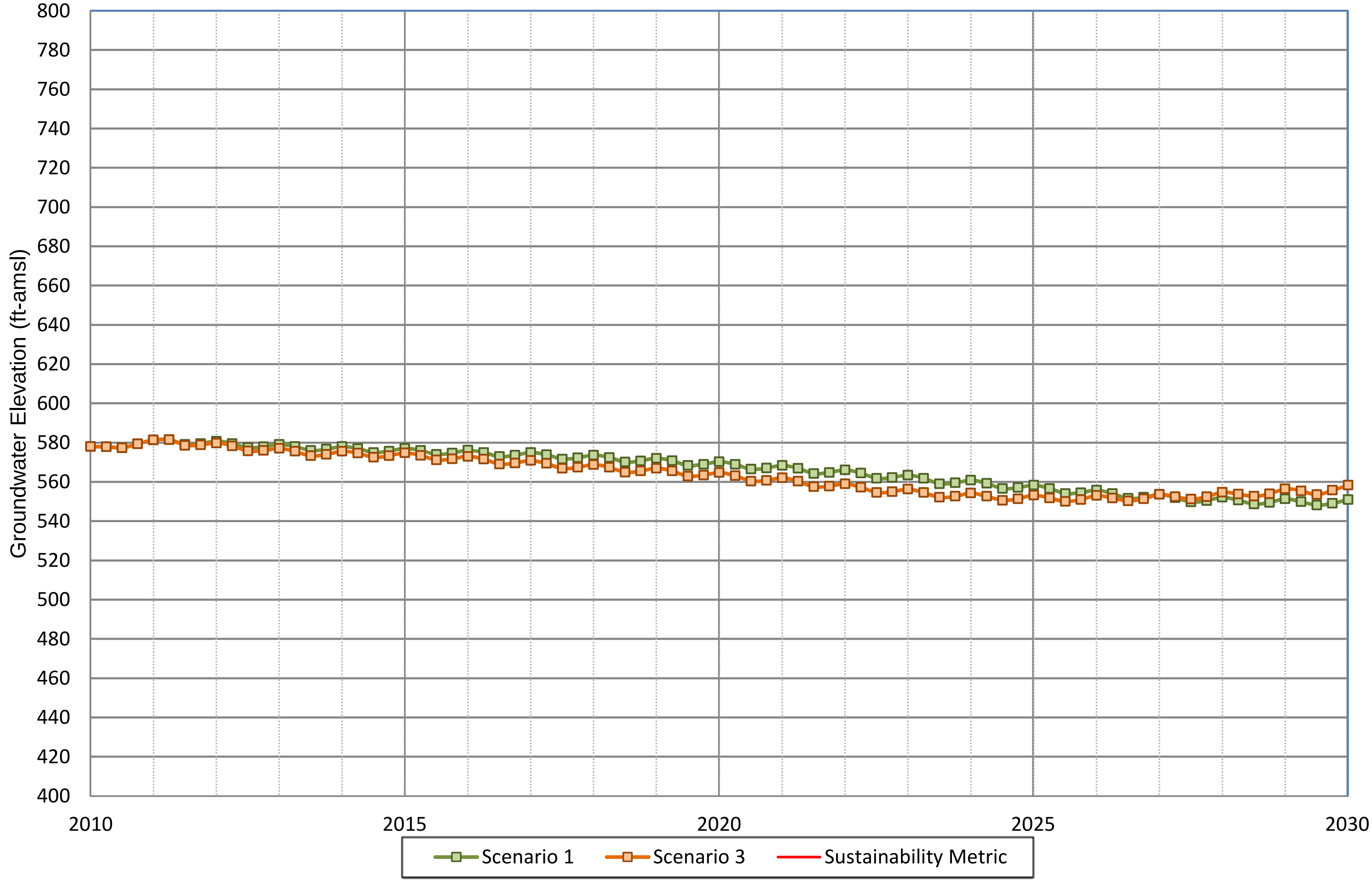
Figure A-13
Projected Groundwater Elevation for Scenarios 1 and 3
City of Chino Well 13



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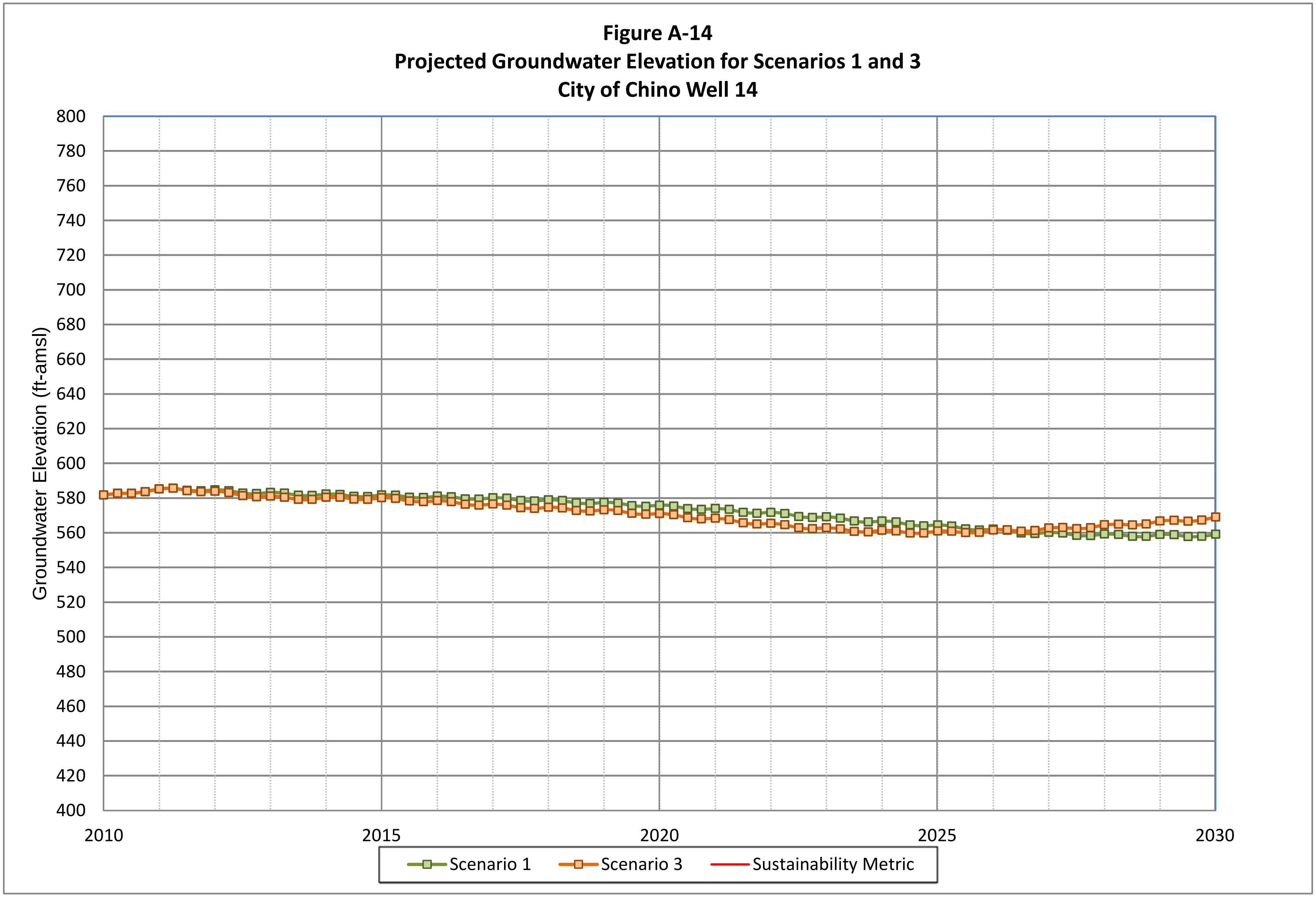

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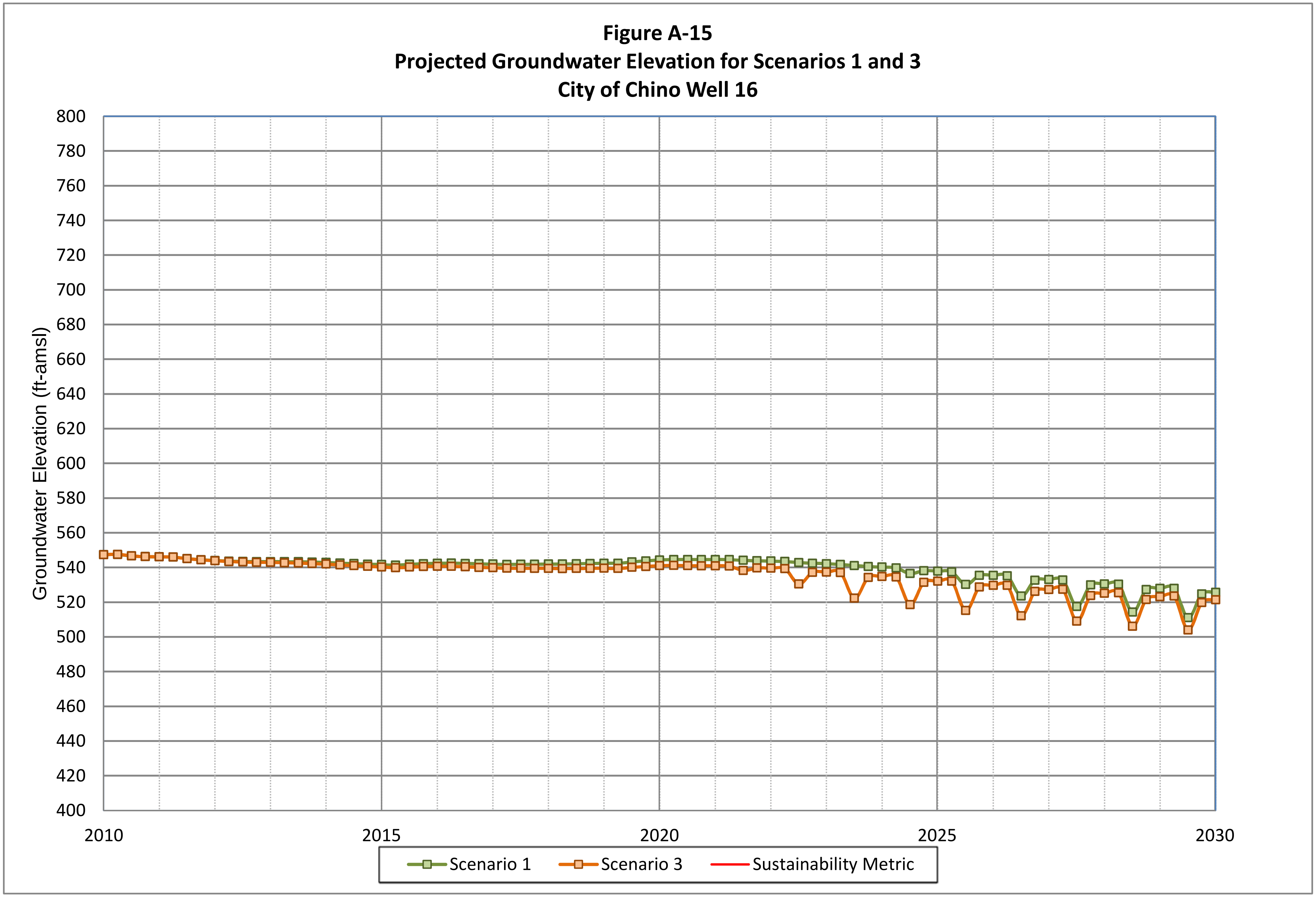

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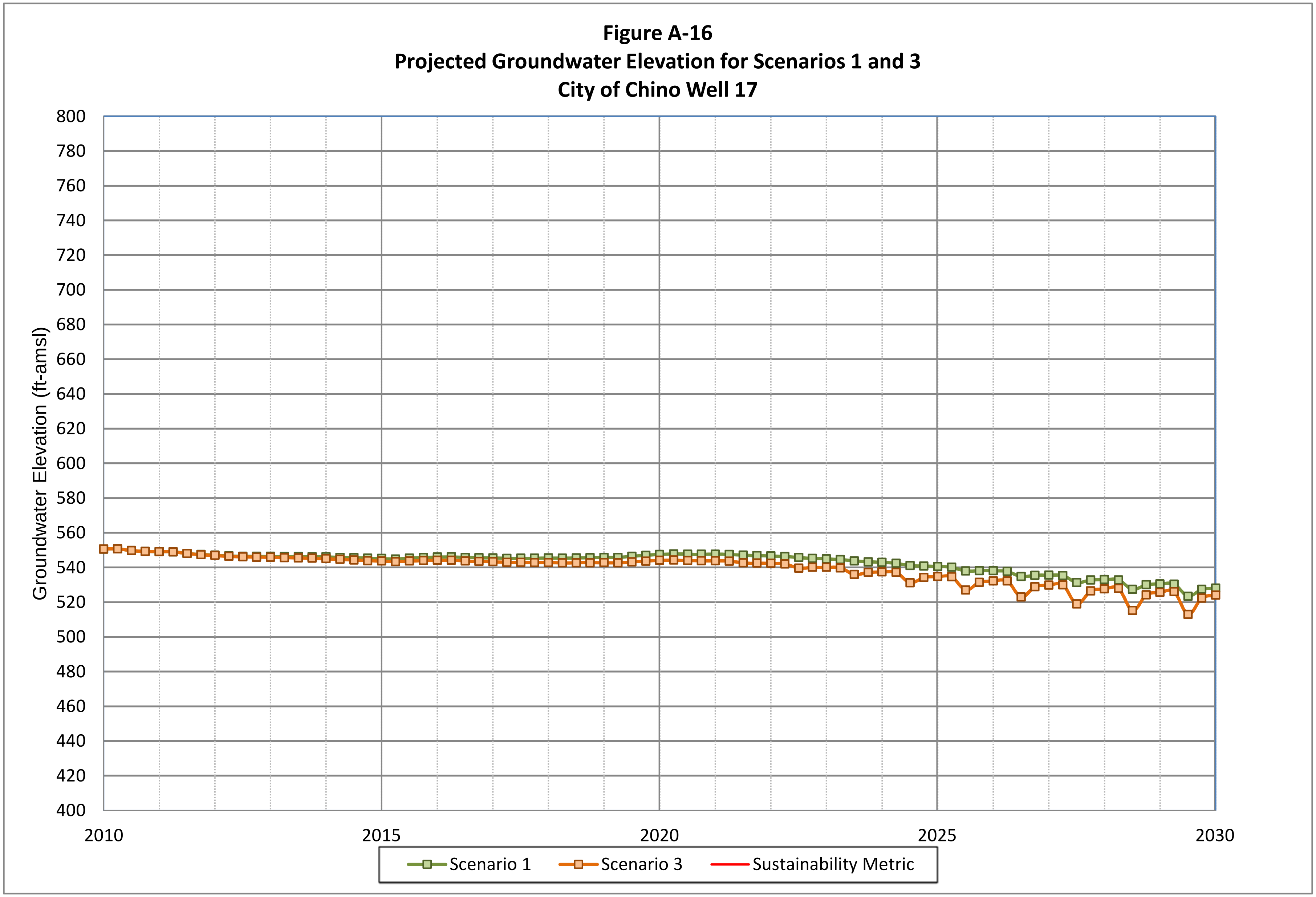

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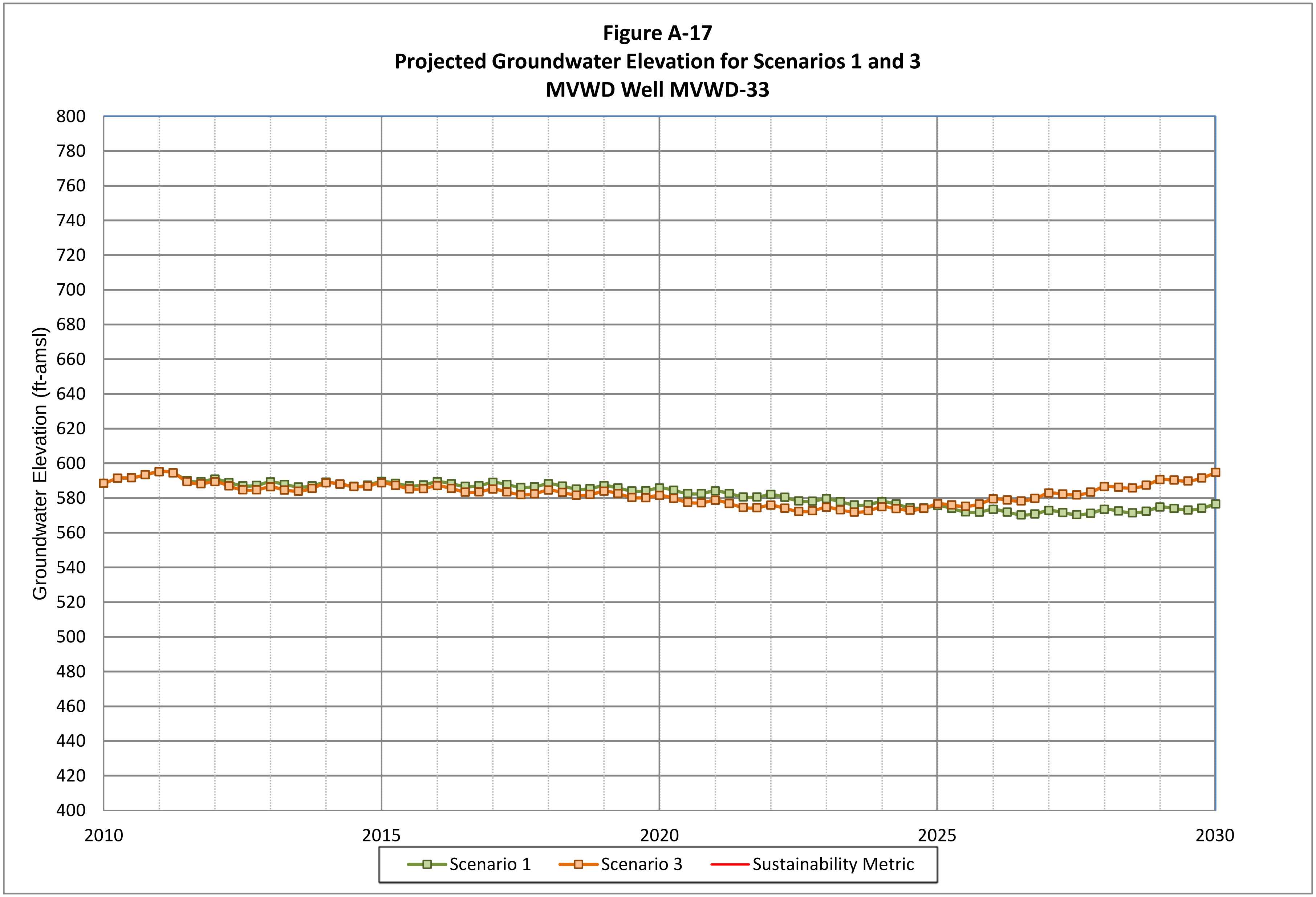

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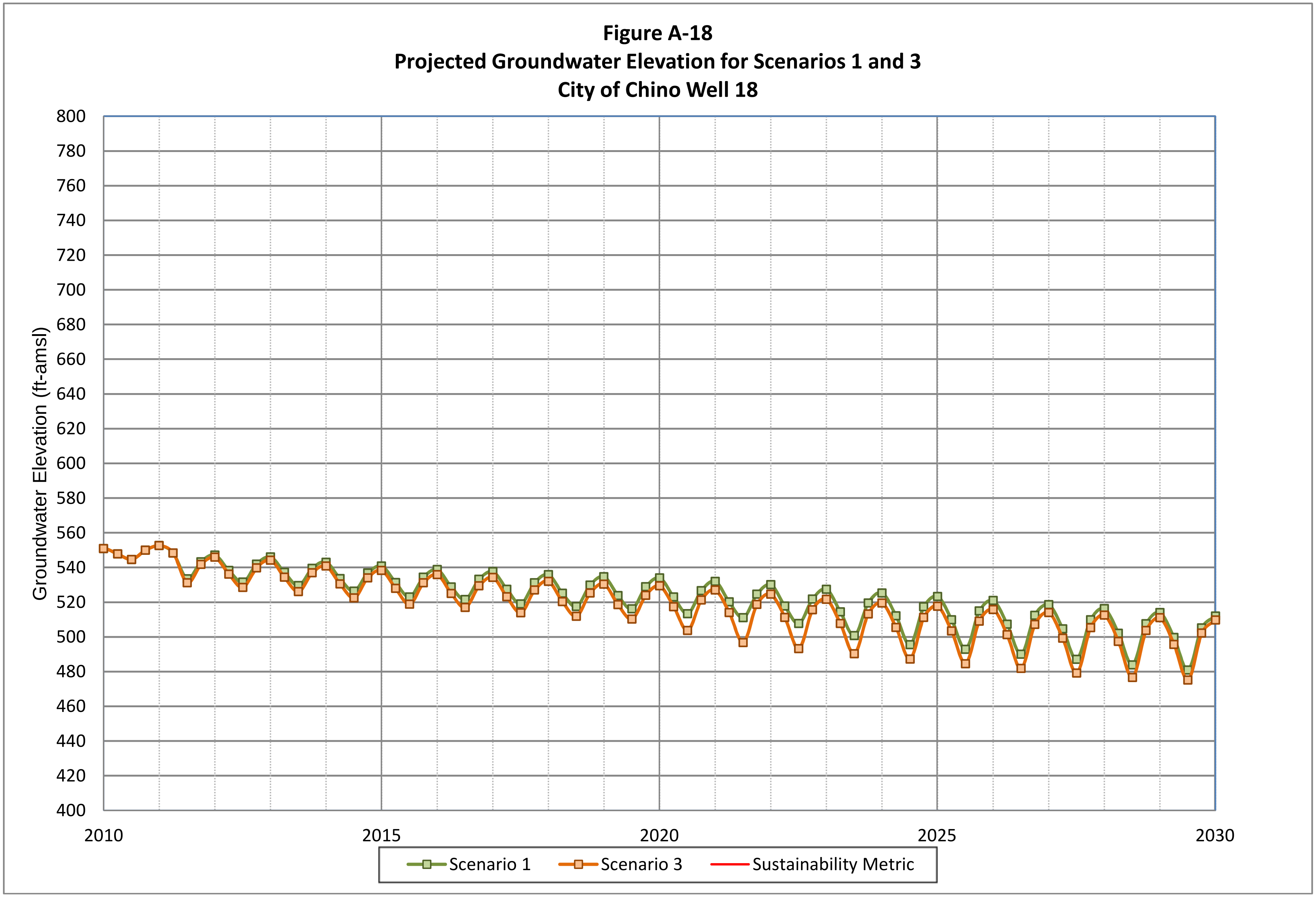
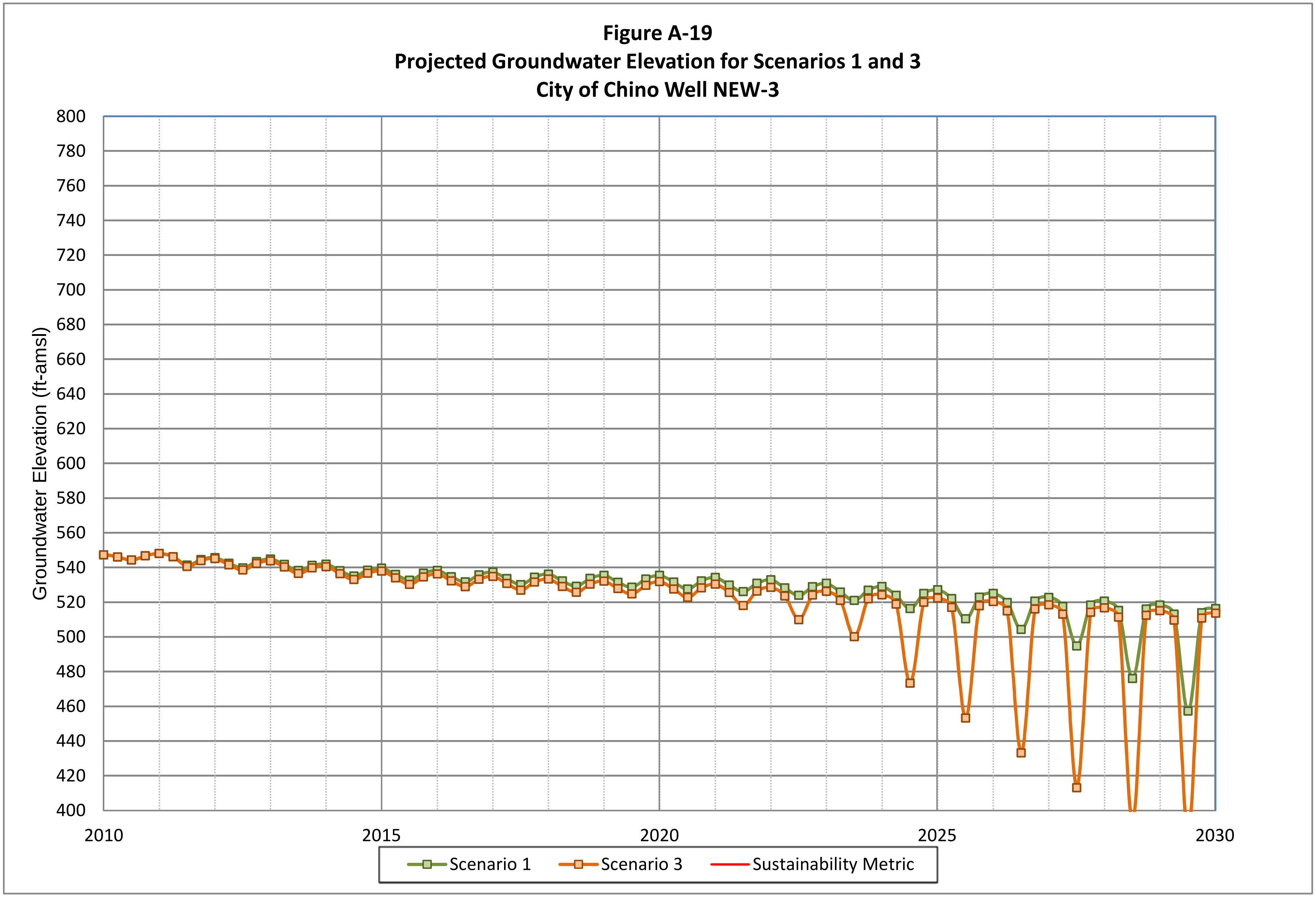


Figure A-18
Projected Groundwater Elevation for Scenarios 1 and 3
City of Chino Well 18
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



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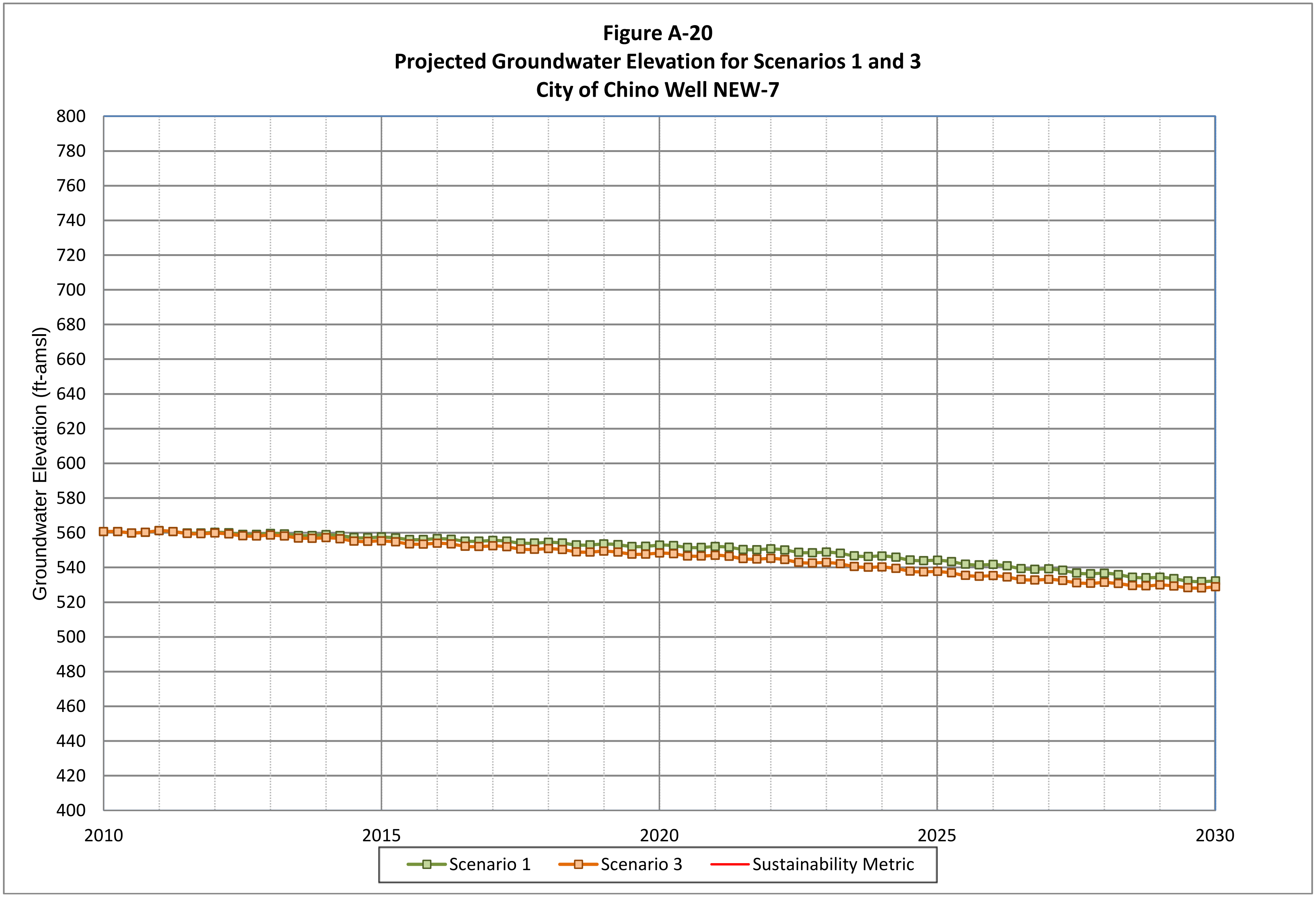

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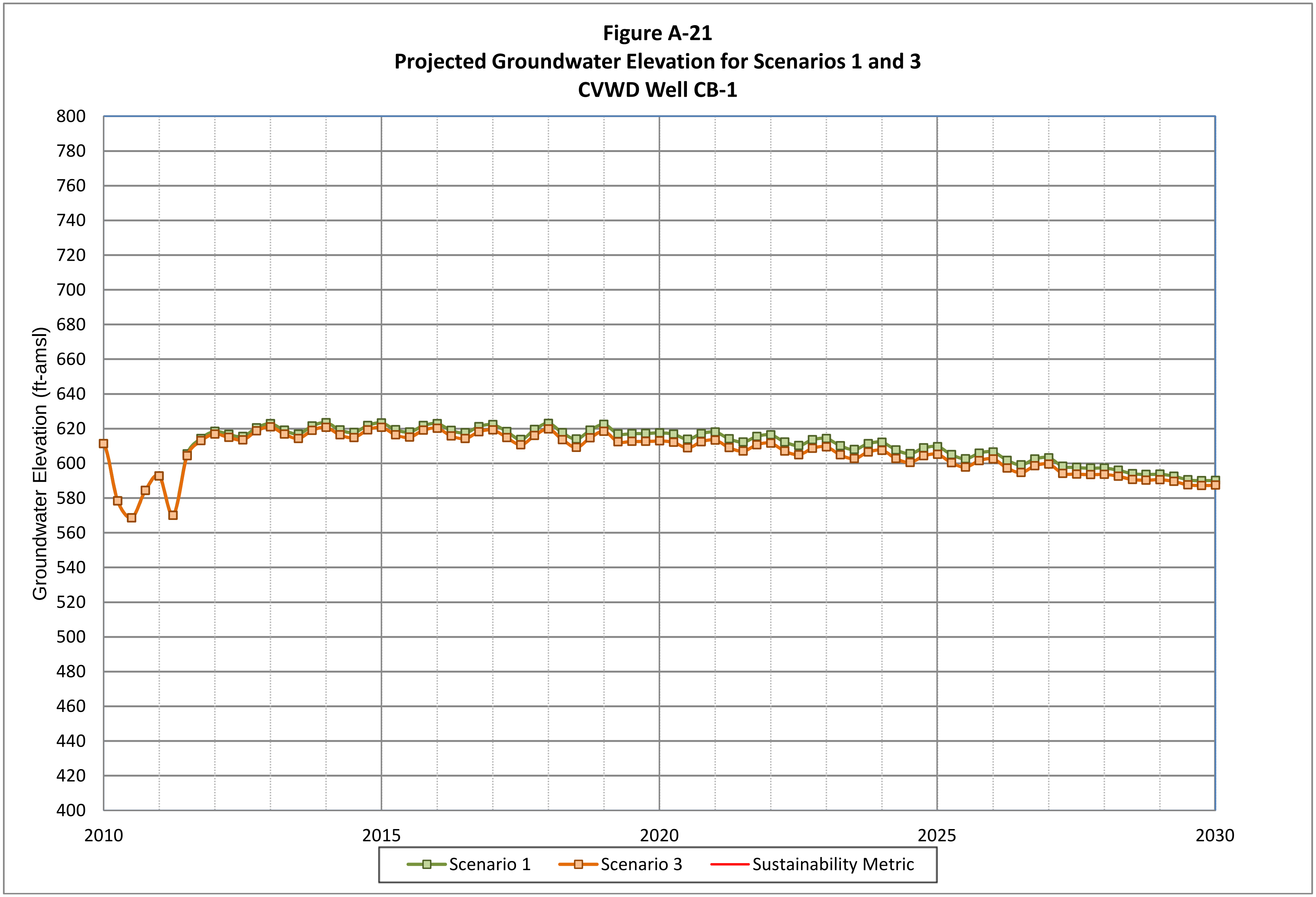

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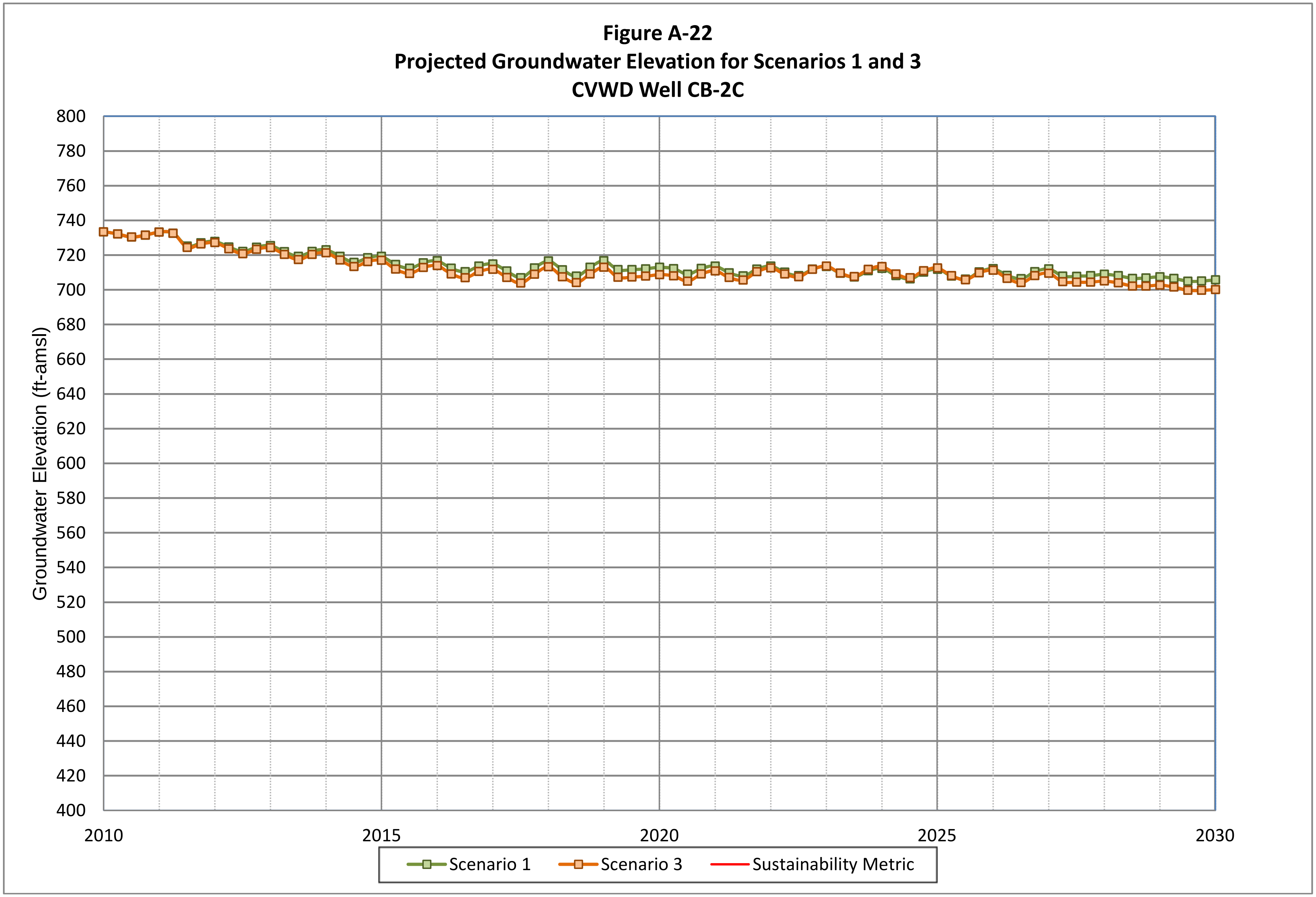

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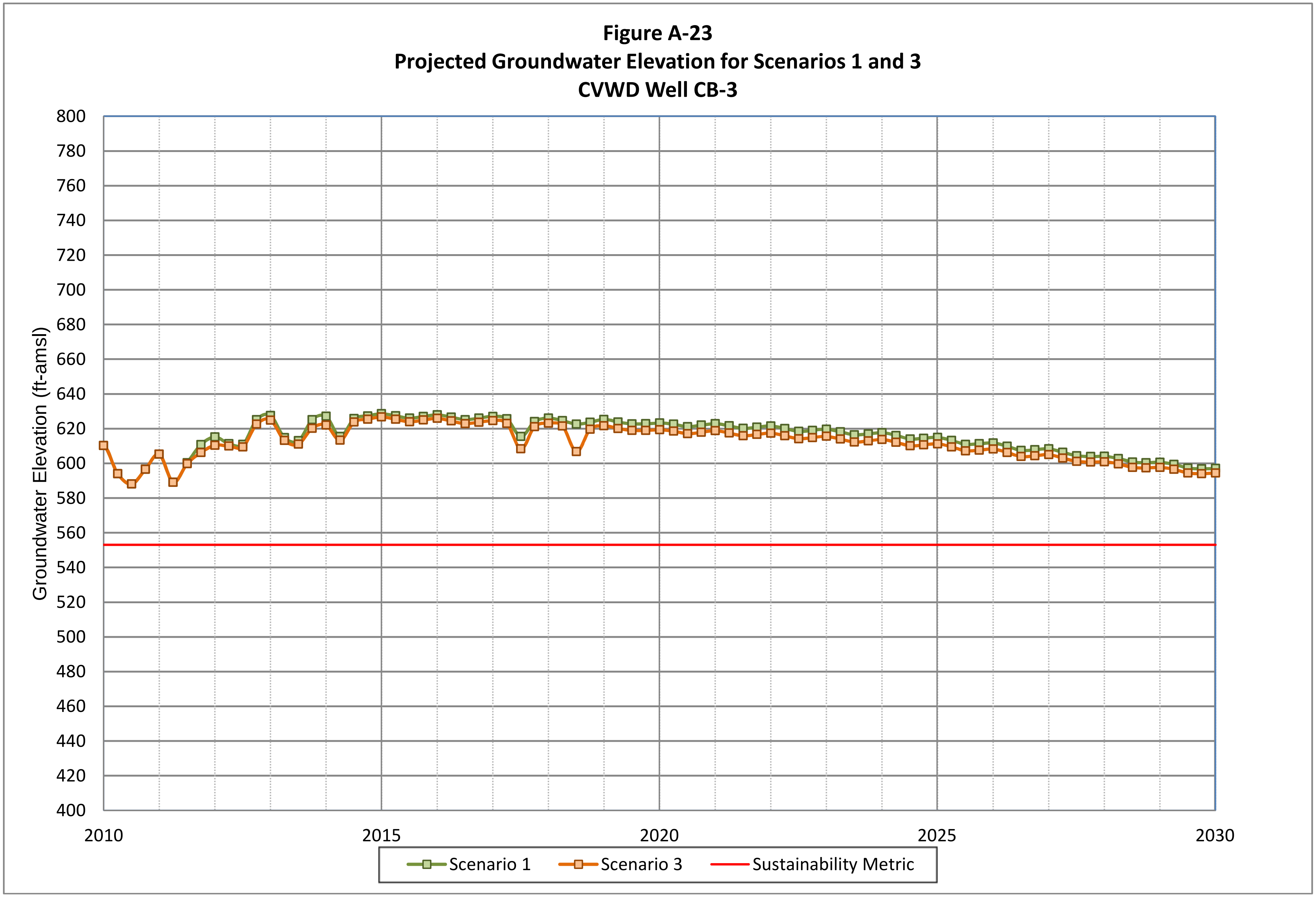
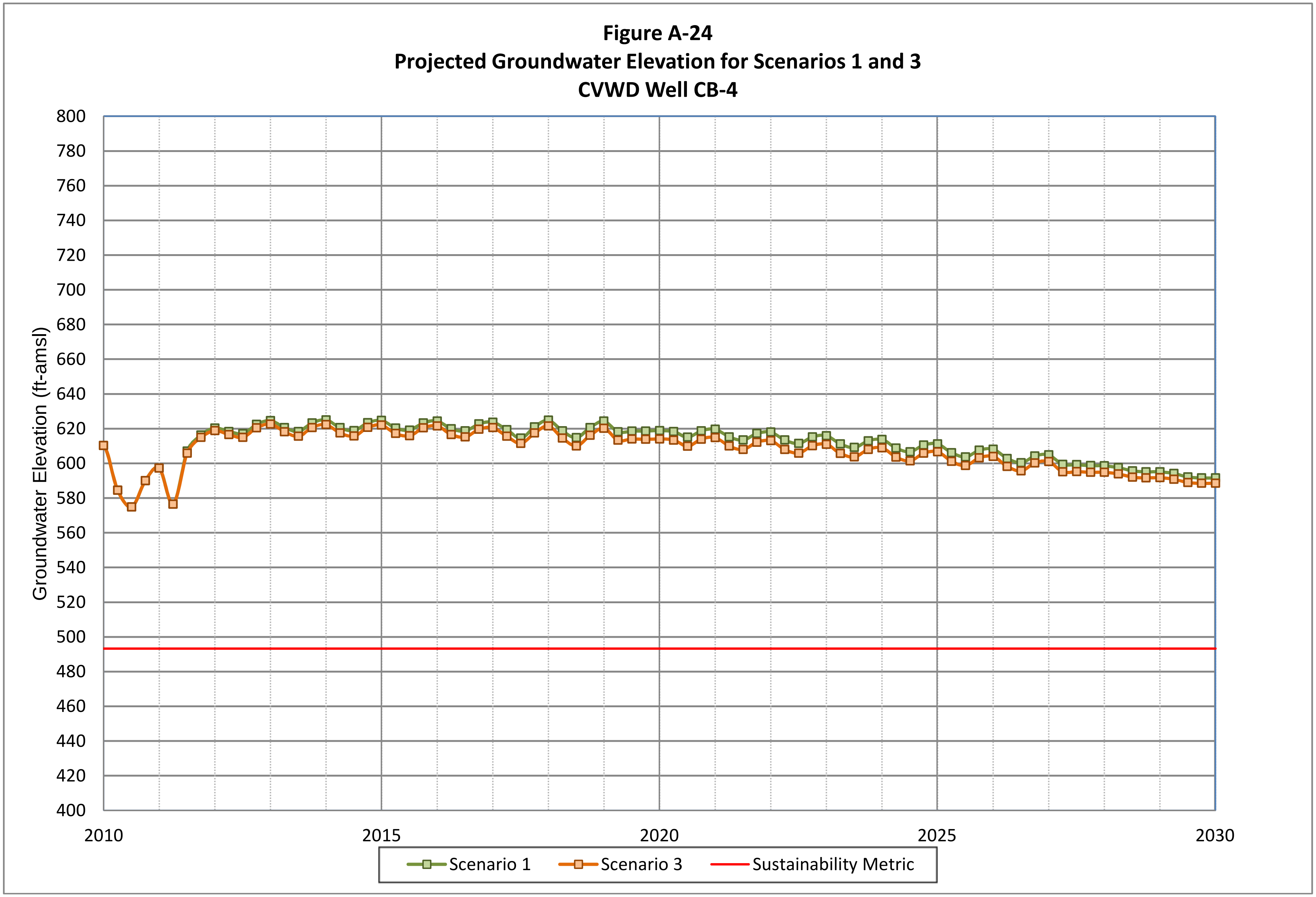


Figure A-23
Projected Groundwater Elevation for Scenarios 1 and 3
CVWD Well CB-3
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



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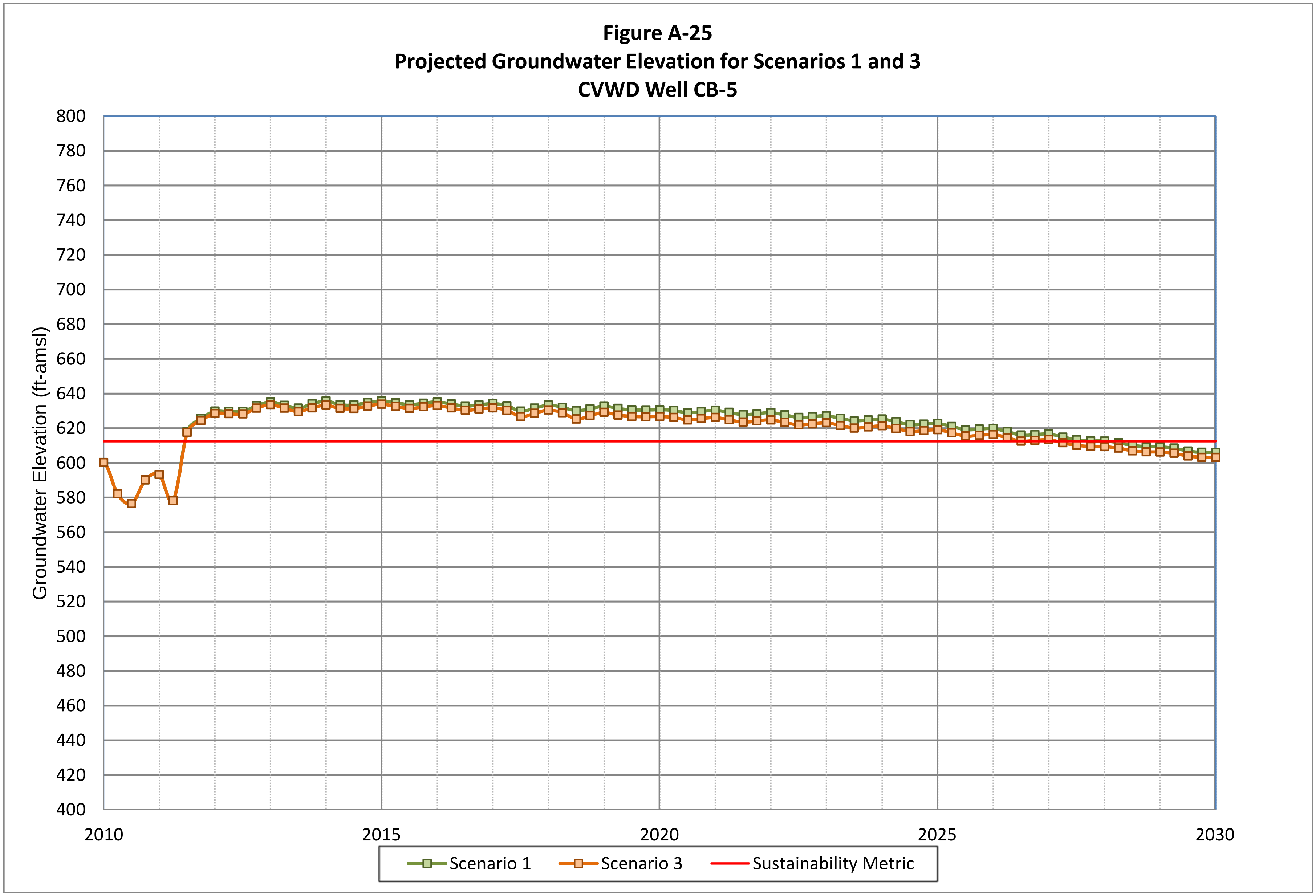
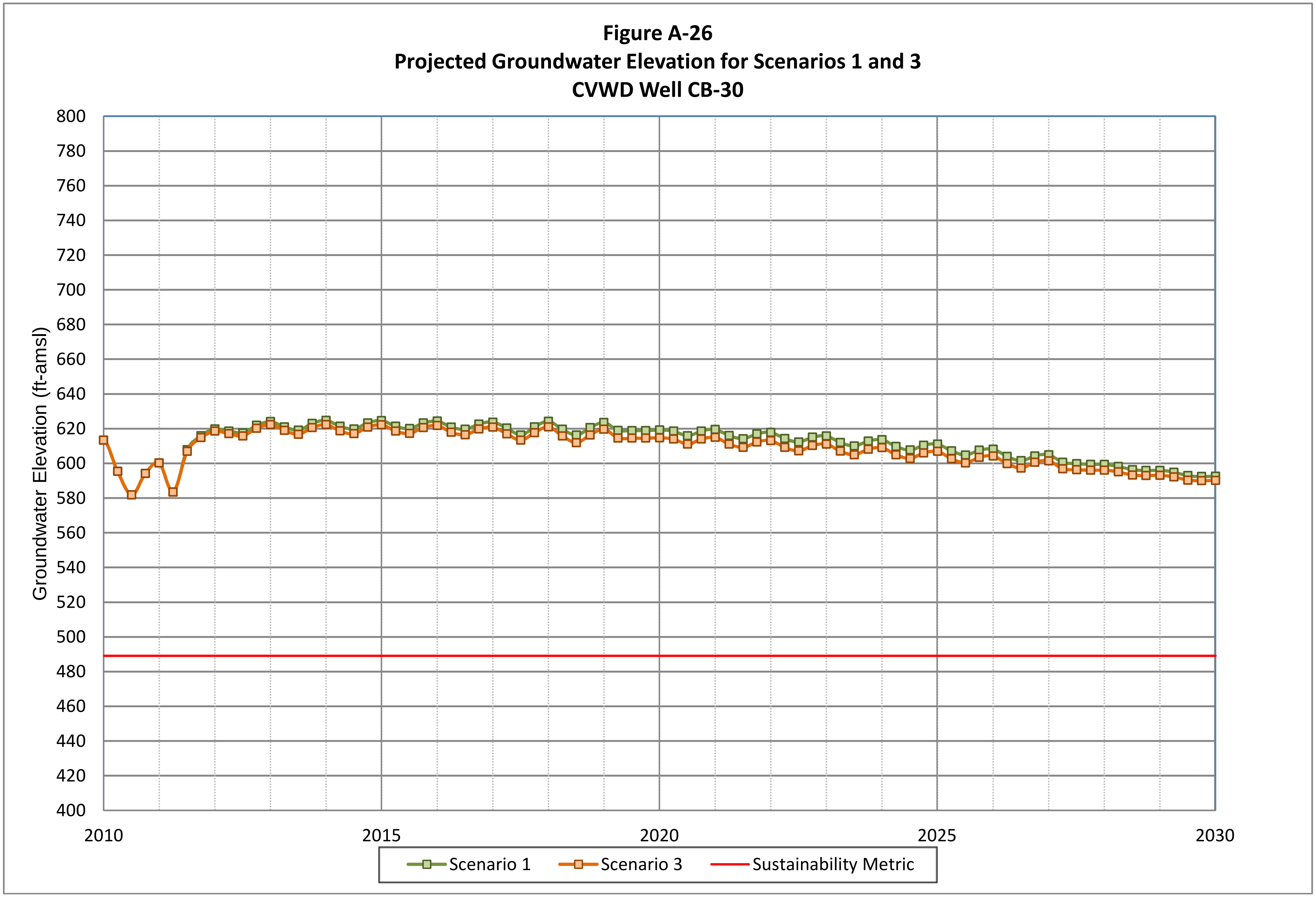


Figure A-25
Projected Groundwater Elevation for Scenarios 1 and 3
CVWD Well CB-5
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



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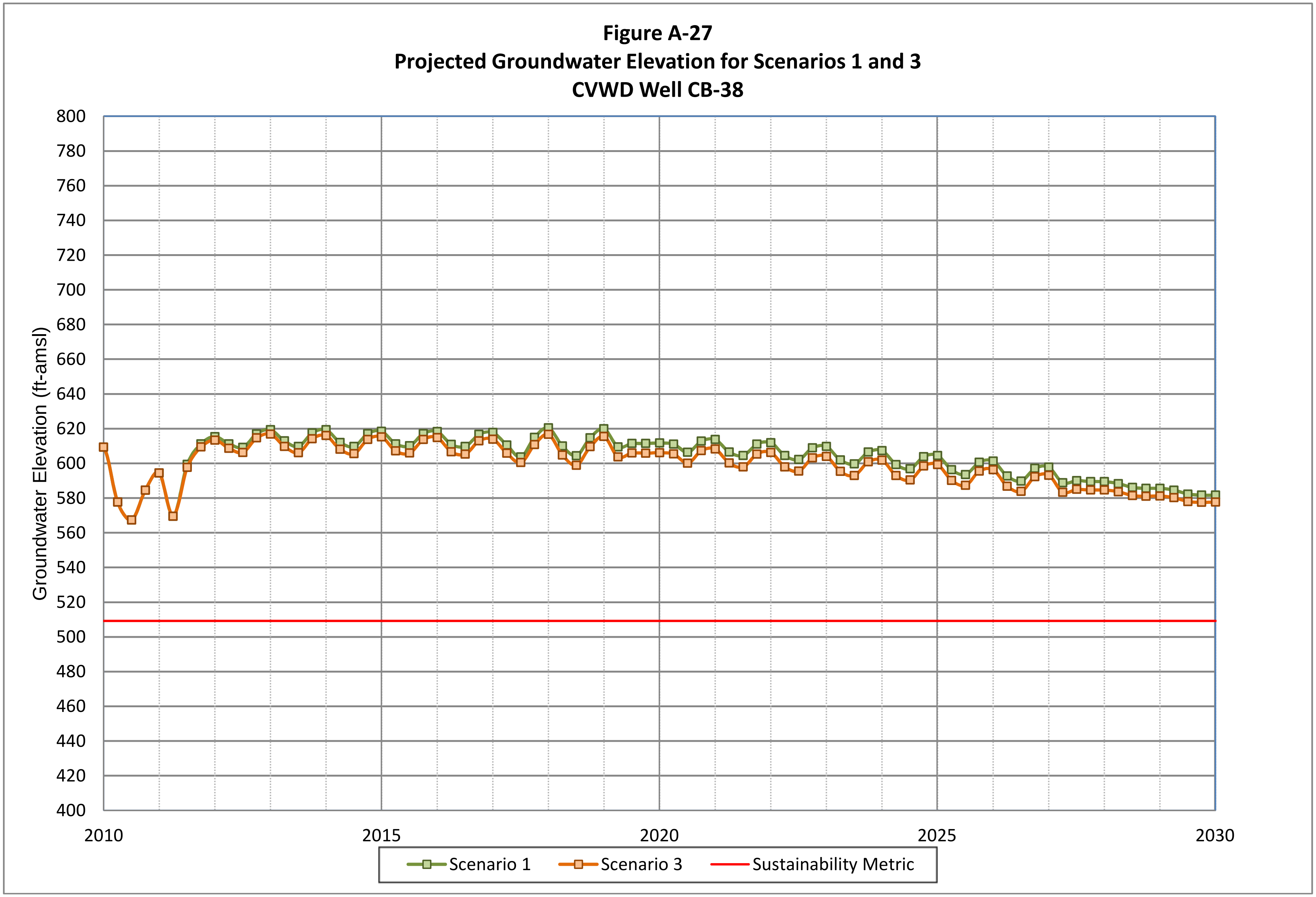

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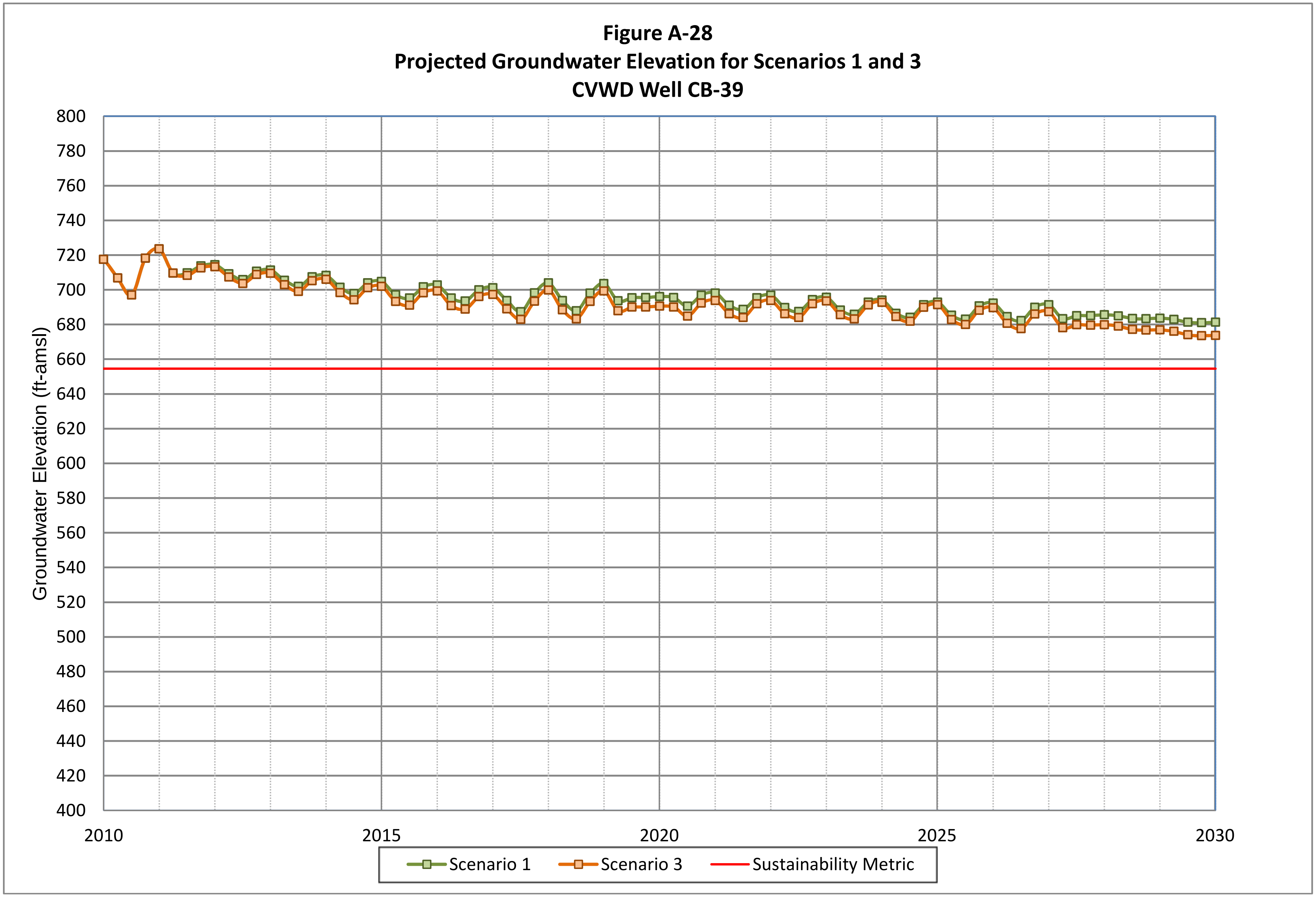

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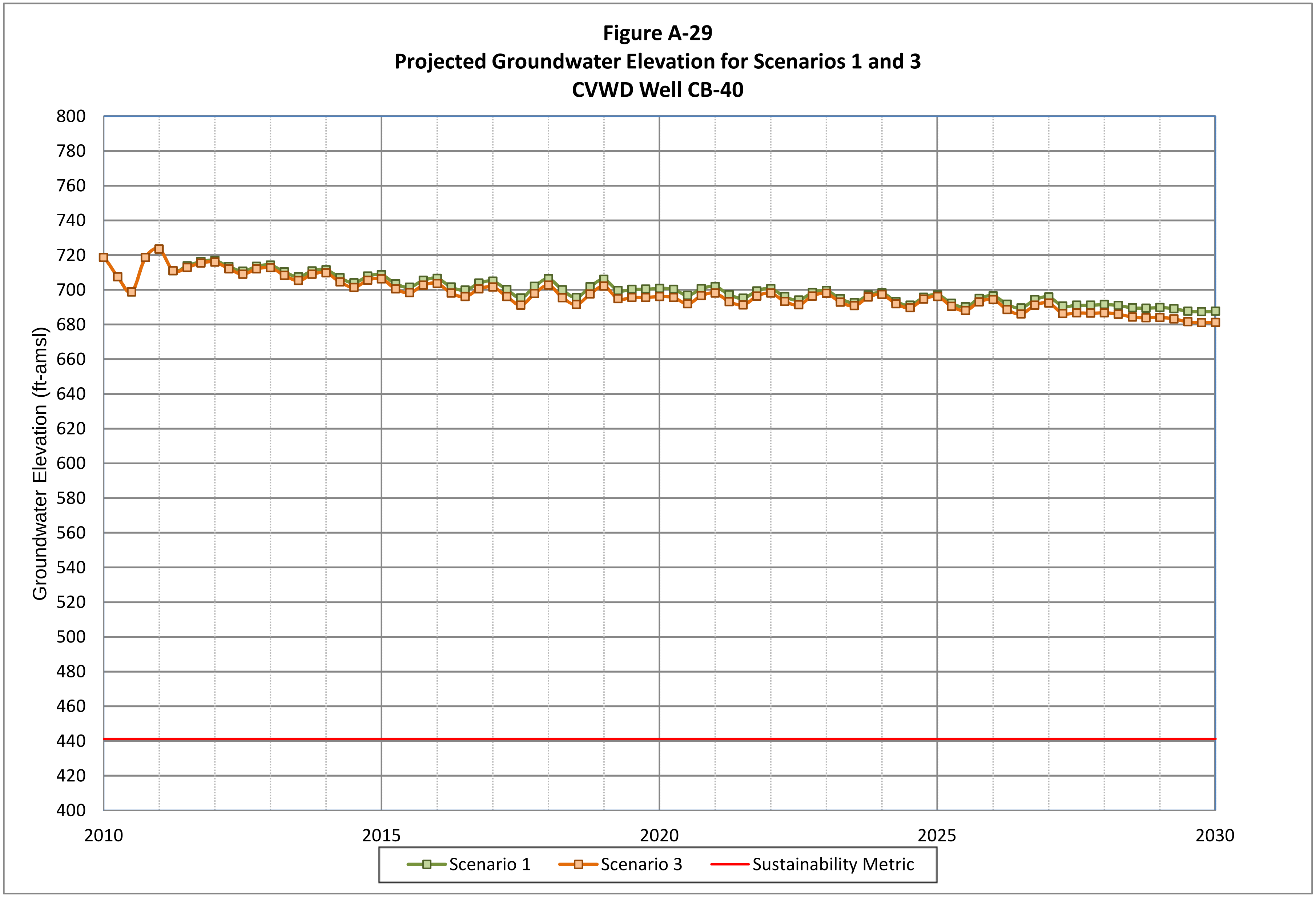

Figure A-29
Projected Groundwater Elevation for Scenarios 1 and 3
CVWD Well CB-40
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric

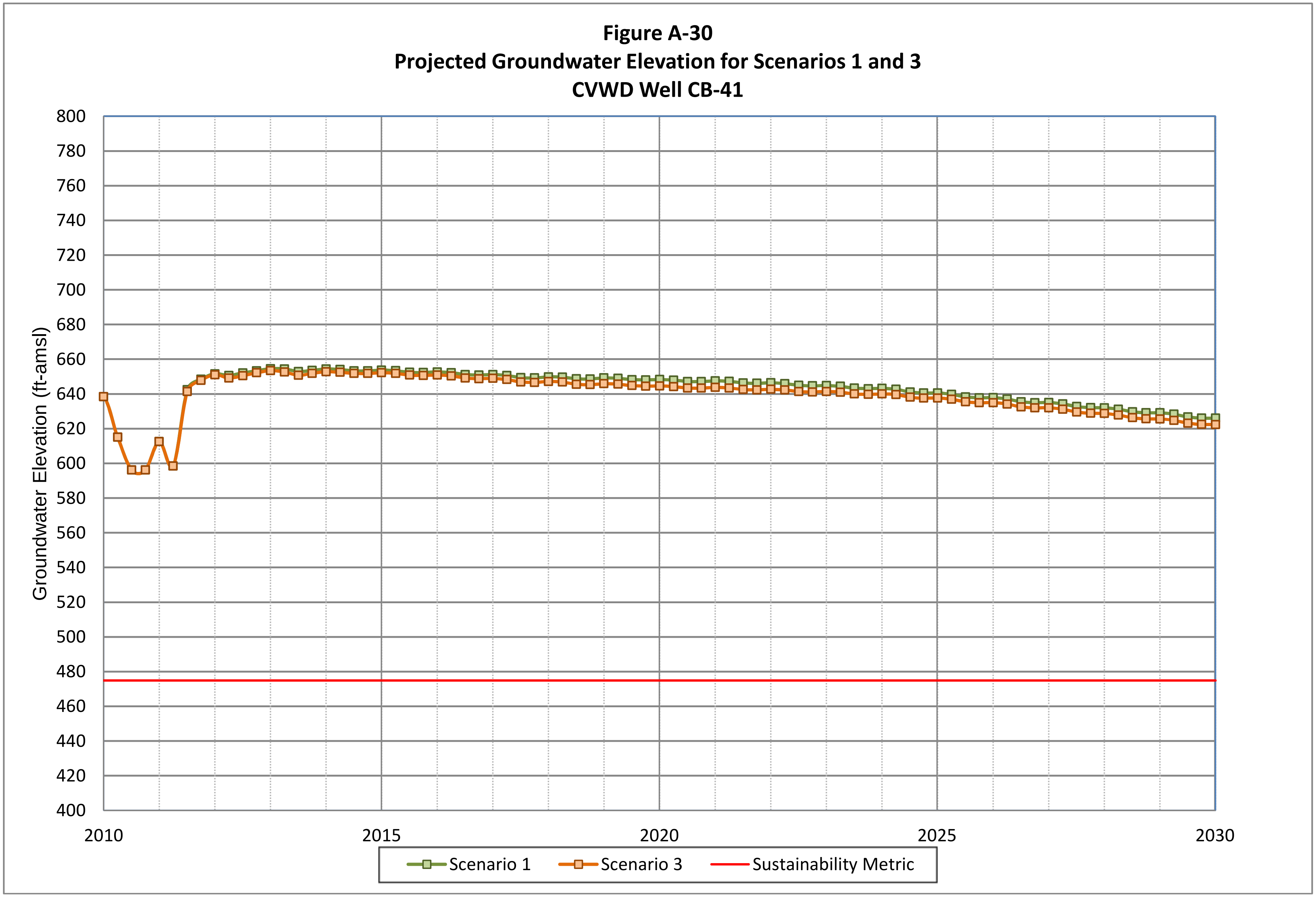

Figure A-30
Projected Groundwater Elevation for Scenarios 1 and 3
CVWD Well CB-41
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric

Figure A-31
Projected Groundwater Elevation for Scenarios 1 and 3
CVWD Well CB-42

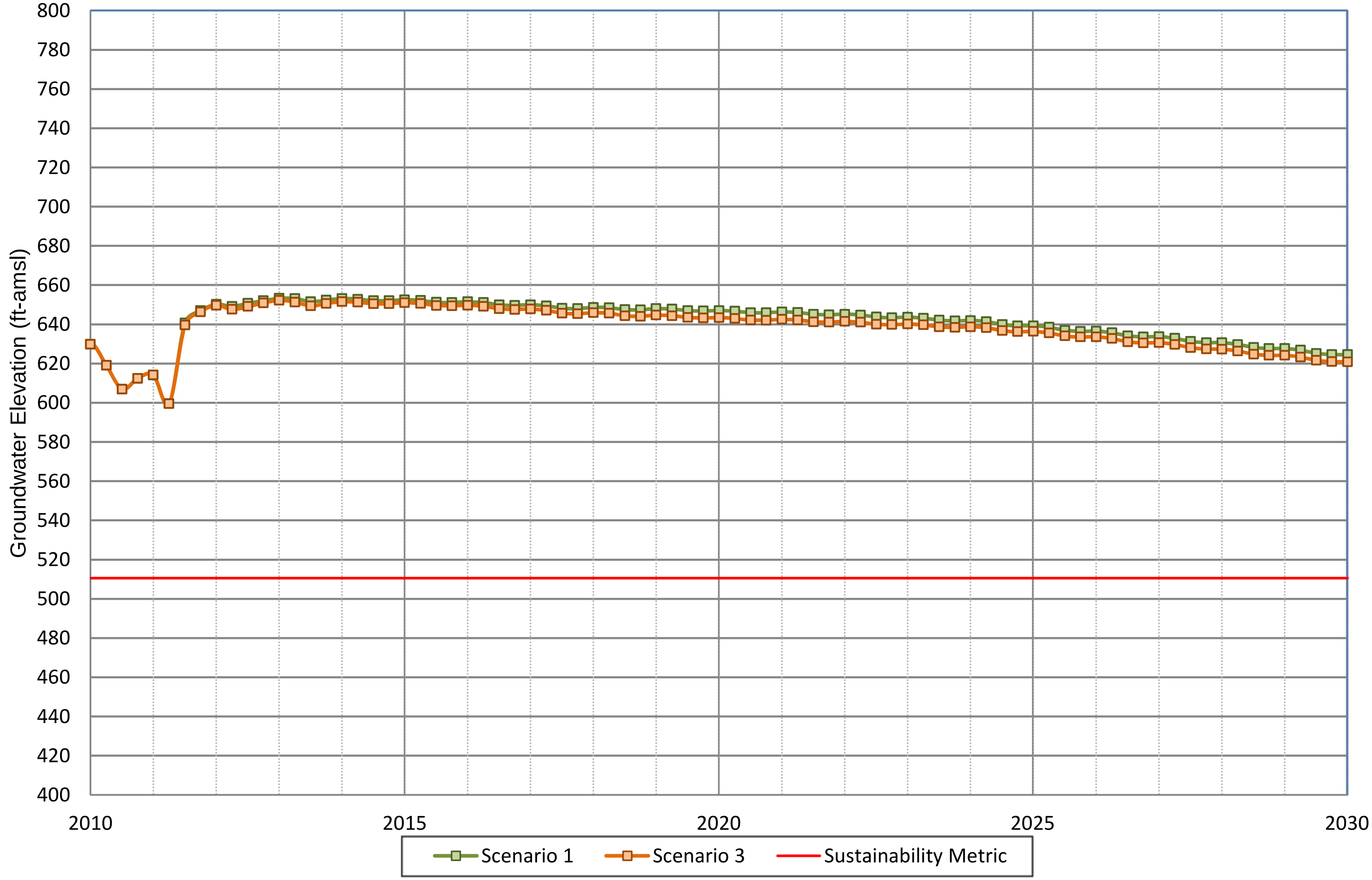

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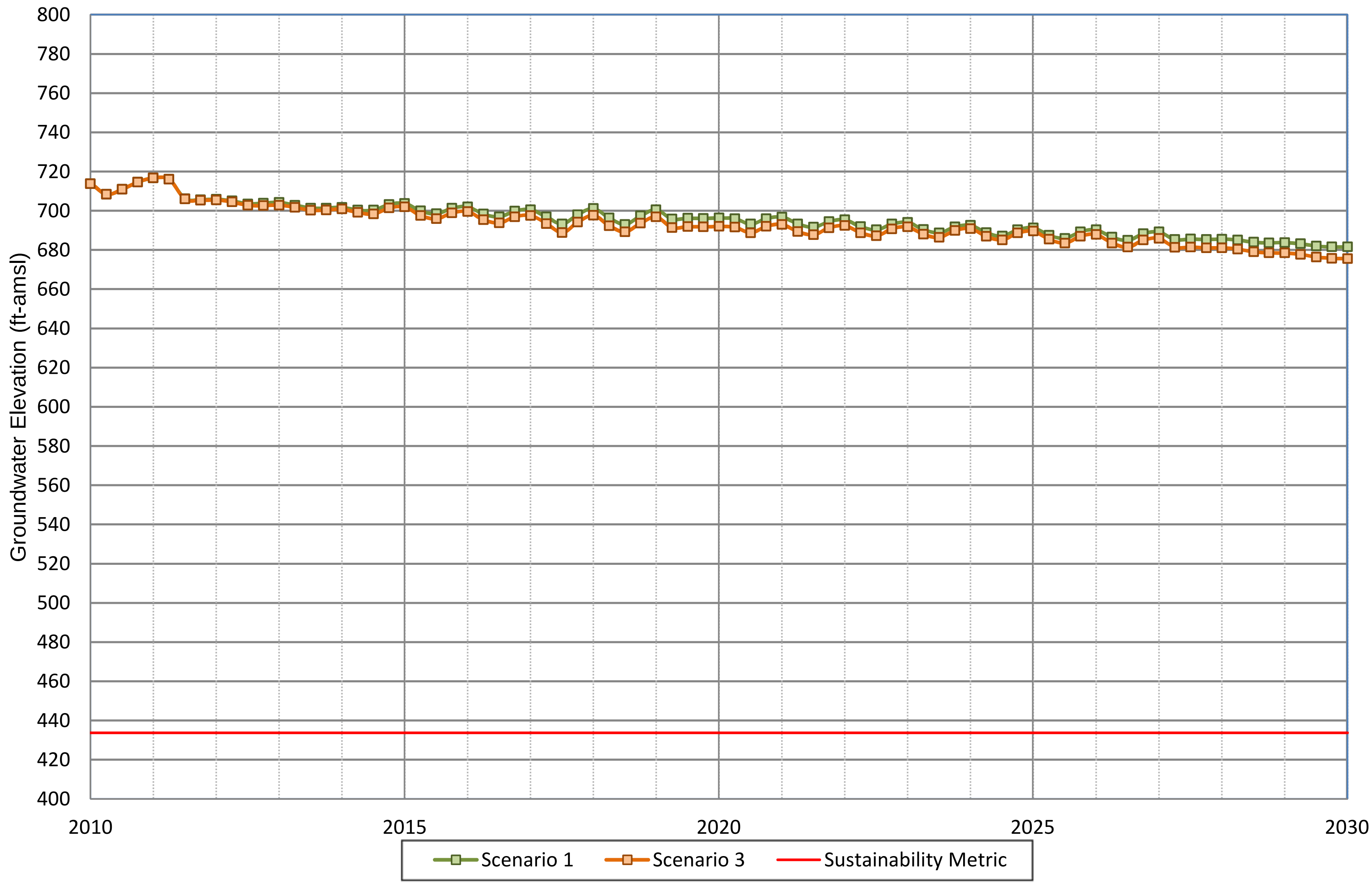
Figure A-32
Projected Groundwater Elevation for Scenarios 1 and 3
CVWD Well CB-43



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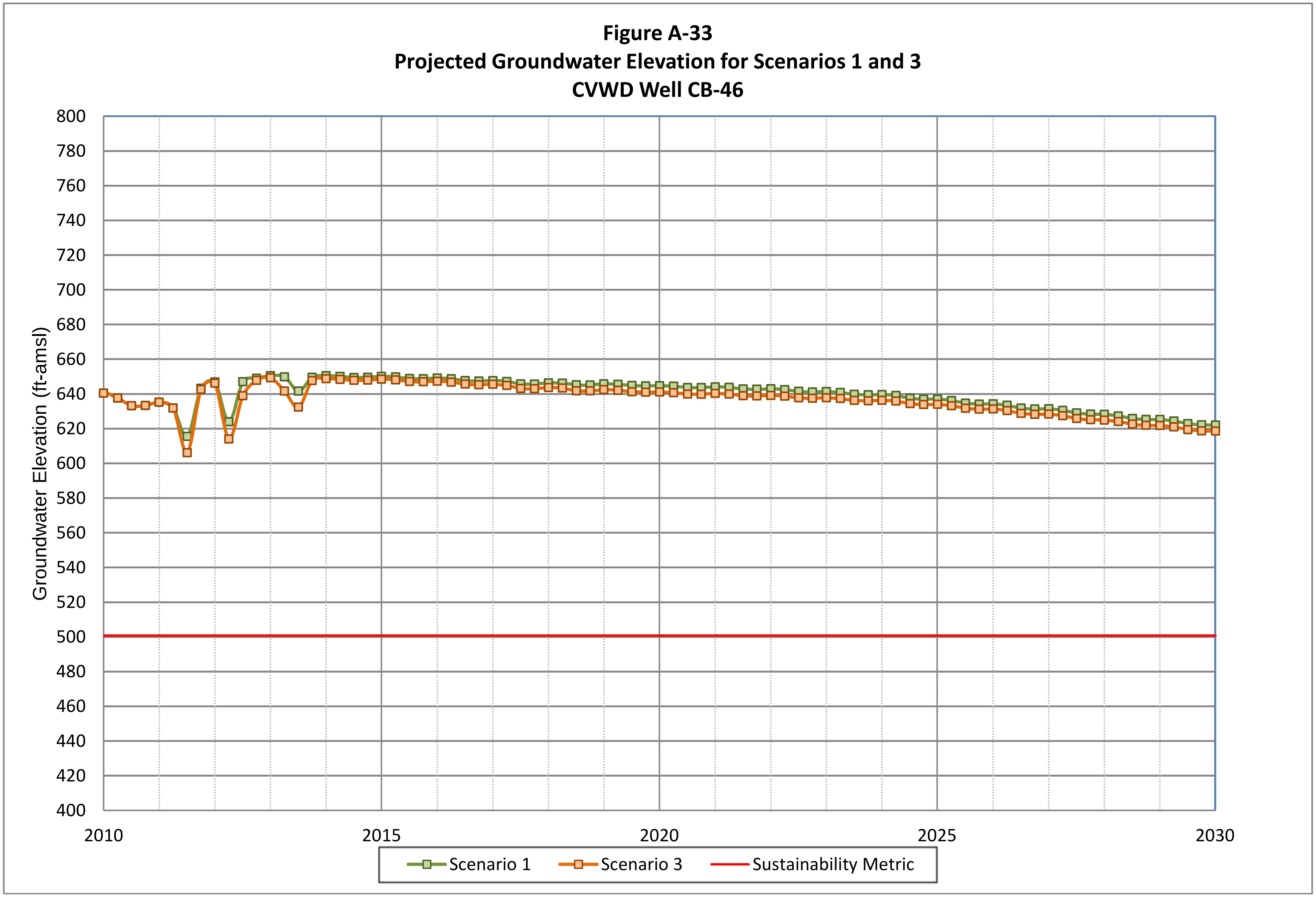

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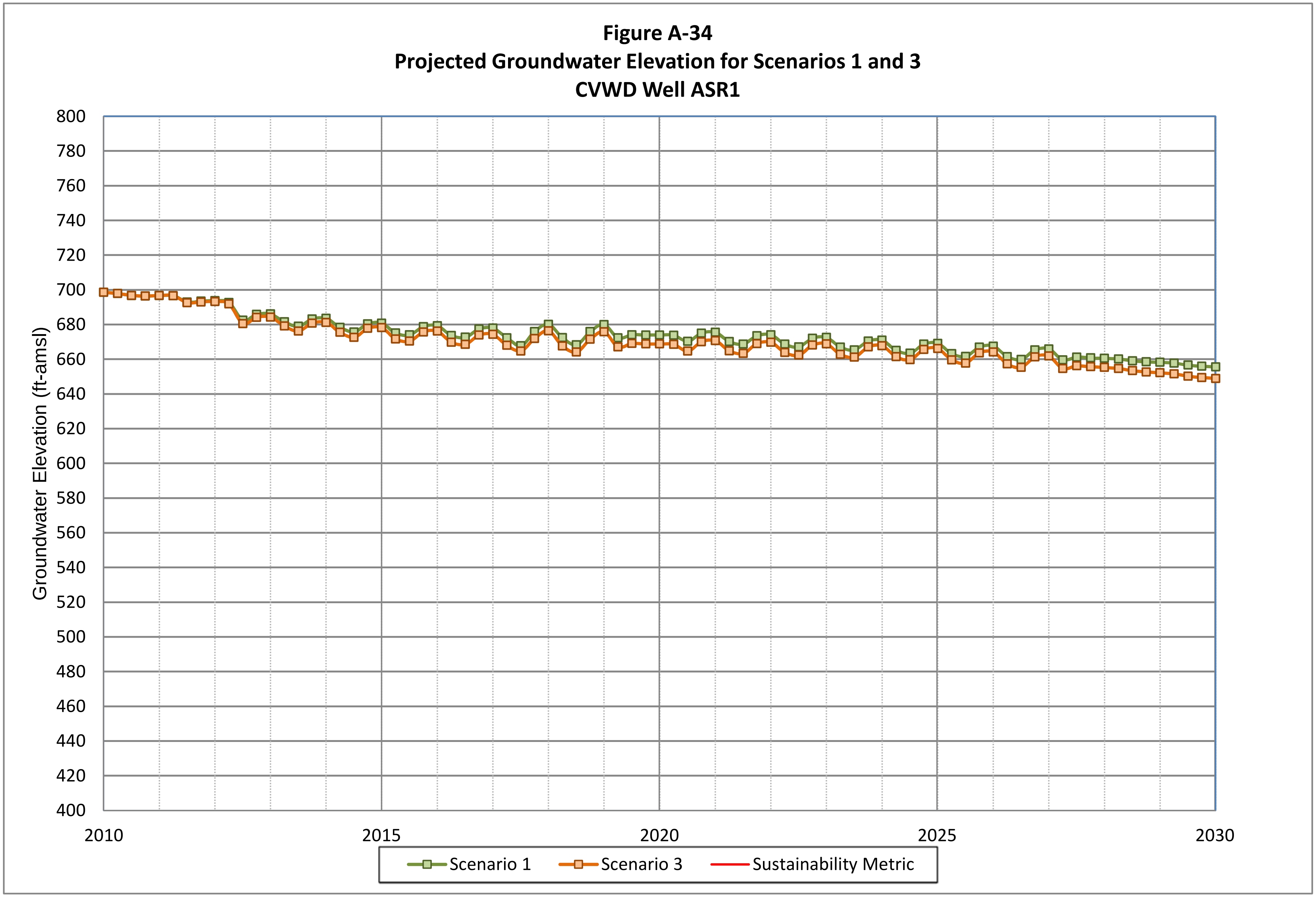

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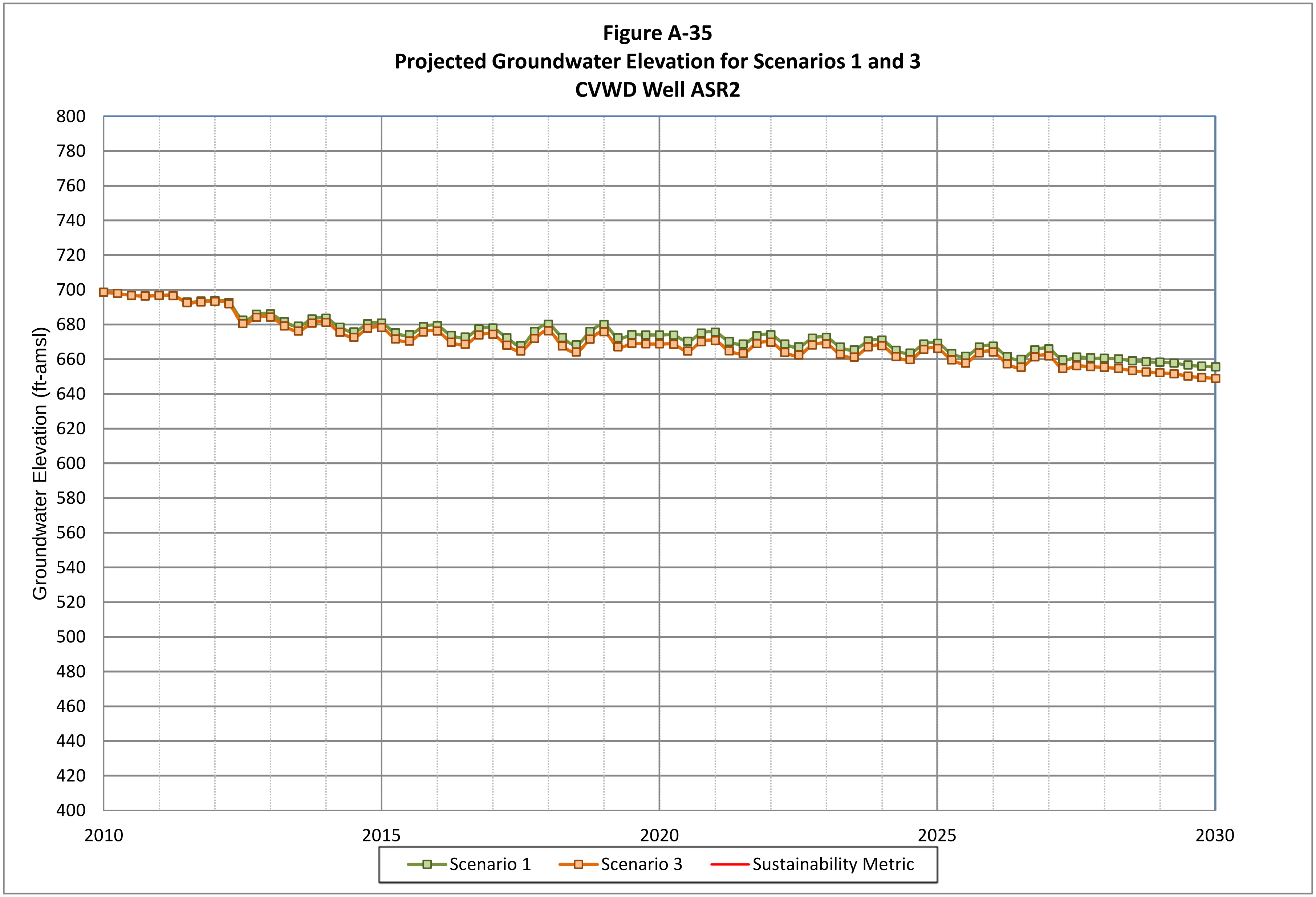

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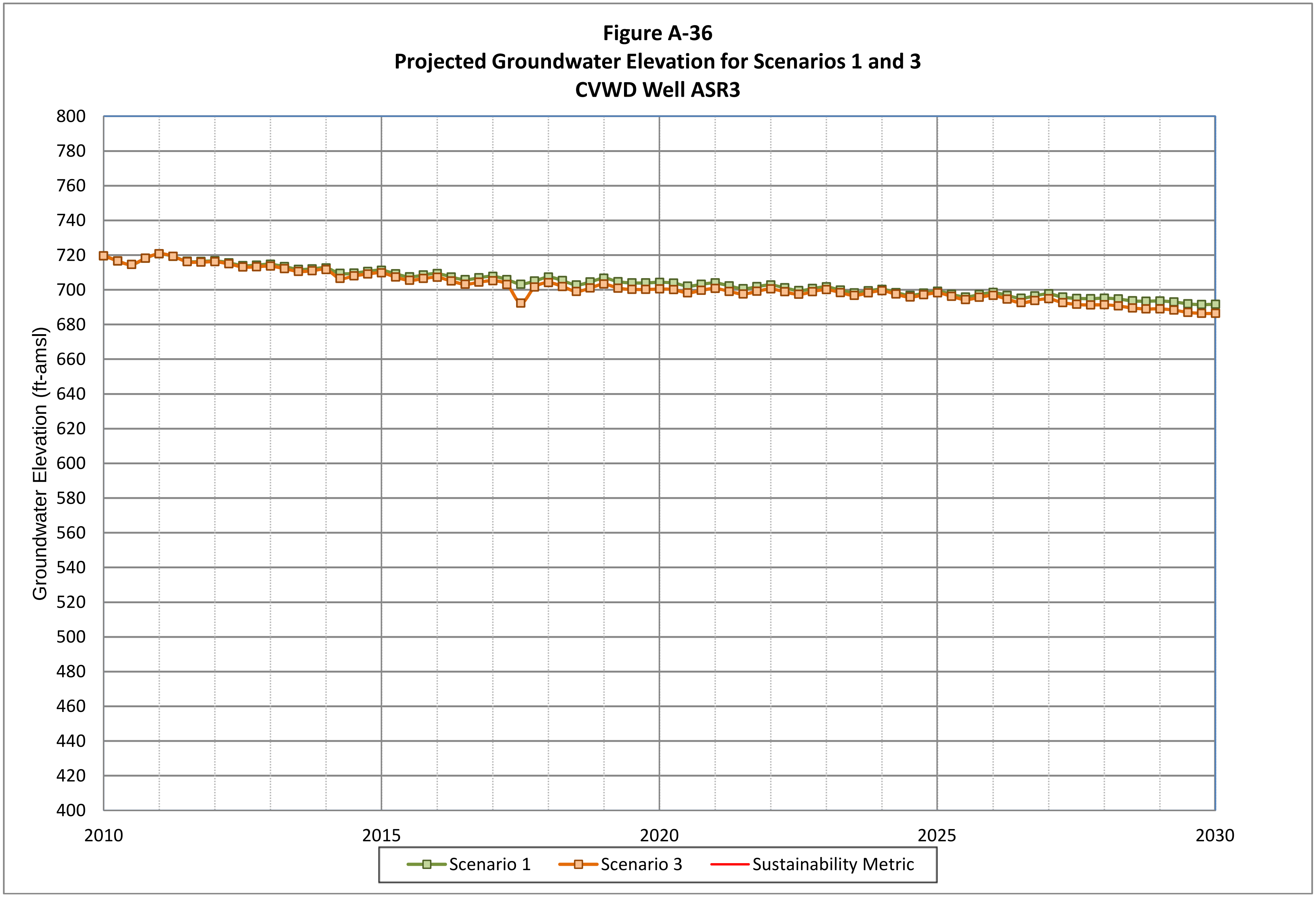

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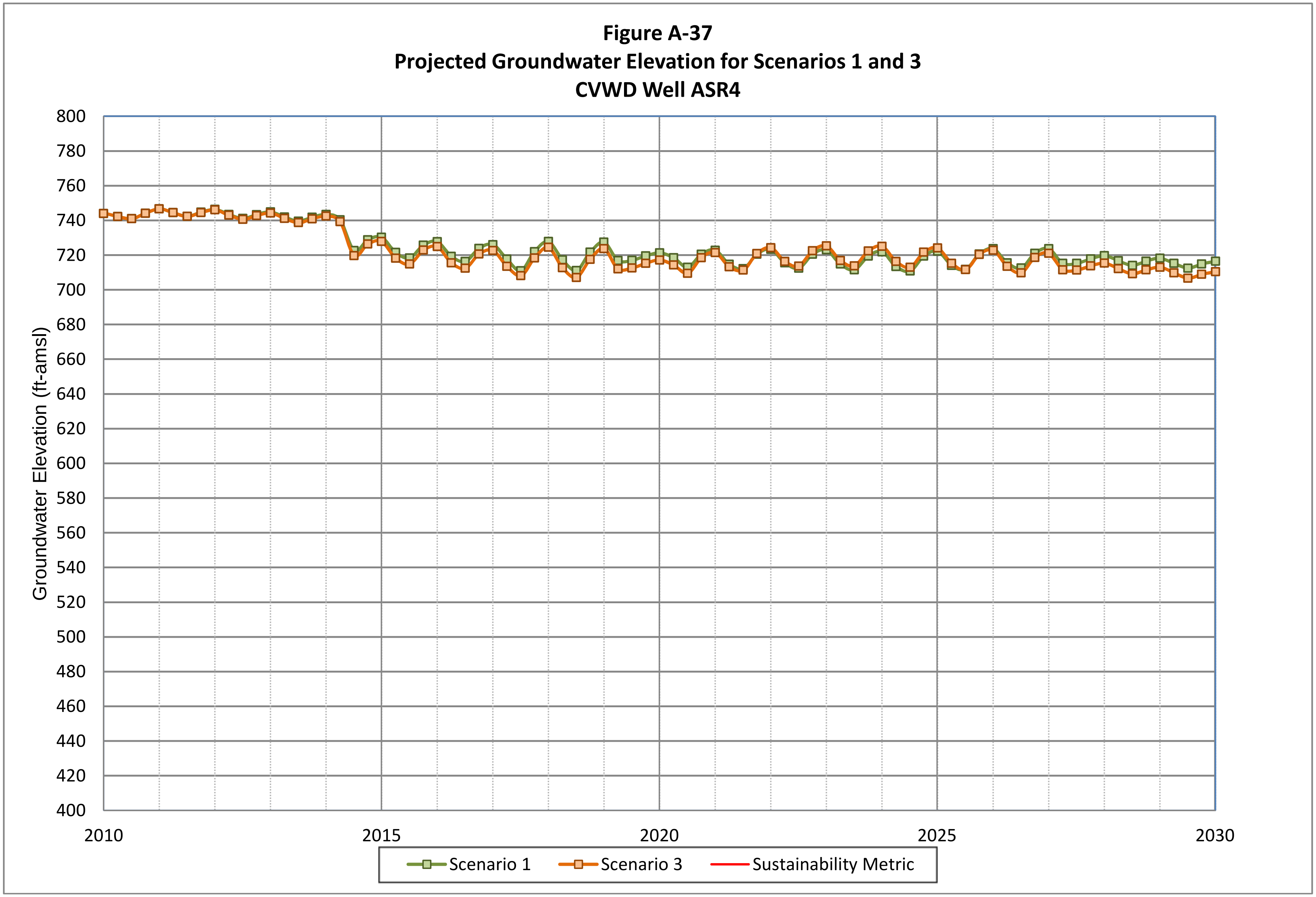

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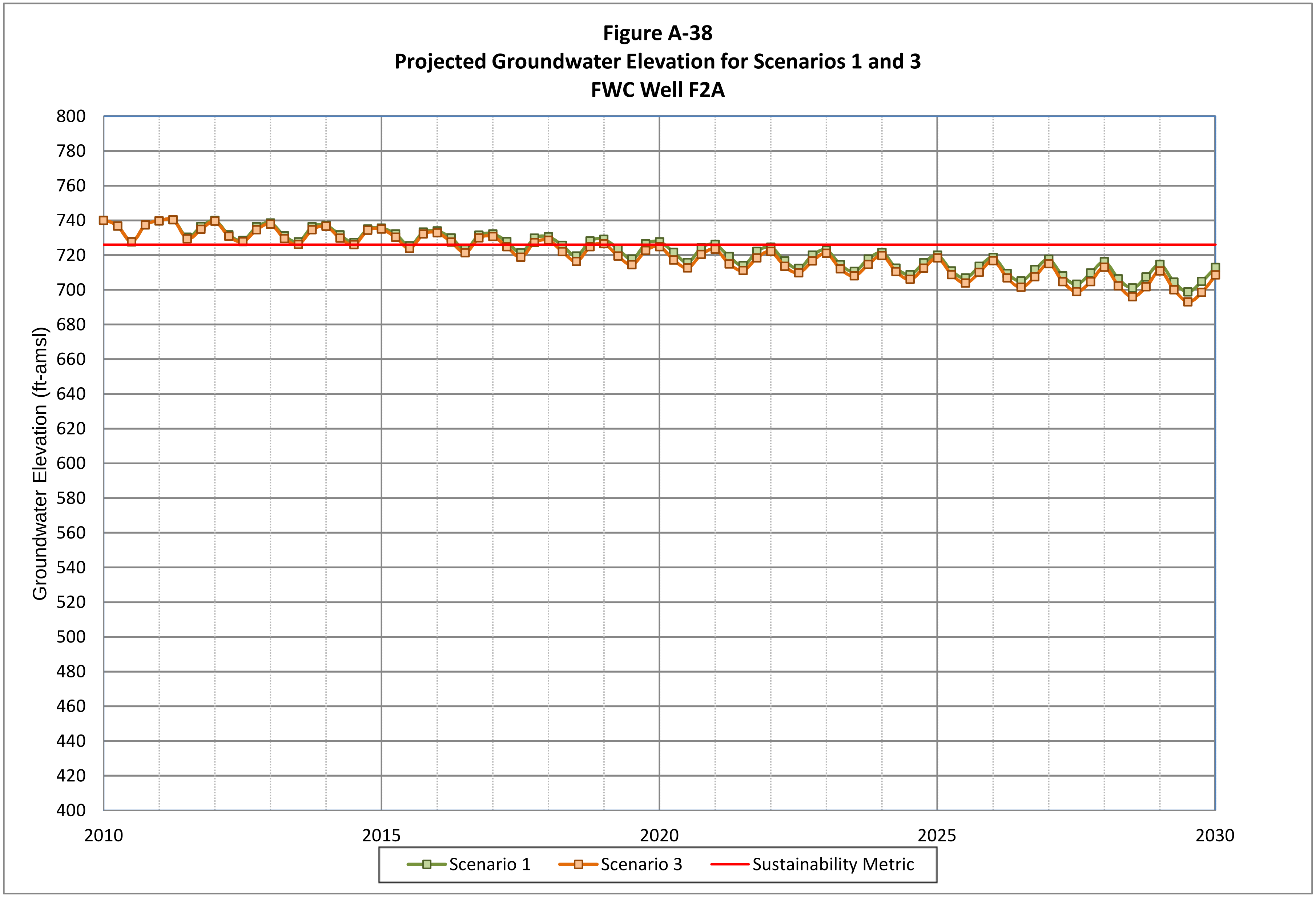

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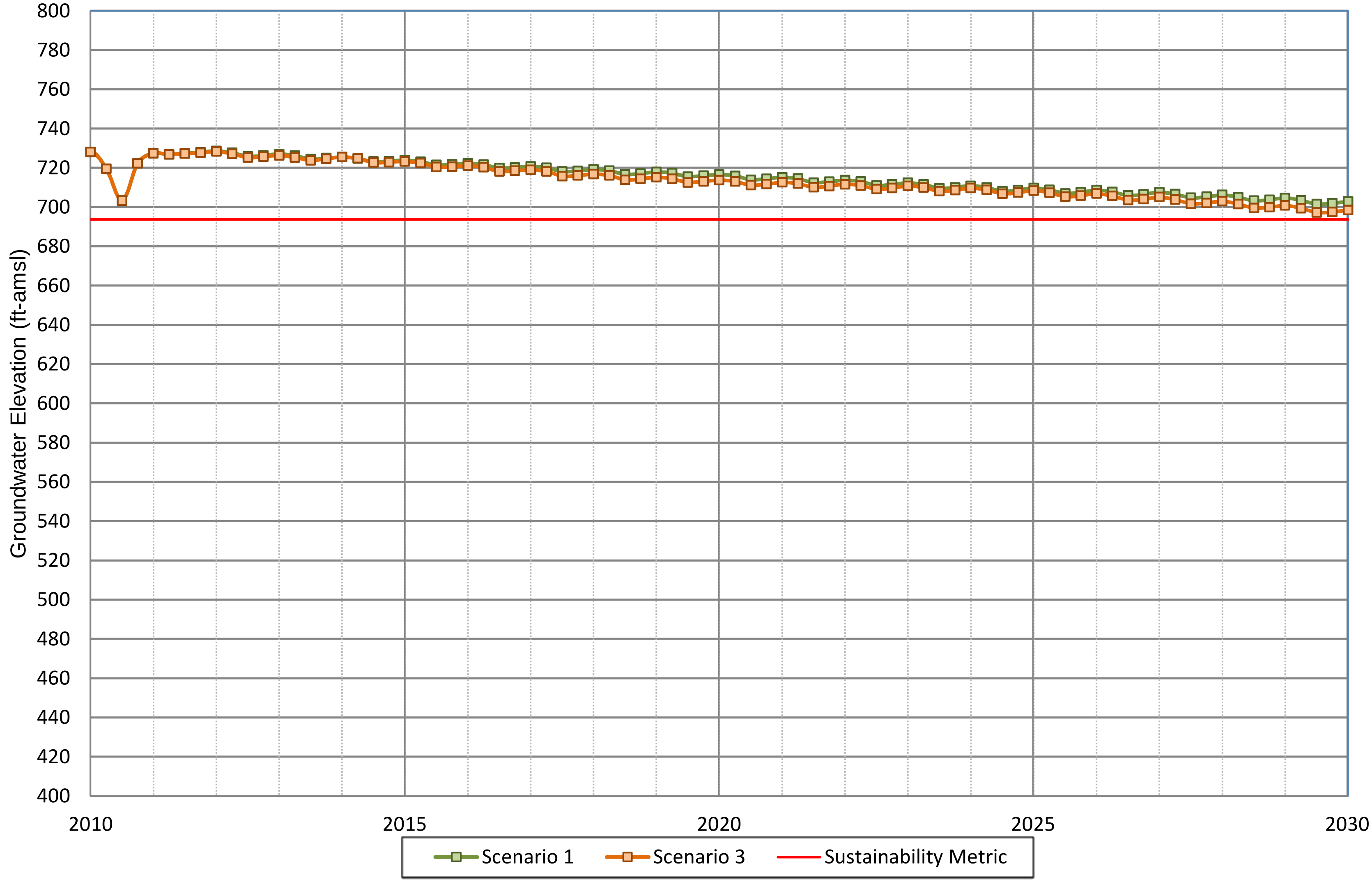
Figure A-39
Projected Groundwater Elevation for Scenarios 1 and 3
FWC Well F7A



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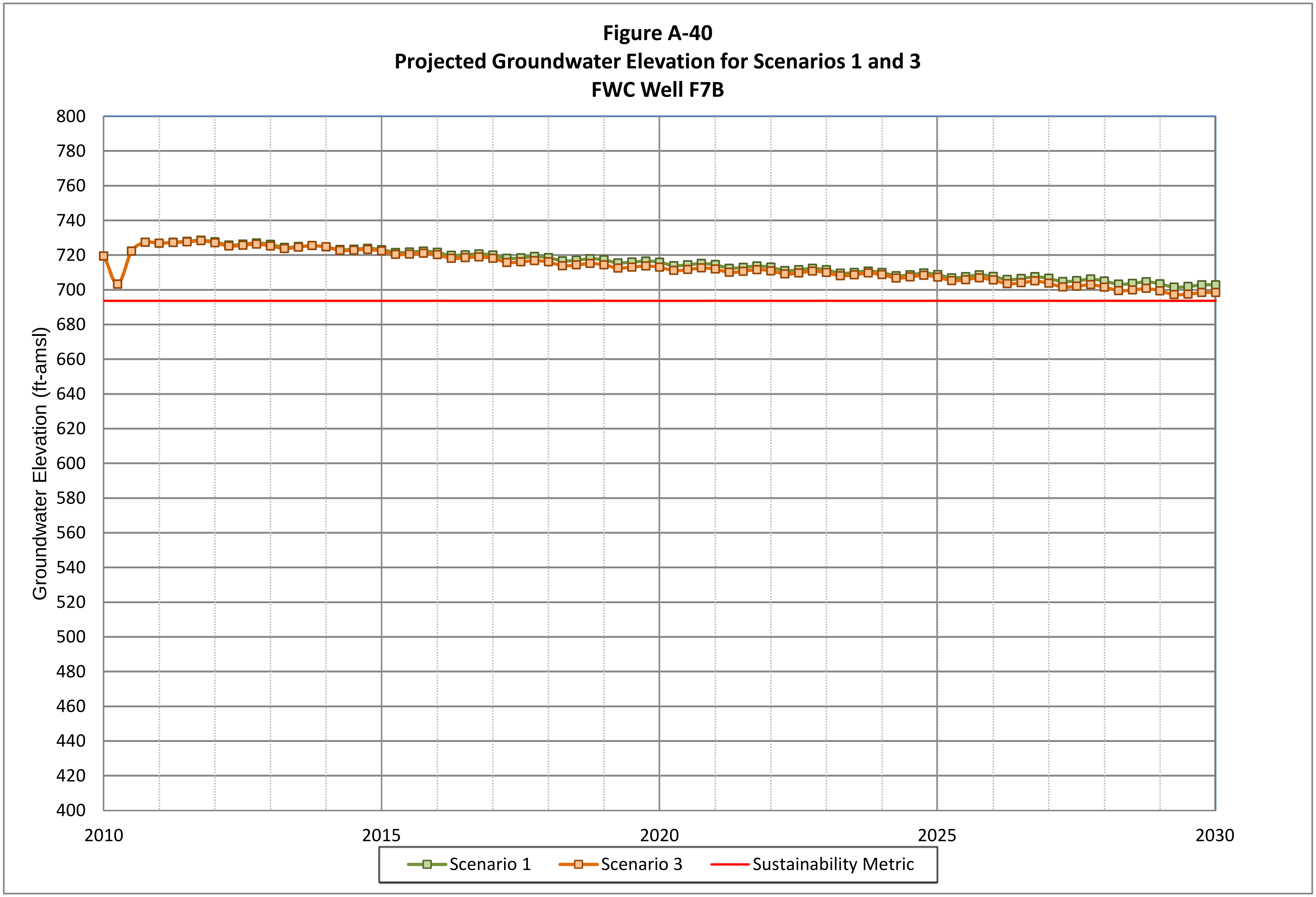

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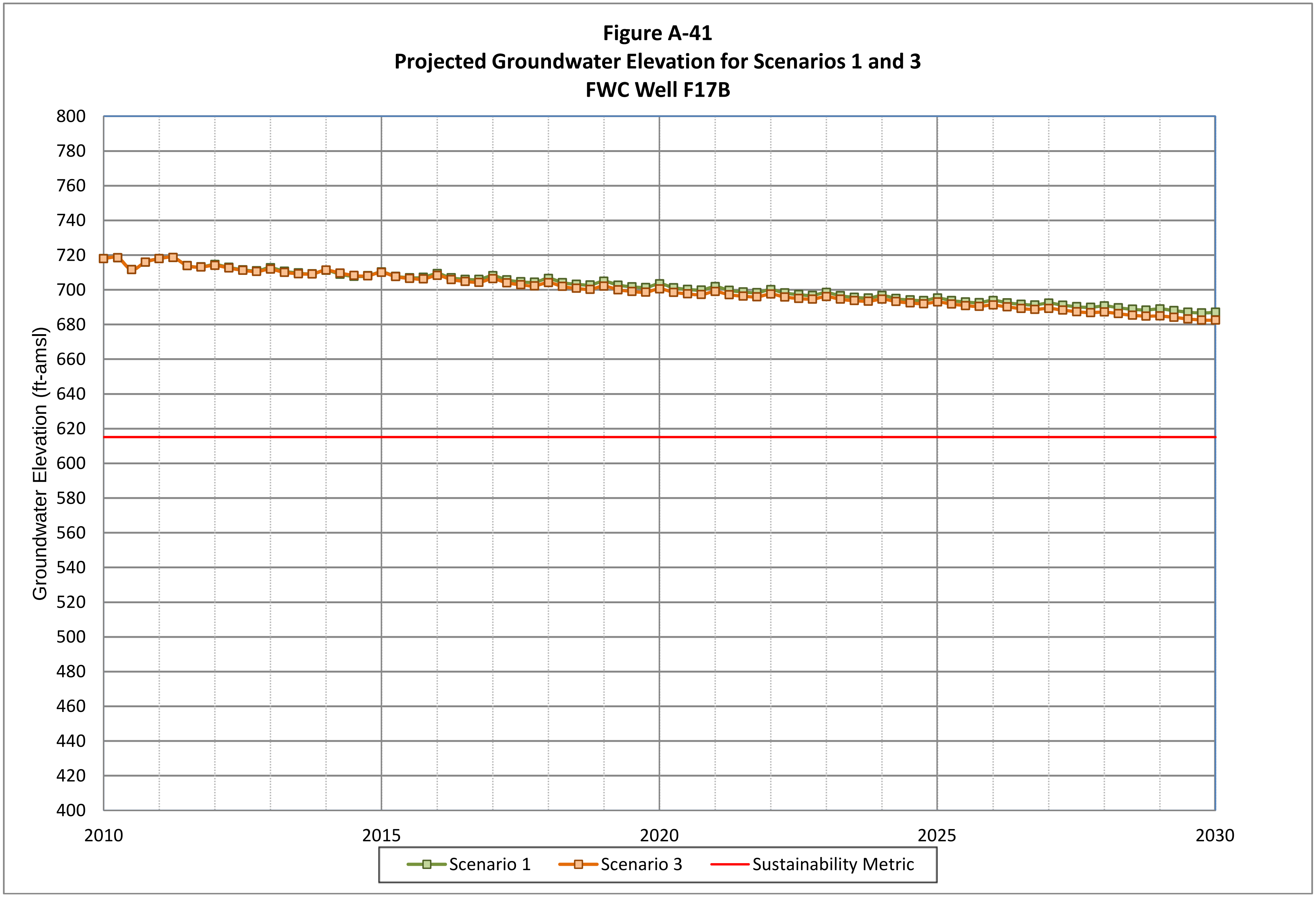

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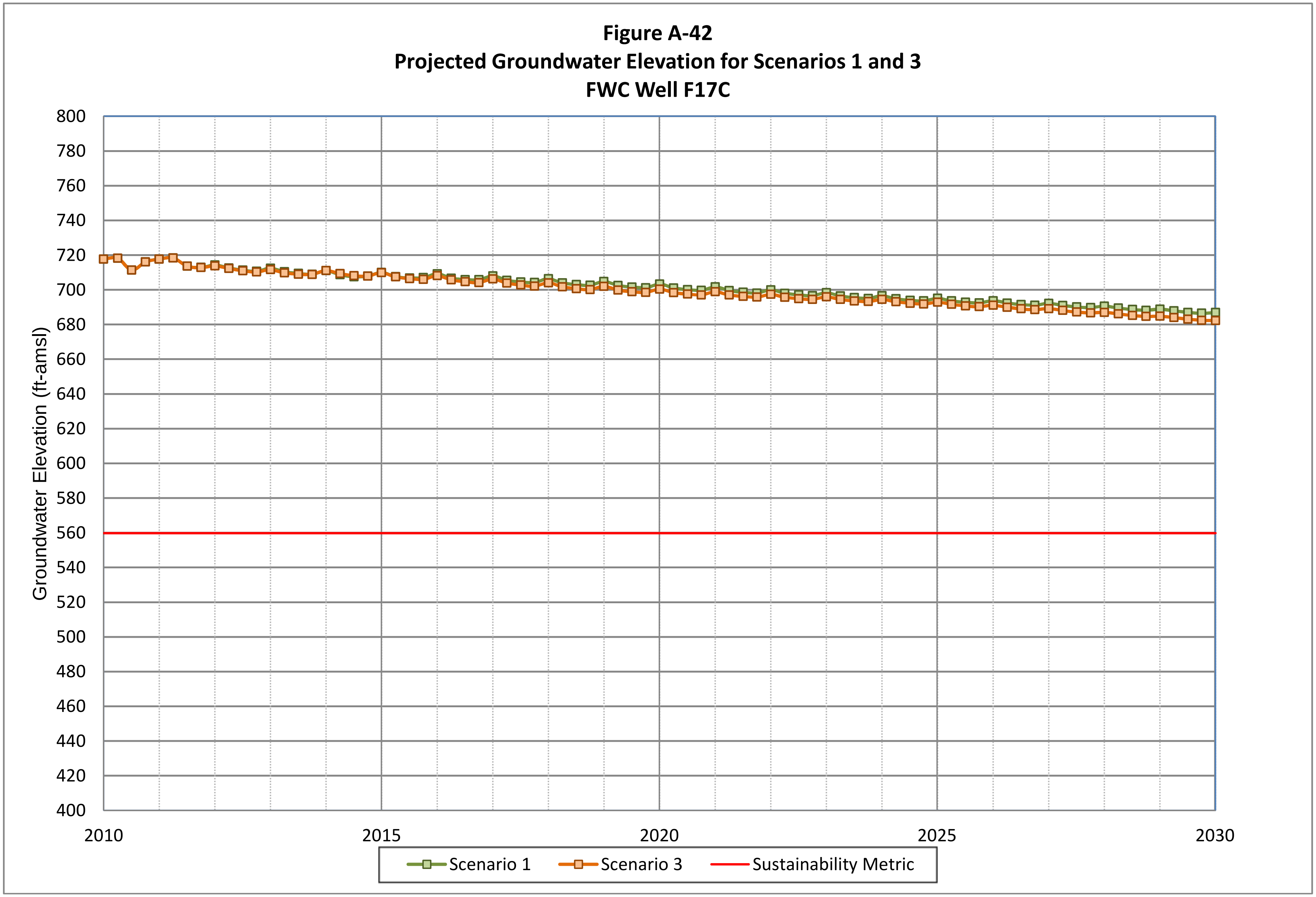

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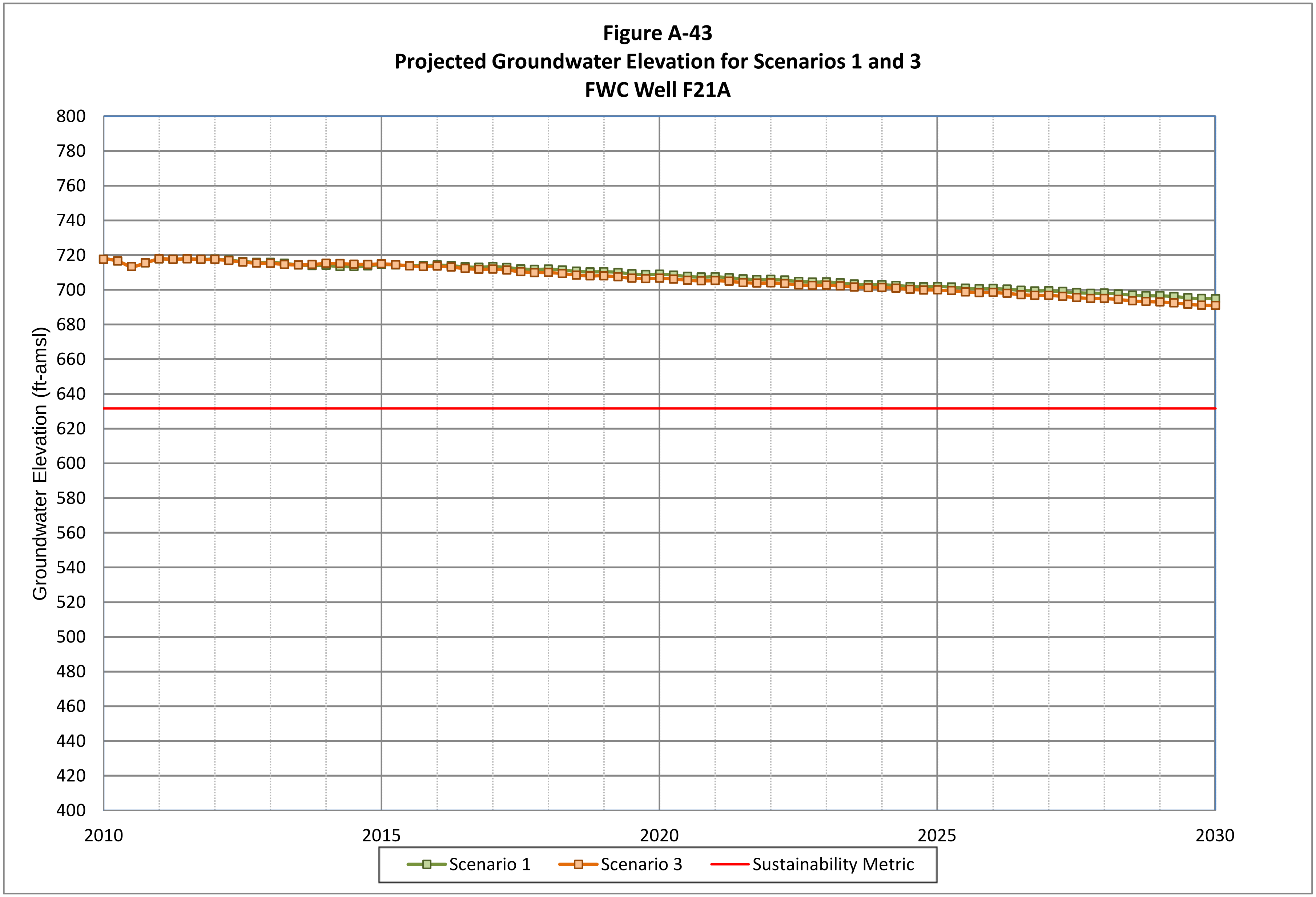

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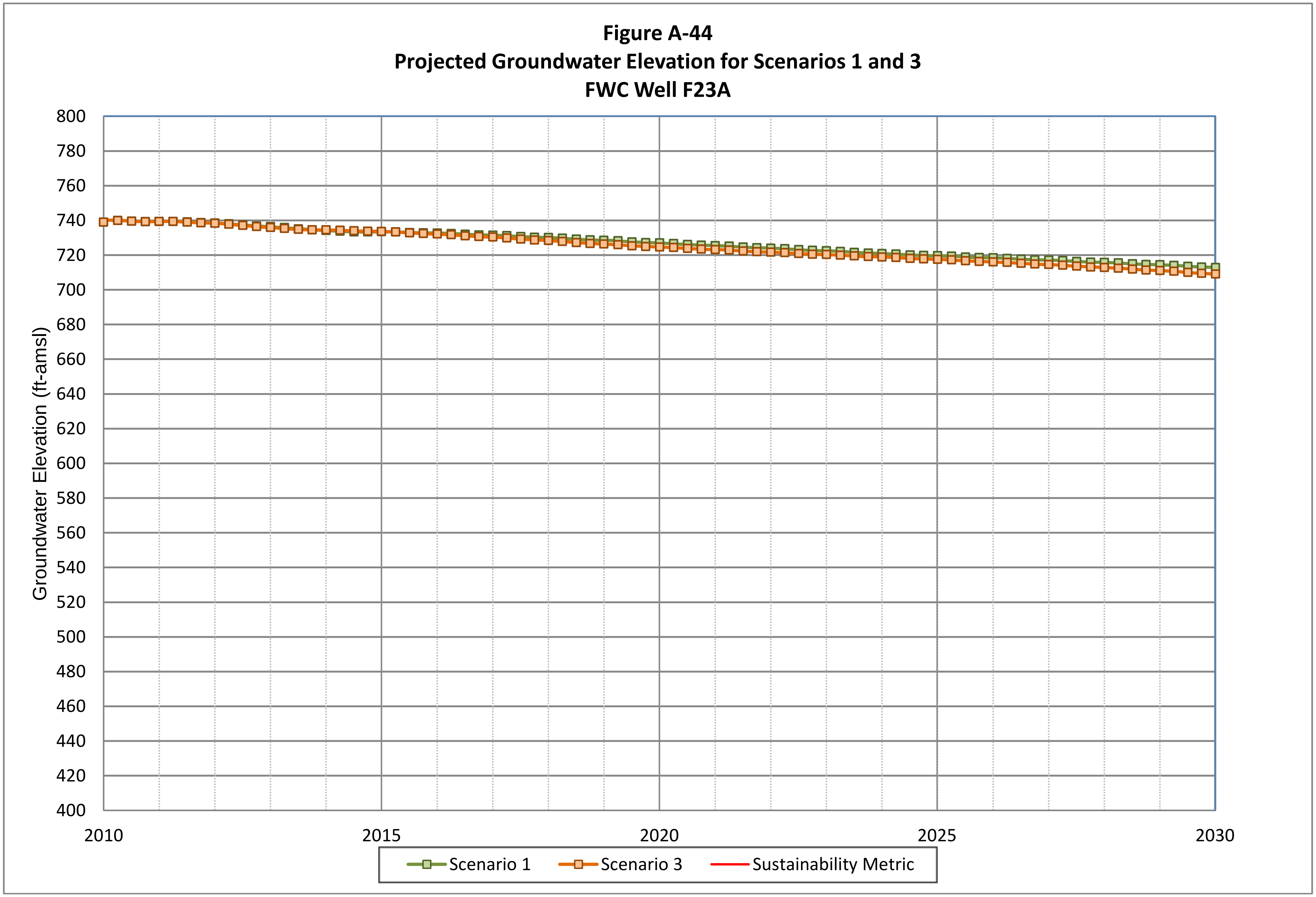

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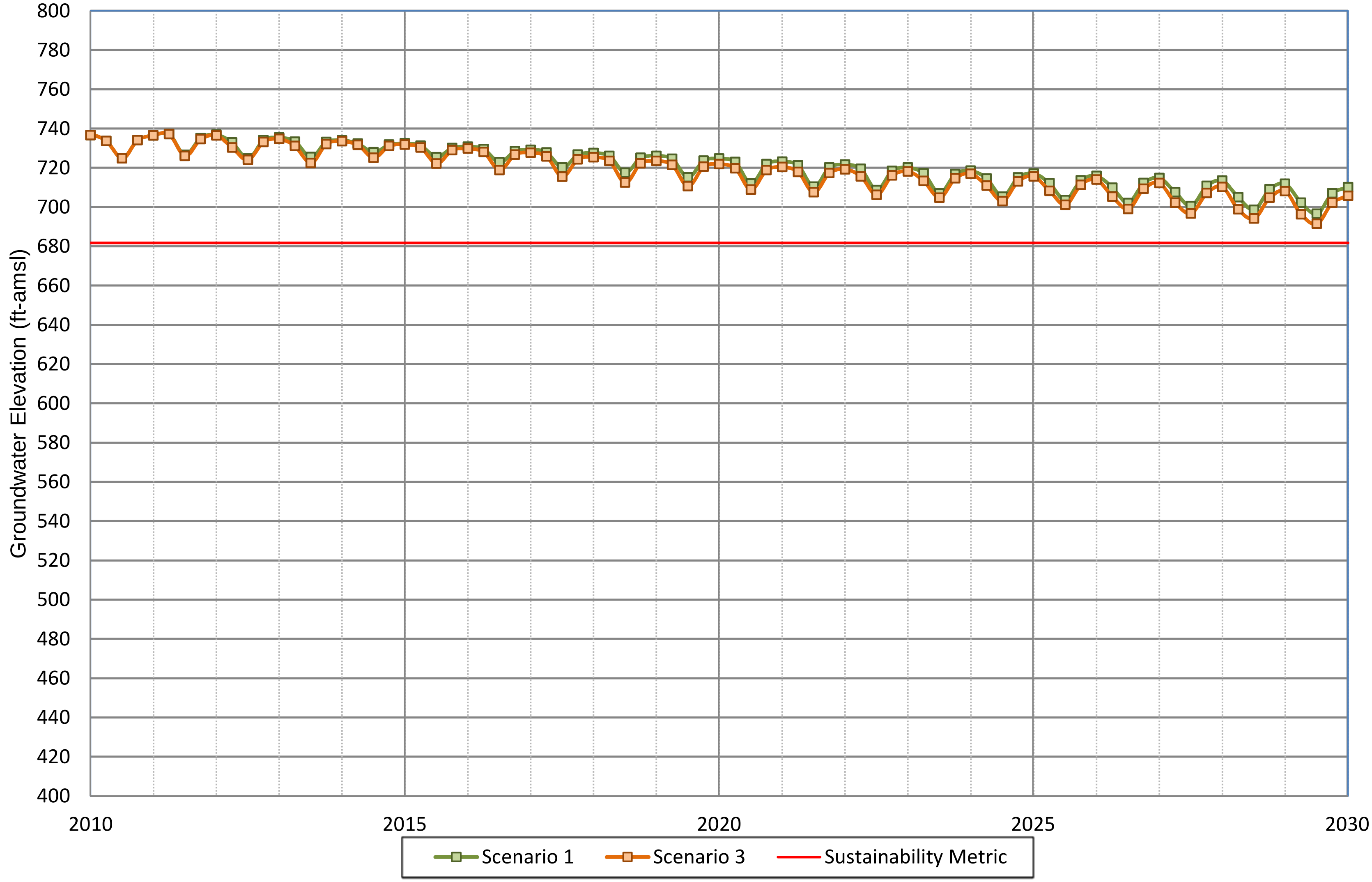
Figure A-45
Projected Groundwater Elevation for Scenarios 1 and 3
FWC Well F30A



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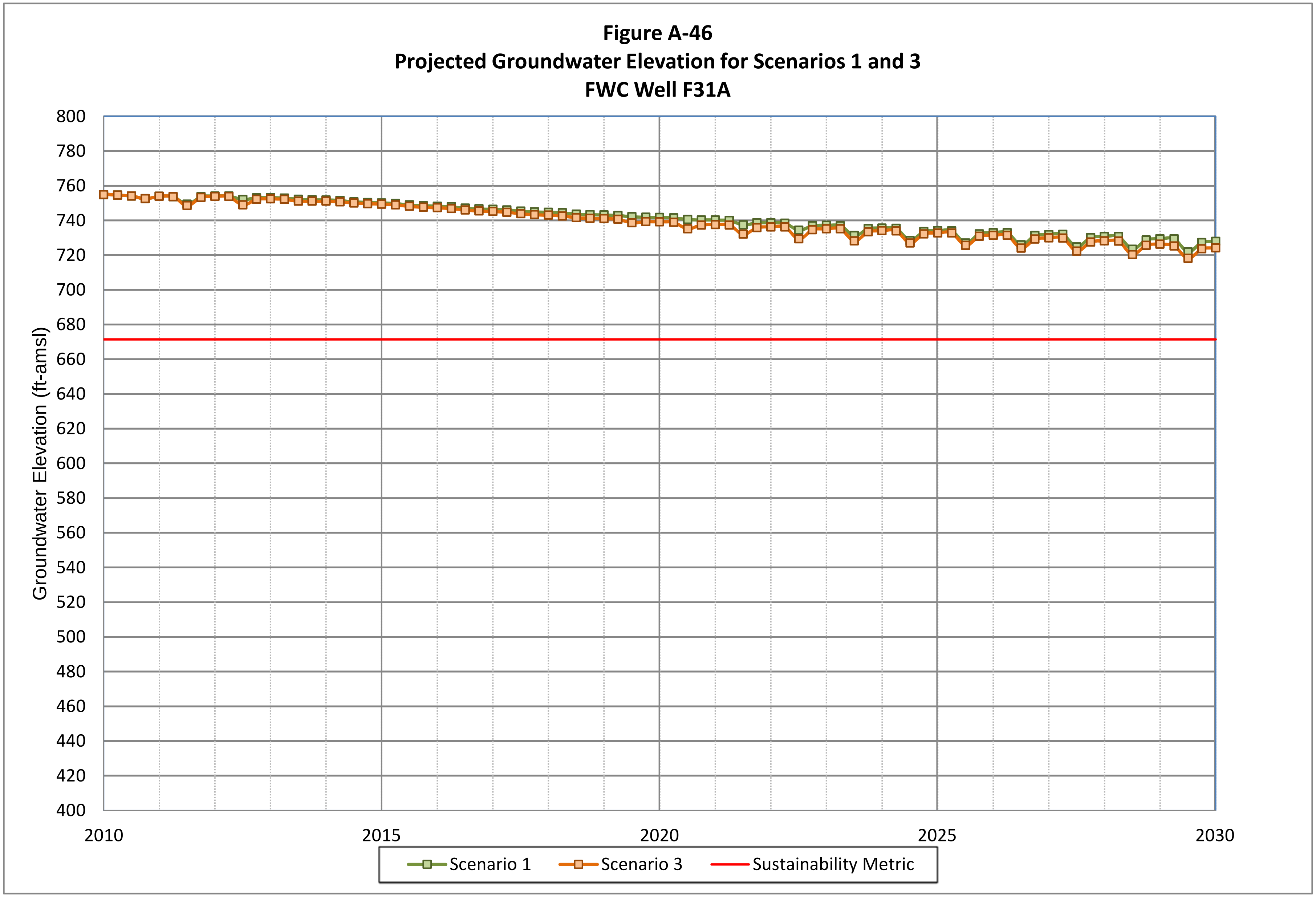

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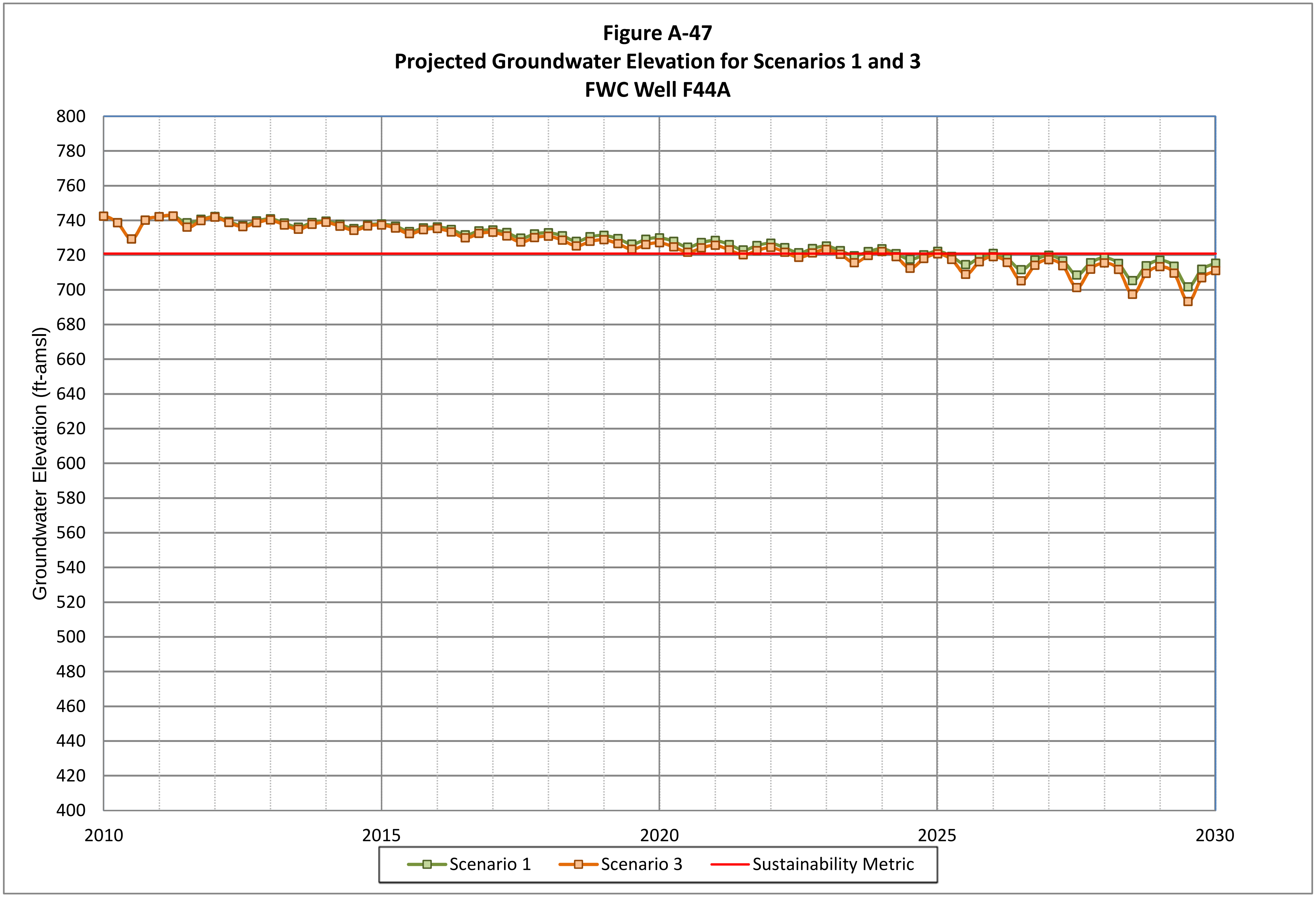
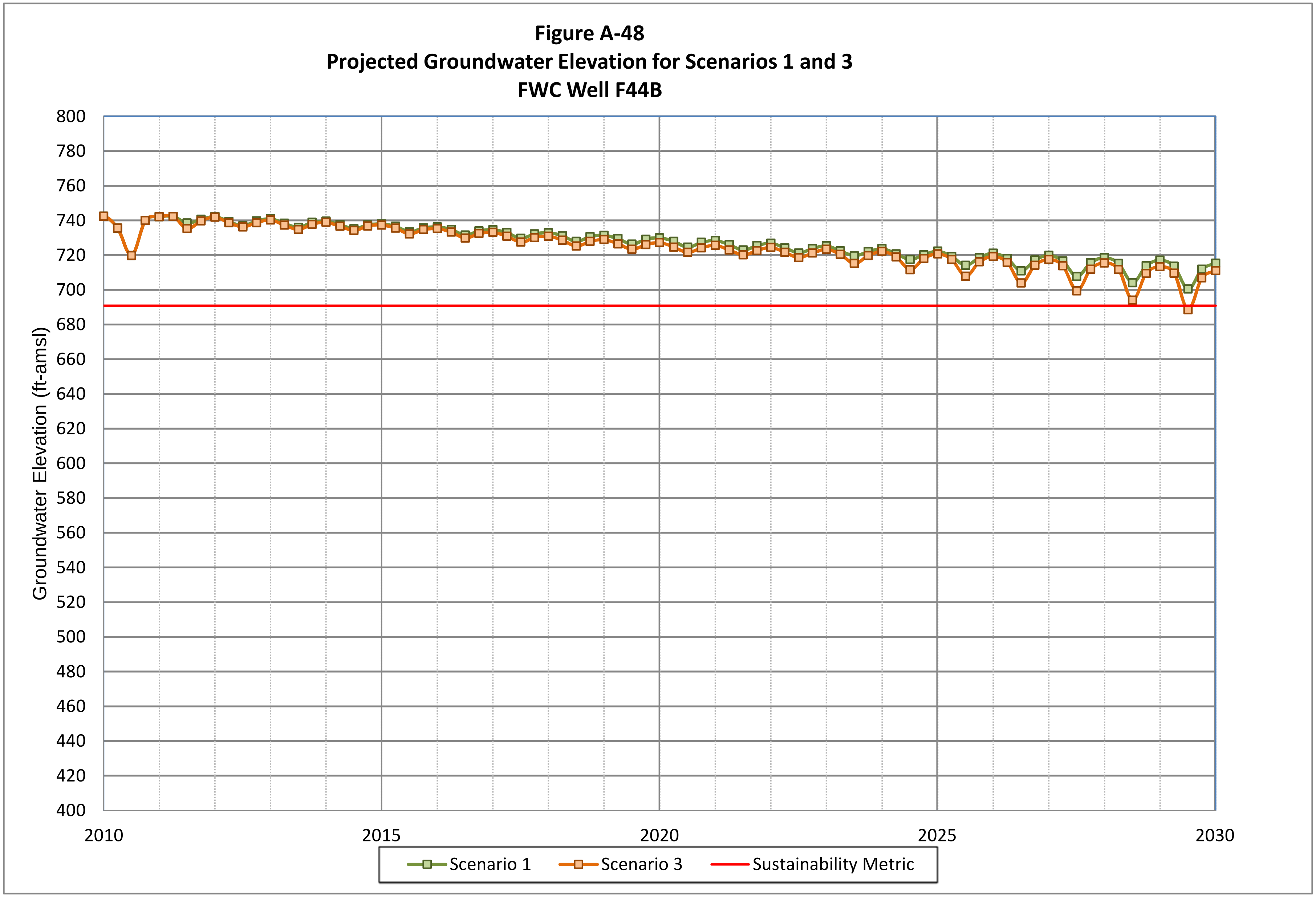


Figure A-47
Projected Groundwater Elevation for Scenarios 1 and 3
FWC Well F44A
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



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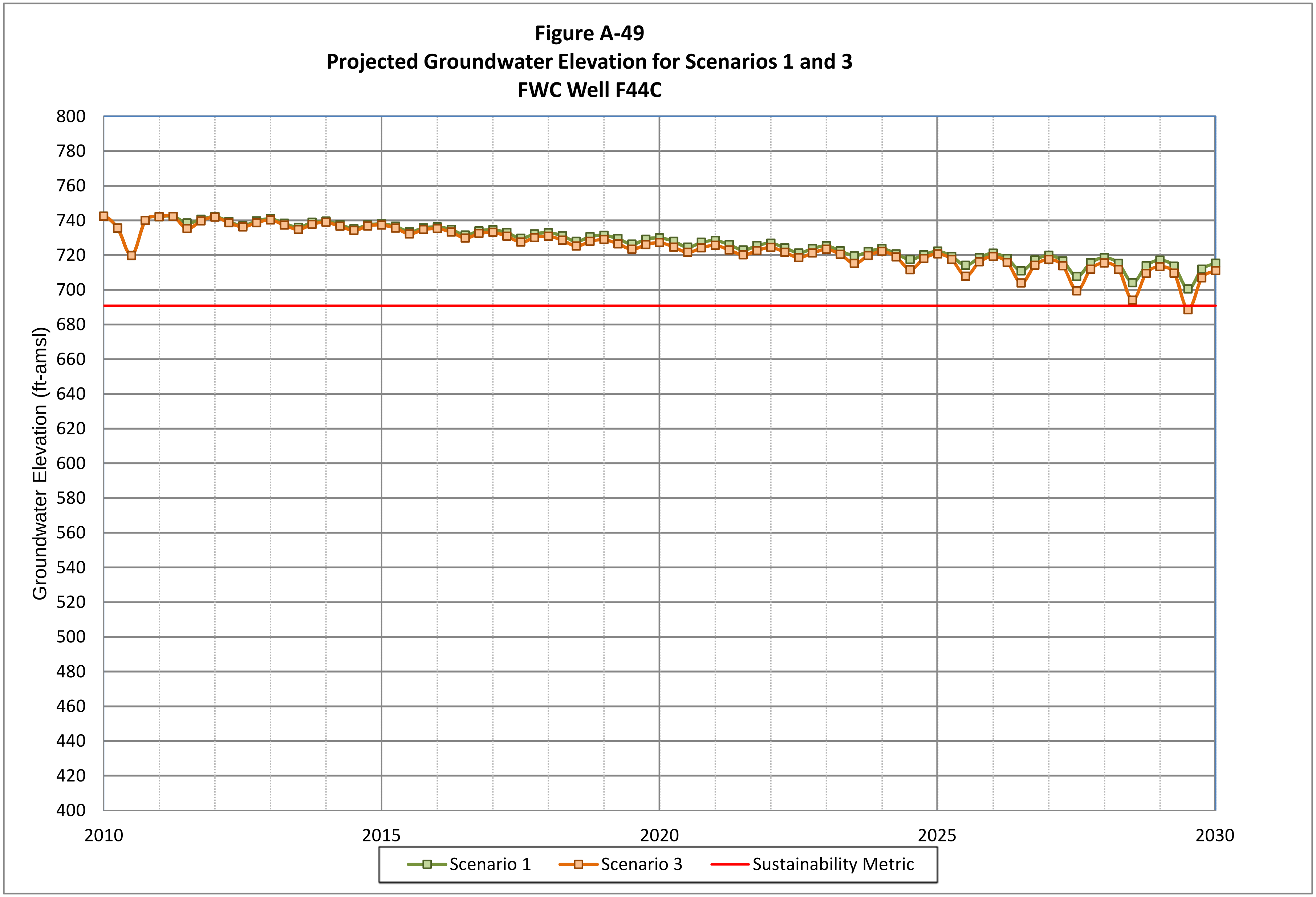

Figure A-49
Projected Groundwater Elevation for Scenarios 1 and 3
FWC Well F44C
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric

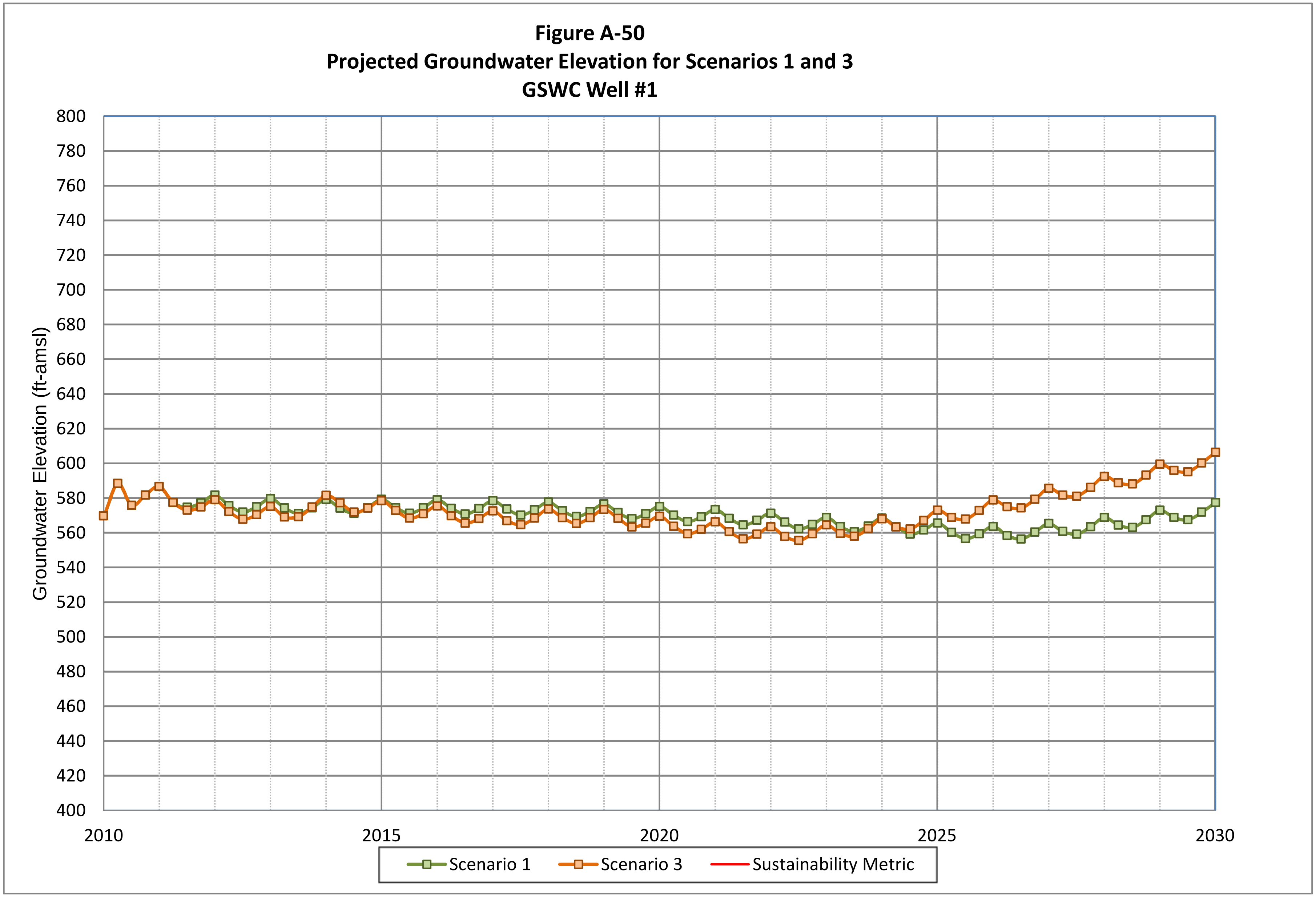

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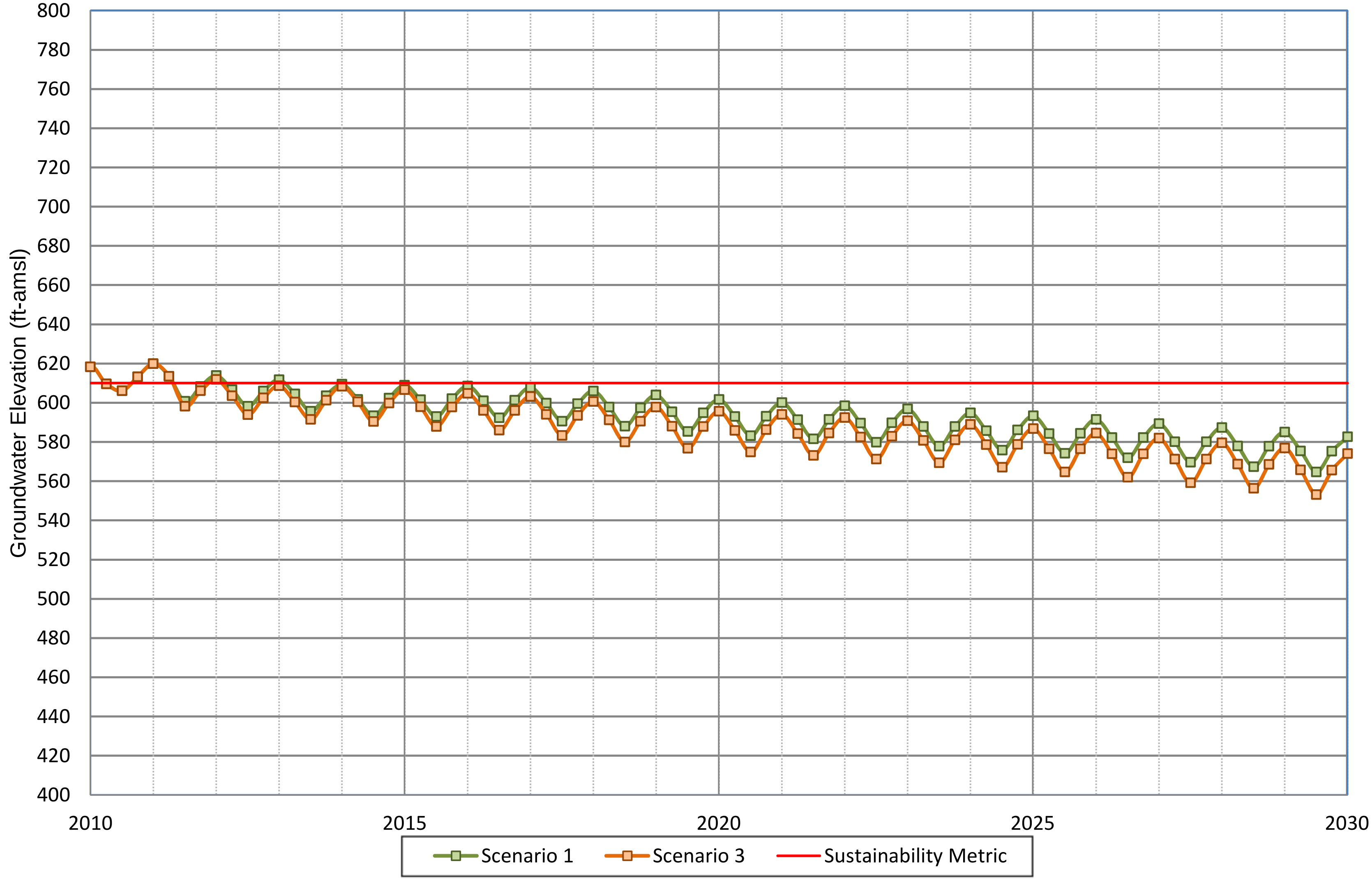
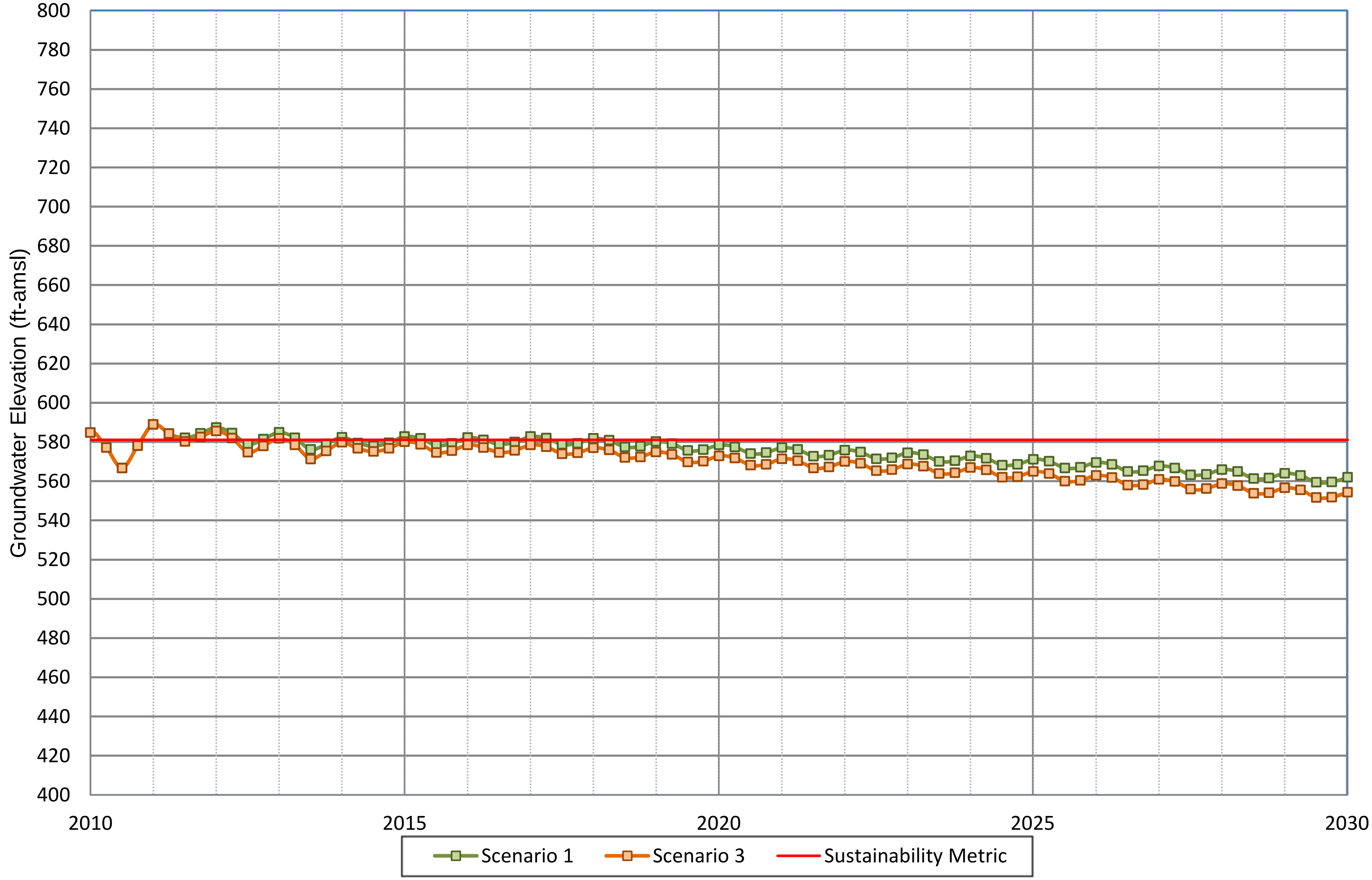
Figure A-51
Projected Groundwater Elevation for Scenarios 1 and 3
JCSD Well 6



20120503_Projected_Hydrographs.xlsx

Figure A-52
Projected Groundwater Elevation for Scenarios 1 and 3
JCSD Well 8



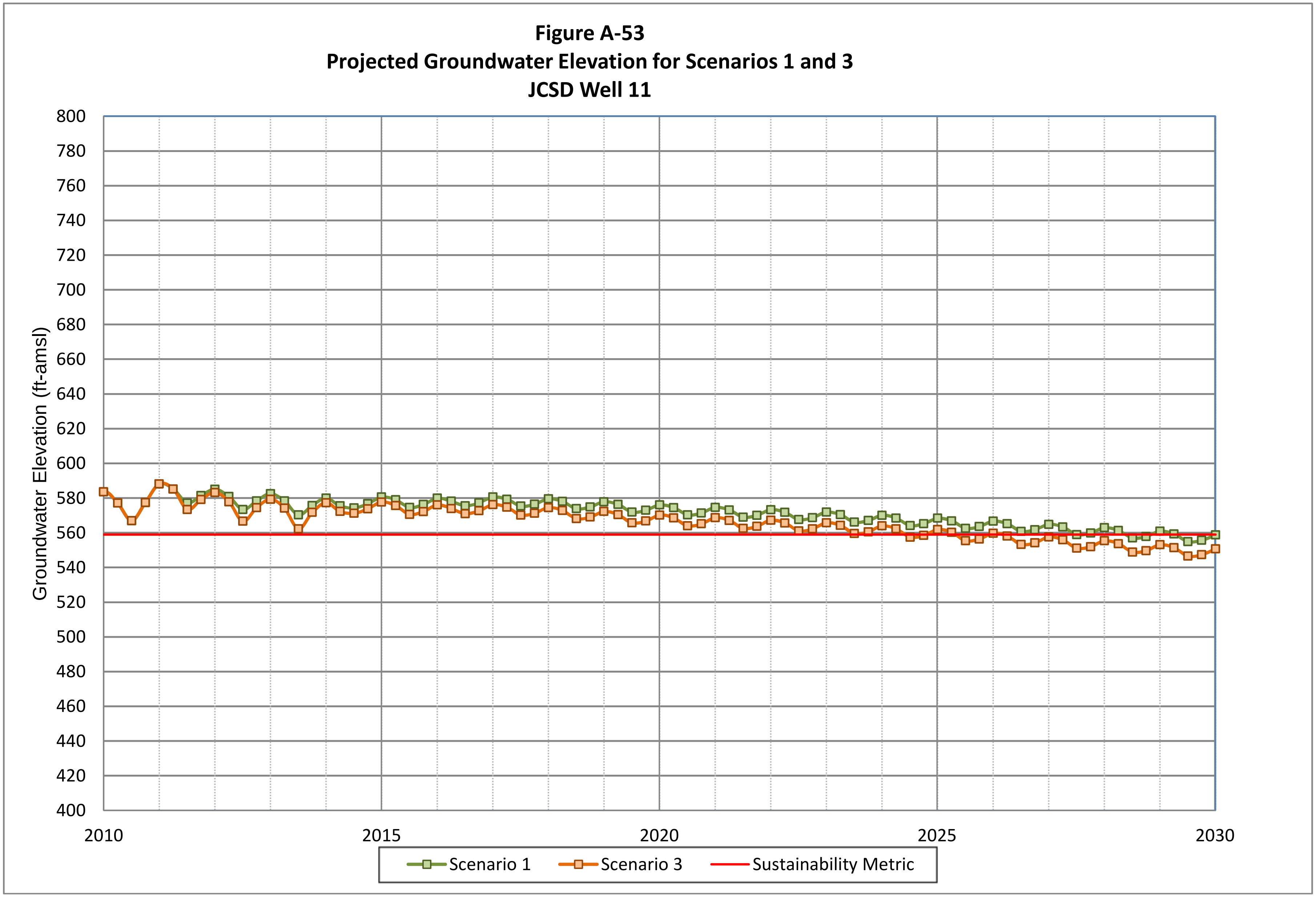
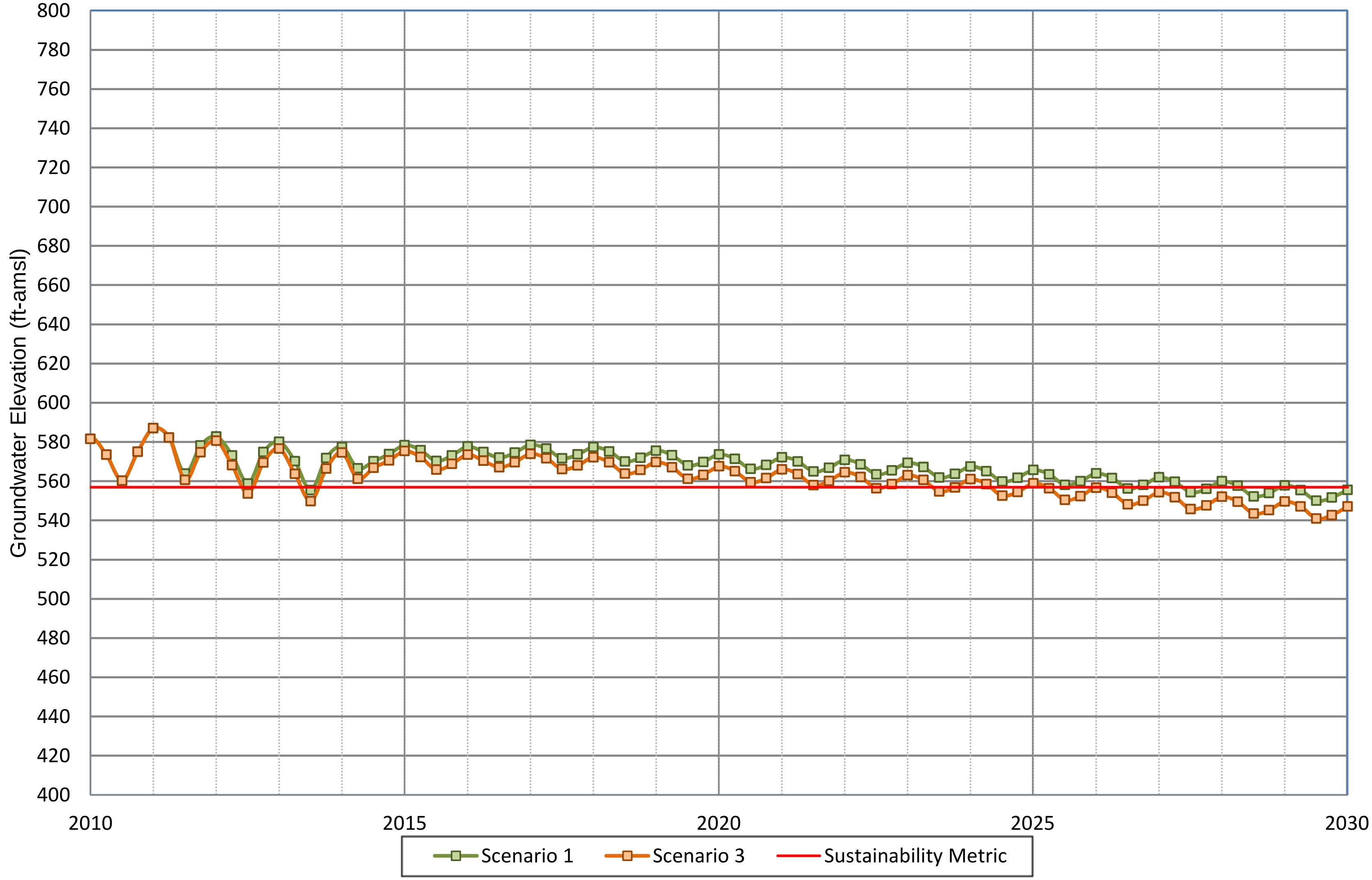


Figure A-53
Projected Groundwater Elevation for Scenarios 1 and 3
JCSD Well 11
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric

Figure A-54
Projected Groundwater Elevation for Scenarios 1 and 3
JCSD Well 12



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WILDERMUTH ENVIRONMENTAL INC.

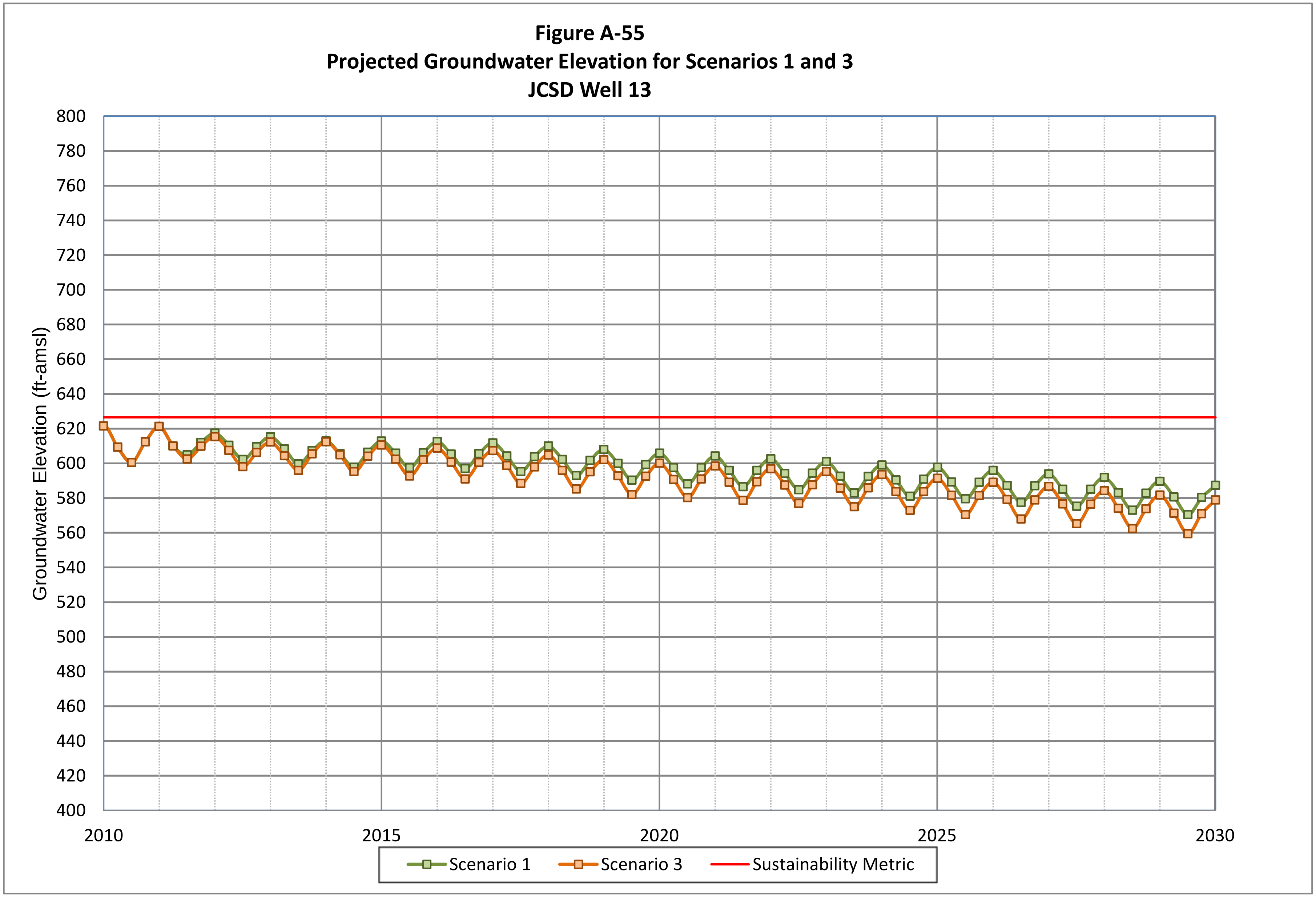
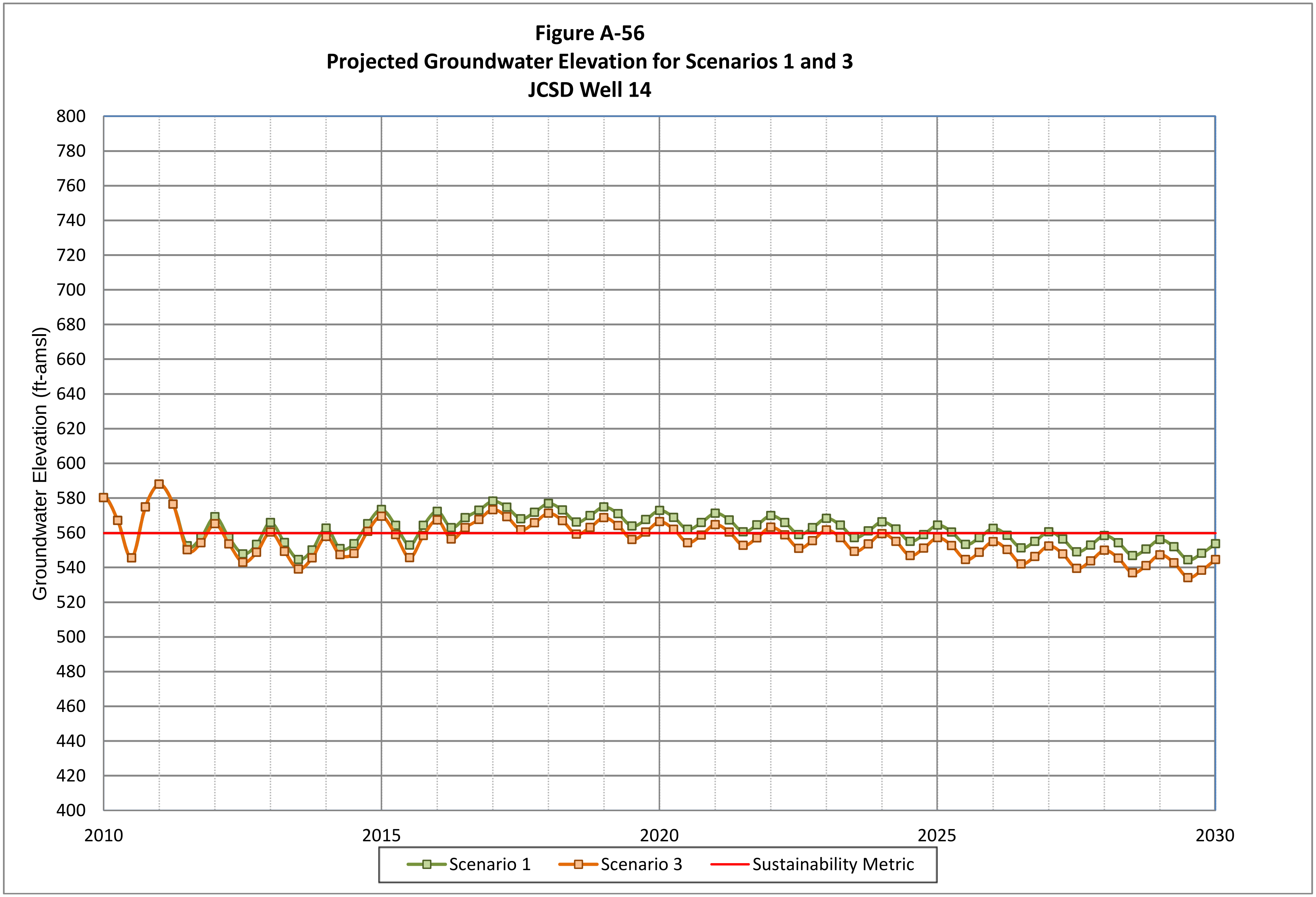
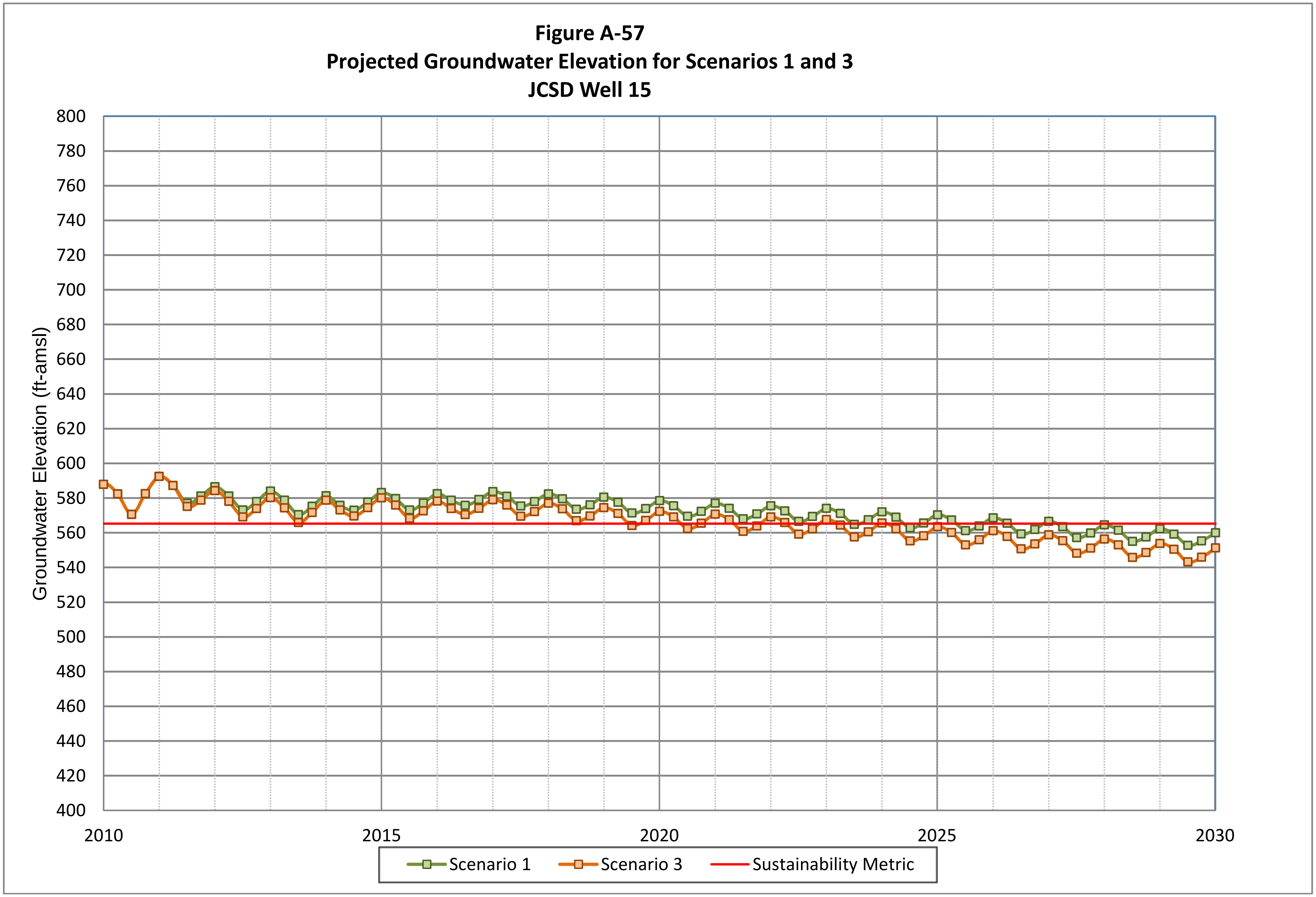


Figure A-55
Projected Groundwater Elevation for Scenarios 1 and 3
JCSD Well 13
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



20120503_Projected_Hydrographs.xlsx



20120503_Projected_Hydrographs.xlsx

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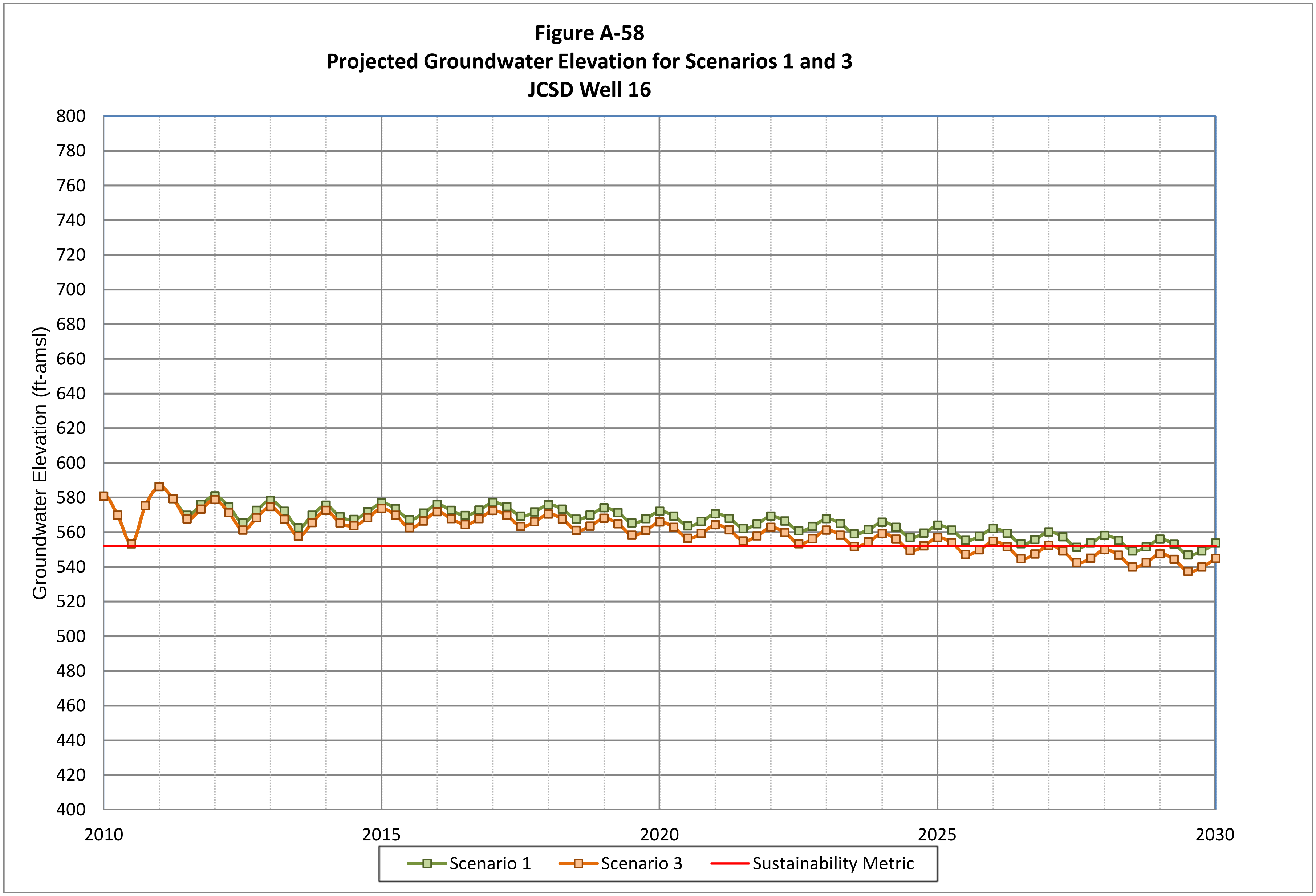
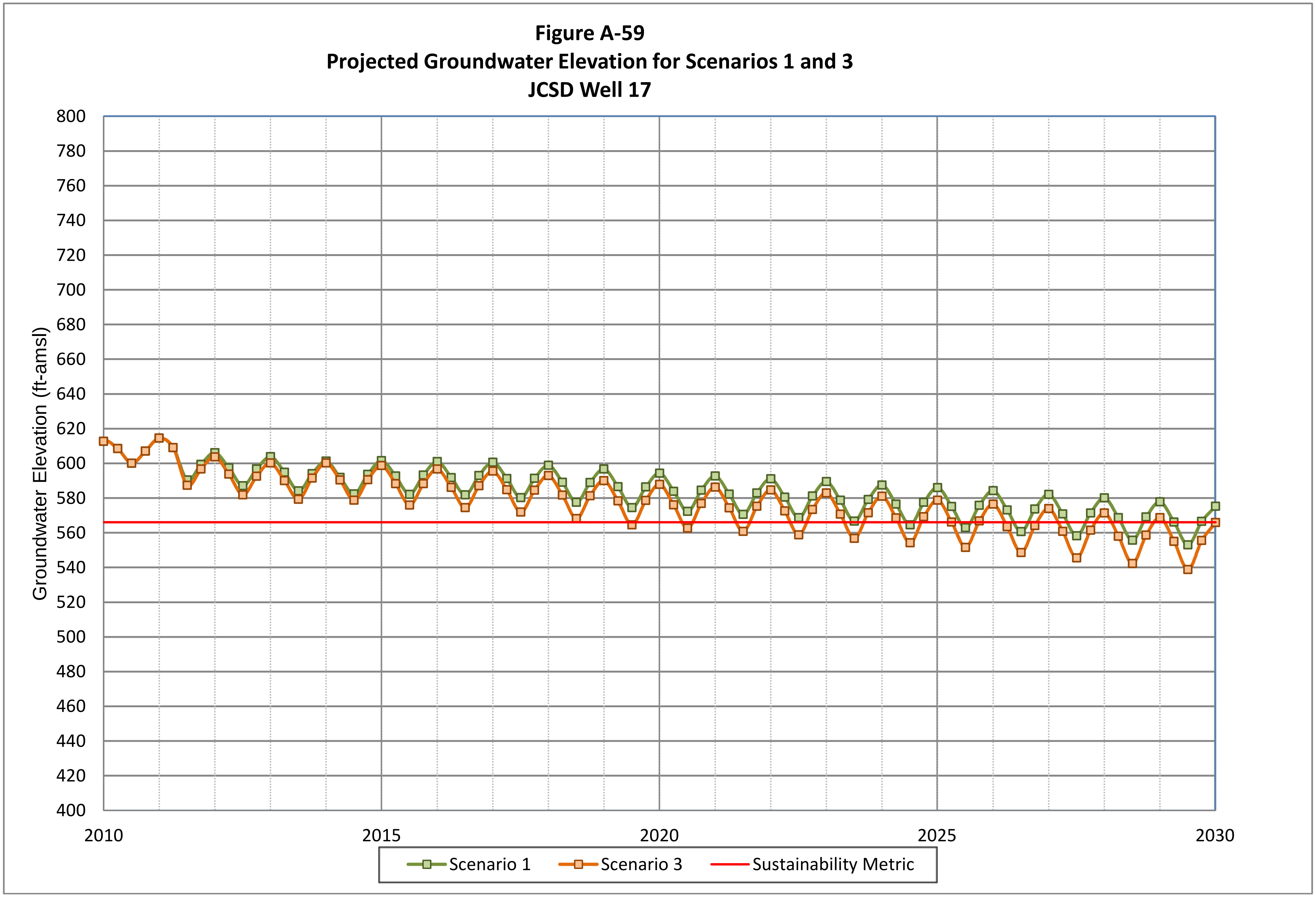


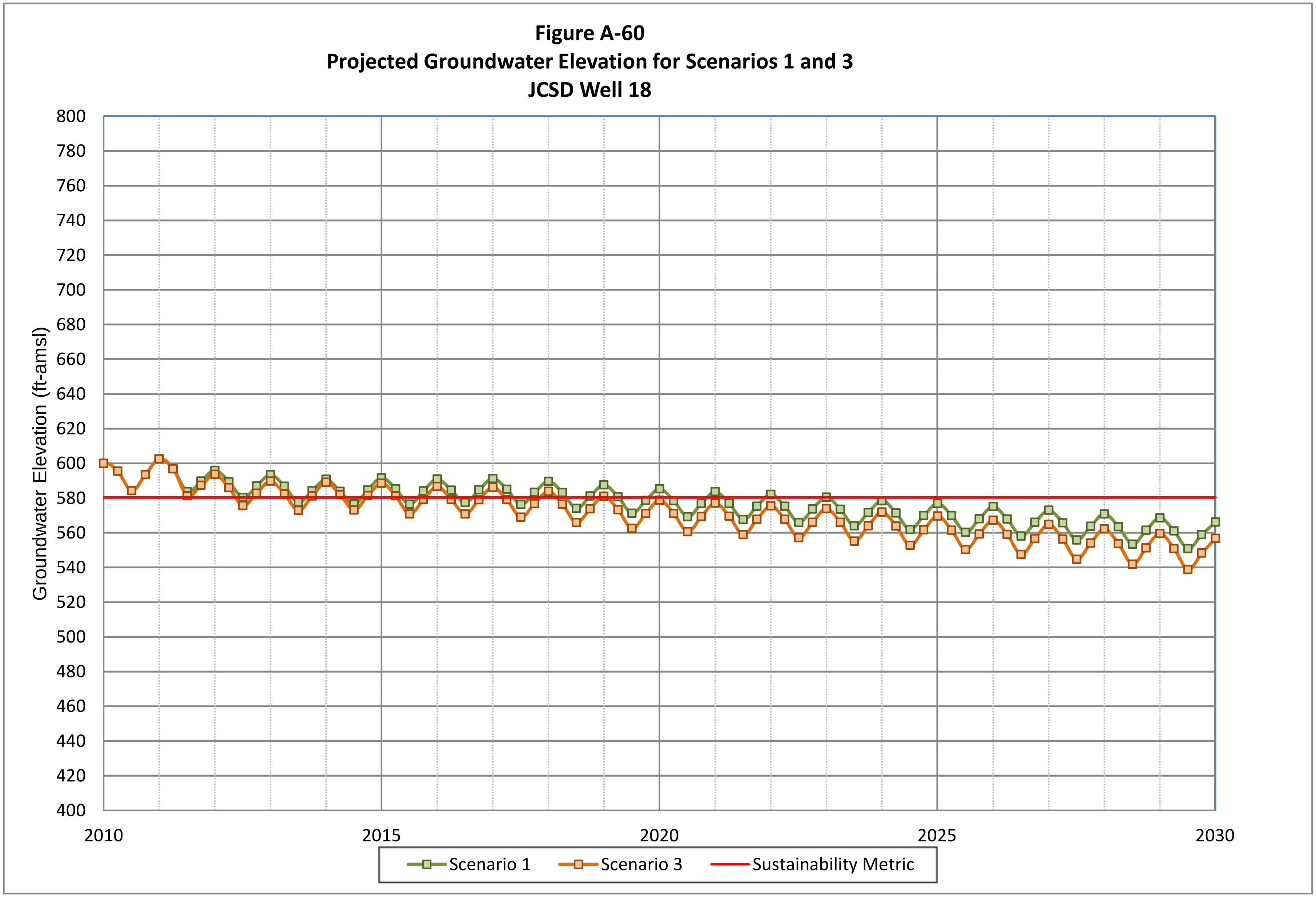
20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.



20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.



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WILDERMUTH ENVIRONMENTAL INC.

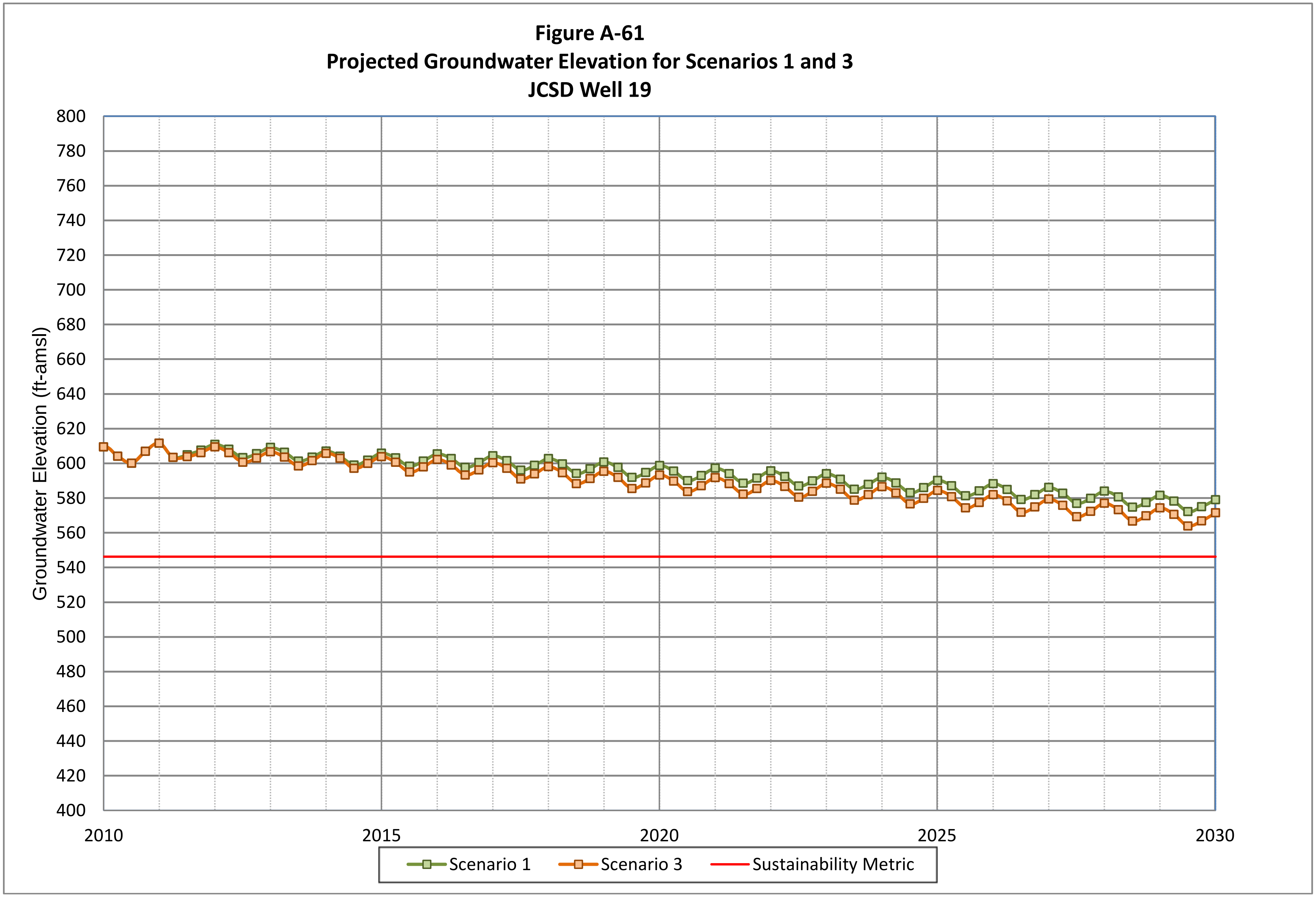
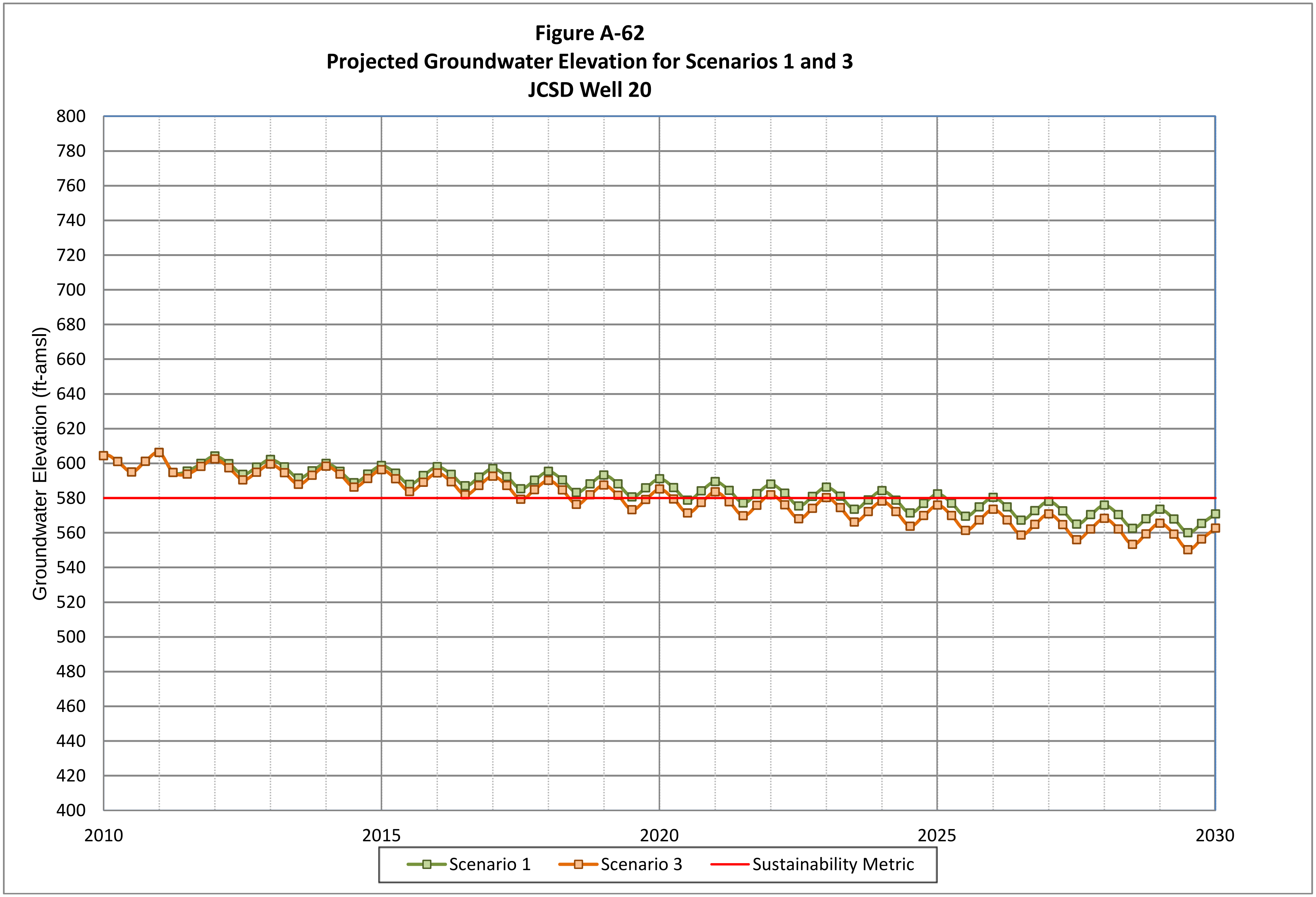


Figure A-61
Projected Groundwater Elevation for Scenarios 1 and 3
JCSD Well 19
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



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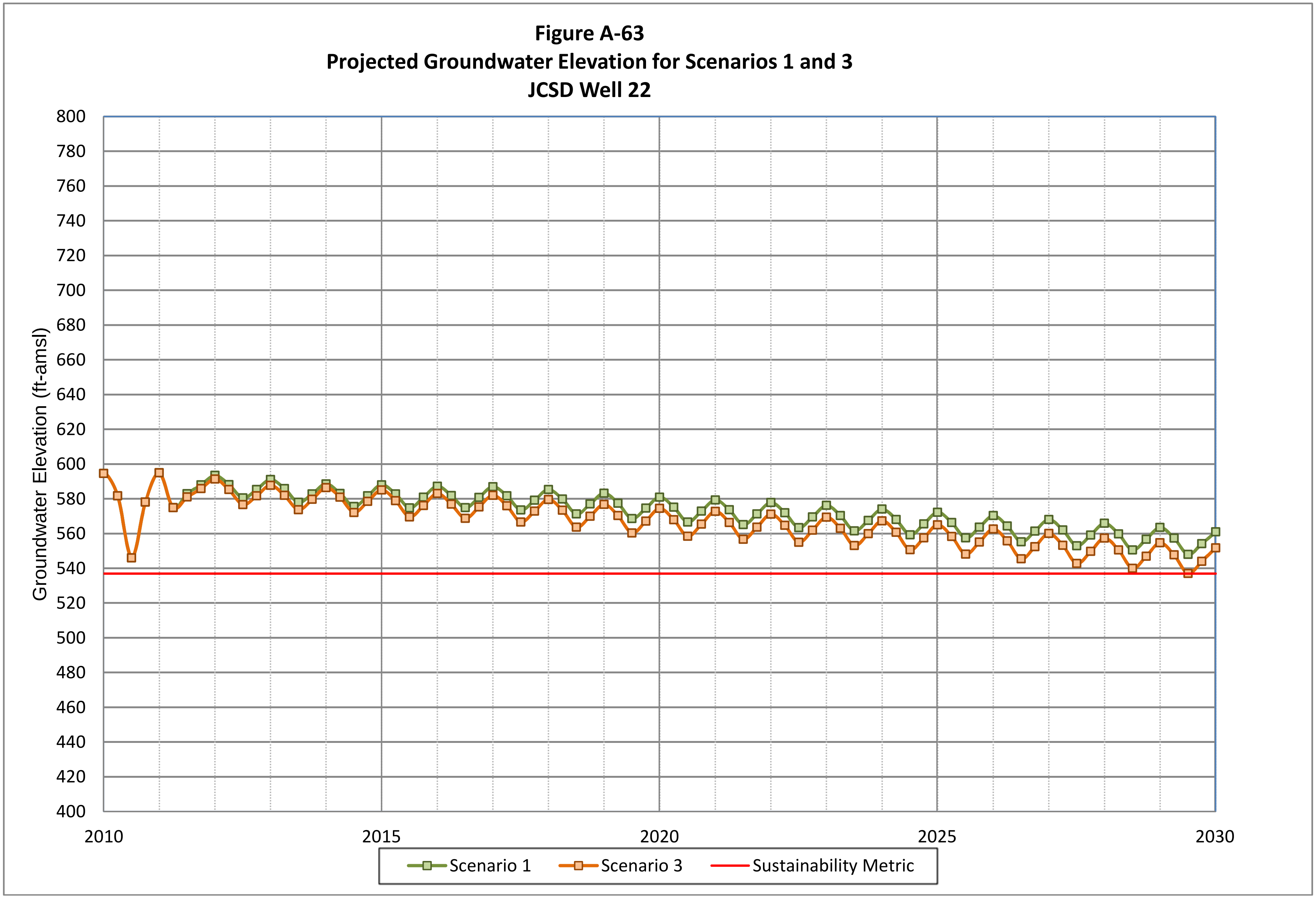
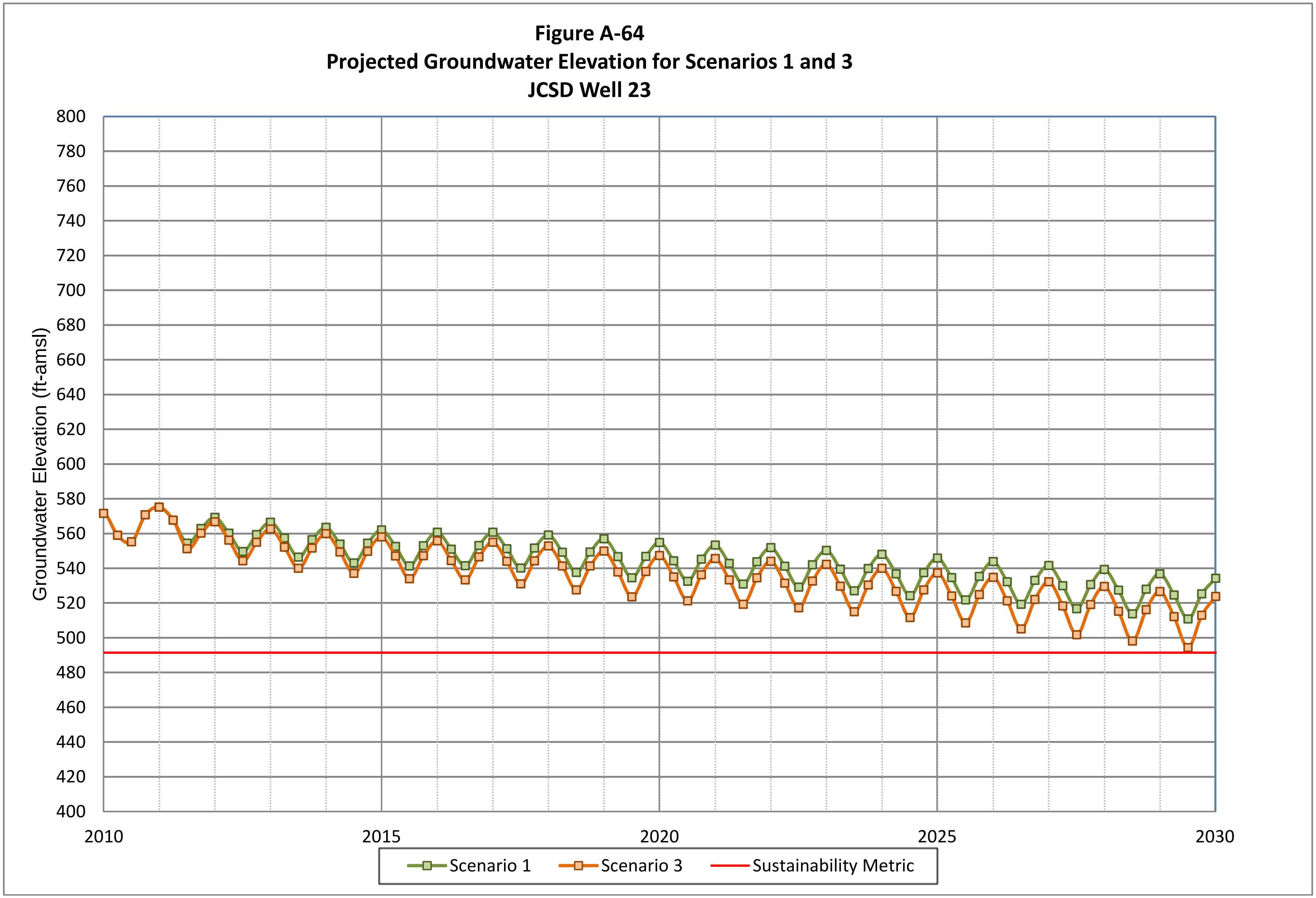


Figure A-63
Projected Groundwater Elevation for Scenarios 1 and 3
JCSD Well 22
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



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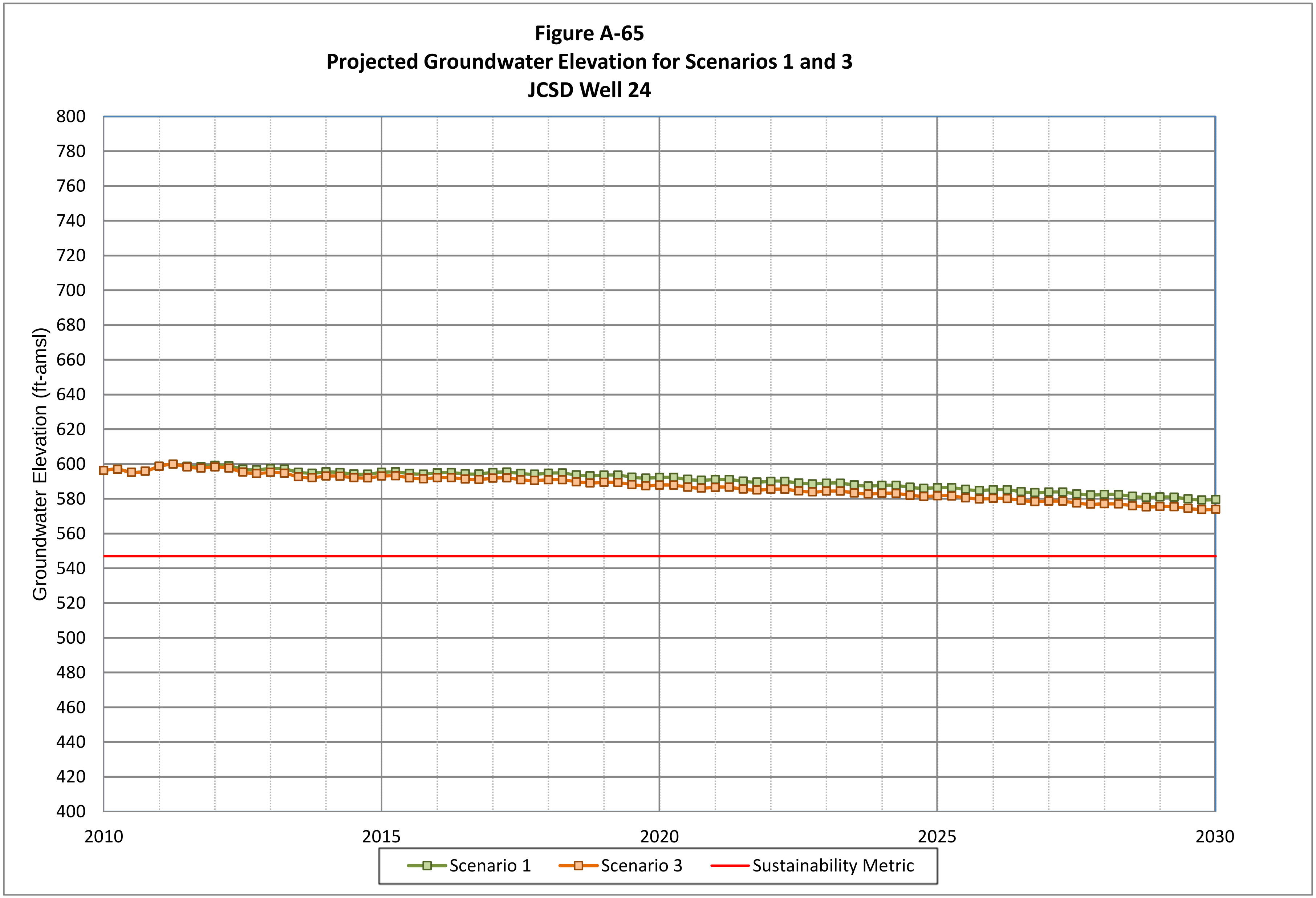

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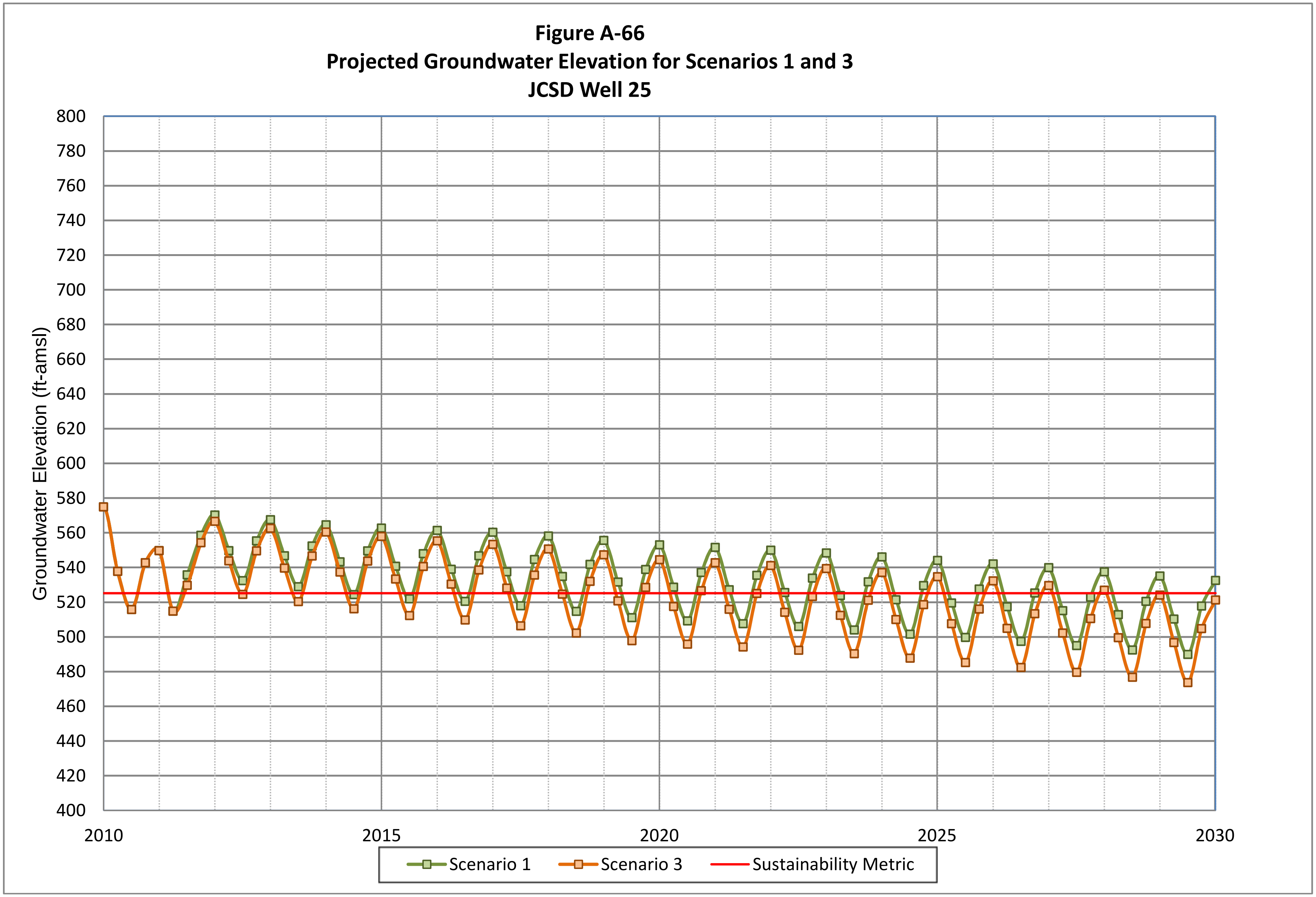
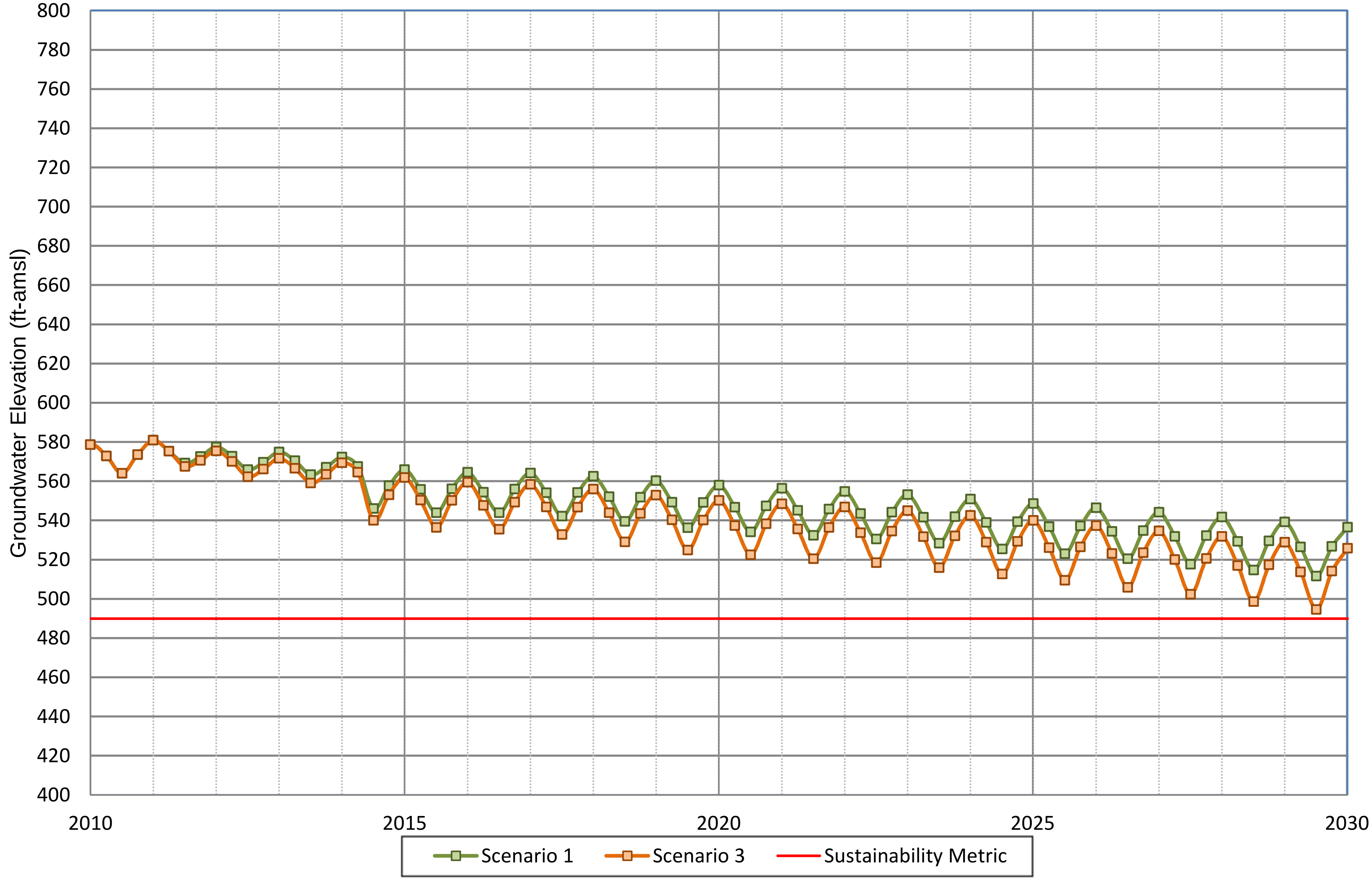


20120503_Projected_Hydrographs.xlsx

Figure A-67
Projected Groundwater Elevation for Scenarios 1 and 3
JCSD Well Galleano



20120503_Projected_Hydrographs.xlsx

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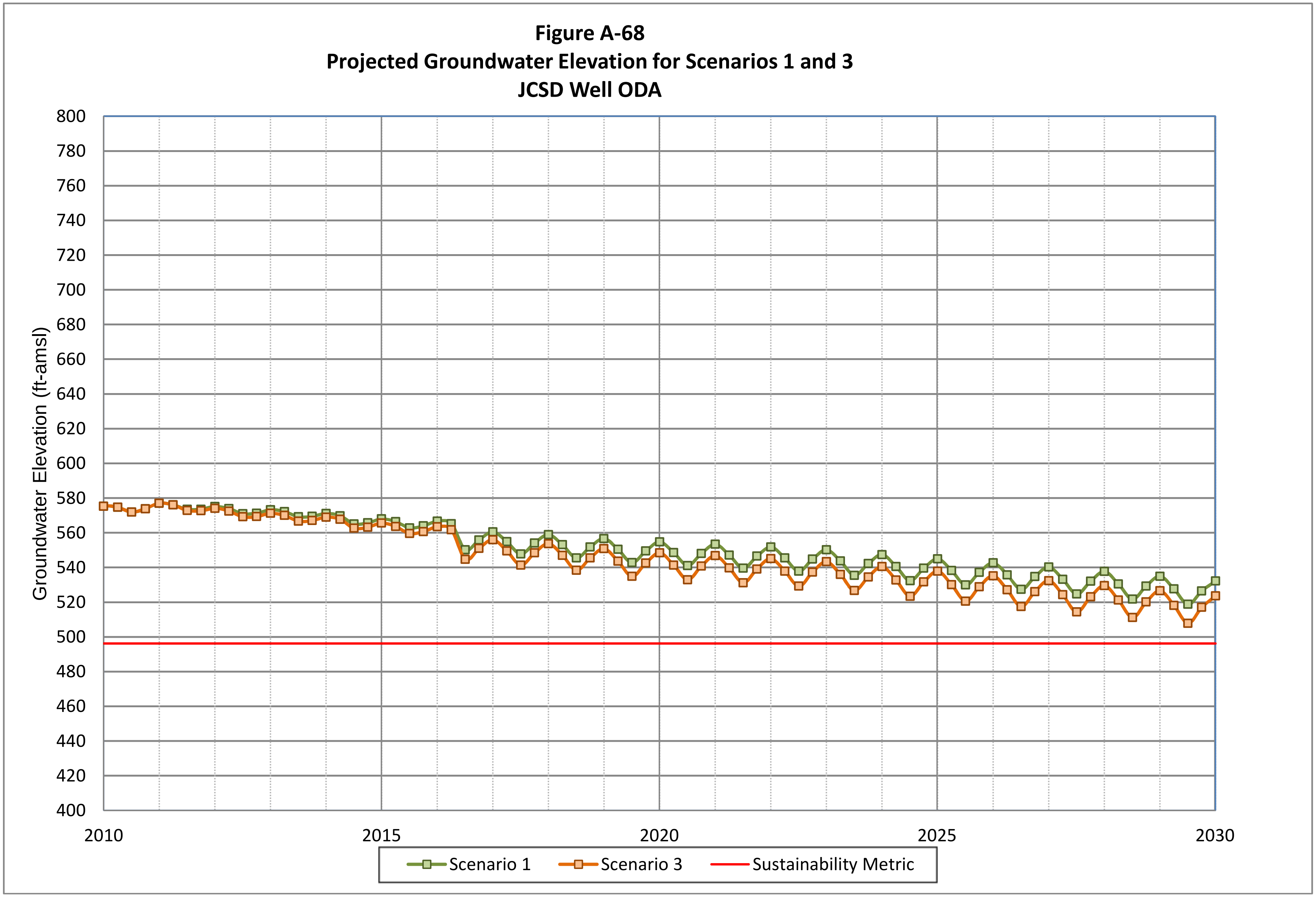

20120503_Projected_Hydrographs.xlsx

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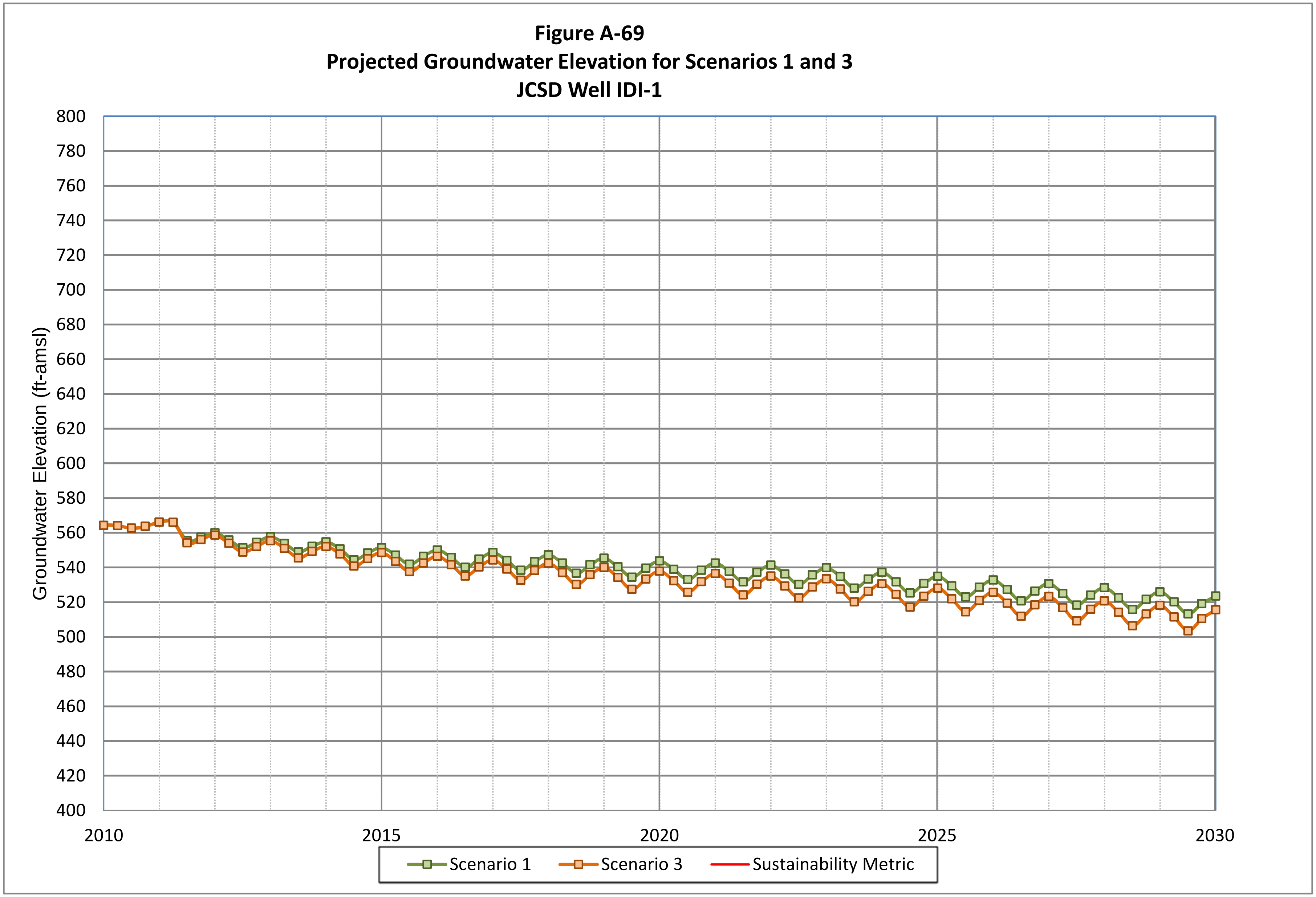
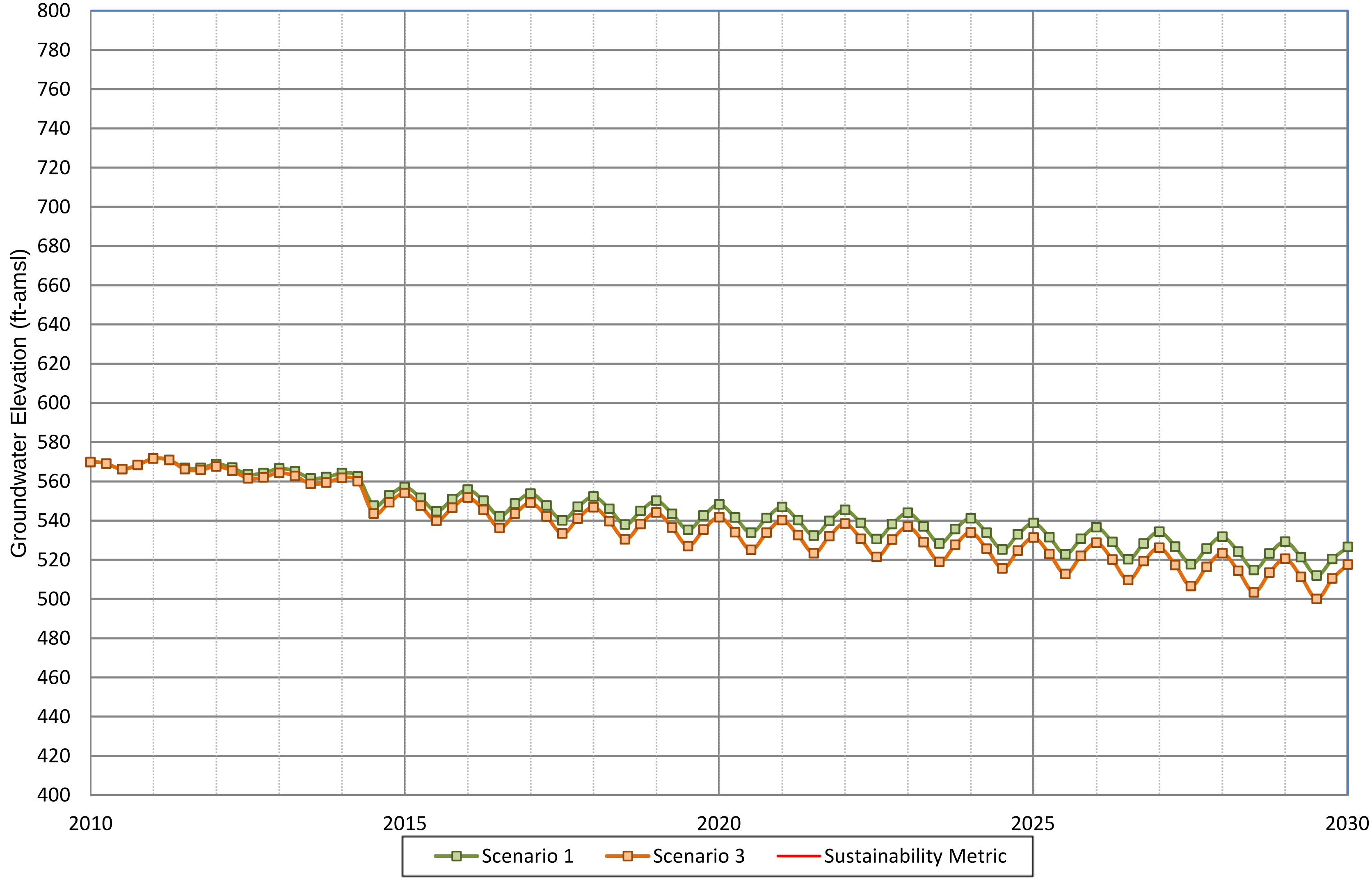


20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

Figure A-70
Projected Groundwater Elevation for Scenarios 1 and 3
JCSD Well IDI-2



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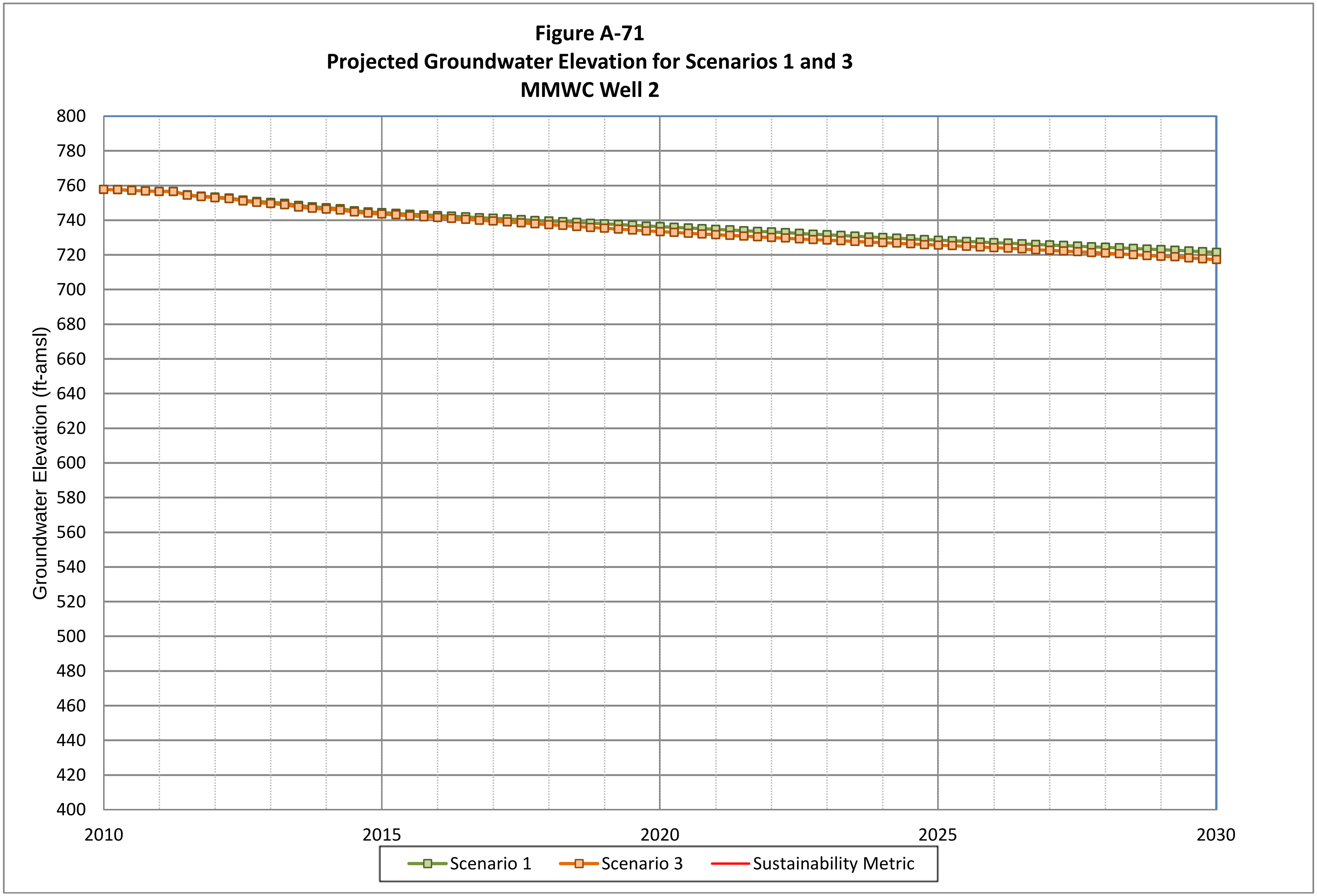
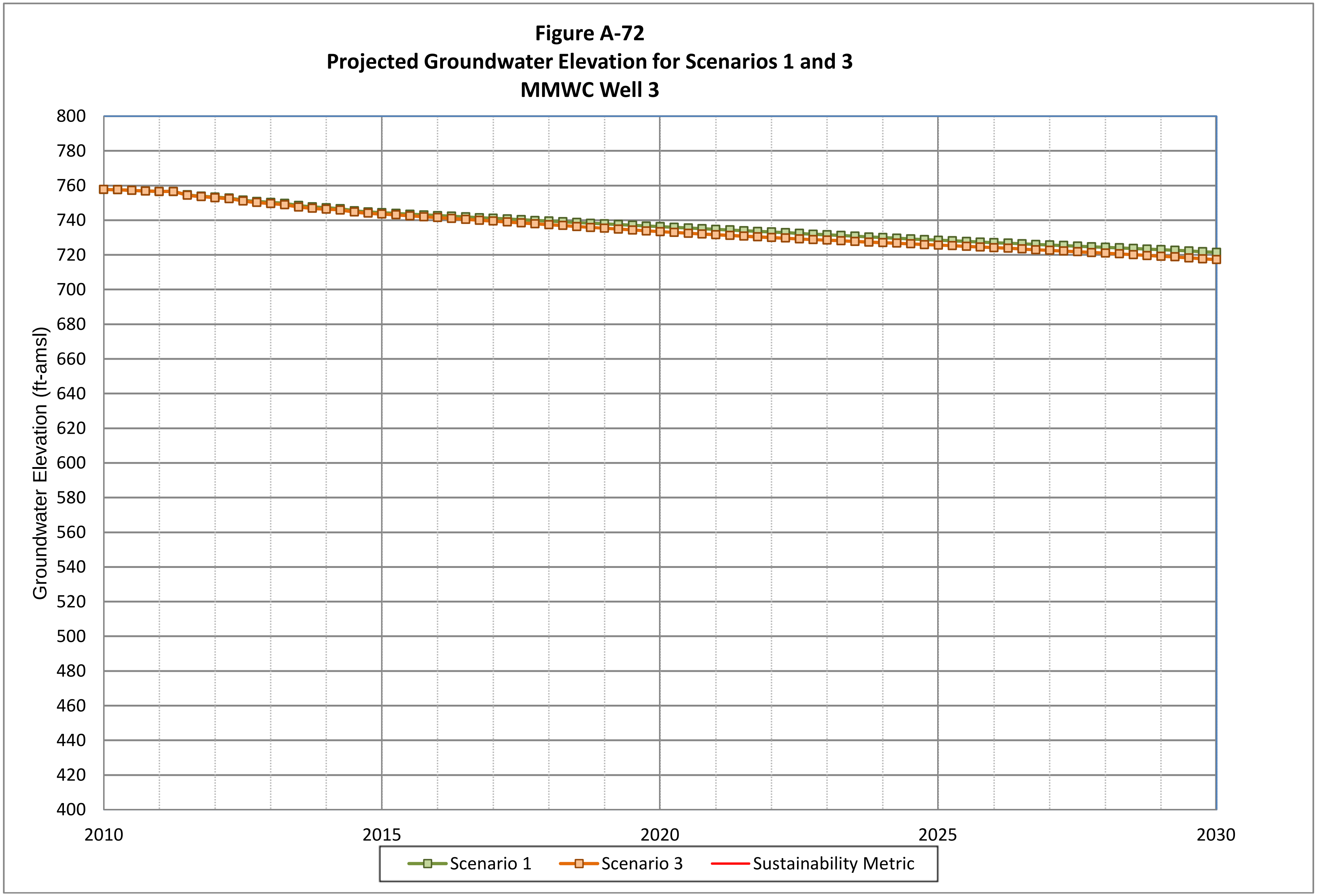


20120503_Projected_Hydrographs.xlsx



20120503_Projected_Hydrographs.xlsx

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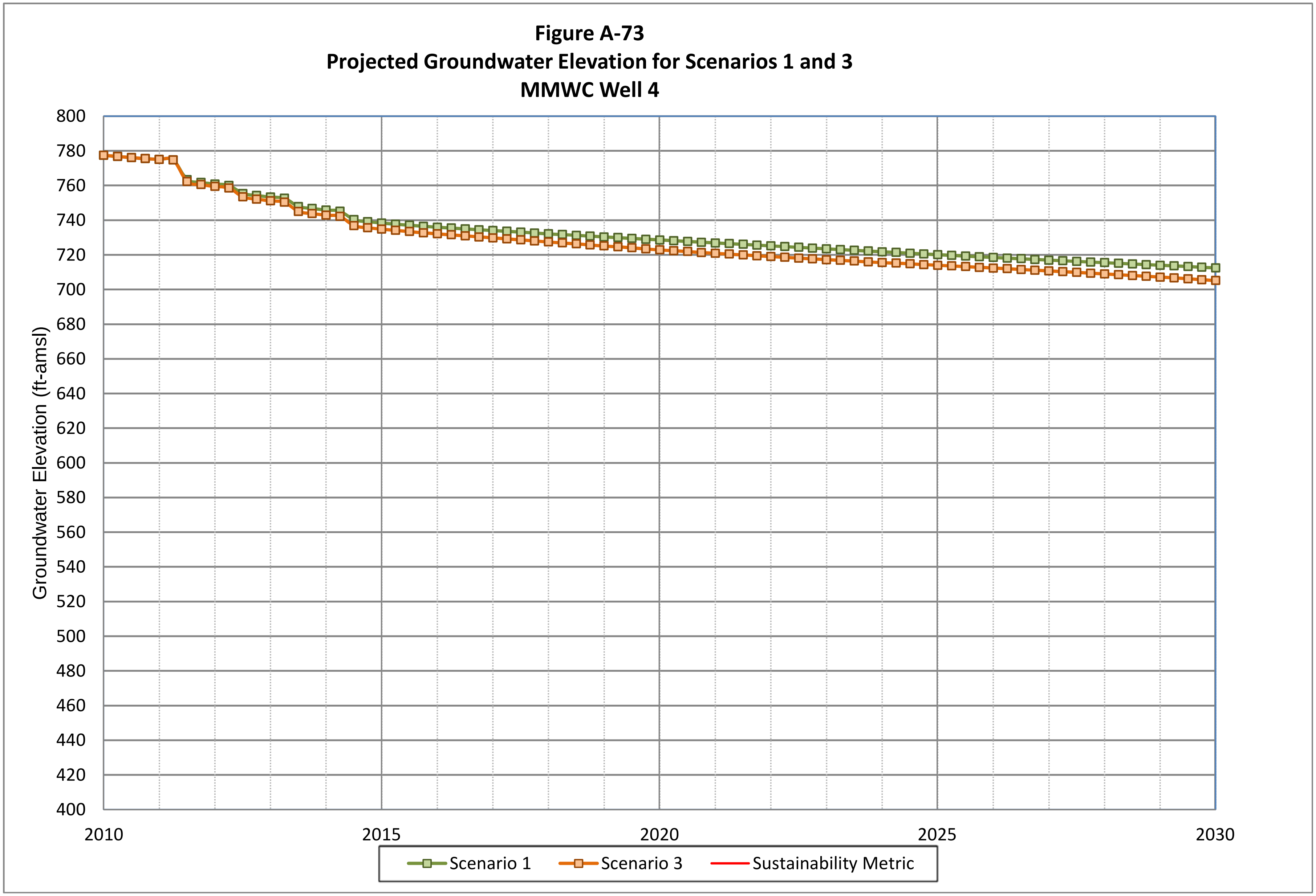

20120503_Projected_Hydrographs.xlsx

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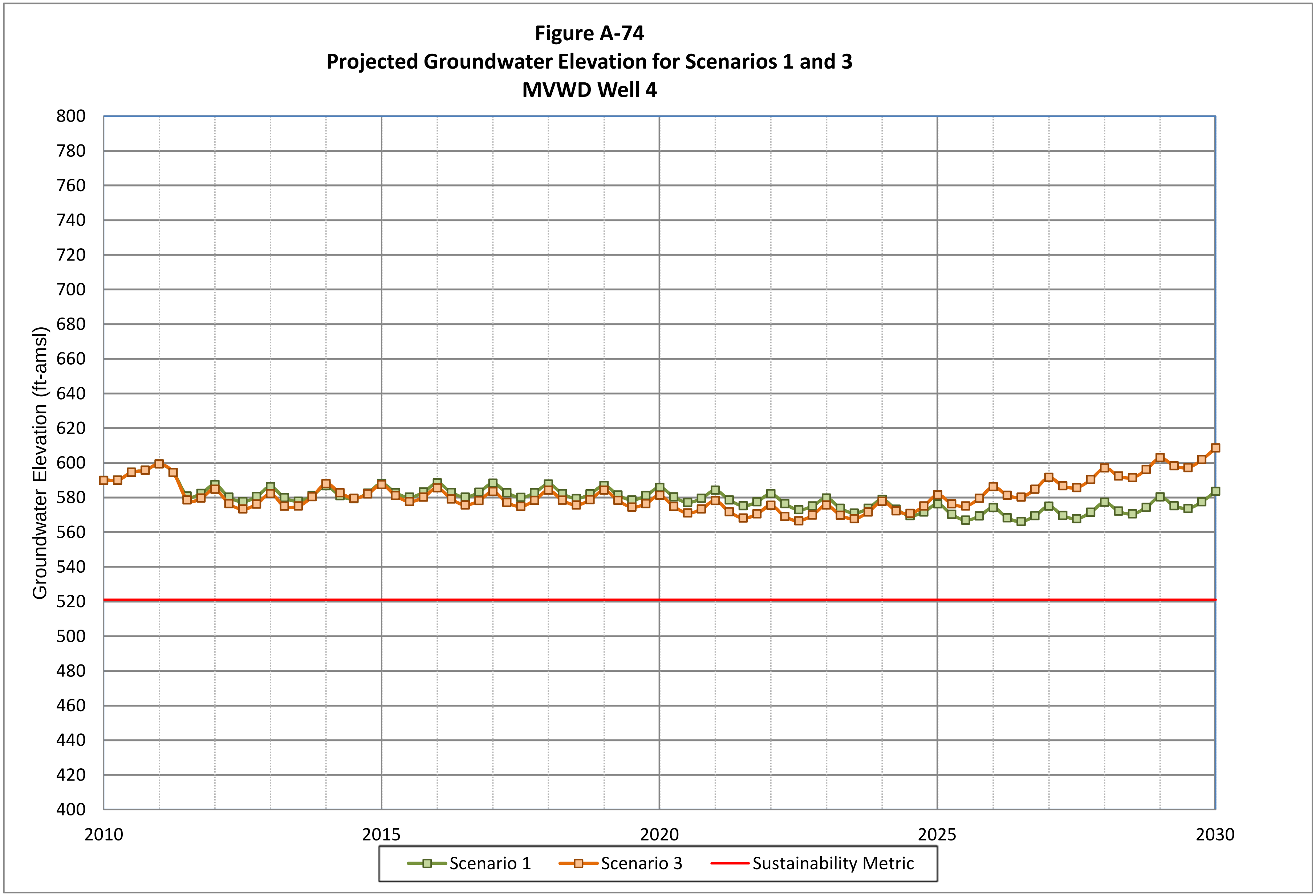
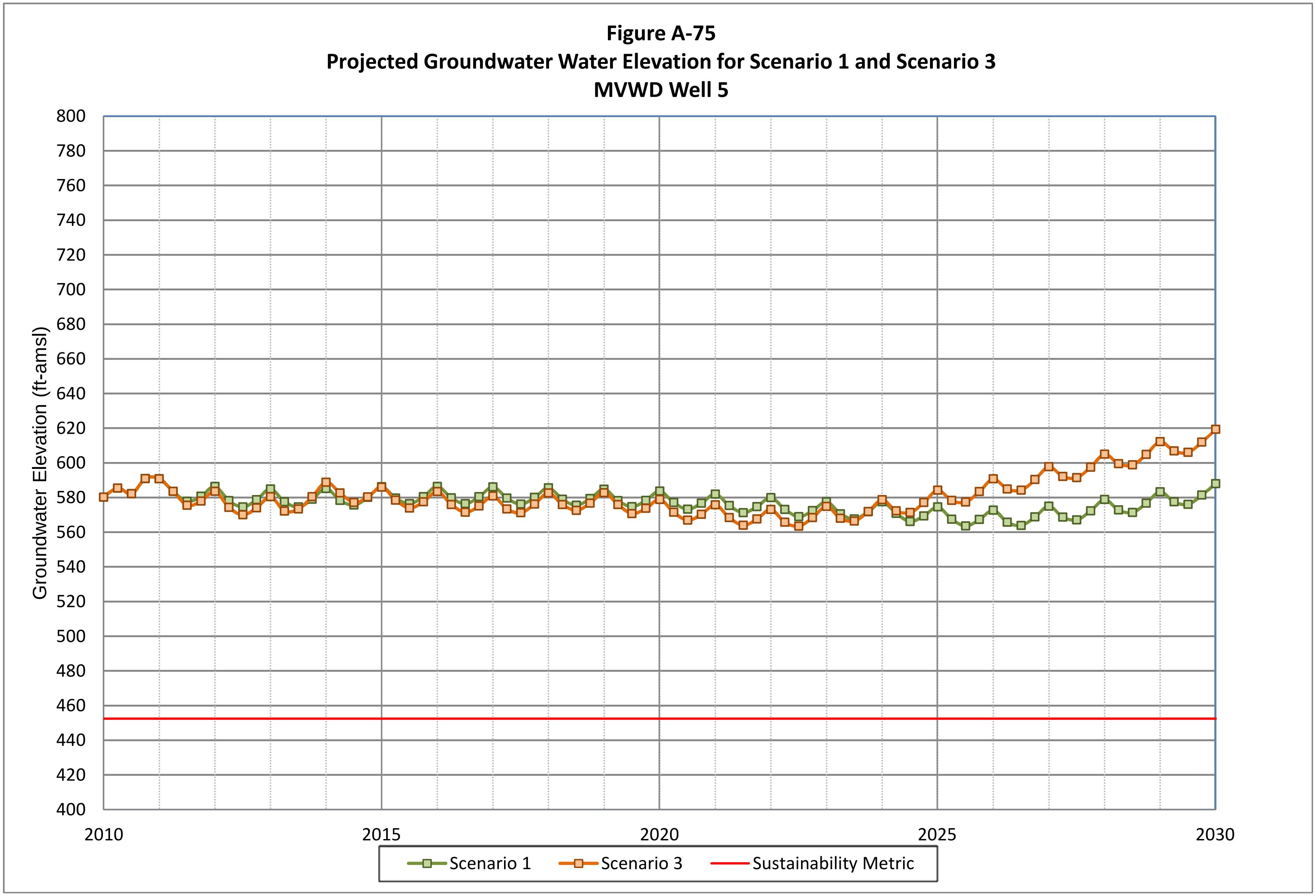
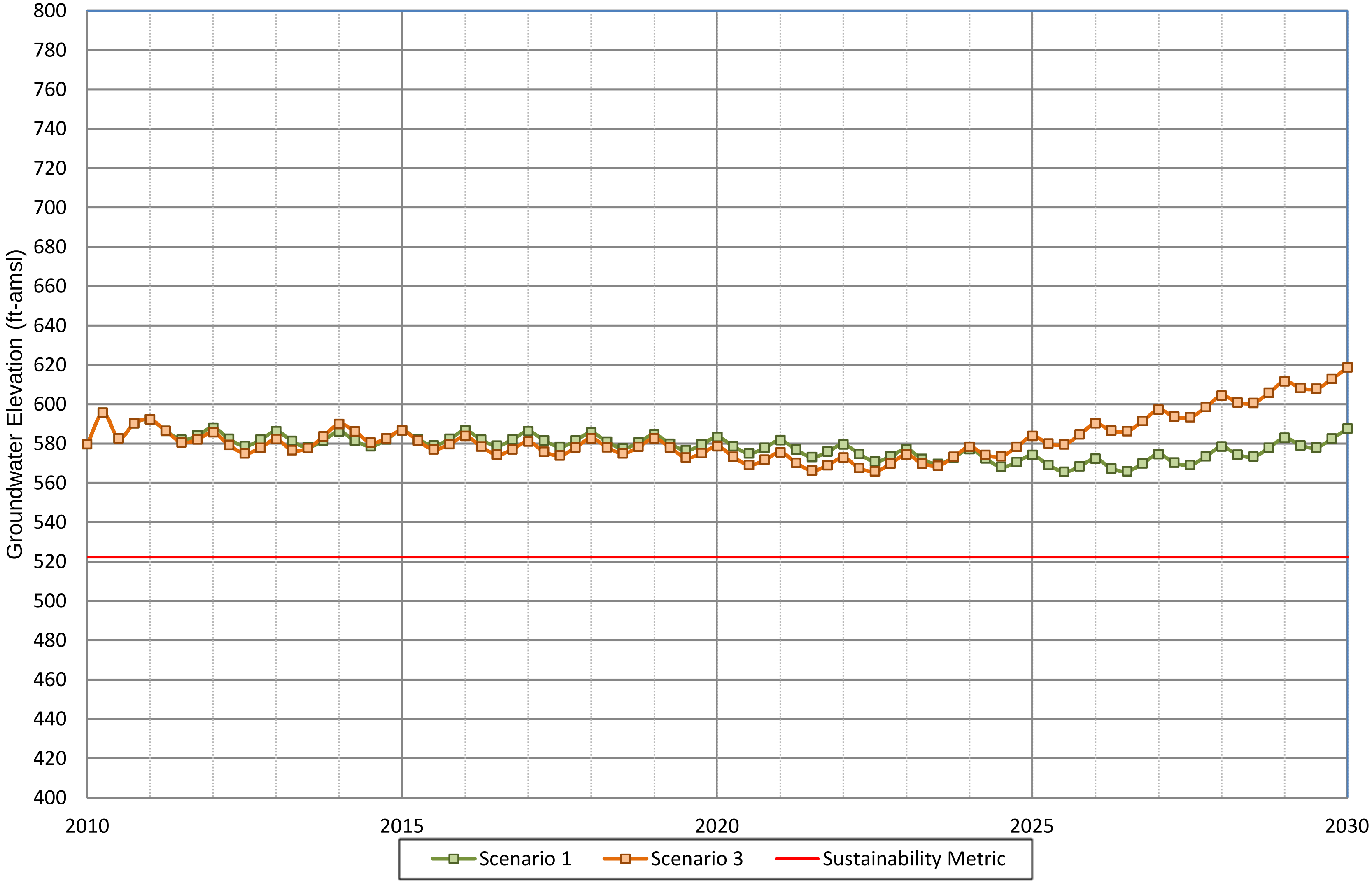


Figure A-74
Projected Groundwater Elevation for Scenarios 1 and 3
MVWD Well 4
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



20120503_Projected_Hydrographs.xlsx

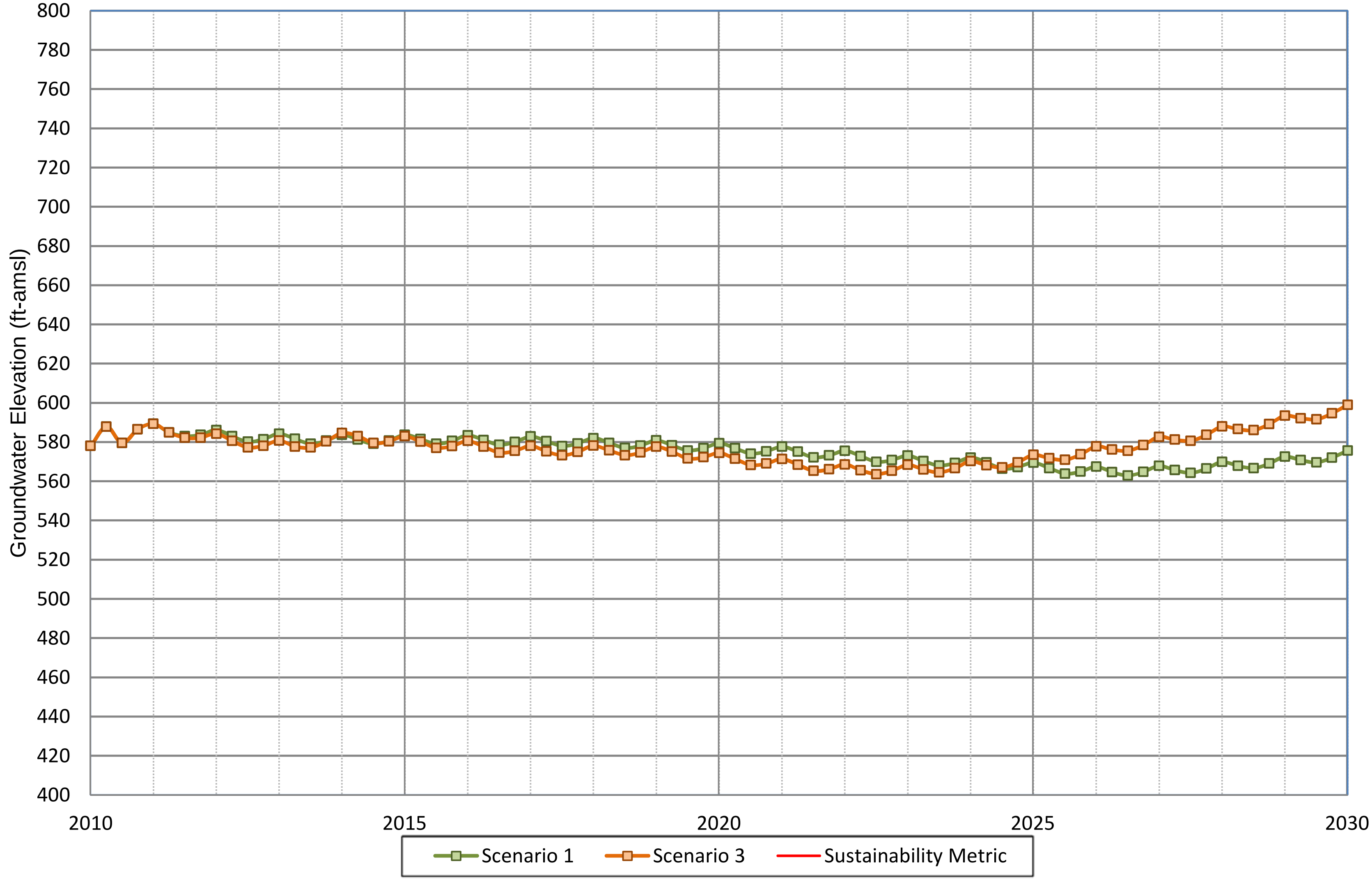
Figure A-76
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
MVWD Well 6



20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

Figure A-77
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
MVWD Well 10



20120503_Projected_Hydrographs.xlsx

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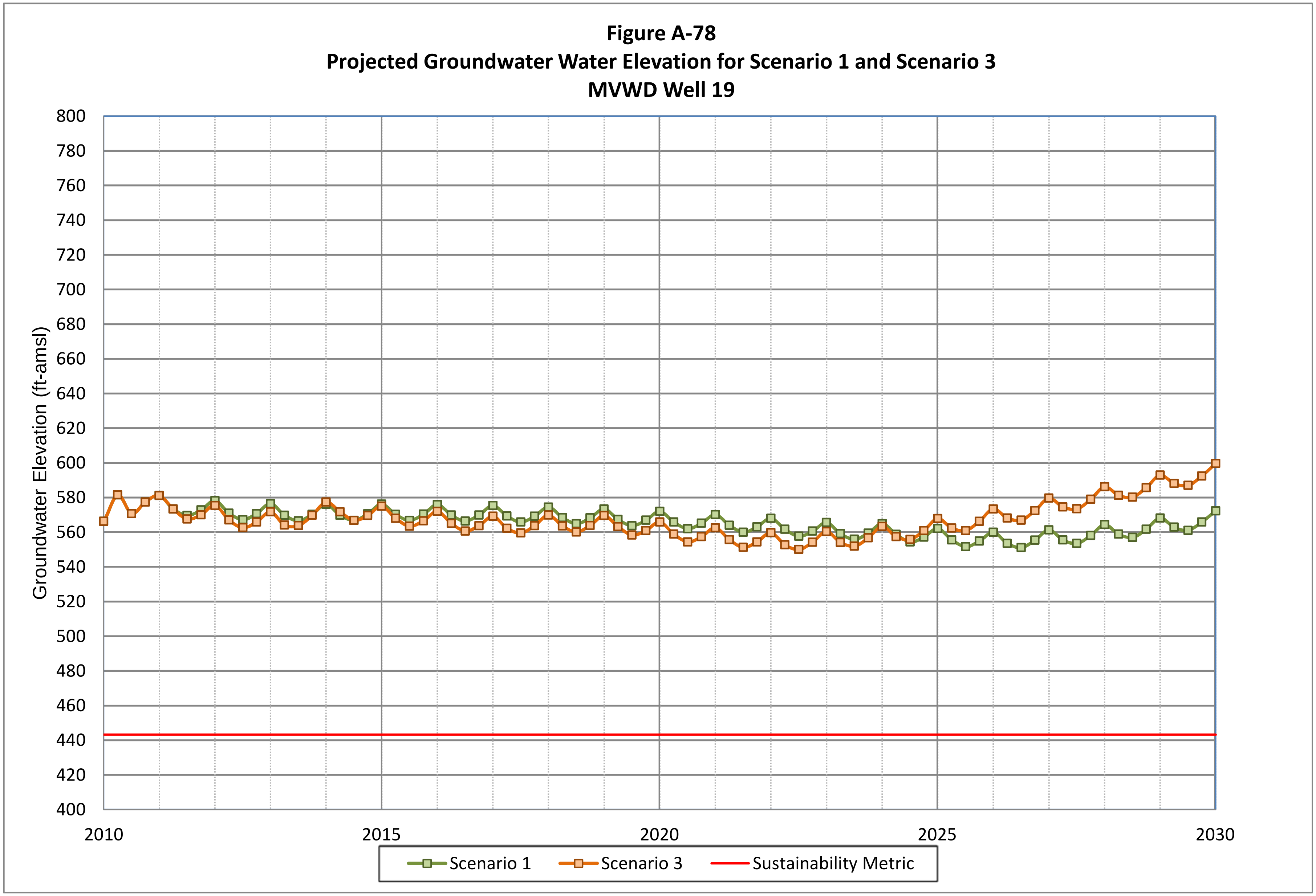


20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

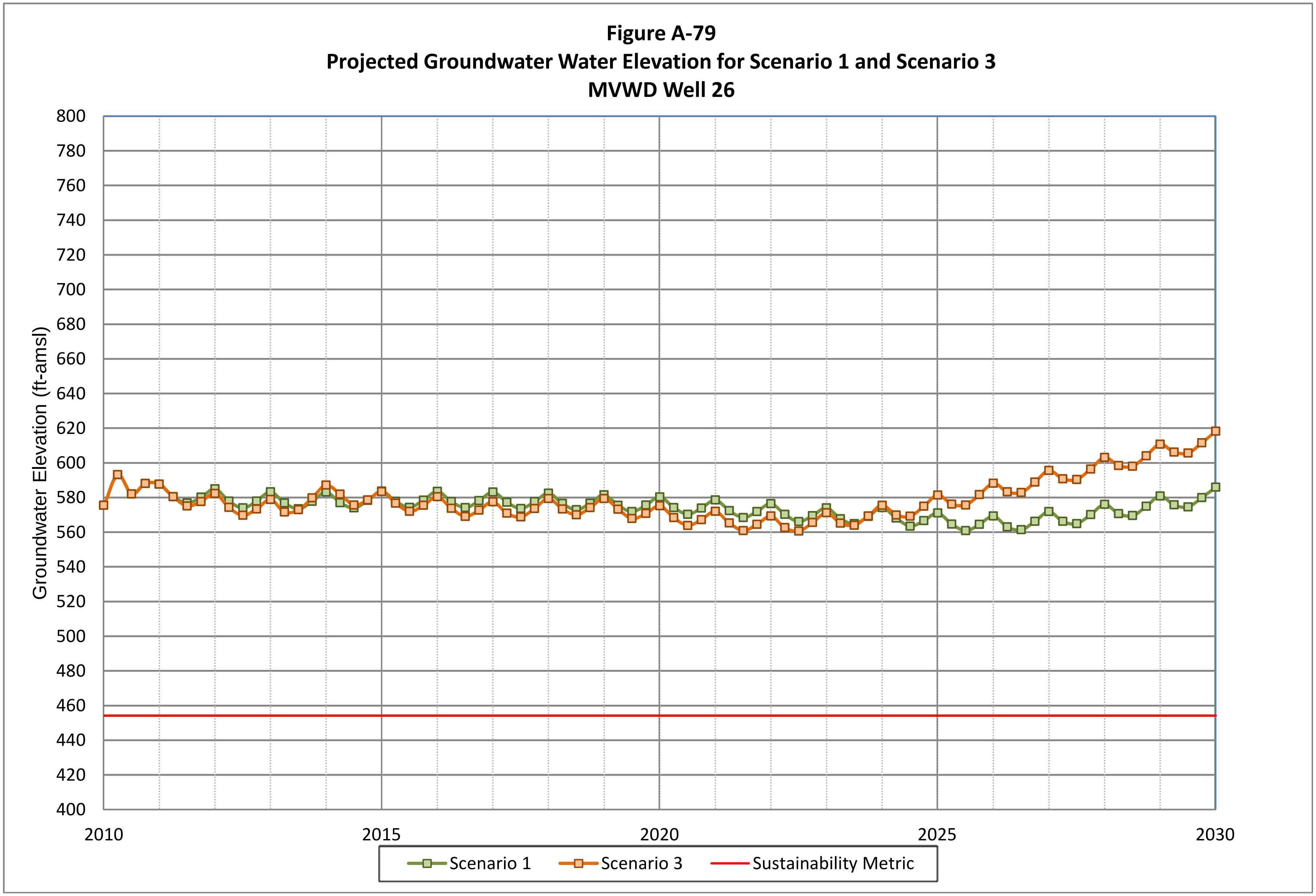
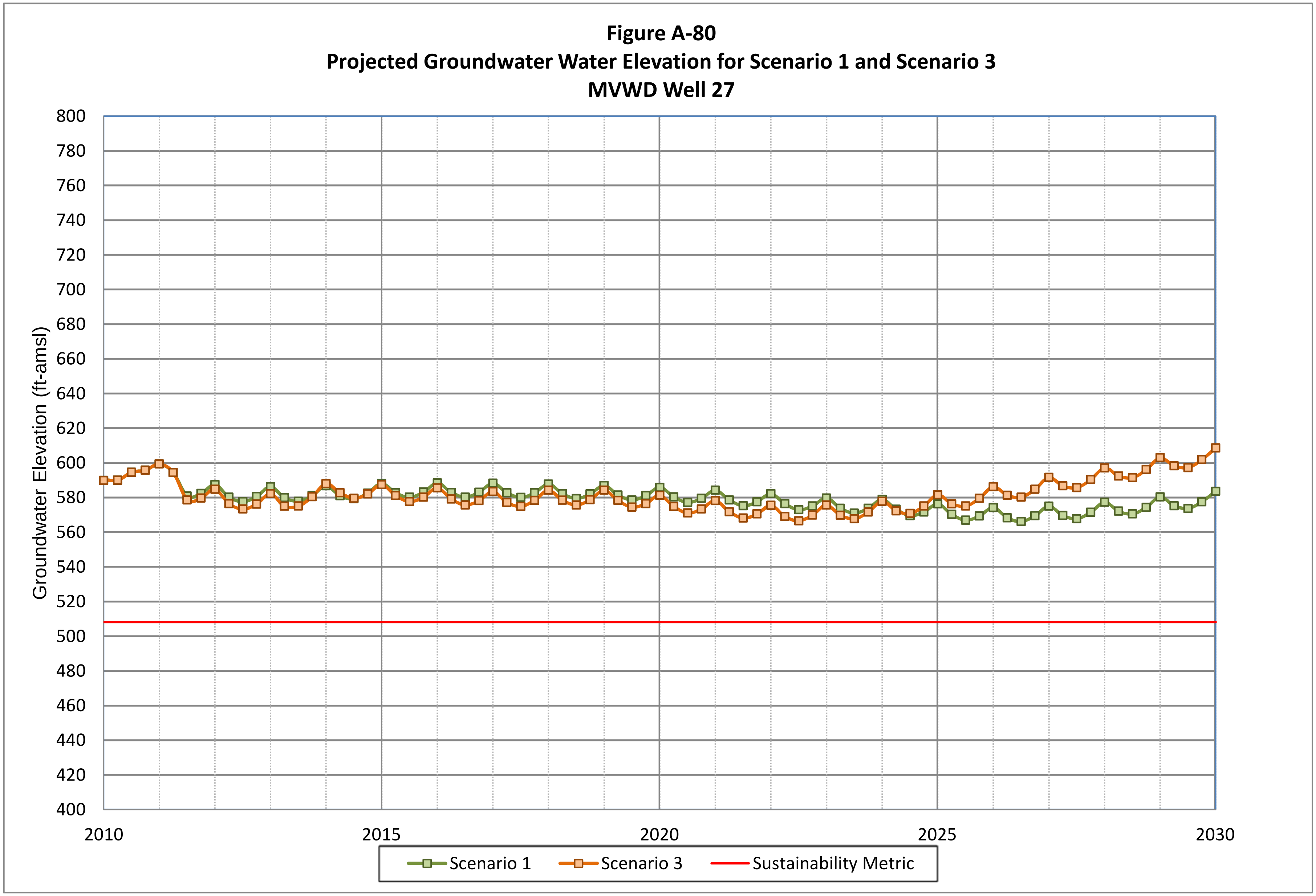


Figure A-79
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
MVWD Well 26
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



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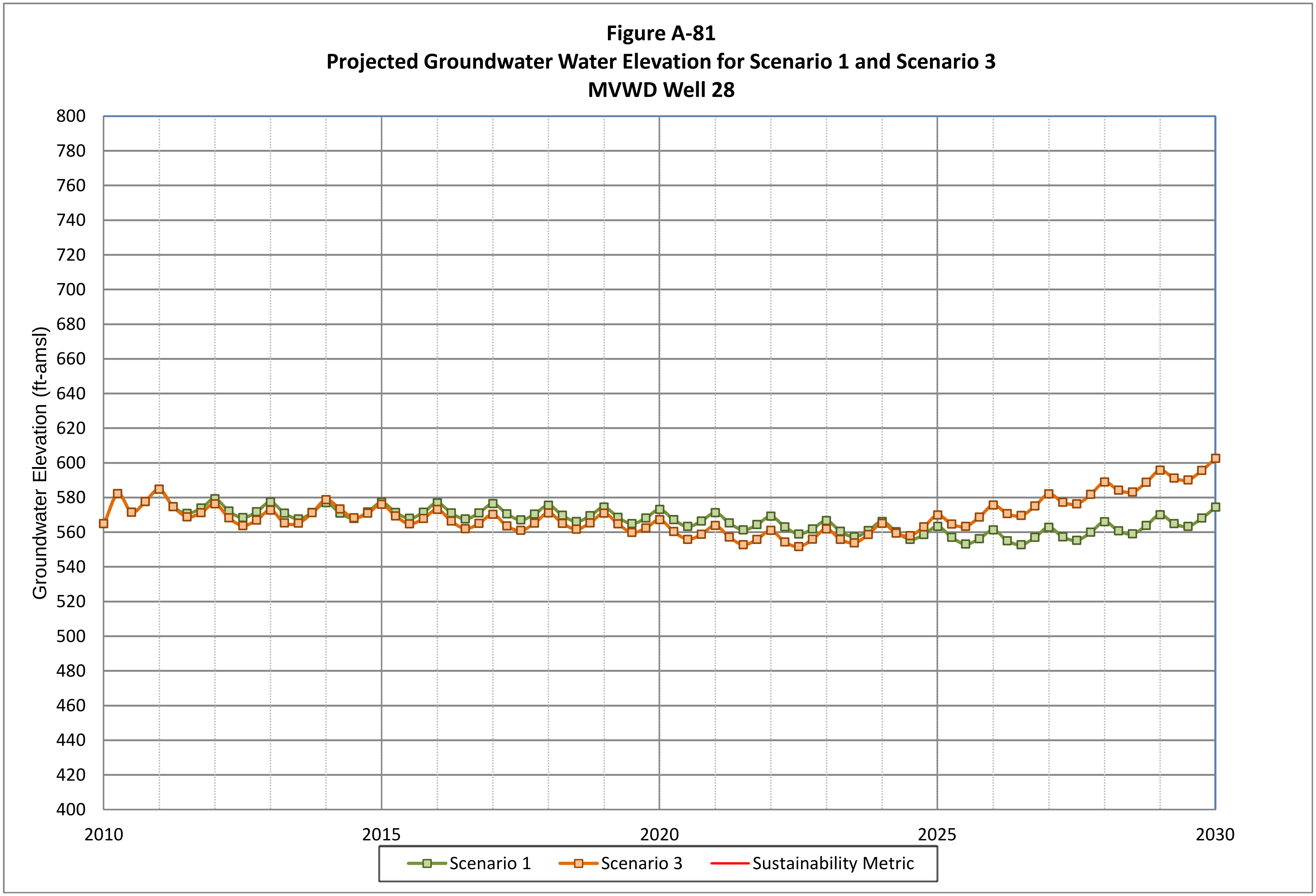

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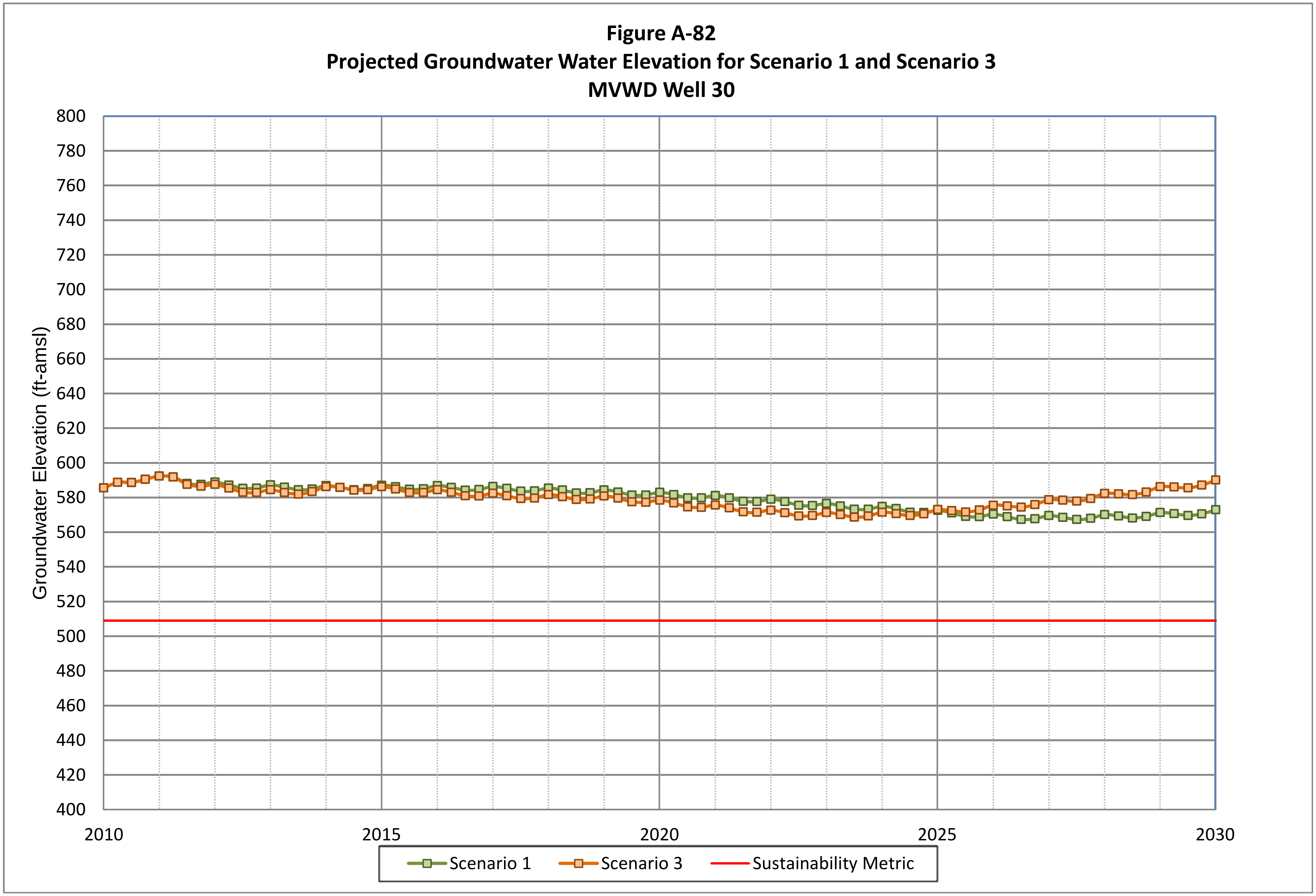

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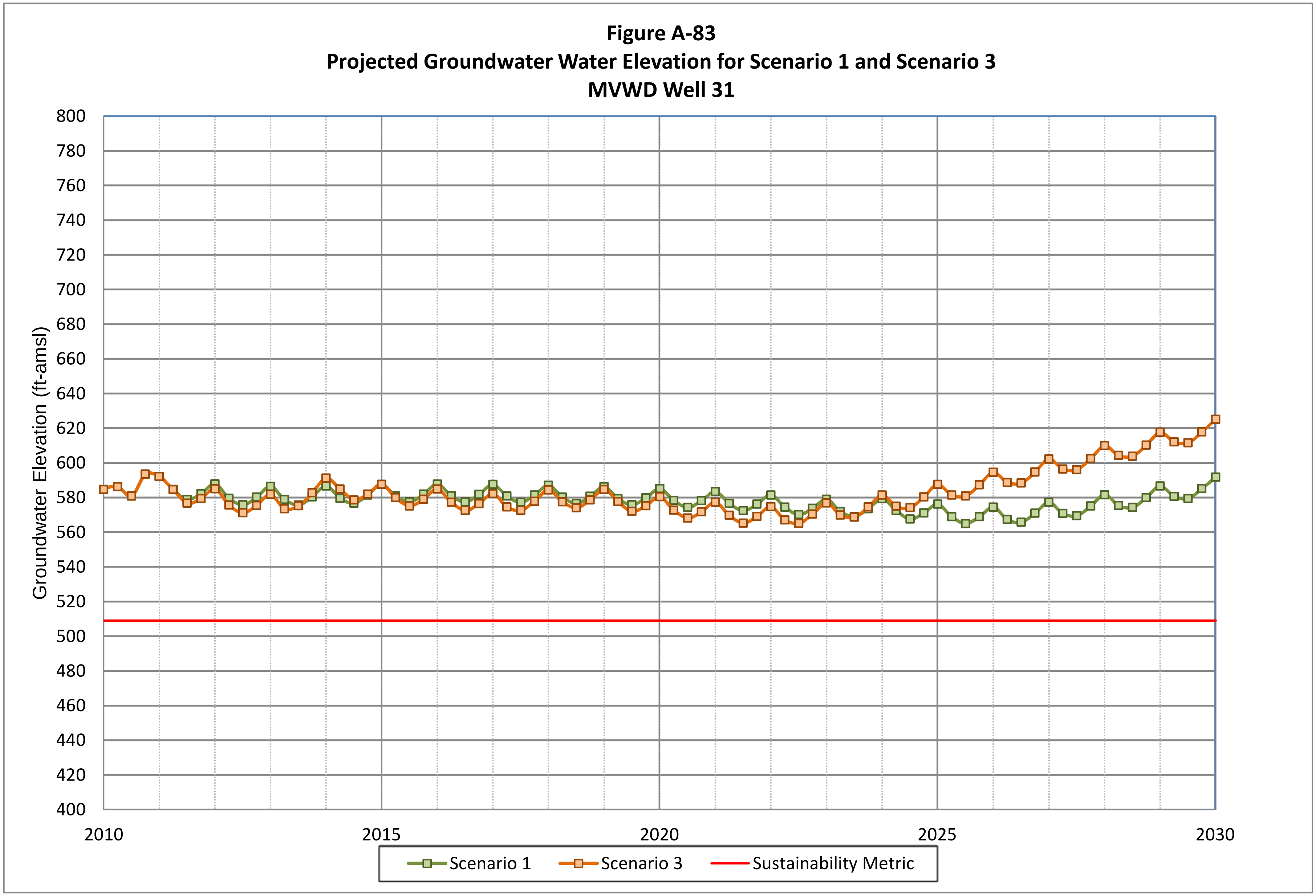

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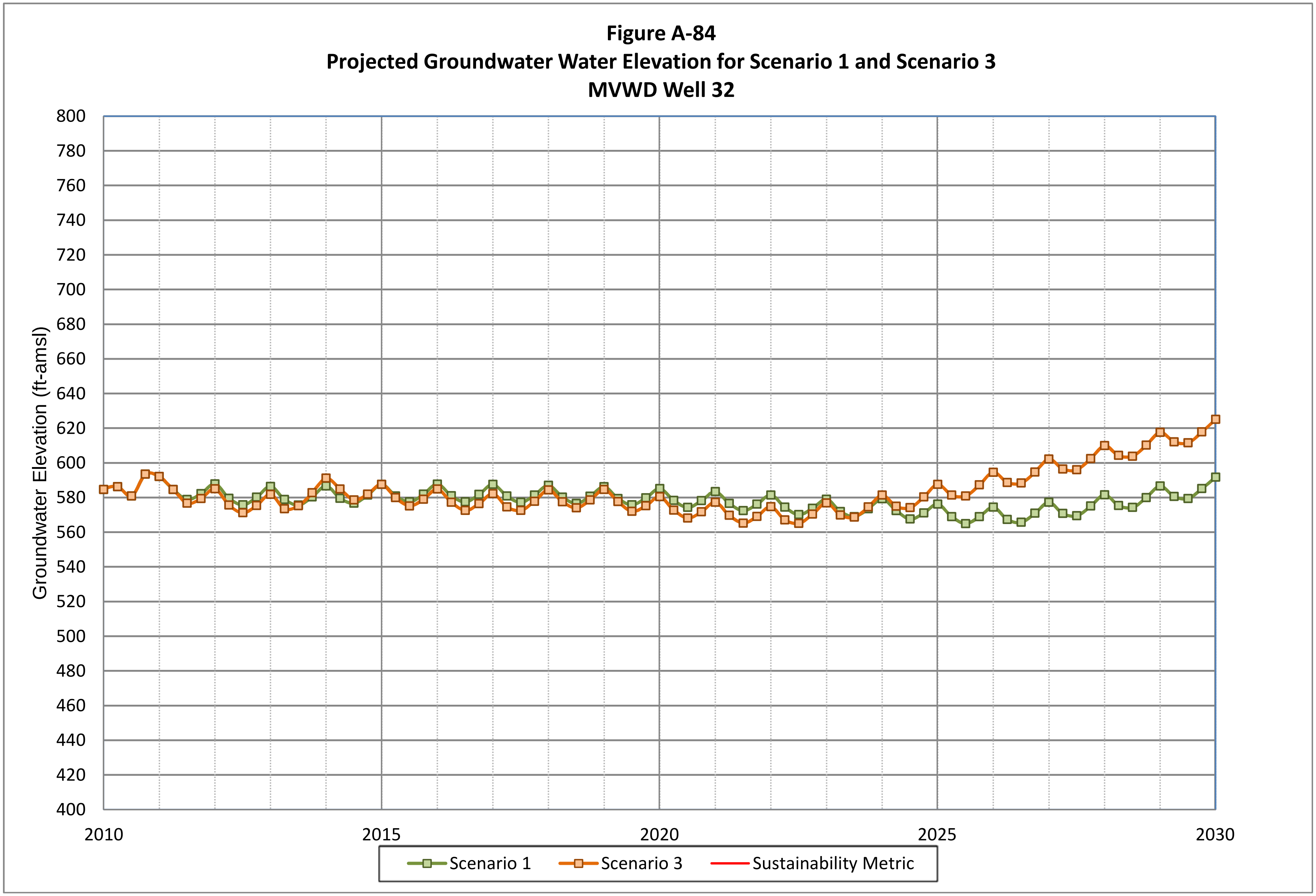

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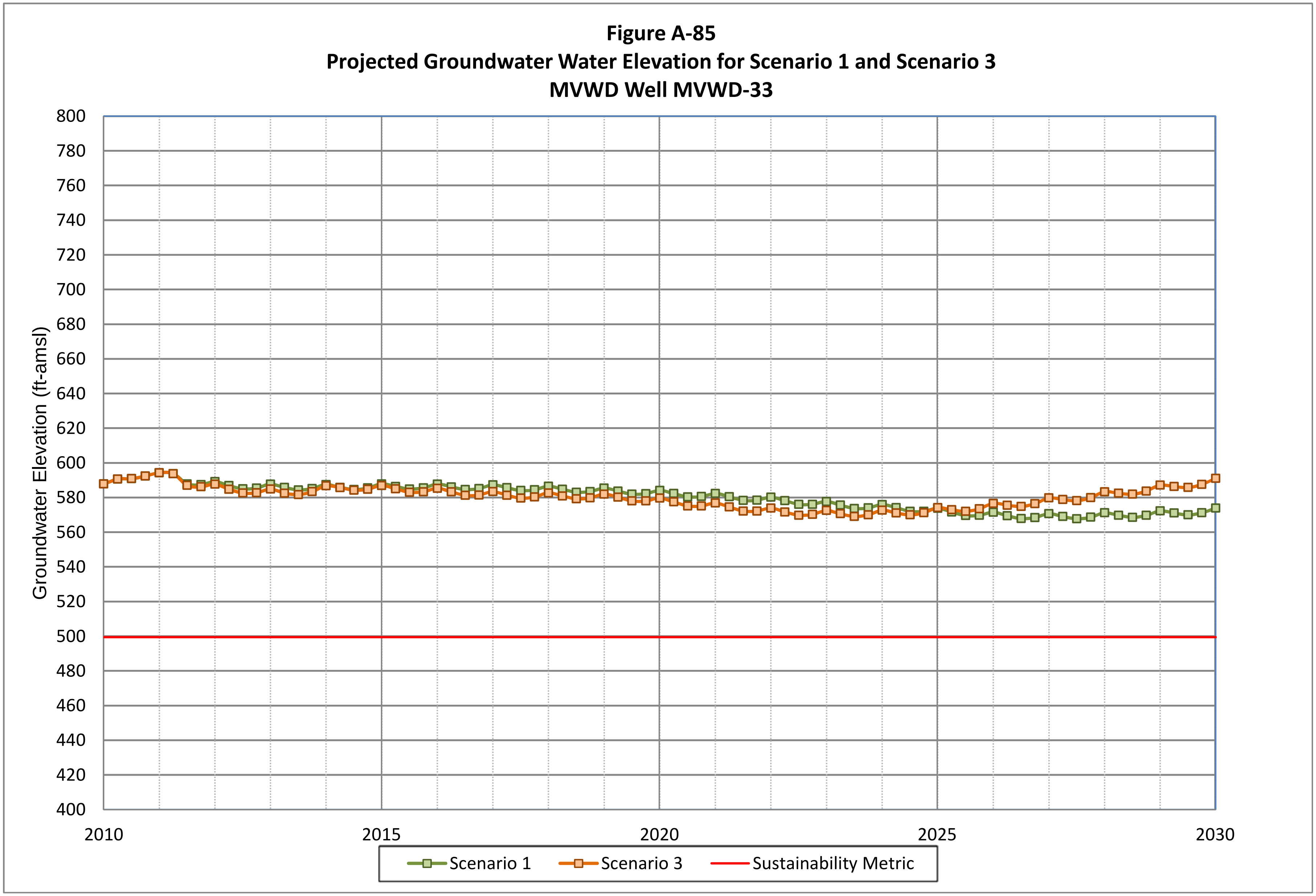

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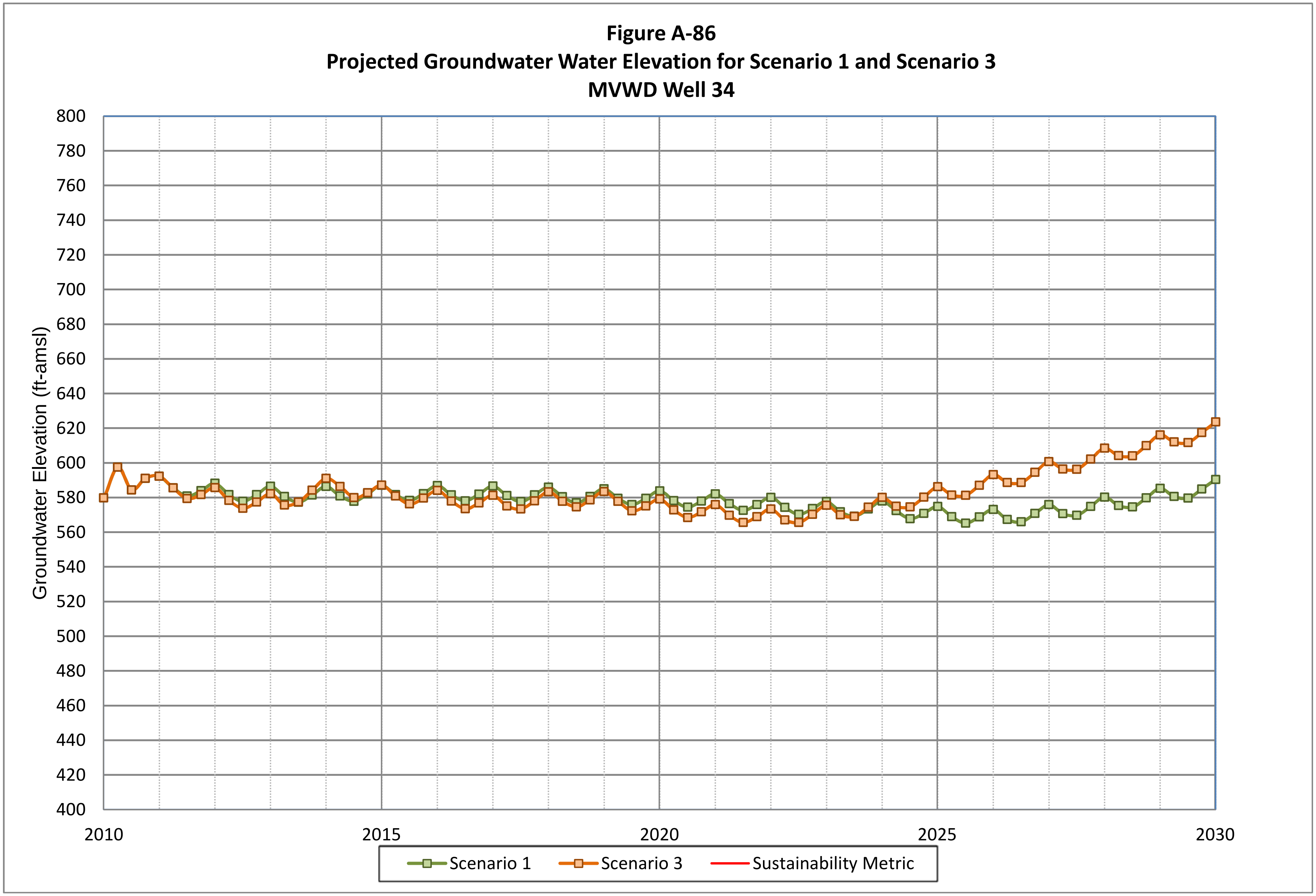
WILDERMUTH ENVIRONMENTAL INC.



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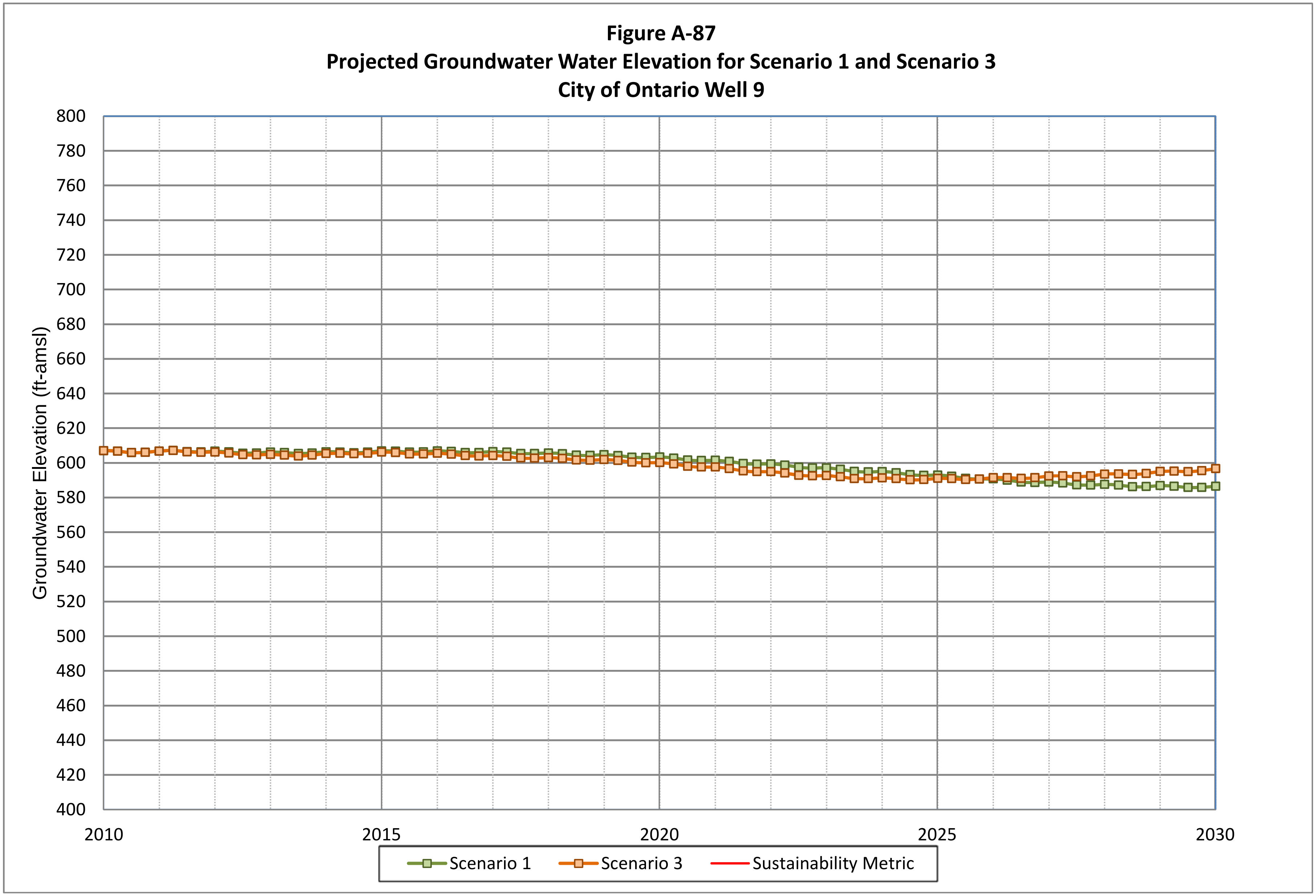
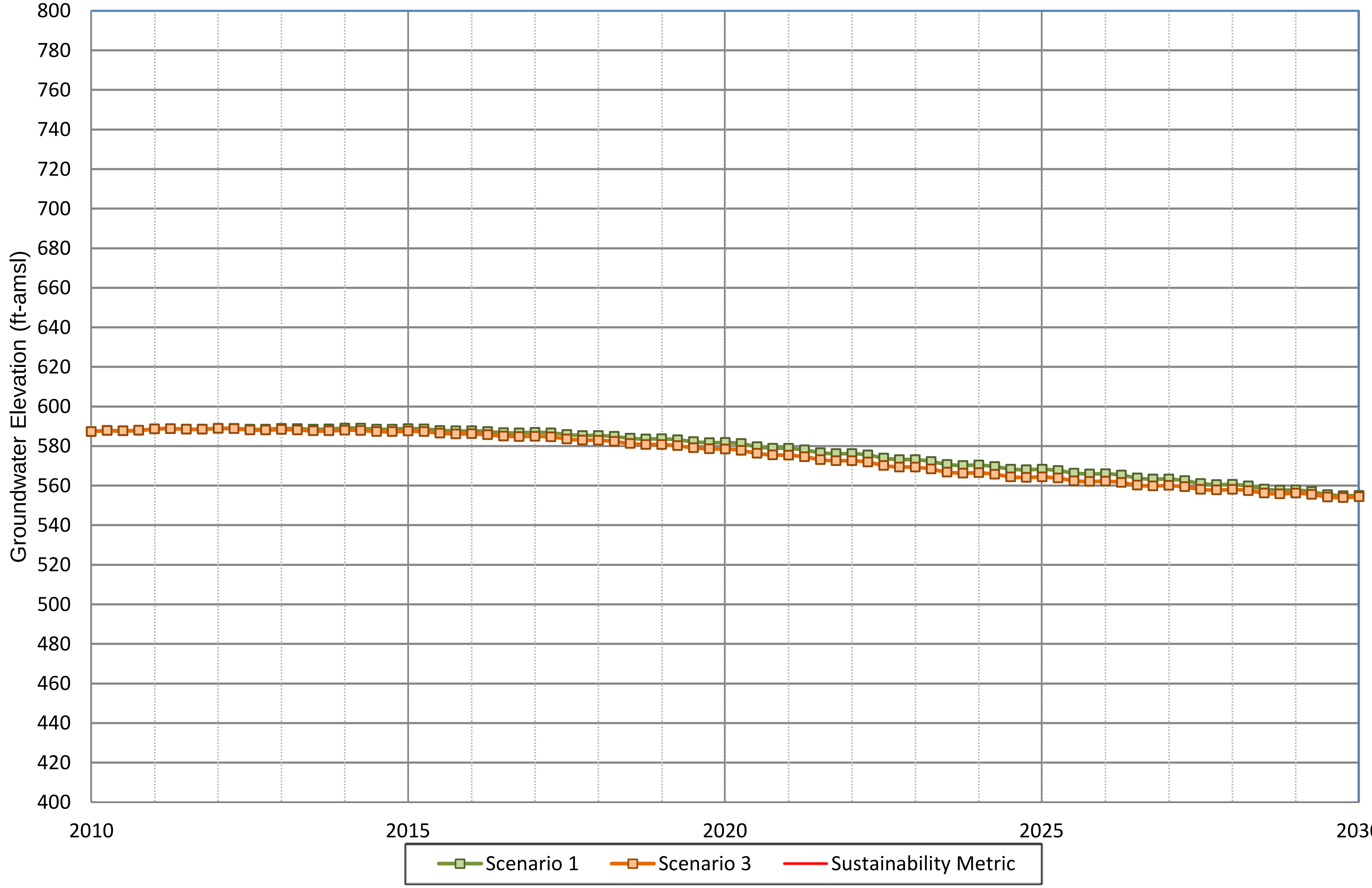


Figure A-87
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 9
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric

Figure A-88
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 16



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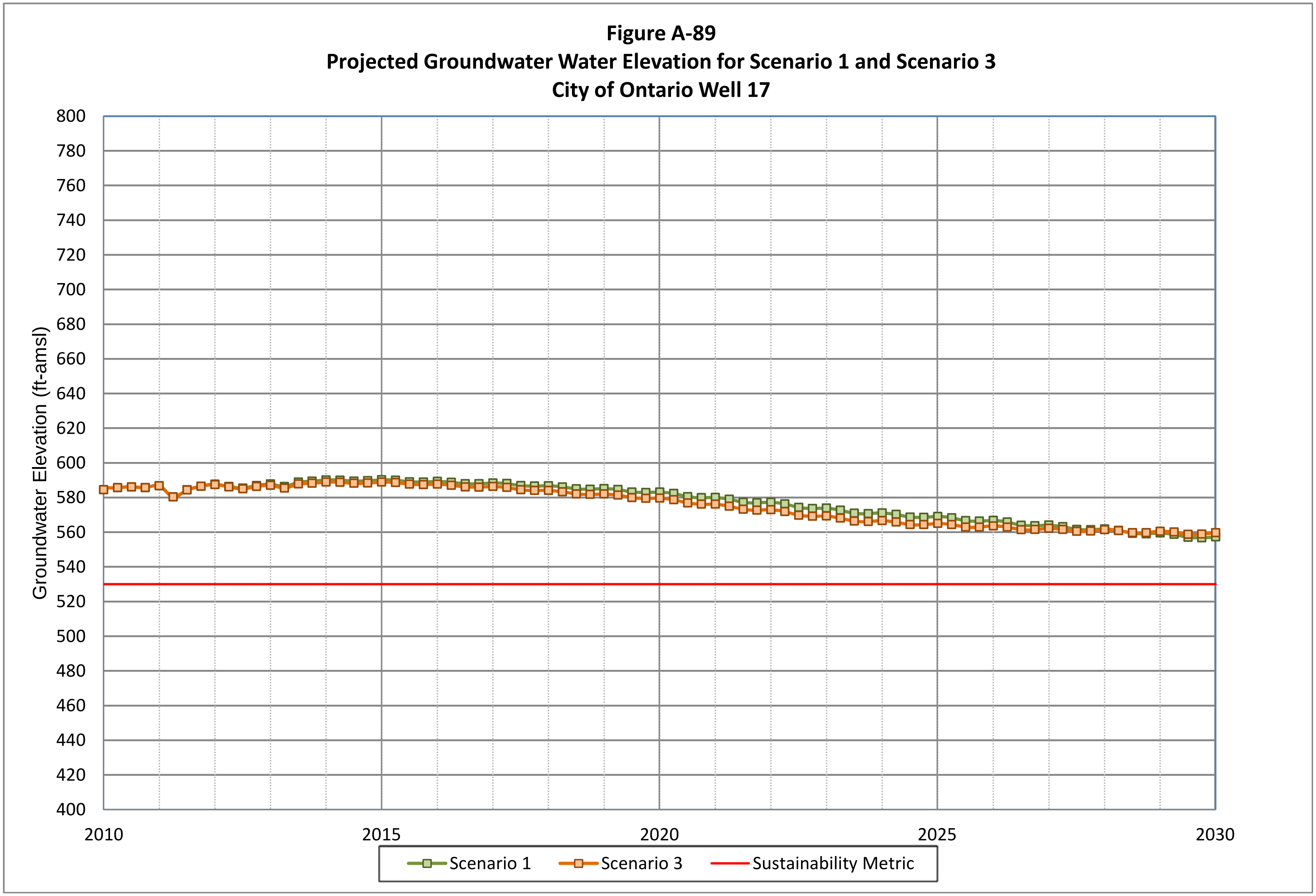

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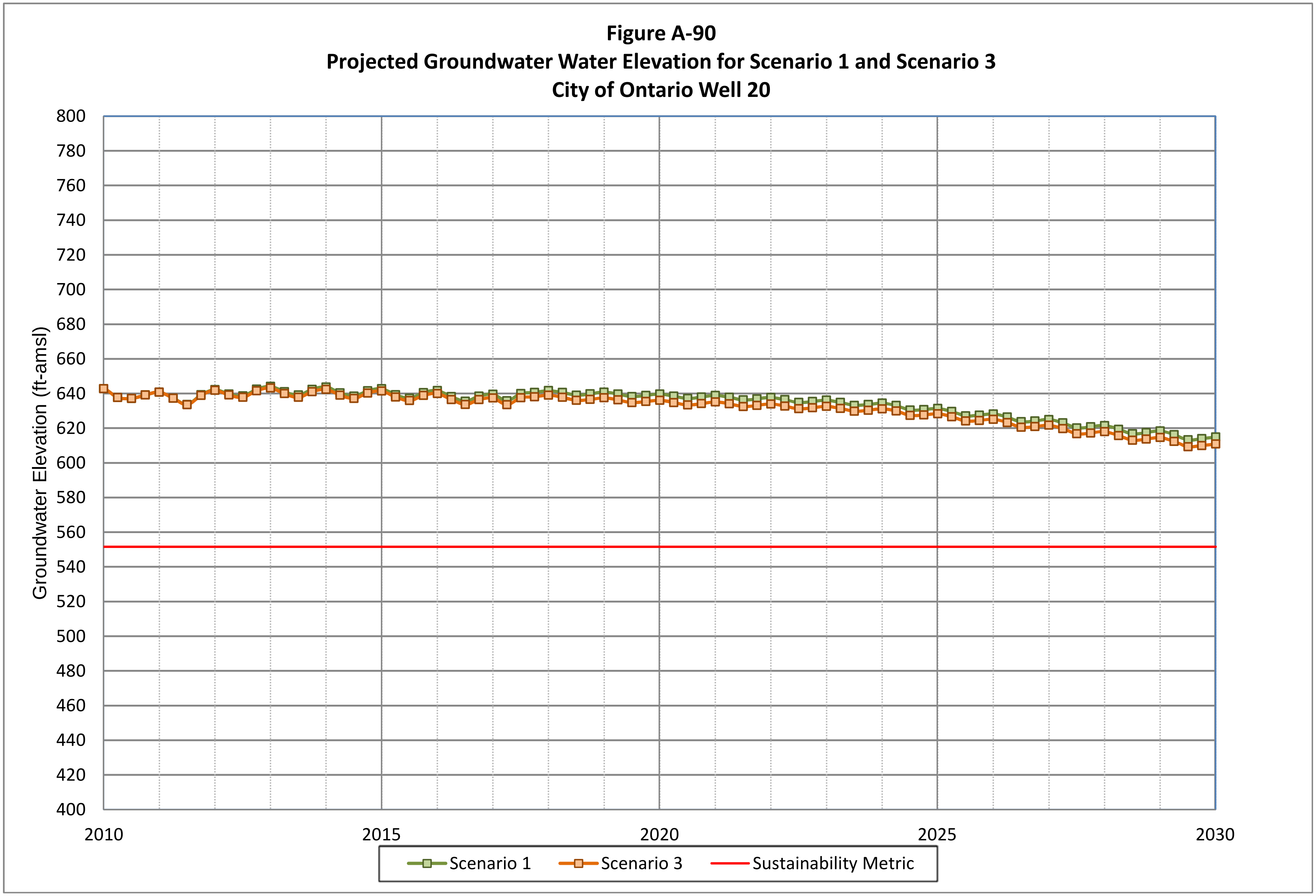

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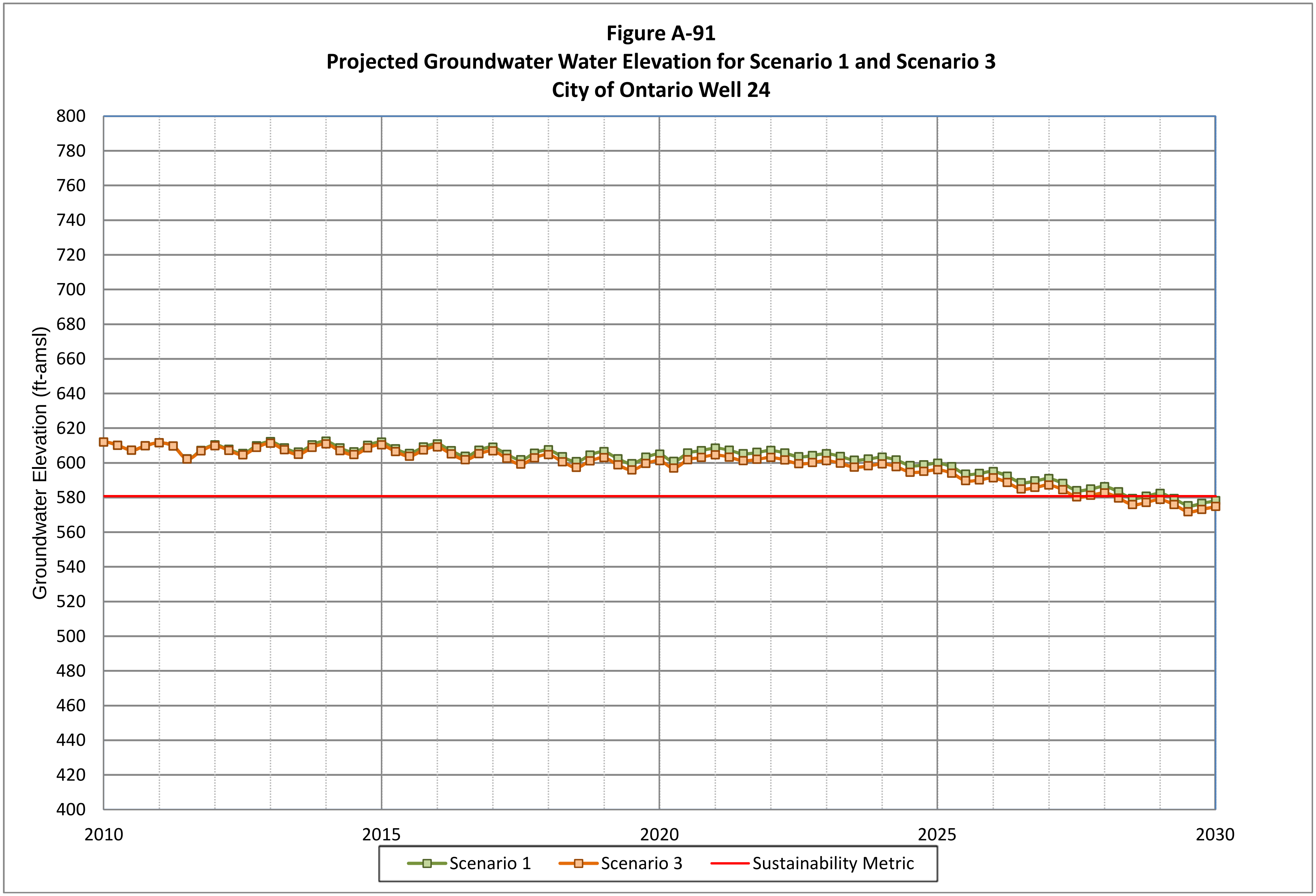
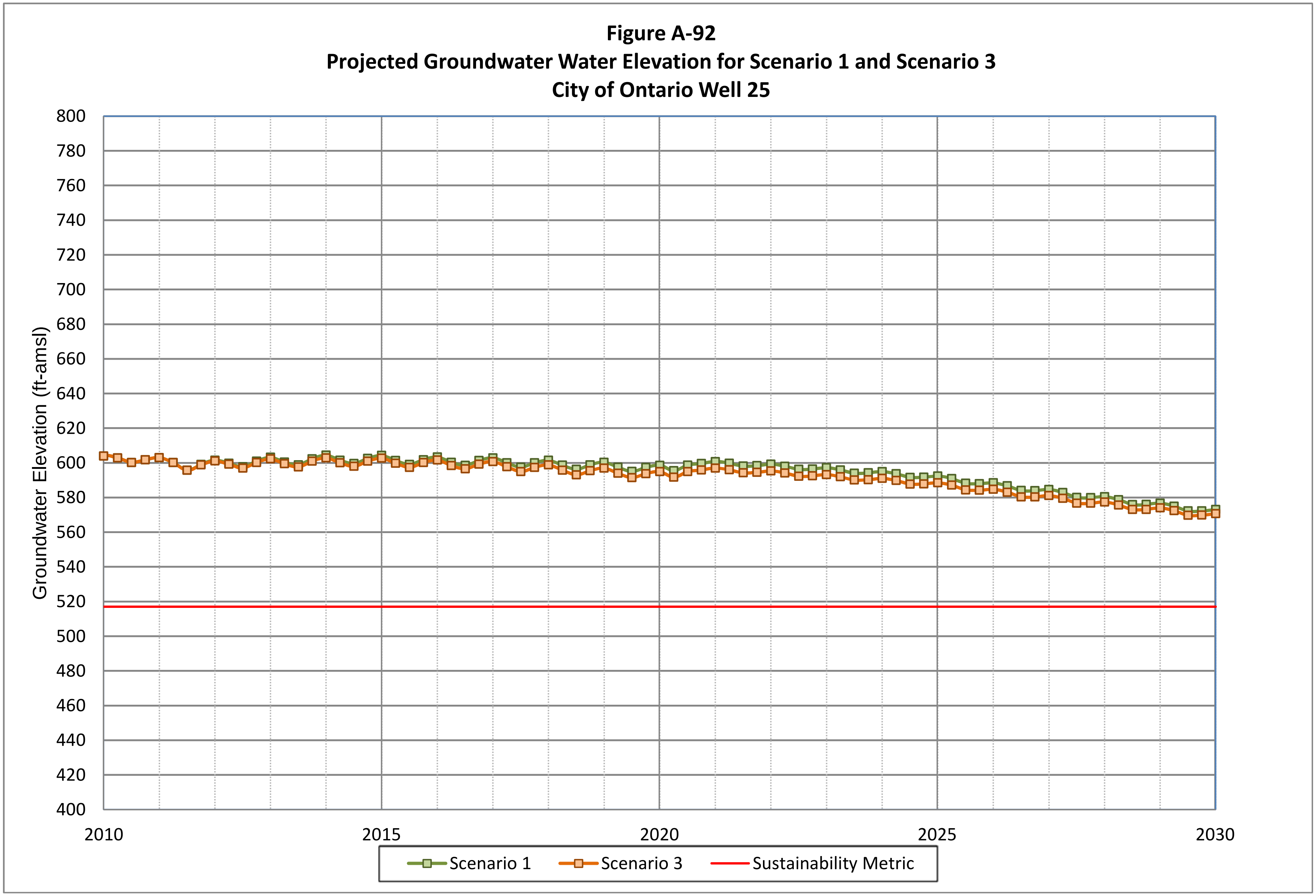
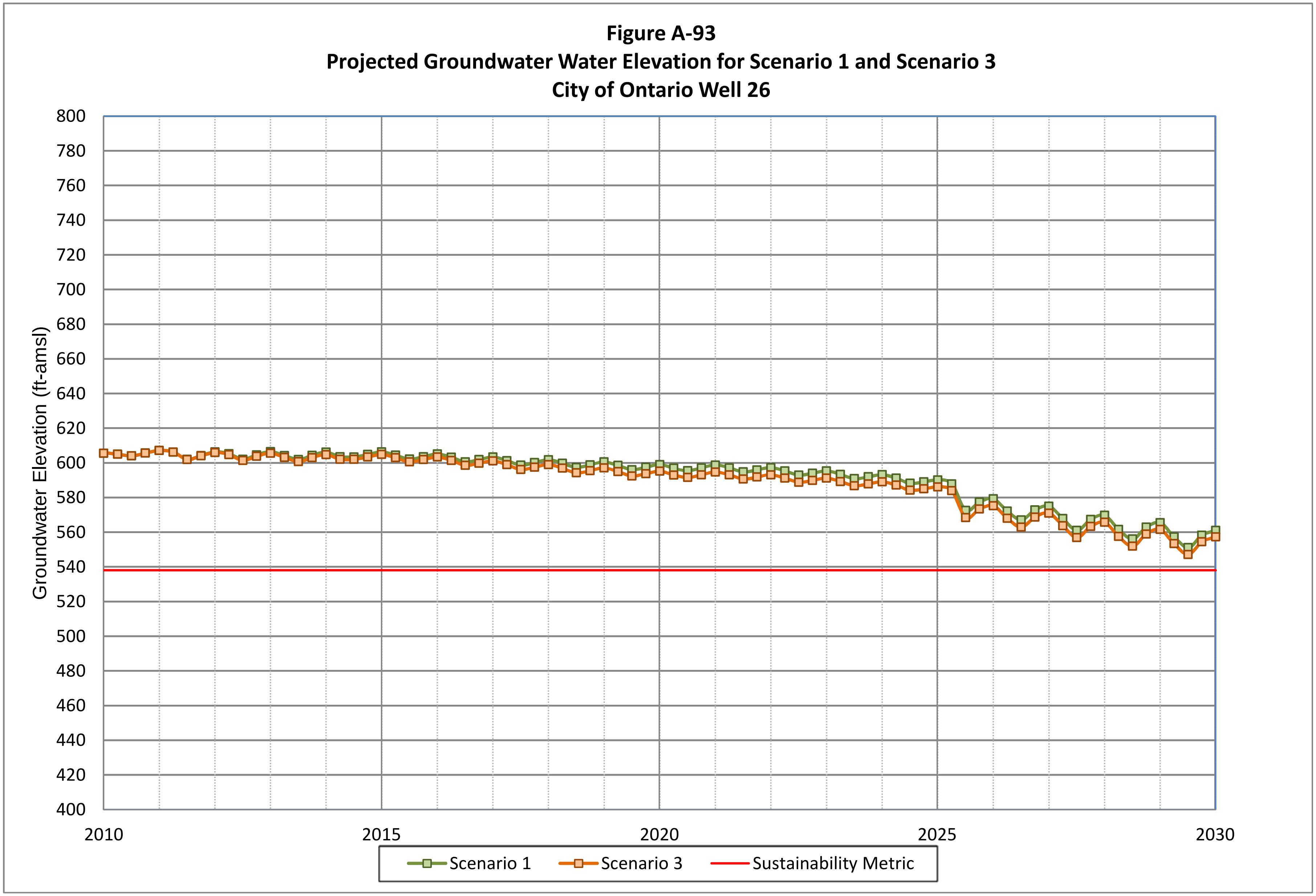


Figure A-91
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 24
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.



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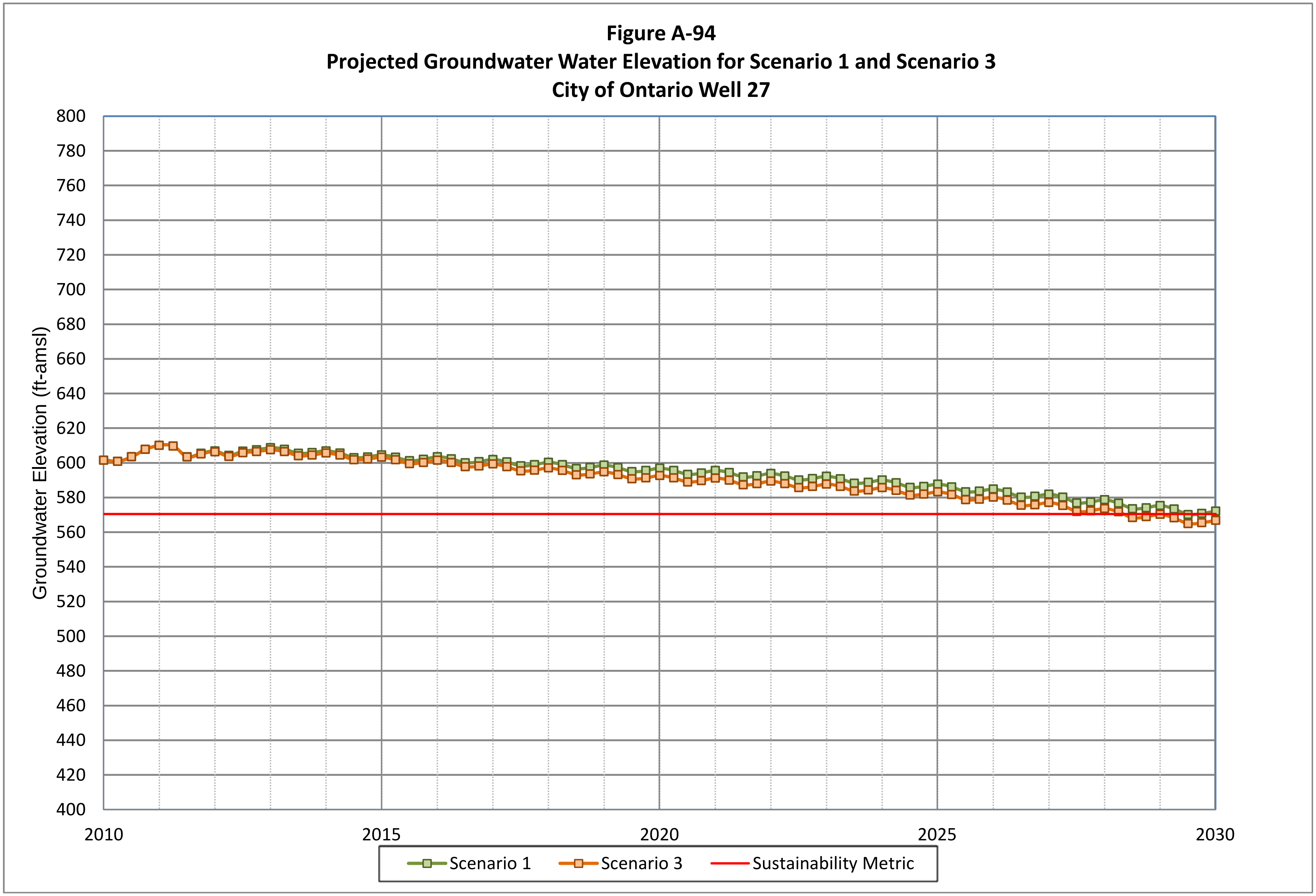
WILDERMUTH ENVIRONMENTAL INC.



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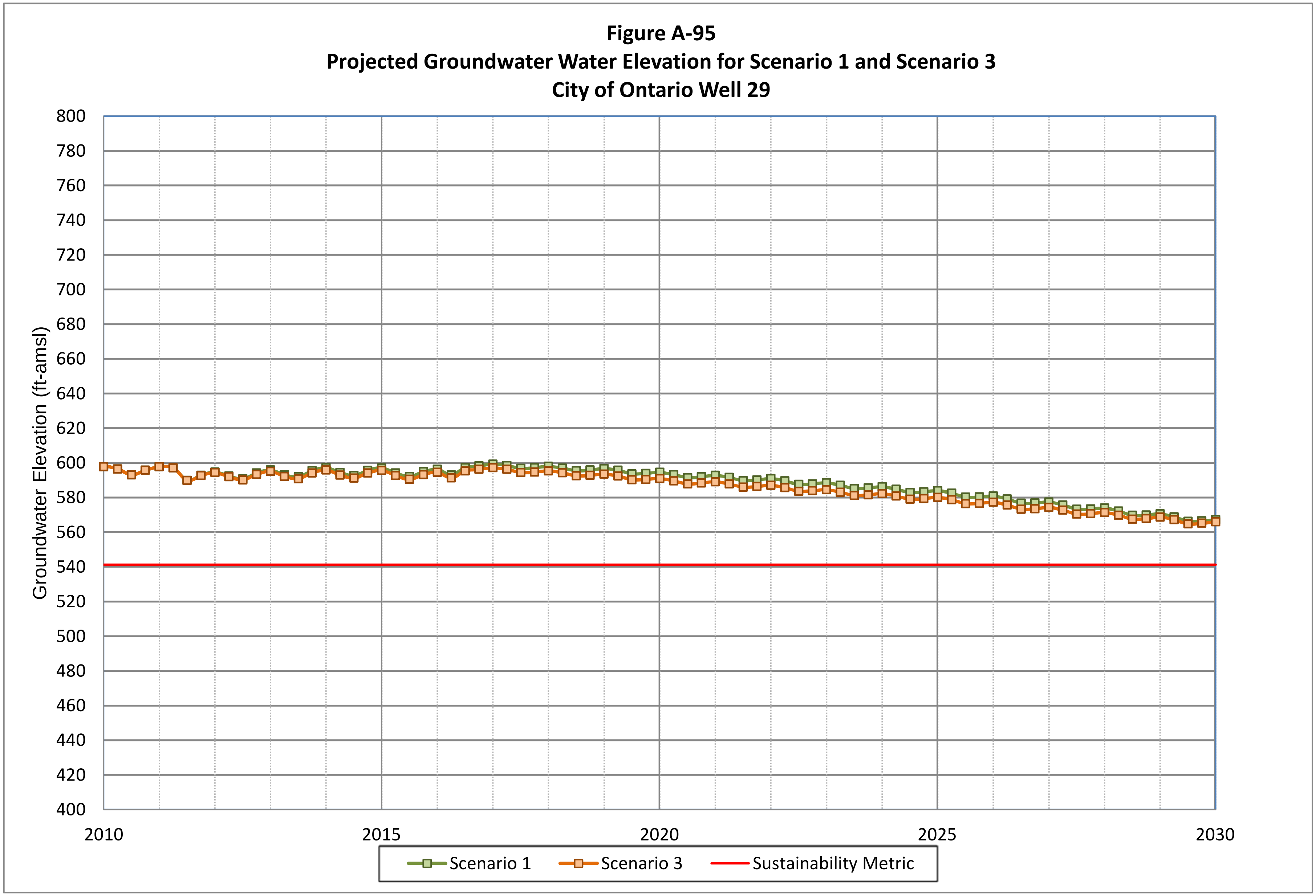

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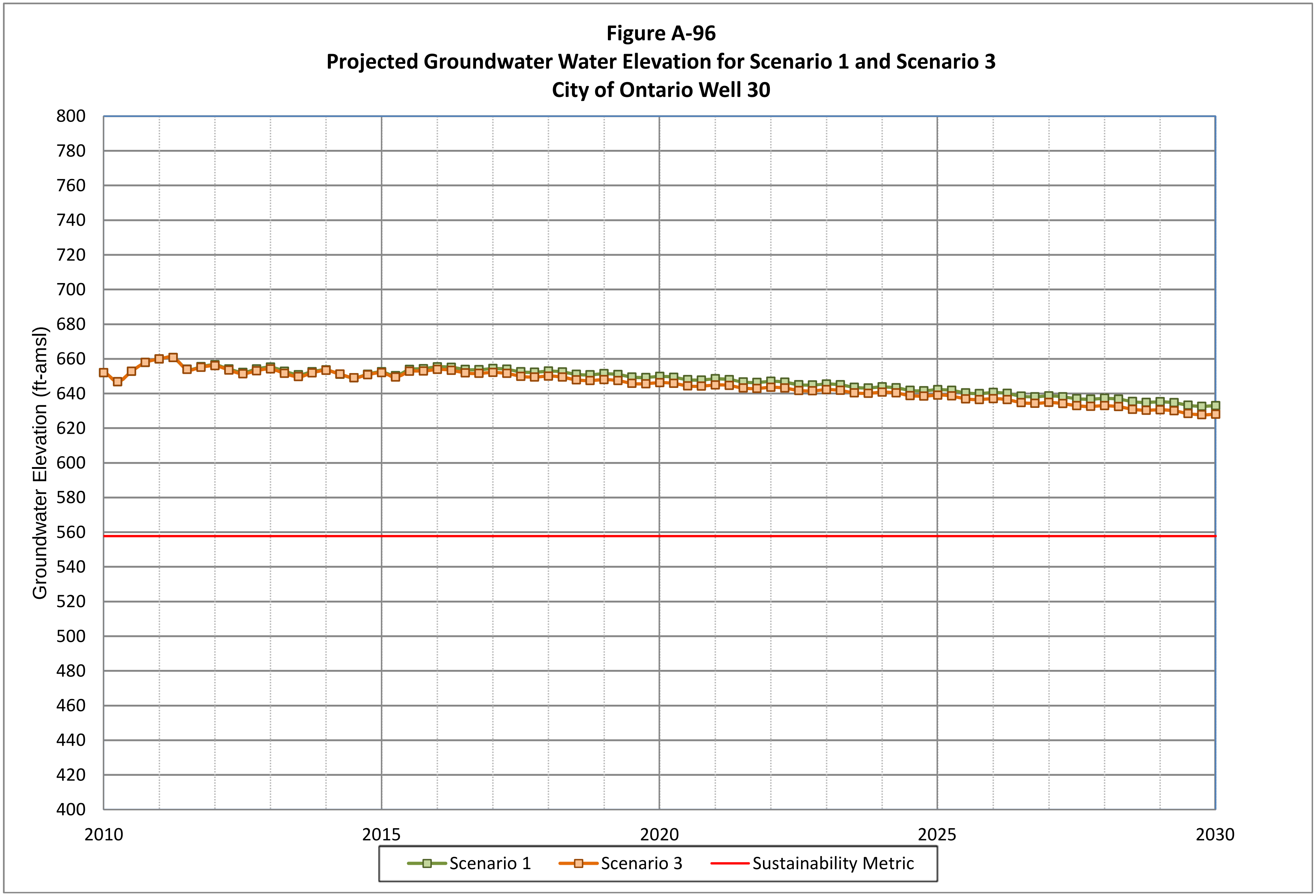

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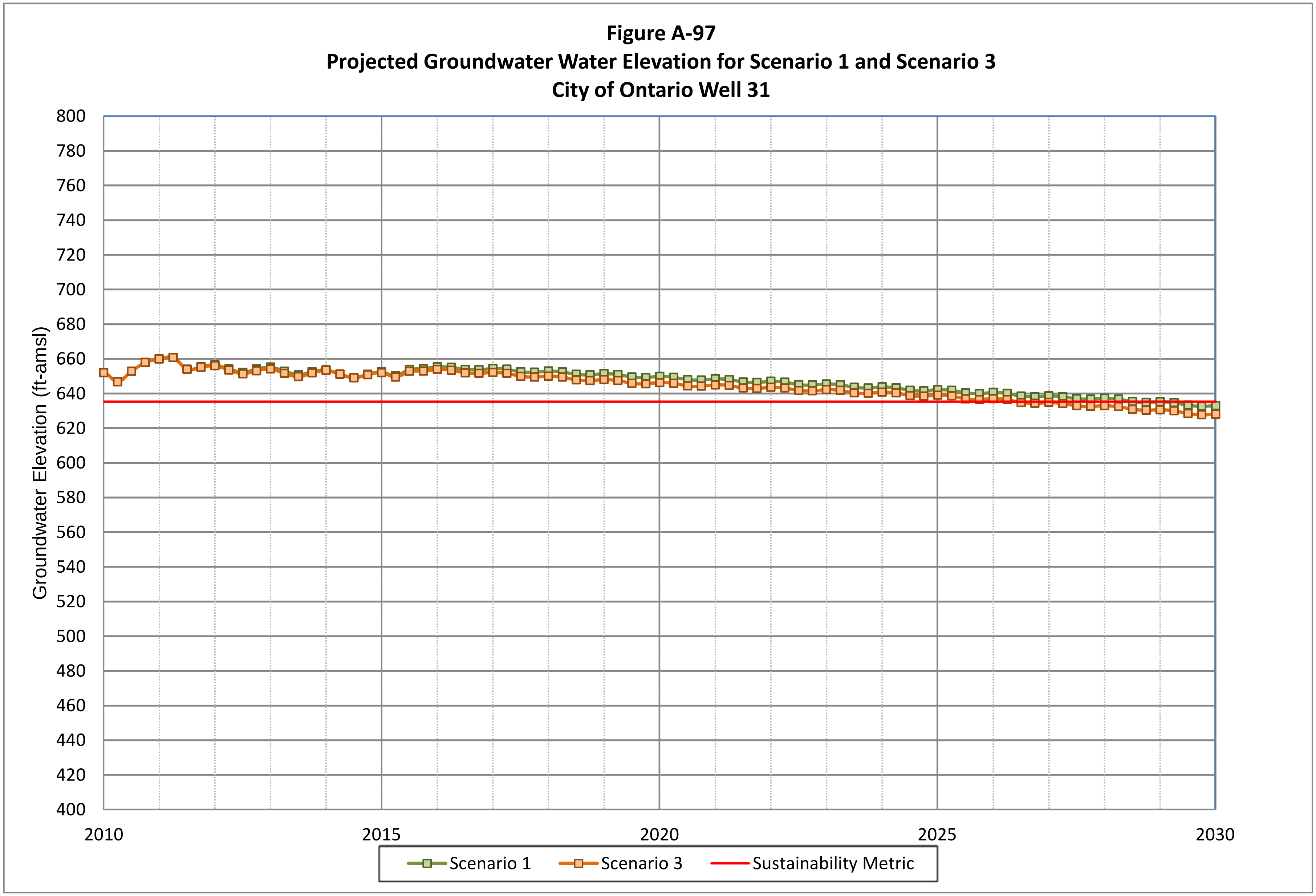

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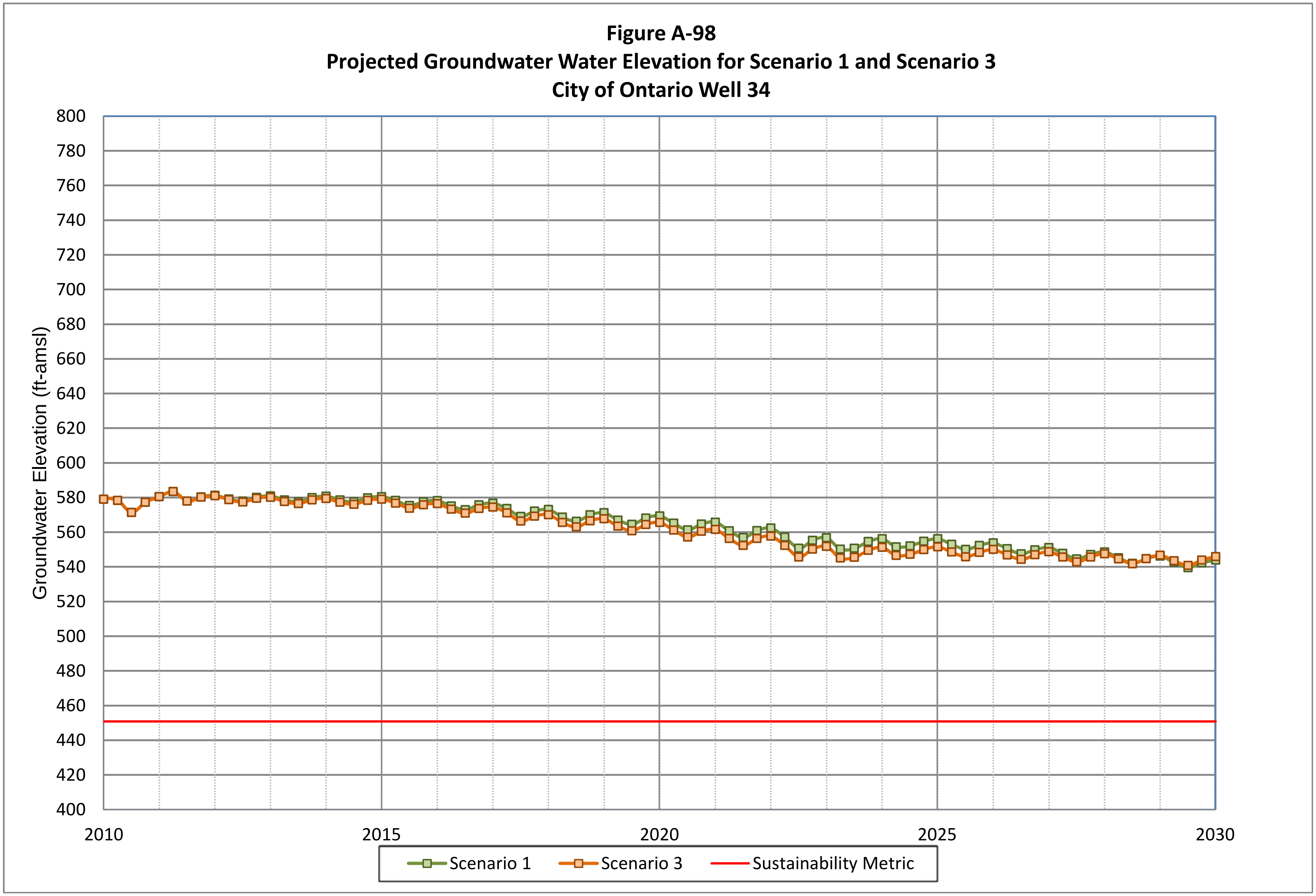

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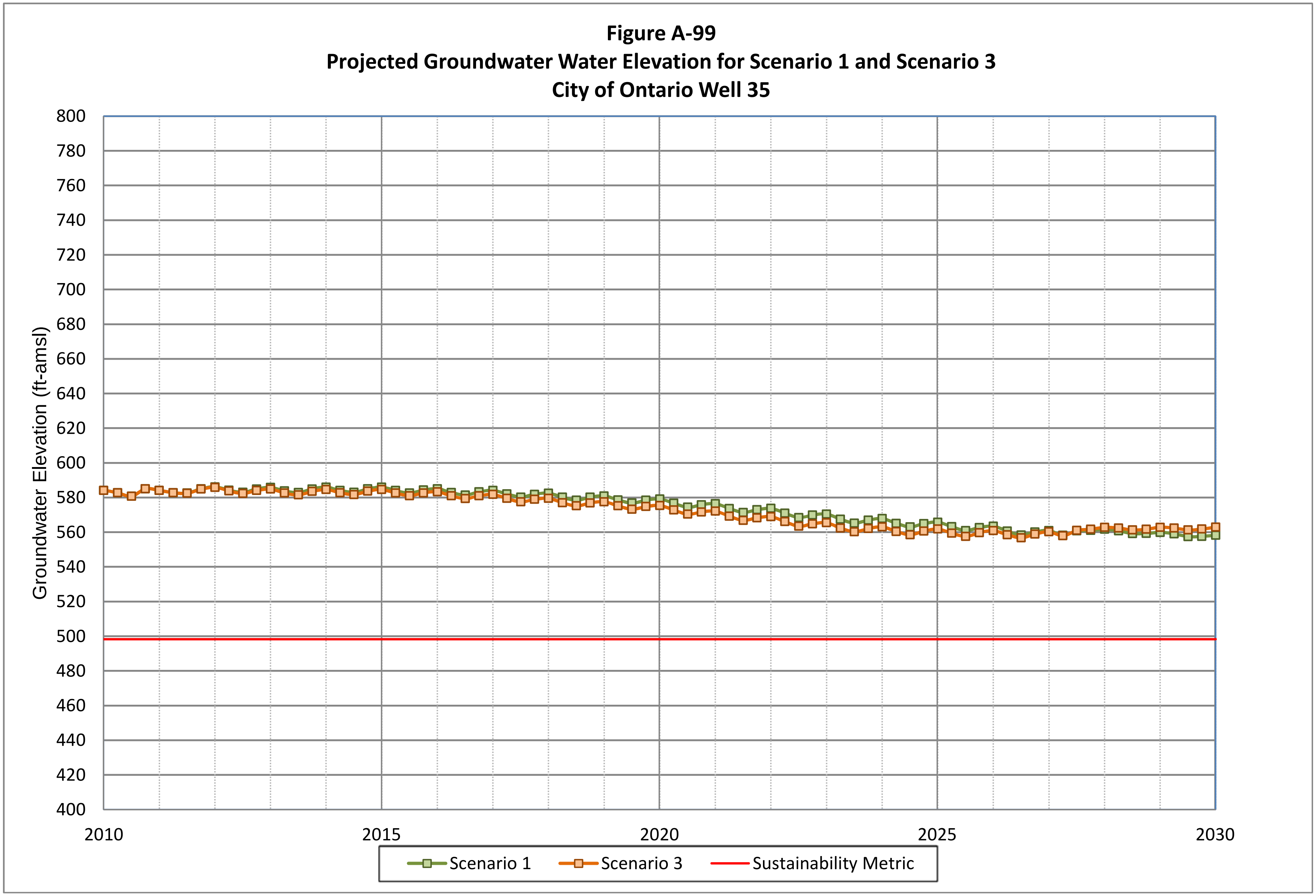

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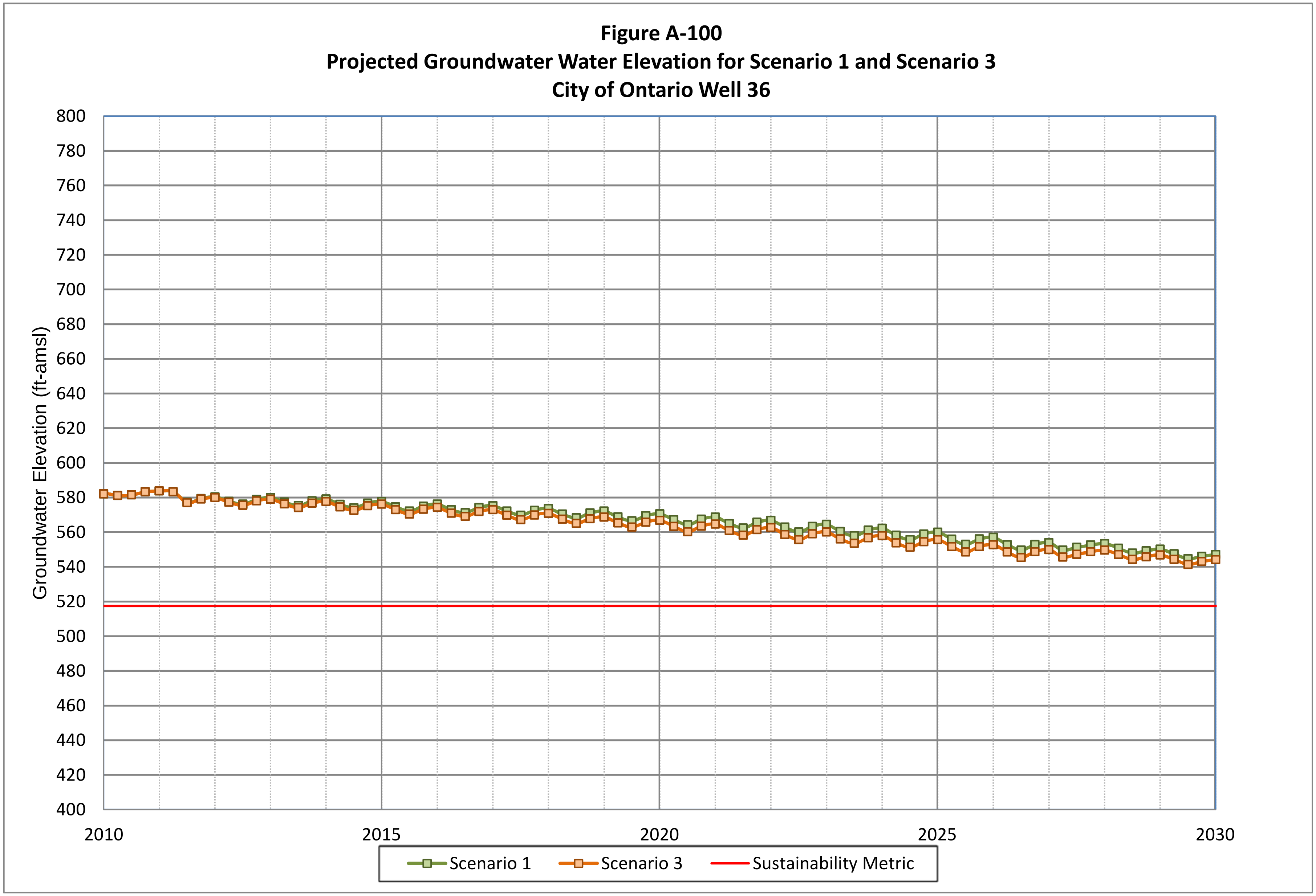
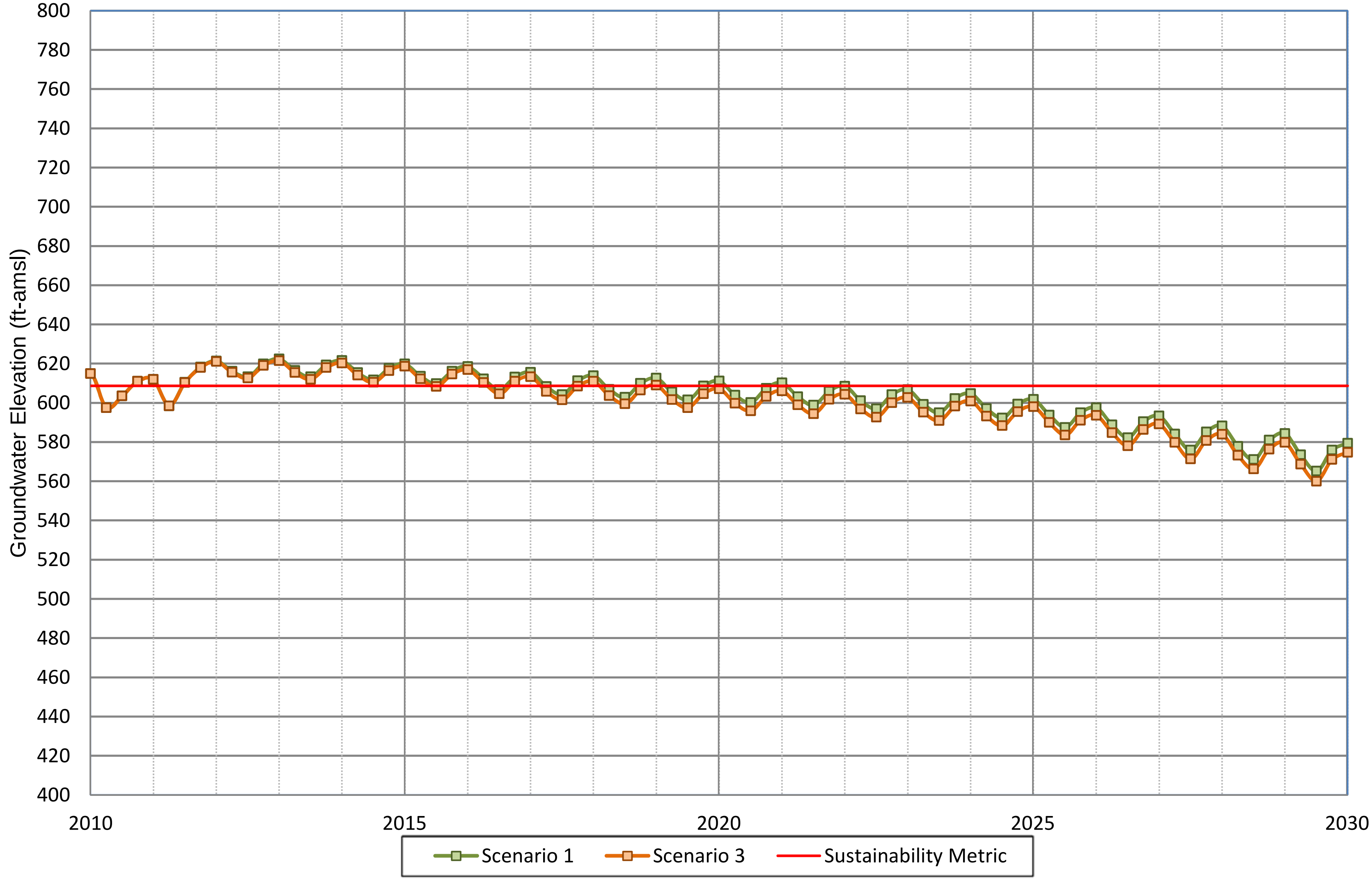


20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

Figure A-101
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 37



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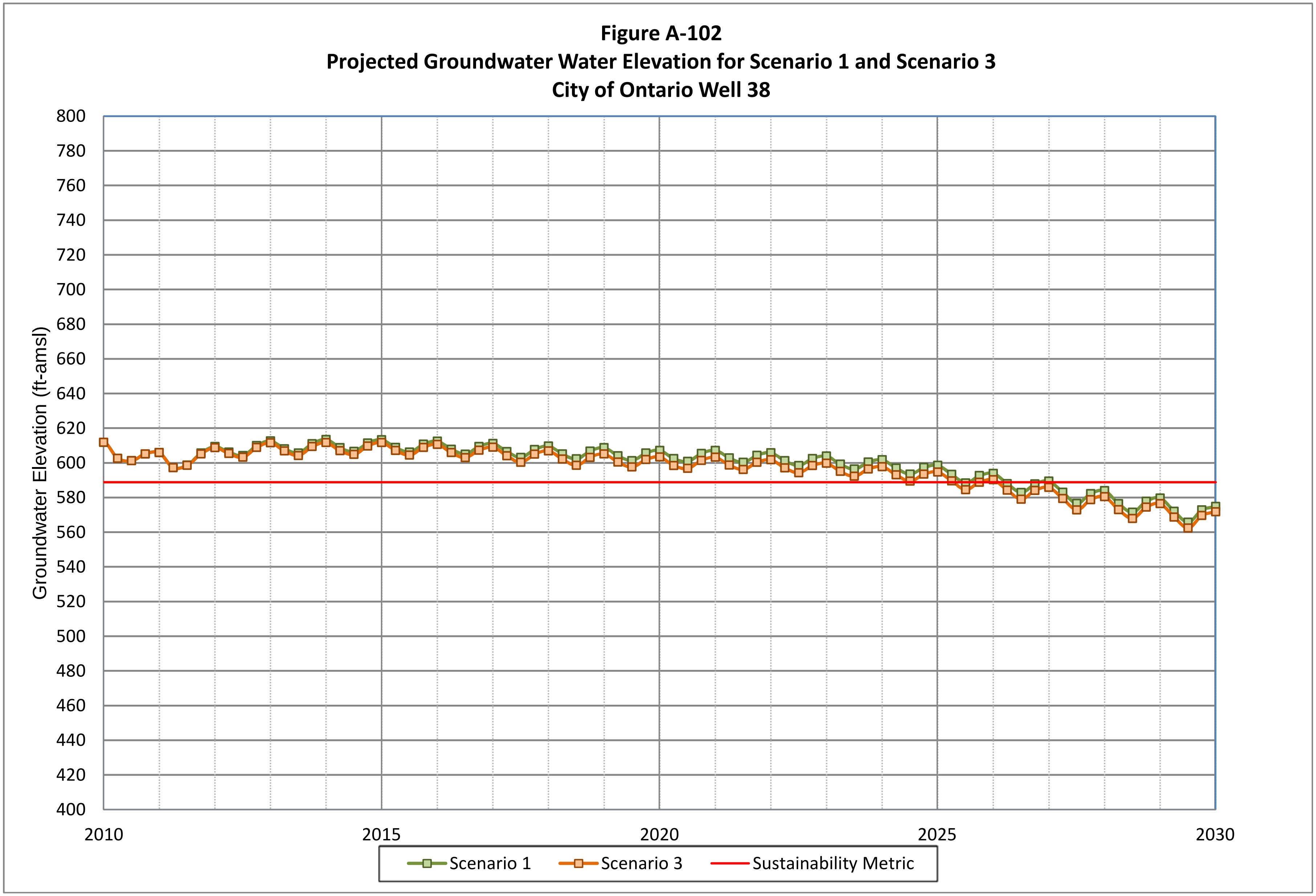
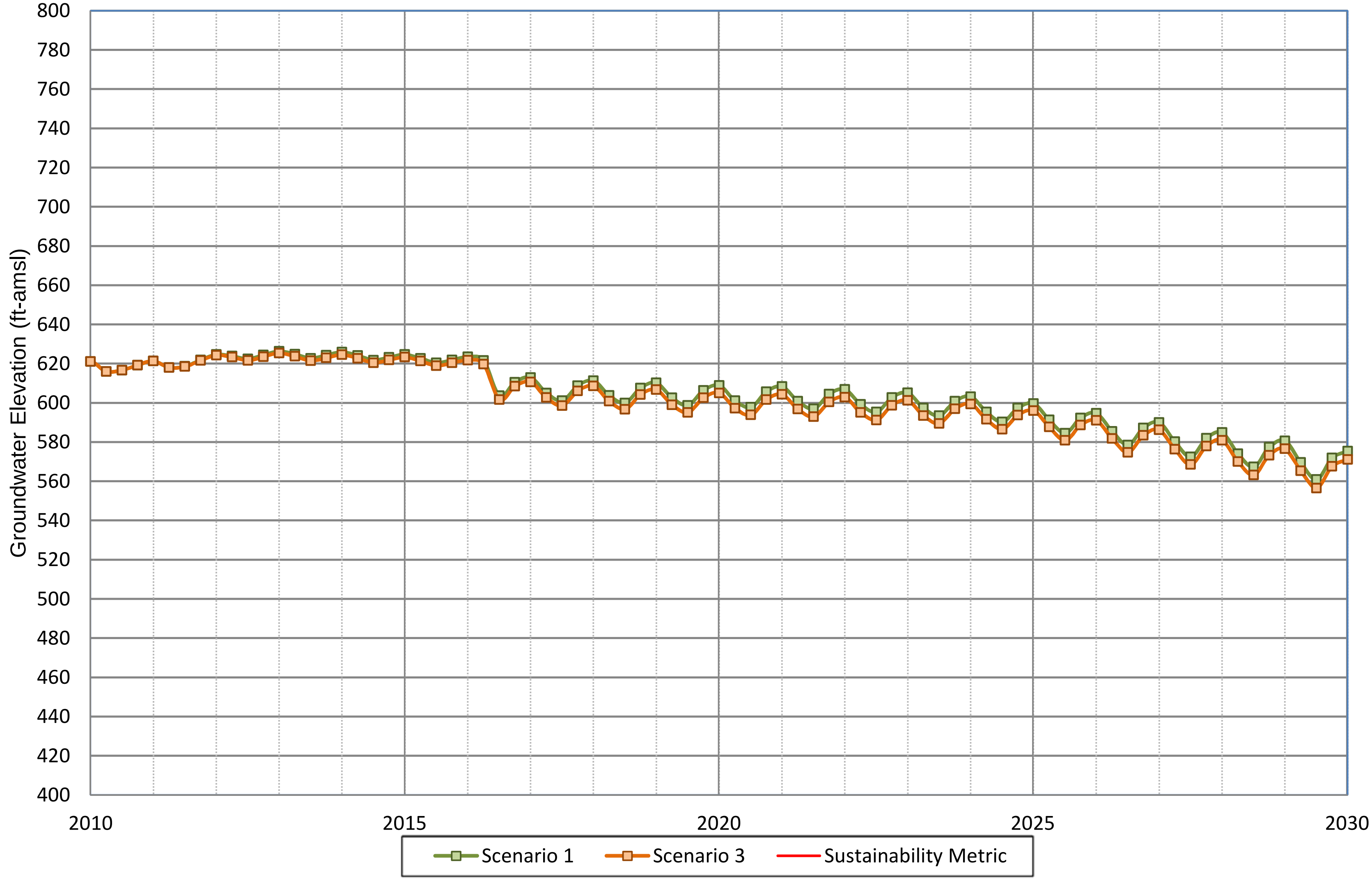


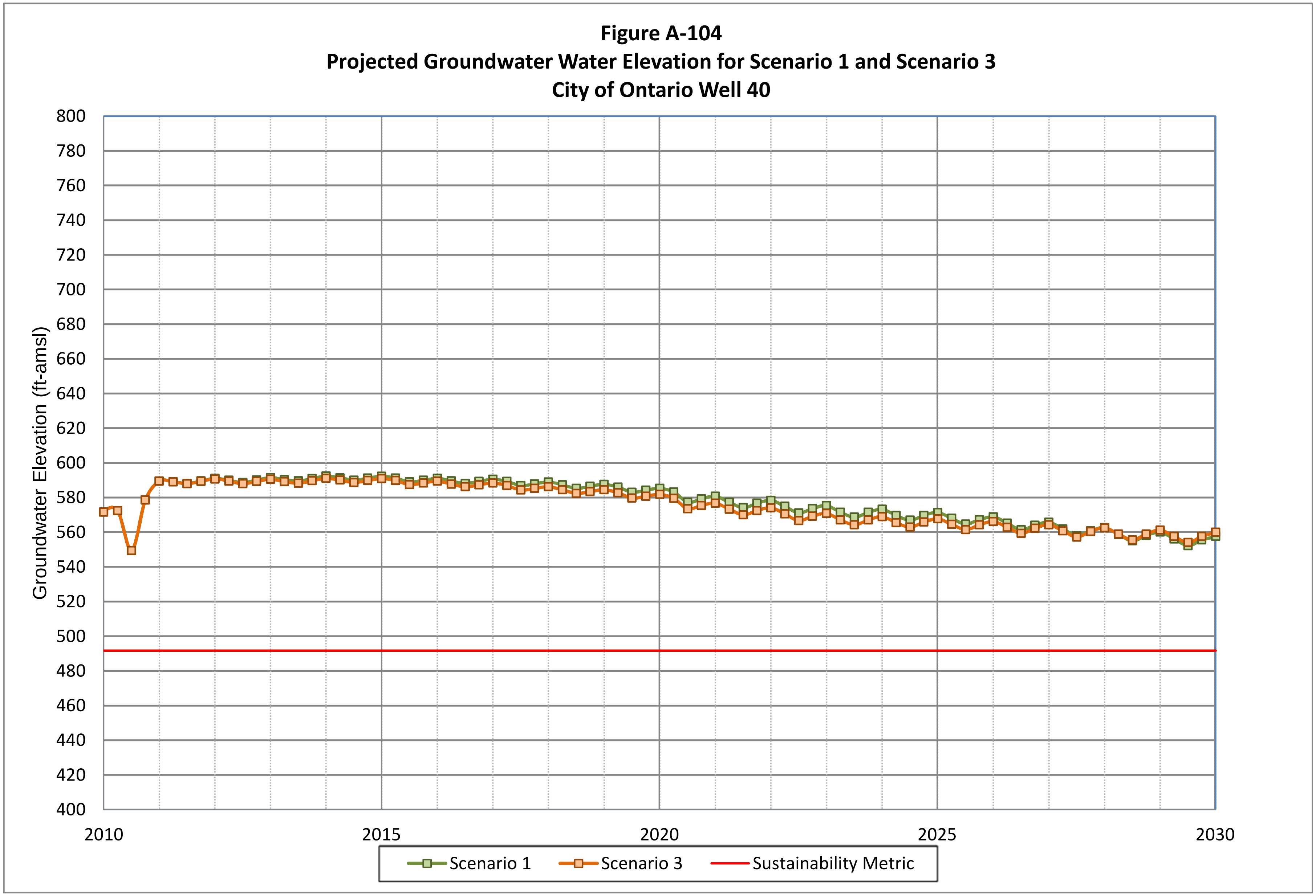
20120503_Projected_Hydrographs.xlsx

Figure A-103
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 39



20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.



20120503_Projected_Hydrographs.xlsx

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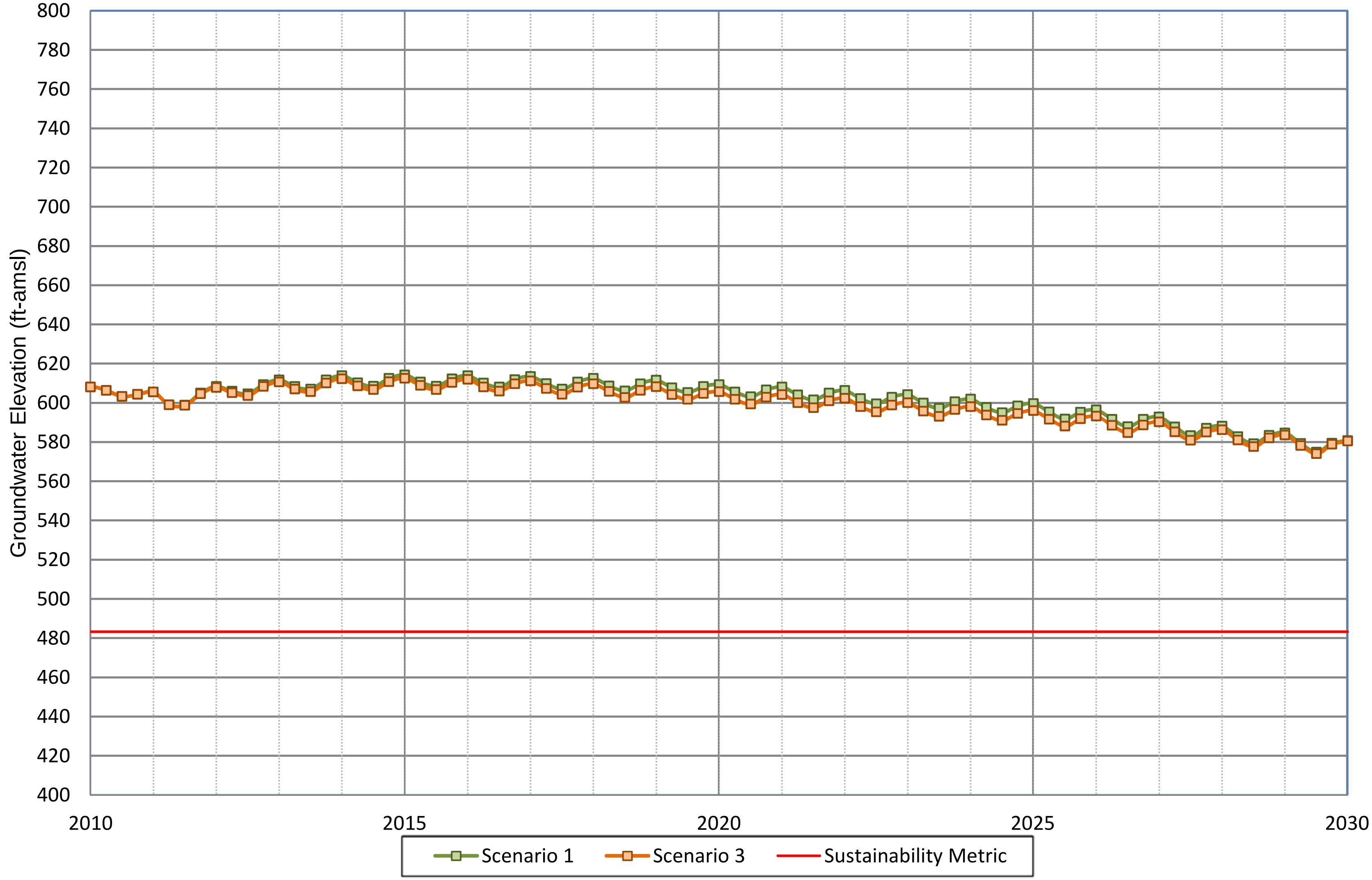
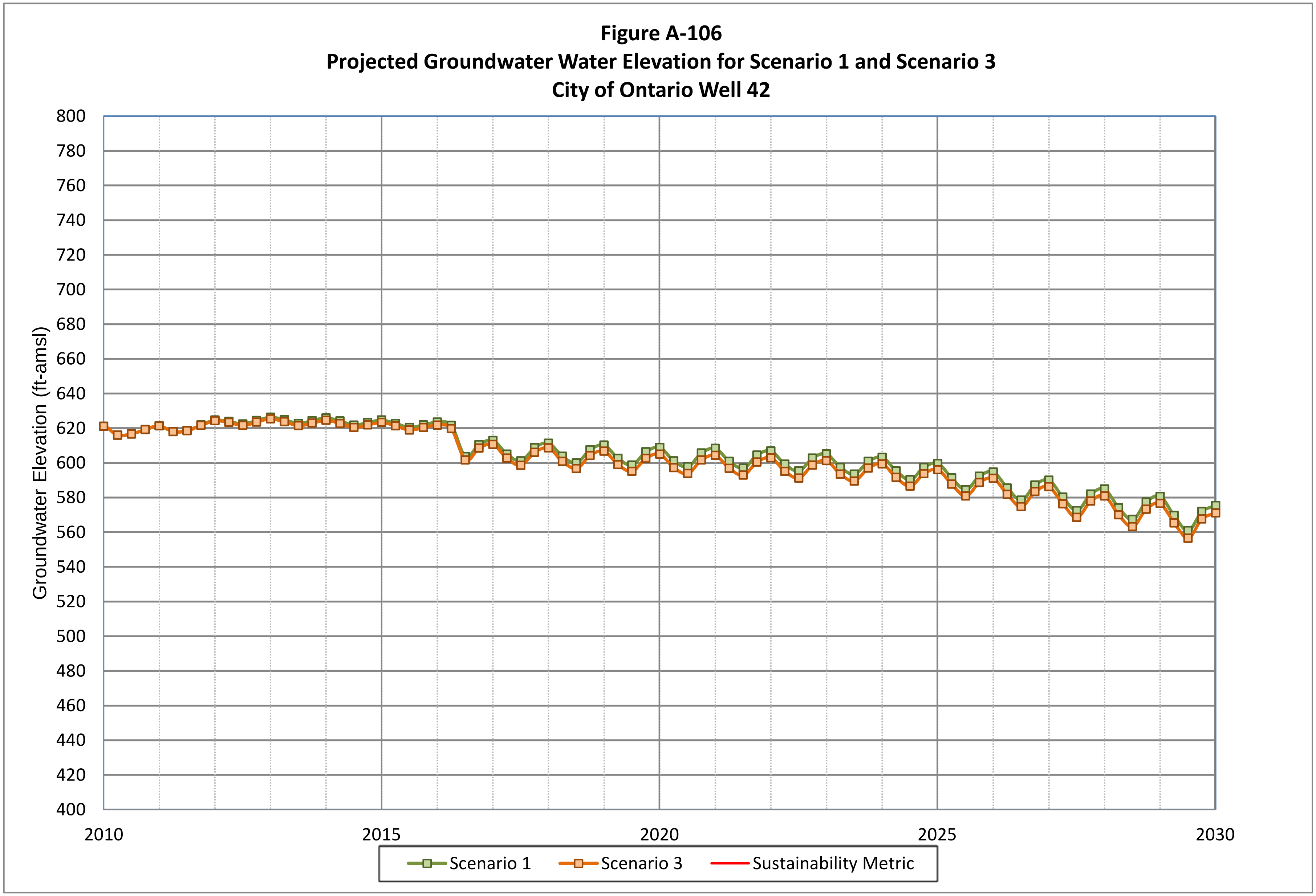
Figure A-105
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 41





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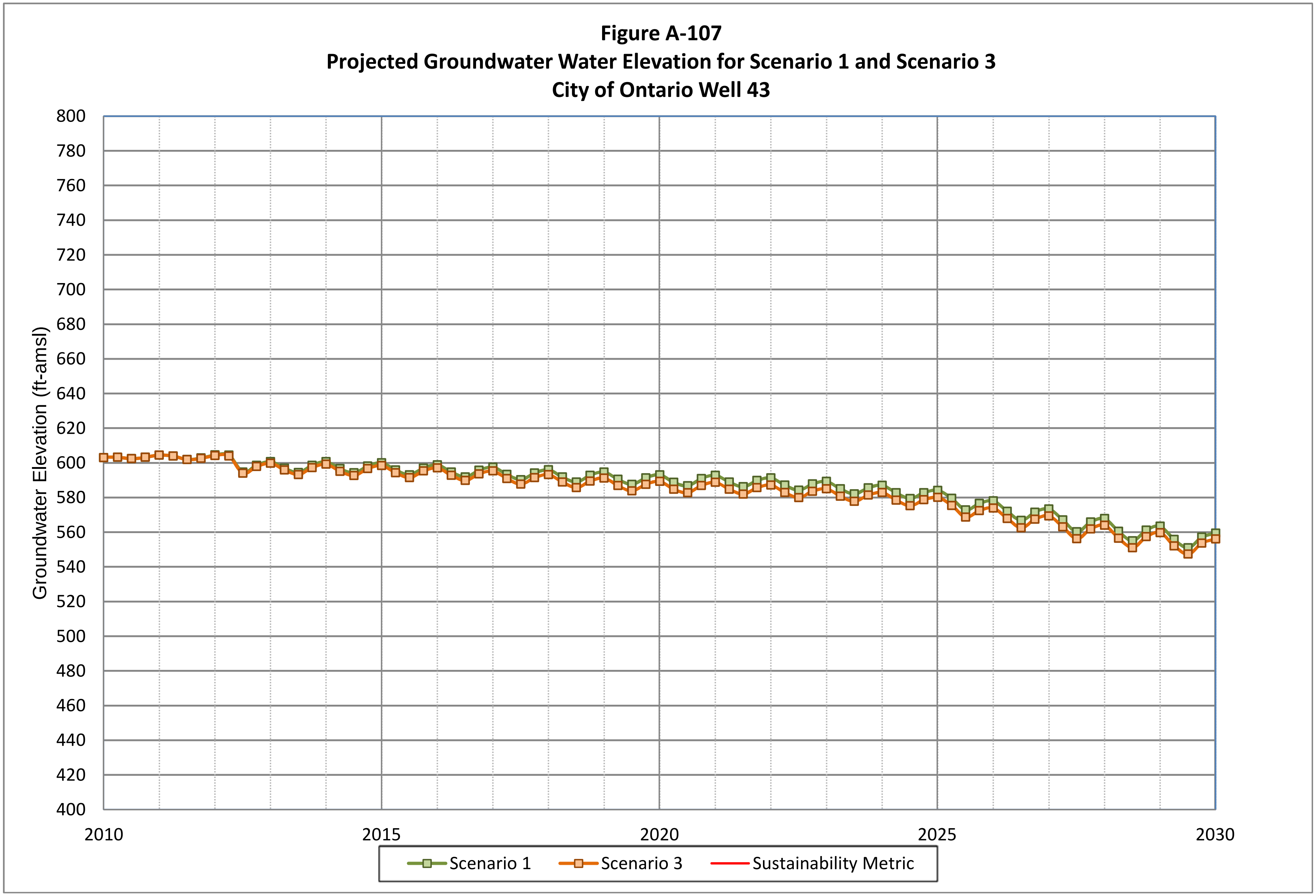

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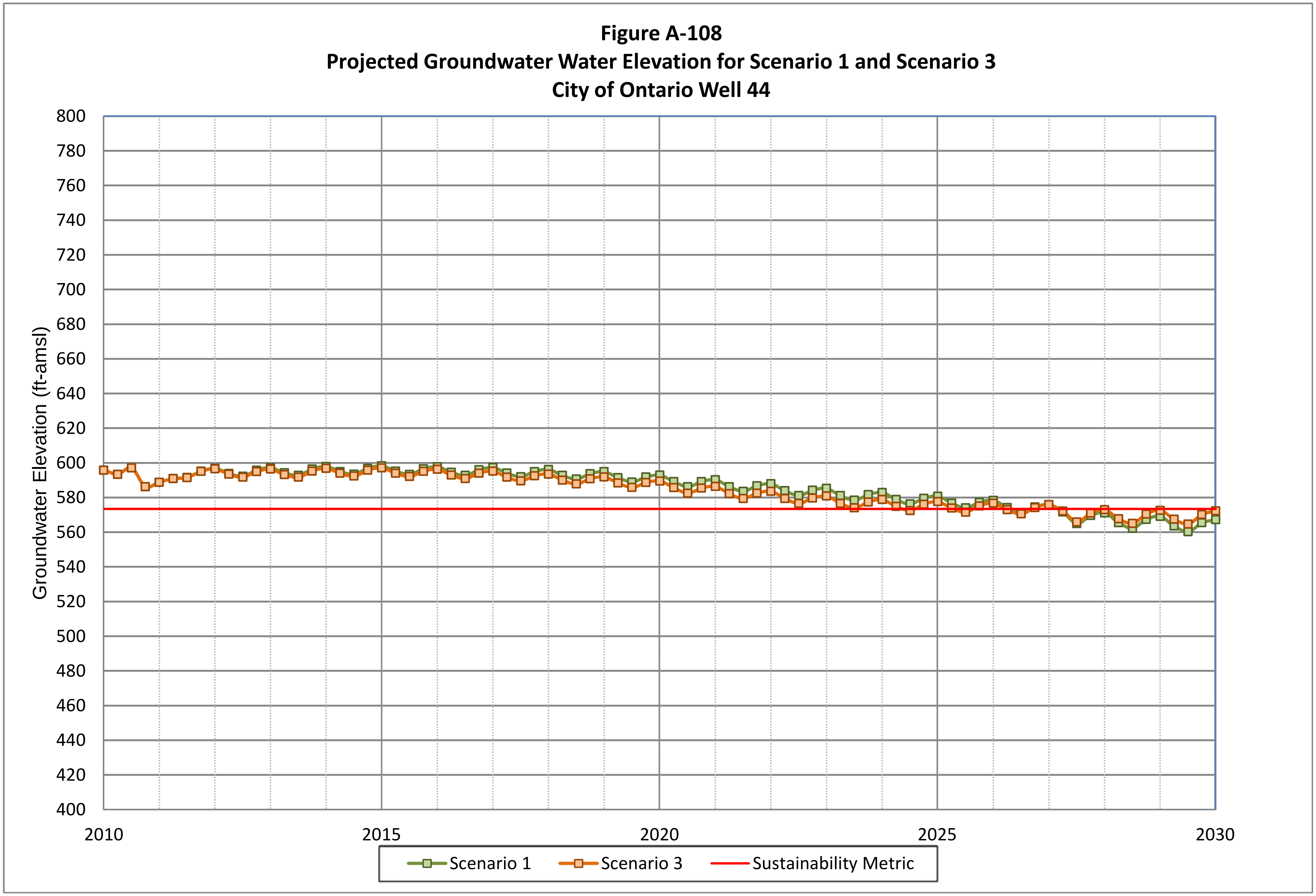

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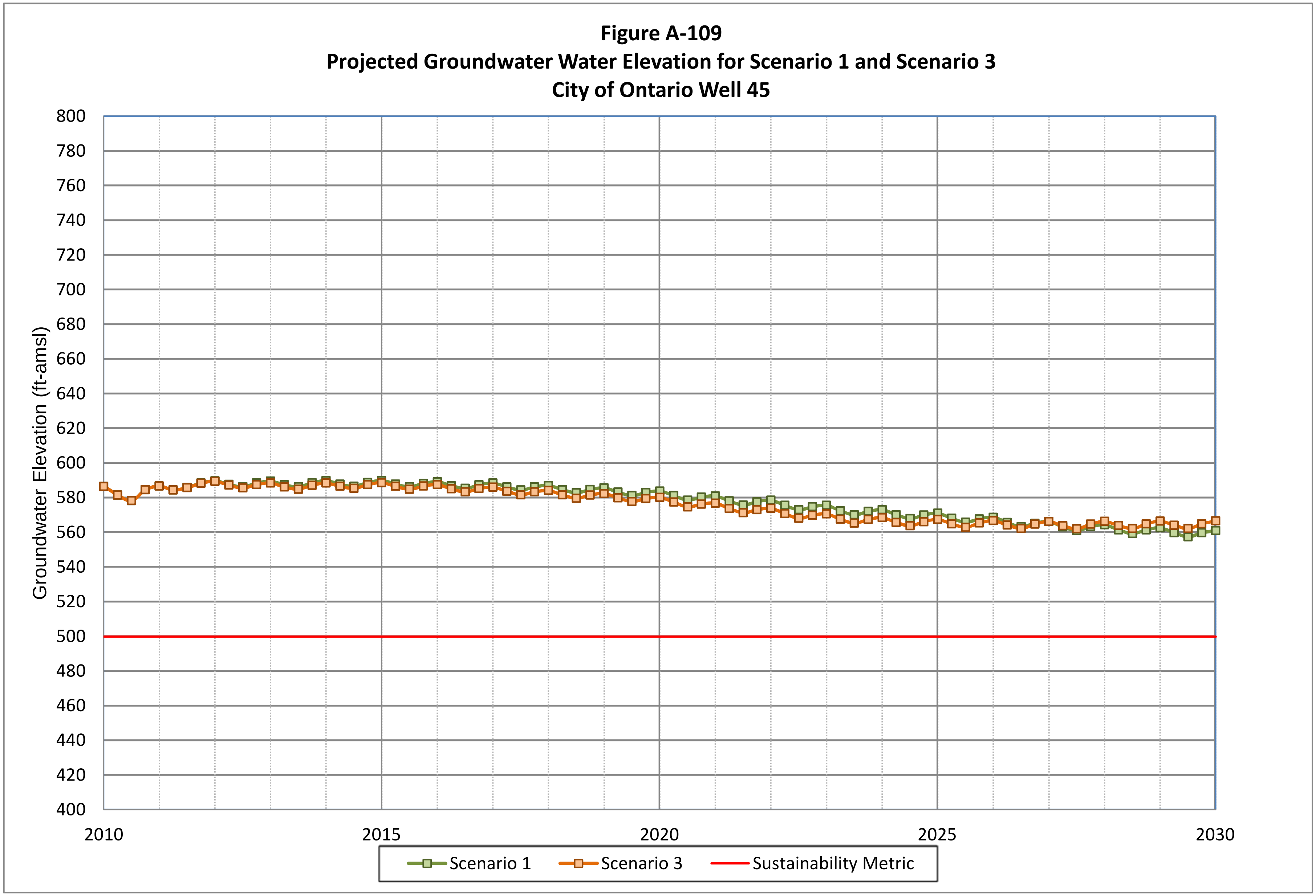
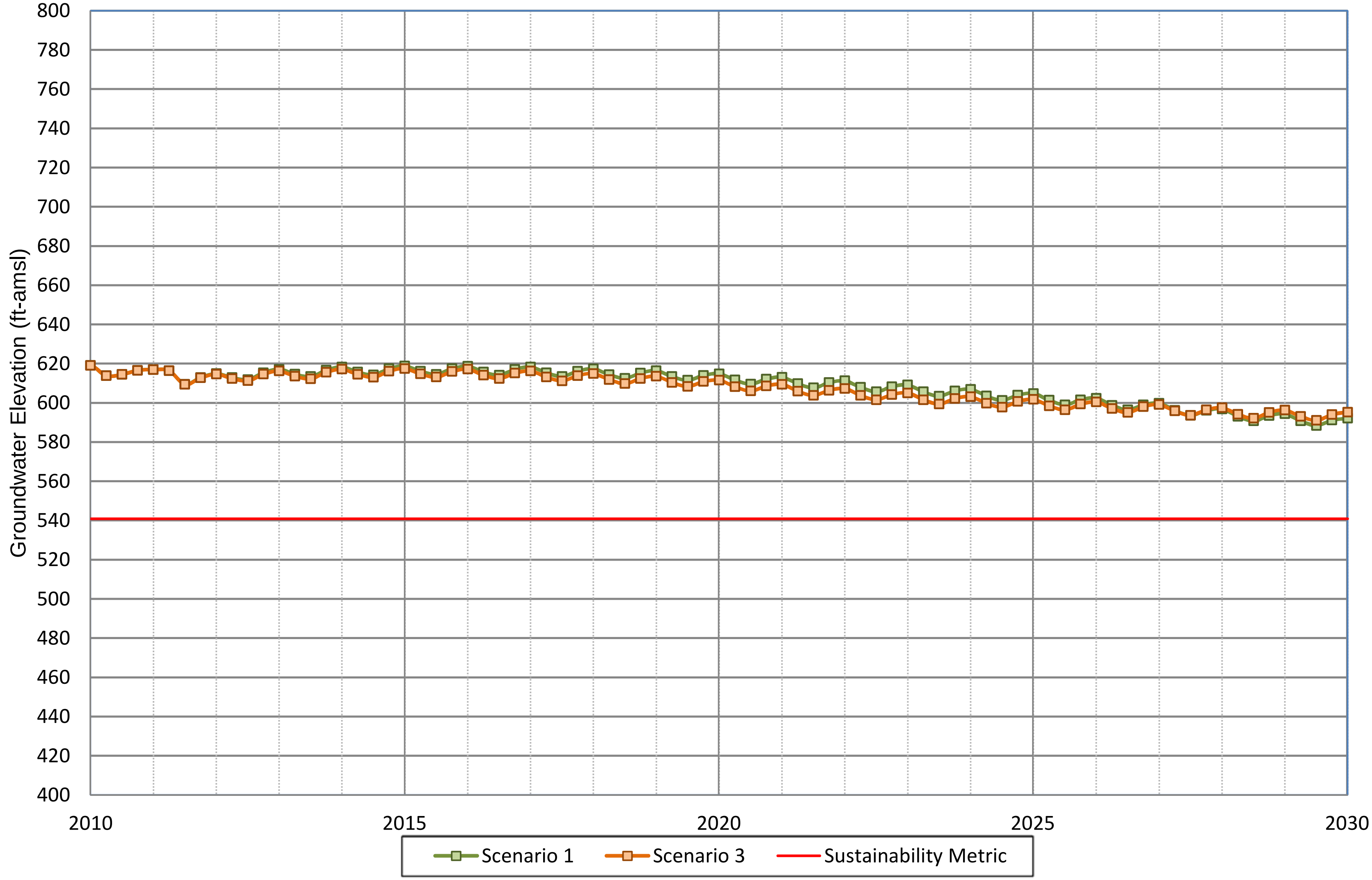
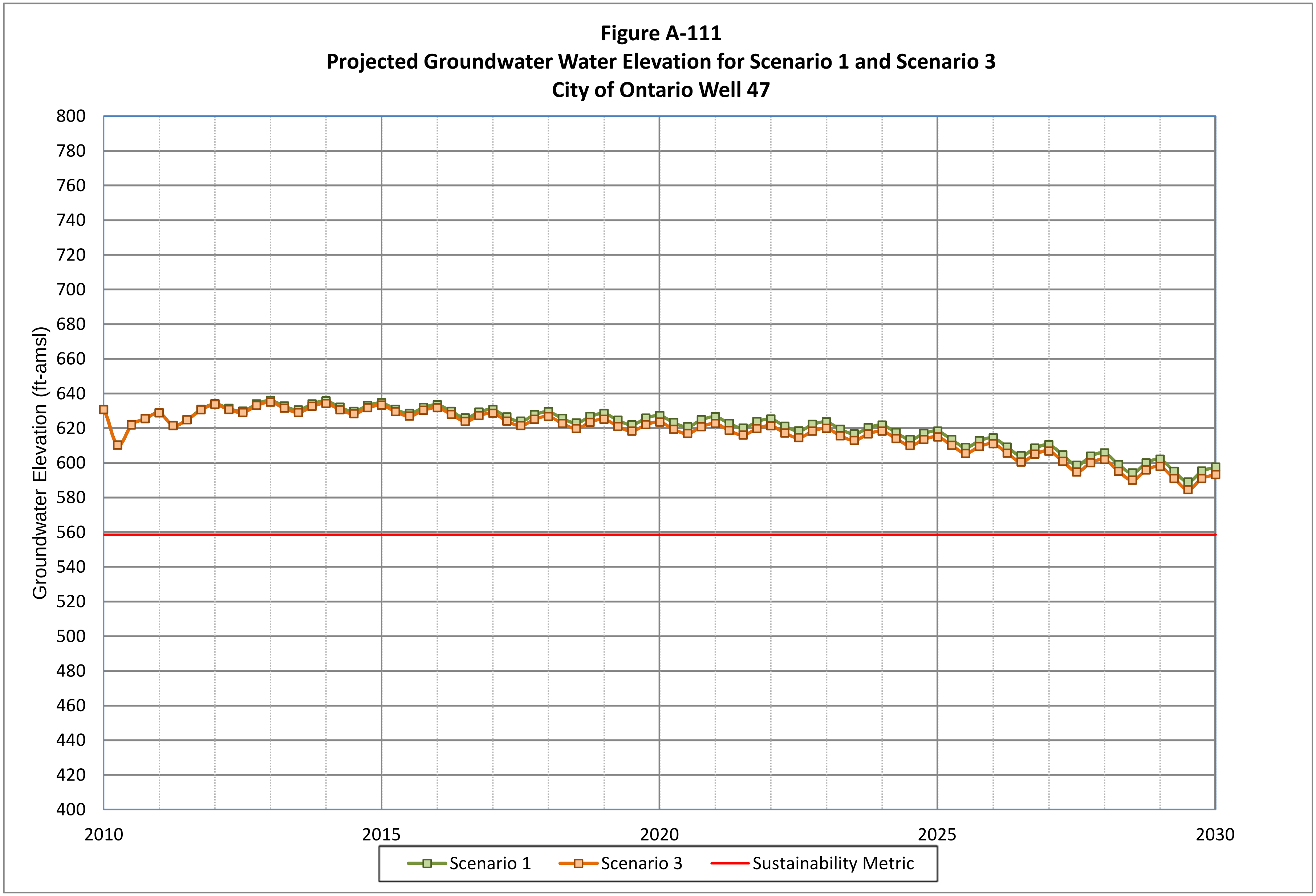


20120503_Projected_Hydrographs.xlsx

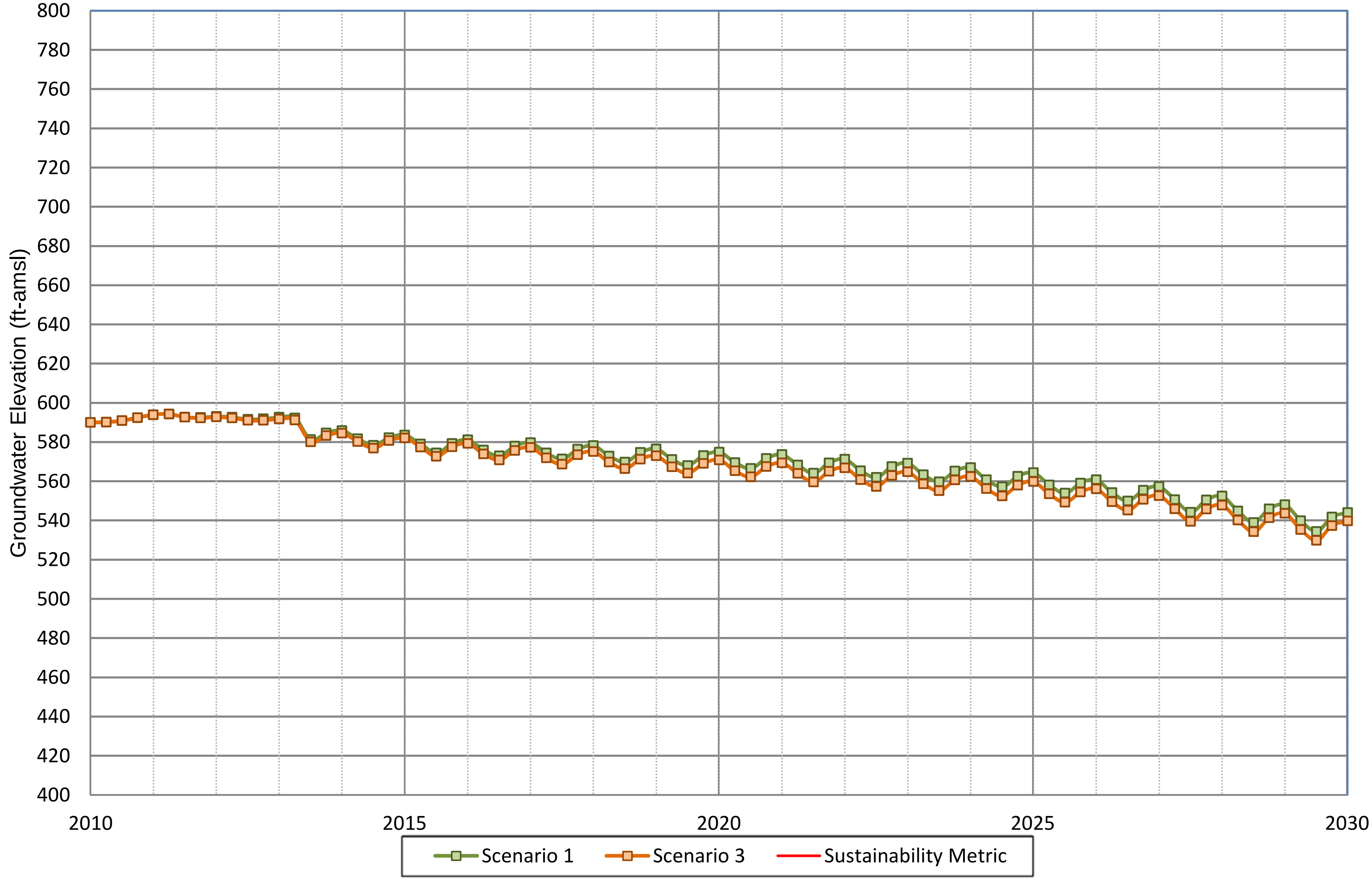
Figure A-110
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 46





20120503_Projected_Hydrographs.xlsx

Figure A-112
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 48



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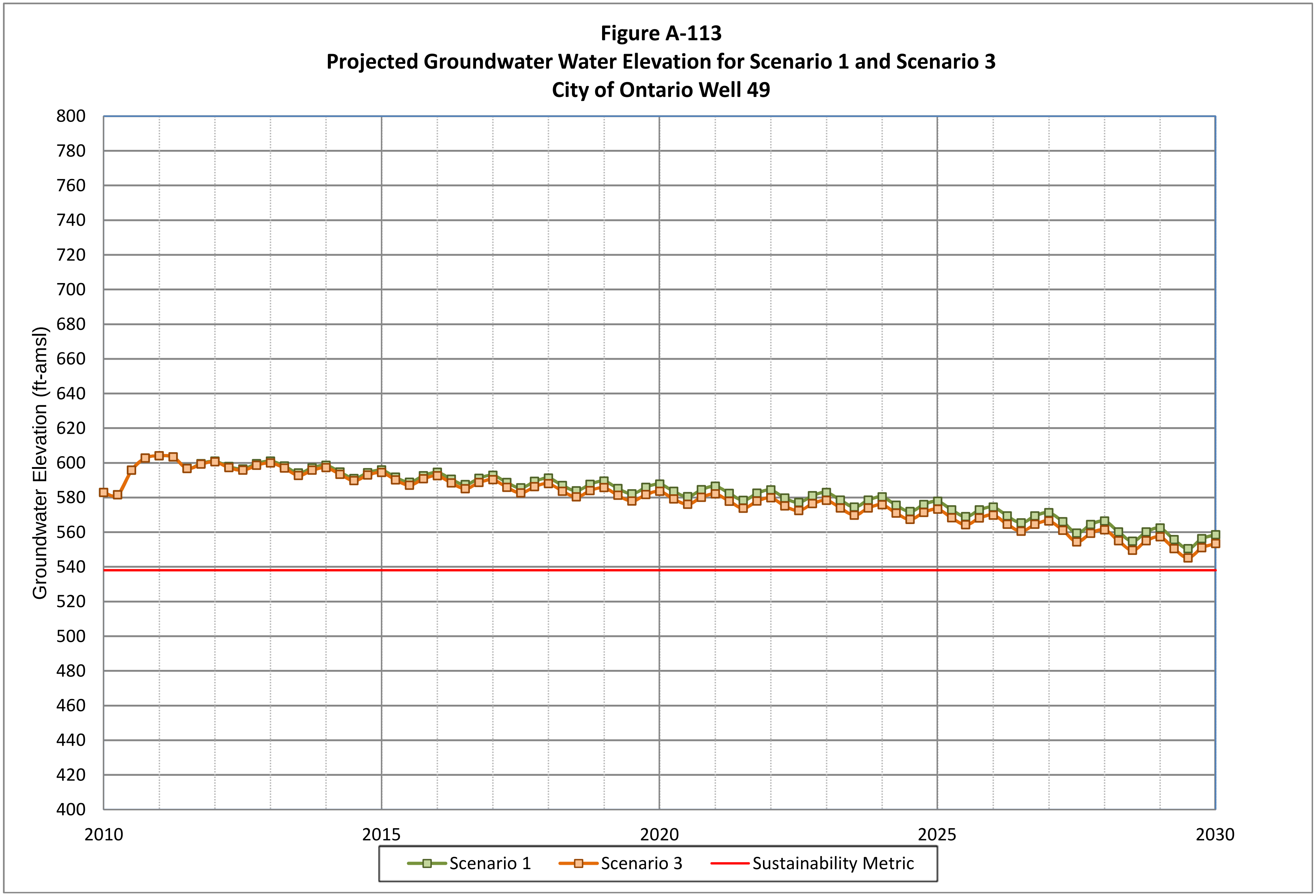
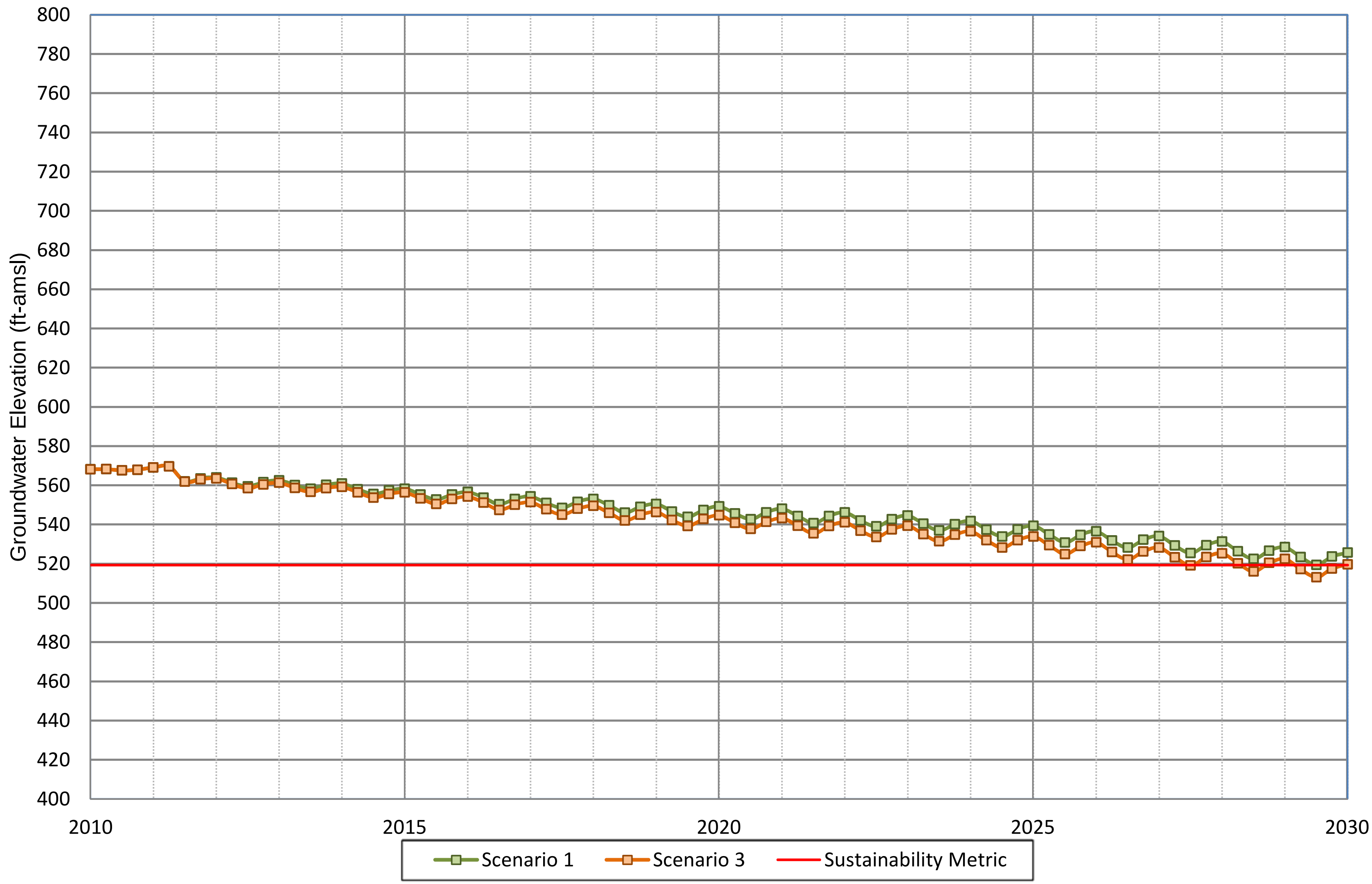
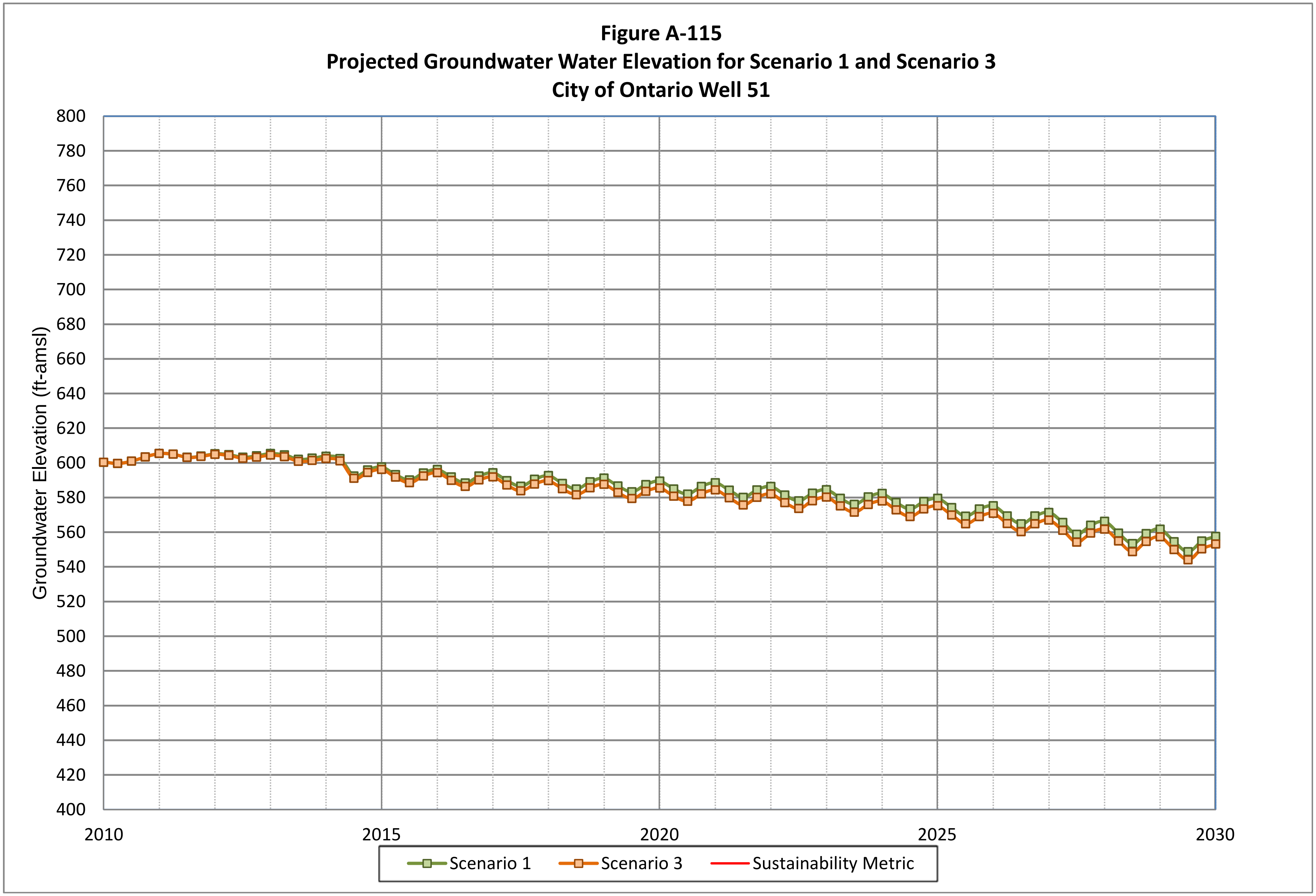


20120503_Projected_Hydrographs.xlsx

Figure A-114
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 50





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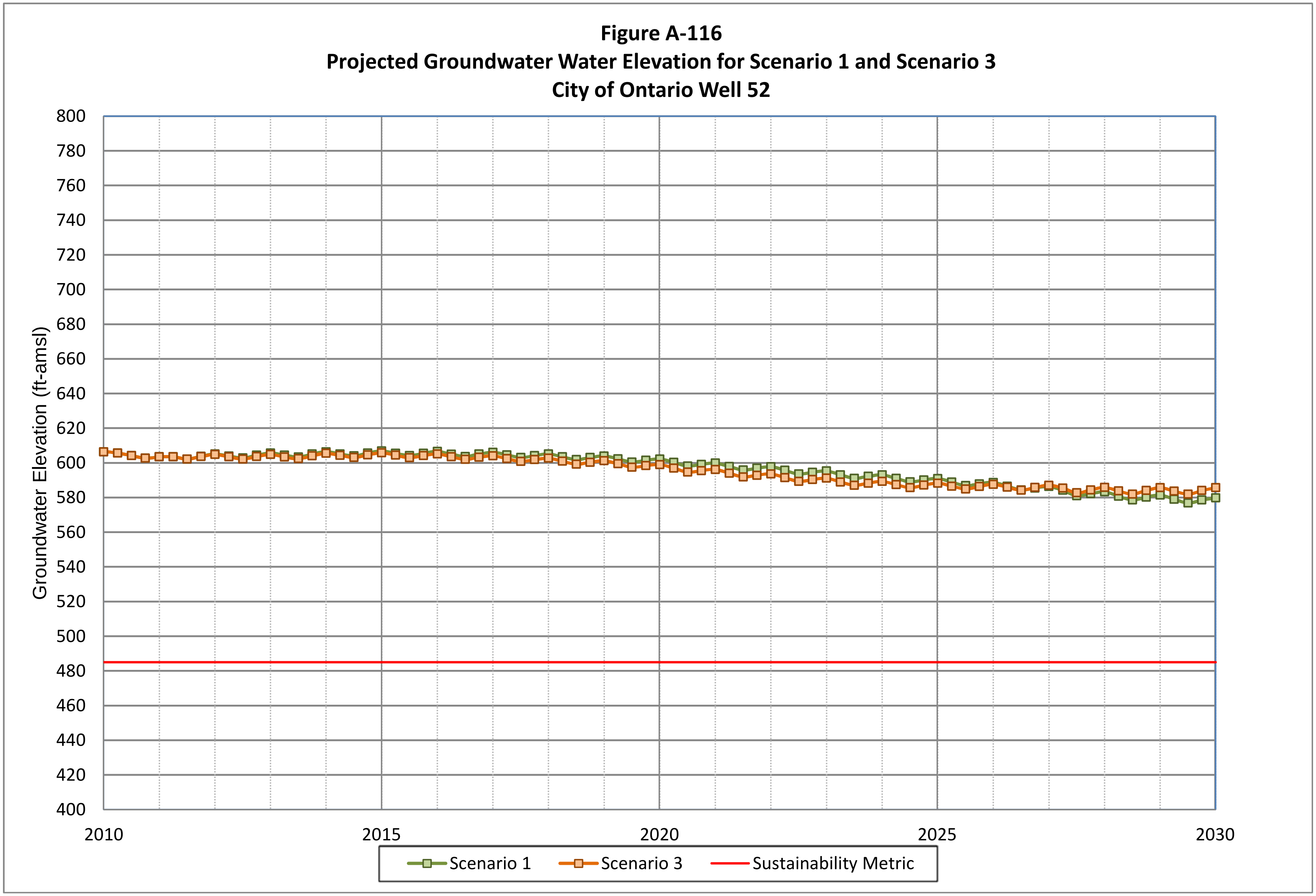
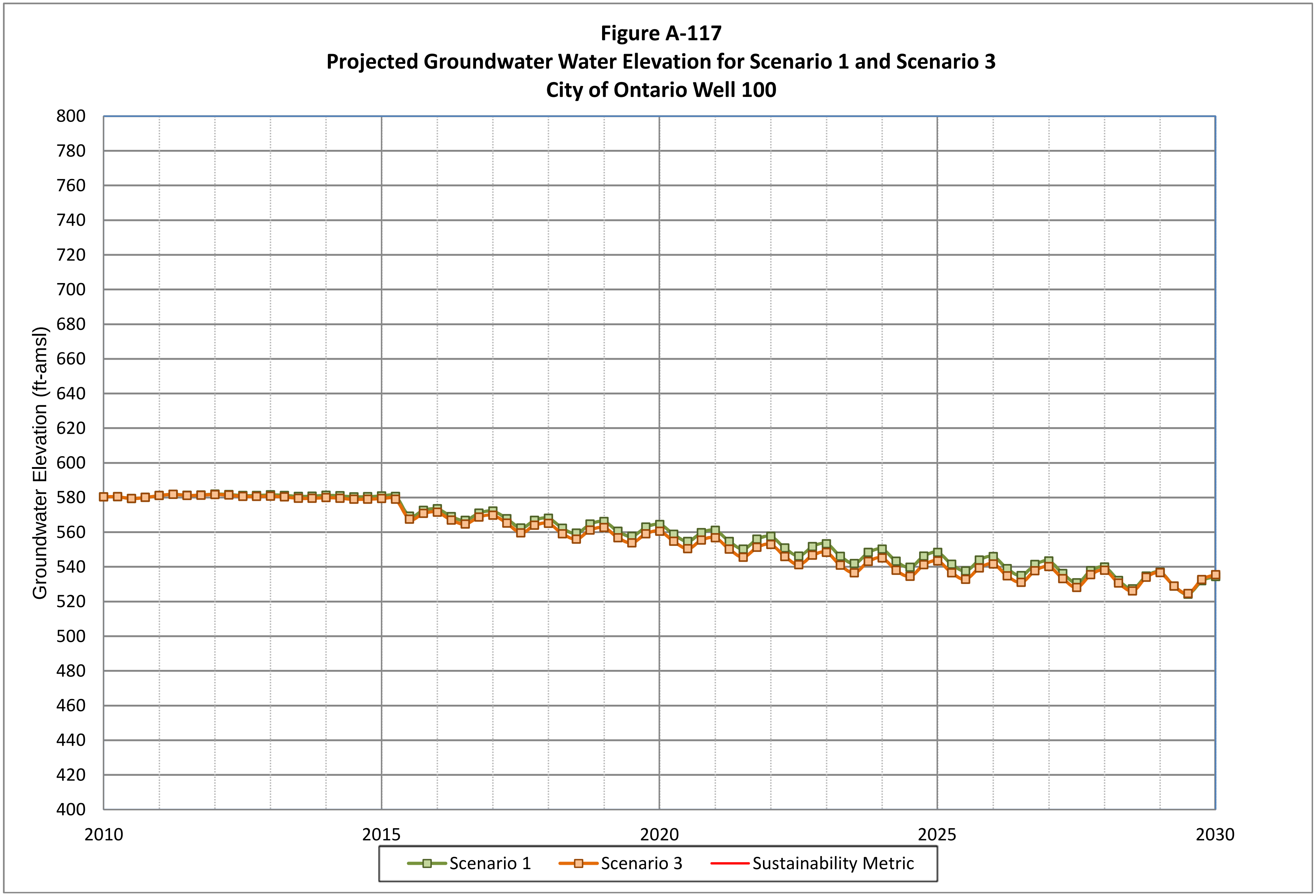


Figure A-116
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 52
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



20120503_Projected_Hydrographs.xlsx

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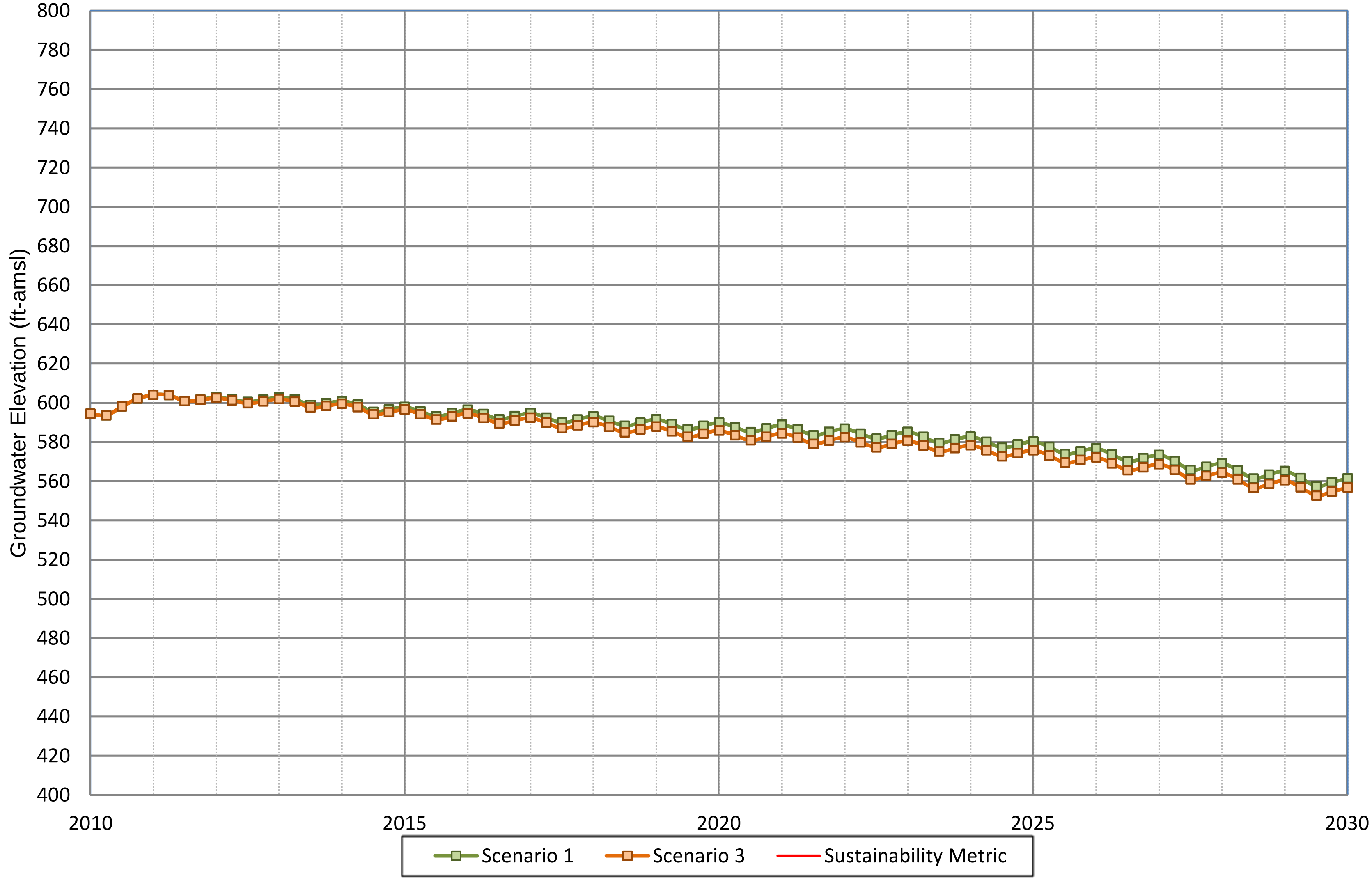
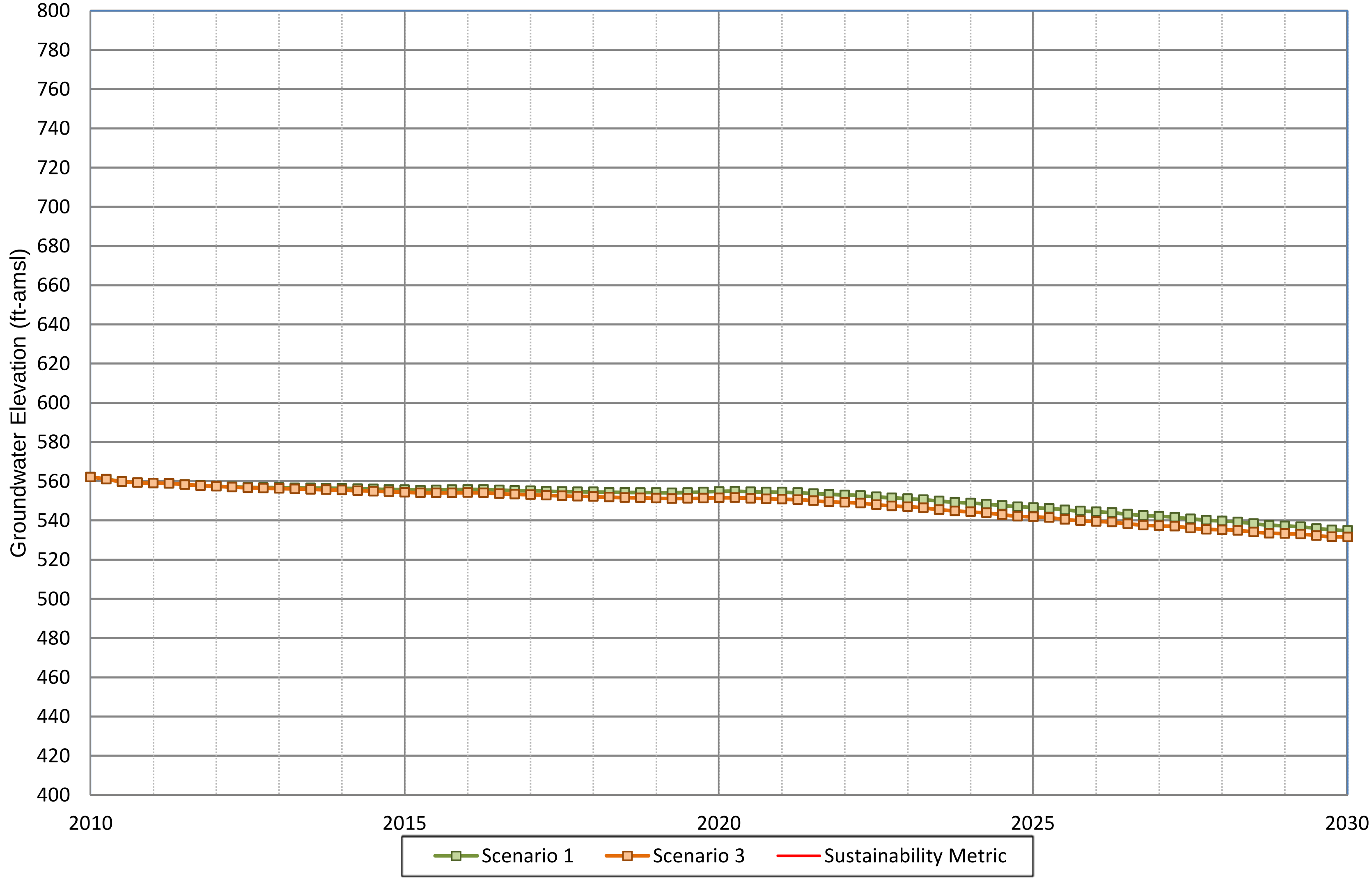
Figure A-118
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 101



20120503_Projected_Hydrographs.xlsx

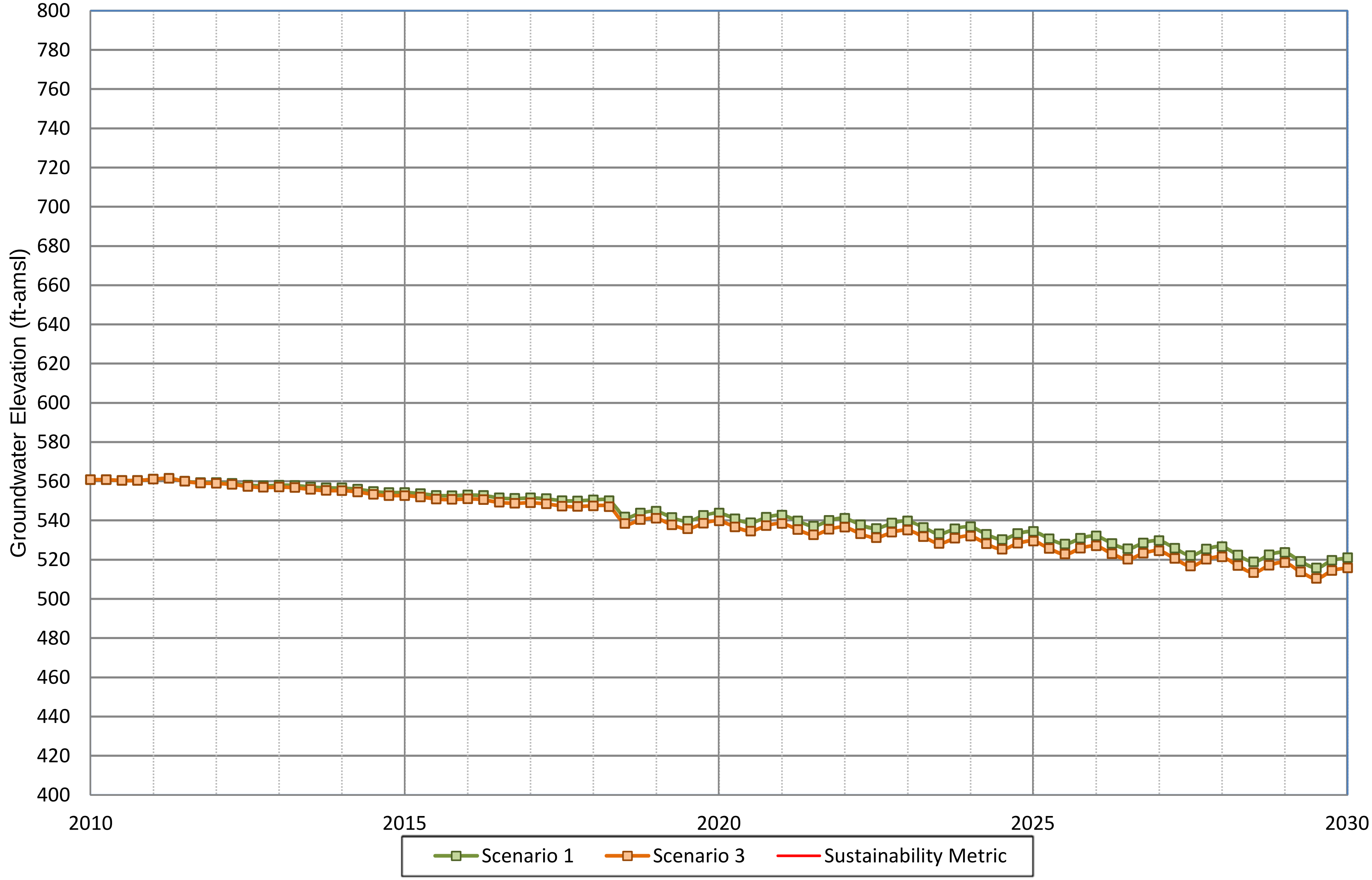
Figure A-119
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 103



20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

Figure A-120
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 104



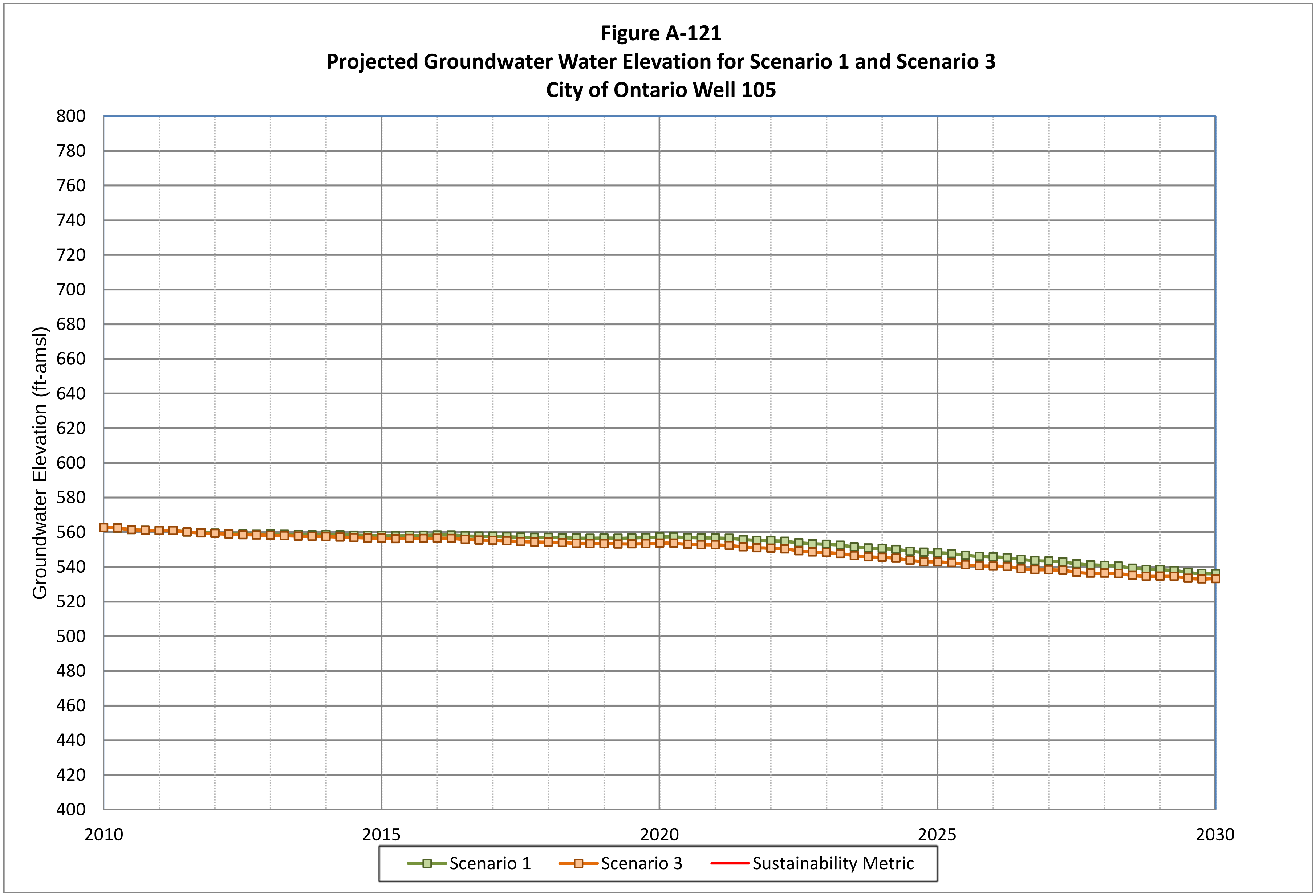
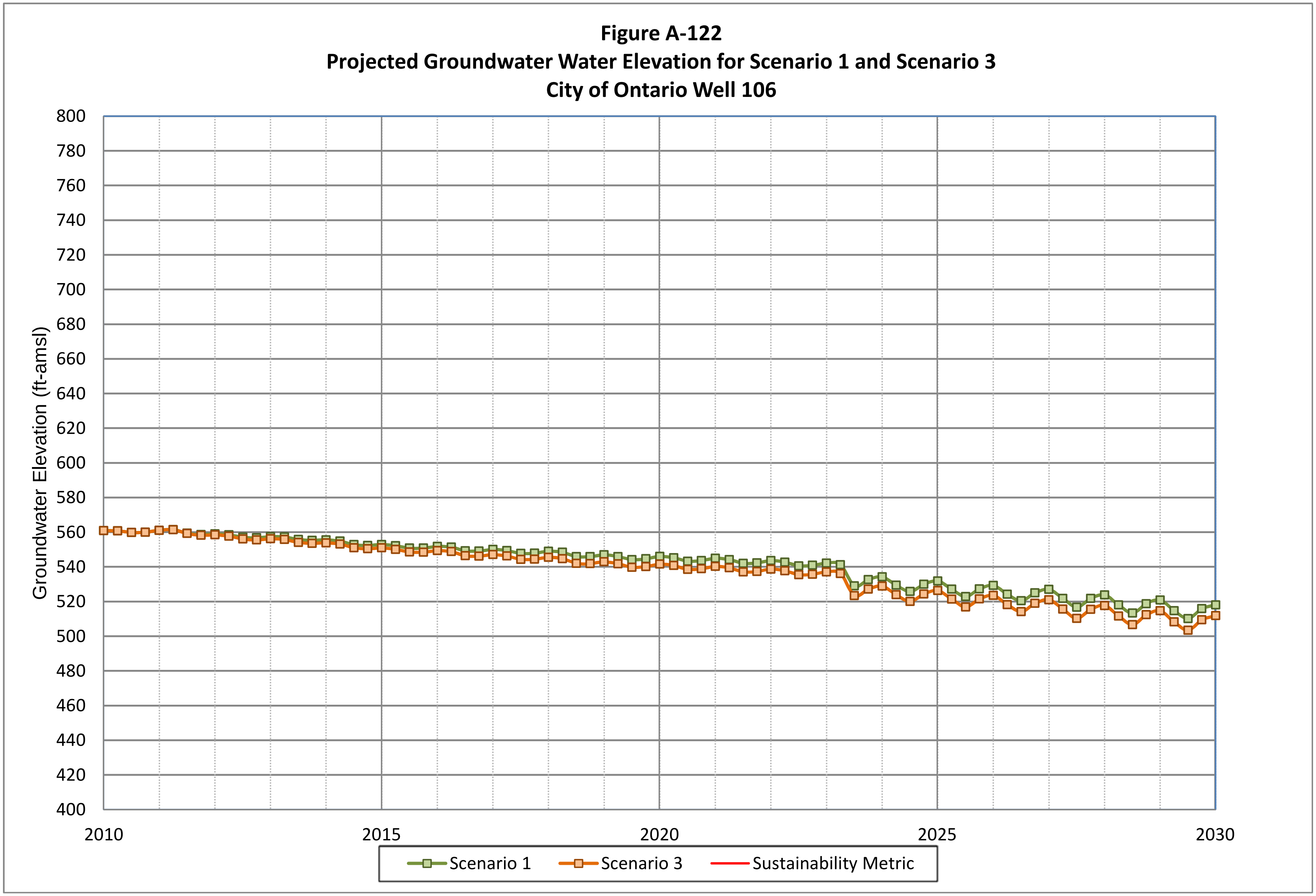
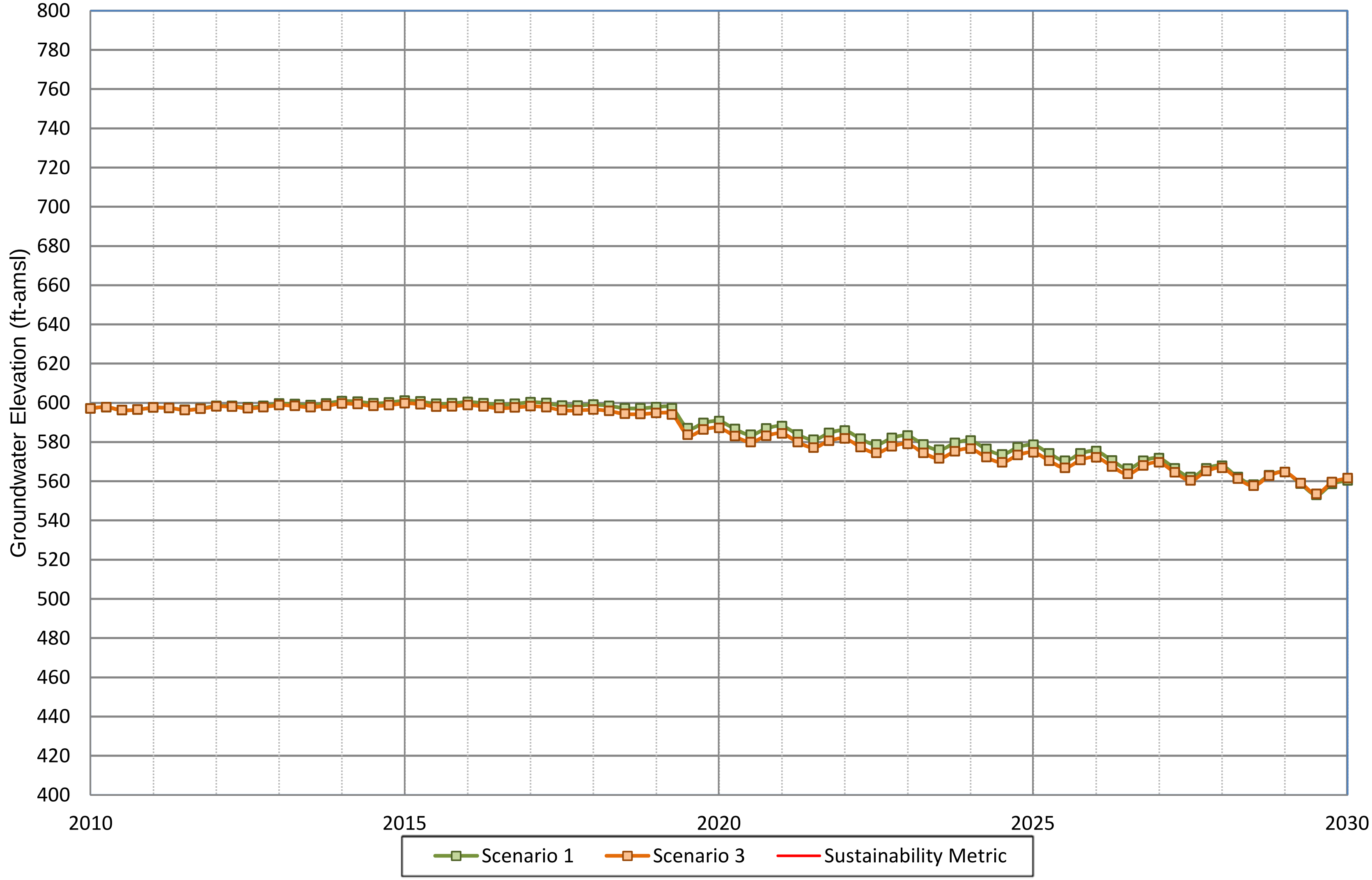


Figure A-121
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 105
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



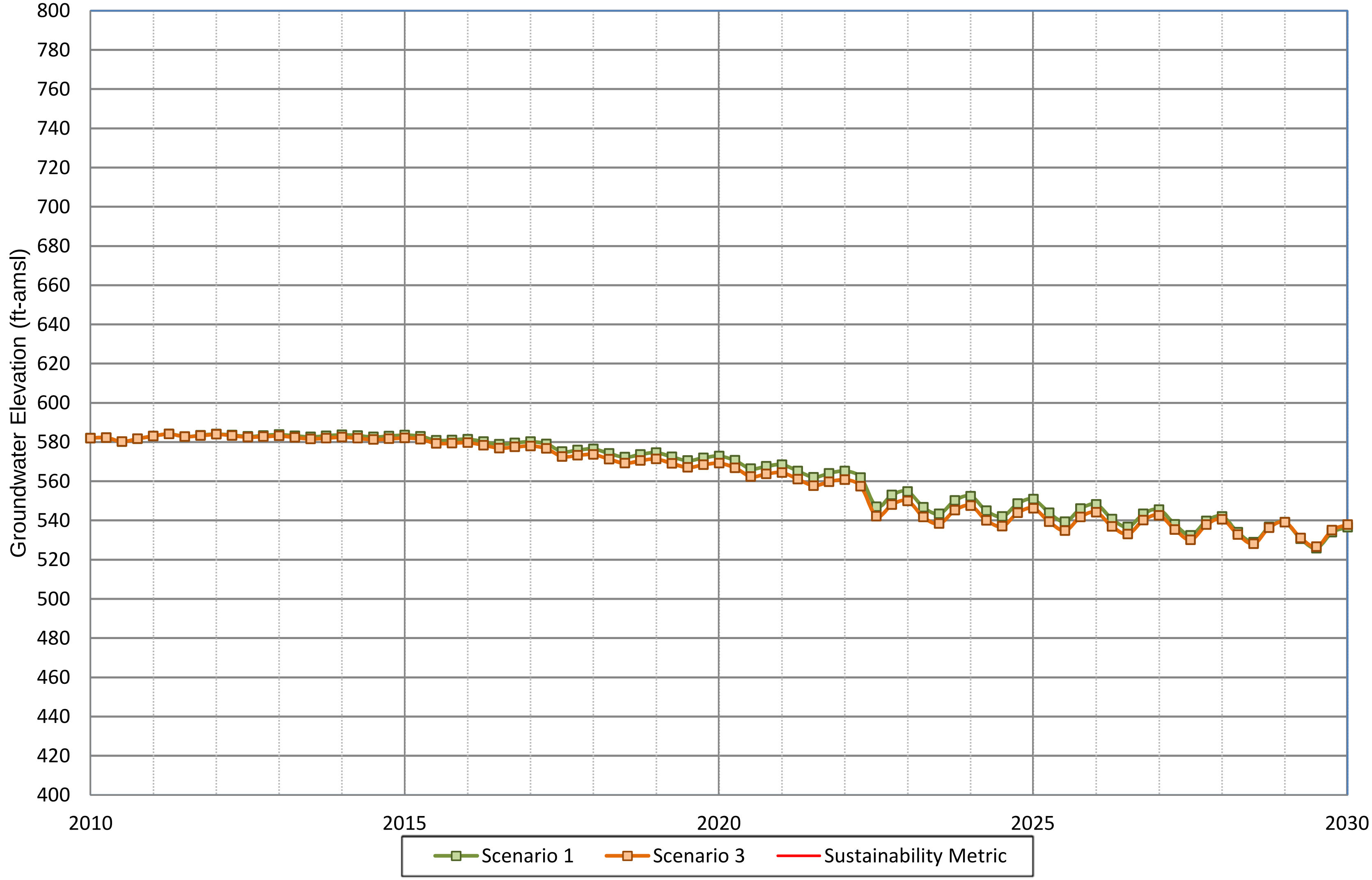
20120503_Projected_Hydrographs.xlsx

Figure A-123
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 109



20120503_Projected_Hydrographs.xlsx

Figure A-124
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 111



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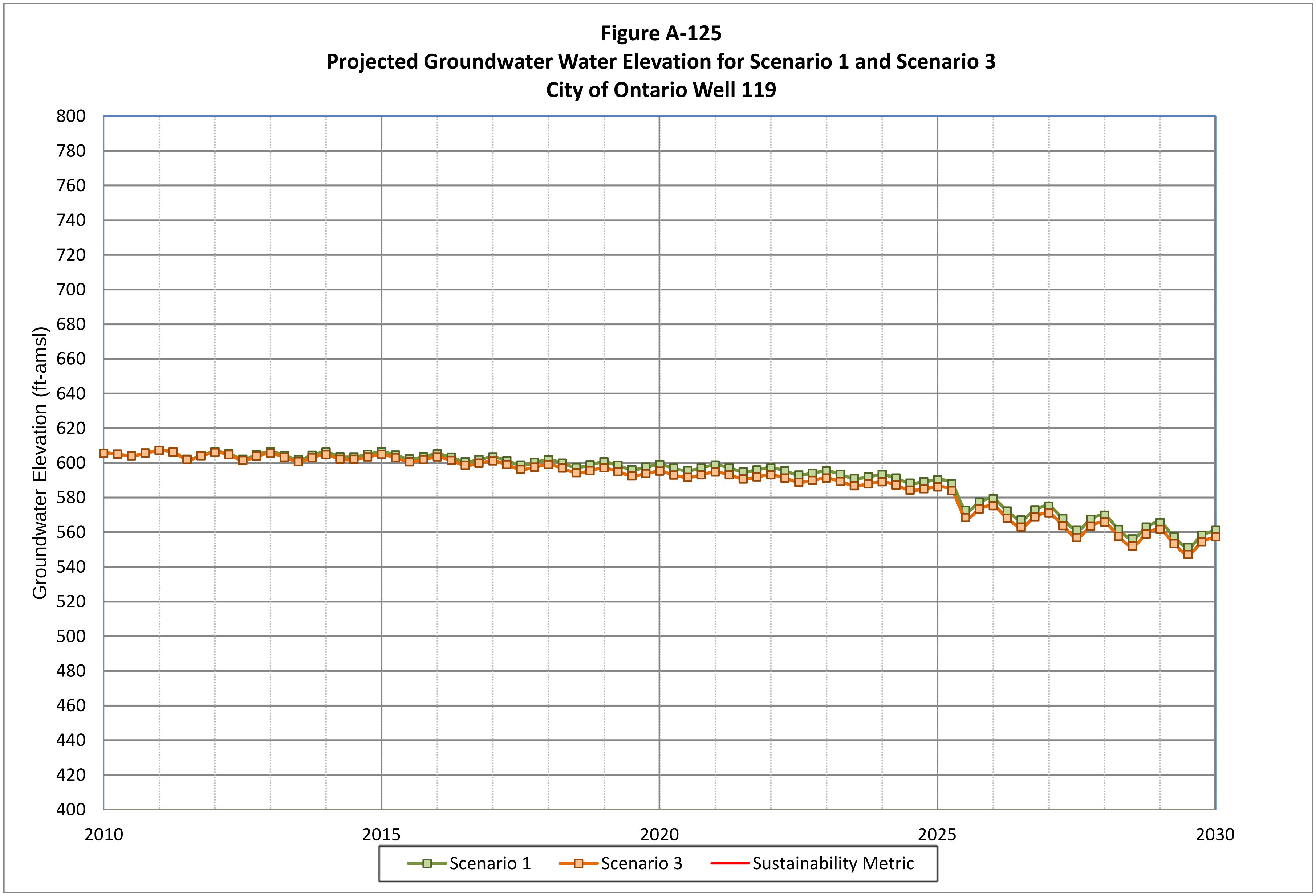
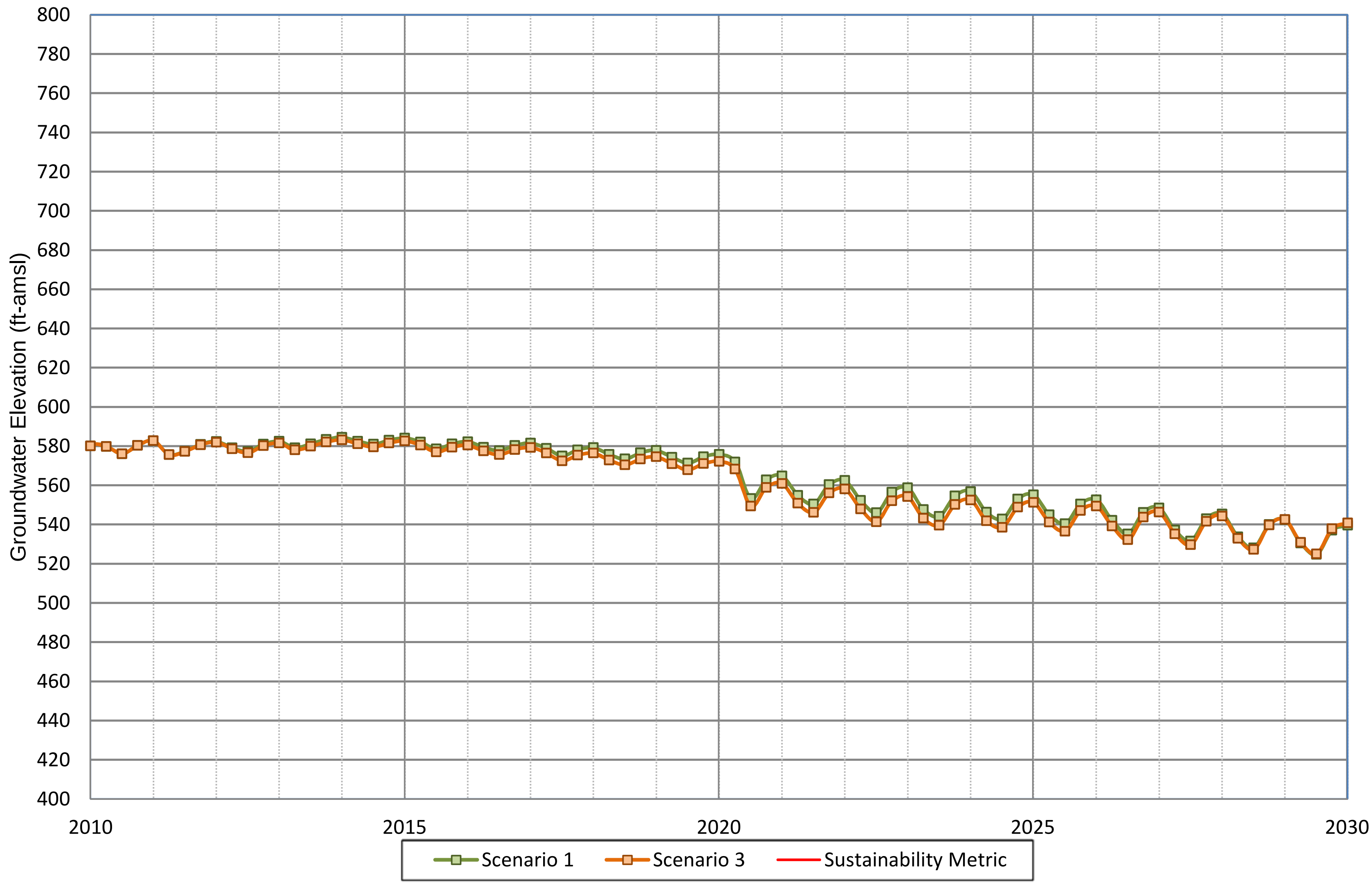


20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

Figure A-126
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 115



20120503_Projected_Hydrographs.xlsx

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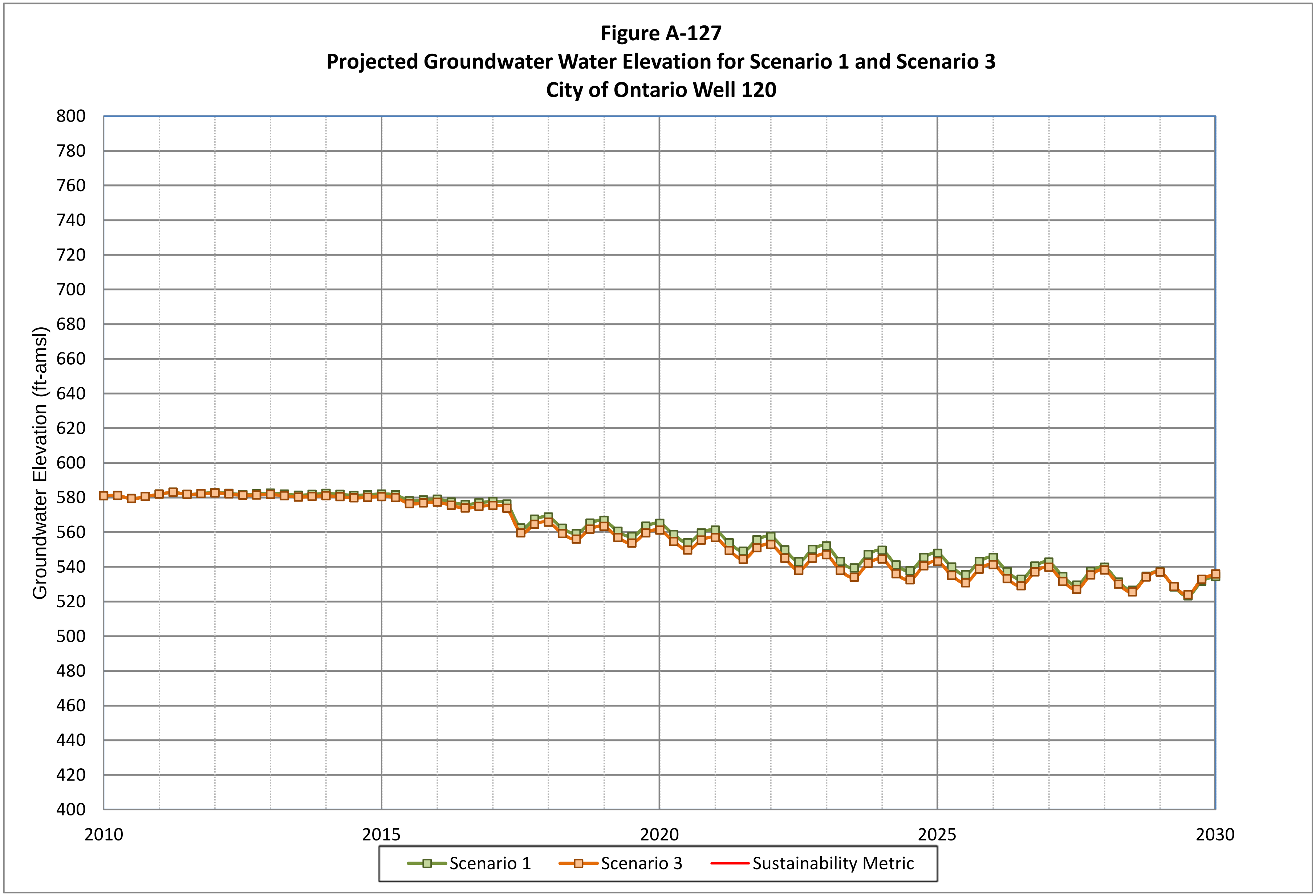
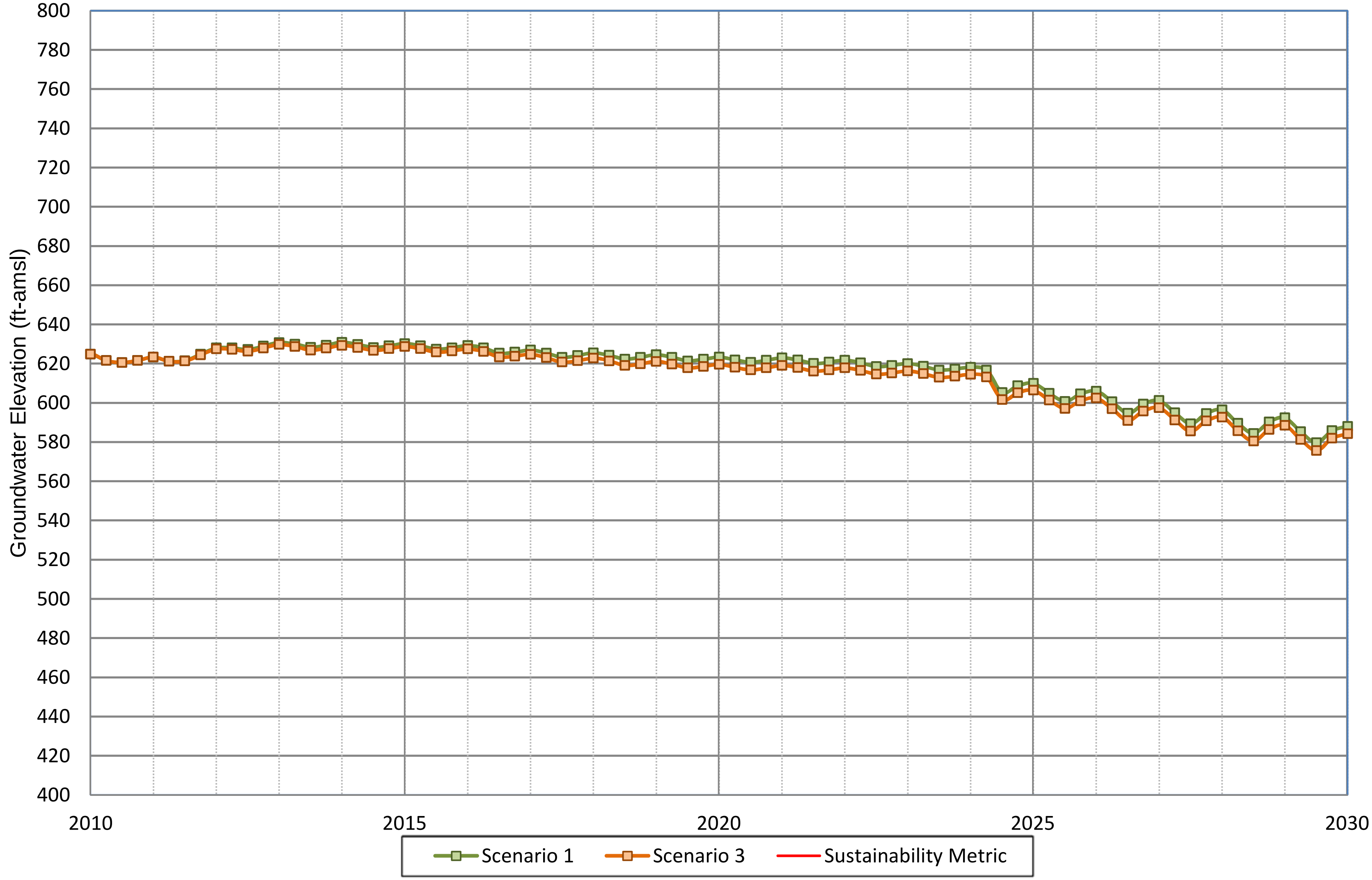


20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

Figure A-128
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 126



20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

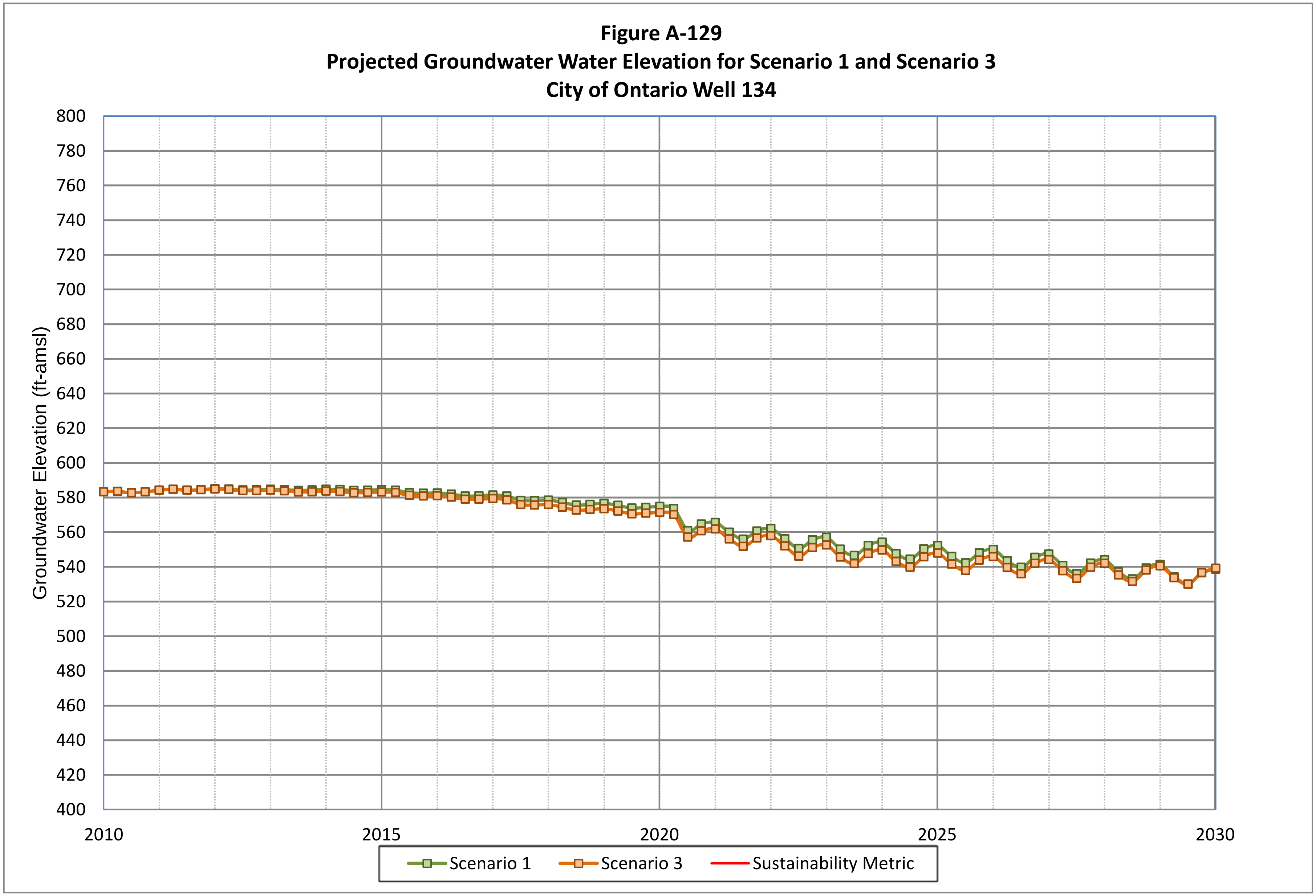
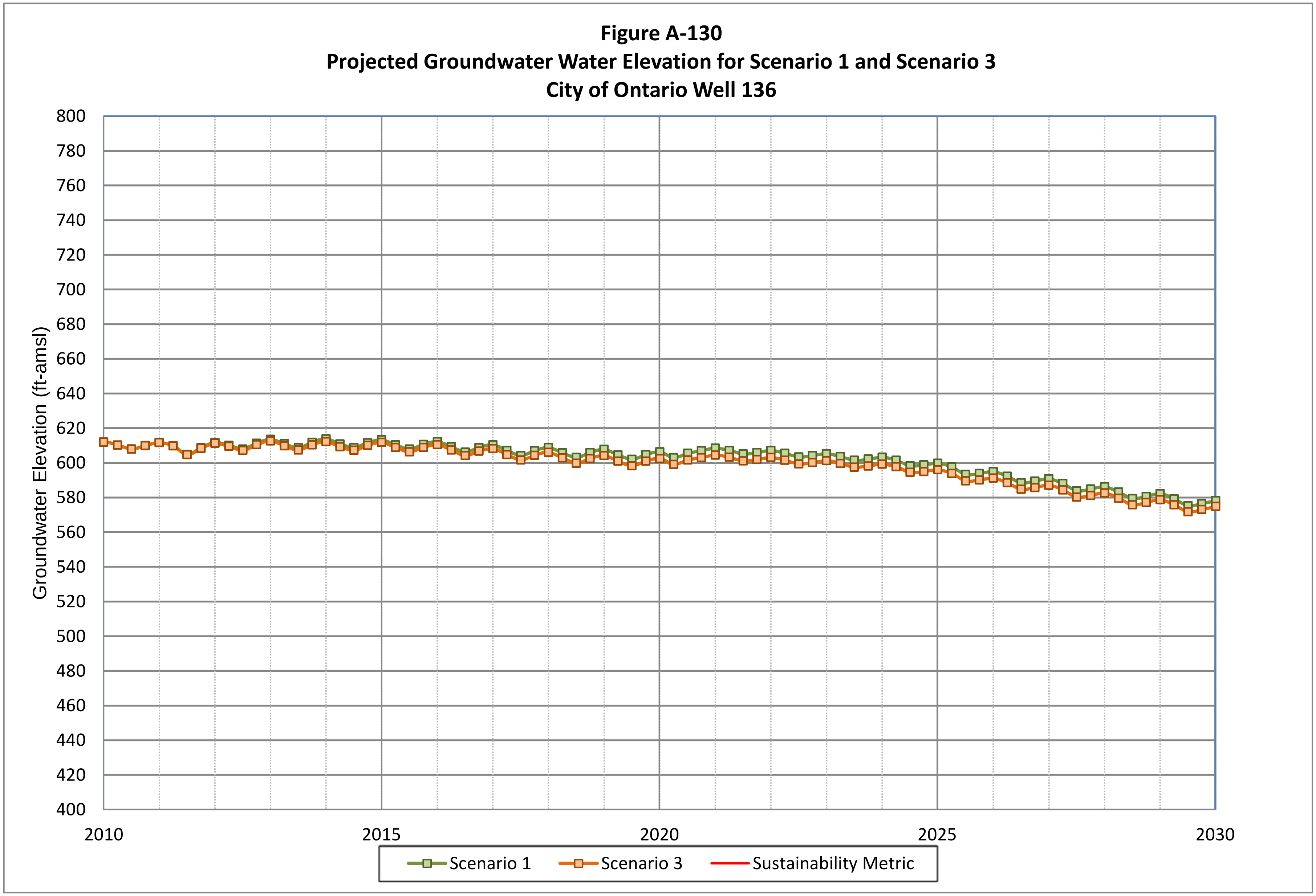
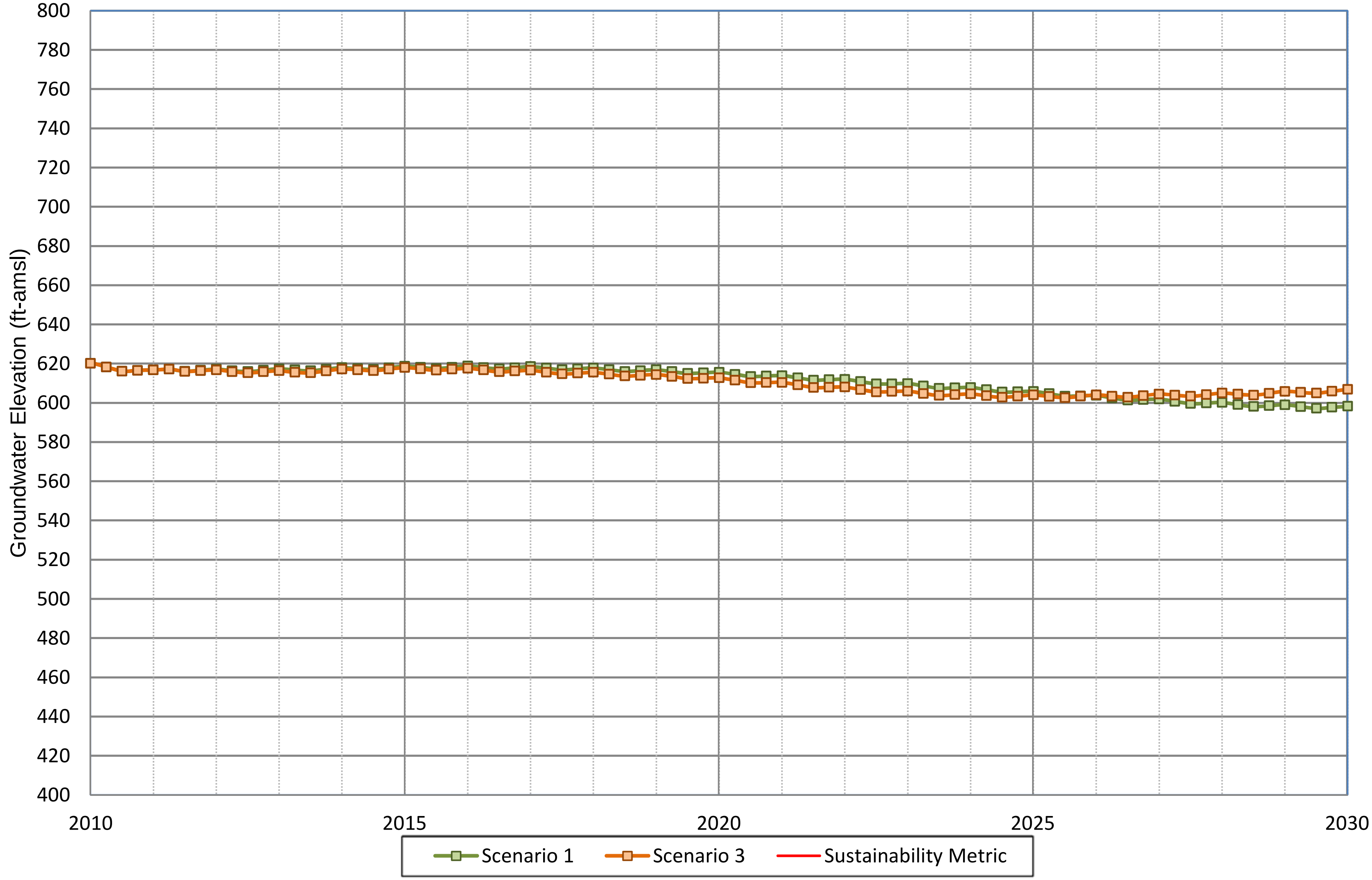


Figure A-129
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 134
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric

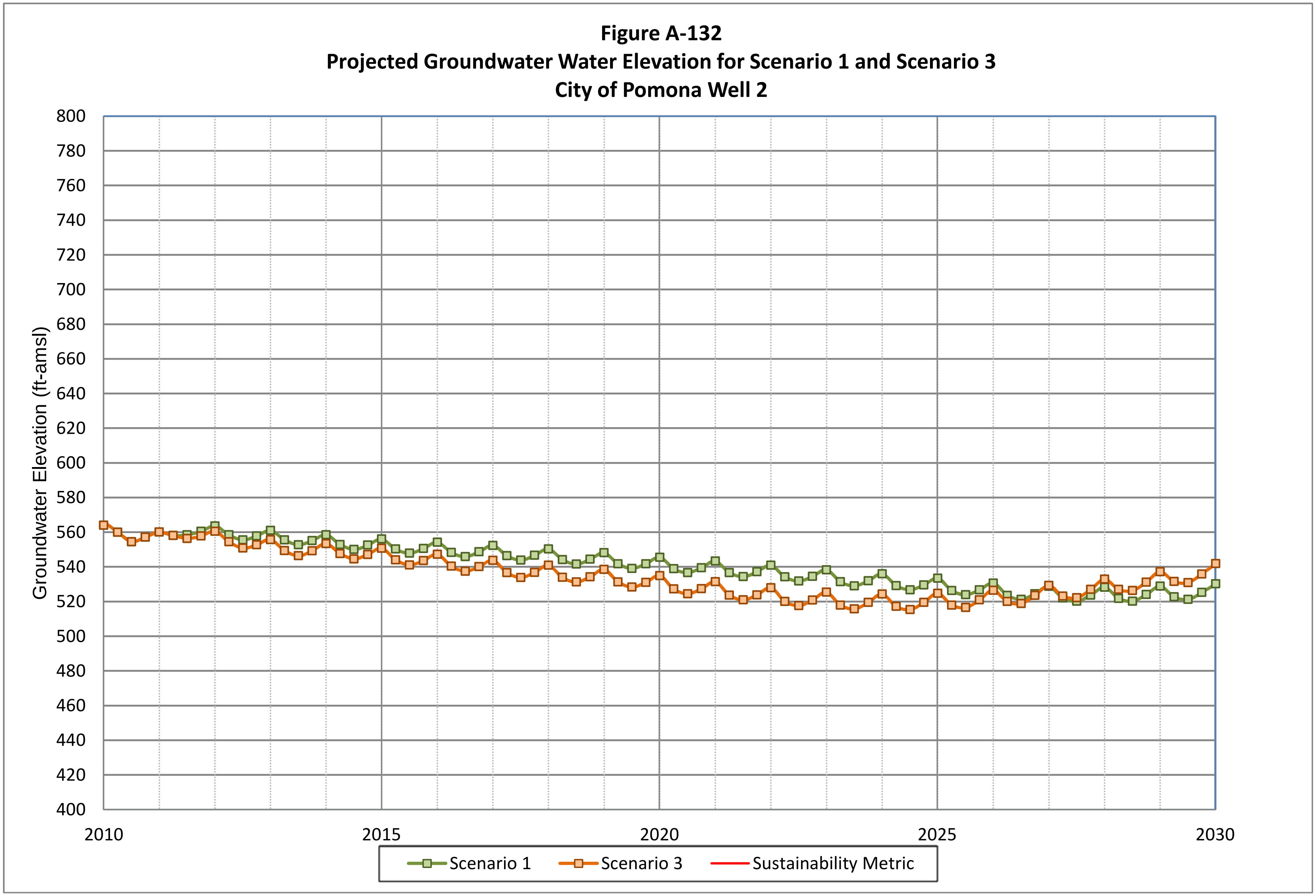


20120503_Projected_Hydrographs.xlsx

Figure A-131
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Ontario Well 138



20120503_Projected_Hydrographs.xlsx



20120503_Projected_Hydrographs.xlsx

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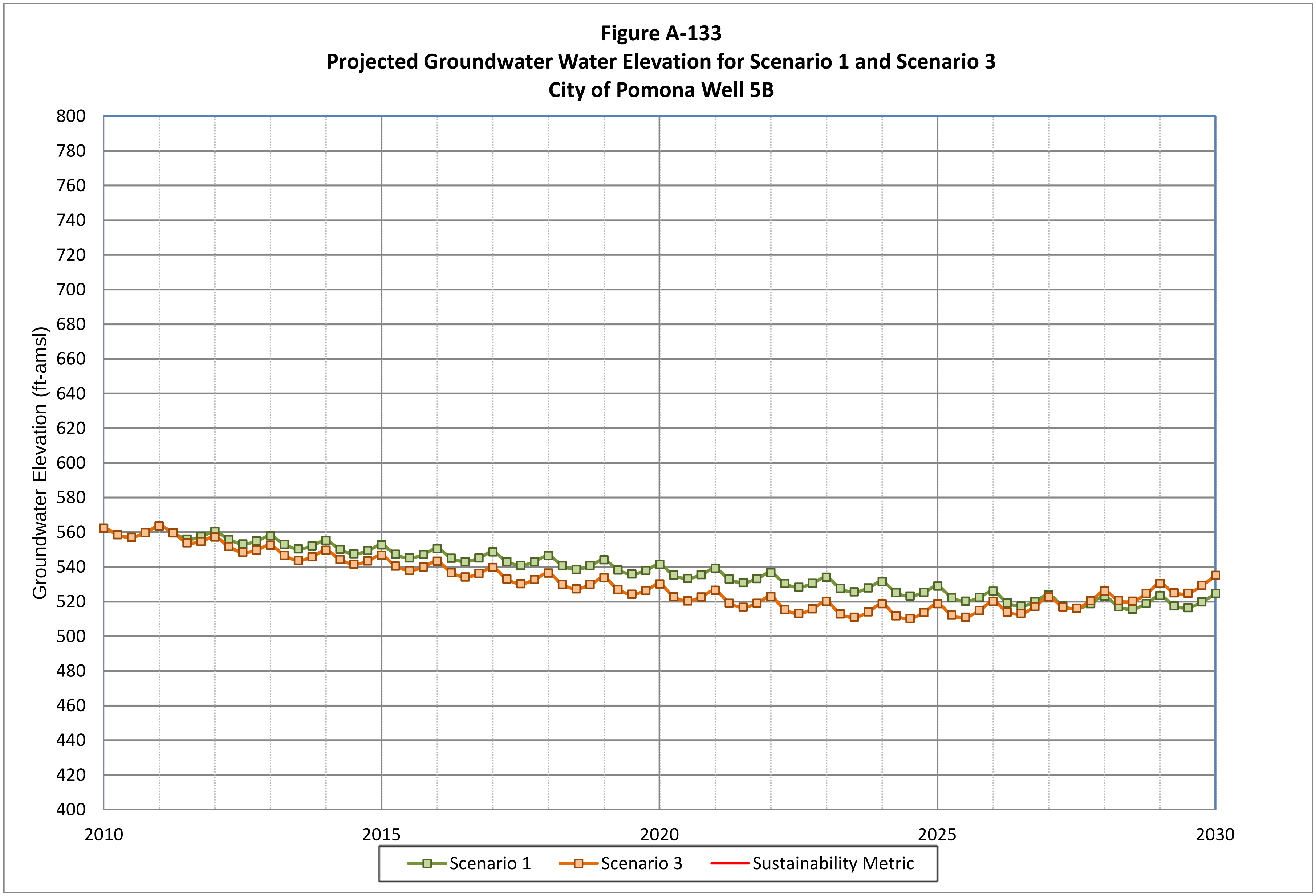
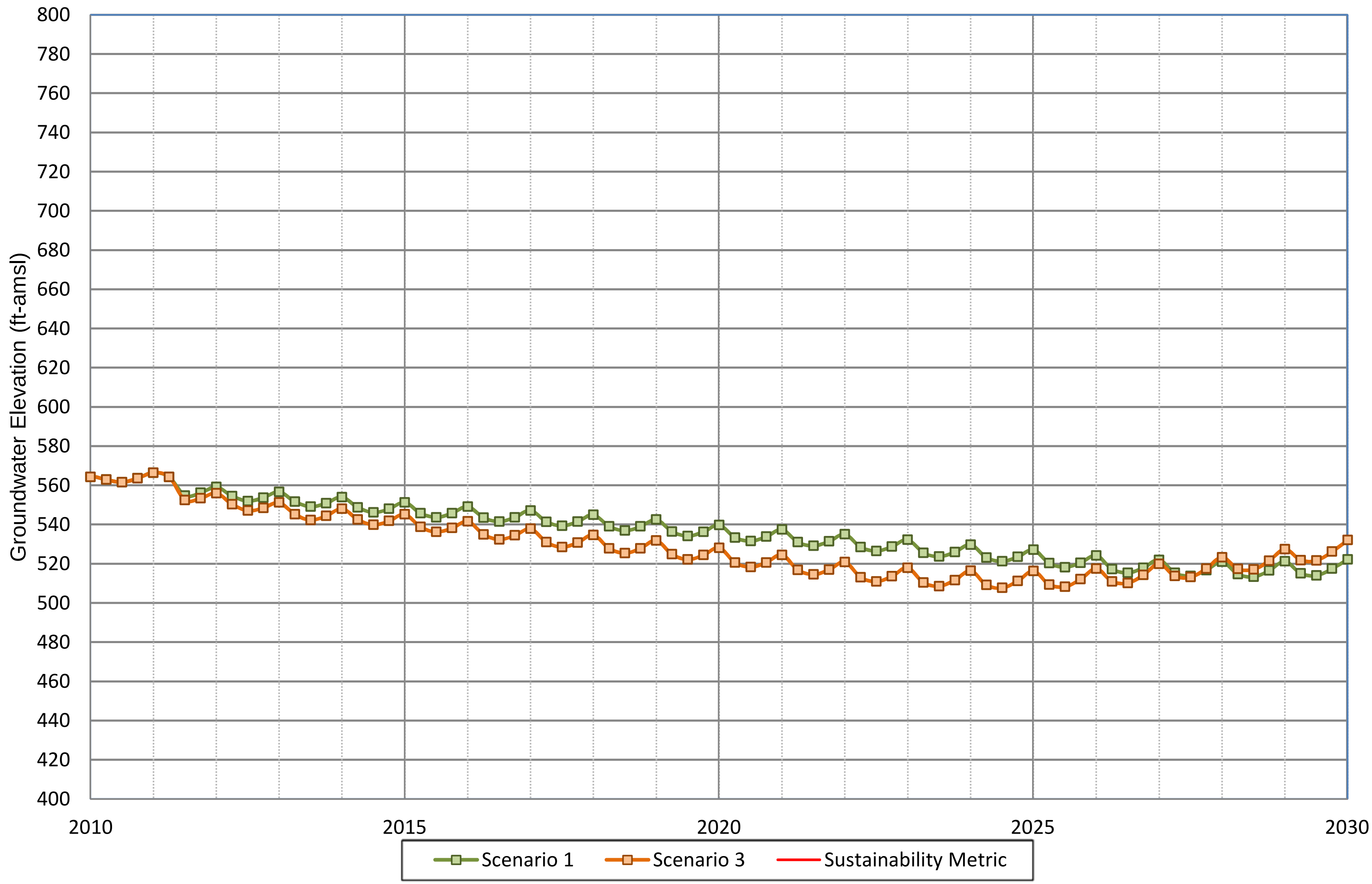
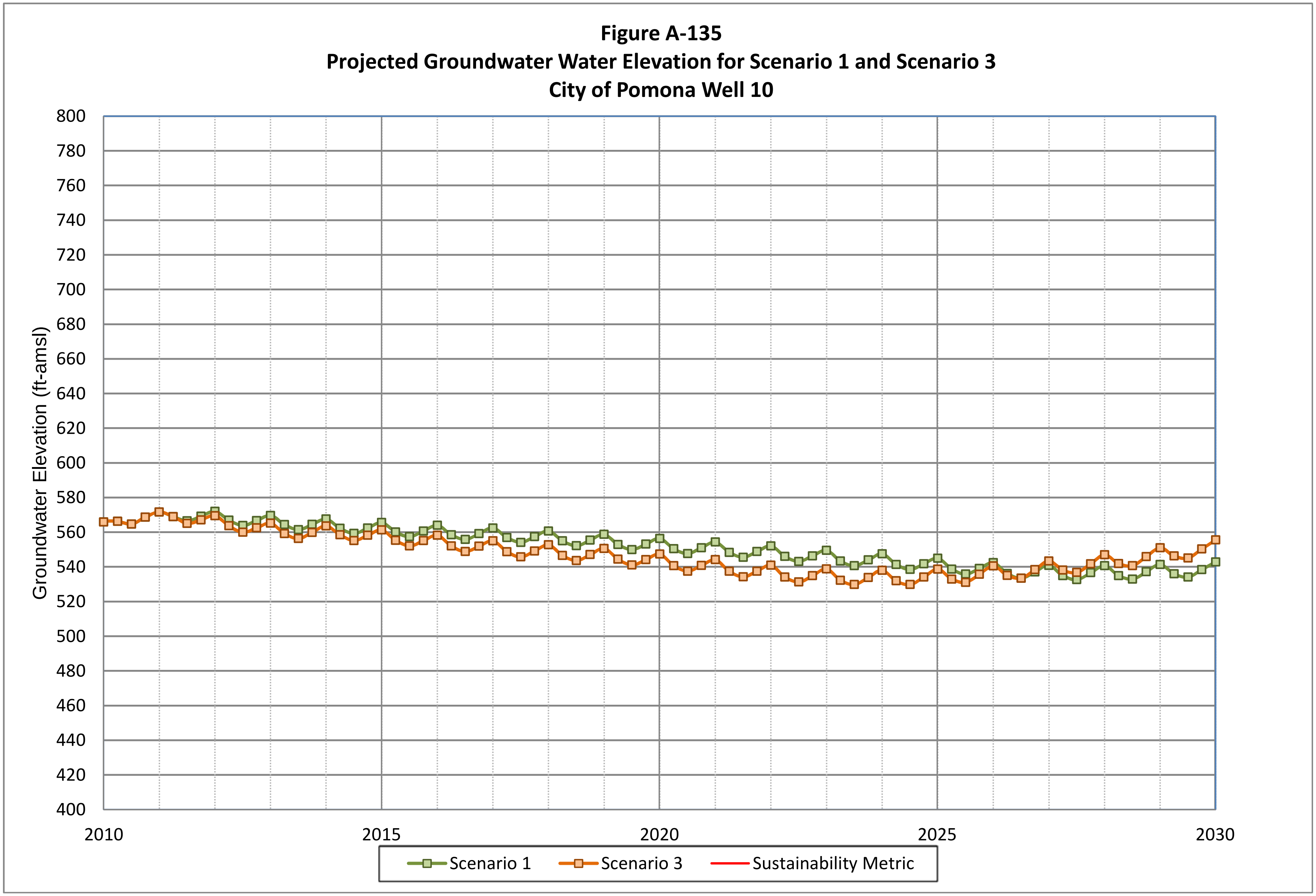


20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

Figure A-134
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Pomona Well 6





20120503_Projected_Hydrographs.xlsx

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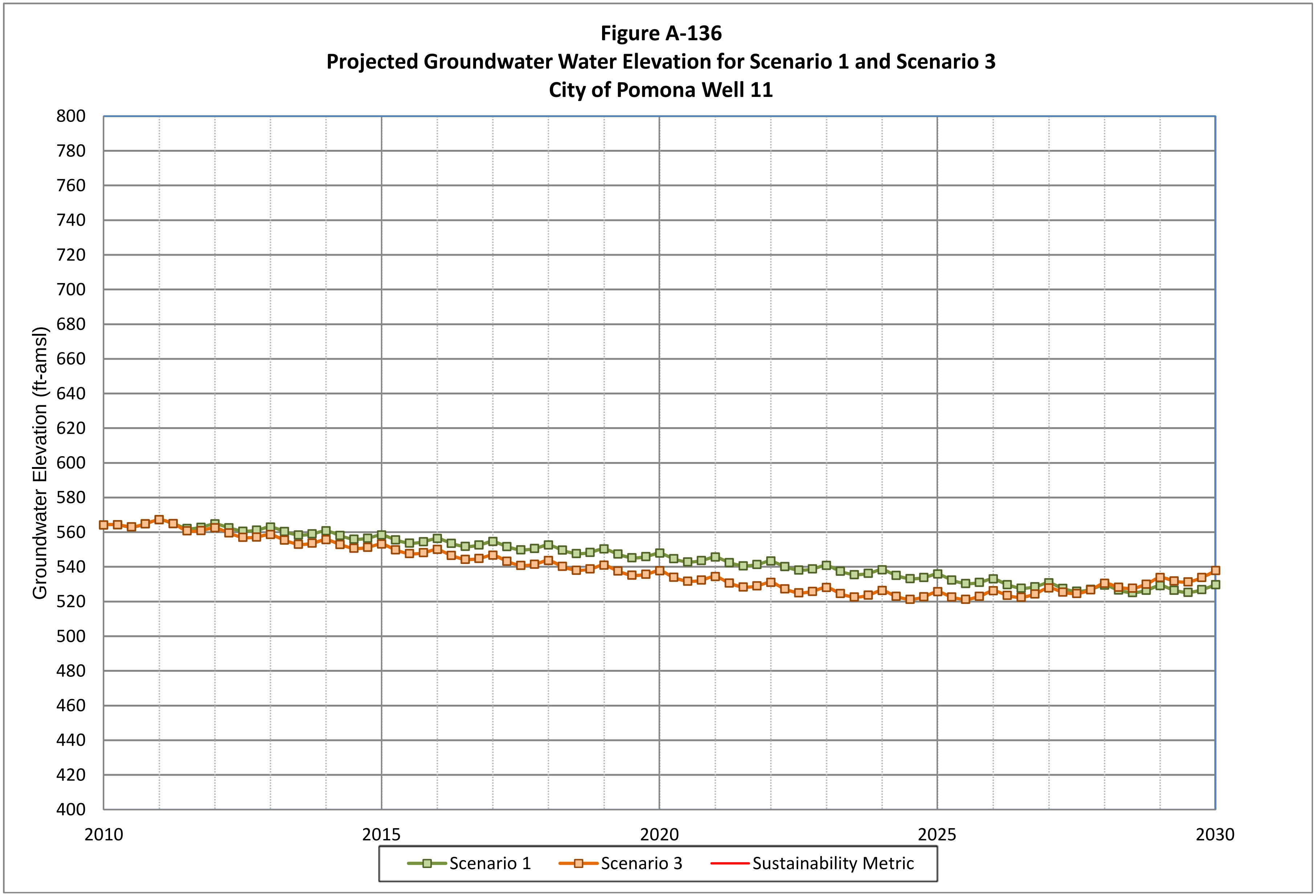


20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

Figure A-137
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Pomona Well 12

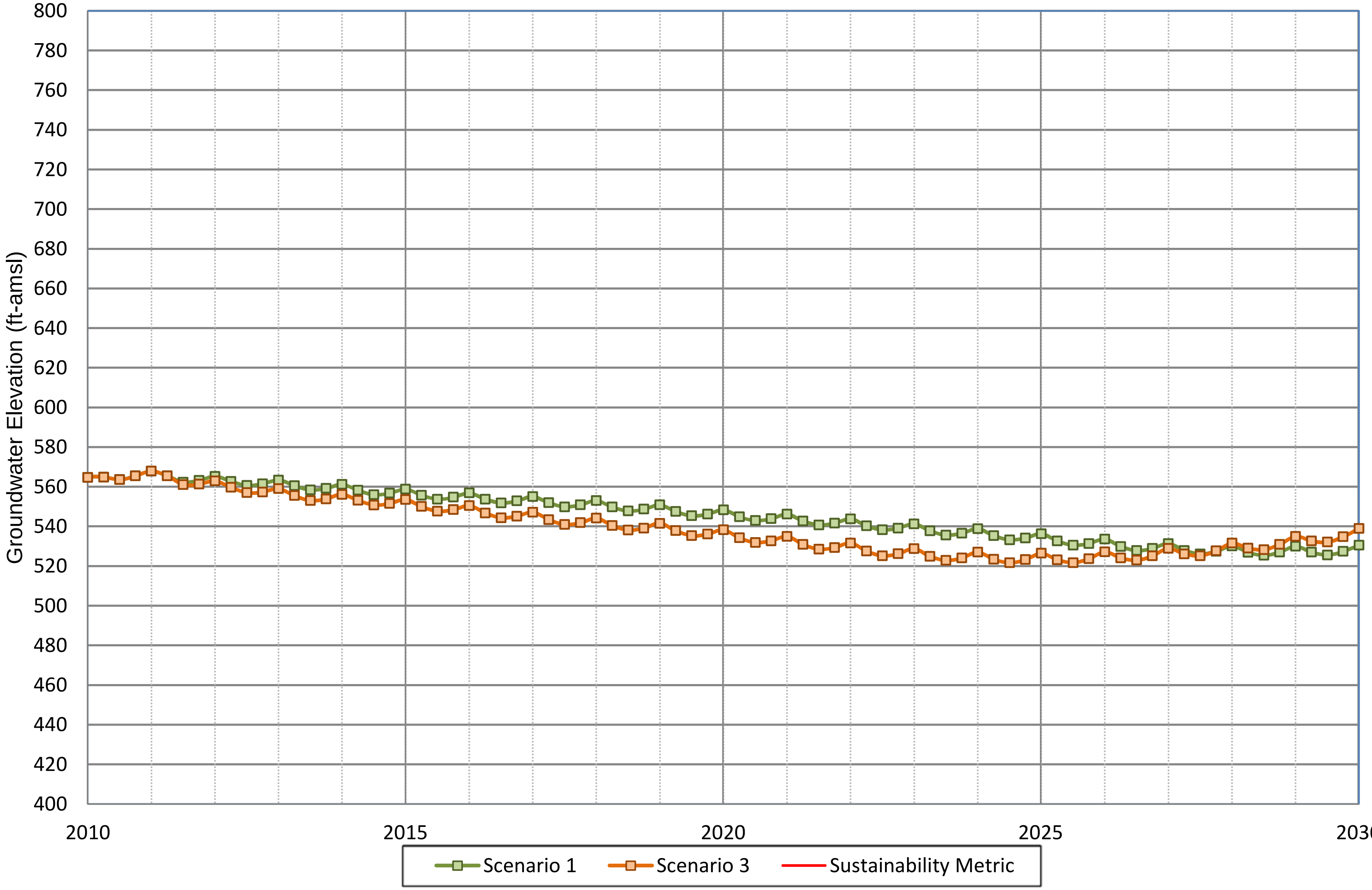
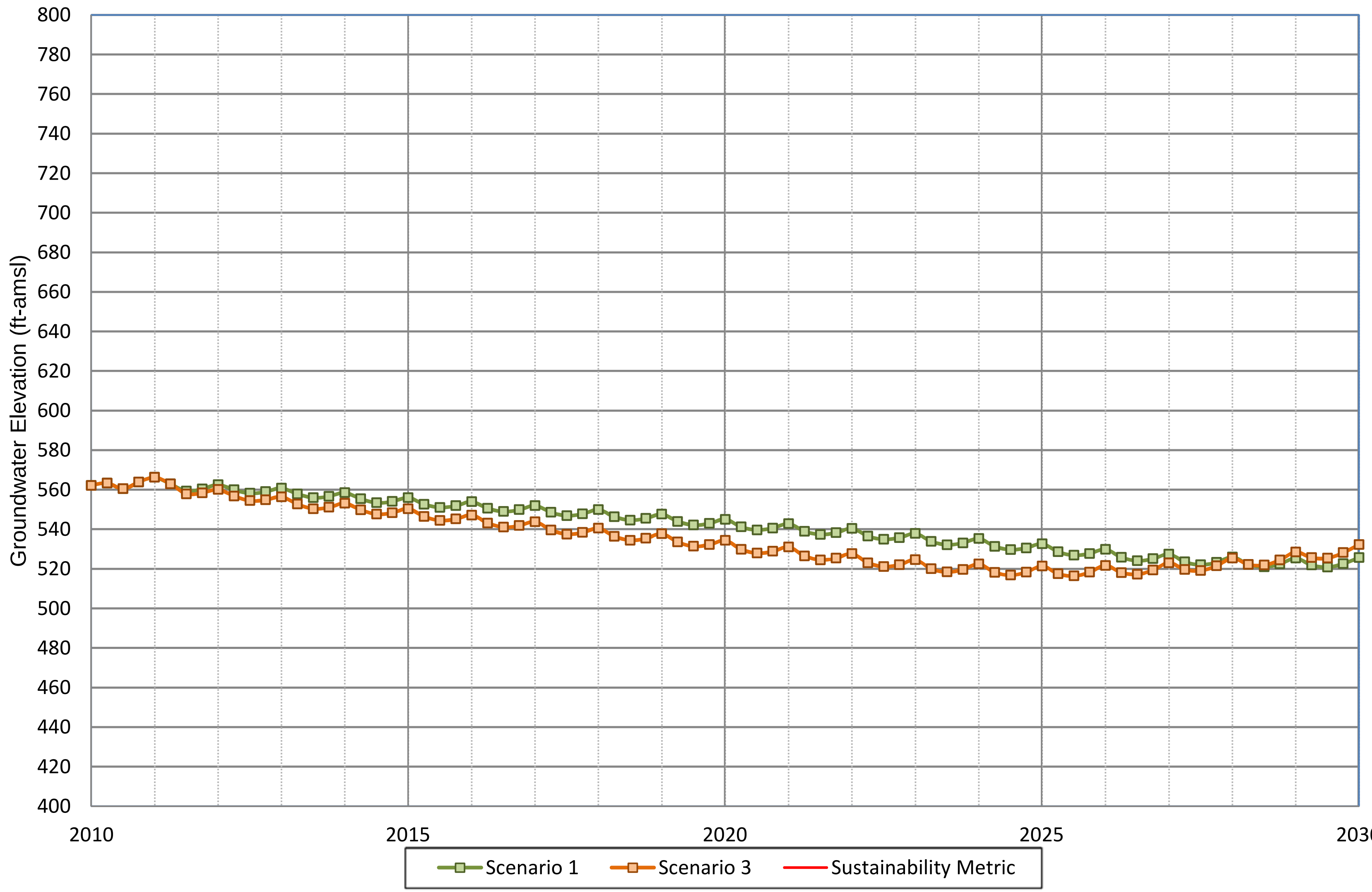


Figure A-138
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Pomona Well 14



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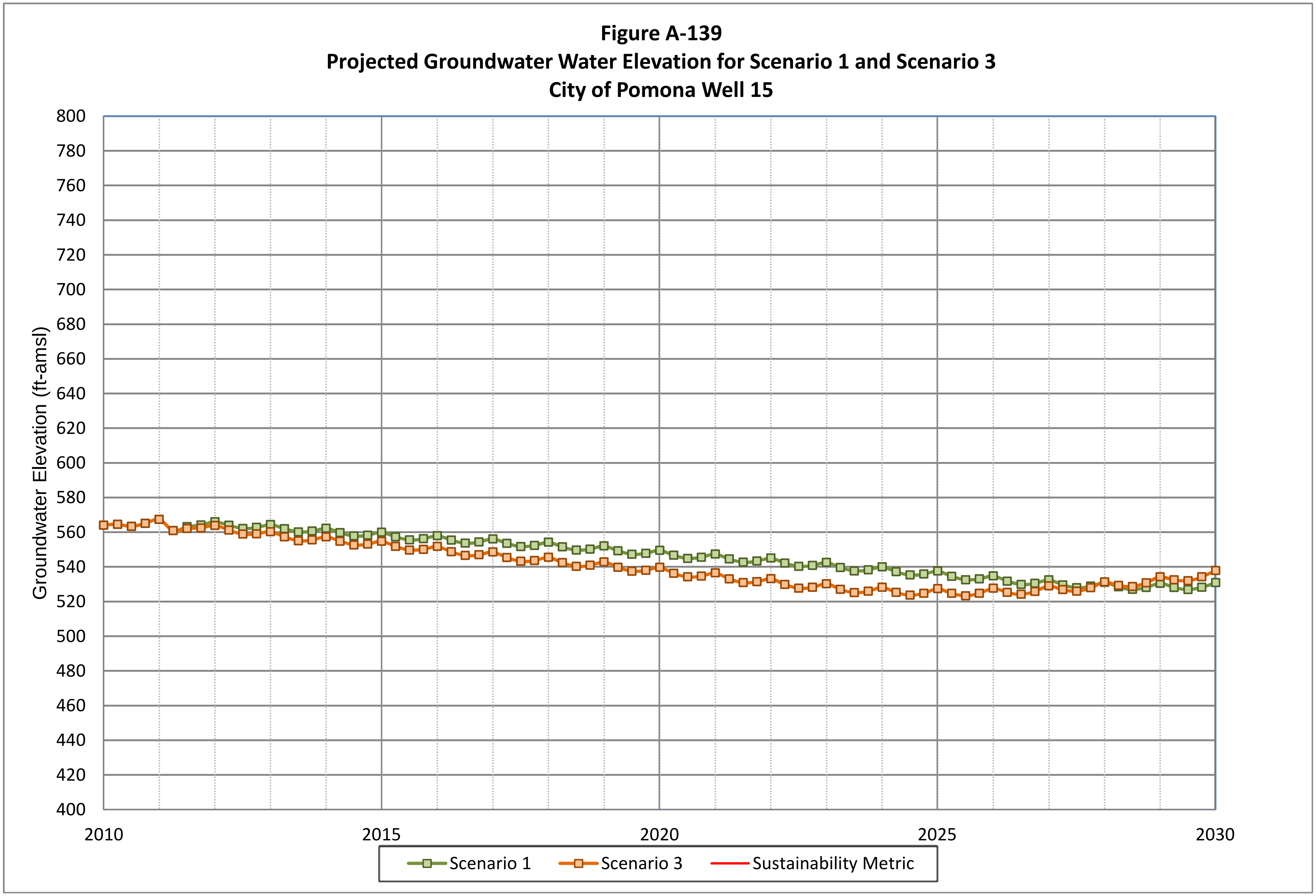

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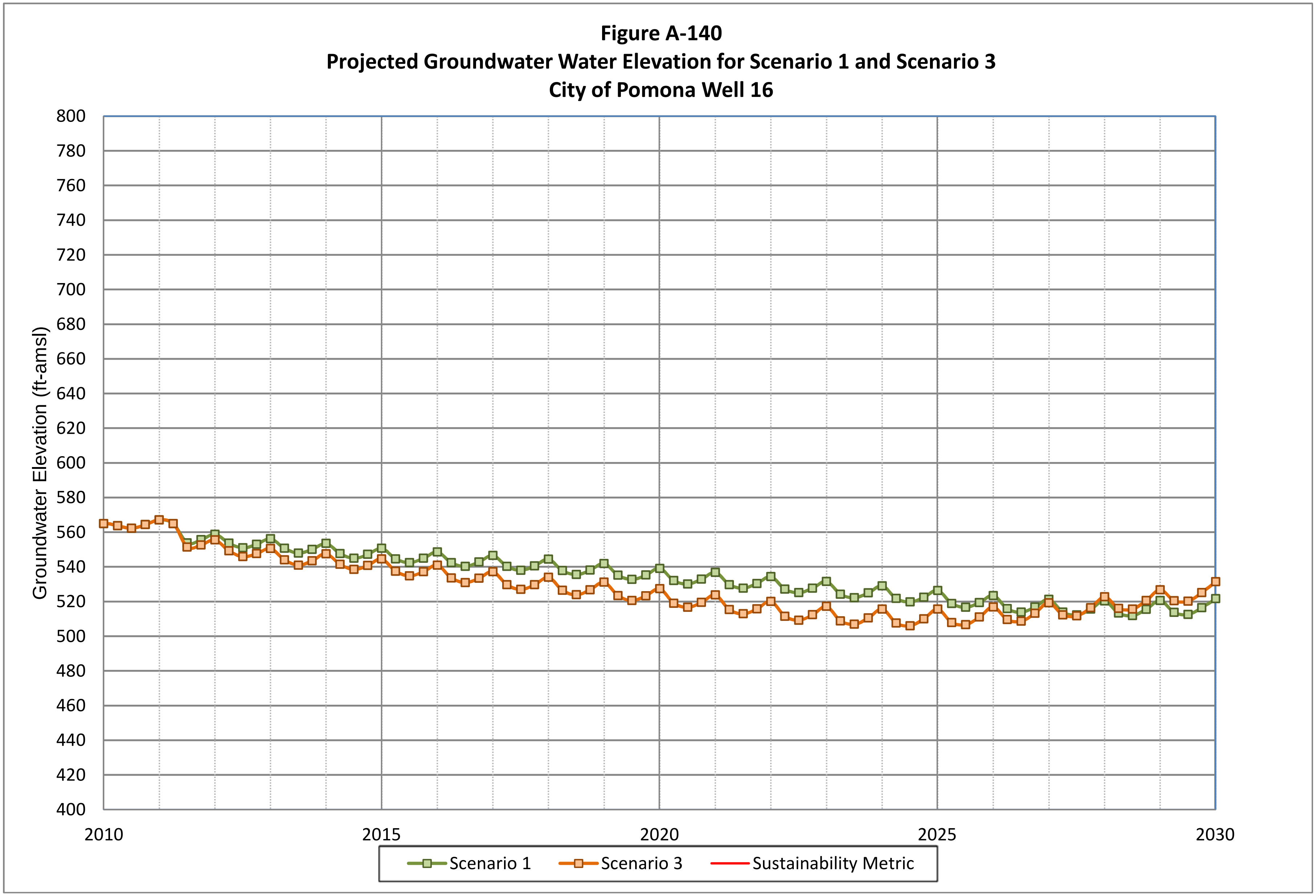


20120503_Projected_Hydrographs.xlsx

Figure A-141
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Pomona Well 17

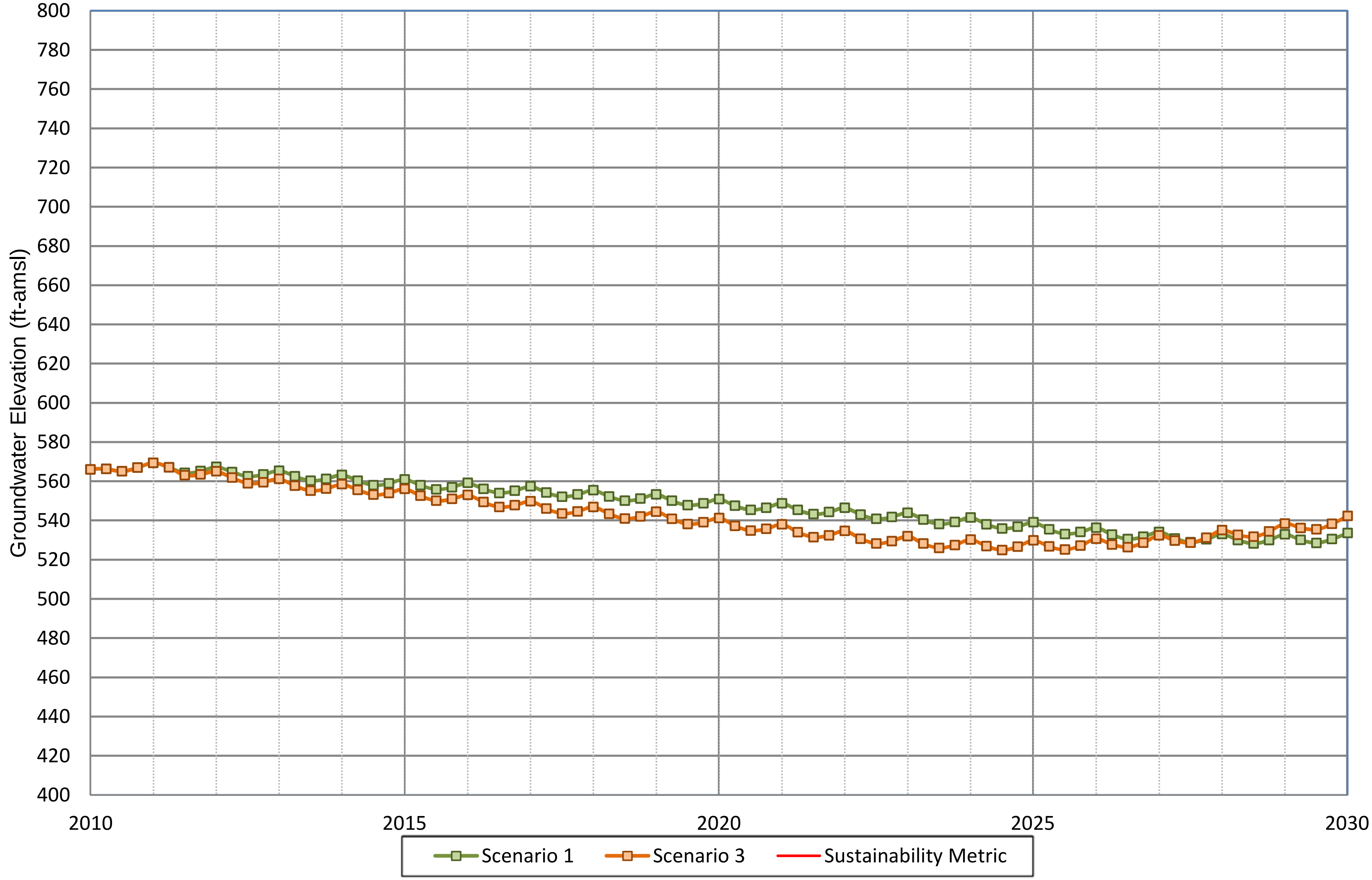
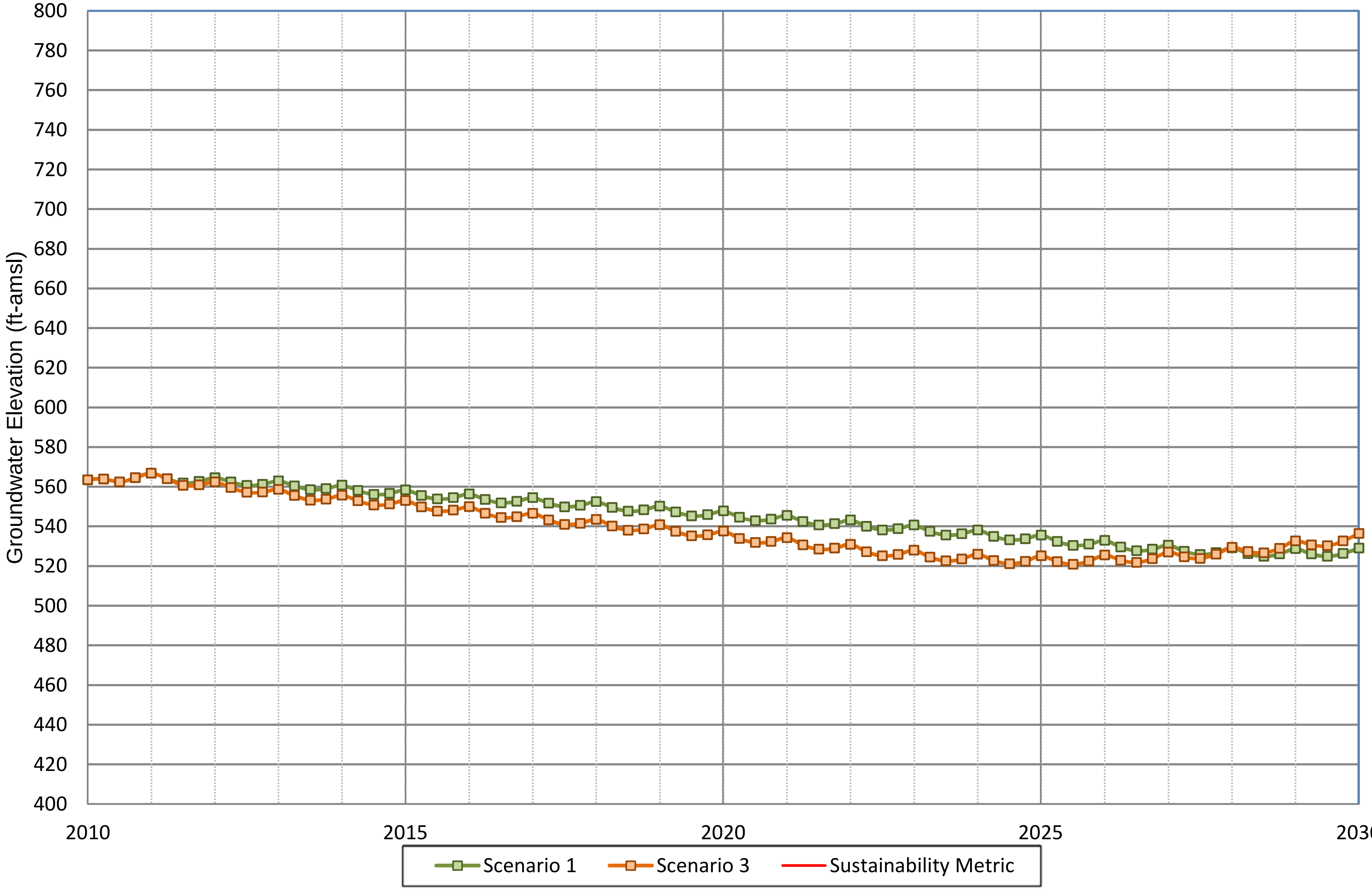
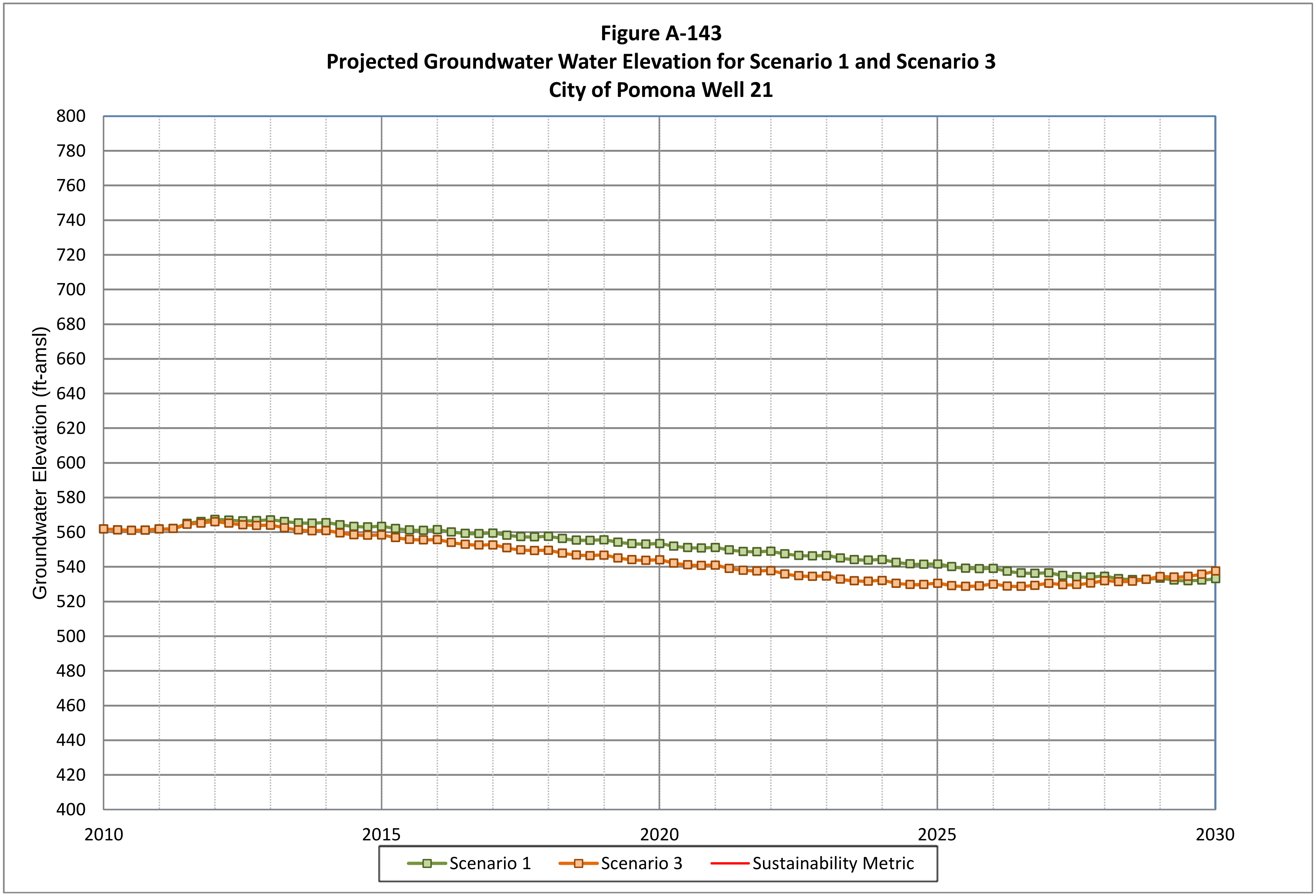


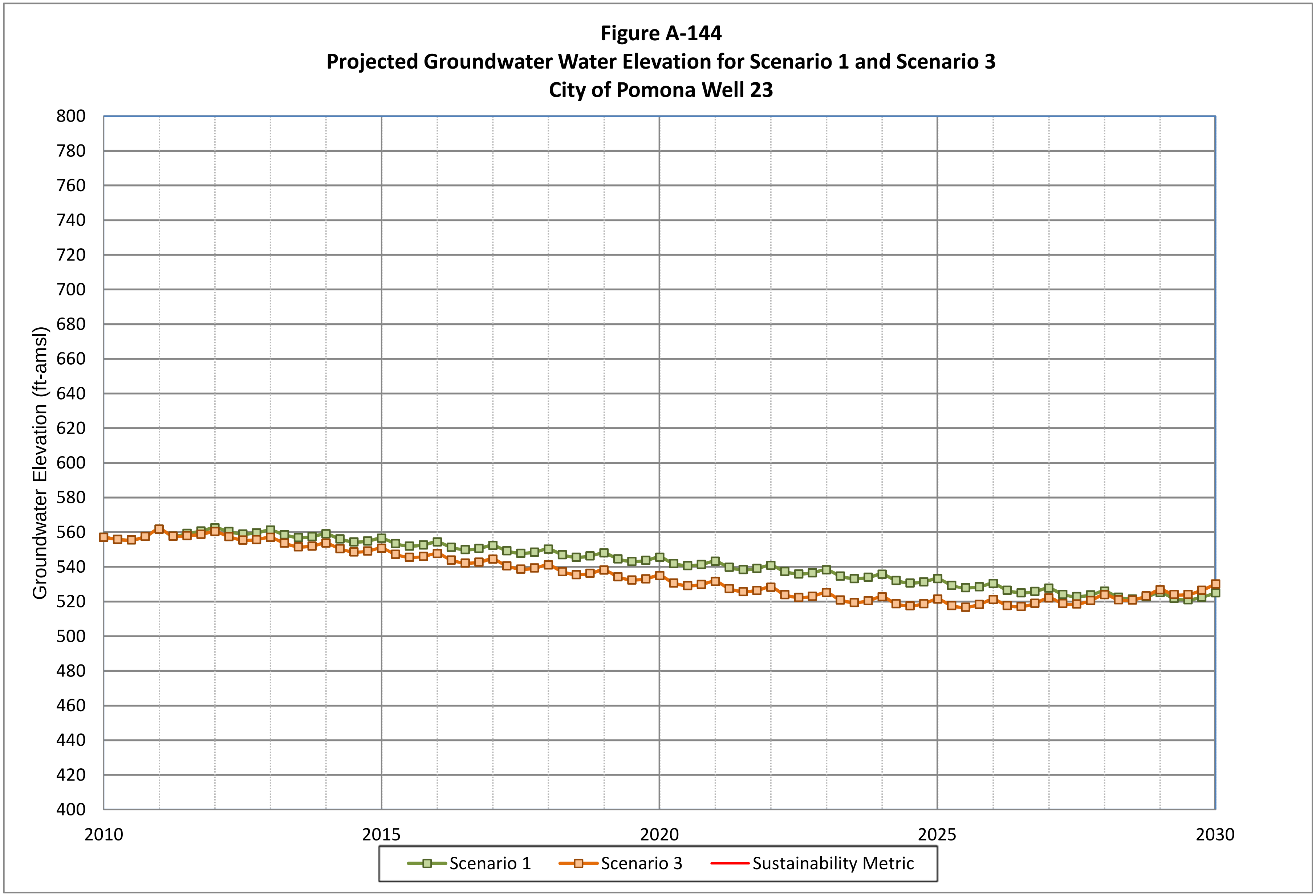
Figure A-142
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Pomona Well 18





20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.



20120503_Projected_Hydrographs.xlsx

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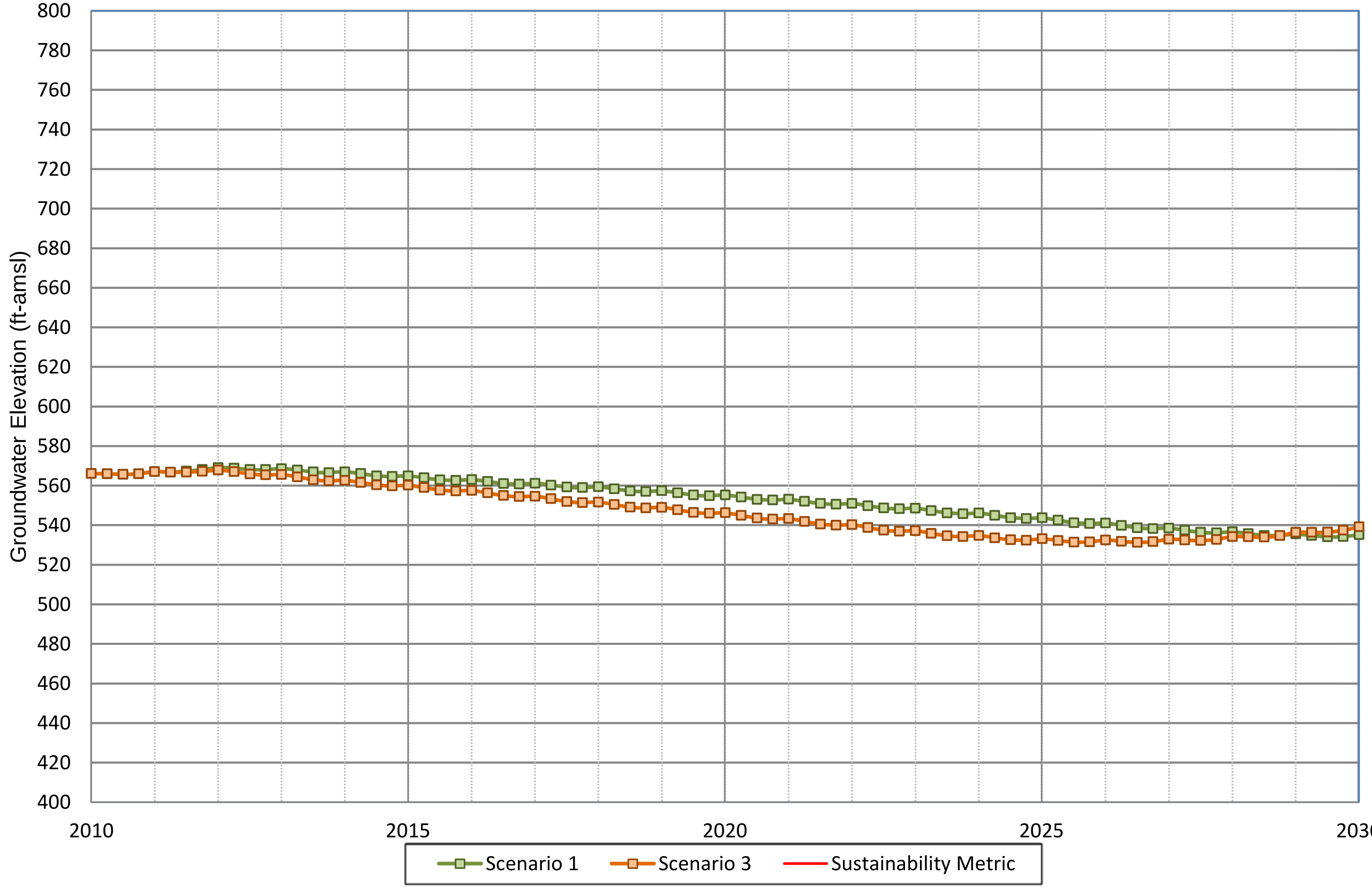
Figure A-145
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Pomona Well 24



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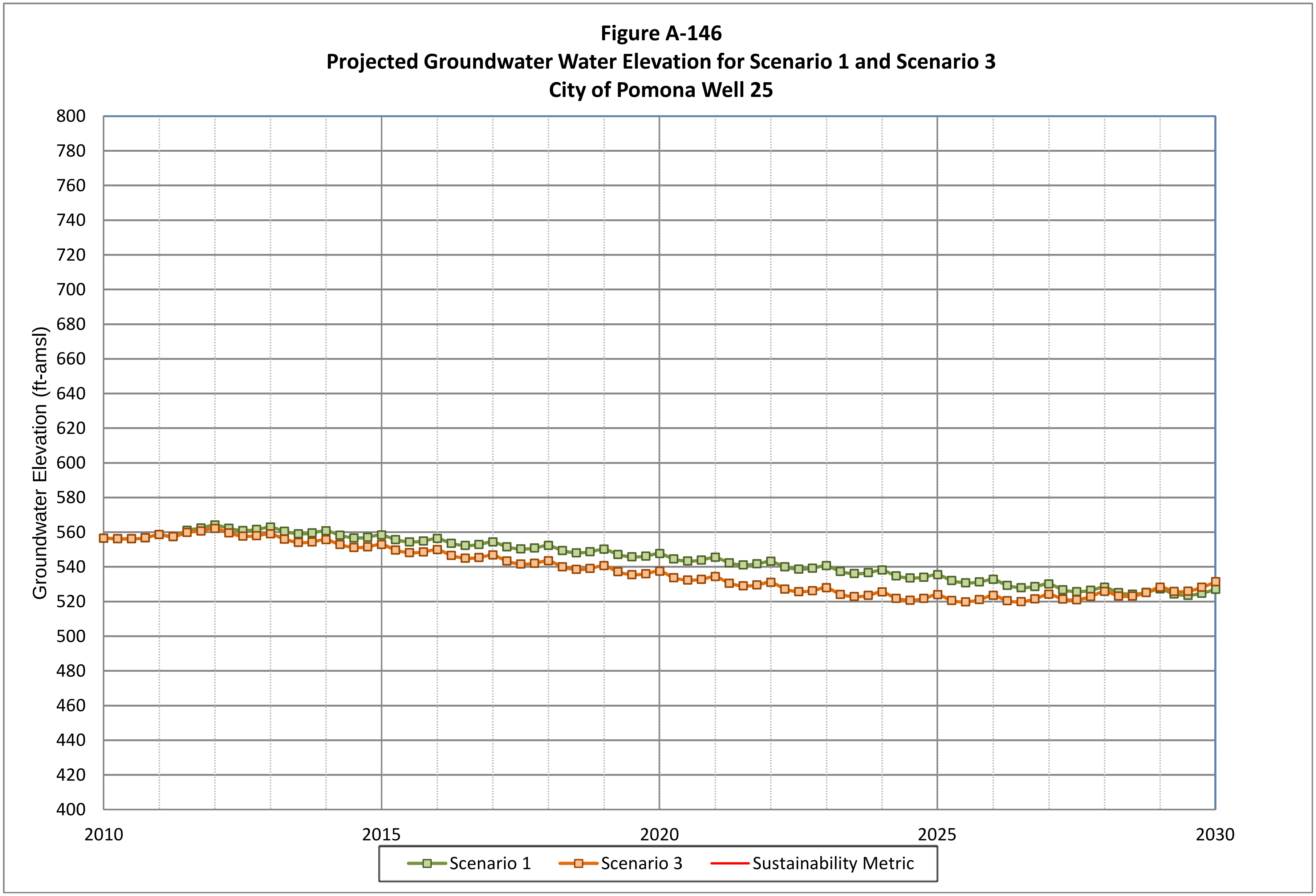


20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

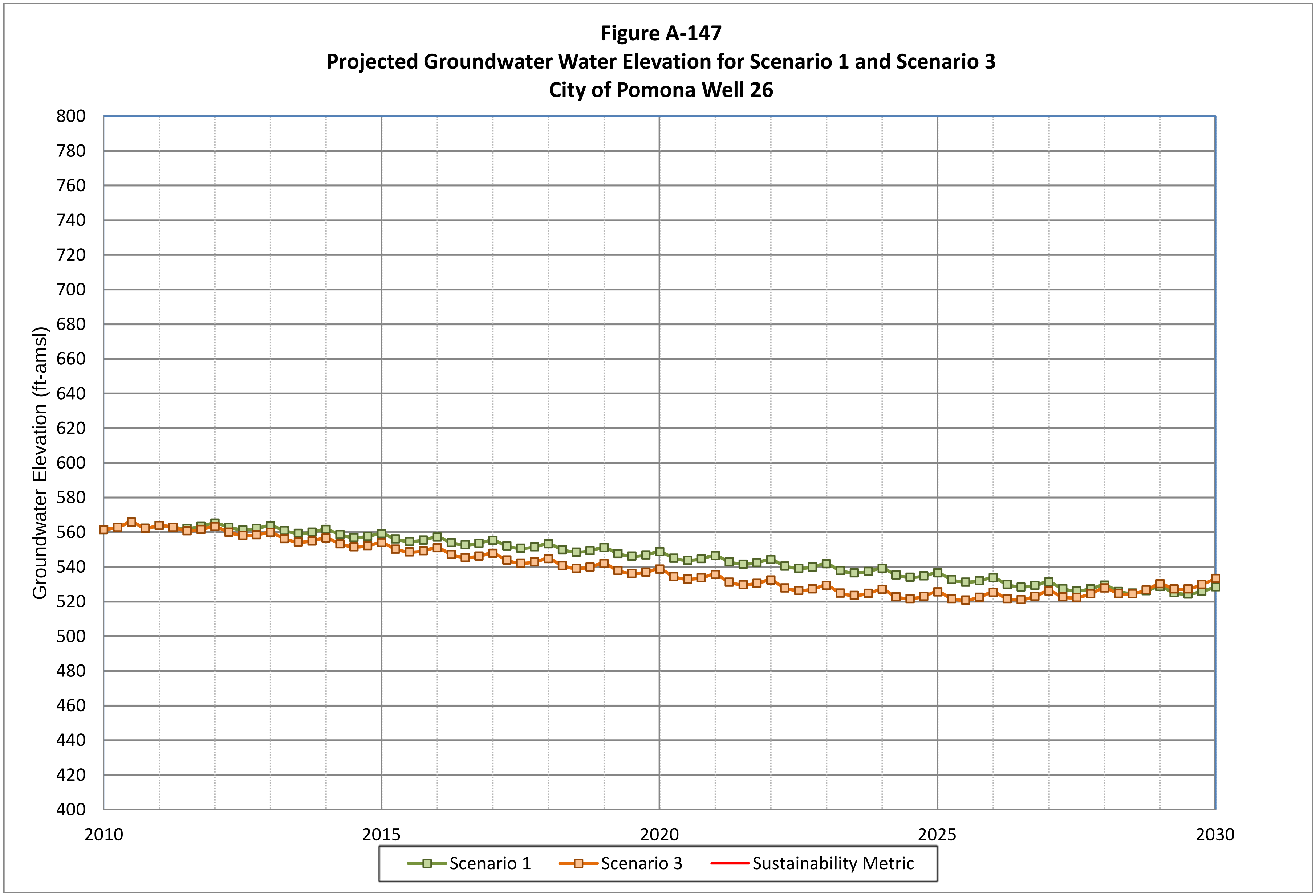
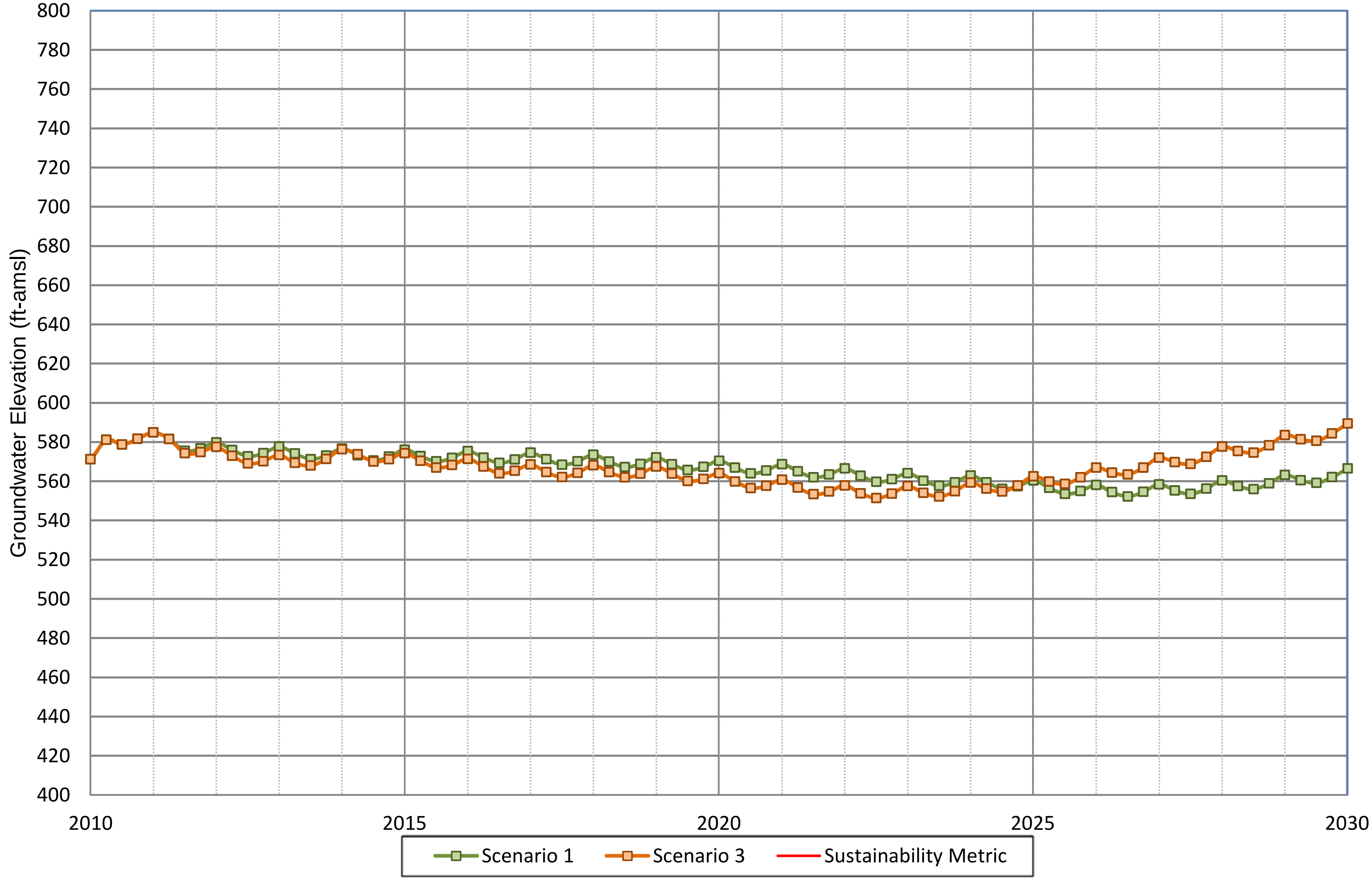


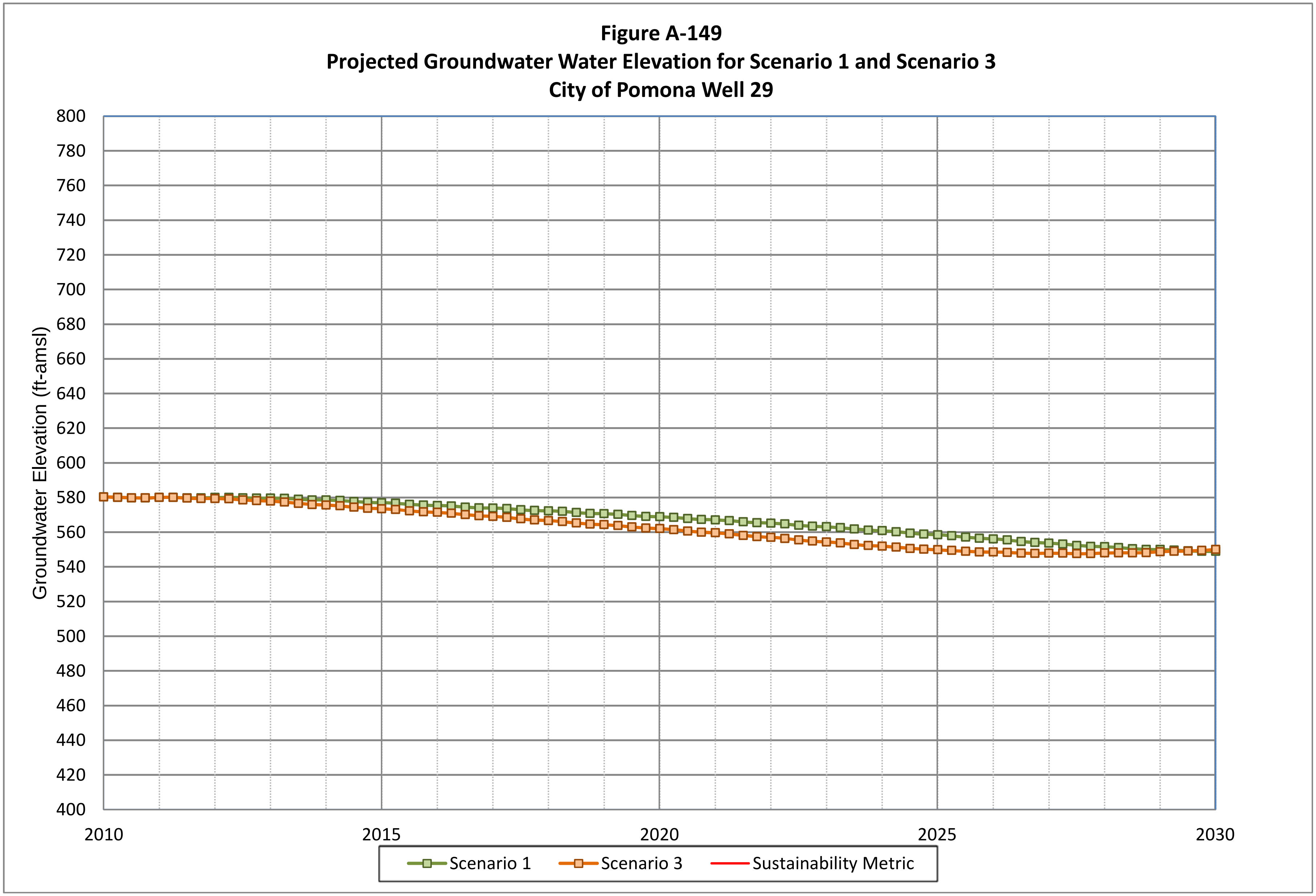
Figure A-147
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Pomona Well 26
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric

Figure A-148
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Pomona Well 27



20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.



20120503_Projected_Hydrographs.xlsx

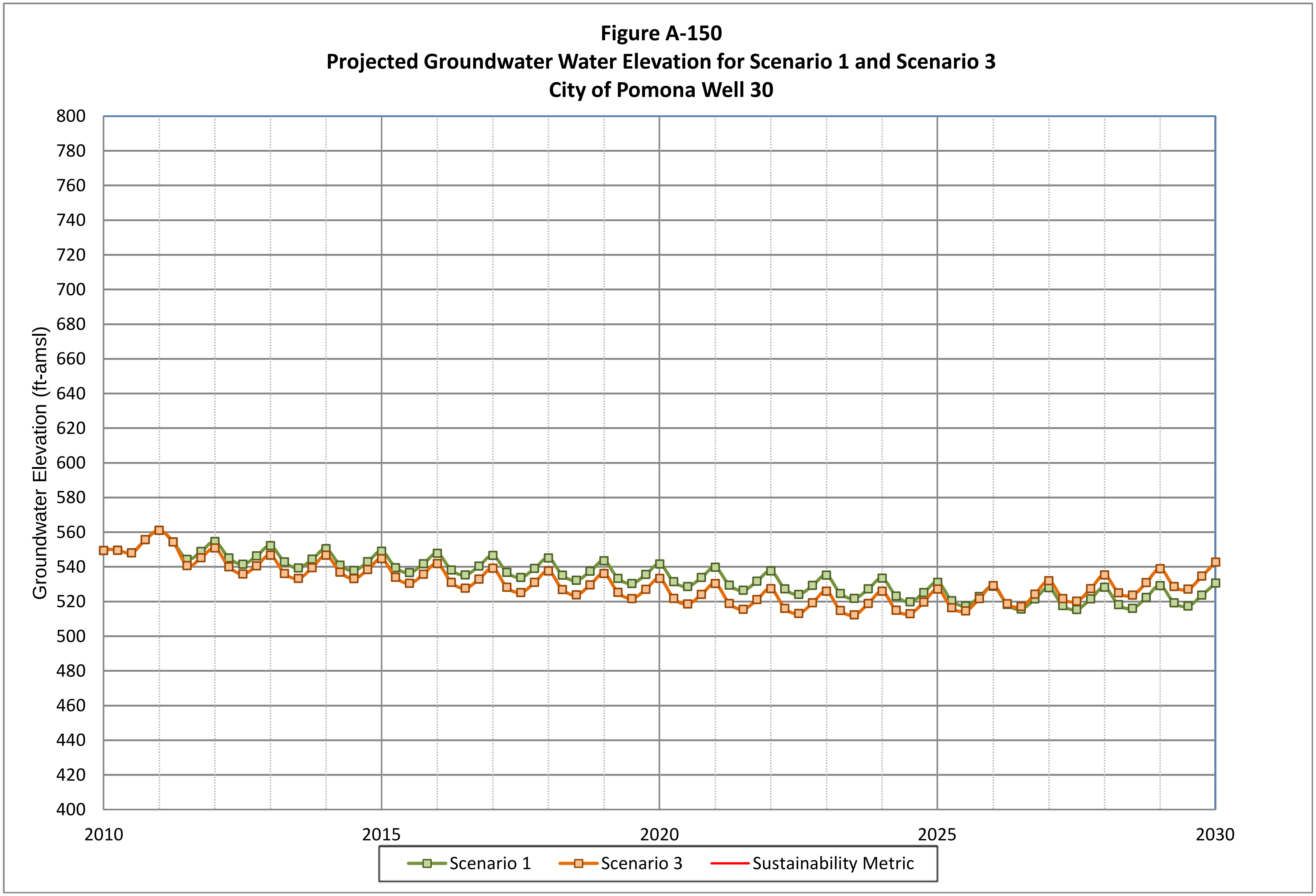
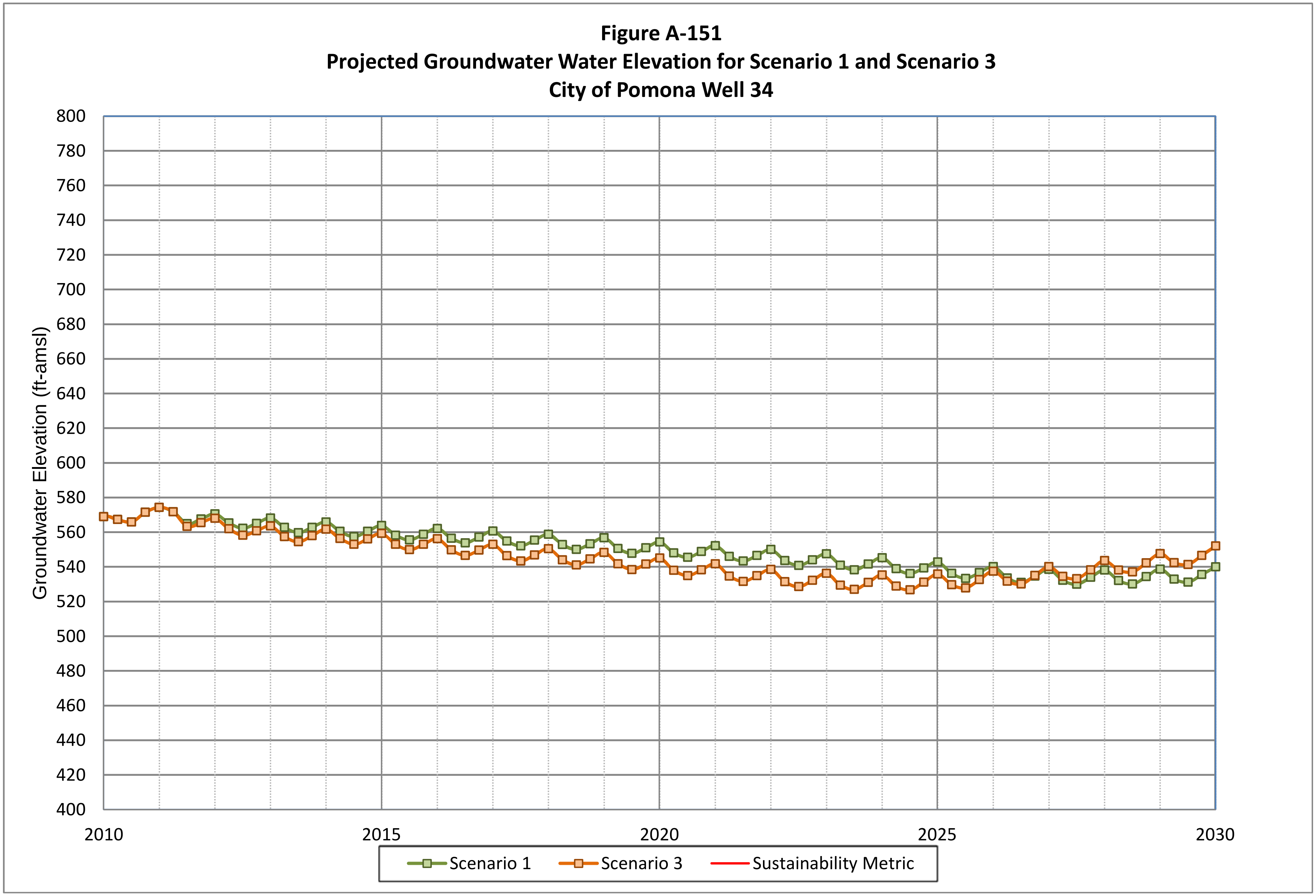
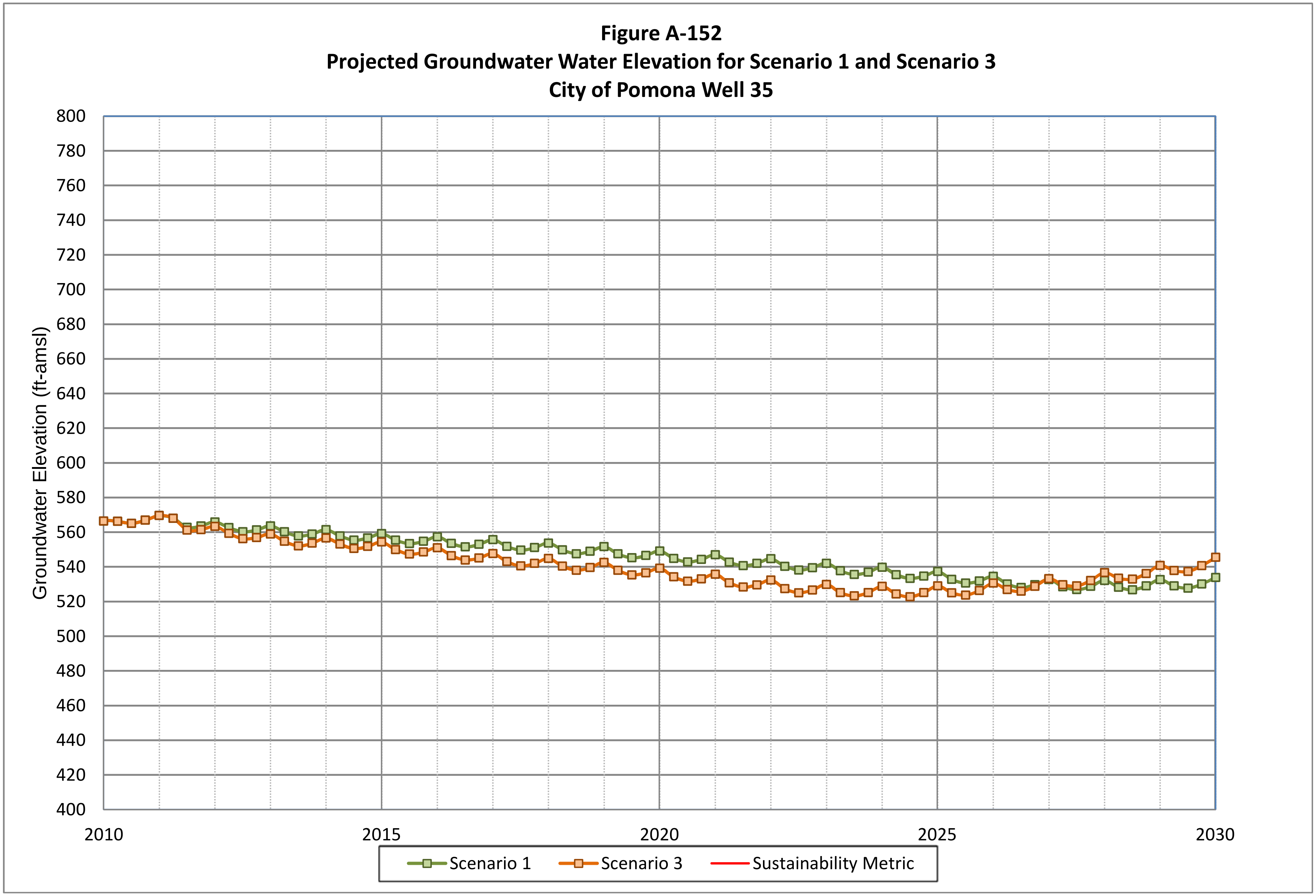


Figure A-150
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Pomona Well 30
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric

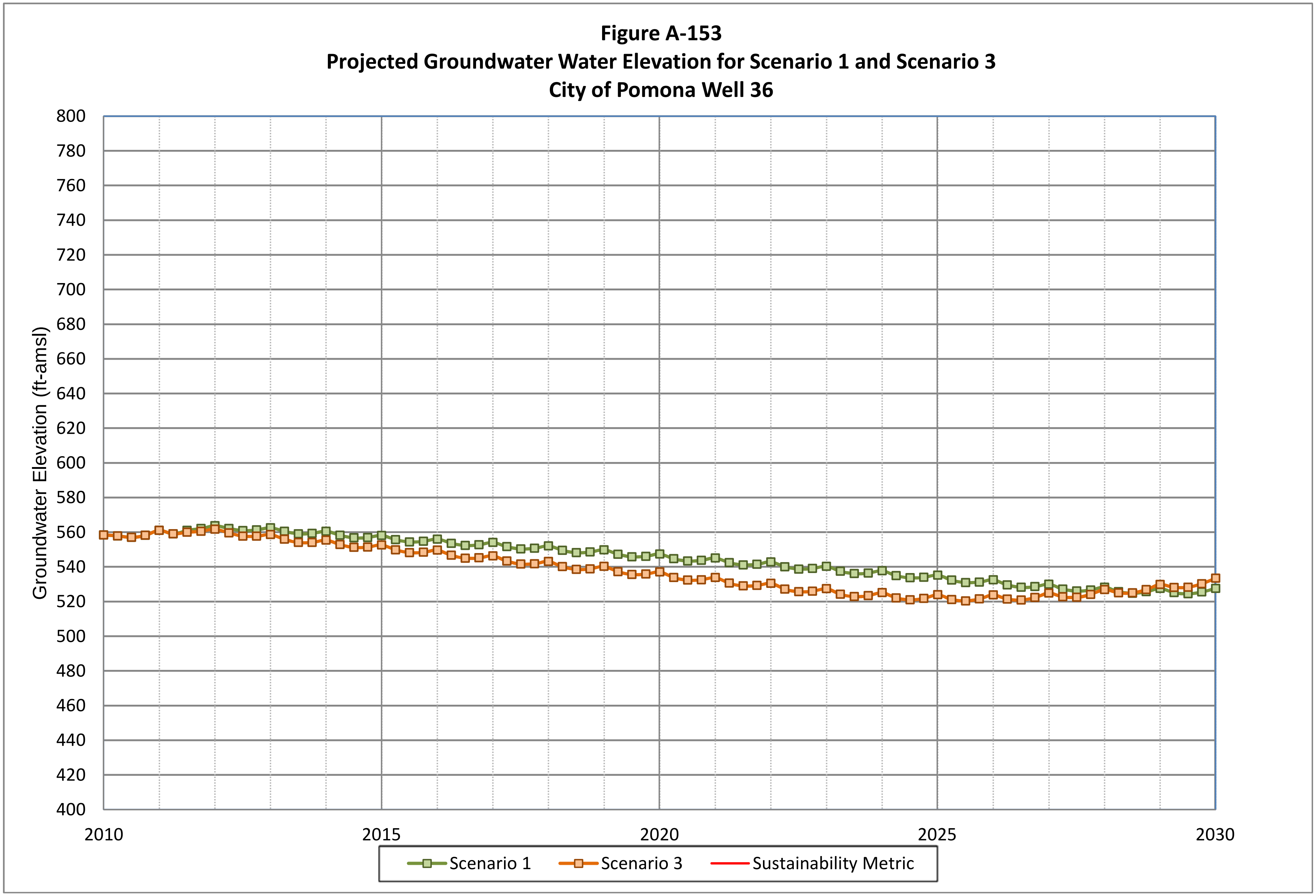


20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

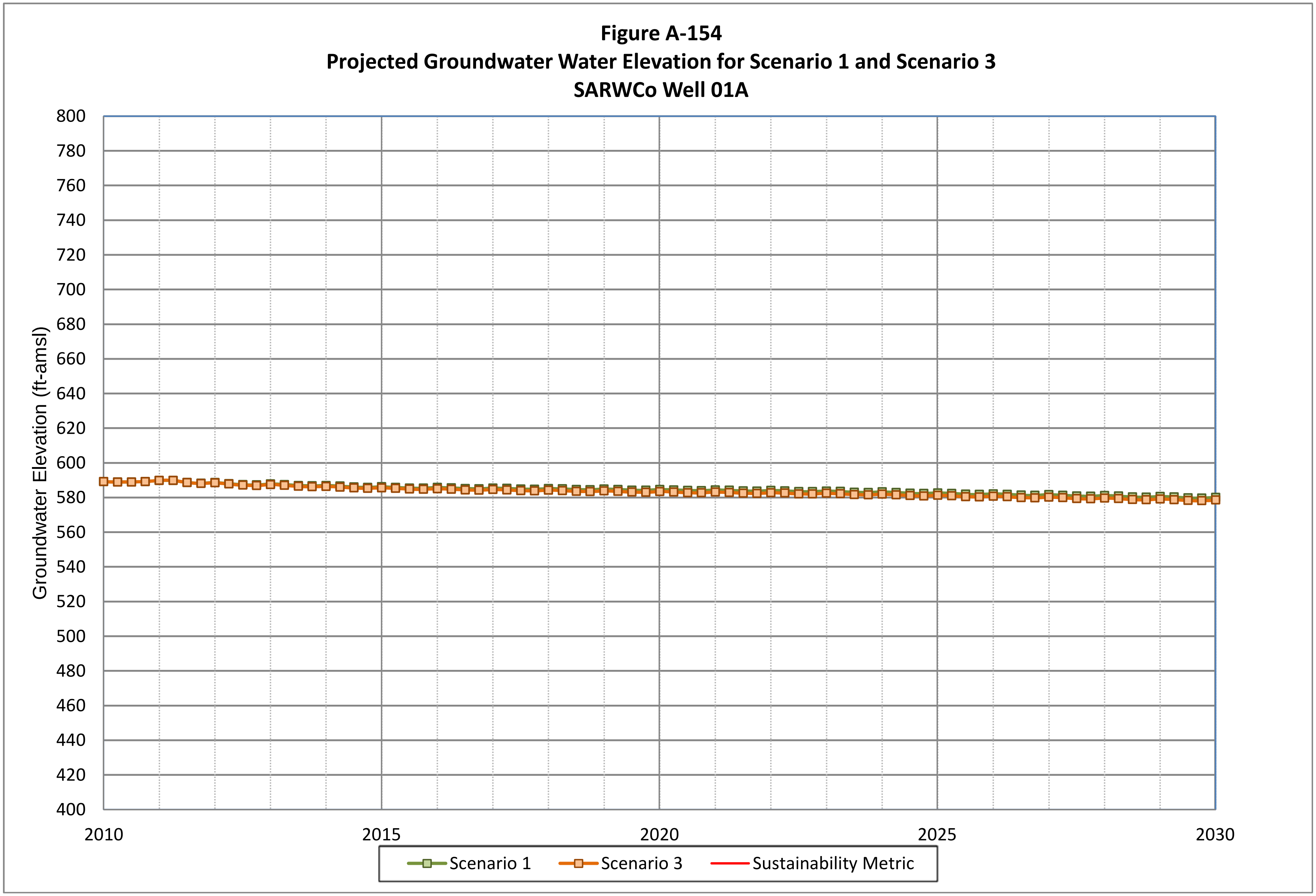


20120503_Projected_Hydrographs.xlsx



20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.



20120503_Projected_Hydrographs.xlsx

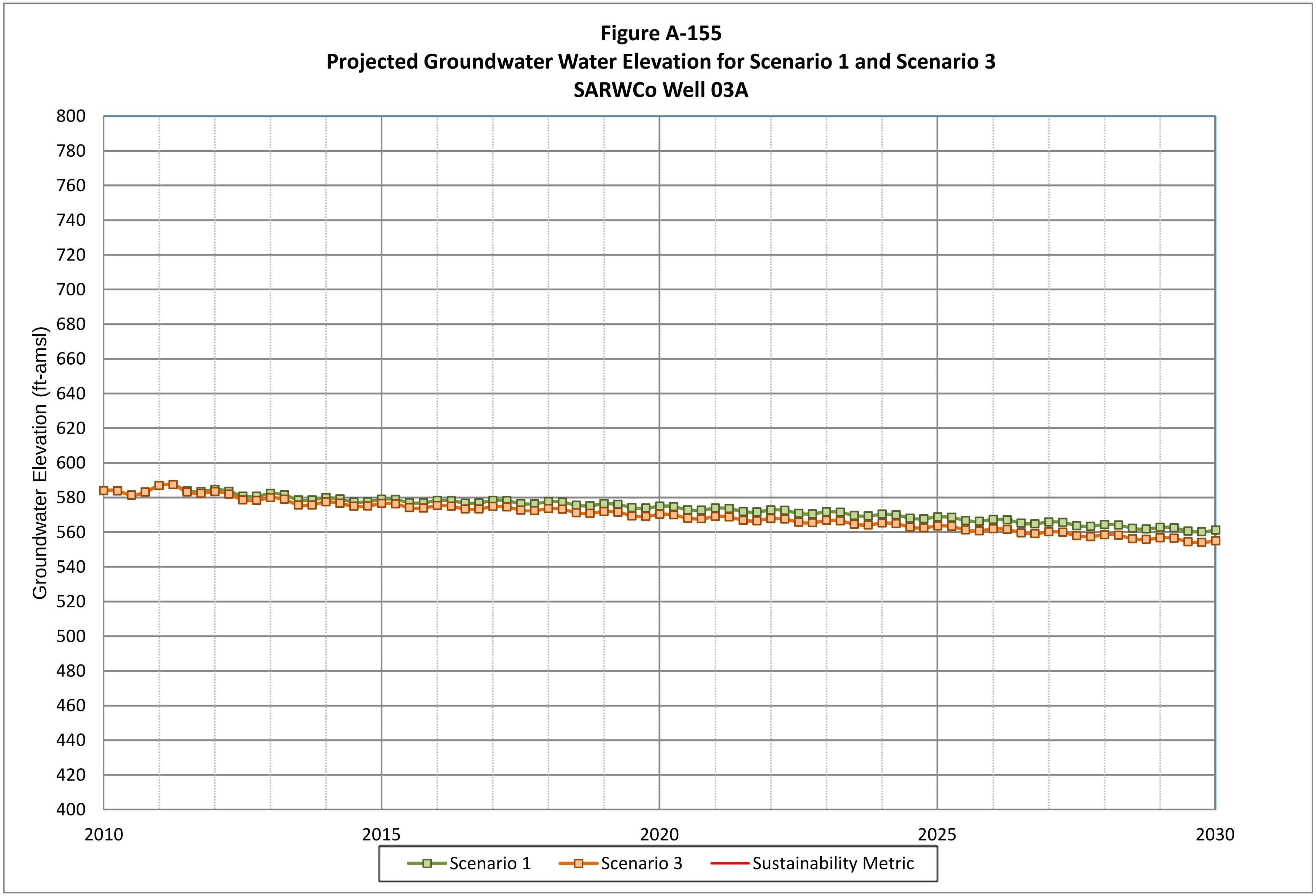
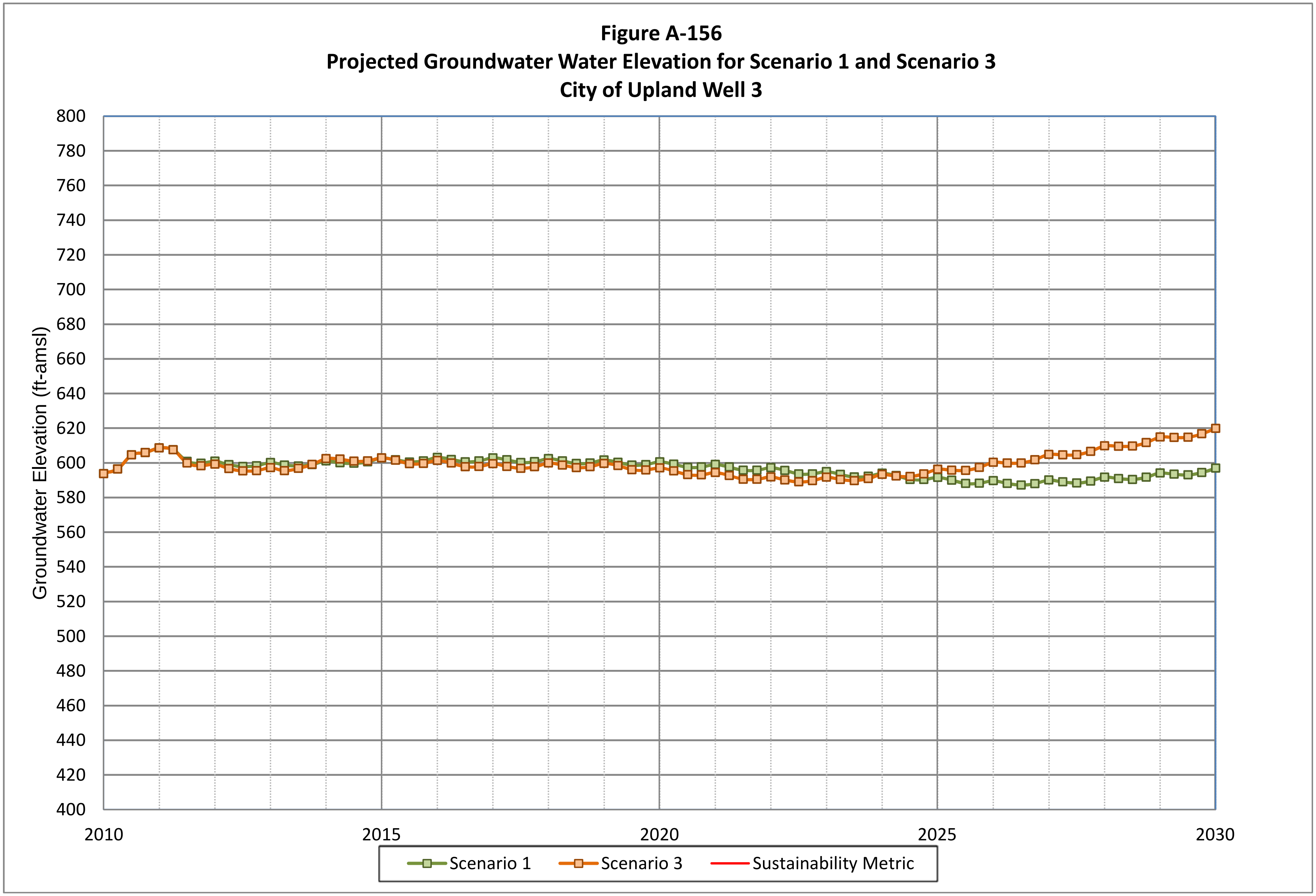


Figure A-155
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
SARWCo Well 03A
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



20120503_Projected_Hydrographs.xlsx

Figure A-157
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Upland Well 7A

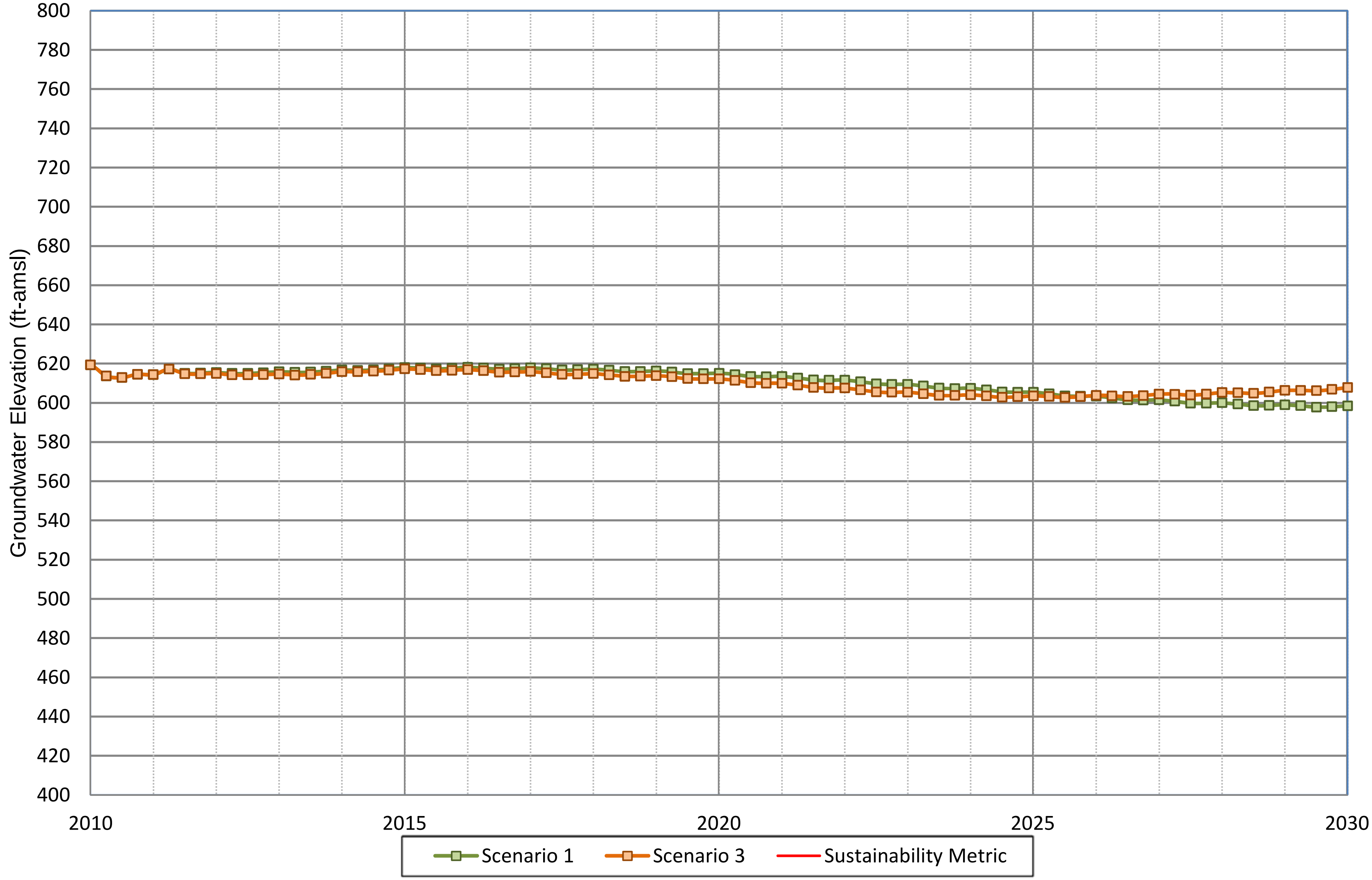
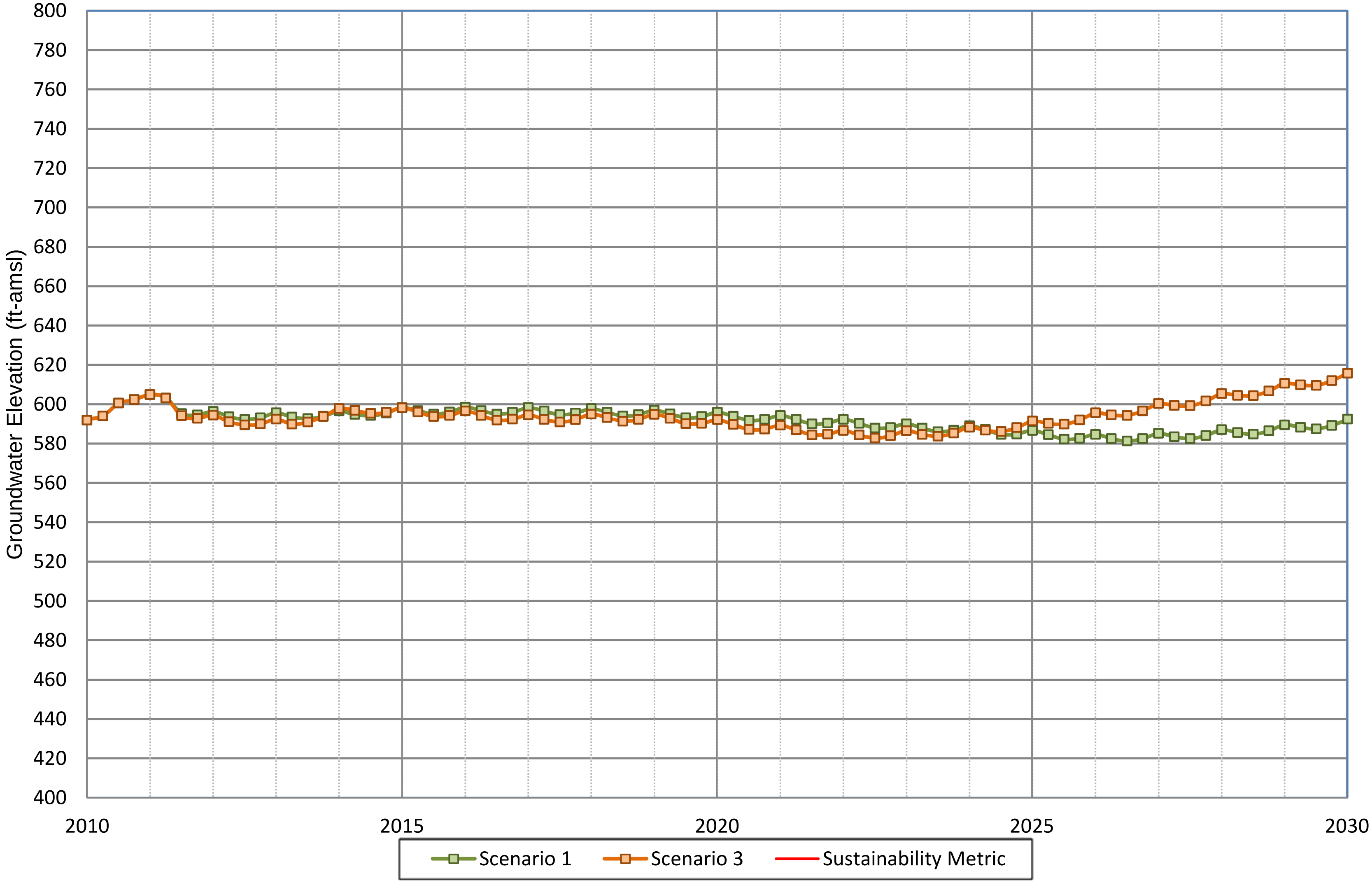


Figure A-158
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Upland Well 8



20120503_Projected_Hydrographs.xlsx

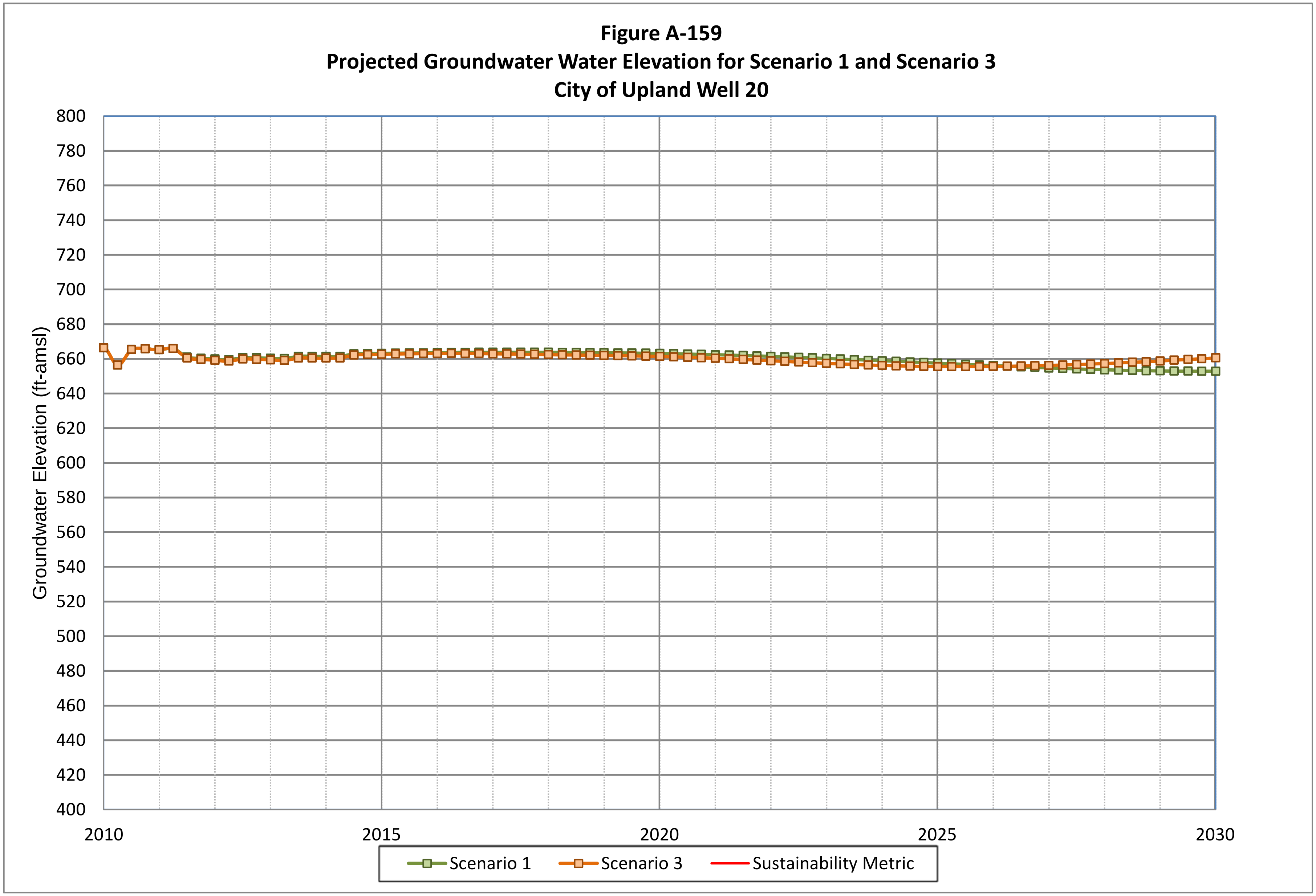
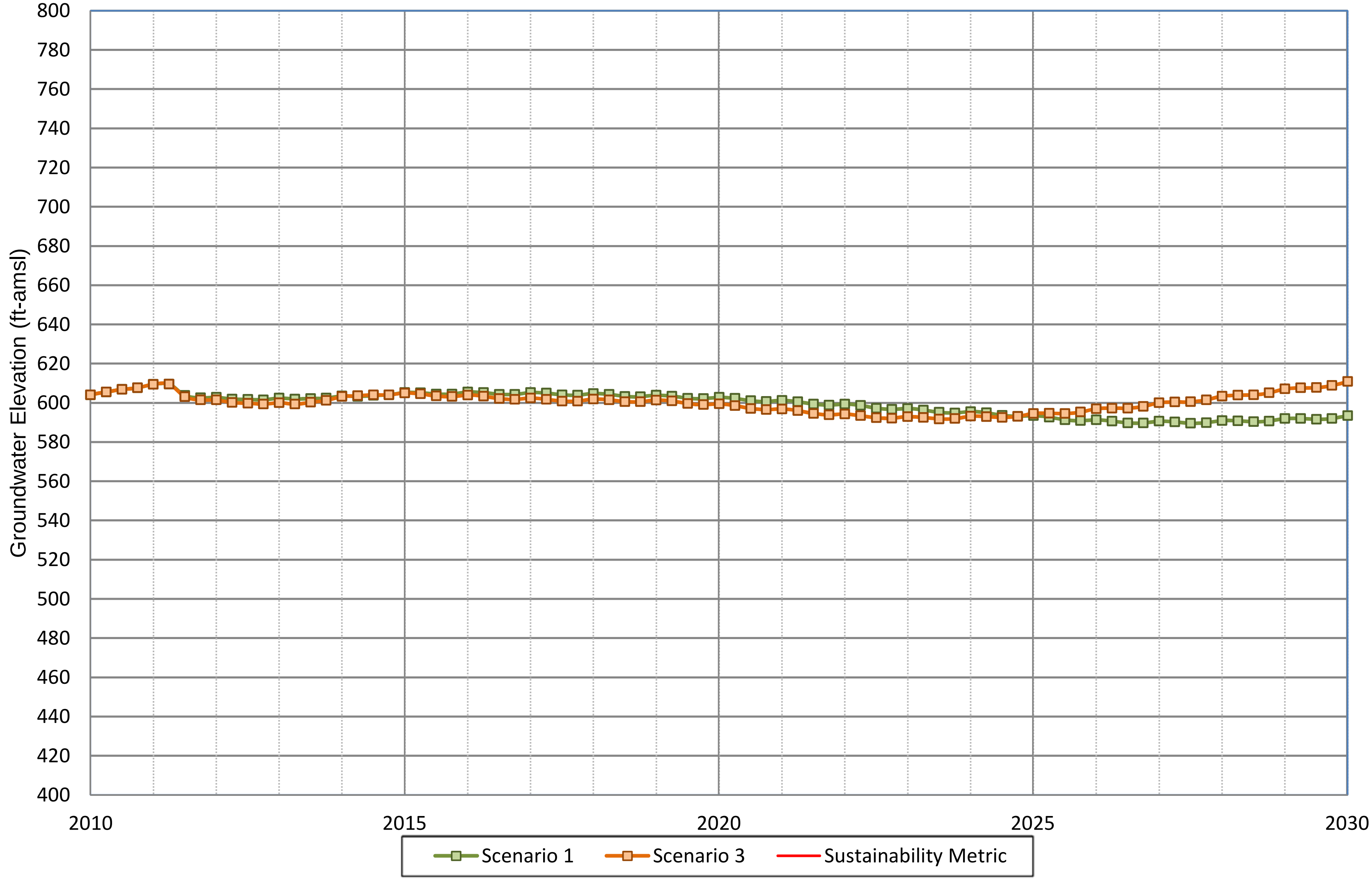


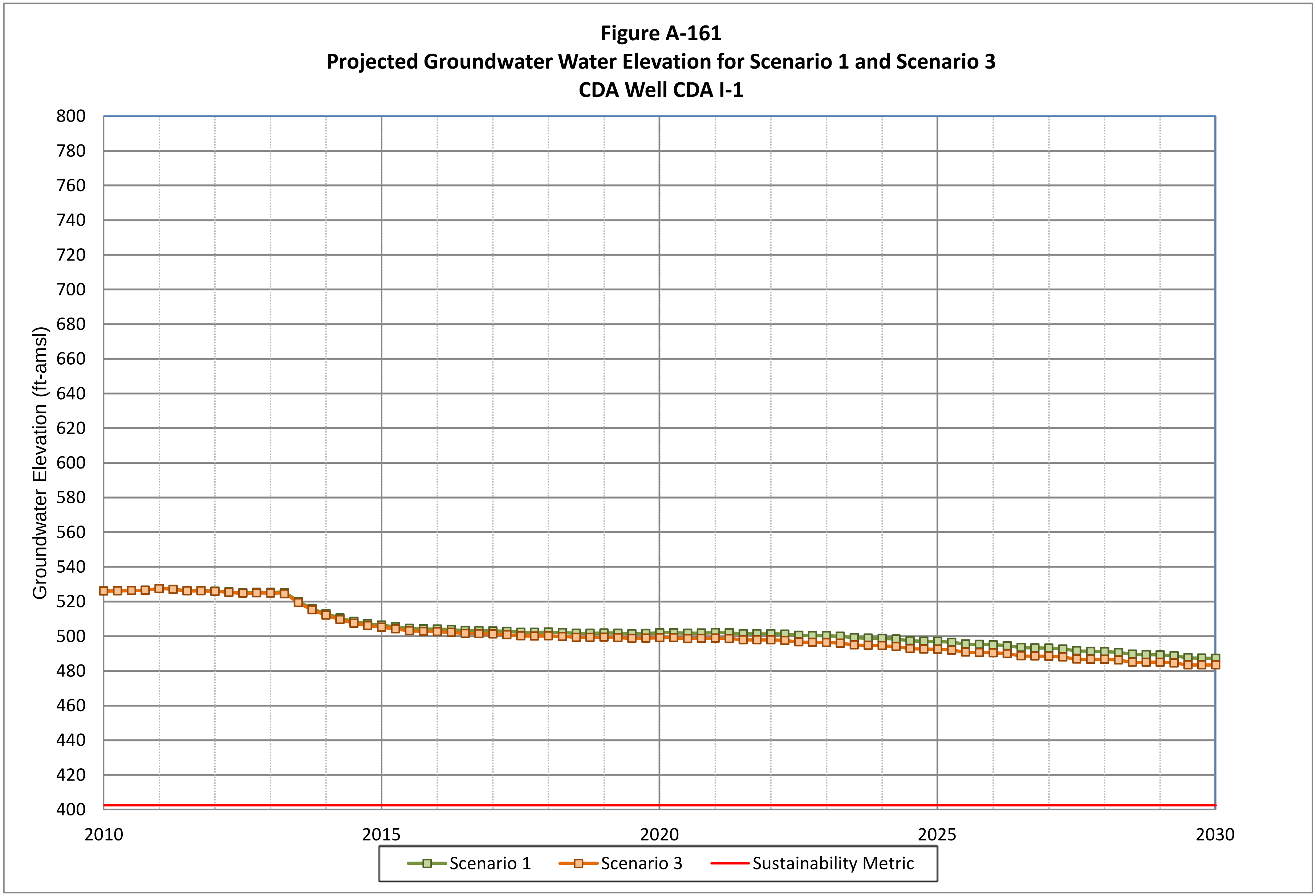
Figure A-159
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Upland Well 20
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric

Figure A-160
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
City of Upland Well 21A



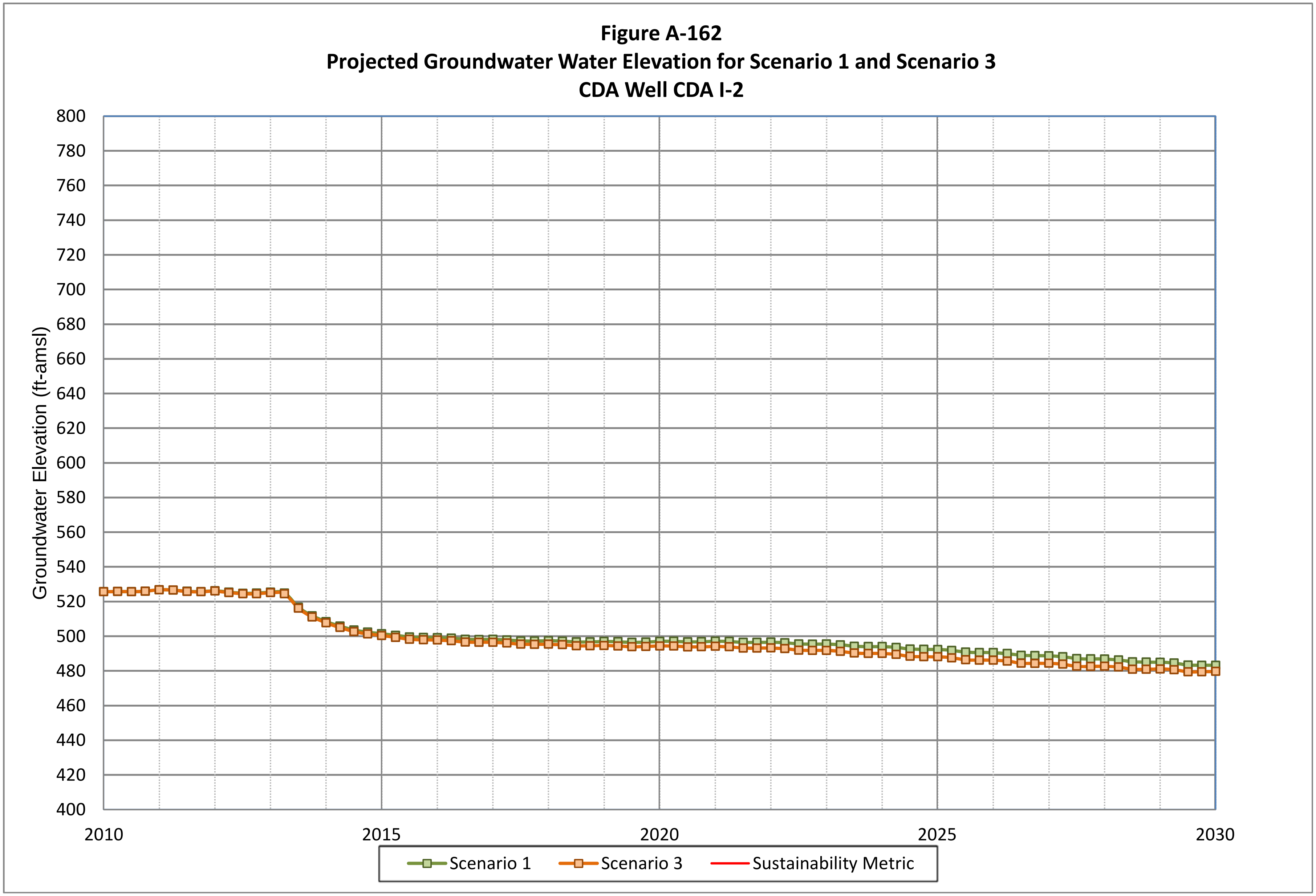
20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.



20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.



20120503_Projected_Hydrographs.xlsx

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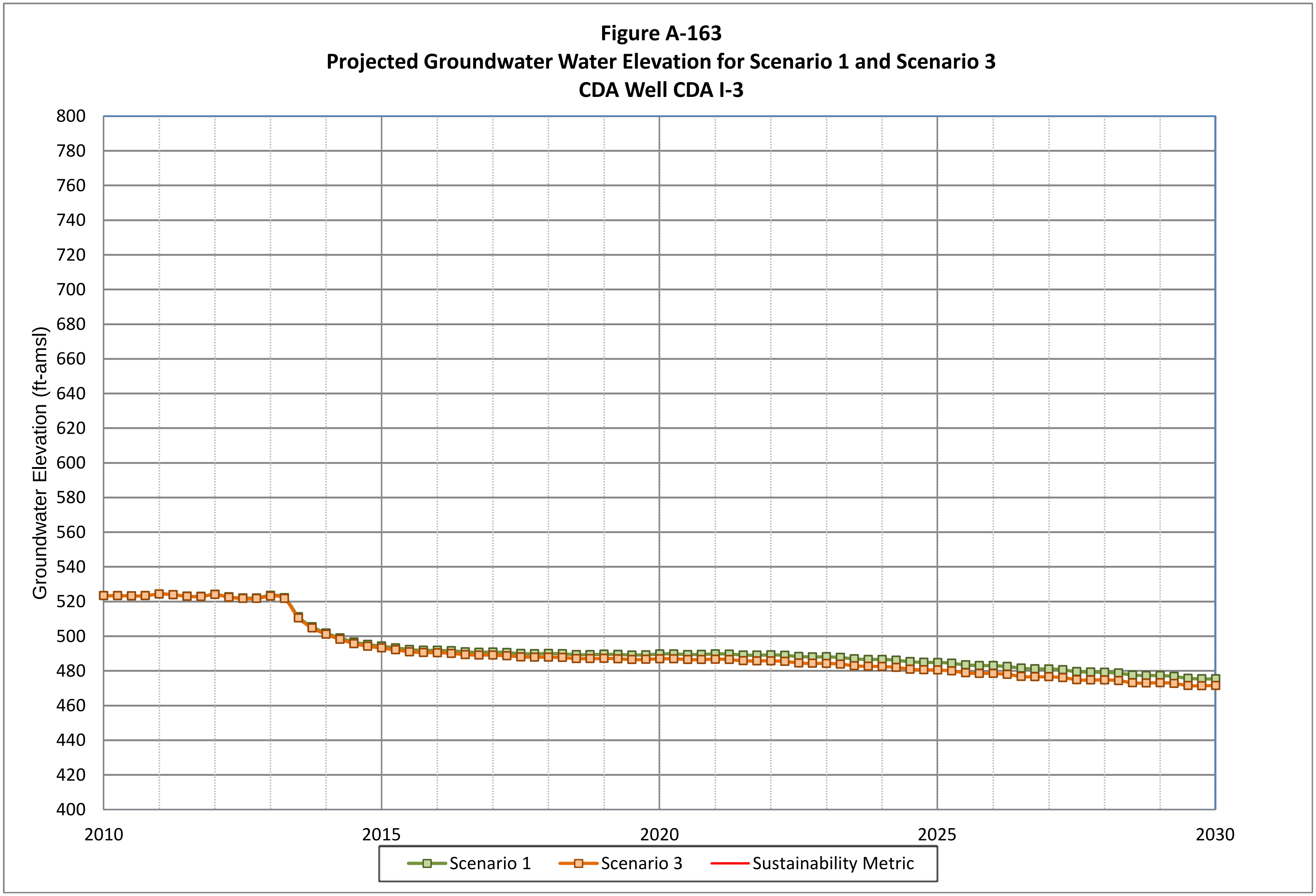
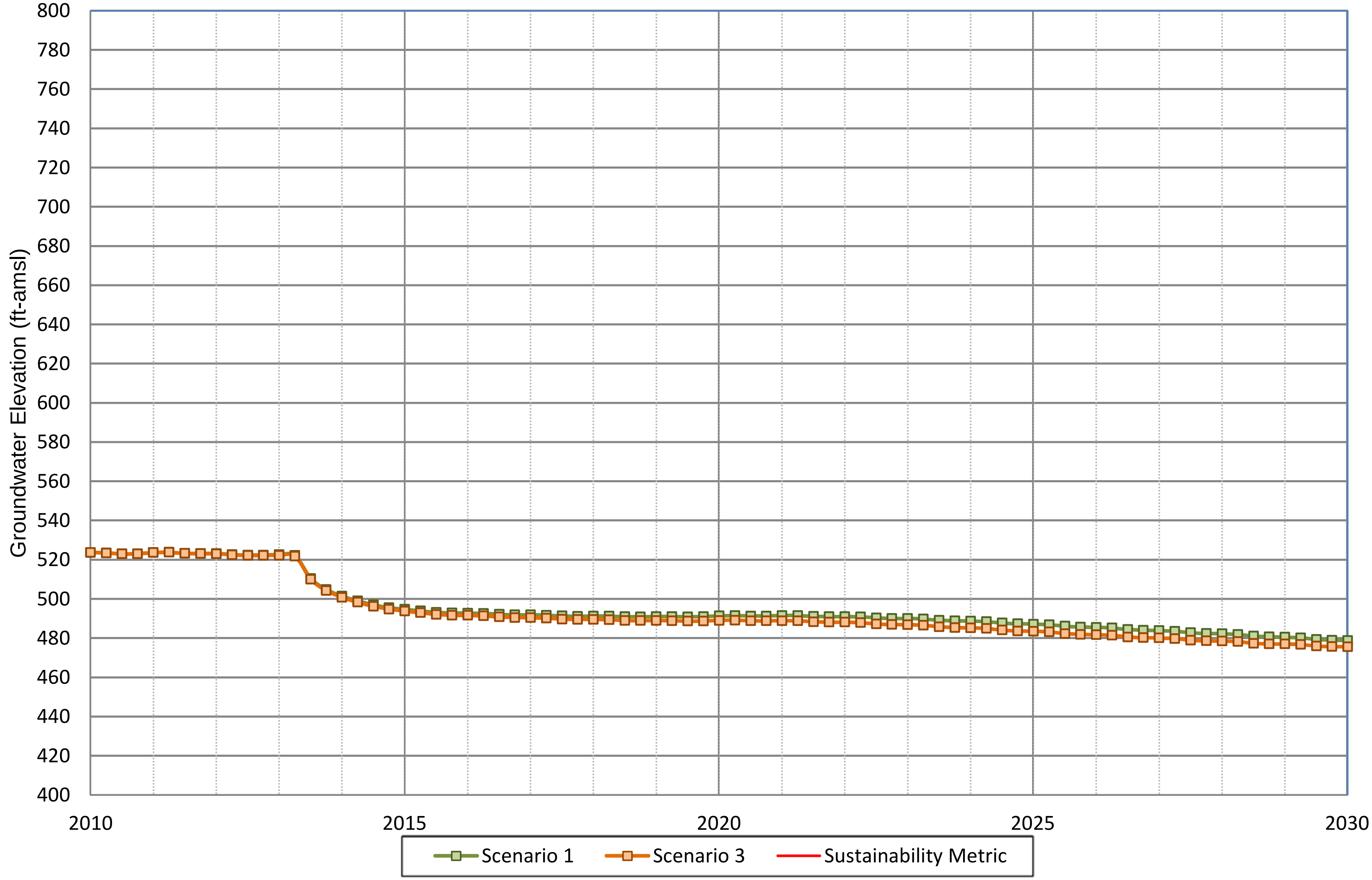
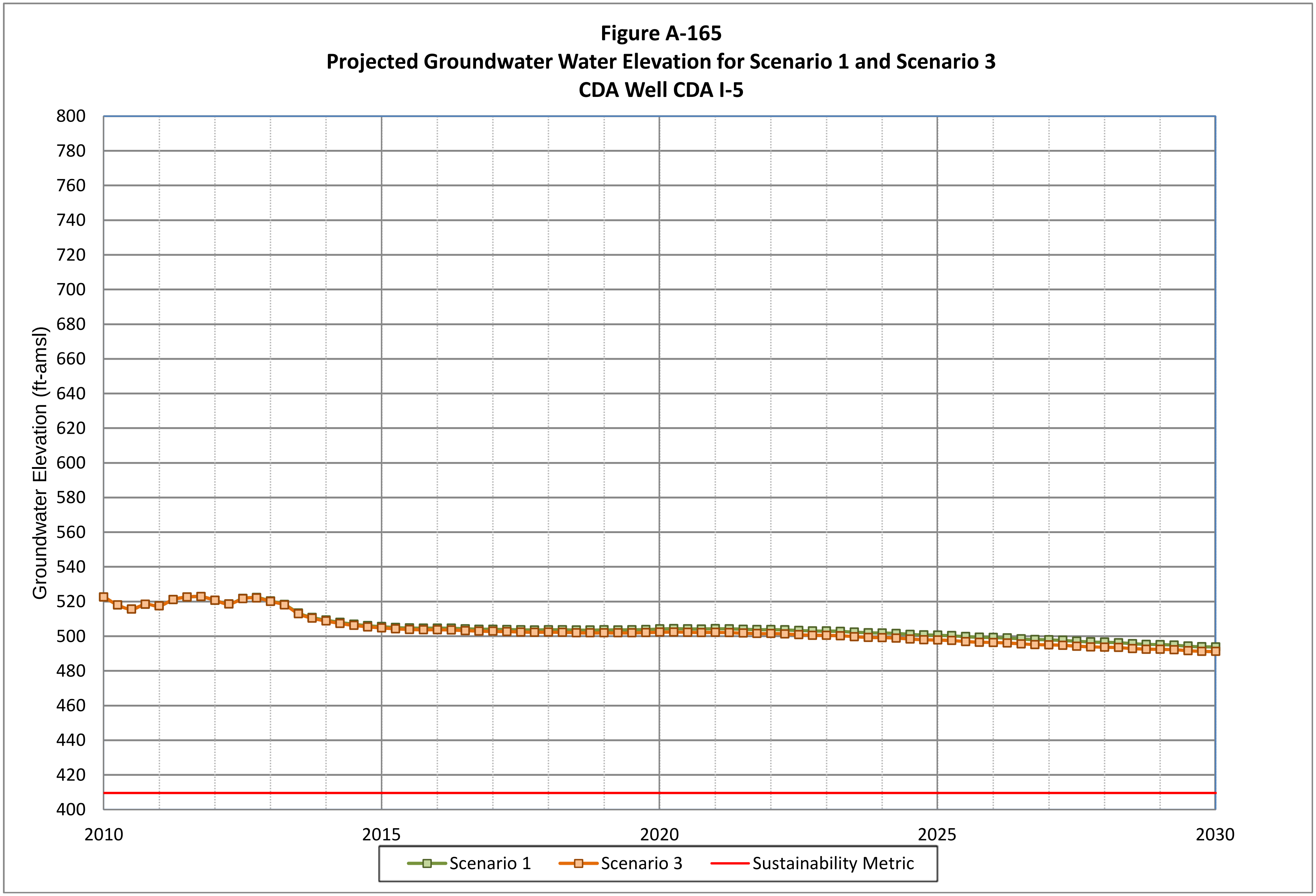


20120503_Projected_Hydrographs.xlsx

Figure A-164
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
CDA Well CDA I-4

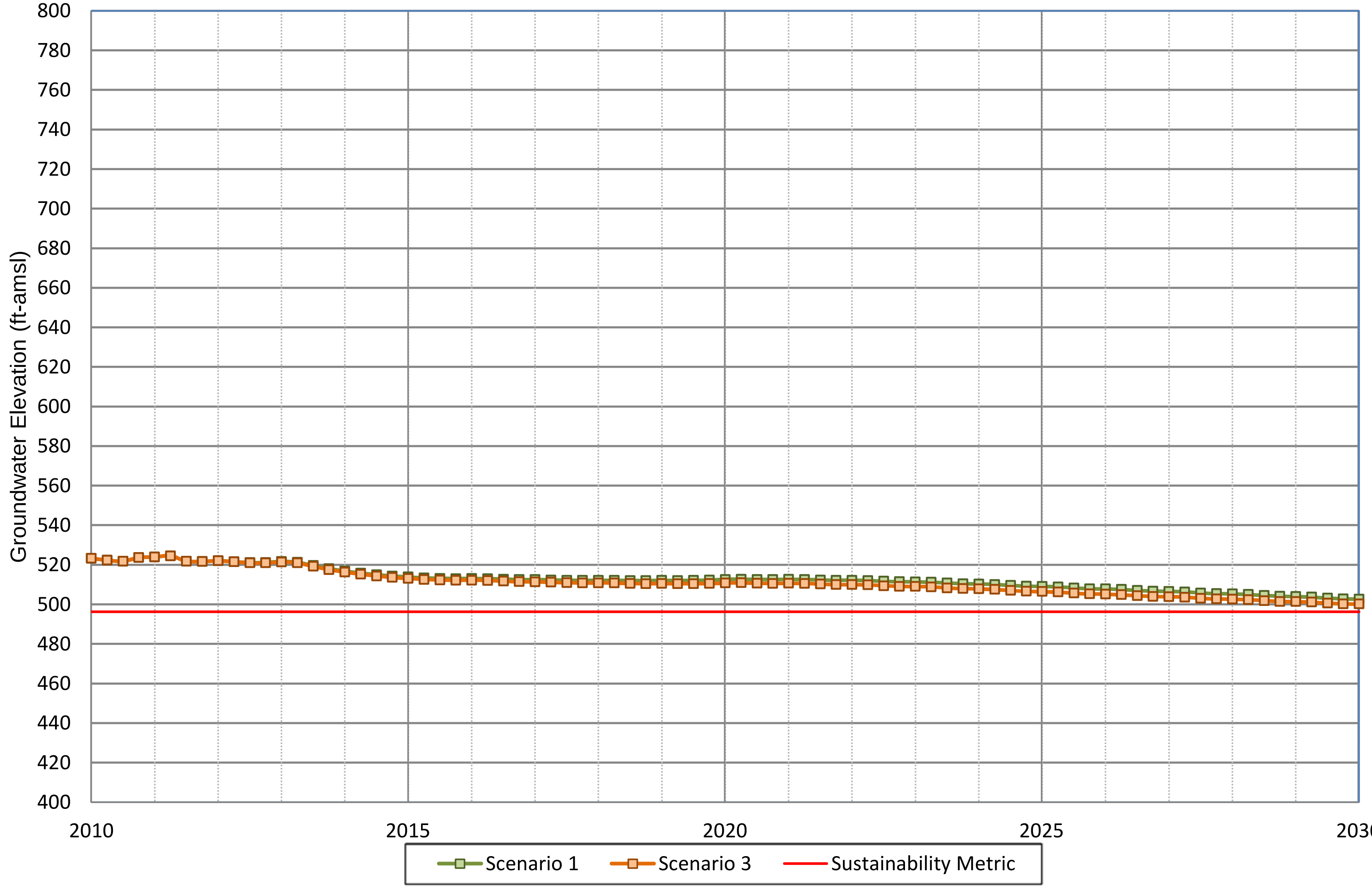


20120503_Projected_Hydrographs.xlsx



20120503_Projected_Hydrographs.xlsx

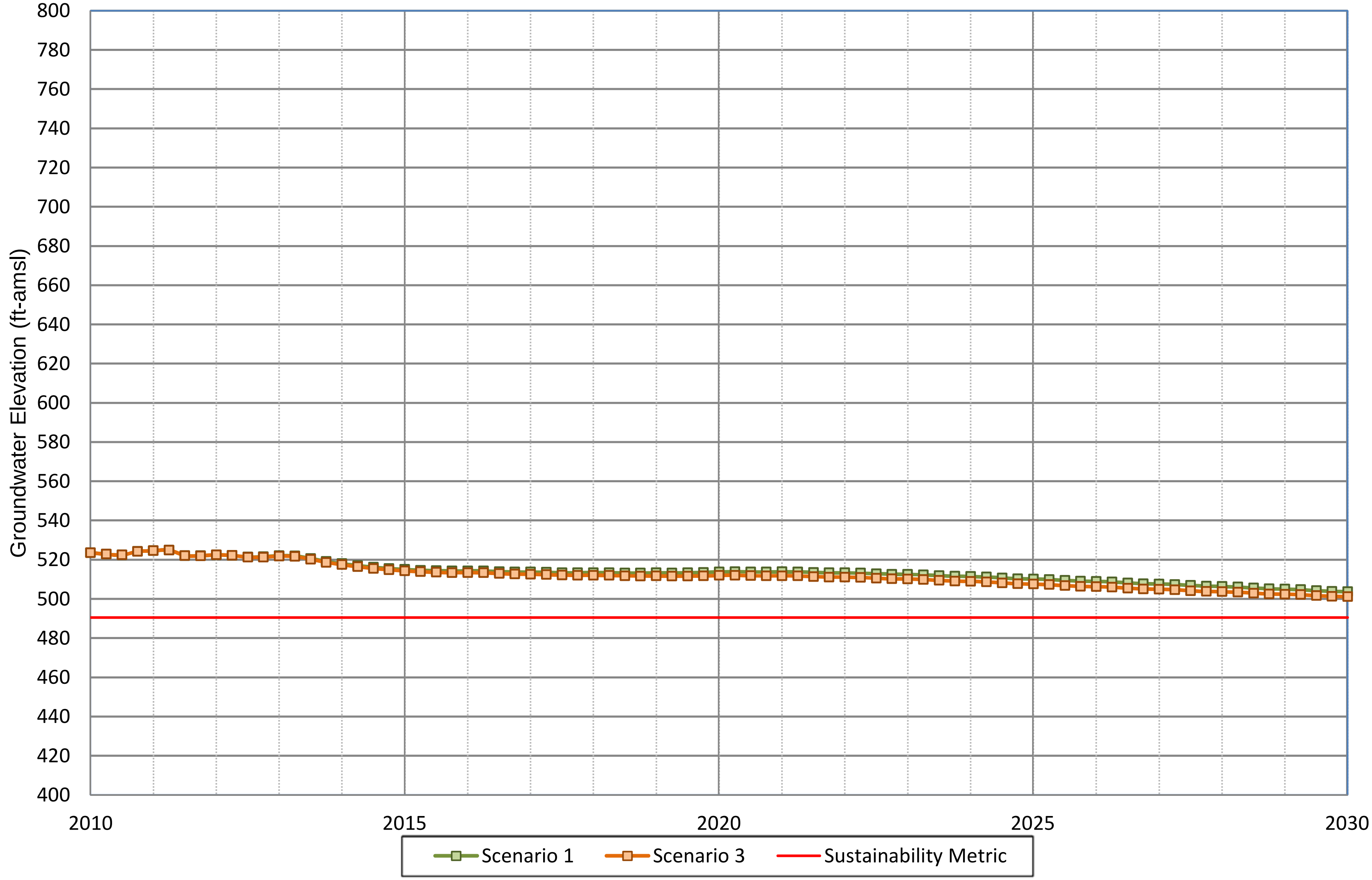
Figure A-166
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
CDA Well CDA I-6

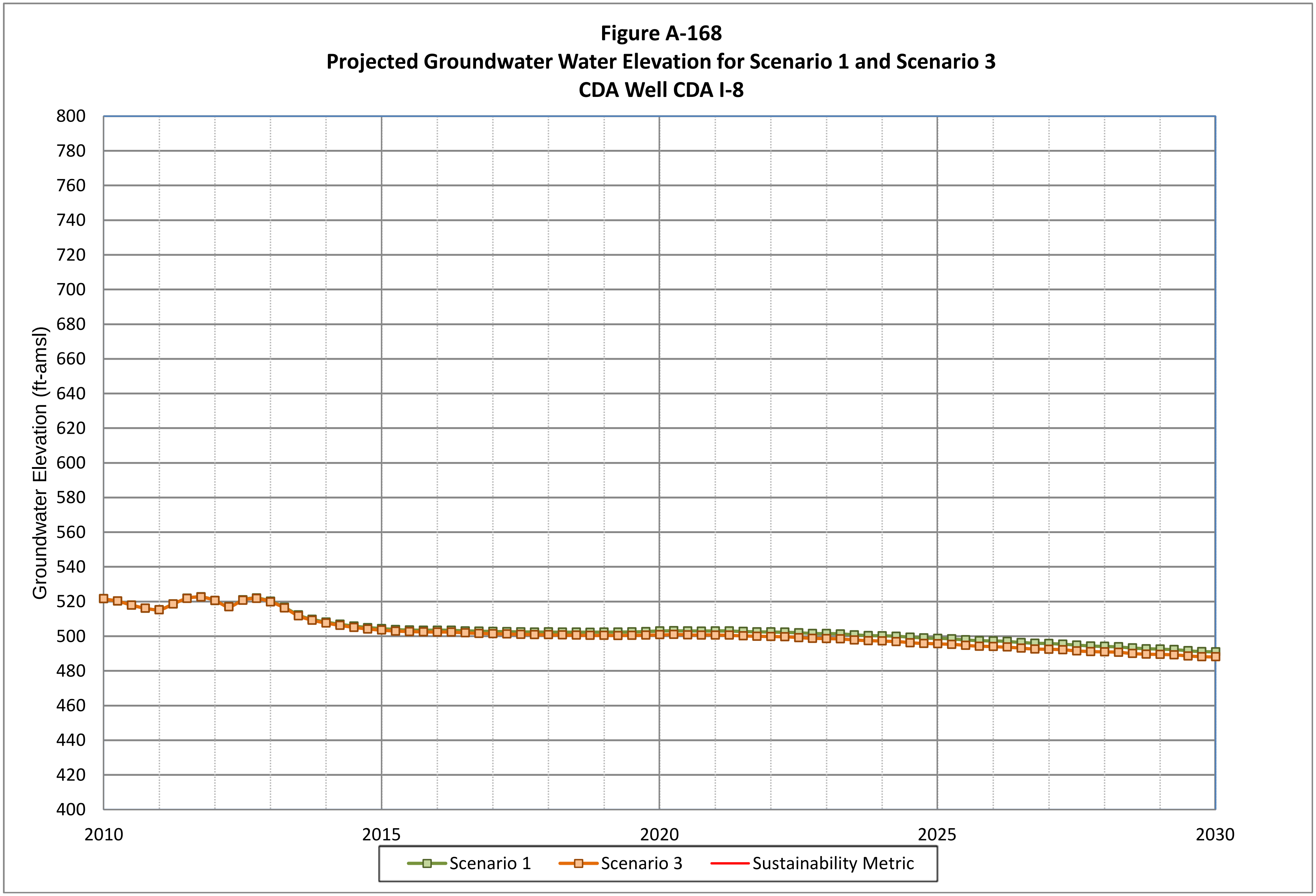


20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

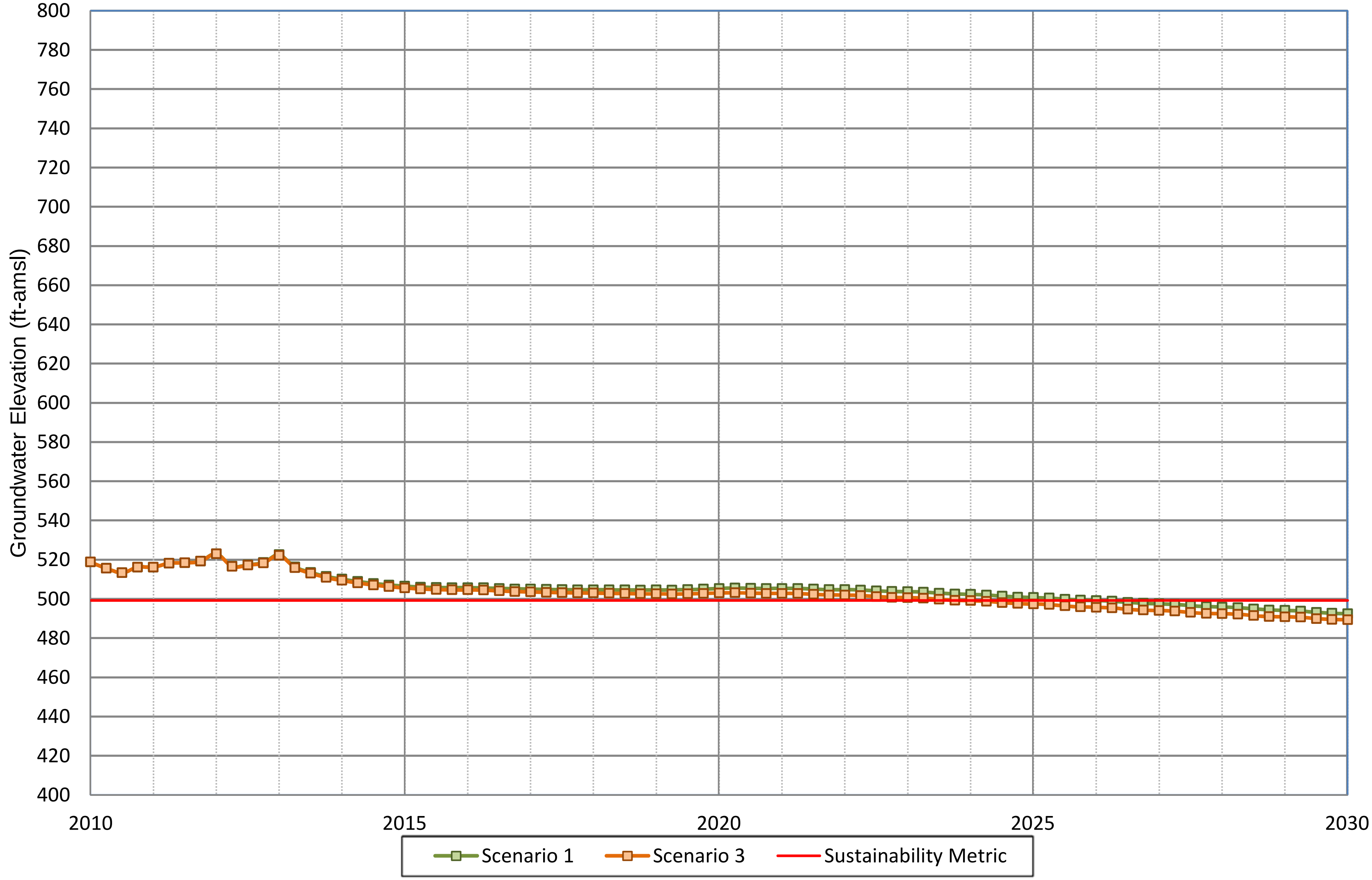
Figure A-167
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
CDA Well CDA I-7

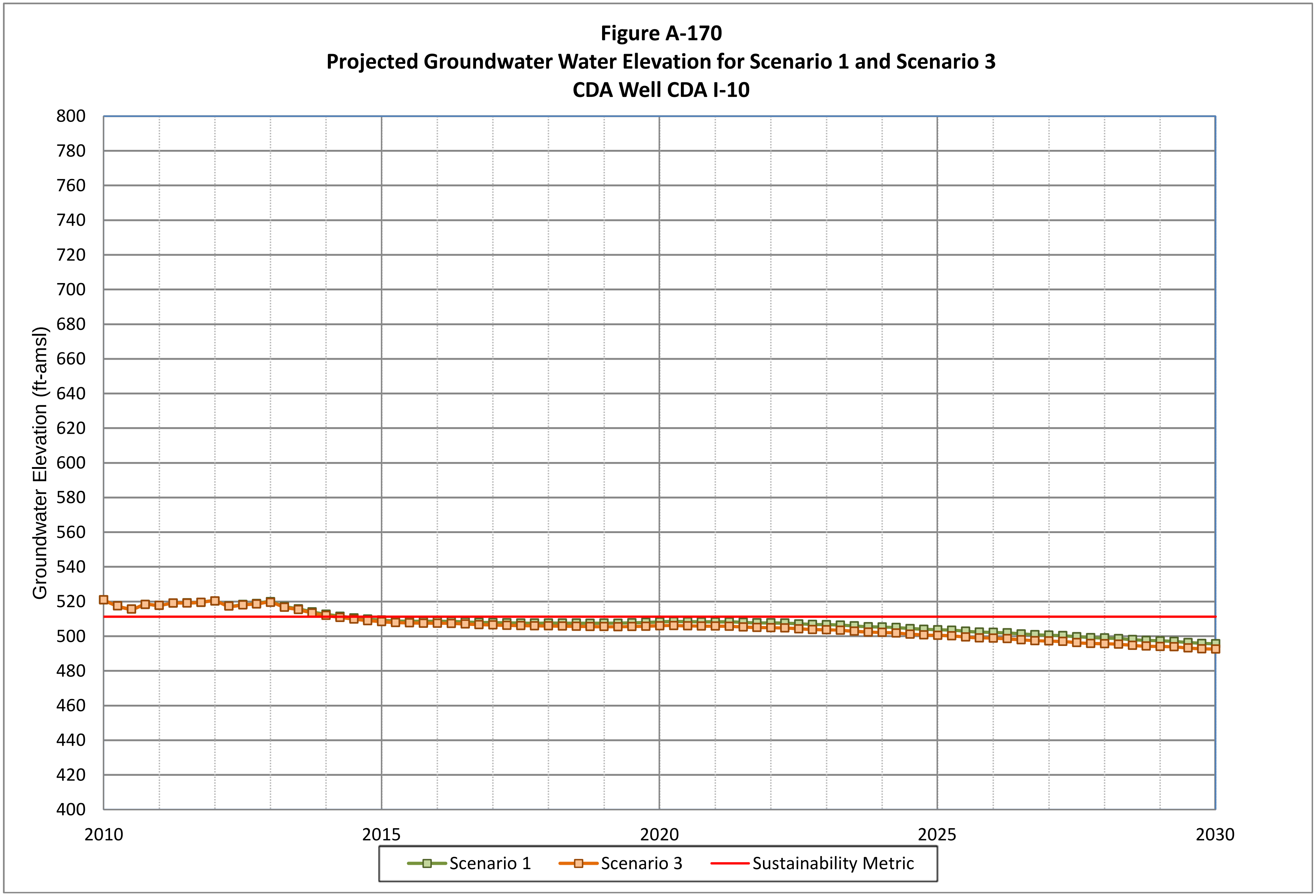




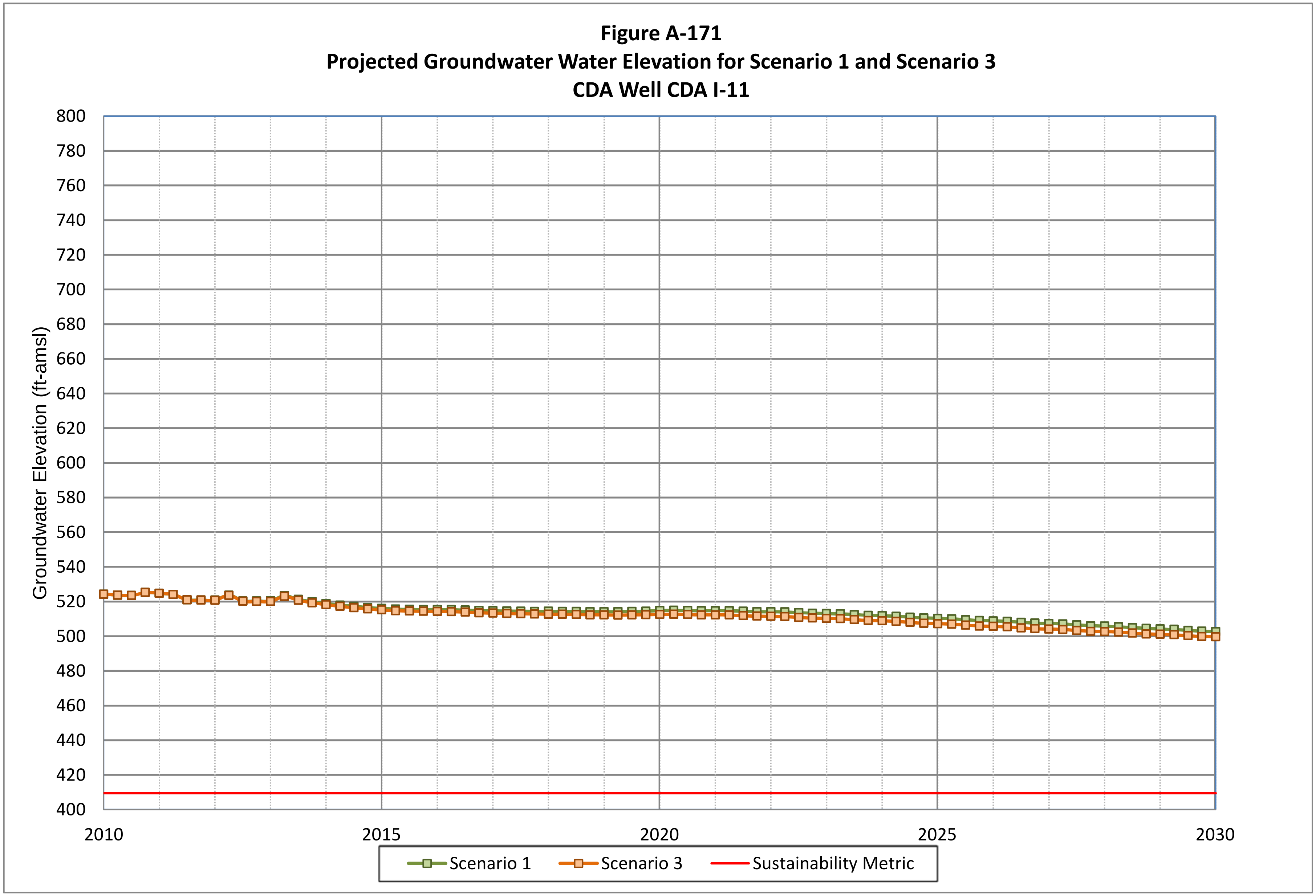
20120503_Projected_Hydrographs.xlsx

Figure A-169
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
CDA Well CDA I-9





WILDERMUTH ENVIRONMENTAL INC.



20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

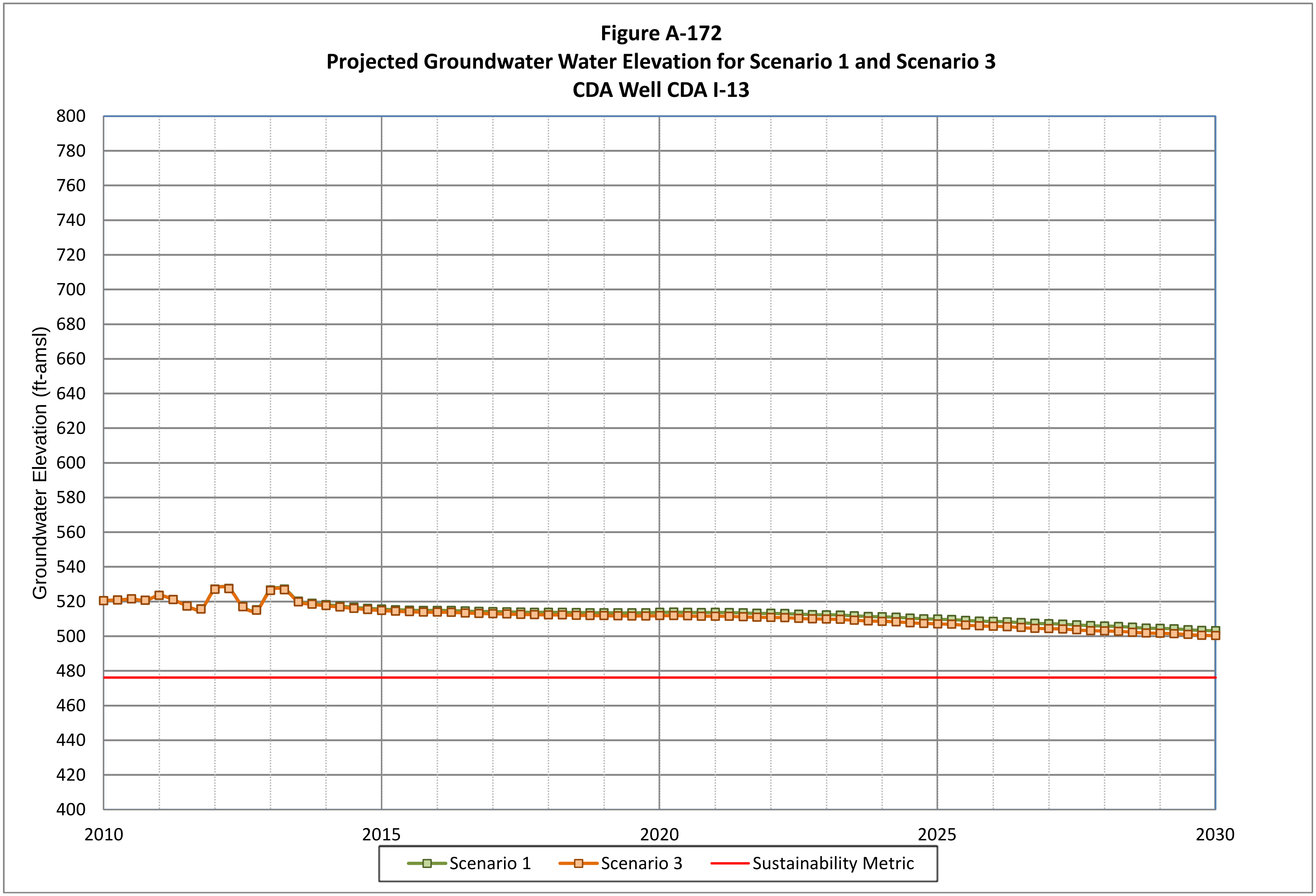


Figure A-172
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
CDA Well CDA I-13
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric

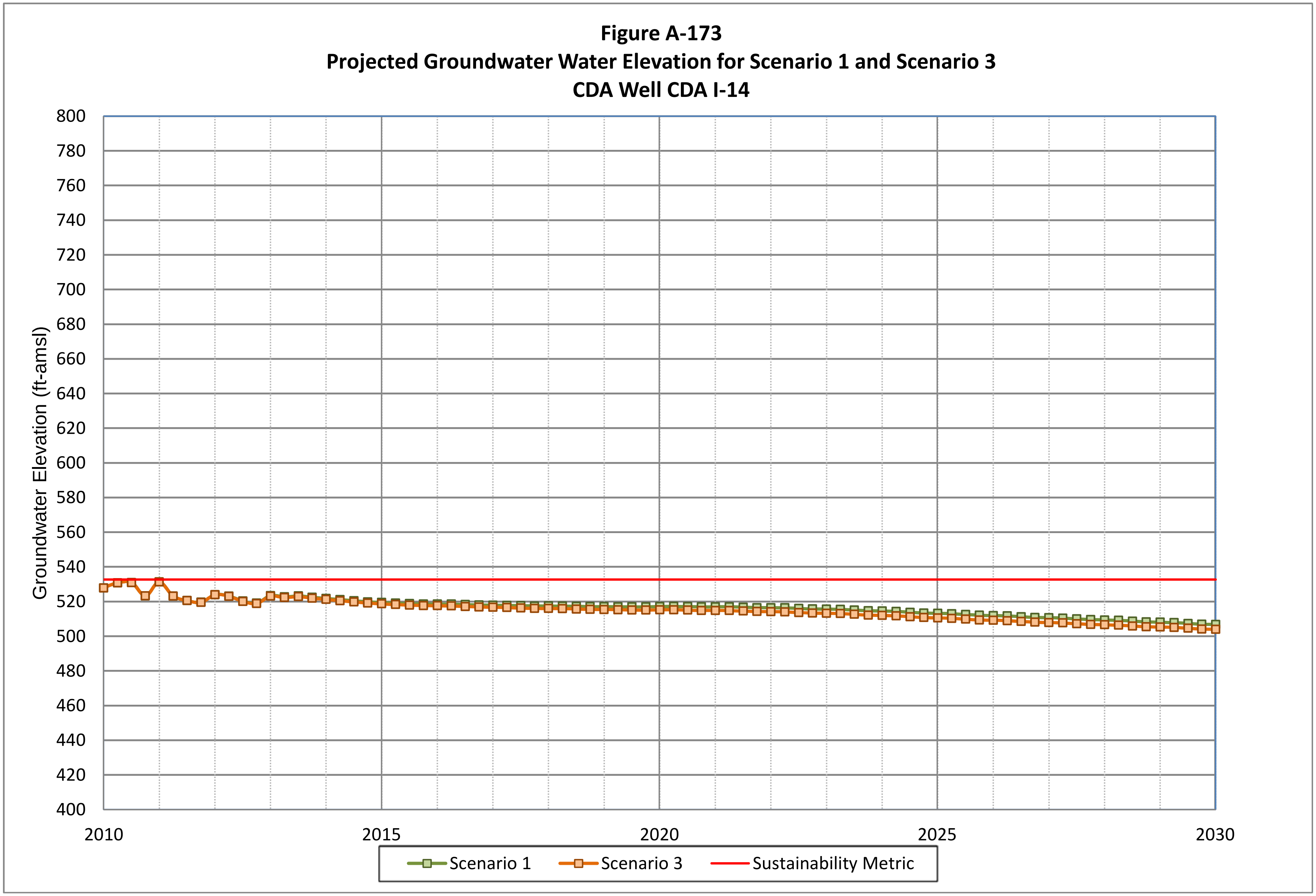
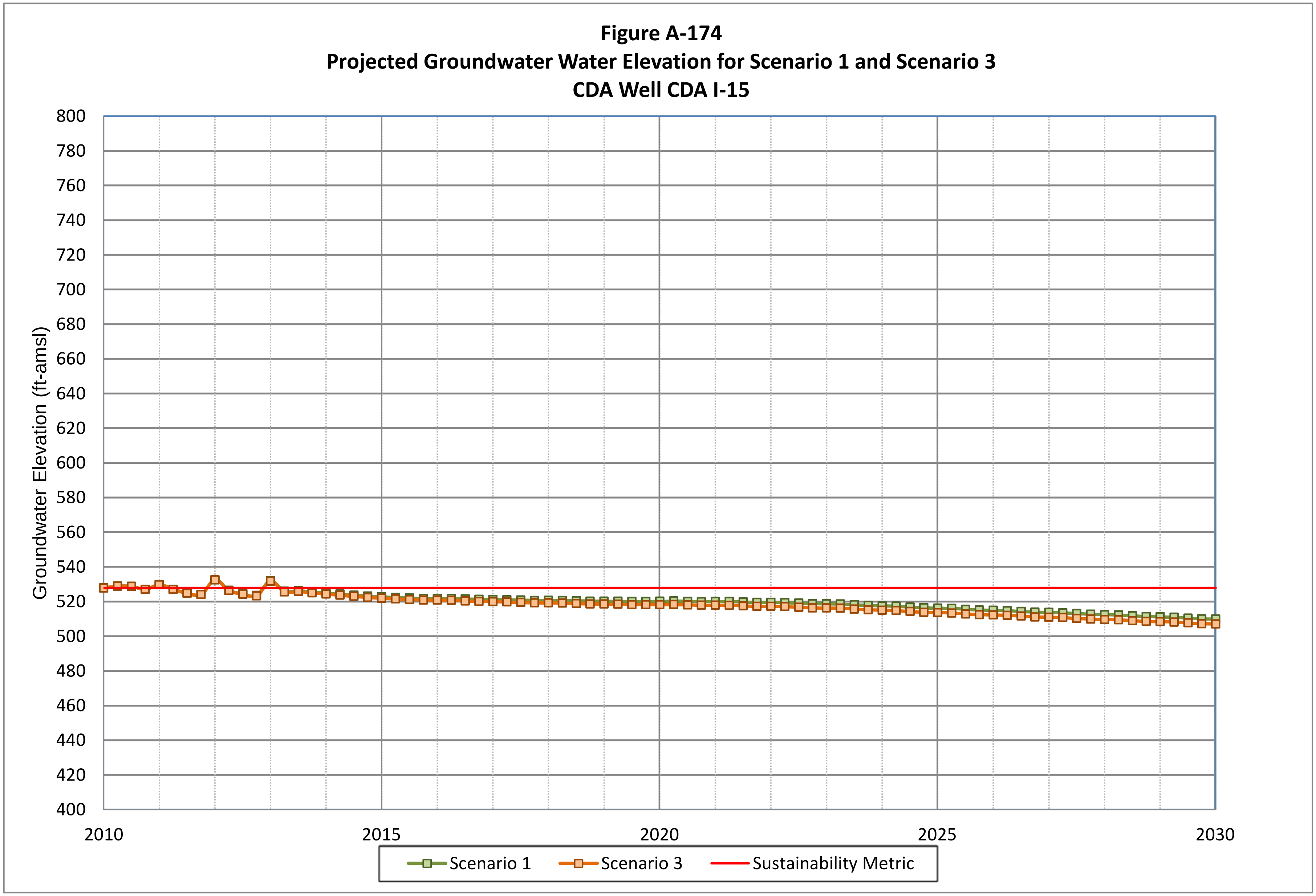
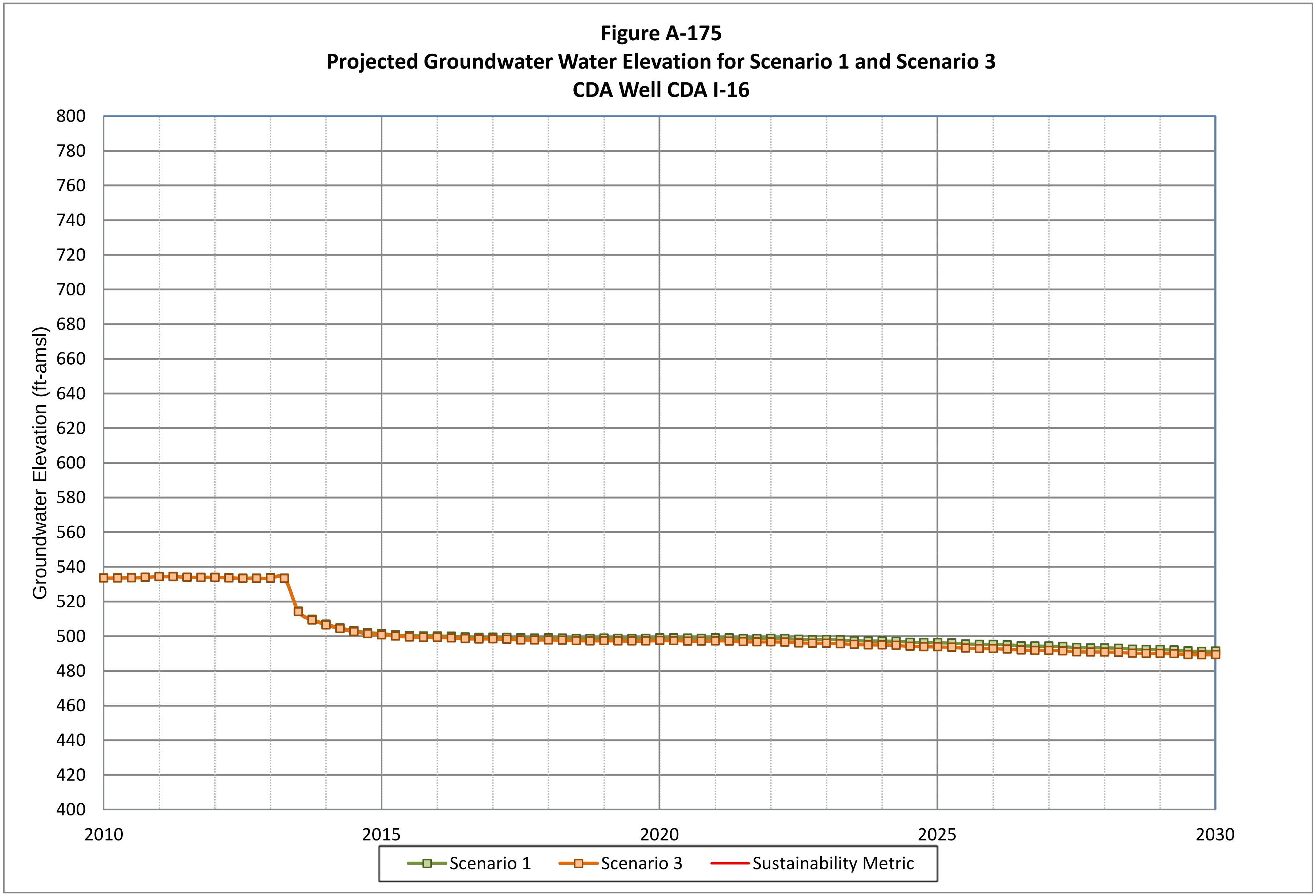


Figure A-173
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
CDA Well CDA I-14
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric

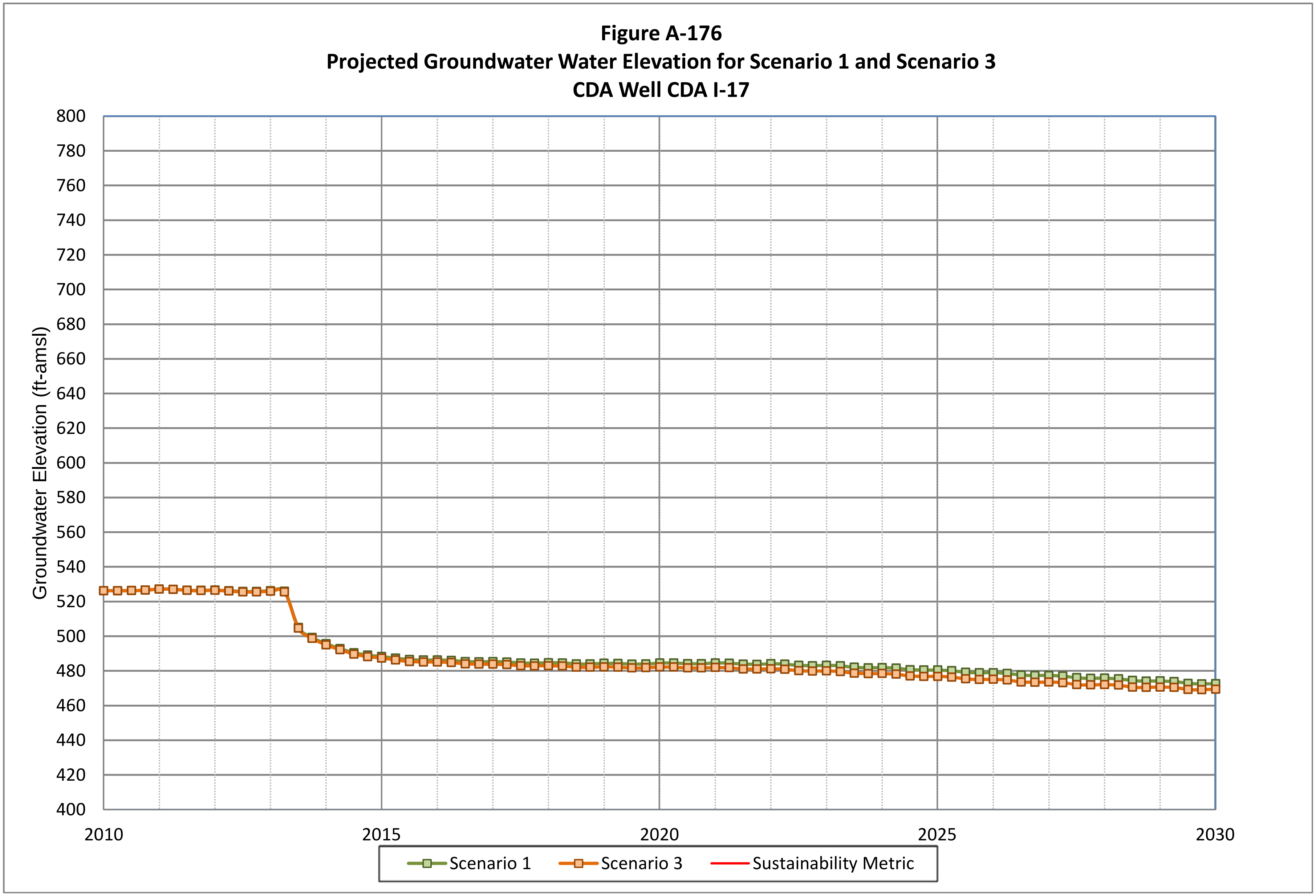


20120503_Projected_Hydrographs.xlsx

WILDERMUTH ENVIRONMENTAL INC.

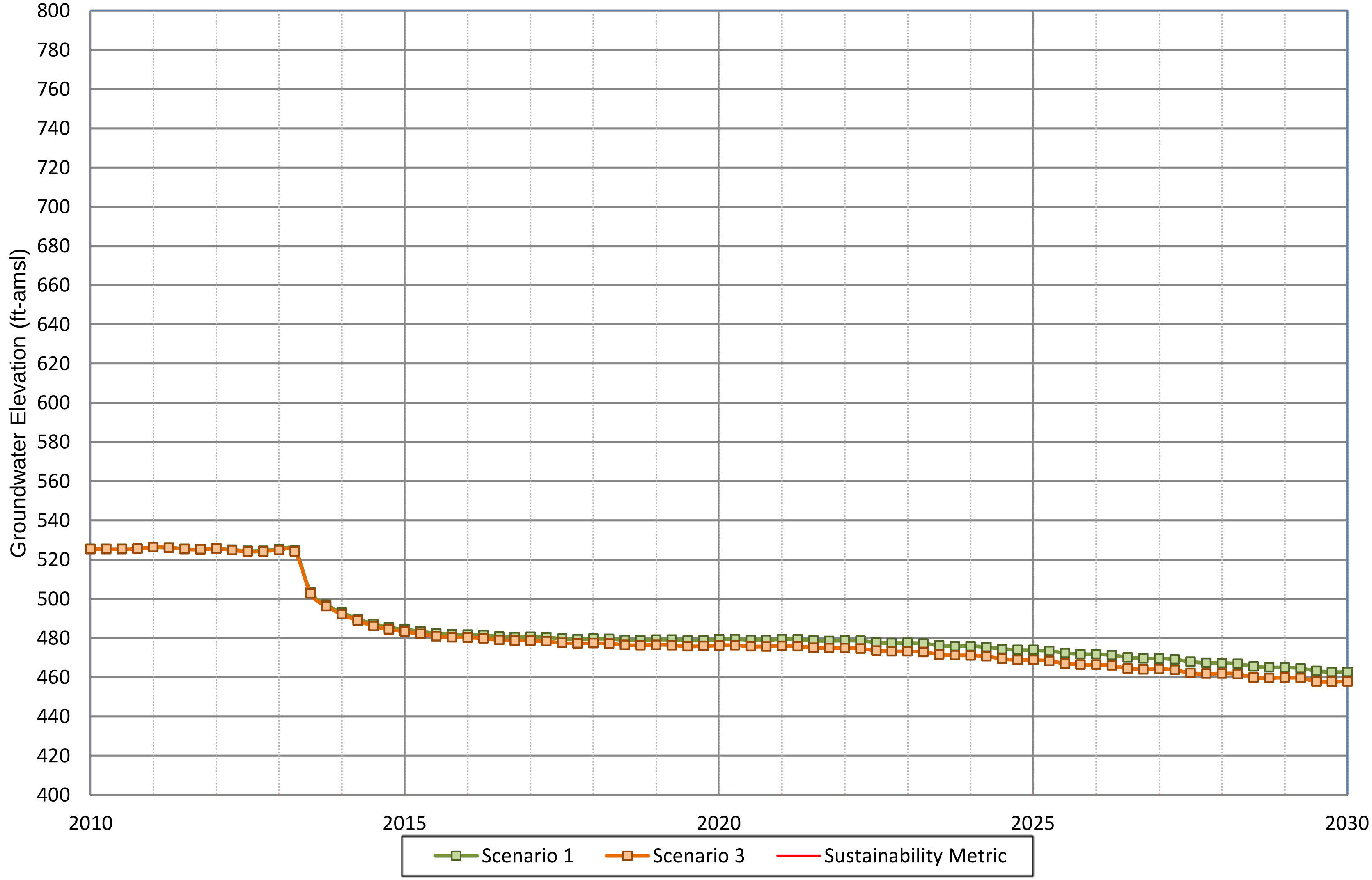


20120503_Projected_Hydrographs.xlsx



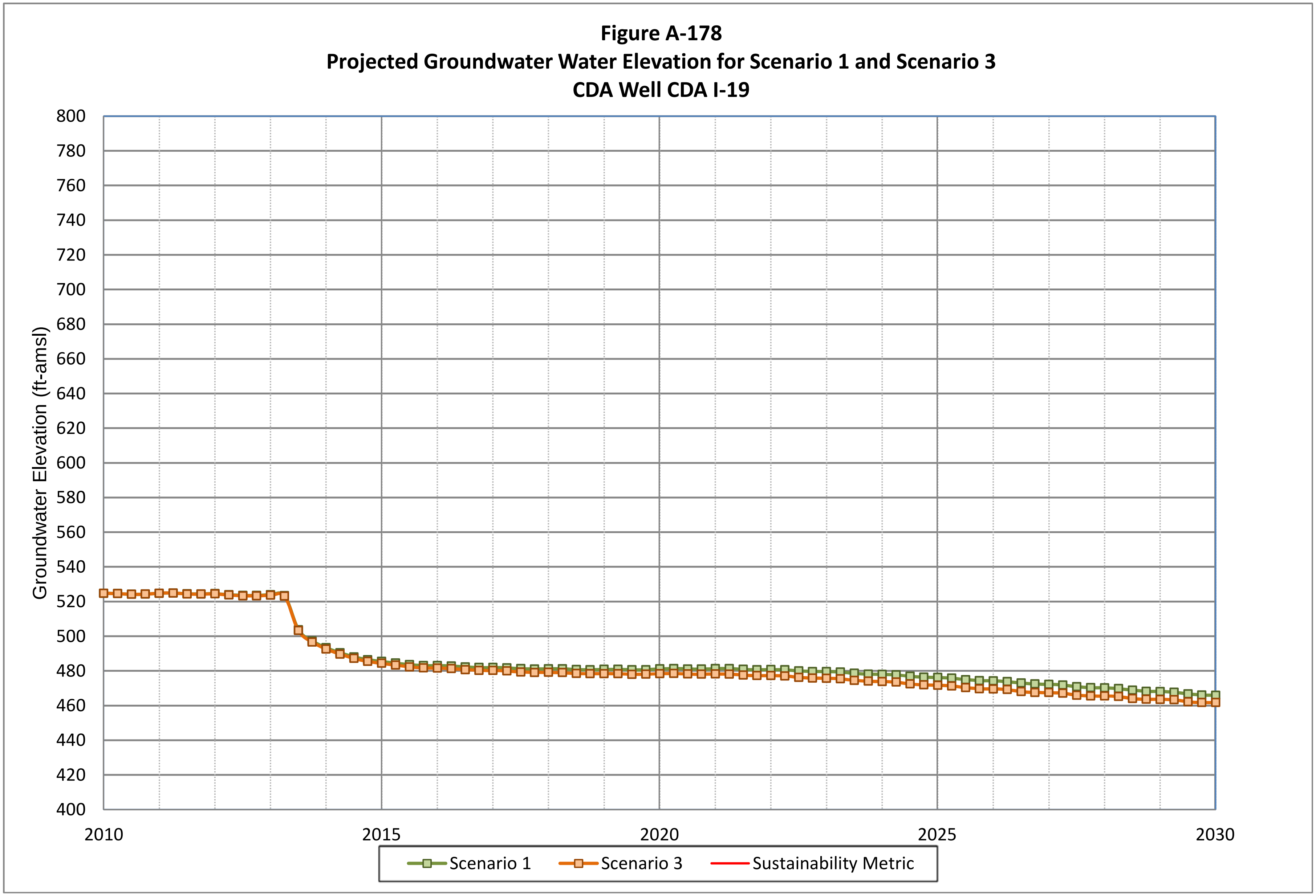
20120503_Projected_Hydrographs.xlsx

Figure A-177
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
CDA Well CDA I-18



20120503_Projected_Hydrographs.xlsx

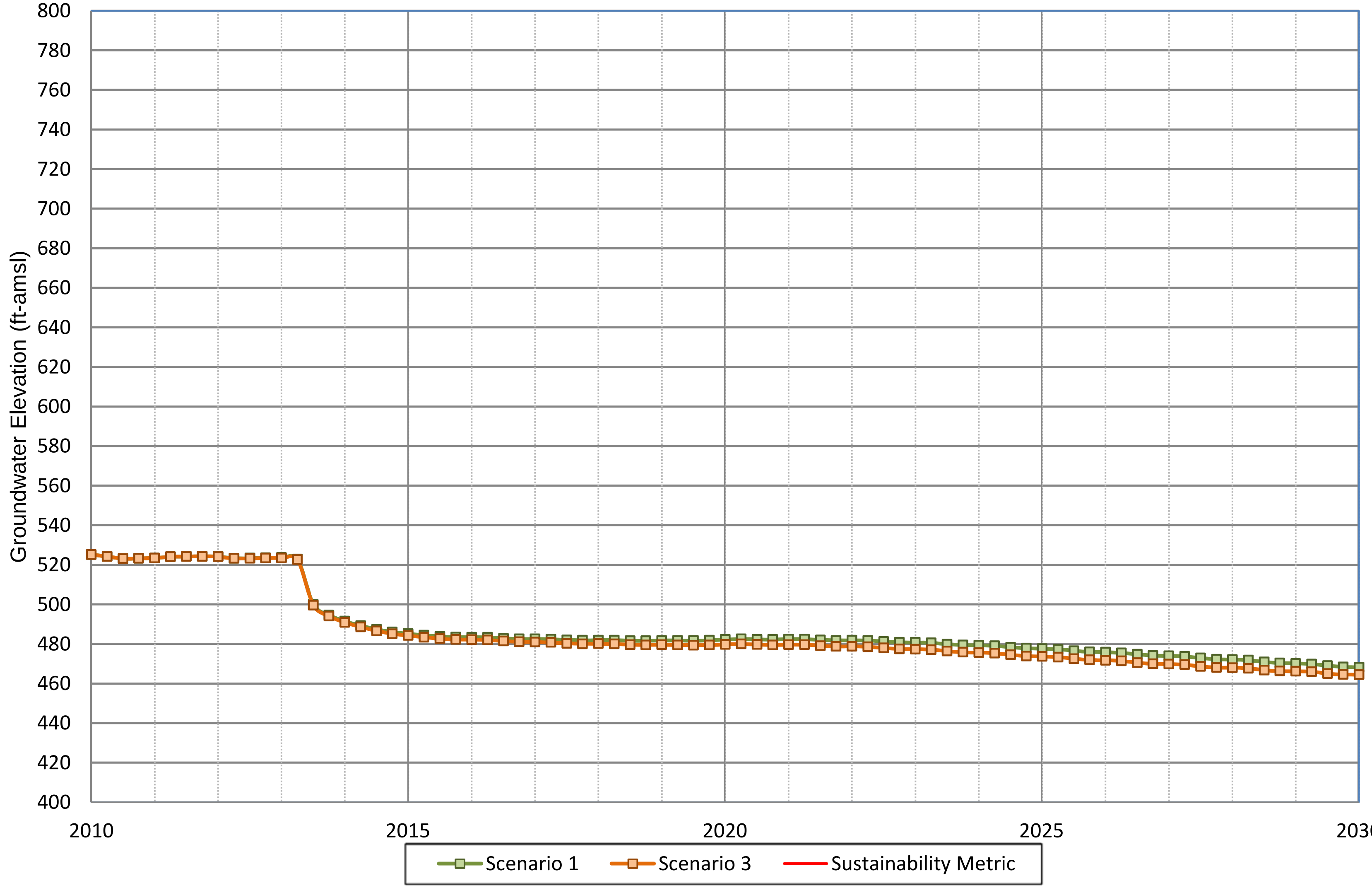
WILDERMUTH ENVIRONMENTAL INC.

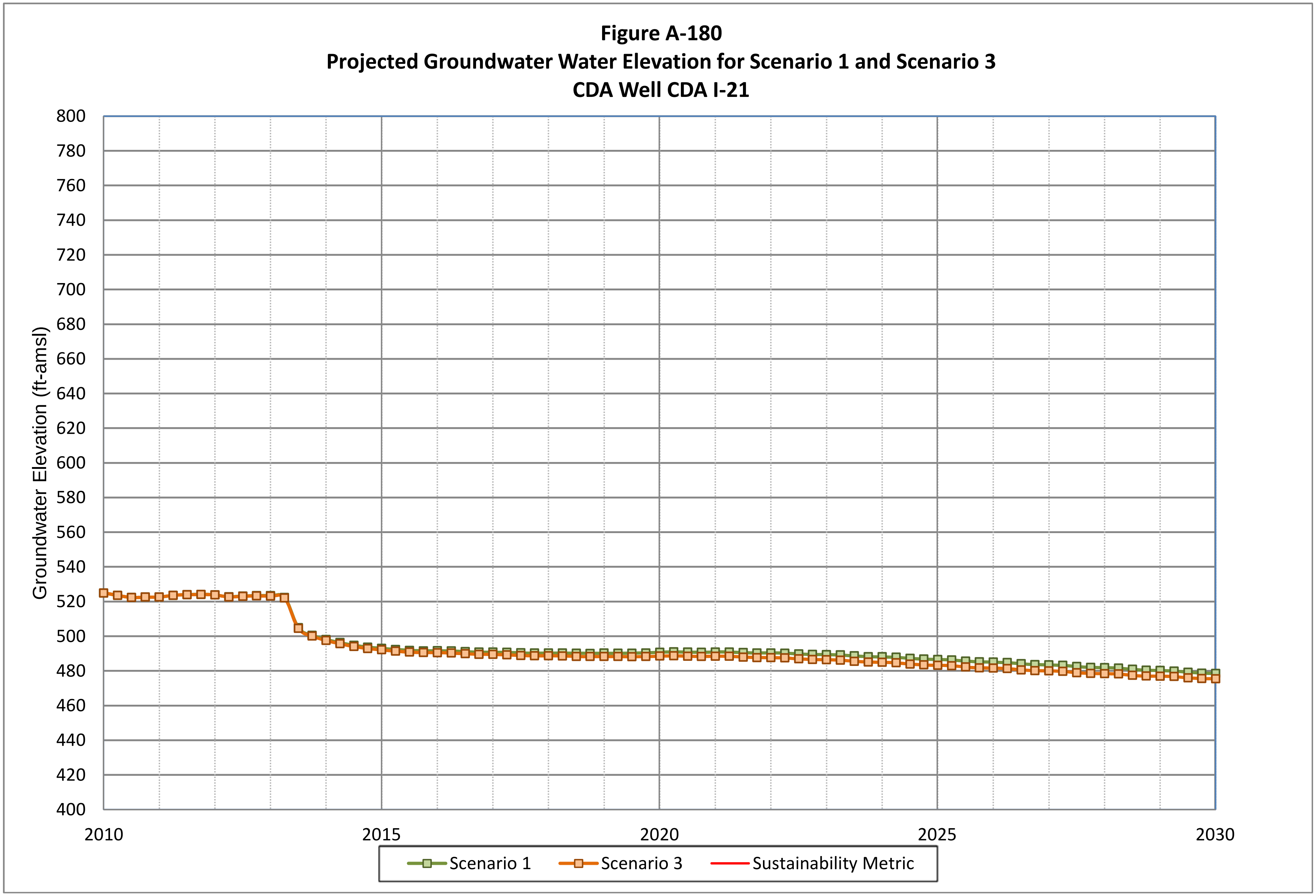


20120503_Projected_Hydrographs.xlsx

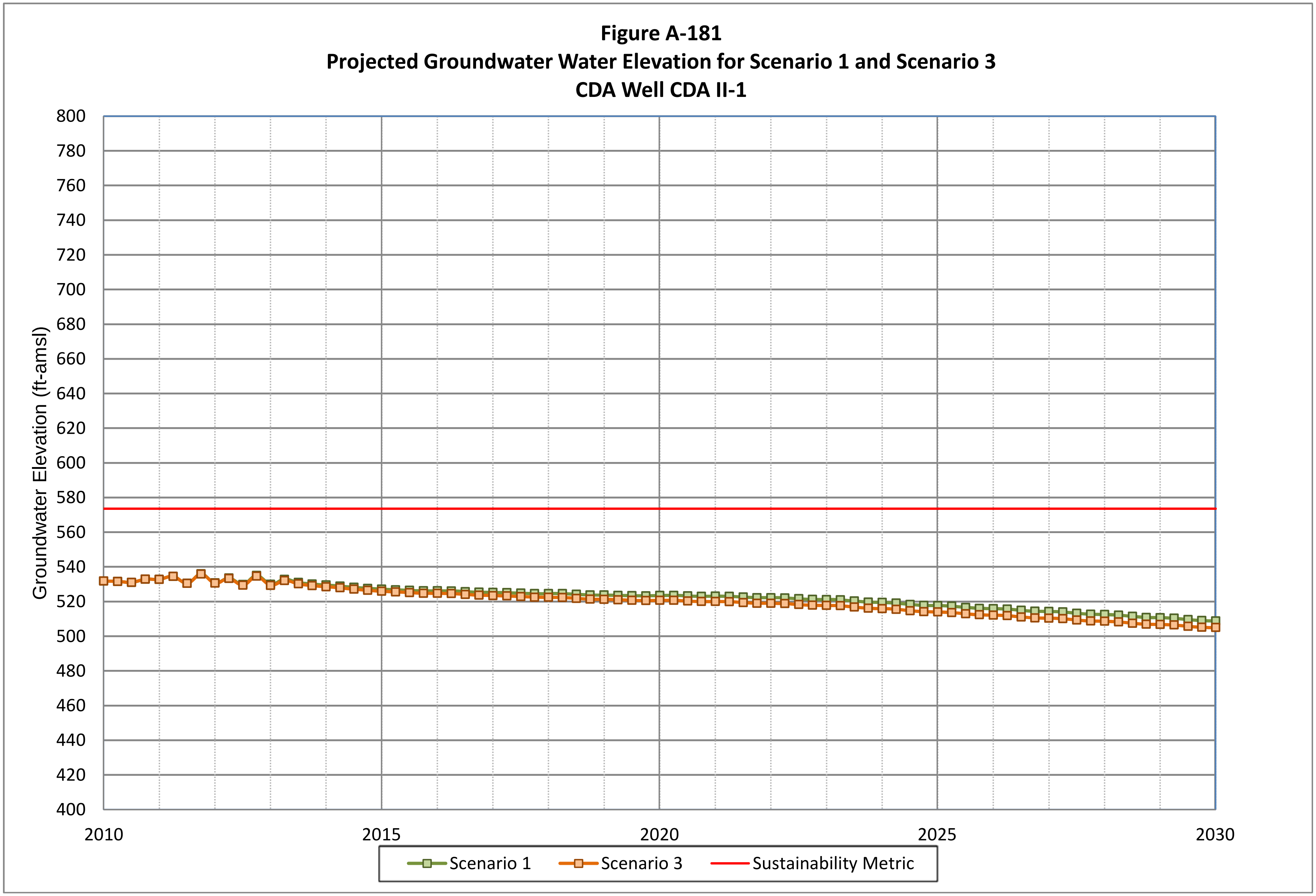
WILDERMUTH ENVIRONMENTAL INC.

Figure A-179
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
CDA Well CDA I-20





20120503_Projected_Hydrographs.xlsx



20120503_Projected_Hydrographs.xlsx

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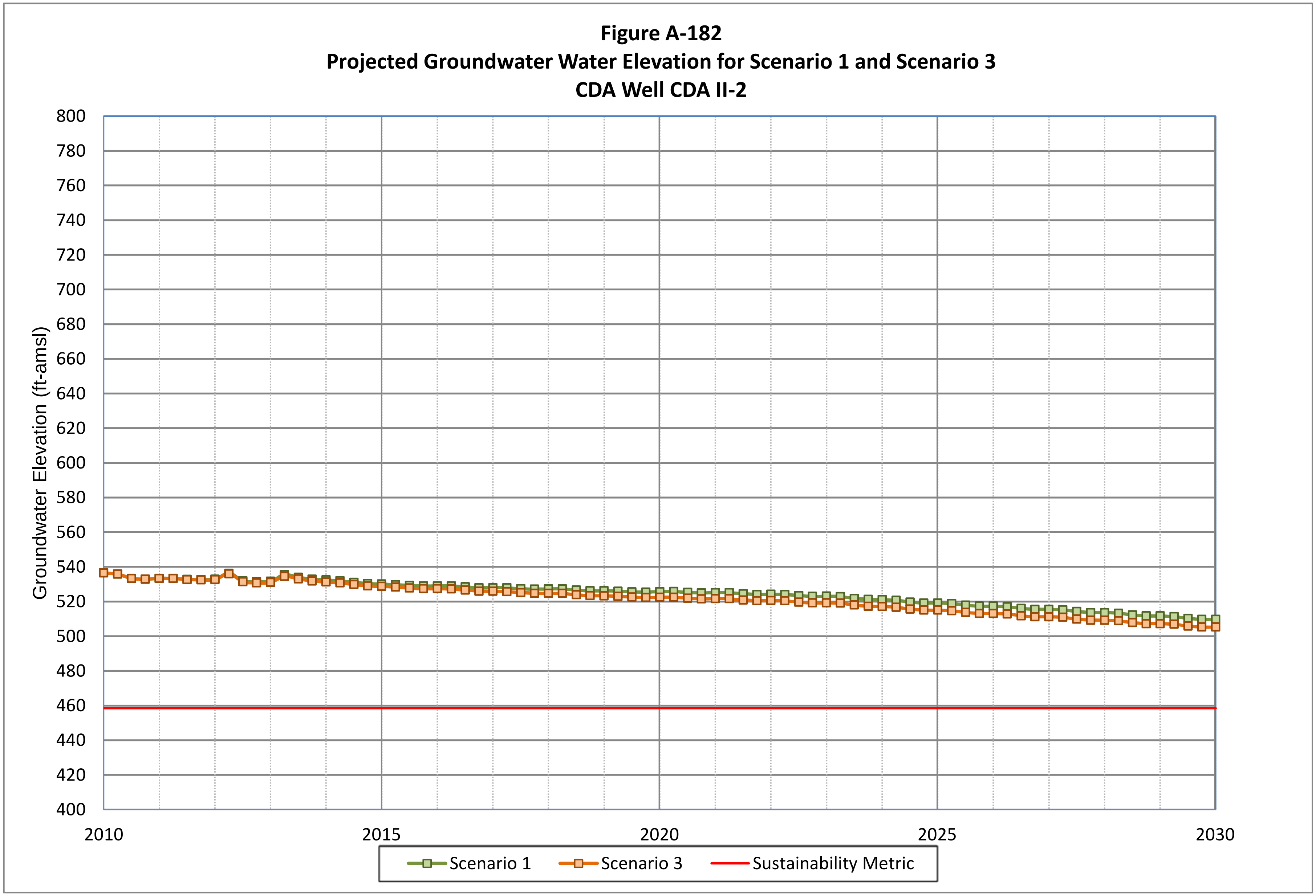

20120503_Projected_Hydrographs.xlsx

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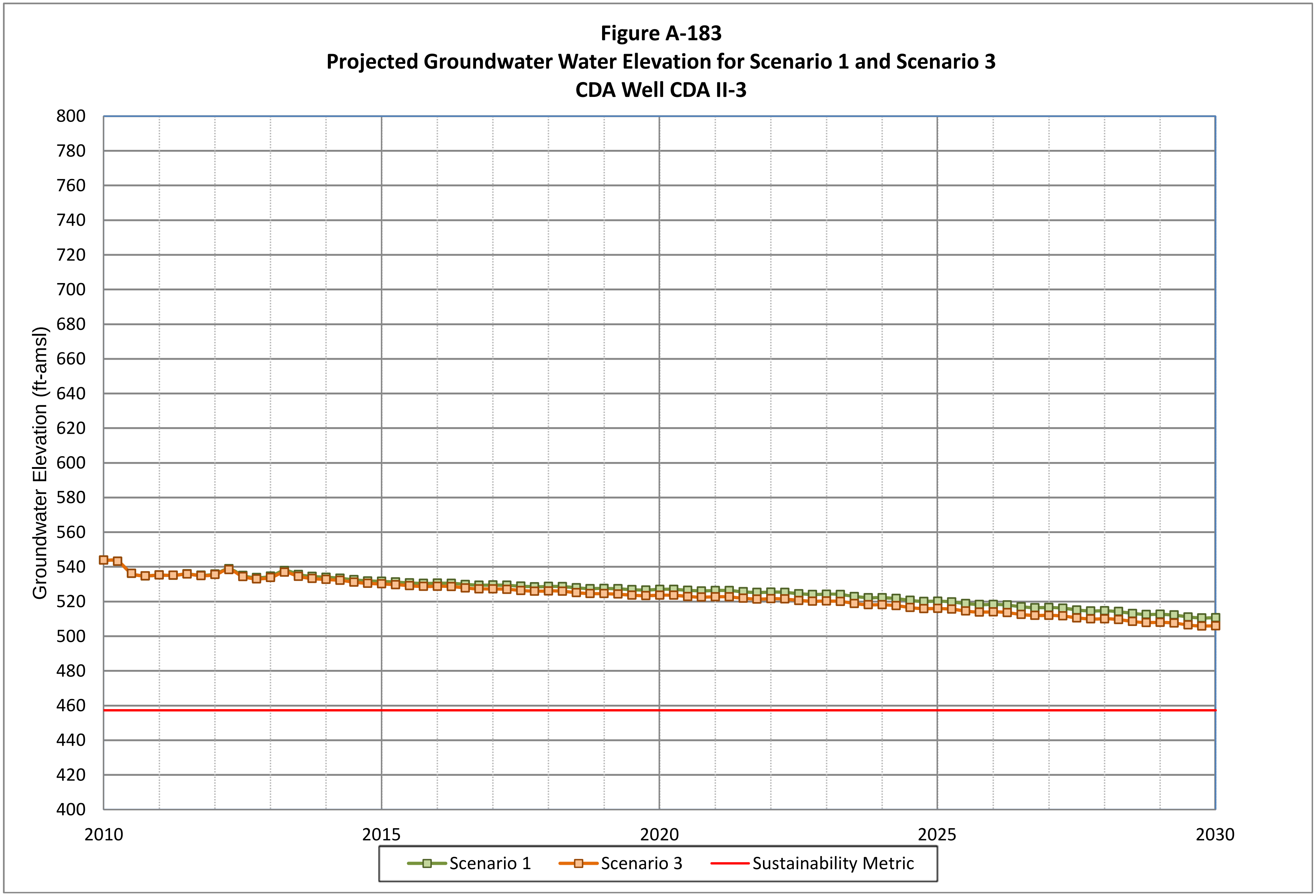
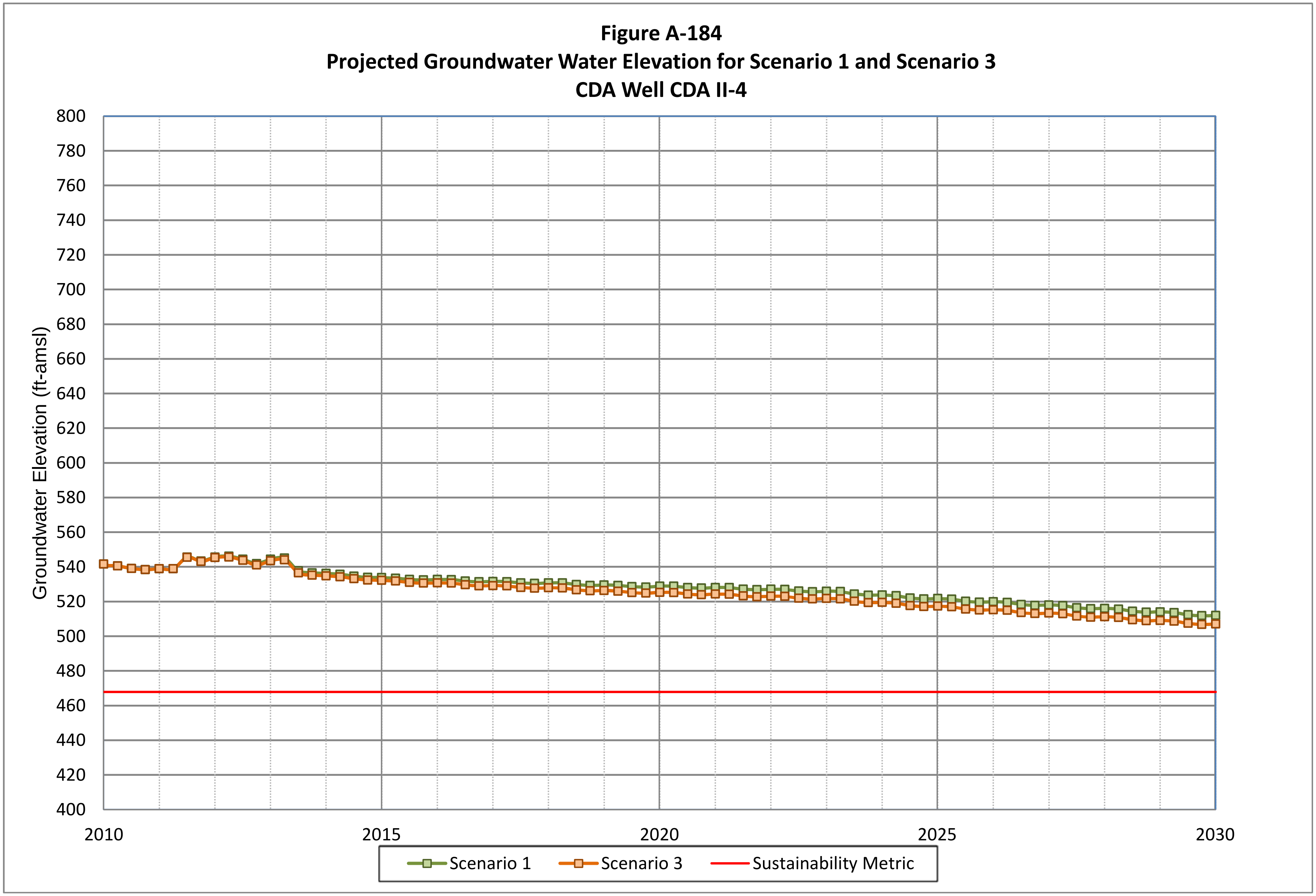


Figure A-183
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
CDA Well CDA II-3
Groundwater Elevation (ft-amsl)
800
780
760
740
720
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Sustainability Metric



20120503_Projected_Hydrographs.xlsx

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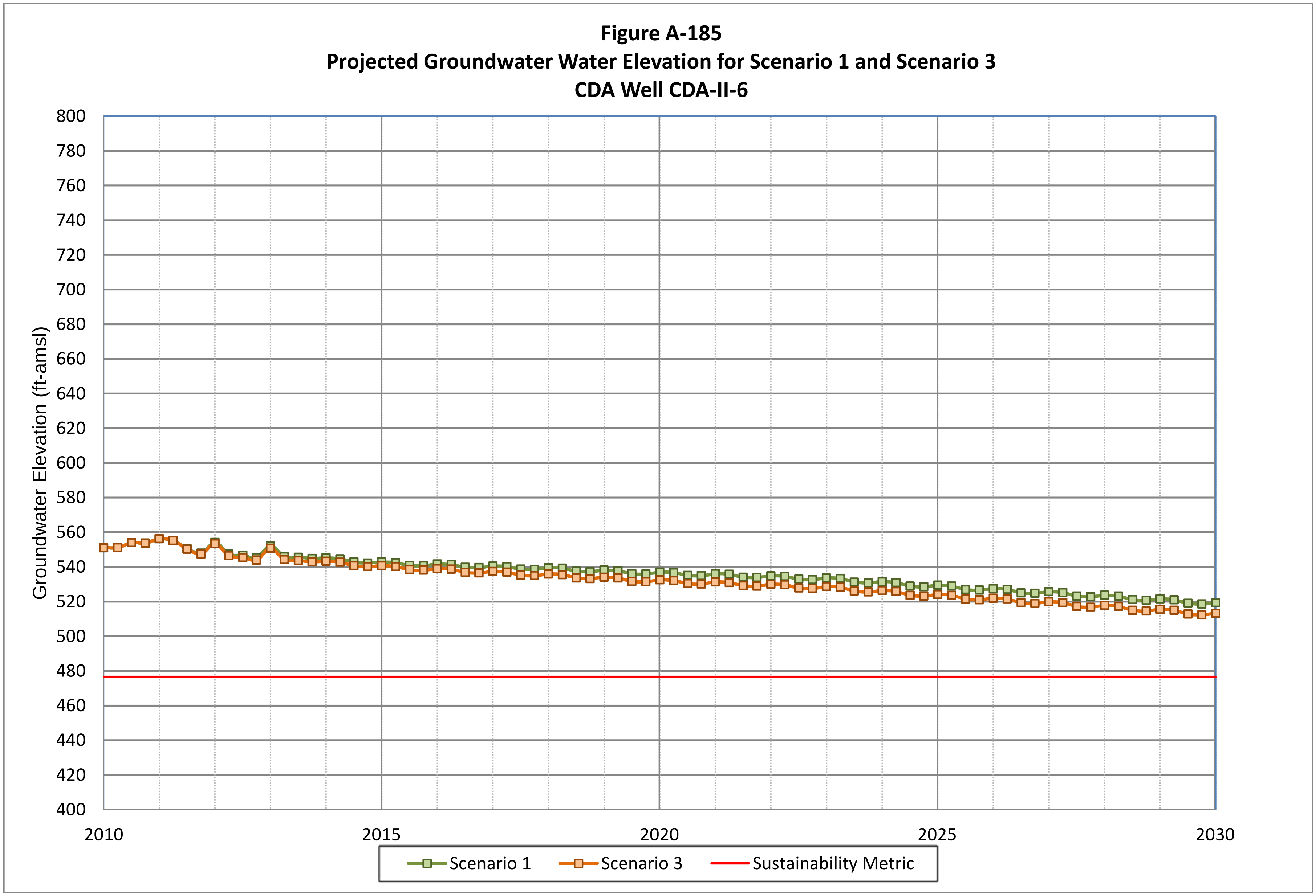

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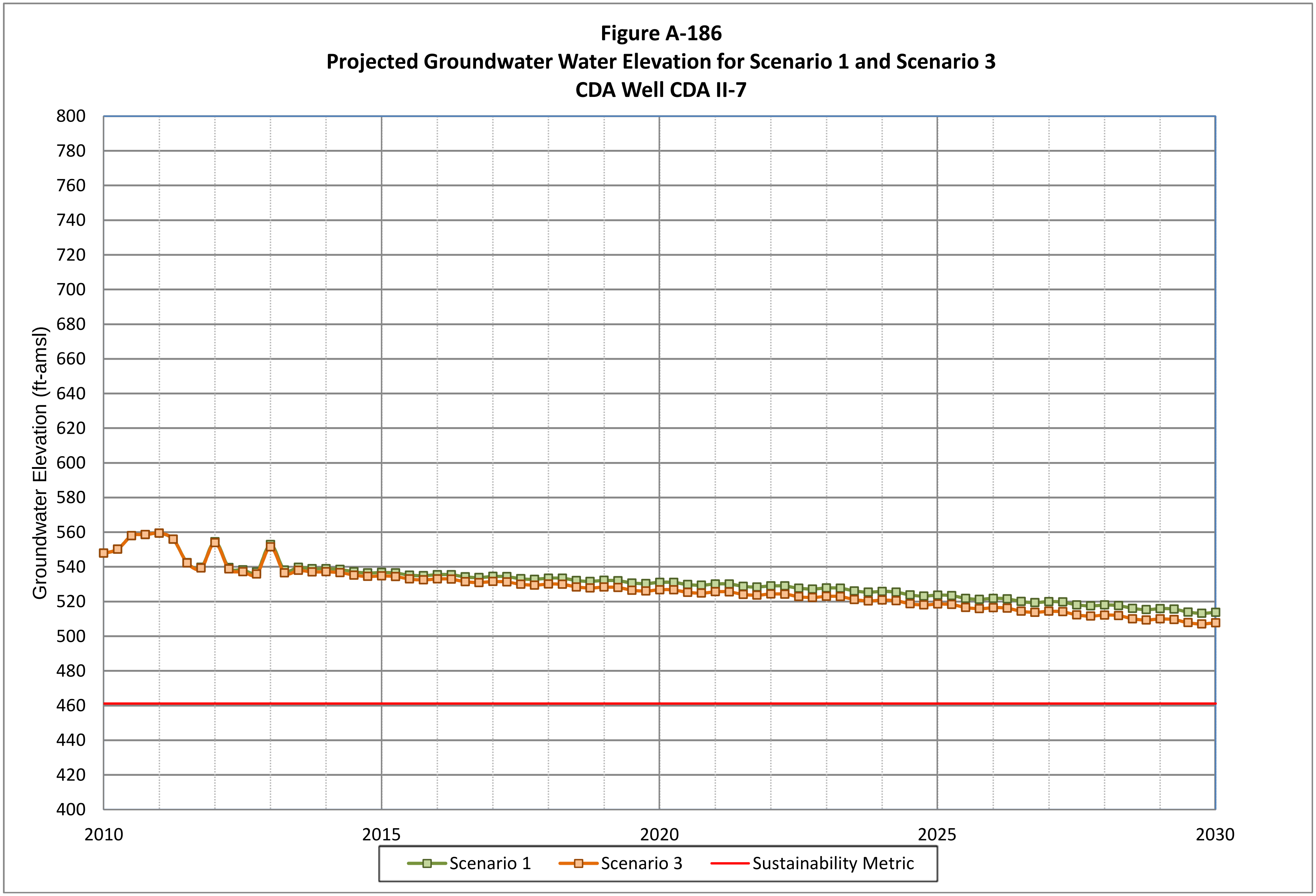

20120503_Projected_Hydrographs.xlsx

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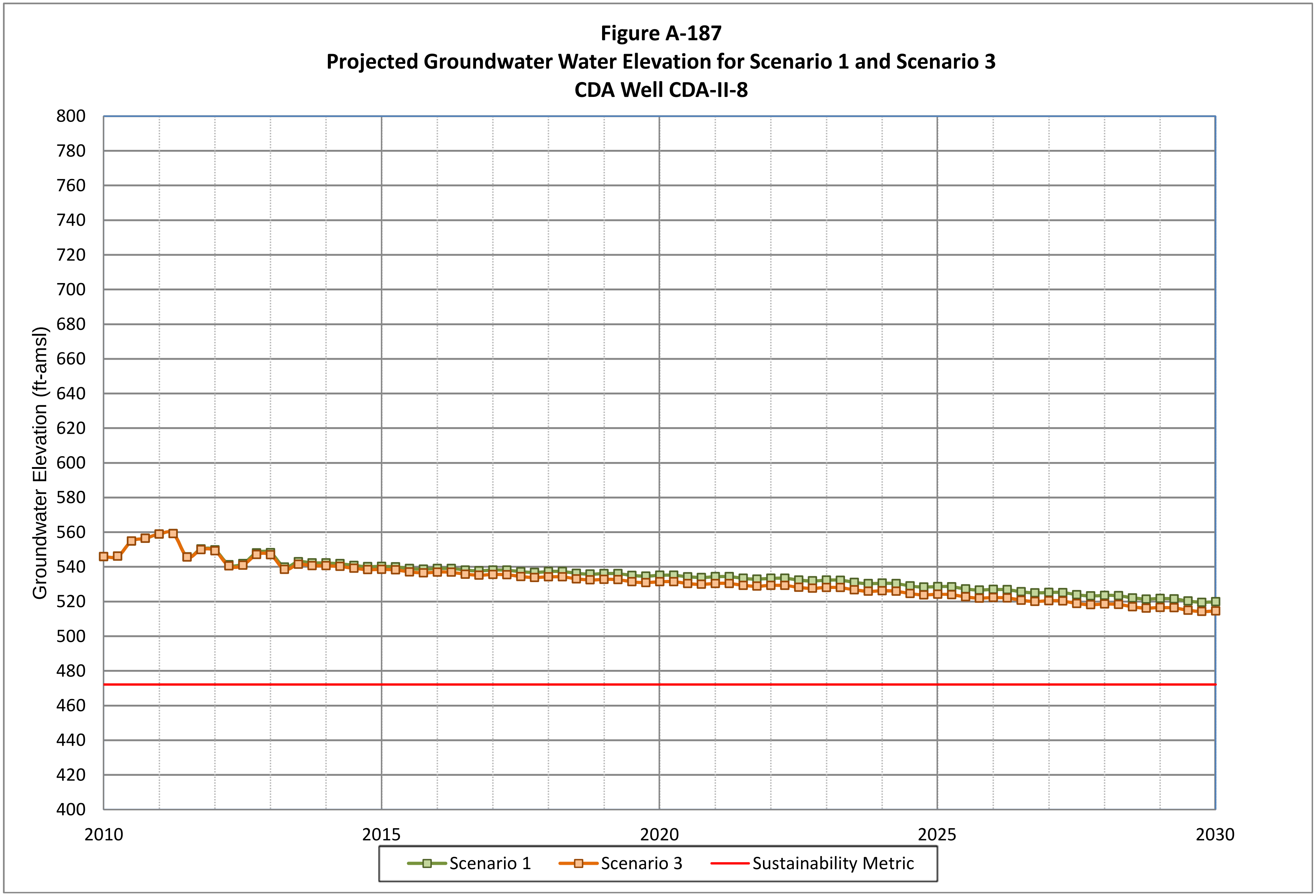

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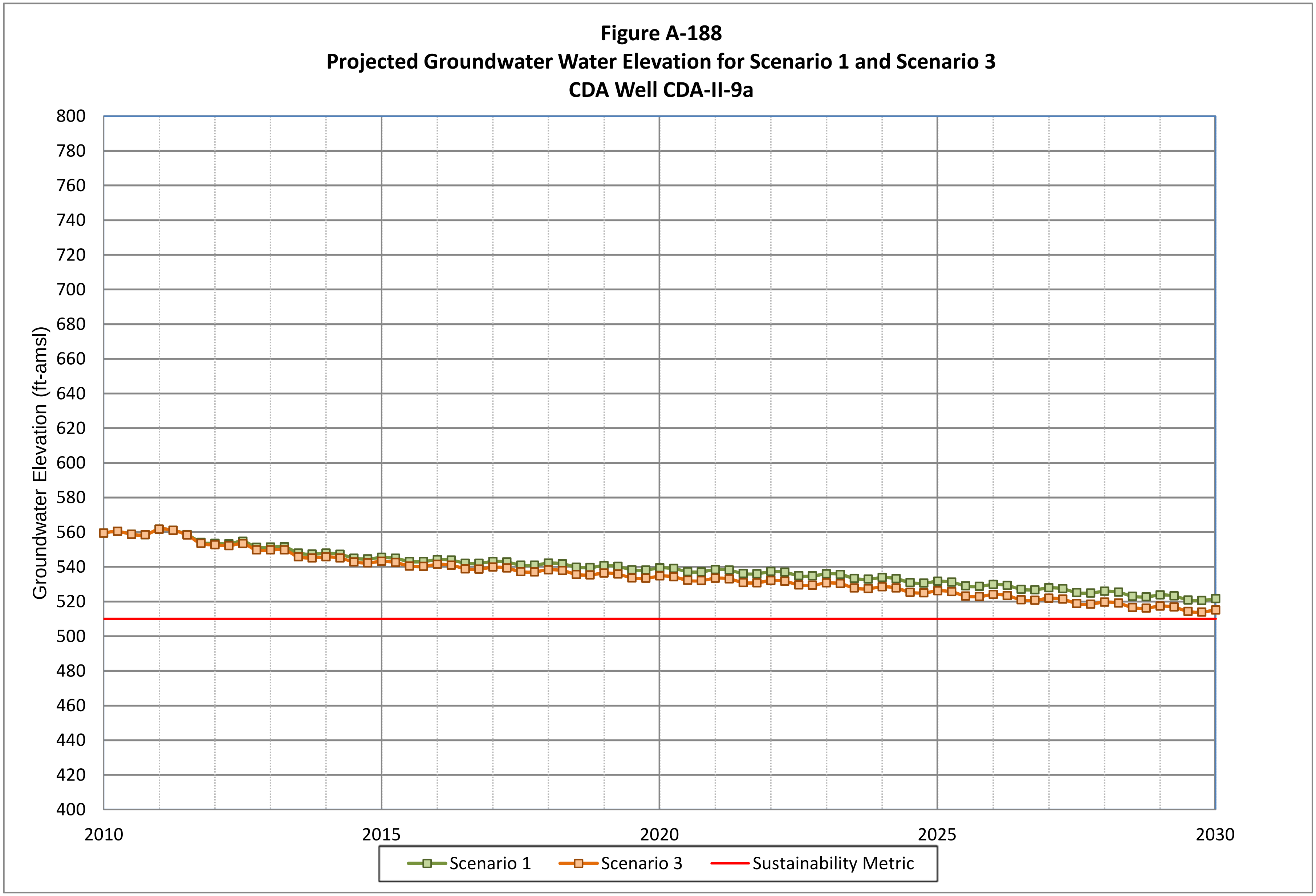


20120503_Projected_Hydrographs.xlsx

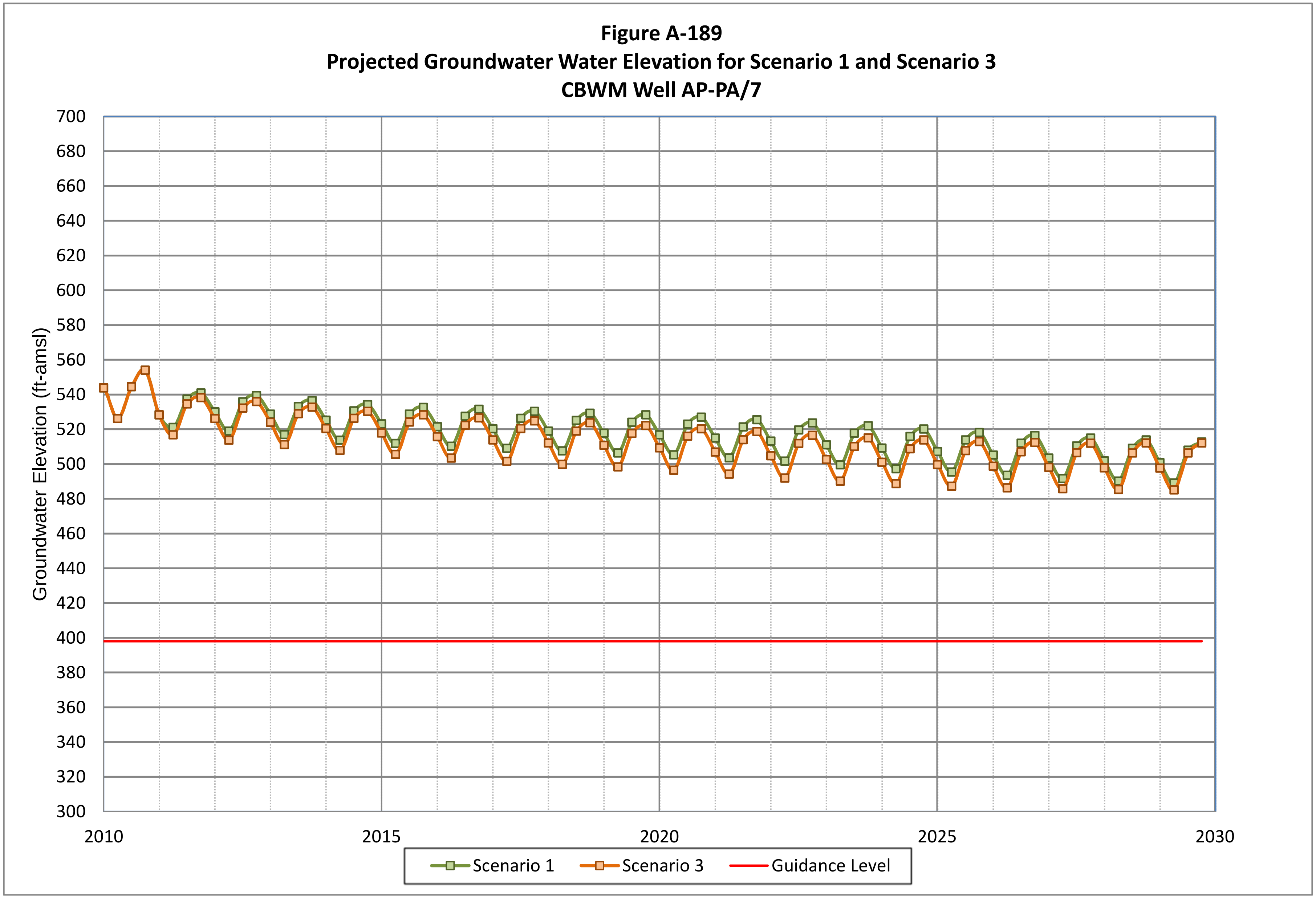


Figure A-189
Projected Groundwater Water Elevation for Scenario 1 and Scenario 3
CBWM Well AP-PA/7
Groundwater Elevation (ft-amsl)
700
680
660
640
620
600
580
560
540
520
500
480
460
440
420
400
380
360
340
320
300
2010
2015
2020
2025
2030
Scenario 1
Scenario 3
Guidance Level

Appendix B

Projected Groundwater Elevation Time Series for JCSD Wells for Scenarios 1, 1A-1D, 3 and 3A-3D

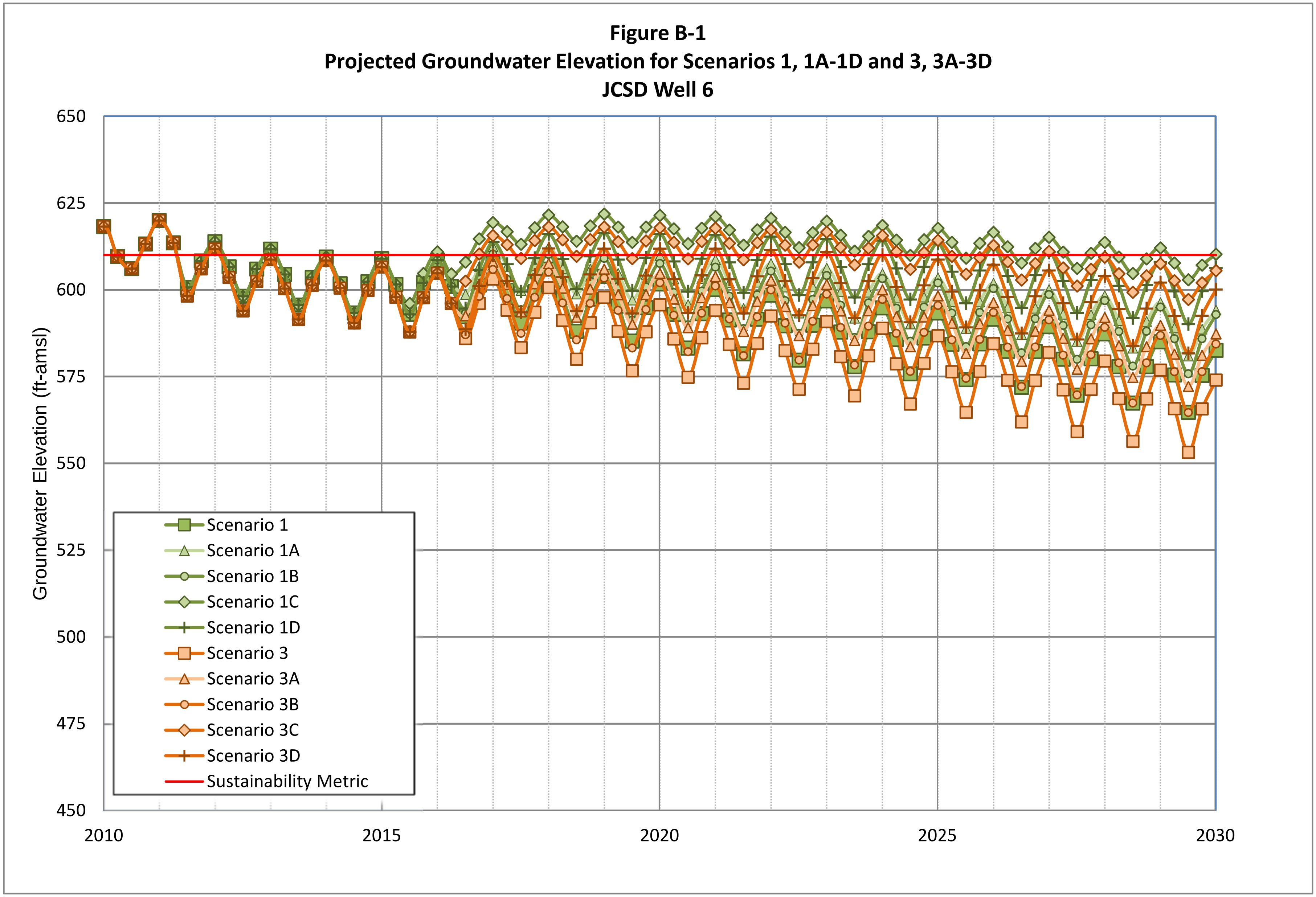
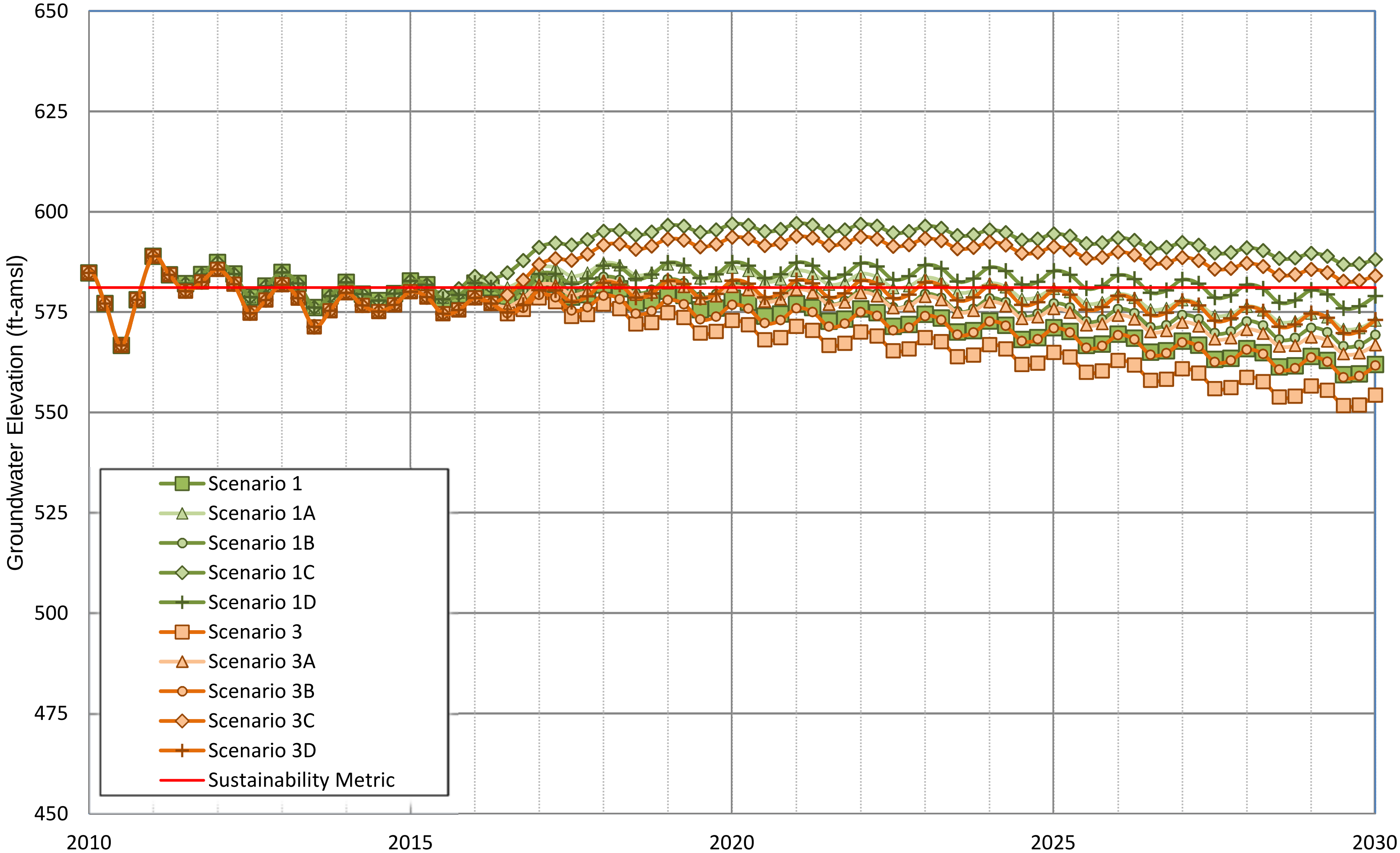
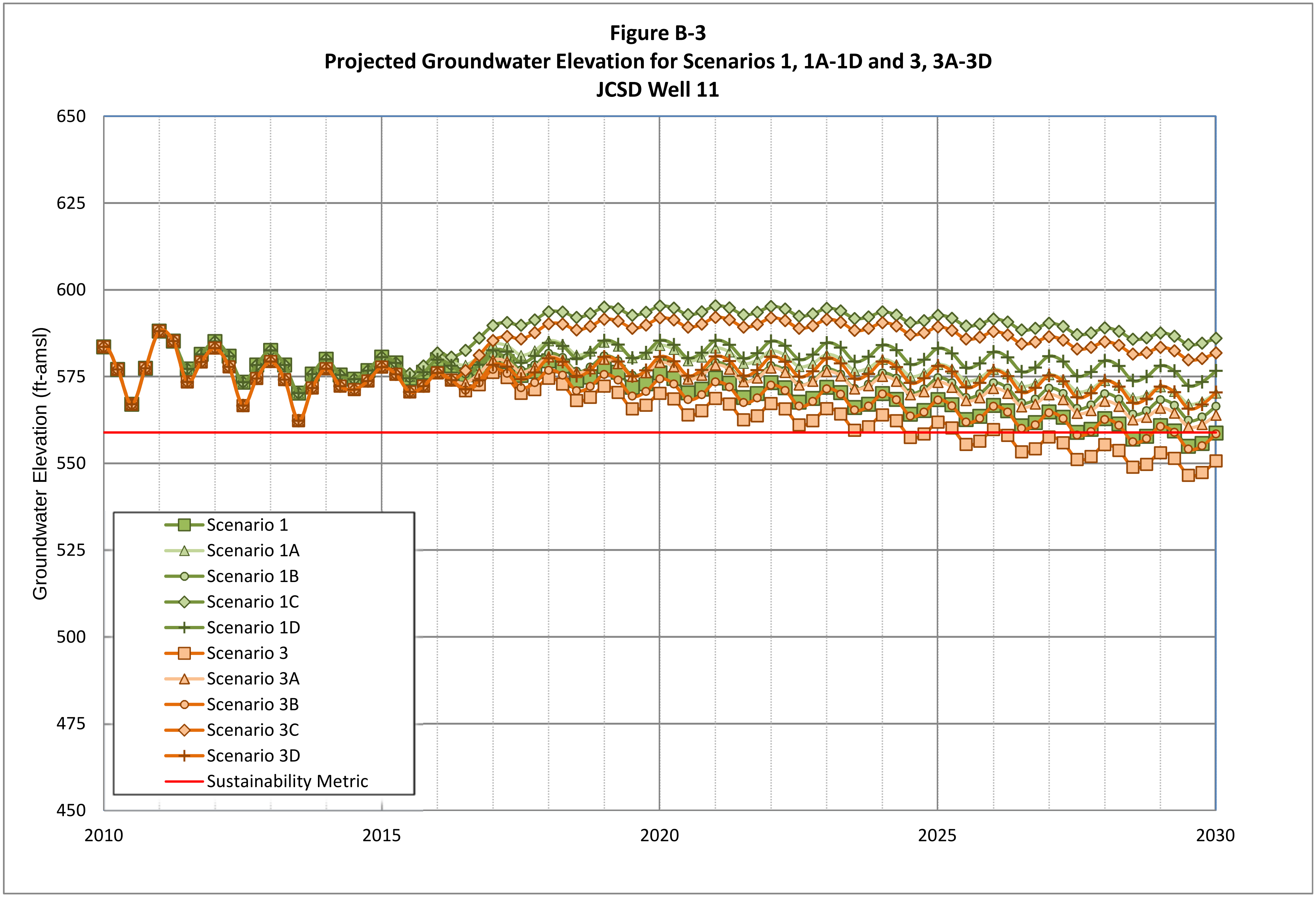


Figure B-1
Projected Groundwater Elevation for Scenarios 1, 1A-1D and 3, 3A-3D
JCSD Well 6
Groundwater Elevation (ft-amsl)
650
625
600
575
550
525
500
475
450
2010
2015
2020
2025
2030
Scenario 1
Scenario 1A
Scenario 1B
Scenario 1C
Scenario 1D
Scenario 3
Scenario 3A
Scenario 3B
Scenario 3C
Scenario 3D
Sustainability Metric

Figure B-2
Projected Groundwater Elevation for Scenarios 1, 1A-1D and 3, 3A-3D
JCSD Well 8





20120503_Projected_Hydrographs_JCSD .xlsx

WILDERMUTH ENVIRONMENTAL INC.

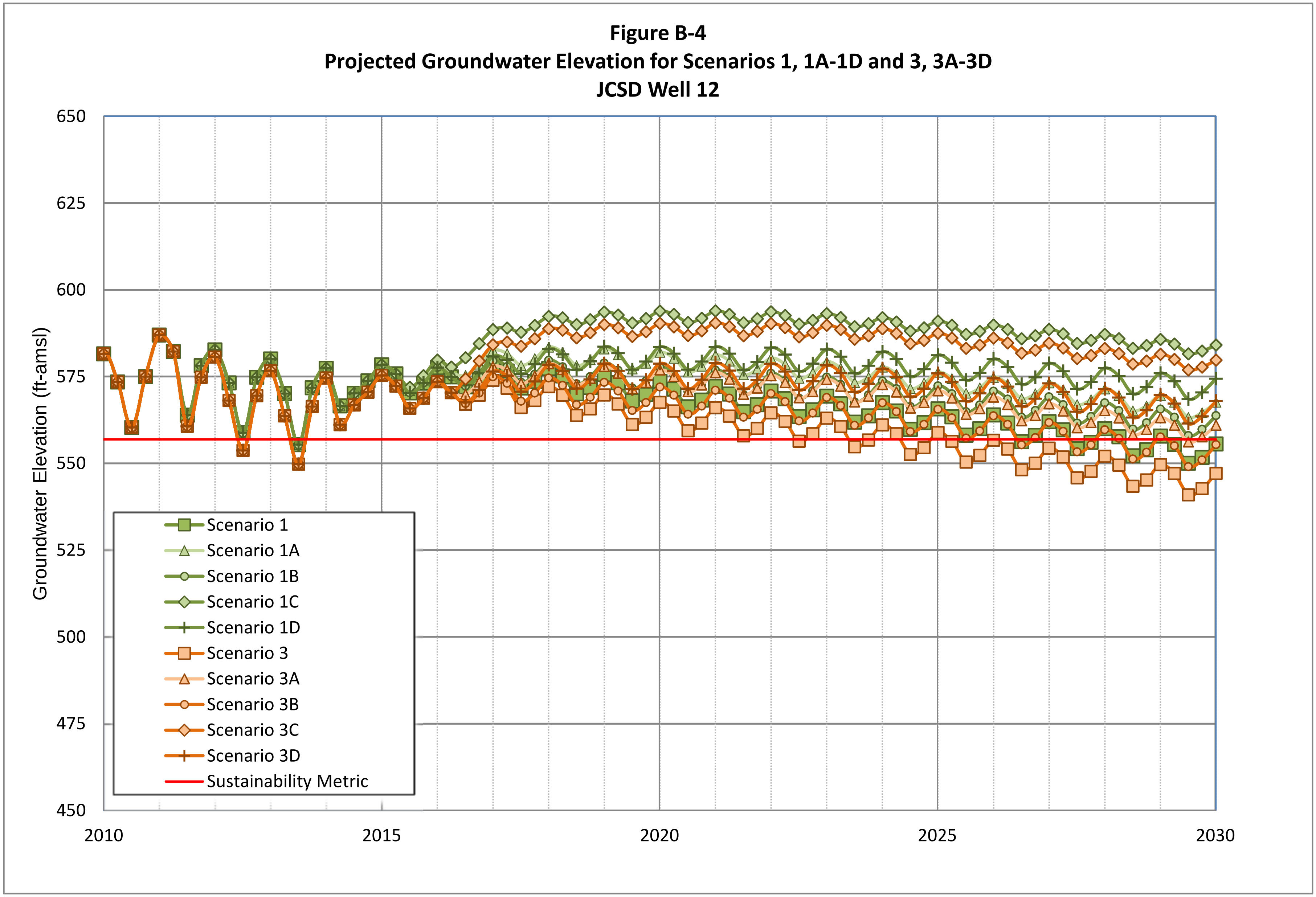
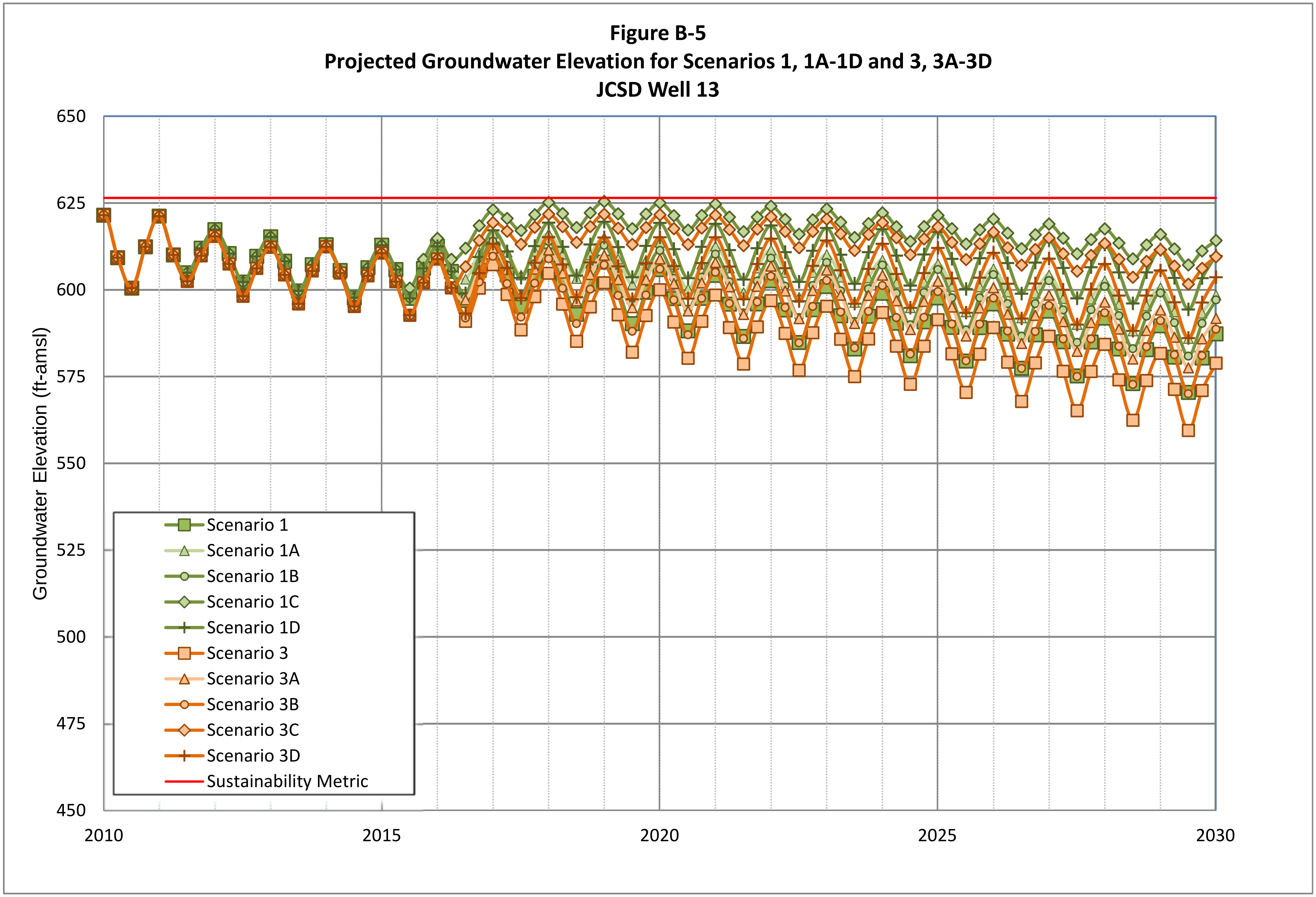


Figure B-4
Projected Groundwater Elevation for Scenarios 1, 1A-1D and 3, 3A-3D
JCSD Well 12
Groundwater Elevation (ft-amsl)
650
625
600
575
550
525
500
475
450
2010
2015
2020
2025
2030
Scenario 1
Scenario 1A
Scenario 1B
Scenario 1C
Scenario 1D
Scenario 3
Scenario 3A
Scenario 3B
Scenario 3C
Scenario 3D
Sustainability Metric



20120503_Projected_Hydrographs_JCSD .xlsx

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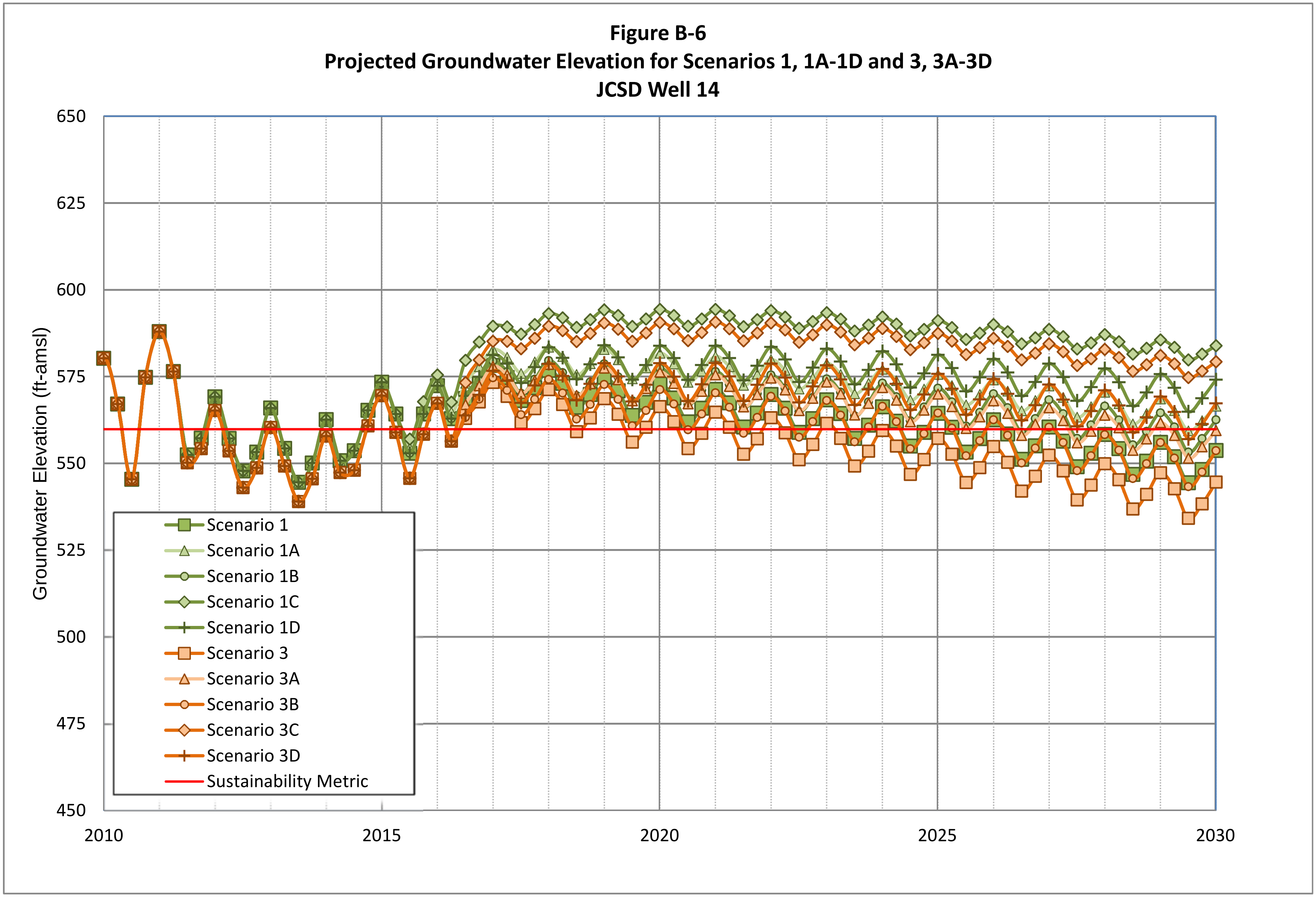
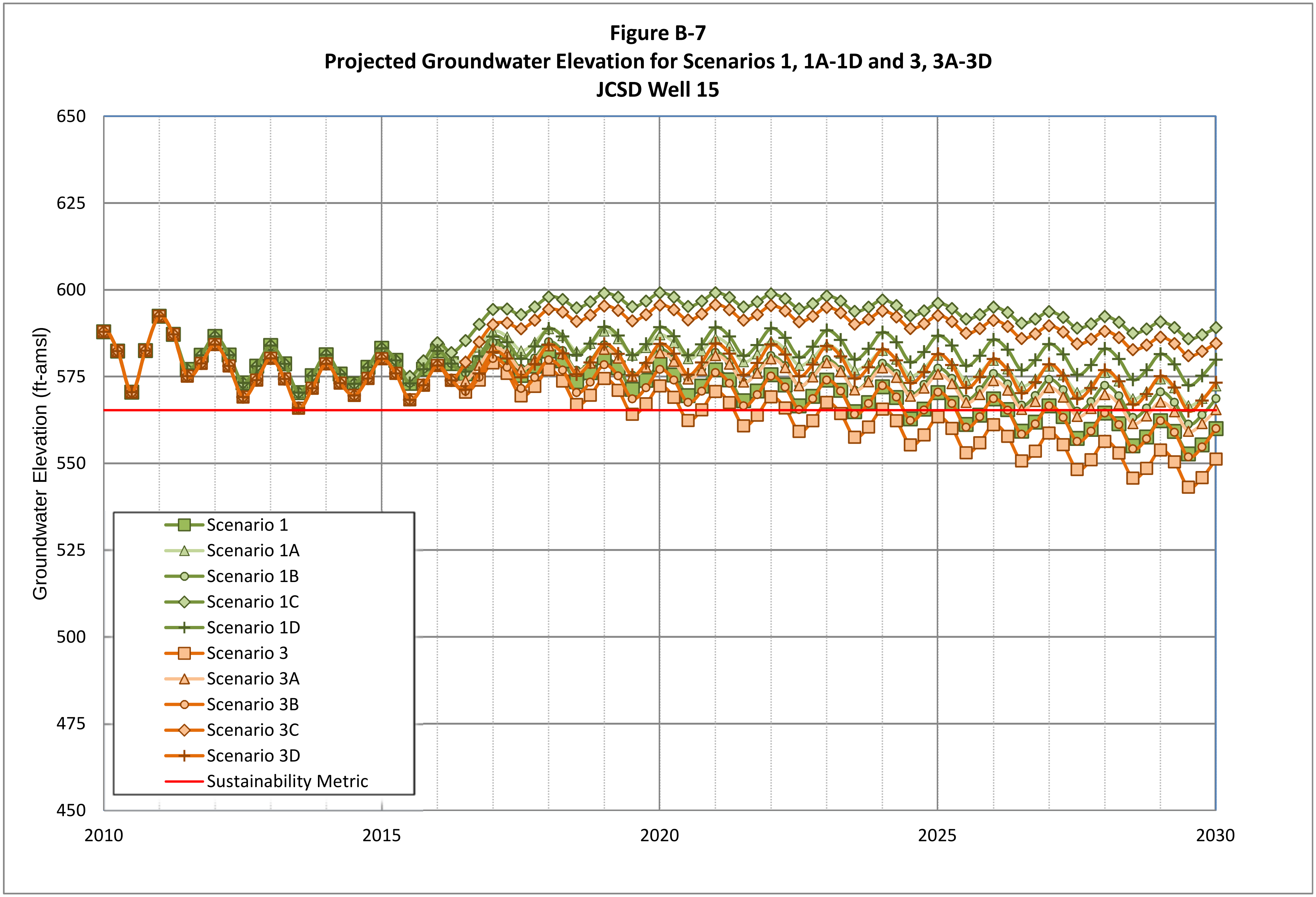


20120503_Projected_Hydrographs_JCSD .xlsx

WILDERMUTH ENVIRONMENTAL INC.



20120503_Projected_Hydrographs_JCSD .xlsx

WILDERMUTH ENVIRONMENTAL INC.

Figure B-8
Projected Groundwater Elevation for Scenarios 1, 1A-1D and 3, 3A-3D
JCSD Well 16

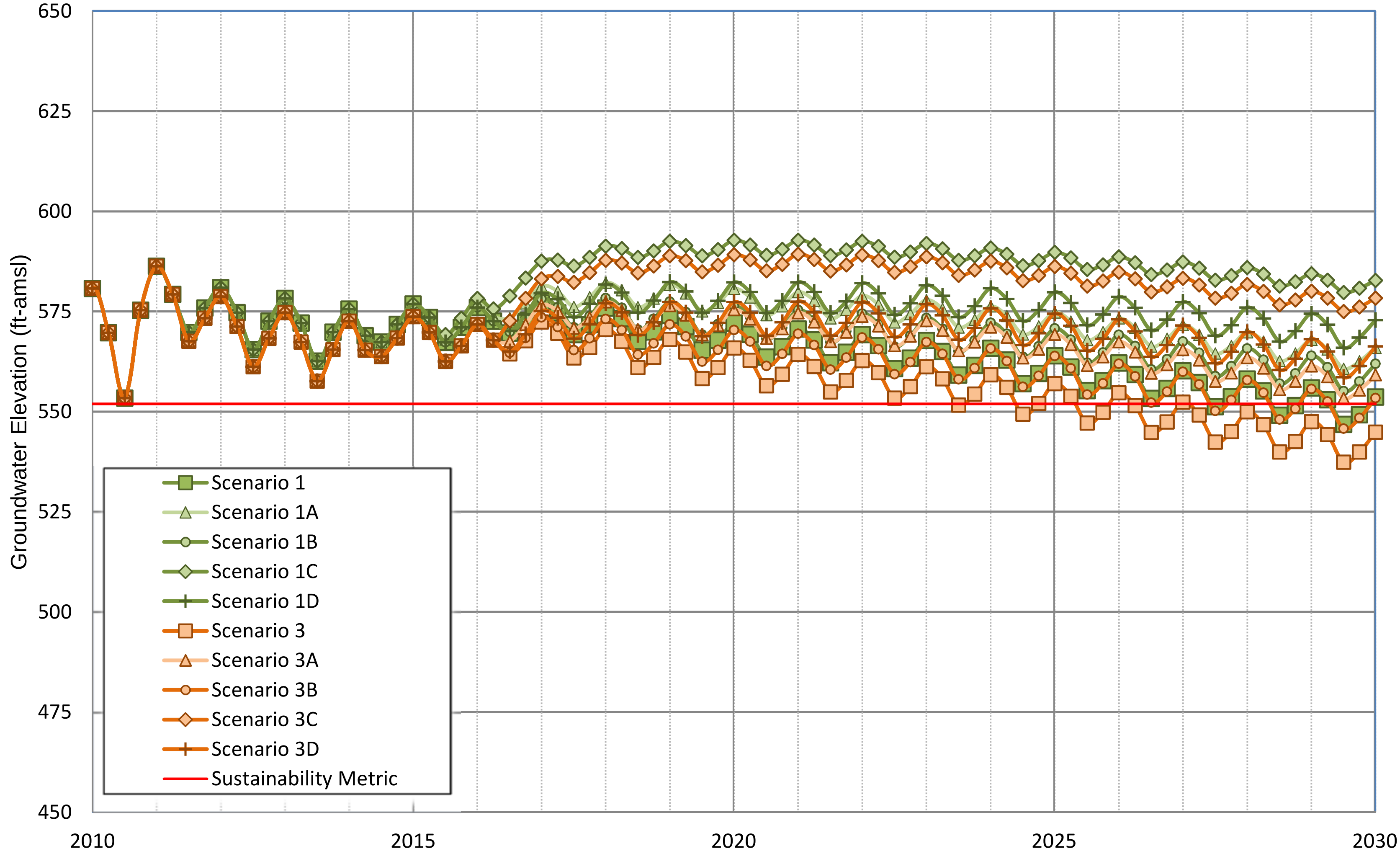
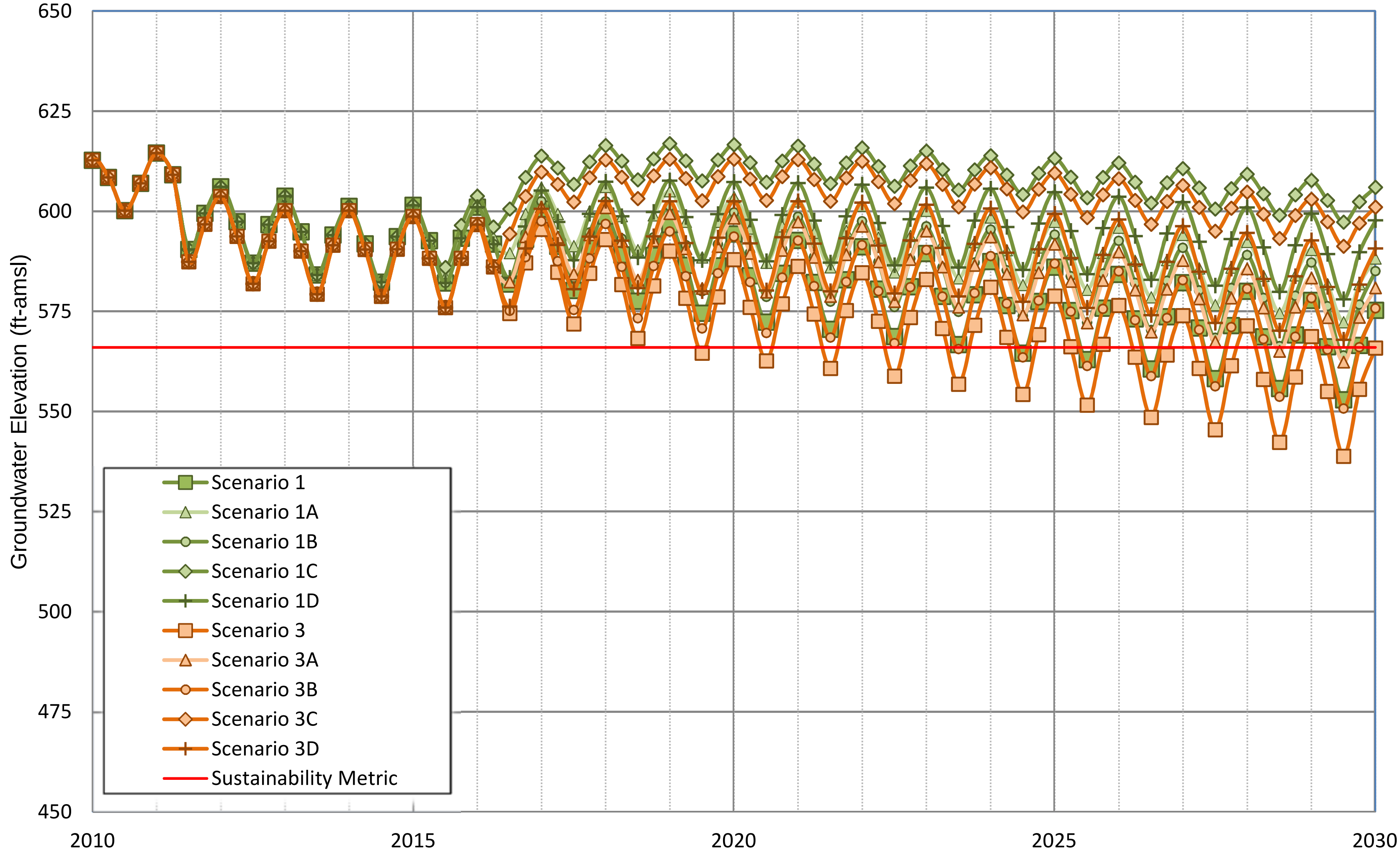
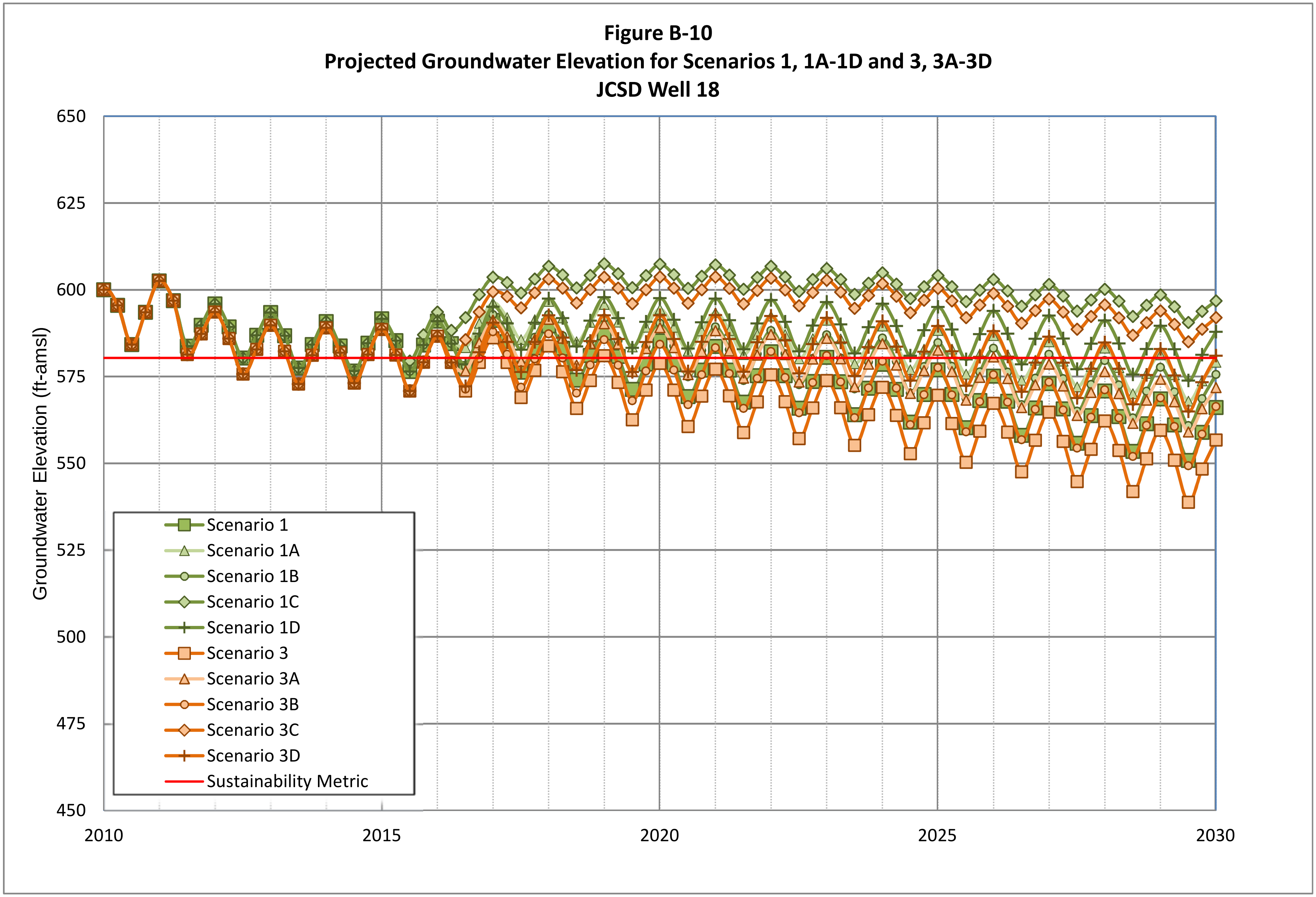
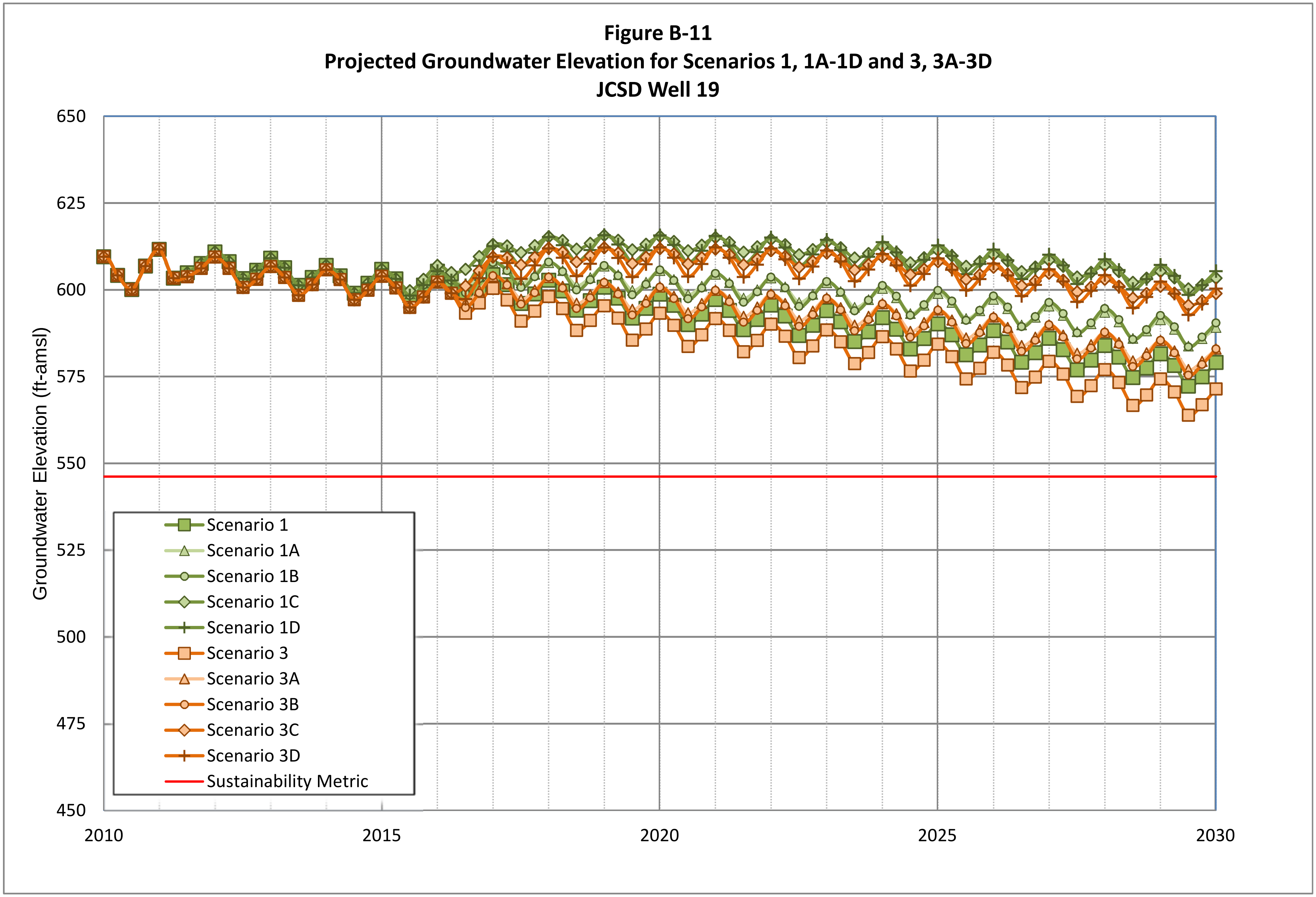


Figure B-9
Projected Groundwater Elevation for Scenarios 1, 1A-1D and 3, 3A-3D
JCSD Well 17





20120503_Projected_Hydrographs_JCSD .xlsx



20120503_Projected_Hydrographs_JCSD .xlsx

WILDERMUTH ENVIRONMENTAL INC.

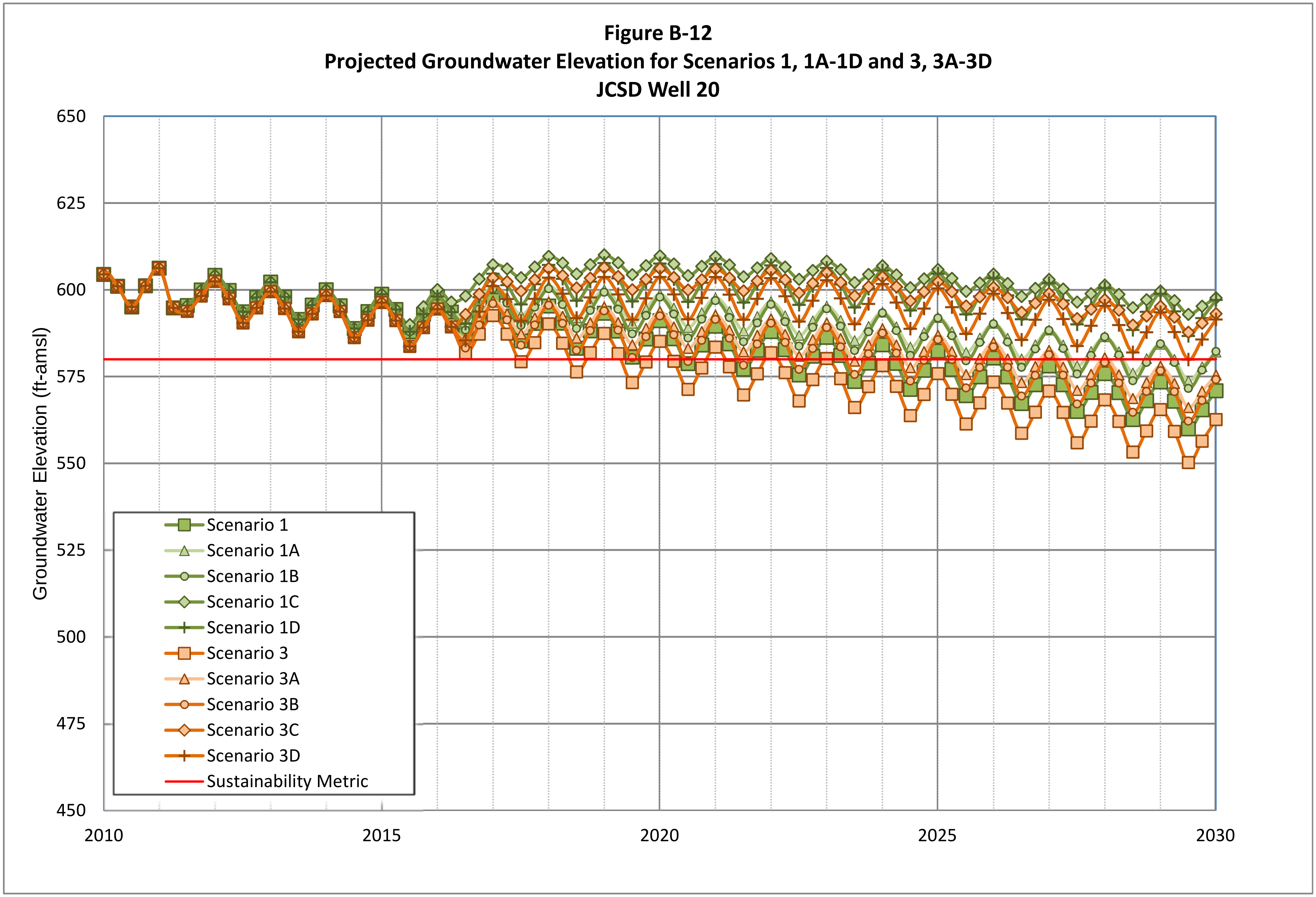
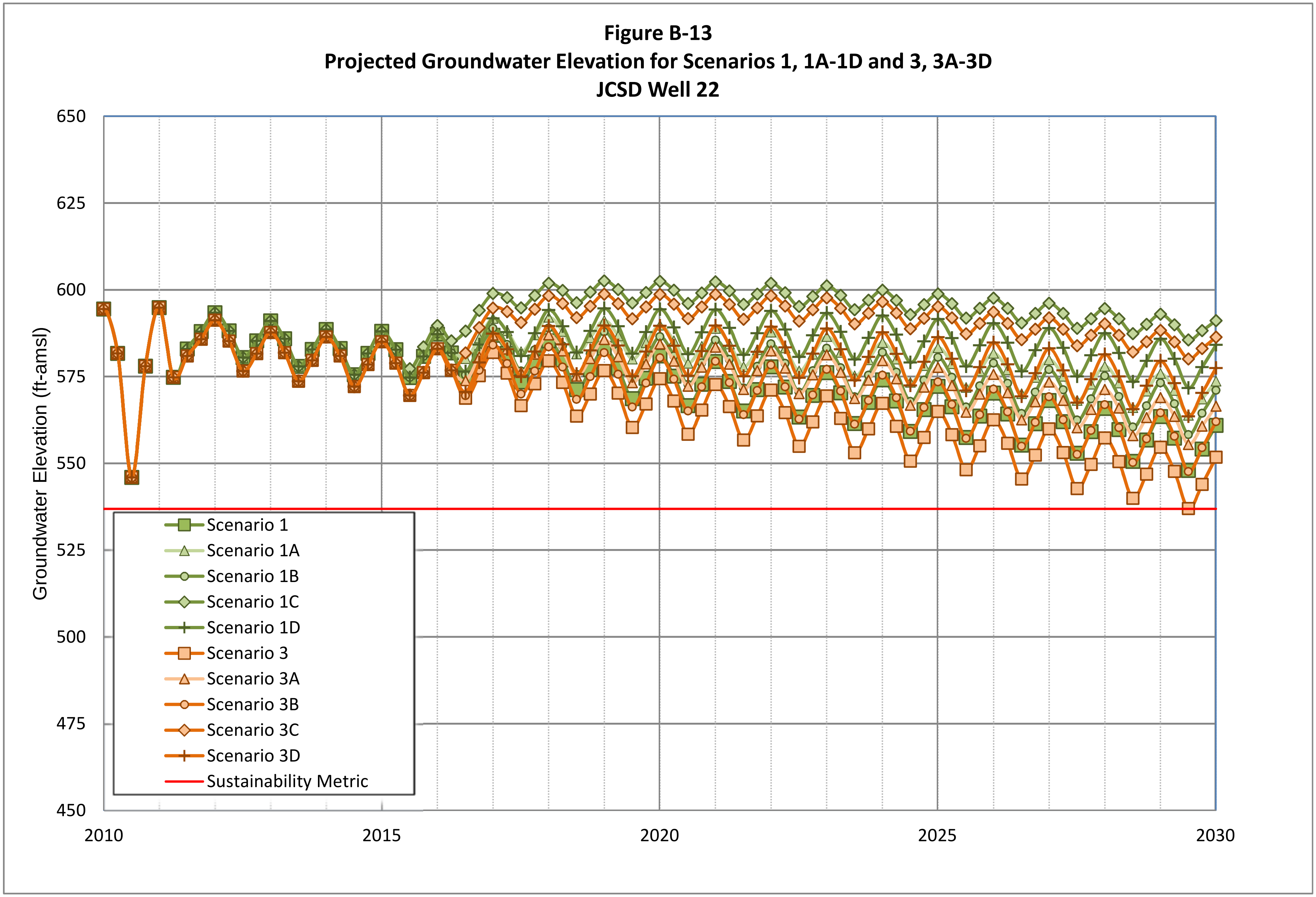
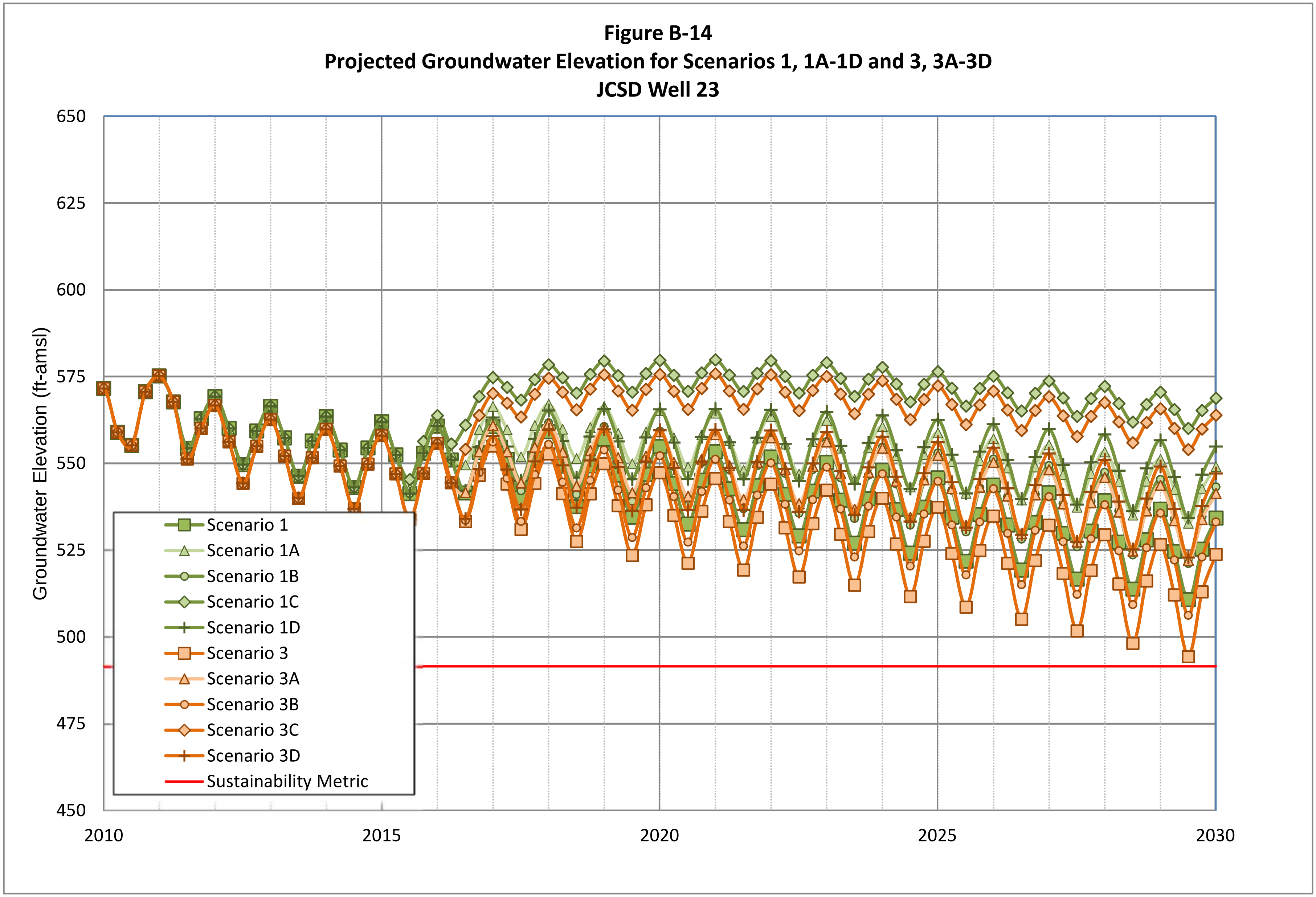


Figure B-12
Projected Groundwater Elevation for Scenarios 1, 1A-1D and 3, 3A-3D
JCSD Well 20
Groundwater Elevation (ft-amsl)
650
625
600
575
550
525
500
475
450
2010
2015
2020
2025
2030
Scenario 1
Scenario 1A
Scenario 1B
Scenario 1C
Scenario 1D
Scenario 3
Scenario 3A
Scenario 3B
Scenario 3C
Scenario 3D
Sustainability Metric



20120503_Projected_Hydrographs_JCSD .xlsx



20120503_Projected_Hydrographs_JCSD .xlsx

WILDERMUTH ENVIRONMENTAL INC.

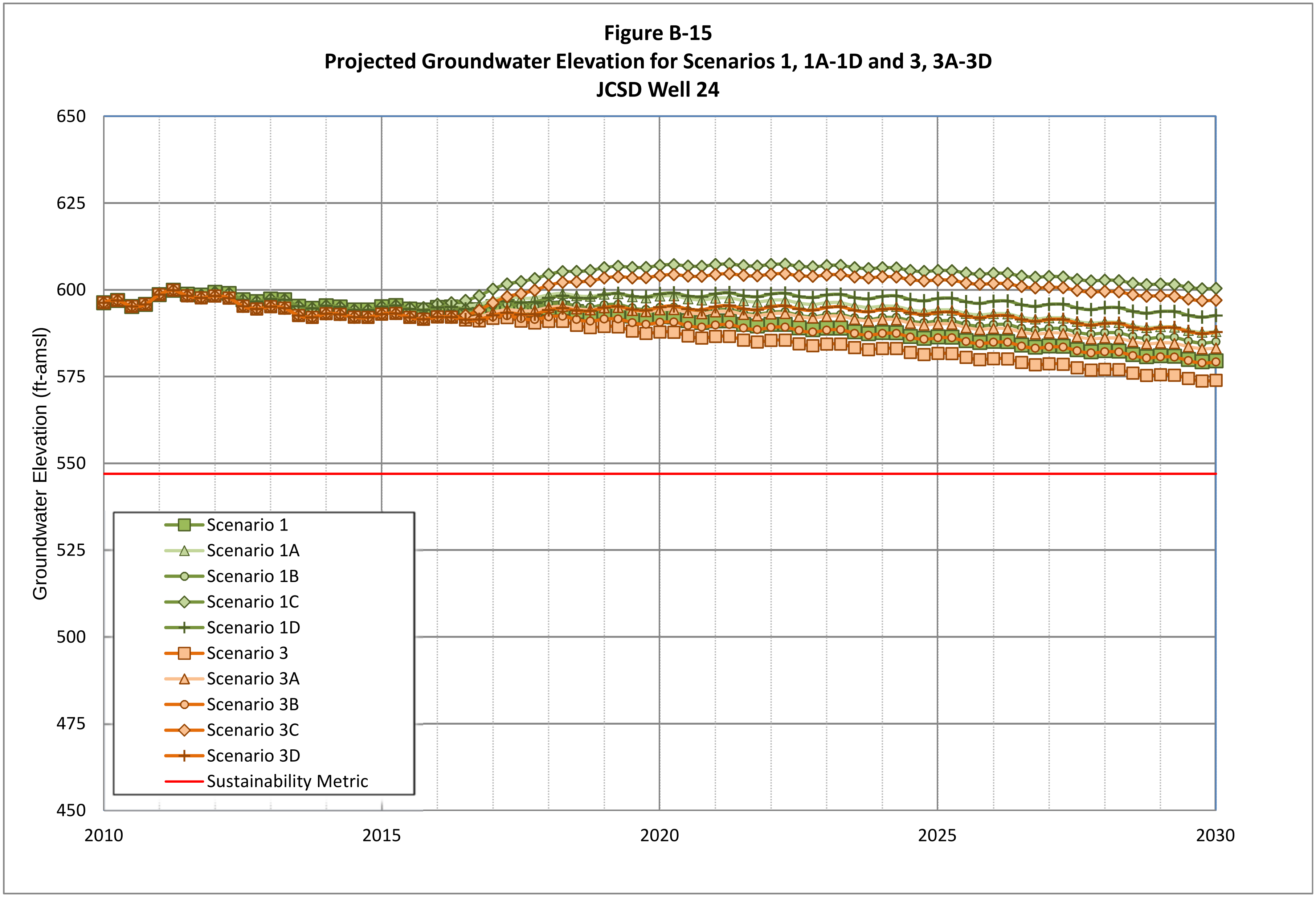
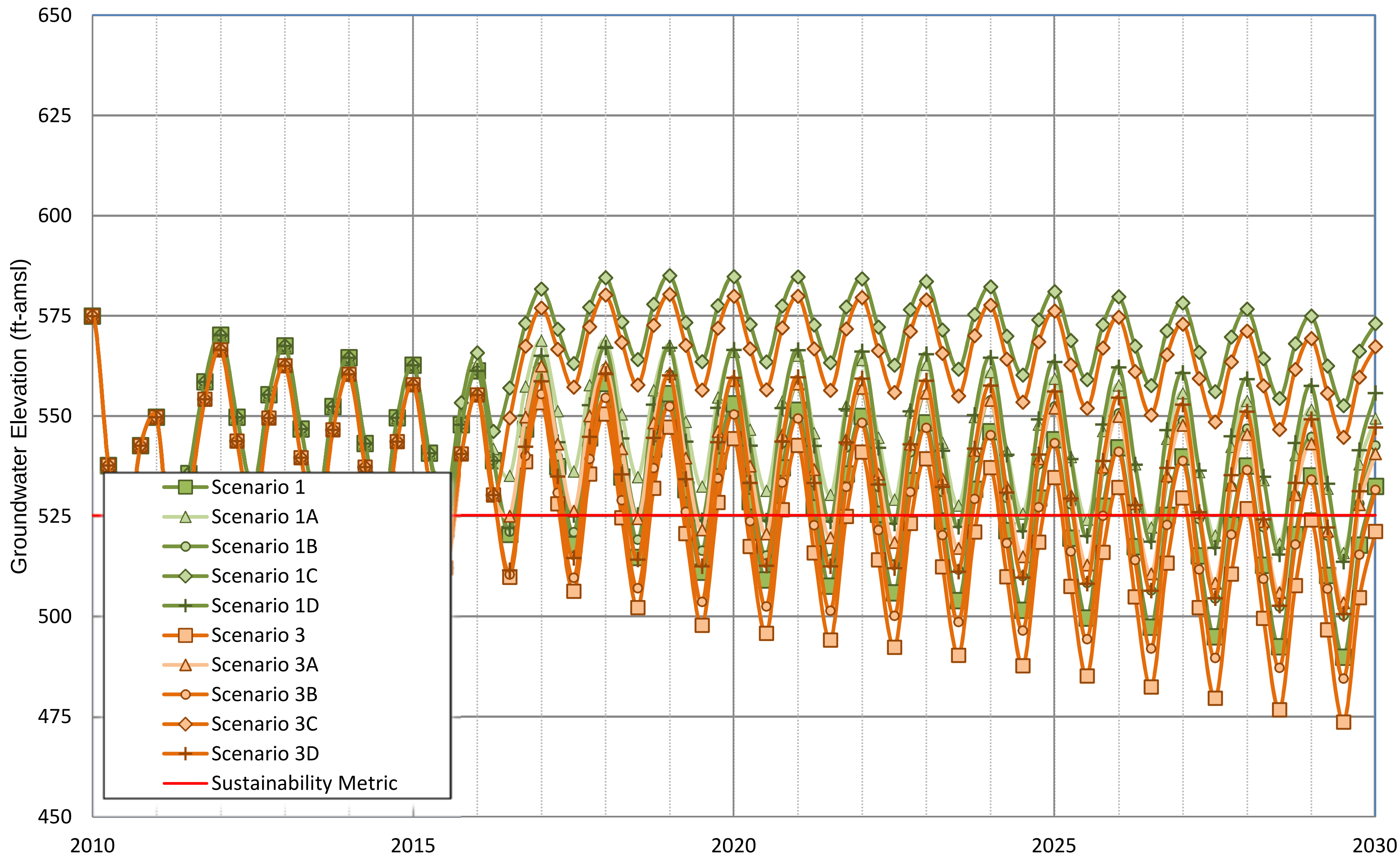


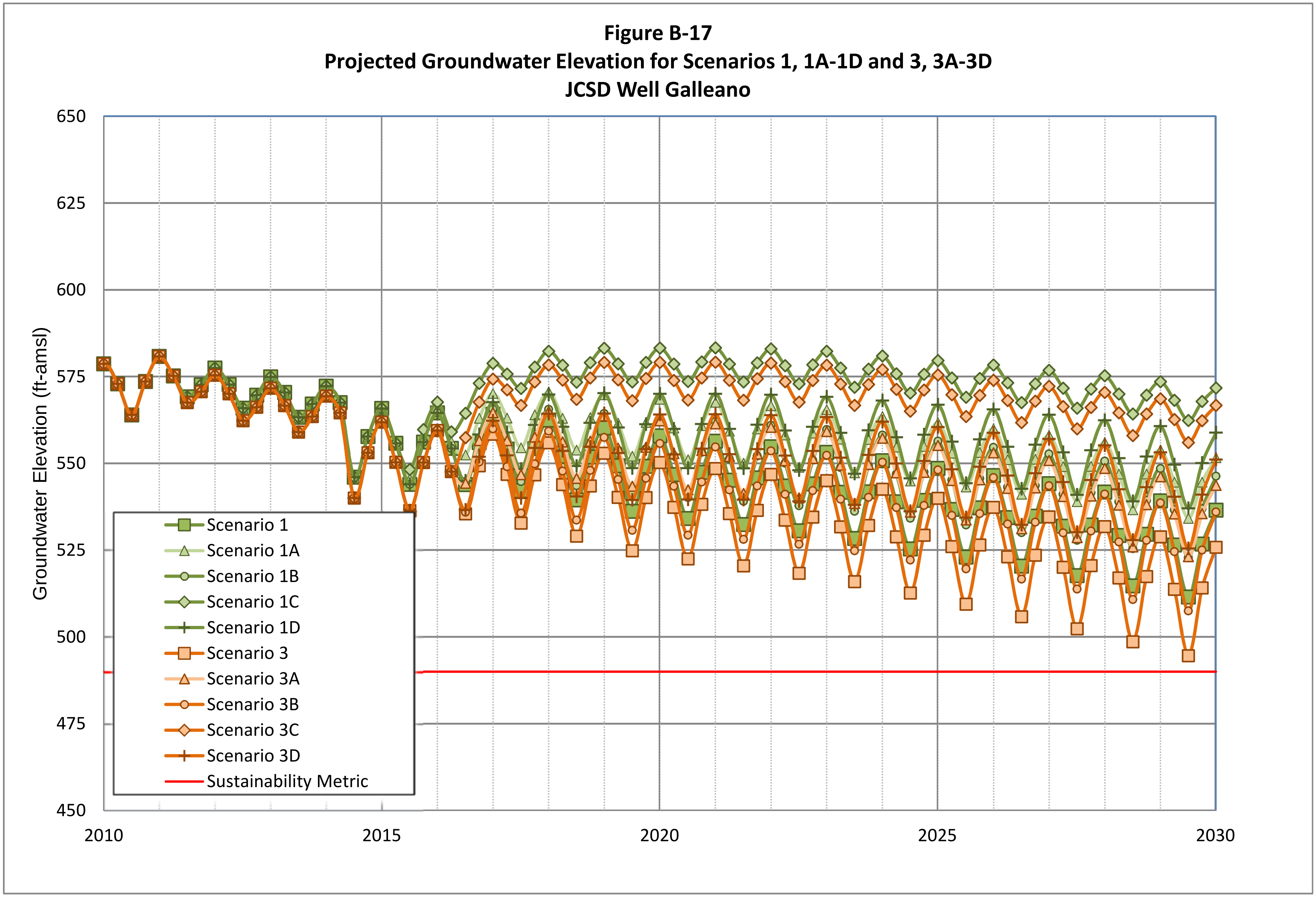
Figure B-15
Projected Groundwater Elevation for Scenarios 1, 1A-1D and 3, 3A-3D
JCSD Well 24
Groundwater Elevation (ft-amsl)
650
625
600
575
550
525
500
475
450
2010
2015
2020
2025
2030
Scenario 1
Scenario 1A
Scenario 1B
Scenario 1C
Scenario 1D
Scenario 3
Scenario 3A
Scenario 3B
Scenario 3C
Scenario 3D
Sustainability Metric

Figure B-16
Projected Groundwater Elevation for Scenarios 1, 1A-1D and 3, 3A-3D
JCSD Well 25



20120503_Projected_Hydrographs_JCSD .xlsx

WILDERMUTH ENVIRONMENTAL INC.



20120503_Projected_Hydrographs_JCSD .xlsx

WILDERMUTH ENVIRONMENTAL INC.

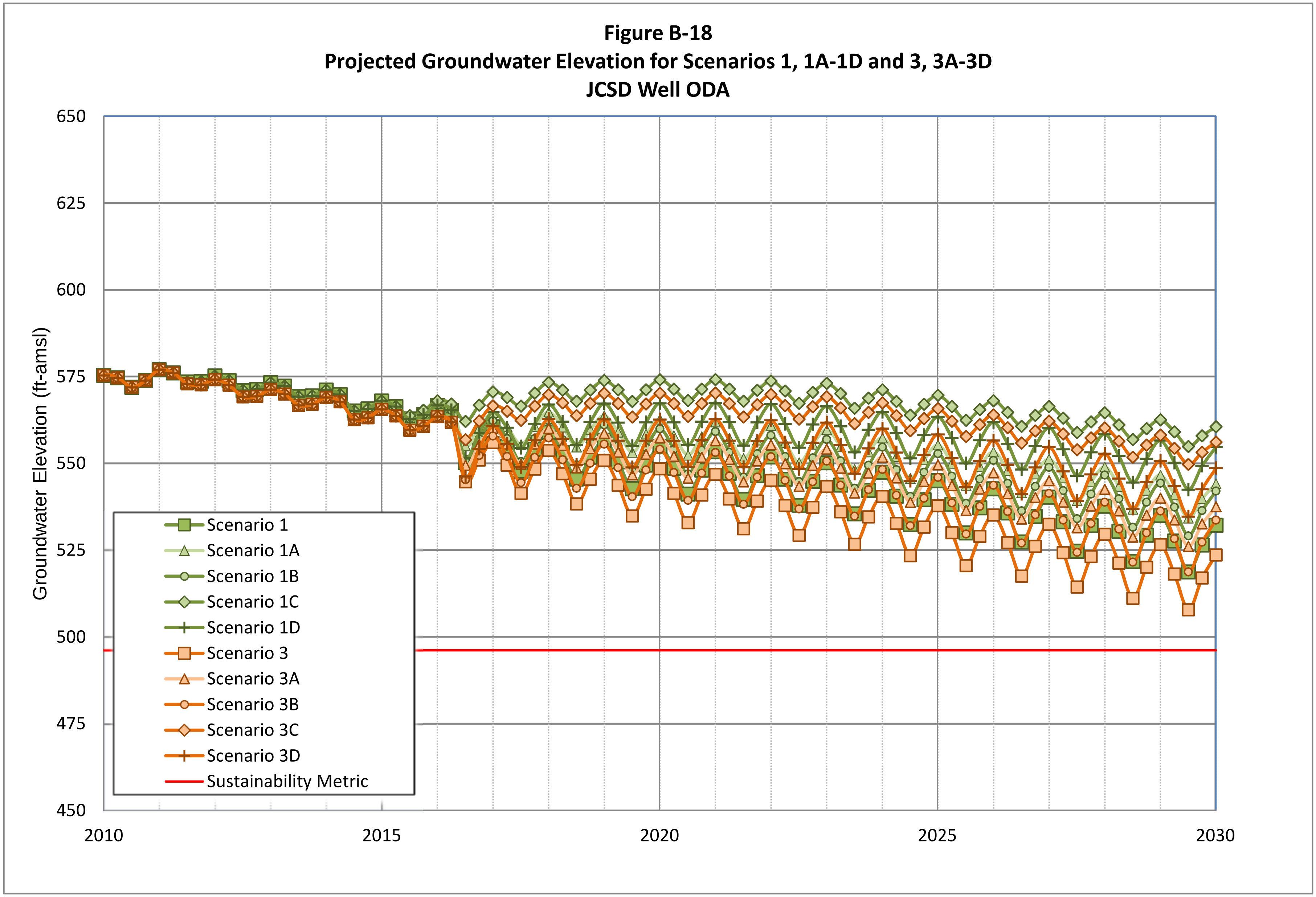
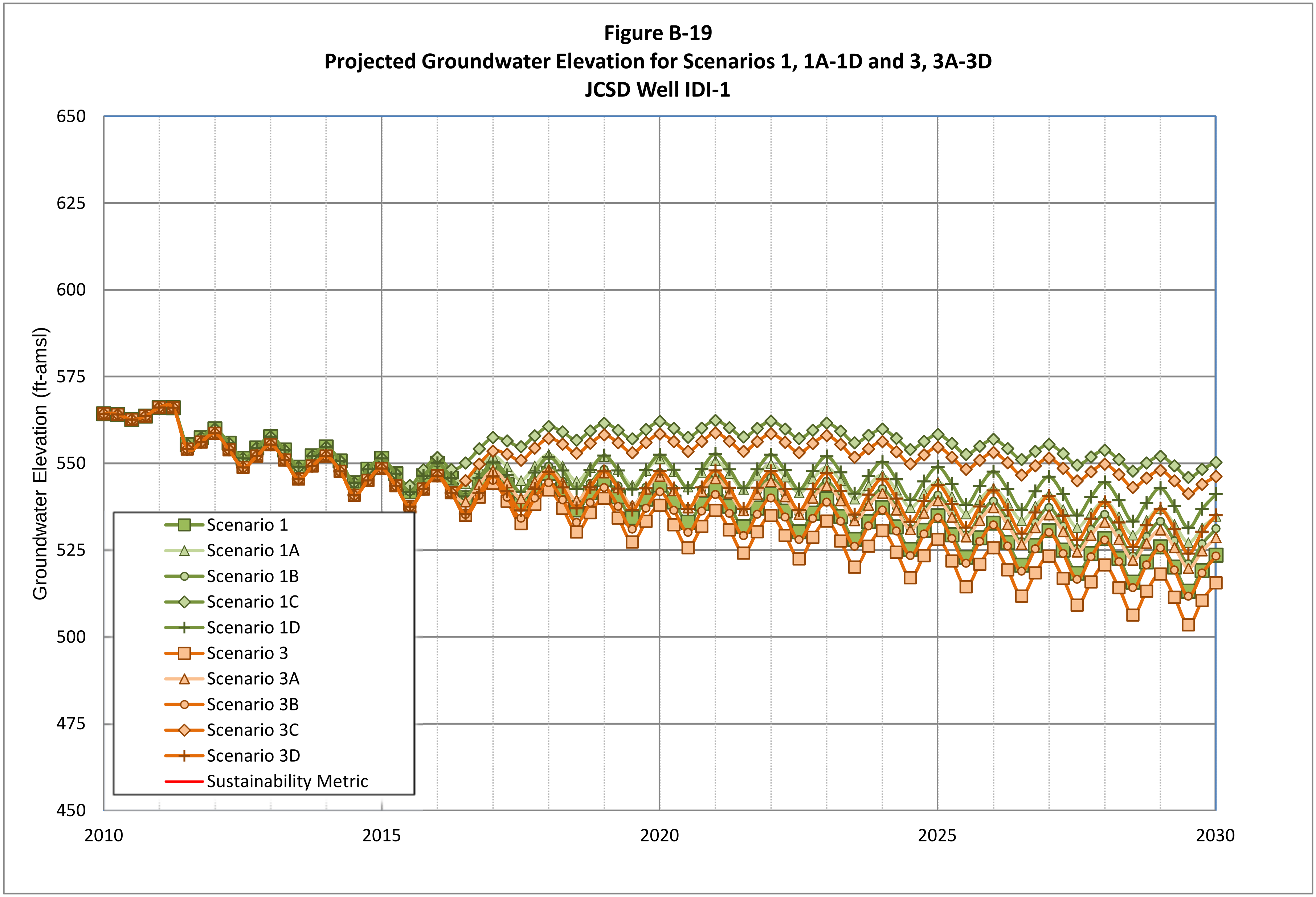
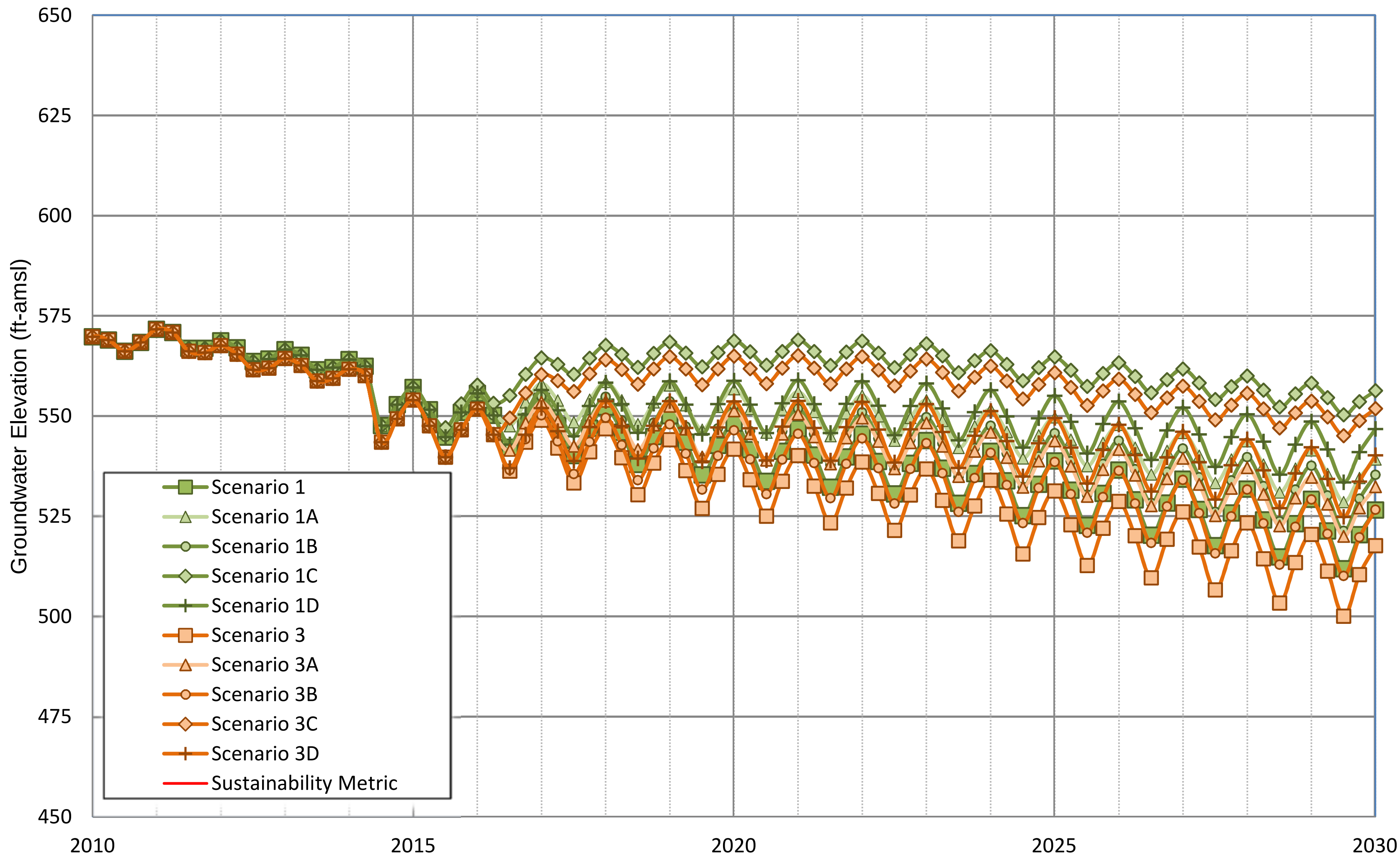


Figure B-18
Projected Groundwater Elevation for Scenarios 1, 1A-1D and 3, 3A-3D
JCSD Well ODA
Groundwater Elevation (ft-amsl)
650
625
600
575
550
525
500
475
450
2010
2015
2020
2025
2030
Scenario 1
Scenario 1A
Scenario 1B
Scenario 1C
Scenario 1D
Scenario 3
Scenario 3A
Scenario 3B
Scenario 3C
Scenario 3D
Sustainability Metric



WILDERMUTH ENVIRONMENTAL INC.

Figure B-20
Projected Groundwater Elevation for Scenarios 1, 1A-1D and 3, 3A-3D
JCSD Well IDI-2



20120503_Projected_Hydrographs_JCSD .xlsx

WILDERMUTH ENVIRONMENTAL INC.

Appendix C

Stakeholder Comments on Sections 1 through 4 and Responses

C.1 CITY OF CHINO (DAVE CROSLEY)

Comment Number	Page Reference	Comment	Response
1	Section 2, top of page 22 and to Table 2-3	I thought I should touch base with you on one circumstance to make certain there is no mis-understanding. Refer to the top of page 22 and to Table 2-3, where projected Ag and Appropriator demands are described. The numbers described for Chino are correct ... we do plan to produce as described. However, because we supply a large amount of water to Ag folks, the WM accounting and assessment process regards Chino's production as having been produced by the Ag Pool. In other words, the summarized assessment package will not readily support the numbers (at least for Chino) in Table 2-3. One must dive deep into the assessment package back-up data to understand that water reported in the assessment package as having been produced by the Ag Pool was actually produced by Chino wells. (I think you already know this.)	Thank you for your comment. Table 2-3 shows actual and projected actual production. The fact that the City may provide recycled water to members of the agricultural pool in-lieu of the agricultural pool member's production of groundwater is not accounted for in Table 2-3 or Scenarios 1 through 4.

C.2 CITY OF CHINO HILLS (MIKE MAESTAS)

Comment Number	Page Reference in the December Draft	Comment	Response
1	Appendix A, Table A1 and associated tables and charts	Following is a list of our wells and the pump setting elevations to be used for your matrix. For sustainability. Please apply the pump setting elevations plus 20-feet. Thank you. Well 1A 383 Well 7A/7B 443 Well 15 383 Well 17 172	Thank you. The tables, charts and text have been updated to reflect this information.

C.3 CHINO DESALTER AUTHORITY (BRIAN DICKINSON)

Comment Number	Page Reference	Comment	Response
1	Appendix A, Table A1 and associated tables and charts	Today we had a TAC meeting to discuss our well sustainability criteria which was originally submitted to Wildermuth Environmental. Through group discussion we came to a consensus that the CDA criteria should be set at top of pump plus 40-feet.	Thank you. The tables, charts and text have been updated to reflect this information.

C.4 JURUPA COMMUNITY SERVICES DISTRICT (THOMAS HARDER AND COMPANY)

Comment Number	Page Reference	Comment	Response
1	Section 1 general comment	This section essentially duplicates Chapter 2 of the 2010 Recharge Master Plan. We appreciate the addition of the Watermaster Board directive from the December 15, 2011 Board meeting.	Comment noted. The intent of Section 1 is to present a complete introduction including the original intent of the 2007 Court Order regarding the 2010 Recharge Master Plan Update and the decisions and actions that led the Watermaster and the IEUA to the current effort.
2	Page 12, second paragraph.	This paragraph refers to groundwater elevation contour maps for fall 2000 and fall 2010. However, Figures 2-1a and 2-1b are labeled as spring 2000 and spring 2010, respectively.	Thank you for the observation. The text was revised to use spring instead of fall.
3	Figures 2-1a and 2-1b.	I recommend showing a groundwater flow direction arrow on these figures to illustrate the flow direction.	Comment noted.
4	Page 20, first full paragraph	It appears the reference to Figure 2-7 should be Figure 2-8 Storage in the Chino Basin.	Thank you for the observation. The text was revised.
5	Page 23	This section becomes the basis for basin operation scenarios analyzed with the groundwater flow model. However, it is not obvious which scenarios are being described and where. I suggest subheadings before the paragraphs that describe the scenarios so we have an easy reference. I would like the subheadings to clearly label the	Thank you for the observation. Headings were added. Text clarifying the location and magnitude of replenishment and recharge were added to Section 3.

Comment Number	Page Reference	Comment	Response
		scenario with descriptive information as appropriate (e.g. Scenario 1 – Baseline Scenario). I also recommend a summary table of the basin operation scenarios. Although Tables 2-4 through 2-7 provide great numerical detail of the scenarios, it would be beneficial to have a brief synopsis of each scenario on a single table. Somewhere in the description of scenarios, there needs to be a description of assumptions regarding artificial recharge amounts and distribution in the basin through the planning period (scenario-specific if appropriate).	
6	Page 26, third paragraph	It appears the reference to Figure 2-8 should be Figure 2-9.	Thank you for the observation. The text was revised.
7	Page 27, second bullet near the bottom of the page	I recommend revising the first sentence of this bullet to read, “For the Chino Basin as a whole, no new recharge facilities or new sources of replenishment water will be required to meet future replenishment obligations, as required by the Judgment.”	Comment noted.
8	Page 29, first paragraph, last sentence	This sentence is unclear.	Thank you for the observation. The figure number was changed from 2-9 to 2-10.

Comment Number	Page Reference	Comment	Response
9	Page 29, second paragraph	It is my understanding that the Metropolitan Water District (MWD) rate increase will be 5 percent in 2012/13, not 7.5 percent.	Thank you for the observation. The text was revised. The Metropolitan Board approved this lesser rate increase after this text was prepared.
10	Page 29, third paragraph	The last sentence appears to reference the wrong table (should be Table 2-10, not 2-11).	Thank you for the observation. The text was revised.
11	Page 29, bullet at the end of page	No. 5 is unclear.	The maximum infiltration rate occurs just post cleaning. A footnote has been added to make this clearer.
12	Page 30, Number 7	"…2012/12 10-yr Capital Improvement Program:" Should this be 2012/22?	Thank you for the observation. The text was revised.
13	Page 30, last bullet, Number 2	The reference should be to infiltration rates <0.5 ft/day.	Thank you for the observation. The text was revised.
14	Page 32, second paragraph, first bullet	Scenarios 1 and 3 are analyzed and presented in the report. However, Scenario 4, which results in the greatest decrease in groundwater storage at the end of the planning period (see Table 2-7) is not addressed or analyzed. It was my understanding that the four scenarios represented the "book-ends" of potential production sensitivity. If we are not going to analyze and present the worst-case scenario, then we should provide an explanation.	The stakeholders in the Watermaster-IEUA Steering Committee process agreed, without dissention, that Scenarios 1 and 3 would be used to bookend the production and replenishment projections. Text has been added to make this clearer.
15	Page 33,	Revise the last sentence to read "At some JCSD	The text of the report was revised in response to this

Comment Number	Page Reference	Comment	Response
	third paragraph under “Basin Response to Updated Groundwater Production and Replenishment.”	wells, the groundwater elevation falls below the sustainability metric provided by the JCSD and the pumps cannot be lowered further because they are already in the bottom of the wells.”	Thank you for the observation. The text has been revised to incorporate this refinement.
16	Series of bullets starting on page 33 and running through 35	Pgs. 33 through 35 bullets. This section is confusing. I suggest simplifying the discussion based on Figures 3-6a and 3-6b. It is noted from Figures 3-6a and 3-6b that groundwater levels are projected to decline throughout most of the basin for both scenarios. It is further noted that sustainability metrics are exceeded in various places of Ontario and Fontana in both scenarios. This needs to be more closely scrutinized when evaluating the option of relocating JCSD pumping in other parts of the basin. It is also noted that groundwater levels rise in the Pomona/Monte Vista Water District area in Scenario 3. Are the artificial recharge assumptions for this scenario different from those of Scenario 1 (see above comment regarding Pg. 23)?	Comment note. As to your specific question (and as stated above in response to comment number 5, text was added to describe the location and magnitude of replenishment and recharge. The algorithm used to establish the location and rate of recharge is consistent among all scenarios although the location and rate of recharge varies among the scenarios.

Comment Number	Page Reference	Comment	Response
	Page 35, bullet near bottom of the page	The last bullet references Chino Basin Desalter Authority (CDA) wells. However, it is noted that the CDA has developed new sustainability metrics that may increase the number of wells shown here.	We received revised sustainability metrics from the CDA on April 25, 2012 which was after the draft on which you are commenting. Text was revised as appropriate.
17	Page 35, last paragraph	Pg. 35, last paragraph. Revise 2nd sentence to read "Because the saturated thickness is thin in the JCSD well field and many of their pumps are already near the bottoms of the wells, it would be difficult, and in some cases impossible, to lower the pumping equipment to assure sustainable production."	Thank you for the observation. The text has been revised to incorporate this refinement.
18	Page 36, last paragraph, third sentence	As discussed above, supplying JCSD with groundwater pumped from another part of the basin may not be advised or even feasible.	It's not clear what discussion "above" the commenter is referring to The advisability and feasibility of producing groundwater elsewhere in the basin and conveying that water to JCSD may be an important management option and it will be addressed in Section 6 and subsequent sections of this report,
19	Page 37, last bullet	This statement is unclear.	Comment noted
20	Page 37, last paragraph	The sensitivity analysis does not address relocating production away from the JCSD well field because this production was not replaced elsewhere in the model during the scenario. If it was, please provide a description of the distribution of replacement production.	Forbearance by the JCSD was simulated by reducing production in the JCSD well field only. The location in the Chino Basin of the replacement production will be evaluated in Section 6 and subsequent sections of this report, The modeling results clearly show that most of the sustainable

Comment Number	Page Reference	Comment	Response
			production challenge faced by the JCSD is due to the location and density of the JCSD wells and the magnitude production at the JCSD wells.
21	Page 38, last paragraph, second to last sentence	This sentence is unclear. Furthermore, the inference that Aquifer Storage and Recovery (ASR) wells were evaluated in the sensitivity analysis is not true. It is my understanding that scenarios involved reducing JCSD production or increasing recharge in Wineville Basin, not injecting water at specific locations designated as ASR wells. Further, injecting at a rate that is half of JCSD's production (approximately 9,000 acre-ft/yr) may not be feasible or cost effective. At this point, ASR wells should only be mentioned as one option of an overall solution.	Thank you for the observation. . The text has been revised for clarity by replacing the phrase "fifty-percent of the total recharge" to "fifty-percent of JCSD production". The basis of the suggestion that recharge at the JCSD wells annually with up to fifty percent of the annual JCSD production comes from the fifty-percent forbearance simulations (Scenarios 1C and 3C, with fifty-percent forbearance of projected JCSD production). It is appropriate to include ASR in this section as a possible alternative that should be explored in Section 6 and subsequent sections of this report.
22	Page 47, first bullet	Suggest adding Fontana Water Company as a potential interconnection party.	Thank you for the observation. As titled, this subsection discuses in-lieu recharge. In-lieu recharge requires that a party have a supplemental supply and possession of groundwater production rights. The Fontana Water Company's share of operating safe yield is about .009 percent and is likely too small to affect significant in-lieu recharge. However an interconnection with the JCSD could be used for in-lieu recharge by the JCSD forgoing production of some of its production rights provide significant benefits to the JCSD.

Comment Number	Page Reference	Comment	Response
23	Page 47, second bullet	It appears that the intent of this is reallocation of desalter production and not an increase in overall desalter production. I suggest deleting the word “Additional” from the first sentence.	Thank you for the observation. The text has been revised to incorporate this refinement.
24	Section 6 Outline	Although it was suggested at the last Recharge Master Plan Steering Committee to address Section 6 after the June Court submittal, I recommend that we include in the submittal an outline of Section 6 that identifies concepts that are being considered for the implementation plan. The concepts submitted at the last meeting are a good start. I would like to reorder the topics to include 2010 Recharge Master Plan Update Phases I through III projects first as this was the directive of the Court. This list should also include the option of recharge using ASR wells.	Comment noted.
25	Section 6 Outline	Another topic that should also be included among the options is an evaluation of the possible redistribution of CDA pumping.	Comment noted.

C.5 MONTE VISTA WATER DISTRICT (MARK KINSEY AND JUSTIN SCOTT-COE)

Comment Number	Page Reference	Comment	Response
1	none	In general, we note that the results of the RMPU analysis demonstrate more than adequate capacity to support the long-term recharge and replenishment obligations of the parties to the Chino Basin Judgment. This is a success story for collaborative groundwater basin management and something in which all parties to the Judgment should collectively take great pride. The RMPU also demonstrates that the long-term issue faced by the Chino Basin is not inadequate recharge capacity but the need to secure additional sources of replenishment and recharge water.	Thank you. Comment noted.
2		We note that "sustainability" is a term employed repeatedly in this document. "Sustainability" is not a term that appears in the Judgment or Peace Agreements. Its specific use appears to have been introduced into the Watermaster process through Wildermuth's modeling work for well pumping parameters, e.g. "sustainability metrics." We would prefer that the term be used in this specific context only and not used more generally, as it potentially recharacterizes the parties' obligations under the Judgment and Peace Agreements (e.g., support of sustained groundwater pumping by individual	Comment noted. Sustainability as used in the report refers only to the ability to sustain production at a well at a desired amount. It has no nexus to the Judgment or the Peace Agreements. The sustainability metrics are defined and explained in two places in the draft report and are currently highlighted in yellow. Groundwater production at wells is presumed to be sustainable if the groundwater level at the well is greater than the sustainability metric. Sustainability metrics are defined for each well by well owner. If the groundwater level falls below the sustainability

Comment Number	Page Reference	Comment	Response
		parties rather than balancing the recharge and discharge within subareas of the basin). Instead, we request that descriptions of the general goals for the RMPU use terms such as "long-term hydrologic balance" which are defined and consistently used in the Judgment and Peace Agreements.	metric, the owner will either lower their pumping equipment in their well or will have to reduce production.
3		We would recommend, when discussing the specific solutions for subareas of the basin that are out of long-term hydrologic balance, that the RMPU look at past successful efforts to achieve balance in other subareas of the basin. We would suggest that MZ1 offers such a model of addressing significant issues of production constraints in a collaborative and cost-effective manner.	Comment noted. This will be addressed in Section 6 and subsequent sections of this report.
4		As mentioned above, the RMPU demonstrates that sufficient recharge capacity exists basin-wide to meet our collective replenishment and recharge obligations. We believe that increasing storm water capture in MZ3 is one of the potential approaches to addressing the long-term hydrologic imbalance in that basin subarea. A secondary benefit of such an approach is to increase new yield being introduced into the basin. Based on preliminary work already completed it would cost the parties several million dollars to implement these projects. To encourage all parties to participate in funding storm water recharge improvements, we recommend that firm	Comment noted. This concept will be considered in Section 6 and subsequent sections of this report.

Comment Number	Page Reference	Comment	Response
		new yield estimates be determined for each project and that these estimates not be adjusted downward during the period of repayment.	
5		Figure 2-6e shows significant groundwater recharge into MZ5 from the Santa Ana River and the City of Riverside WWTP (through the river). It is our understanding that one of purposes of installing desalter wells in MZ4, MZ3, and MZ2 is to induce inflow from the river into the basin. If this is the case, why is no recharge from the river reflected in Figures 2-6d, 2-6-c, and 2-6b for the period following the installation of these wells?	The recharge “bars” shown in each of the Figures 2-6a through 2-6e are specific to recharge through the surface of the management zone. Santa Ana River water recharge occurs in MZ5 through the streambed only in MZ5.
6		On page 20, the RMPU incorrectly presents carryover water as stored water. Under the Judgment, these are completely separate categories of water. We request that carryover water be excluded from the description of stored water on page 20 and the calculations of past, current, and projected future stored water in Tables 2-1 and 2-2 and Figures 2-8 (incorrectly labeled Figure 2-7 on page 20) and 2-9.	Thank you for the observation. The intent was to describe the amount of water in storage and the text, tables and charts were reviewed to remove the term “stored water”.
7		On pages 23 and 31, the RMPU cites prior studies by Wildermuth projecting a reduction of safe yield from its current 140,000 AFY to 130,000 AFY by 2035. We request that the RMPU discuss how its recommendations for increasing recharge would	Model projections based on historical and future groundwater management plans suggest that increasing recharge will not materially change the projected decline in safe yield. This concept will be discussed in Section 6 and subsequent sections of

Comment Number	Page Reference	Comment	Response
		impact these projected reductions.	this report
8		On page 21, last paragraph, second sentence, we request that the sentence be rewritten to read as follows: "Several appropriators have demonstrated that, given increased replenishment, power, and assessment costs, it is currently or will soon be more economical to purchase Metropolitan water directly than to produce groundwater in excess of their production rights."	Thank you for the observation. The text has been revised to incorporate this refinement.
9		On page 41, second paragraph, last sentence, we request that the sentence be rewritten to read as follows: "As evident in these figures, the MZ1 recharge requirement of 6,500 acre-ft/yr has been met on an average if not on an annual basis, and in recent years recharge within MZ3 has increased."	Thank you for the observation. The text has been revised to incorporate this refinement.
10		On page 43, fourth paragraph, first sentence, we request that the sentence be rewritten to read as follows: "Watermaster has an obligation under the Judgment to provide replenishment water for overproduction in the prior year." (You may want to add a citation to paragraph 45 of the Judgment; no other citation should be required.)	Thank you for the observation. The text has been revised to incorporate this refinement.
11		On page 44, first full paragraph, second sentence, we request that the sentence be rewritten to read as follows: "Instead, it is recharged into the basin and subsequently assigned to certain appropriator	Thank you for the observation. The text has been revised to incorporate this refinement.

Comment Number	Page Reference	Comment	Response
		parties' supplemental storage accounts, thereby potentially increasing the appropriators' production rights and reducing their future replenishment liabilities."	
12		On page 47, fifth full paragraph, fourth sentence, we request that the word "Typically" be added to the beginning of the sentence.	Thank you for the observation. The text has been revised to incorporate this refinement.
13		On Table 4-5, please note that these wells are owned by MVWD (except for Well 33 which is, as already noted, co-owned by City of Chino).	Comment noted. Table 4-5 contains a footnote that makes this statement.
14		On Figures 4-1 and 4-2, please add a footnote that explains that past and existing recharge levels in MZ1 are contractually required under Peace II and address a long-term hydrological imbalance that had historically occurred in this subarea of the basin.	Thank you for the observation. The text has been revised to incorporate this refinement.
15		Section 5 of the RMPU has not yet been drafted, but will seek to answer questions regarding ownership of new yield generated through the capture storm and urban runoff water from projects associated with MS4 permit compliance. We believe this is an appropriate conversation to have at this time, and that it needs to be addressed within the context of the net safe yield of the basin. Specifically, land use changes (both past and on-going) since the Judgment will have an impact on	Comment noted.

Comment Number	Page Reference	Comment	Response
		basin safe yield; seemingly any new yield associated with MS4 projects should first be contributed to addressing the reduction in safe yield associated with changes in land use practices.	
16		In Section 6, we would recommend that two additional alternatives to address production sustainability challenges be considered: namely, the relocation of CDA wells in order to stop their interference with JCSD wells, and/or the reduction in CDA well production if doing so would not impact hydraulic control. There might be an opportunity for the latter alternative to be accomplished in a way that will benefit all parties, both in helping to achieve JCSD's production goals and reducing the region's collective cost associated with desalter operations.	Comment noted.

Appendix D

Recharge Facilities Descriptions and Cost Opinions

Appendix D – Recharge Facilities Descriptions and Cost Opinions

Organization of this Appendix

This appendix contains table and figures that were used in the development of the 2013 Recharge Master Plan Update Amendment. The tables are grouped as follows in this appendix:

- Table D-1 *Project Data for Yield Enhancement Projects* contains a detailed characterization of all the yield enhancement projects that were analyzed in detail.
- Table D-2 *Summary of Unit Costs* contains the unit costs that were developed jointly by the Chino Basin Watermaster and the IEUA and that were subsequently used to estimate the capital cost of each project that passed the initial screening cost of $1,500 per acre-ft.
- Table D-3a through D-19 contain cost opinions for all the 2013 RMPU yield enhancement projects that passed the initial screening cost of $1,500 per acre-ft.
- Table D-20 through D-24 contains the rankings of the yield enhancement projects using evaluated using three thresholds: a marginal unit cost less than $600 per acre-ft, a melded unit cost less than $600 per acre-ft, and a melded unit cost less than $612 per acre-ft. The three unit cost thresholds were analyzed with and without the excavation discount.

The figures are grouped as follows in this appendix:

- Figure D-1 *Location of Projects that Were Analyzed in Detail* shows the location of all the projects that were evaluated in detail and supplemental water facilities.
- Figures D2a through D-15b contain charts that compare the stormwater recharge estimates of the calibrated Wasteload Allocation Model to the IEUA capture volume for selected basins. The "a" figure is a direct comparison by fiscal year and the "b" figure shows the same information in a scatter plot.
- Figures D16 through D-34 show the location and key features of the recharge projects that were evaluated in detail.

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Ranking of Yield Enhancement Projects

Tables D-20 through D-24 contains the yield enhancement projects ranked using the Section 7 criteria and based on input from the Steering Committee. The projects are listed by management zone in order of increasing unit cost. The Project ID numbers with an "a" extension indicate that the project includes excavation and haul-off costs, and the capital cost shown assumes that the project's excavation and haul-off costs are reduced by 90 percent with the excavated materials being used in another construction project or leased to a mining operator.

The Steering Committee reached consensus that all projects with unit costs of less than $600 per acre-ft would be considered for implementation (Table D-20). There are seven projects recommended for construction that will increase stormwater recharge by 5,000 acre-ft/yr and increase recycled water recharge capacity by 4,900 acre-ft/yr. The average unit cost of stormwater recharge is about $400 per acre-ft and the capital cost is about $26,000,000.

Keeping a unit cost threshold of less than $600 per acre-ft, the projects were also ranked if the excavation costs were not reduced (Table D-21); as a melded unit cost (Table D-22), and as a melded unit cost without the reduction of the excavation costs (Table D-23). A review of the melded unit costs revealed that an increase in the threshold from $600 to $612 per acre-ft resulted in an additional 1,200 acre-ft of stormwater recharge as shown on Table D-24. The melded unit cost of $612 per acre-ft without the discounted elevation cost is equivalent to Table D-23. The following describe the changes in the ranked project lists from Table D-20:

- **Without Discounted Excavation Costs (Table D-21).** Two projects in Management Zone 3 were eliminated from list; CSI Basin- PID 18 at $756 per acre-ft and Sierra Basin- PID 25 per $1,057 an acre-ft. Five projects would be recommended for construction that will increase stormwater recharge by about 4,900 acre-ft/yr and increase recycled water recharge capacity by 4,900 acre-ft/yr. The average unit cost of stormwater recharge is about $430 per acre-ft and the capital cost is about $26,500,000.
- **Melded Unit Cost (Table D-22).** One project in Management Zone 3 and two projects in Management Zone 2 were added to the list; Declez Basin- PID 27, Turner Basin- PID 14, and Ely Basin – PID 15a. Ten projects would be recommended for construction that will increase stormwater recharge by about 5,560 acre-ft/yr and increase recycled water recharge capacity by 4,900 acre-ft/yr. The average unit cost of stormwater recharge is about $474 per acre-ft and the capital cost is about $34,400,000.
- **Melded Unit Cost Without Discounted Excavation Costs (Table D-23).** One project in Management Zone 3 and one project in Management Zone 2 were added to the list; Declez Basin- PID 27, and Turner Basin- PID 14. Nine projects would be recommended for construction that will increase stormwater recharge by about 5,340 acre-ft/yr and increase recycled water recharge capacity by 4,900 acre-ft/yr. The average unit cost of stormwater recharge is about $480 per acre-ft and the capital cost is about $33,400,000.
- **Melded Unit Cost of $612 per acre-ft (Table 8- D-24).** One project in Management Zone 3 and three projects in Management Zone 2 were added to the list; Declez Basin- PID 27, Turner Basin- PID 14, Ely Basin – PID 15a, and Lower San Sevaine Basin – PID 17a. Eleven projects would be recommended for construction that will increase stormwater recharge by about 6,780 acre-ft/yr and increase recycled water recharge capacity by 4,900 acre-ft/yr. The average unit cost of stormwater recharge is about $612 per acre-ft and the capital cost is about $57,000,000.

The total capital costs increased about $8,000,000 from about $26,000,000 to about $34,000,000 when the threshold changed to a melded unit cost less than $600 per acre-ft from a unit cost of less than $600 per acre-ft. The increase in the melded unit cost from $600 to $612 per acre-ft results in a capital cost increase of about $23,000,000 from about $34,000,000 to about $57,000,000. The differences between the recommended projects with and without the reduction in excavation costs did not significantly change the average unit or capital costs. The various alternatives of the unit cost thresholds described above are shown in the summary table below:

Threshold	Yield (acre-ft/yr)	Recycled Water (acre-ft/yr)	Unit Cost ($)	Capital Cost ($)	Total Annual Cost ($)	Reference Table
Marginal Unit Cost < $600 (excavation discount)	5,033	4,936	415	26,252,000	2,087,887	Table D-20
Marginal Unit Cost < $600 (w/o excavation discount)	4,888	4,936	430	26,542,000	2,101,312	Table D-21
Melded Unit Cost < $600 (excavation discount)	5,560	4,936	474	34,412,000	2,638,307	Table D-22
Melded Unit Cost < $600 (w/o excavation discount)	5,340	4,936	480	33,402,000	2,564,345	Table D-23
Melded Unit Cost < $612 (excavation discount)	6,781	4,936	612	56,962,000	4,150,372	Table D-24

Most of the new recharge is concentrated in Management Zone 3 and 2, which will contribute to production sustainability in these management zones and more specifically in the JCSD well field area.

Table D-1
Project Data for Yield Enhancement Projects

							Storm Water Recharge									
Project ID	Project Combinations	Group[1]	Project	Man. Zone	Summary of Key Project Features	Potential Cost Share if Mutually Agreed?	Baseline Storm Water Recharge (acre-ft/yr)	New Storm Water Recharge (acre-ft/yr)	Constructed for Regulatory Compliance?	Project Complete?	Capital Cost ($)	Annualized Capital Cost ($)	Annual O&M Cost ($)	Total Annual Cost ($)	Storm Water Recharge Unit Cost[2]	Production Sustainability Score[5]
Proposed Projects in Table 6-1 that Were Analyzed in Detail																
1		i	Montclair Basins	1	Transfer water between Montclair Basins and deepen MC 4	N	1,188	71	N	N	$ 5,450,000	$ 354,500	$ 2,631	$ 357,131	$ 4,997	0
1a		i	Montclair Basins	1	Transfer water between Montclair Basins and deepen MC 4	N	1,188	71	N	N	$ 5,050,000	$ 328,500	$ 2,631	$ 331,131	$ 4,633	
2		i	Montclair Basins	1	New drop inlet structures to MC 2 and MC 3	N	1,188	248	N	N	$ 1,440,000	$ 93,700	$ 9,132	$ 102,832	$ 415	0
3		i	Montclair Basins	1	Automate inlet to MC 1[6]	N	1,188	0	N	N	$ 50,000	$ 3,300	$ (6,000)	$ (2,700)	$ -	0
4		i	Montclair Basins	1	Construct low-level drains from Basin 1 to 2 and 2 to 3	N	1,188	0	N	N	$ 790,000	$ 51,400	$ -	$ 51,400	$ -	0
5		i	North West Upland Basin	1	Increase drainage area and basin enlargement	N	29	93	N	N	$ 5,490,000	$ 357,100	$ 3,441	$ 360,541	$ 3,858	0
5a		i	North West Upland Basin	1	Increase drainage area and basin enlargement	N	29	93	N	N	$ 4,640,000	$ 301,800	$ 3,441	$ 305,241	$ 3,266	
6		i	Princeton Basin	2	Basin enlargement and increased drainage area[22]	N	48	0	N	N	$ -	$ -	$ -	$ -	$ -	0
7		ii	San Sevaine Basins	2	Construct pump station, pump water from SS 5 to SS 3, and construct internal berm in SS 5[7]	Y	1,177	642	N	N	$ 3,550,000	$ 230,900	$ 23,641	$ 254,541	$ 396	0
8		ii	San Sevaine Basins	2	Extend IEUA recycled water pipeline to SS 3 and construct internal berm in SS 5[7]	Y	1,177	345	N	N	$ 2,620,000	$ 170,400	$ 12,719	$ 183,119	$ 530	0
9		i	San Sevaine Basins	2	Construct internal berms in SS 1 and SS 2 and install a gate between SS 1 and SS 2	N	1,177	0	N	N	$ 300,000	$ 19,500	$ -	$ 19,500	$ -	0
10		i	San Sevaine Basins	2	Increase CB13T capacity and power supply	N	1,177	0	N	N	$ -	$ -	$ -	$ -	$ -	0
11		i	Victoria Basin	2	Abandon the mid-level outlet and extend the lysimeters	Y	439	43	N	N	$ 150,000	$ 9,800	$ 1,576	$ 11,376	$ 266	0
12		ii	Lower Day Basin (2010 RMPU)	2	Inlet improvements, rebuilding embankment, elimination of mid-level outlet	N	395	789	N	N	$ 2,480,000	$ 161,300	$ 29,041	$ 190,341	$ 241	0
13		ii	Lower Day Basin	2	Install gate on mid-level outlet	N	395	75	N	N	$ 600,000	$ 39,000	$ 2,777	$ 41,777	$ 554	0
14		i	Turner Basin	2	Raise Turner 2 spillway[8]	N	1,226	66	N	N	$ 890,000	$ 57,900	$ 2,426	$ 60,326	$ 916	1
15		i	Ely Basin	2	Basin enlargement and increased drainage area	N	1,103	221	N	N	$ 9,120,000	$ 593,300	$ 8,122	$ 601,422	$ 2,726	0
15a		i	Ely Basin	2	Basin enlargement and increased drainage area	N	1,103	221	N	N	$ 3,200,000	$ 208,200	$ 8,122	$ 216,322	$ 981	
16		i	Ontario Bioswale Project	2	New bioswale	N	0	8	Y	Y	$ 650,000	$ 42,300	$ 277	$ 42,577	$ -	0
17		i	Lower San Sevaine Basin (2010 RMPU)	2	New basin	Y	0	1,221	N	N	$ 22,715,000	$ 1,477,600	$ 44,947	$ 1,522,547	$ 1,247	0
17a		i	Lower San Sevaine Basin (2010 RMPU)	2	New basin	Y	0	1,221	N	N	$ 11,275,000	$ 733,500	$ 44,947	$ 778,447	$ 638	0
18		i	CSI Storm Water Basin	3	Deepen basin by 10 feet	N	72	81	N	N	$ 900,000	$ 58,500	$ 2,998	$ 61,498	$ 755	0
18a		i	CSI Storm Water Basin	3	Deepen basin by 10 feet	N	72	81	N	N	$ 440,000	$ 28,600	$ 2,998	$ 31,598	$ 388	0
19		iii	Wineville Basin (2010 RMPU)	3	Gate the low-elevation outlet, replace embankment with dam, and construct a pneumatic gate on the spillway[9]	Y	5	2,157	N	N	$ 6,280,000	$ 408,500	$ 79,438	$ 487,938	$ 226	2
19a		iii	Wineville Basin (2010 RMPU)	3	Gate the low-elevation outlet, replace embankment with dam, and construct a pneumatic gate on the spillway[9]	Y	5	2,157	N	N	$ 4,890,000	$ 318,100	$ 79,438	$ 397,538	$ 184	2
20		iii	Jurupa Basin	3	Inlet improvements and CB-18 turnout modifications	N	234	421	N	N	$ 2,150,000	$ 139,900	$ 15,516	$ 155,416	$ 369	2
21		ii	RP3 Basin Improvements (2010 RMPU)	3	Inlet improvements and enlargement	N	628	406	N	N	$ 22,044,000	$ 1,434,000	$ 14,931	$ 1,448,931	$ 3,573	2
21a		ii	RP3 Basin Improvements (2010 RMPU)	3	Inlet improvements and enlargement	N	628	406	N	N	$ 13,464,000	$ 875,900	$ 14,931	$ 890,831	$ 2,197	
22		ii, iii	RP3 Basin Improvements (2013 RMPU)	3	Increase conservation storage[10]	Y	628	137	N	N	$ 5,290,000	$ 344,100	$ 5,062	$ 349,162	$ 2,540	2
22a		ii, iii	RP3 Basin Improvements (2013 RMPU)	3	Increase conservation storage[10]	Y	628	137	N	N	$ 3,710,000	$ 241,300	$ 5,062	$ 246,362	$ 1,792	2
23	Includes PID's 19,20,22	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin with 2013 Proposed RP3 Improvements	3	2010 RMPU Proposed Wineville Basin Improvements, Wineville 20 cfs PS to Jurupa, Improved Jurupa Basin Inlet, 40 cfs PS to RP3 Basin with Proposed 2013 RMPU RP3	Y	867	3,166	N	N	$ 23,324,000	$ 1,517,300	$ 311,014	$ 1,828,314	$ 577	2
23a	Includes PID's 19,20,22	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin with 2013 Proposed RP3 Improvements	3	2010 RMPU Proposed Wineville Basin Improvements, Wineville 20 cfs PS to Jurupa, Improved Jurupa Basin Inlet, 40 cfs PS to RP3 Basin with Proposed 2013 RMPU RP3	Y	867	3,166	N	N	$ 21,314,000	$ 1,386,500	$ 311,014	$ 1,697,514	$ 536	2
24		i	Vulcan Pit	3	Construct new inflow and outflow structures[11]	Y	0	857	N	N	$ 27,700,000	$ 1,801,900	$ 31,548	$ 1,833,448	$ 2,140	1
25		i	Sierra	3	Deepen basin by 10 feet	N	12	64	N	N	$ 1,000,000	$ 65,100	$ 2,351	$ 67,451	$ 1,056	1
25a		i	Sierra	3	Deepen basin by 10 feet	N	12	64	N	N	$ 490,000	$ 31,900	$ 2,351	$ 34,251	$ 536	1
26		i	Sultana Avenue	3	Deepen basin by 10 feet	N	89	7	N	N	$ 1,026,200	$ 66,800	$ 258	$ 67,058	$ 9,556	1
26a		i	Sultana Avenue	3	Deepen basin by 10 feet	N	89	7	N	N	$ 502,200	$ 32,700	$ 258	$ 32,958	$ 4,697	1
27		i	Declez Basin	3	Reconstruct existing embankment and install a gate on the low level outlet[12]	N	674	241	N	N	$ 4,070,000	$ 264,800	$ 8,877	$ 273,677	$ 1,135	2
Operations and Maintenance[13]																
28		ii	Banana Basin (annual cleaning)	3	Increase frequency of basin maintenance (Increased infiltration rate to 0.6 ft/day)	Y	317	11	N	N			$ 3,183	$ 3,183	$ 294	0
29		ii	Banana Basin (semiannual cleanings)	3	Increase frequency of basin maintenance (Increased infiltration rate to 0.72 ft/day)	Y	317	31	N	N			$ 15,192	$ 15,192	$ 495	0
30		ii	Declez Basin (annual cleaning)	3	Increase basin maintenance frequency (Increased infiltration rate to 0.66 ft/day)	Y	674	16	N	N			$ 6,537	$ 6,537	$ 409	0
31		ii	Declez Basin (semiannual cleanings)	3	Increase basin maintenance frequency (Increased infiltration rate to 0.78 ft/day)	Y	674	47	N	N			$ 32,923	$ 32,923	$ 701	0
32		ii	Ely Basin (annual cleaning)	2	Increase maintenance frequency (Increased infiltration rate to 0.27 ft/day)	Y	1,103	44	N	N			$ 29,450	$ 29,450	$ 668	0
33		ii	Ely Basin (semiannual cleanings)	2	Increase maintenance frequency (Increased infiltration rate to 0.33 ft/day)	Y	1,103	128	N	N			$ 127,949	$ 127,949	$ 997	0

Table D-1
Project Data for Yield Enhancement Projects

Project ID	Project Combinations	Group[1]	Project	Man. Zone	Summary of Key Project Features	Potential Cost Share if Mutually Agreed?	Storm Water Recharge									Production Sustainability Score[5]
							Baseline Storm Water Recharge (acre-ft/yr)	New Storm Water Recharge (acre-ft/yr)	Constructed for Regulatory Compliance?	Project Complete?	Capital Cost ($)	Annualized Capital Cost ($)	Annual O&M Cost ($)	Total Annual Cost ($)	Storm Water Recharge Unit Cost[2]	
34		ii	Hickory Basin (annual cleaning)	2	Increase frequency of basin maintenance (Increased infiltration rate to 0.44 ft/day)	Y	353	7	N	N			$ 3,812	$ 3,812	$ 518	0
35		ii	Hickory Basin (semiannual cleanings)	2	Increase frequency of basin maintenance (Increased infiltration rate to 0.52 ft/day)	Y	353	20	N	N			$ 17,640	$ 17,640	$ 877	0
Proposed Projects in Table 6-1 that Were Not Analyzed																
36			Turner Expansion	2	Basin improvements to the basins east of Archibald Ave and new basins adjacent to Turner 4[14]											
37			Upland Basin	1	Construct low level drain[15]											
38			College Heights	1	Construct internal berms to reduce seepage to the Upland basin[16]											
39			Lower Cucamonga Basin	2	Basin enlargement for distribution[17]											
40			Management Zones 2 and 3 Capture, Pump and Recharge	2,3	Capture water in MZ-2 and 3 basins low in the system and pump to basins higher in the system[17]											
41			Jurupa Basin	3	Inlet improvements and basin enlargement[17]											
42			RP3 Basins	3	Inlet improvements[18]											
43			Alder Basin	3	Deepen basin[17]											

[1] The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; iv- the project is included in a "iii" group.

[2] The results of this table provide an estimate of the cost per acre-ft of recharge. These estimates are reconnaissance level (level 5) estimates, and additional technical work needs to be done to assure feasibility.

[3] The IEUA recycled water recharge rate was assumed to be $195/acre-ft per Table 2-9.

[4] The MWD imported water recharge rate was assumed to be untreated Tier 1 Service at a price of $621 an acre-ft per Table 2-9.

[5] The production sustainability score is a tool to characterize a project's contribution to production sustainability in areas with sustainability challenges. In simple terms, the score is as follows: 0 – does not contribute to production sustainability; 1 – contributes minimally to production sustainability (a necessary but not sufficient condition of sustainability); 2 – contributes significantly to production sustainability (a necessary and sufficient condition of sustainability).

[6] The automation of the inlet gate and flume data to MC 1 results in a reduction of O&M.

[7] With a 40-percent RWC limitation, an additional 1,911 acre-ft/yr of recycled water can be recharged.

[8] The baseline for the Turner 2 Spillway Project and the Turner Expansion includes the recharge from Turner 1, 2, 3, and 4.

[9] The results from the Wineville proof-of-concept project may render the project infeasible. Recycled water recharge was estimated to be 630 acre-ft/yr, assuming an infiltration rate of 0.10 ft/day over 30 acres

[10] The maximum amount of recycled water that can be recharged is 12,800 acre-ft/yr at RP3.

[11] Recycled water recharge based upon an estimated 0.1 ft/day infiltration at 40-acres for 7-months of operations. Actual RWC is unknown; recharge based upon an assumed RWC at 25% with the following flows: 840 AFY storm water, 1,800 AFY underflow, and diluent water the same at Banana Basin. The project includes the price of land at $14 million

[12] Recycled water recharge operations will not benefit from the increased operating level.

[13] Based on available information, it can be assumed that basin infiltration can be increased 10 to 20% with annual cleaning and 20 to 50 % with cleaning twice a year. Field data needs to be established to determine optimum cleaning frequencies per basin

[14] The Turner Basin expansion project was not included because it is currently under construction.

[15] The Upland Basin Project was removed by the IEUA because the basin performs well, and limited cleaning is needed.

[16] The College Heights project does not affect stormwater recharge.

[17] The projects did not pass the screening criteria and were not considered.

[18] The estimated total stormwater recharge gained by the 2010 RMPU RP3 inlet improvement is comparable to the currently achievable stormwater recharge at RP3 due to enhance stormwater recharge efforts by IEUA.

[19] Reduces the amount of lost water due to basin inlet constraints and clogging.

[20] Will increase the amount of time water can be recharged in SS-1 by solving the vector control issues.

[21] Will allow the Jurupa Basin to accept an additional 15 cfs from the CB 18 if Hickory and Banana Basins were offline.

[22] The SBCFCD did not allow the City of Ontario to connect the new 5th Street storm drain to the Princeton Basin. The SBCFCD required improvements to the Princeton Basin such as enlarging the basin by purchasing the adjacent property, deepening the basin, and enlarging the outlet structures in order to allow the diversion of the 15th St storm drain to the Princeton Basin. These costs made the improvement infeasible. The City of Ontario connected the 60" storm drain to the West Cucamonga channel to the south of the Princeton Basin. This information was not presented until after the model runs and cost estimates were completed.

a - The project includes excavation costs, and the capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

Table D-2
Summary of Unit Costs

Items	Unit	Unit Cost		Source
Financial Analysis Assumptions				
Mobilization @ 5% Other Direct Construction Cost	Rate		5%	d
Contingency > $2 million@ 10%	Rate		10%	d
Contingency $1 - $2 million @ 15%	Rate		15%	d
Contingency < $1 million@ 20%	Rate		20%	d
Engineering and Admin < $1 million@ 20%	Rate		20%	d
Engineering and Admin $1 - $2 million @ 15%	Rate		15%	d
Engineering and Admin > $2 million@ 10%	Rate		10%	d
Construction Management > $2 million@ 10%	Rate		10%	d
Construction Management $1 - $2 million @ 15%	Rate		15%	d
Construction Management < $1 million@ 20%	Rate		20%	d
Amortization Rate	Rate		5%	a
Amortization Period	Years		30	a
Conveyance Facilities				
Booster Pump Station	$ /HP	$	5,000	a
Valve Actuator Adder	EA	$	15,000	d
Sluice Gate	$/in-dia	$	595	d
18" Diameter CMLC	Lin. Ft.	$	279	b
18" Gate Valve	EA	$	5,670	d
24" Diameter CMLC	Lin. Ft.	$	330	b
24" Gate Valve	EA	$	7,560	d
30" Diameter CMLC	Lin. Ft.	$	379	b
30" Gate Valve	EA	$	9,450	d
36" Diameter CMLC	Lin. Ft.	$	429	b
42" Diameter CMLC	Lin. Ft.	$	480	b
Recharge Basin Facilities				
Turnout Valve and Metering	LS	$	25,000	d
36" Dia. RCP	Lin. Ft.	$	303	b
48" Dia. RCP	Lin. Ft.	$	376	b
60" Dia. RCP Outlet Conduit	Lin. Ft.	$	673	b
8' x 10' RCB	Lin. Ft.	$	930	b
Basin Discharge Concrete Structure	Cu. Yds.	$	1,345	b
Basin Excavation & Haul Offsite	Cu. Yds.	$	14	b
Material Haul Onsite	Cu. Yds.	$	3.0	d
CMU Building	Sq. Ft.	$	300	d
Berm Overflow Concrete Structure	Cu. Yds.	$	1,345	b
Channel Demolition	Cu. Yds.	$	62	b
Channel Demolition	Cu. Yds.	$	27	b
Coarse Drain Material	Ton	$	26	b
Compacted Embankment	Cu. Yds.	$	6.7	b
Concrete Channel & Weir	Cu. Yds.	$	560	b
Concrete Inlet Spillway Structure	Cu. Yds.	$	785	b
Concrete Spillway Structure	Cu. Yds.	$	897	b
Concrete Structure	Cu. Yds.	$	1,345	b
Excavation	Cu. Yds.	$	5.6	b
Trench Shoring	Lin. Ft.	$	50	d
Backfill and Compaction (Native)	Cu. Yds.	$	5.6	d
Backfill and Compaction (Import)	Cu. Yds.	$	15	d
Import Pipe Bedding Material	Cu. Yds.	$	15	d
Foundation Excavation	Cu. Yds.	$	3.4	b
Interior Berm Compacted Fill	Cu. Yds.	$	6.7	b
Interior Berm Excavation	Cu. Yds.	$	3.4	b
Modify Channel for Conduit Inlet	Cu. Yds.	$	1,200	b
Replace Compacted Fill	Cu. Yds.	$	17	a
Mass Excavation	Cu. Yds.	$	11	a
Fine Grading	Cu. Yds.	$	17	a
Perimeter Fence	Lin. Ft.	$	17	a
Surface Rehabilitation	Sq. Ft.	$	25	d
Electrical @ 25%	Lump Sum		25%	d
Instrumentation and Controls @ 10% of Electrical	Lump Sum		10%	d
Instrumentation	Lump Sum	$	112,000	a
Operations and Maintenance				
Basins Recharge SW/IW/RW	$/acre-ft	$	24	c
Basins Recharge SW/RW	$/acre-ft	$	37	c
Pipelines - general	$/mile	$	4,500	a
Pump Stations - general	% construction cost		2%	a
Misc. well maintenance	$/year/well	$	28,000	a

a - From the 2010 RMPU Technical Memorandum, Black & Veatch and WEI, March 19, 2009. Cost estimates were escalated from July 2009 to January 2013 using the Bureau of Reclamation Construction Cost trend.
b - From the 2010 RMPU Section 5, Wagner & Bonsignore and WEI, June 2010. Cost estimates were escalated from July 2009 to January 2013 using the Bureau of Reclamation Construction Cost trend.
c - Per Andy Campbell of IEUA, 2/11/2013.
d - Per IEUA March 2013.

Table D-3a
Cost Opinion for Montclair Basins -- PID 1

	Description	Quantity	Unit	Unit Cost	Total Cost	Total Cost[1]
Direct Construction Costs						
Item #						
1	Mobilization @ 5% Other Direct Construction Cost	1	LS	5%	$ 196,665	$ 196,665
2	Basin 4 Material Removal					
	Basin Excavation & Haul Offsite	32000	Cu. Yds.	$ 14	$ 448,387	$ 44,839
	Fine Grading	650	Cu. Yds.	$ 17	$ 10,929	$ 10,929
3	Pump Station and Pipeline (Basin 4 to Basin 2 and 3)					
	Basin Excavation & Haul Offsite	150	Cu. Yds.	$ 14	$ 2,102	$ 2,102
	Interior Berm Excavation	3,000	Cu. Yds.	$ 3	$ 10,089	$ 10,089
	Concrete Structure	150	Cu. Yds.	$ 1,345	$ 201,774	$ 201,774
	24" Diameter	50	Lin. Ft.	$ 330	$ 16,478	$ 16,478
	Sluice Gate	50	$/in-dia	$ 595	$ 29,750	$ 29,750
	Booster Pump Station	150	$ /HP	$ 5,000	$ 750,000	$ 750,000
	CMU Building	100	Sq. Ft.	$ 300	$ 30,000	$ 30,000
	Backfill and Compaction (Native)	600	Cu. Yds.	$ 6	$ 3,363	$ 3,363
	Compacted Embankment	1,650	Cu. Yds.	$ 7	$ 11,098	$ 11,098
	Coarse Drain Material	50	Ton	$ 26	$ 1,289	$ 1,289
	Basin Discharge Concrete Structure	20	Cu. Yds.	$ 1,345	$ 26,903	$ 26,903
	Electrical @ 25%	1	LS	$ 195,000.00	$ 195,000	$ 195,000
	Instrumentation and Controls @ 10% of Electrical	1	LS	$ 19,500	$ 19,500	$ 19,500
	24" Diameter	2,400	Lin. Ft.	$ 330	$ 790,955	$ 790,955
	Excavation	3,200	Cu. Yds.	$ 6	$ 17,935	$ 17,935
	Backfill and Compaction (Native)	2,000	Cu. Yds.	$ 6	$ 11,210	$ 11,210
	Import Pipe Bedding Material	700	Cu. Yds.	$ 15	$ 10,500	$ 10,500
	Surface Rehabilitation	12,000	Sq. Ft.	$ 25	$ 300,000	$ 300,000
4	Pump Station and Pipeline (Basin 3 to Basin 2)					
	Basin Excavation & Haul Offsite	150	Cu. Yds.	$ 14	$ 2,102	$ 2,102
	Interior Berm Excavation	2,800	Cu. Yds.	$ 3	$ 9,416	$ 9,416
	Concrete Structure	150	Cu. Yds.	$ 1,345	$ 201,774	$ 201,774
	24" Diameter	50	Lin. Ft.	$ 330	$ 16,478	$ 16,478
	Sluice Gate	50	$/in-dia	$ 595	$ 29,750	$ 29,750
	Booster Pump Station	75	$ /HP	$ 5,000	$ 375,000	$ 375,000
	CMU Building	200	Sq. Ft.	$ 300	$ 60,000	$ 60,000
	Backfill and Compaction (Native)	600	Cu. Yds.	$ 6	$ 3,363	$ 3,363
	Compacted Embankment	1,750	Cu. Yds.	$ 7	$ 11,770	$ 11,770
	Coarse Drain Material	50	Ton	$ 26	$ 1,289	$ 1,289
	Basin Discharge Concrete Structure	20	Cu. Yds.	$ 1,345	$ 26,903	$ 26,903
	Electrical @ 25%	1	LS	$ 108,750.00	$ 108,750	$ 108,750
	Instrumentation and Controls @ 10% of Electrical	1	LS	$ 10,875	$ 10,875	$ 10,875
	24" Diameter	400	Lin. Ft.	$ 330	$ 131,826	$ 131,826
	Excavation	500	Cu. Yds.	$ 6	$ 2,802	$ 2,802
	Backfill and Compaction (Native)	300	Cu. Yds.	$ 6	$ 1,681	$ 1,681
	Import Pipe Bedding Material	150	Cu. Yds.	$ 15	$ 2,250	$ 2,250
	Surface Rehabilitation	2,000	Sq. Ft.	$ 25	$ 50,000	$ 50,000
SubTotal Direct Construction Costs					**$ 4,130,000**	**$ 3,726,000**
	Contingency > $2 million@ 10%	1	LS	10%	$ 413,000	$ 413,000
	Construction Management > $2 million@ 10%	1	LS	10%	$ 413,000	$ 413,000
Total Construction Cost					**$ 4,956,000**	**$ 4,552,000**
	Engineering and Admin > $2 million@ 10%	1	LS	10%	$ 495,600	$ 495,600
Total Engineering and Administration					**$ 496,000**	**$ 496,000**
Total Estimated Project Cost					**$ 5,450,000**	**$ 5,050,000**
Annual Cost - 30 Years @ 5% Interest					**$ 354,500**	**$ 328,500**

[1] The capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

Table D-3b
Cost Opinion for Montclair Basins -- PID 2

	Description	Quantity	Unit	Unit Cost		Total Cost	
Direct Construction Costs							
Item #							
1	Mobilization @ 5% Other Direct Construction Cost	1	LS		5%	$	45,846
2	Basin Inlet Structure to Basin 2 and 3						
	Channel Demolition	250	Cu. Yds.	$	62	$	15,413
	Basin Excavation & Haul Offsite	3,800	Cu. Yds.	$	14	$	53,246
	Concrete Structure	250	Cu. Yds.	$	1,345	$	336,290
	Concrete Channel & Weir	75	Cu. Yds.	$	560	$	42,036
	Compacted Embankment	2,000	Cu. Yds.	$	7	$	13,452
	Backfill and Compaction (Native)	1,600	Cu. Yds.	$	6	$	8,968
	Trench Shoring	300	Lin. Ft.	$	50	$	15,000
	Coarse Drain Material	1,200	Ton	$	26	$	30,939
	Sluice Gate	72	$/in-dia	$	595	$	42,840
	36" Dia. RCP	300	Lin. Ft.	$	303	$	90,798
	Import Pipe Bedding Material	200	Cu. Yds.	$	15	$	3,000
	Basin Discharge Concrete Structure	100	Cu. Yds.	$	1,345	$	134,516
	Basin Discharge Concrete Structure	20	Cu. Yds.	$	1,345	$	26,903
	Surface Rehabilitation	1,200	Sq. Ft.	$	25	$	30,000
	Electrical @ 25%	2	LS	$	33,410	$	66,819
	Instrumentation and Controls @ 10% of Electrical	2	LS	$	3,341	$	6,682
SubTotal Direct Construction Costs						**$**	**963,000**
	Contingency $1 - $2 million @ 15%	1	LS		15%	$	144,450
	Construction Management $1 - $2 million @ 15%	1	LS		15%	$	144,450
Total Construction Cost						**$**	**1,251,900**
	Engineering and Admin $1 - $2 million @ 15%	1	LS		15%	$	187,785
Total Engineering and Administration						**$**	**188,000**
Total Estimated Project Cost						**$**	**1,440,000**
Annual Cost - 30 Years @ 5% Interest						**$**	**93,700**

Table D-3c
Cost Opinion for Montclair Basins -- PID 4

Description		Quantity	Unit	Unit Cost	Total Cost
Direct Construction Costs					
Item #					
1	Mobilization @ 5% Other Direct Construction Cost	1	LS	5%	$ 22,348.45
2	Basin Low Level Drain Outlet (Basin 1 to Basin 2)				
	Basin Excavation & Haul Offsite	100	Cu. Yds.	$ 14	$ 1,401
	Interior Berm Excavation	2,000	Cu. Yds.	$ 3	$ 6,726
	Concrete Structure	50	Cu. Yds.	$ 1,345	$ 67,258
	Sluice Gate	36	$/in-dia	$ 595	$ 21,420
	Backfill and Compaction (Native)	400	Cu. Yds.	$ 6	$ 2,242
	Compacted Embankment	1,250	Cu. Yds.	$ 7	$ 8,407
	Coarse Drain Material	50	Ton	$ 26	$ 1,289
	Basin Discharge Concrete Structure	10	Cu. Yds.	$ 1,345	$ 13,452
	36" Diameter	200	Lin. Ft.	$ 429	$ 85,866
	Excavation	400	Cu. Yds.	$ 6	$ 2,242
	Backfill and Compaction (Native)	300	Cu. Yds.	$ 6	$ 1,681
	Import Pipe Bedding Material	100	Cu. Yds.	$ 15	$ 1,500
	Surface Rehabilitation	400	Sq. Ft.	$ 25	$ 10,000
3	Basin Low Level Drain Outlet (Basin 2 to Basin 3)				
	Basin Excavation & Haul Offsite	100	Cu. Yds.	$ 14	$ 1,401
	Interior Berm Excavation	2,000	Cu. Yds.	$ 3	$ 6,726
	Concrete Structure	50	Cu. Yds.	$ 1,345	$ 67,258
	Sluice Gate	36	$/in-dia	$ 595	$ 21,420
	Backfill and Compaction (Native)	400	Cu. Yds.	$ 6	$ 2,242
	Compacted Embankment	1,250	Cu. Yds.	$ 7	$ 8,407
	Coarse Drain Material	50	Ton	$ 26	$ 1,289
	Basin Discharge Concrete Structure	10	Cu. Yds.	$ 1,345	$ 13,452
	36" Diameter	200	Lin. Ft.	$ 429	$ 85,866
	Excavation	400	Cu. Yds.	$ 6	$ 2,242
	Backfill and Compaction (Native)	300	Cu. Yds.	$ 6	$ 1,681
	Import Pipe Bedding Material	100	Cu. Yds.	$ 15	$ 1,500
	Surface Rehabilitation	400	Sq. Ft.	$ 25	$ 10,000
SubTotal Direct Construction Costs					**$ 469,000.00**
	Contingency < $1 million@ 20%	1	LS	20%	$ 93,800.00
Total Construction Cost					**$ 562,800.00**
	Engineering and Admin < $1 million@ 20%	1	LS	20%	$ 112,560.00
	Construction Management < $1 million@ 20%	1	LS	20%	$ 112,560.00
Total Engineering and Administration					**$ 225,000.00**
Total Estimated Project Cost					**$ 790,000.00**
Annual Cost - 30 Years @ 5% Interest					**$51,400.00**

Table D-4
Cost Opinion for North West Upland Basin -- PID 5

Description	Quantity	Unit	Unit Cost	Total Cost	Total Cost[1]
Direct Construction Costs					
1 Mobilization @ 5% Other Direct Construction Cost	1	Job	Lump Sum	$216,000	$216,000
2 Basin Construction					
Traffic Control and Safety	1	LS	$15,000.00	$15,000	$15,000
Utility Verification (potholing)	1	LS	$8,000.00	$8,000	$8,000
Survey	1	LS	$30,000.00	$30,000	$30,000
Swppp and Bmps	1	LS	$5,000.00	$5,000	$5,000
Clearing, Grubbing, Removals, Relocations, Restorations and Earthwork	1	LS	$400,000.00	$400,000	$40,000
Structure Excavation and Over Excavation	1	LS	$250,000.00	$250,000	$25,000
Structure Backfill and Grading	2,903	LF	$100.00	$290,300	$29,030
Riprap	6,690	SF	$25.00	$167,250	$167,250
Construct 24" RCP	80	LF	$120.00	$9,600	$9,600
Construct 30" RCP	14	LF	$170.00	$2,380	$2,380
Construct 36" RCP	601	LF	$175.00	$105,175	$105,175
Construct 42" RCP	1,784	LF	$225.00	$401,400	$401,400
Construct 66" RCP	97	LF	$700.00	$67,900	$67,900
Construct 84" RCP	2,236	LF	$780.00	$1,744,080	$1,744,080
Construct reinforced concrete plug	1	EA	$2,000.00	$2,000	$2,000
Construct curb opening catch basin per sppwc 300-3	22	EA	$13,000.00	$286,000	$286,000
Construct local depression at catch basin per sppwc 313-3	22	EA	$2,000.00	$44,000	$44,000
Construct manhole per sppwc 320-2	4	EA	$9,000.00	$36,000	$36,000
Construct manhole per sppwc 322-2	7	EA	$9,000.00	$63,000	$63,000
Construct manhole shaft safety ledge per sppwc 330-2	11	EA	$10,000.00	$110,000	$110,000
Construct junction structure per sppwc 331-3	13	EA	$6,000.00	$78,000	$78,000
Construct junction structure per sppwc 332-2	2	EA	$8,000.00	$16,000	$16,000
Construct concrete collar per sppwc 380-4	17	EA	$2,000.00	$34,000	$34,000
Construct junction structure per sppwc 340-2	2	EA	$8,500.00	$17,000	$17,000
Abandon exist. 4" water line	1	LS	$15,000.00	$15,000	$15,000
Construct 18'x9' conc. outlet	1	EA	$25,000.00	$25,000	$25,000
Remove existing 16" waterline	1	LS	$15,000.00	$15,000	$15,000
Construct energy dissipater	1	EA	$20,000.00	$20,000	$20,000
Construct 1 ft. wide concrete lined swale	1	LS	$6,000.00	$12,000	$12,000
Construct new curb and gutter	25	LF	$25.00	$625	$625
Concrete vaults and miscellaneous concrete	7	EA	$3,500.00	$24,500	$24,500
Paving	1	LS	$25,000.00	$25,000	$25,000
Subtotal Direct Construction				**$4,535,000**	**$3,689,000**
Contingency > $2 million@ 10%				$454,000	$454,000
Construction Management > $2 million@ 10%				$454,000	$454,000
Total Construction				**$4,989,000**	**$4,143,000**
Engineering and Administration Costs					
Engineering and Admin > $2 million@ 10%				$499,000	$499,000
Total Engineering and Administration				**$499,000**	**$499,000**
Total Estimated Cost				**$5,488,000**	**$4,642,000**
Total Estimated Cost - Rounded				**$5,490,000**	**$4,640,000**
Annual Cost - 30 Years @ 5% Interest				**$357,000**	**$302,000**

[1] The capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

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Table D-5a
Cost Opinion for the San Sevaine Basins -- PID 7

	Description	Quantity	Unit	Unit Cost		Total Cost	
Direct Construction Costs							
Item #							
1	Mobilization @ 5% Other Direct Construction Cost	1	LS		5%	$	126,281.18
2	StormWater Pipeline and Pump Station						
	Basin Discharge Concrete Structure	15	Cu. Yds.	$	1,345	$	20,177
	18" Diameter CMLC Steel	3700	Lin. Ft.	$	279	$	1,032,748
	18" Gate Vavle	1	EA	$	5,670	$	5,670
	Booster Pump Station	150	$ /HP	$	5,000	$	750,000
	CMU Building	300	Sq. Ft.	$	300	$	90,000
	Concrete Structure	45	Cu. Yds.	$	1,345	$	60,532
	Excavation	3600	Cu. Yds.	$	6	$	20,177
	Fine Grading	280	Cu. Yds.	$	17	$	4,708
	Backfill and Compaction (Native)	2800	Cu. Yds.	$	6	$	15,694
	Import Pipe Bedding Material	600	Cu. Yds.	$	15	$	9,000
	Basin Discharge Concrete Structure	10	Cu. Yds.	$	1,345	$	13,452
	Sluice Gate	20	$/in-dia	$	595	$	11,900
	Surface Rehabilitation	1500	Sq. Ft.	$	25	$	37,500
	Habitat Area Mitigation	1	LS	$	200,871	$	200,871
	Electrical @ 25%	1	LS	$	230,177.42	$	230,177
	Instrumentation and Controls @ 10% of Electrical	1	LS	$	23,018	$	23,018
	Interior Berm Excavation	300	Cu. Yds.	$	3	$	1,009
	Excavation	1500	Cu. Yds.	$	6	$	8,407
	Material Haul Onsite	1500	Cu. Yds.	$	3	$	4,500
	Interior Berm Compacted Fill	1500	Cu. Yds.	$	7	$	10,089
	Fine Grading	150	Cu. Yds.	$	17	$	2,522
	Basin Discharge Concrete Structure	5	Cu. Yds.	$	1,345	$	6,726
SubTotal Direct Construction Costs						**$**	**2,690,000.00**
	Contingency > $2 million@ 10%	1	LS		10%	$	269,000.00
	Construction Management > $2 million@ 10%	1	LS		10%	$	269,000.00
Total Construction Cost						**$**	**3,228,000.00**
	Engineering and Admin > $2 million@ 10%	1	LS		10%	$	322,800.00
Total Engineering and Administration						**$**	**323,000.00**
Total Estimated Project Cost						**$**	**3,550,000.00**
Annual Cost - 30 Years @ 5% Interest						**$**	**230,900.00**

Table D-5b
Cost Opinion for the San Sevaine Basins -- PID 8

Description		Quantity	Unit	Unit Cost		Total Cost	
Direct Construction Costs							
Item #							
1	Mobilization @ 5% Other Direct Construction Cost	1	LS		5%	$	83,465.92
2	Recycyled Water Pipeline (SSV 5 to SSV3)						
	Turnout Modifications	1	LS	$	15,000	$	15,000
	30" Diameter CMLC	3500	Lin. Ft.	$	379	$	1,326,105
	30" Gate Valve	2	EA	$	9,450	$	18,900
	Basin Discharge Concrete Structure	15	Cu. Yds.	$	1,345	$	20,177
	Sluice Gate	30	$/in-dia	$	595	$	17,850
	Excavation	4000	Cu. Yds.	$	6	$	22,419
	Fine Grading	550	Cu. Yds.	$	17	$	9,248
	Backfill and Compaction (Native)	3000	Cu. Yds.	$	6	$	16,815
	Import Pipe Bedding Material	600	Cu. Yds.	$	15	$	9,000
	Surface Rehabilitation	1400	Sq. Ft.	$	25	$	35,000
	Habitat Area Mitigation	1	LS	$	145,551	$	145,551
6	Construct Internal Berm in SS-5						
	Interior Berm Excavation	300	Cu. Yds.	$	3	$	1,009
	Excavation	1500	Cu. Yds.	$	6	$	8,407
	Material Haul Onsite	1500	Cu. Yds.	$	3	$	4,500
	Interior Berm Compacted Fill	1500	Cu. Yds.	$	7	$	10,089
	Fine Grading	150	Cu. Yds.	$	17	$	2,522
	Basin Discharge Concrete Structure	5	Cu. Yds.	$	1,345	$	6,726
SubTotal Direct Construction Costs						**$**	**1,750,000**
	Contingency $1 - $2 million @ 15%	1	LS		15%	$	262,500
	Construction Management $1 - $2 million @ 15%	1	LS		15%	$	262,500
Total Construction Cost						**$**	**2,275,000**
	Engineering and Admin $1 - $2 million @ 15%	1	LS		15%	$	341,250
Total Engineering and Administration						**$**	**341,000**
Total Estimated Project Cost						**$**	**2,620,000**
Annual Cost - 30 Years @ 5% Interest						**$**	**170,400**

Table D-6
Cost Opinion for the Victoria Basin -- PID 11

Description		Quantity	Unit	Unit Cost	Total Cost
Direct Construction Costs					
Item #					
1	Mobilization @ 5% Other Direct Construction Cost	1	LS	5%	$ 4,631
2	Remove Mid-Level Outlet				
	36" Steel Bulkhead	1	LS	$ 7,500	$ 7,500
	Existing Concrete Outlet Modifications (Concrete Deck and Fill)	1	LS	$ 15,000	$ 15,000
3	Lysimeter Relocation				
	Relocating Allowance	1	LS	$ 55,000	$ 55,000
	Electrical @ 25%	1	LS	$ 13,750	$ 13,750
	Instrumentation @ 10%	1	LS	$ 1,375	$ 1,375
SubTotal Direct Construction Costs					**$ 100,000**
	Contingency $1 - $2 million @ 15%	1	LS	15%	$ 15,000
	Construction Management $1 - $2 million @ 15%	1	LS	15%	$ 15,000
Total Construction Cost					**$ 130,000**
	Engineering and Admin $1 - $2 million @ 15%	1	LS	15%	$ 19,500
Total Engineering and Administration					**$ 19,500**
Total Estimated Project Cost					**$ 150,000**
Annual Cost - 30 Years @ 5% Interest					**$ 9,800**

Table D-7a

Cost Opinion for the Lower Day Basin -- PID 12

	Description	Quantity	Unit	Unit Cost	Total Cost
Direct Construction Costs					
1	Mobilization @ 5% Other Direct Construction Cost	1	Job	Lump Sum	$79,000
2	Compacted Embankment				
	Foundation Excavation	72,000	Cu. Yds.	$3.36	$242,129
	Compacted Embankment	72,000	Cu. Yds.	$6.73	$484,258
3	Day Creek Channel Modification				
	Channel Demolition	400	Cu. Yds.	$61.65	$24,661
	Gate	1	Job	$144,000	$144,000
	Gate Structure	1	Job	$165,000	$165,000
4	Basin Diversion Channel Inlet				
	Gate	1	Job	$144,000	$144,000
	Gate Structure	1	Job	$378,000	$378,000
	Subtotal Direct Construction				**$1,660,000**
	Contingency $1 - $2 million @ 15%				$249,000
	Construction Management $1 - $2 million @ 15%				$249,000
	Total Construction				**$2,158,000**
Engineering and Administration Costs					
	Engineering and Admin $1 - $2 million @ 15%				$324,000
	Total Engineering and Administration				**$324,000**
Total Estimated Cost					**$2,482,000**
Total Estimated Cost - Rounded					**$2,480,000**
Annual Cost - 30 Years @ 5% Interest					**$161,500**

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Table D-7b
Cost Opinion for the Lower Day Basin -- PID 13

Description		Quantity	Unit	Unit Cost		Total Cost	
Direct Construction Costs							
Item #							
1	Mobilization @ 5% Other Direct Construction Cost	1	LS	5%		$	17,080.60
2	Mid-Level Gate Structure						
	Sluice Gate	60	$/in-dia	$	595	$	35,700
	Basin Excavation & Haul Offsite	11,200	Cu. Yds.	$	14	$	156,935
	Concrete Structure	0	Cu. Yds.	$	1,345	$	-
	Basin Discharge Concrete Structure	50	Cu. Yds.	$	1,345	$	67,258
	Coarse Drain Material	100	Ton	$	26	$	2,578
	Backfill and Compaction (Native)	5,600	Cu. Yds.	$	6	$	31,387
	Interior Berm Compacted Fill	5,600	Cu. Yds.	$	7	$	37,665
	Fine Grading	600	Cu. Yds.	$	17	$	10,089
SubTotal Direct Construction Costs						**$**	**359,000.00**
	Contingency < $1 million@ 20%	1	LS	20%		$	71,800.00
	Construction Management < $1 million@ 20%	1	LS	20%		$	71,800.00
Total Construction Cost						**$**	**502,600.00**
	Engineering and Admin < $1 million@ 20%	1	LS	20%		$	100,520.00
Total Engineering and Administration						**$**	**101,000.00**
Total Estimated Project Cost						**$**	**600,000.00**
Annual Cost - 30 Years @ 5% Interest							**$39,000.00**

Table D-8
Cost Opinion for the Turner Basin -- PID 14

Description		Quantity	Unit	Unit Cost		Total Cost	
Direct Construction Costs							
Item #							
1	Mobilization @ 5% Other Direct Construction Cost	1	LS		5%	$	25,163.10
2	Raise Turner 2 Spillway						
	Channel Demolition	350	Cu. Yds.	$	62	$	21,579
	Basin Excavation & Haul Offsite	2,500	Cu. Yds.	$	14	$	35,030
	Replace Compacted Fill	2,500	Cu. Yds.	$	17	$	42,036
	Concrete Spillway Structure	400	Cu. Yds.	$	897	$	358,710
	Compacted Embankment	1,250	Cu. Yds.	$	7	$	8,407
	Surface Rehabilitation	1,500	Sq. Ft.	$	25	$	37,500
SubTotal Direct Construction Costs						**$**	**528,000.00**
	Contingency < $1 million@ 20%	1	LS		20%	$	105,600.00
	Construction Management < $1 million@ 20%	1	LS		20%	$	105,600.00
Total Construction Cost						**$**	**739,200.00**
	Engineering and Admin < $1 million@ 20%	1	LS		20%	$	147,840.00
Total Engineering and Administration						**$**	**148,000.00**
Total Estimated Project Cost						**$**	**890,000.00**
Annual Cost - 30 Years @ 5% Interest							**$57,900.00**

Table D-9
Cost Opinion for the Ely Basins -- PID 15

	Description	Quantity	Unit	Unit Cost	Total Cost	Total Cost[1]
Direct Construction Costs						
1	Mobilization @ 5% Other Direct Construction Cost	1	Job	Lump Sum	$329,000	$329,000
2	Reservoir Excavation					0
	Excavate & Haul Offsite	470,000	Cu. Yds.	$14.01	$6,585,685	$658,569
	Subtotal Direct Construction				**$6,910,000**	**$988,000**
	Contingency > $2 million@ 10%				$691,000	$691,000
	Construction Management > $2 million@ 10%				$691,000	$691,000
	Total Construction				**$8,292,000**	**$2,370,000**
Engineering and Administration Costs						
	Engineering and Admin > $2 million@ 10%				$829,000	$829,000
	Total Engineering and Administration				**$829,000**	**$829,000**
Total Estimated Cost					**$9,121,000**	**$3,199,000**
Total Estimated Cost - Rounded					**$9,120,000**	**$3,200,000**
Annual Cost - 30 Years @ 5% Interest					**$593,300**	**$208,100**

[1] The capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

Table D-10
Cost Opinion for the Lower San Sevaine Basin -- PID 17

Description	Quantity	Unit	Unit Cost	Total Cost	Total Cost[1]
Direct Construction Costs					
1 Mobilization @ 5% Other Direct Construction Cost	1	Job	Lump Sum	$1,201,000	$1,201,000
2 Compacted Embankment					
Foundation Excavation	30,000	Cu. Yds.	$3.36	$100,887	$100,887
Compacted Embankment	46,000	Cu. Yds.	$6.73	$309,387	$309,387
3 Reservoir Excavation					
Excavate & Haul Offsite	1,542,000	Cu. Yds.	$14.01	$21,606,653	$2,160,665
4 Existing Channel Demolition					
Channel Demolition	5,800	Cu. Yds.	$26.90	$156,039	$156,039
5 Basin Outlet to Etiwanda Channel					
60" Dia. RCP Outlet Conduit	300	Lin. Ft.	$673	$201,774	$201,774
Gates and Controls	1	Job	$50,000	$50,000	$50,000
6 Basin Outlet to San Sevaine Channel					
60" Dia. RCP Outlet Conduit	300	Lin. Ft.	$673	$201,774	$201,774
Gates and Controls	1	Job	$50,000	$50,000	$50,000
7 Basin Spillway/Discharge Structure					
Concrete Structure	650	Cu. Yds.	$1,345	$874,355	$874,355
8 Basin Inlet Structure					
Concrete Structure	350	Cu. Yds.	$1,345	$470,806	$470,806
9 Land Acquisition Cost					
Land Costs	40	$/acre-ft	$230,000	$9,200,000	$9,200,000
Subtotal Direct Construction				**$34,420,000**	**$14,980,000**
Contingency > $2 million@ 10%				$3,442,000	$3,442,000
Construction Management > $2 million@ 10%				$3,442,000	$3,442,000
Total Construction				**$41,304,000**	**$18,422,000**
Engineering and Administration Costs					
Engineering and Admin > $2 million@ 10%				$4,130,000	$4,130,000
Total Engineering and Administration				**$4,130,000**	**$4,130,000**
Total Estimated Cost				**$45,434,000**	**$22,552,000**
Total Estimated Cost - Rounded				**$45,430,000**	**$22,550,000**
Annual Cost - 30 Years @ 5% Interest				**$2,955,500**	**$1,467,000**

[1] The capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a

Table D-11
Cost Opinion for the CSI Basin -- PID 18

	Description	Quantity	Unit	Unit Cost	Total Cost	Total Cost[1]
Direct Construction Costs						
1	Mobilization @ 5% Other Direct Construction Cost	1	Job	Lump Sum	$26,000	$26,000
2	Reservoir Excavation					
	Excavate & Haul Offsite	36,500	Cu. Yds.	$14.01	$511,442	$51,144
	Subtotal Direct Construction				**$537,000**	**$77,000**
	Contingency < $1 million@ 20%				$107,000	$107,000
	Construction Management < $1 million@ 20%				$107,000	$107,000
	Total Construction				**$751,000**	**$291,000**
Engineering and Administration Costs						
	Engineering and Admin < $1 million@ 20%				$150,000	$150,000
	Total Engineering and Administration				**$150,000**	**$150,000**
Total Estimated Cost					**$901,000**	**$441,000**
Total Estimated Cost - Rounded					**$900,000**	**$440,000**
Annual Cost - 30 Years @ 5% Interest					**$58,600**	**$28,600**

[1] The capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

Table D-12
Cost Opinion for the Wineville Basin -- PID 19

		Quantity	Unit	Unit Cost	Total Cost	Total Cost[1]
Direct Construction Costs						
1	Mobilization @ 5% Other Direct Construction Cost	1	Job	Lump Sum	$227,000	$227,000
2	Compacted Embankment					0
	Foundation Excavation	122,000	Cu. Yds.	$3.36	$410,274	$410,274
	Compacted Embankment	122,000	Cu. Yds.	$6.73	$820,548	$820,548
3	Basin Spillway/Discharge Structure					0
	Spillway Gate	1	Job	$720,000	$720,000	$720,000
	Concrete/Building Components	1	Job	$1,038,000	$1,038,000	$1,038,000
4	Basin Cleaning and Contouring					
	Basin Excavation	110,000	Cu. Yds.	$14.01	$1,541,331	$154,133
	Subtotal Direct Construction				**$4,760,000**	**$3,370,000**
	Contingency > $2 million@ 10%				$476,000	$476,000
	Construction Management > $2 million@ 10%				$476,000	$476,000
	Total Construction				**$5,712,000**	**$4,322,000**
Engineering and Administration Costs						
	Engineering and Admin > $2 million@ 10%				$571,000	$571,000
	Total Engineering and Administration				**$571,000**	**$571,000**
Total Estimated Cost					**$6,283,000**	**$4,893,000**
Total Estimated Cost - Rounded					**$6,280,000**	**$4,890,000**
Annual Cost - 30 Years @ 5% Interest					**$408,700**	**$318,300**

[1] The capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

Table D-13
Cost Opinion for the Jurupa Basin -- PID 20

Description		Quantity	Unit	Unit Cost		Total Cost	
Direct Construction Costs							
Item #							
1	Mobilization @ 5% Other Direct Construction Cost	1	LS		5%	$	68,661
2	Basin Inlet Structure Improvements						
	Channel Demolition	400	Cu. Yds.	$	62	$	24,661
	Concrete Structure	200	Cu. Yds.	$	1,345	$	269,032
	Modify Channel for Conduit Inlet	200	Cu. Yds.	$	1,200	$	240,000
	Concrete Channel & Weir	200	Cu. Yds.	$	560	$	112,097
	48" Dia. RCP	100	Lin. Ft.	$	376	$	37,552
	Sluice Gate	48	$/in-dia	$	595	$	28,560
	Electrical @ 25%	1	LS	$	284,761	$	284,761
	Instrumentation and Controls @ 10% of Electrical	1	LS	$	28,476	$	28,476
3	Turnout CB-18 Modifications (Shall be completed only if Inlet Structure Capacity Increased						
	Turnout Modifications	1	LS	$	273,000	$	273,000
	Electrical @ 25%	1	LS	$	68,250	$	68,250
	Instrumentation and Controls @ 10% of Electrical	1	LS	$	6,825	$	6,825
SubTotal Direct Construction Costs						**$**	**1,440,000**
	Contingency $1 - $2 million @ 15%	1	LS		15%	$	216,000
	Construction Management $1 - $2 million @ 15%	1	LS		15%	$	216,000
Total Construction Cost						**$**	**1,872,000**
	Engineering and Admin $1 - $2 million @ 15%	1	LS		15%	$	280,800
Total Engineering and Administration						**$**	**281,000**
Total Estimated Project Cost						**$**	**2,150,000**
Annual Cost - 30 Years @ 5% Interest						**$**	**139,900**

Table D-14a
Cost Opinion for the RP3 Basins -- PID 21

Description	Quantity	Unit	Unit Cost	Total Cost	Total Cost[1]
Direct Construction Costs					
Item #					
1 Mobilization @ 5% Other Direct Construction Cost	1	LS	5%	$ 190,800	$ 190,800
2 Increase Conservation Storage - Inlet Structure					
Concrete Structure	250	Cu. Yds.	$ 1,345	$ 336,290	$ 336,290
Sluice Gate	48	$/in-dia	$ 595	$ 28,560	$ 28,560
Channel Demolition	100	Cu. Yds.	$ 62	$ 6,165	$ 6,165
Modify Channel for Conduit Inlet	100	Cu. Yds.	$ 1,200	$ 120,000	$ 120,000
Basin Excavation & Haul Offsite	7,000	Cu. Yds.	$ 14	$ 98,085	$ 98,085
48" Dia. RCP	48	Lin. Ft.	$ 376	$ 18,025	$ 18,025
Compacted Embankment	5,500	Cu. Yds.	$ 7	$ 36,992	$ 36,992
Import Pipe Bedding Material	700	Cu. Yds.	$ 15	$ 10,500	$ 10,500
Surface Rehabilitation	750	Sq. Ft.	$ 25	$ 18,750	$ 18,750
Inlet Channel Allowance - Misc	1	LS	$ 163,654	$ 163,654	$ 163,654
3 Increase Conservation Storage - Basin Excavation					
Basin Excavation & Haul Offsite	125,000	Cu. Yds.	$ 14	$ 1,751,512	$ 175,151
Compacted Embankment	95,000	Cu. Yds.	$ 7	$ 638,952	$ 638,952
Fine Grading	35,000	Cu. Yds.	$ 17	$ 588,508	$ 588,508
SubTotal Direct Construction Costs				**$ 4,010,000**	**$ 2,430,000**
Contingency > $2 million@ 10%	1	LS	10%	$ 401,000	$ 401,000
Construction Management > $2 million@ 10%	1	LS	10%	$ 401,000	$ 401,000
Total Construction Cost				**$ 4,812,000**	**$ 3,232,000**
Engineering and Admin > $2 million@ 10%	1	LS	10%	$ 481,200	$ 481,200
Total Engineering and Administration				**$ 481,000**	**$ 481,000**
Total Estimated Project Cost				**$ 5,290,000**	**$ 3,710,000**
Annual Cost - 30 Years @ 5% Interest				**$ 344,100**	**$ 241,300**

[1] The capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

Table D-14b
Cost Opinion for the RP3 Basins -- PID 22

	Quantity	Unit	Unit Cost	Total Cost	Total Cost[1]
Direct Construction Costs					
1 Mobilization @ 5% Other Direct Construction Cc	1	Job	Lump Sum	$795,000	$795,000
2 Reservoir Excavation					
Excavate & Haul Offsite	762,000	Cu. Yds.	$14.01	$9,525,000	$952,500
3 Channel Modification					
Modify Channel for Conduit Inlet	35	Cu. Yds.	$1,200	$42,000	$42,000
Modify Channel for Pneumatic Gate	1	Job	$380,500	$380,500	$380,500
Pneumatic Gate	1	Job	$140,000	$140,000	$140,000
4 Conduit to Cell 1					
Excavation	22,200	Cu. Yds.	$5.60	$111,000	$111,000
Replace Compacted Fill	8,300	Cu. Yds.	$16.81	$124,500	$124,500
8' x 10' RCB	950	Lin. Ft.	$930	$788,500	$788,500
Coarse Drain Material	550	Ton	$26	$12,650	$12,650
Automated Gate	1	Job	$130,000	$130,000	$130,000
Concrete Inlet Structure	1	Job	$24,000	$24,000	$24,000
Energy Dissipation Structure	1	Job	$226,800	$226,800	$226,800
Road Demolition & Replacement	1	Job	$66,000	$66,000	$66,000
5 Conduit to Cell 3					
Excavation	66,500	Cu. Yds.	$5.60	$332,500	$332,500
Replace Compacted Fill	66,500	Cu. Yds.	$16.81	$997,500	$997,500
8' x 10' RCB	820	Lin. Ft.	$930	$680,600	$680,600
Coarse Drain Material	460	Ton	$26	$10,580	$10,580
Automated Gate	1	Job	$162,500	$162,500	$162,500
Concrete Inlet Structure	1	Job	$48,000	$48,000	$48,000
Energy Dissipation Structure	1	Job	$48,000	$48,000	$48,000
Channel Demolition & Replacement	1	Job	$218,000	$218,000	$218,000
6 Conduit to Cell 4					
Excavation	23,400	Cu. Yds.	$5.60	$117,000	$117,000
Replace Compacted Fill	23,400	Cu. Yds.	$16.81	$351,000	$351,000
48" Dia. RCP	420	Lin. Ft.	$376	$140,700	$140,700
Automated Gate	1	Job	$30,000	$30,000	$30,000
Concrete Inlet Structure	1	Job	$23,500	$23,500	$23,500
Energy Dissipation Structure	1	Job	$23,500	$23,500	$23,500
7 Spillway from Cell 1					
48" Dia. RCP	440	Lin. Ft.	$376	$147,400	$147,400
Concrete Inlet Structure	1	Job	$23,500	$23,500	$23,500
Energy Dissipation Structure	1	Job	$1,400	$1,400	$1,400
8 Spillway from Cell 3					$0
Excavate & Haul Offsite	300	Cu. Yds.	$14.01	$3,750	$3,750
Concrete Channel & Weir	125	Cu. Yds.	$560	$62,500	$62,500
Energy Dissipation Structure	1	Job	$17,000	$17,000	$17,000
9 Spillway from Cell 4					
Excavate & Haul Offsite	200	Cu. Yds.	$14.01	$2,500	$2,500
Concrete Channel & Weir	105	Cu. Yds.	$560	$52,500	$52,500
Energy Dissipation Structure	1	Job	$17,000	$17,000	$17,000
10 Tie-In to Jurupa Pipeline					$0
36" Dia. RCP	2,300	Lin. Ft.	$303	$621,000	$621,000
Butterfly Valve	3	Job	$19,700	$59,100	$59,100
Energy Dissipation Structure	3	Job	$46,200	$138,600	$138,600
Subtotal Direct Construction				**$16,700,000**	**$8,120,000**
Contingency > $2 million@ 10%				$1,670,000	$1,670,000
Construction Management > $2 million@ 10%				$1,670,000	$1,670,000
Total Construction				**$20,040,000**	**$11,460,000**
Engineering and Administration Costs					
Engineering and Admin > $2 million@ 10%				$2,004,000	$2,004,000
Total Engineering and Administration				**$2,004,000**	**$2,004,000**
Total Estimated Cost				**$22,044,000**	**$13,464,000**
Annual Cost - 30 Years @ 5% Interest				**$1,434,000**	**$876,000**

[1] The capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

Table D-15

Cost Opinion for the 2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements -- PID 23

		Quantity	Unit	Unit Cost	Total Cost	Total Cost[1]
Direct Construction Costs						
1	Mobilization @ 5% Other Direct Construction Cost	1	Job	Lump Sum	$842,000	$842,000
2	Conveyance System					
	Pipeline	10,400	$/LF	$330	$3,427,471	$3,427,471
	Pump	2	LS	$240,000	$480,000	$480,000
	Pump structure	1	LS	$3,200,000	$3,200,000	$3,200,000
3	2013 RMPU RP3 Project					
	Total direct construction cost	1	Job	$3,819,200	$3,819,200	$2,239,200
4	Jurupa Inlet Improvement					
	Total direct construction cost	1	Job	$1,371,339	$1,371,339	$1,371,339
5	2010 RMPU Wineville Project					
	Total direct construction cost	1	Job	$4,533,000	$4,533,000	$4,095,000
	Subtotal Direct Construction				**$17,670,000**	**$15,660,000**
	Contingency > $2 million@ 10%				$1,767,000	$1,767,000
	Construction Management > $2 million@ 10%				$1,767,000	$1,767,000
	Total Construction				**$21,204,000**	**$19,194,000**
Engineering and Administration Costs						
	Engineering and Admin > $2 million@ 10%				$2,120,000	$2,120,000
	Total Engineering and Administration				**$2,120,000**	**$2,120,000**
Total Estimated Cost					**$23,324,000**	**$21,314,000**
Annual Cost - 30 Years @ 5% Interest					**$1,517,300**	**$1,386,500**

[1] The capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

Table D-16
Cost Opinion for the 2010 RMPU Vulcan Basin Project[1]

	Description	Quantity	Unit	Unit Cost	Total Cost
Direct Construction Costs					
1	Mobilization @ 5% Other Direct Construction Cost	1	Job	Lump Sum	$423,000
2	Basin Modification				
	Construction of Basin per County Requirements	1	LS	$6,401,250	$6,401,250
3	Spillway				
	200 ft Emergency Spillway	1	LS	$812,500	$812,500
	Inlet Spillway Upgrade	1	LS	$1,250,000	$1,250,000
4	Land Acquisition Cost				
	Land Costs	1	LS	$14,000,000	$14,000,000
	Subtotal Direct Construction				**$22,890,000**
	Contingency > $2 million@ 10%				$2,289,000
	Construction Management > $2 million@ 10%				$2,289,000
	Total Construction				**$25,179,000**
Engineering and Administration Costs					
	Engineering and Admin > $2 million@ 10%				$2,518,000
	Total Engineering and Administration				**$2,518,000**
Total Estimated Cost					**$27,697,000**
Total Estimated Cost - Rounded					**$27,700,000**
Annual Cost - 30 Years @ 5% Interest					**$1,801,700**

[1] Reconnaissance-Level Construction Cost Opinion Alternative 2 Flood Control Use with Maximum Storm Water Capture, WEI 2006.

Table D-17
Cost Opinion for the Sierra Basin -- PID 25

	Description	Quantity	Unit	Unit Cost	Total Cost	Total Cost[1]
Direct Construction Costs						
1	Mobilization @ 5% Other Direct Construction Cost	1	Job	Lump Sum	$28,000	$28,000
2	Reservoir Excavation					
	Excavate & Haul Offsite	40,500	Cu. Yds.	$14.01	$567,490	$56,749
	Subtotal Direct Construction				**$595,000**	**$85,000**
	Contingency < $1 million@ 20%				$119,000	$119,000
	Construction Management < $1 million@ 20%				$119,000	$119,000
	Total Construction				**$833,000**	**$323,000**
Engineering and Administration Costs						
	Engineering and Admin < $1 million@ 20%				$167,000	$167,000
	Total Engineering and Administration				**$167,000**	**$167,000**
Total Estimated Cost					**$1,000,000**	**$490,000**
Annual Cost - 30 Years @ 5% Interest					**$65,100**	**$31,900**

[1] The capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

Table D-18
Cost Opinion for the Sultana Basin -- PID 26

	Description	Quantity	Unit	Unit Cost	Total Cost	Total Cost[1]
Direct Construction Costs						
1	Mobilization @ 5% Other Direct Construction Cost	1	Job	Lump Sum	$29,000	$29,000
2	Reservoir Excavation					
	Excavate & Haul Offsite	41,500	Cu. Yds.	$14.01	$581,502	$58,150
	Subtotal Direct Construction				**$611,000**	**$87,000**
	Contingency < $1 million@ 20%				$122,200	$122,200
	Construction Management < $1 million@ 20%				$122,000	$122,000
	Total Construction				**$855,200**	**$331,200**
Engineering and Administration Costs						
	Engineering and Admin < $1 million@ 20%				$171,000	$171,000
	Total Engineering and Administration				**$171,000**	**$171,000**
Total Estimated Cost					**$1,026,200**	**$502,200**
Annual Cost - 30 Years @ 5% Interest					**$66,800**	**$32,700**

[1] The capital cost shown assumes that the project's excavation costs would be reduced by 90%. The material excavated could be used for another construction site or leased to a mining operator.

Table D-19

Cost Opinion for the Declez Basin -- PID 27

Description	Quantity	Unit	Unit Cost	Total Cost
Direct Construction Costs				
1 Mobilization @ 5% Other Direct Construction Cost	1	Job	Lump Sum	$147,000
2 Compacted Embankment				
Foundation Excavation	70,600	Cu. Yds.	$3.36	$237,421
Compacted Embankment	70,600	Cu. Yds.	$6.73	$474,842
Interior Berm Excavation	40,000	Cu. Yds.	$3.36	$134,516
Interior Berm Compacted Fill	40,000	Cu. Yds.	$6.73	$269,032
3 Existing Spillway Demolition				
Channel Demolition	1,000	Cu. Yds.	$18.17	$18,170
4 Basin Spillway/Discharge Structure				
Basin Discharge Concrete Structure	1,000	Cu. Yds.	$1,345	$1,345,161
Berm Overflow Concrete Structure	300	Cu. Yds.	$1,345	$403,548
5 Outlet Gate				
Gates and Controls	1	Job	$50,000	$50,000
Subtotal Direct Construction				**$3,080,000**
Contingency > $2 million@ 10%				$308,000
Construction Management > $2 million@ 10%				$308,000
Total Construction				**$3,696,000**
Engineering and Administration Costs				
Engineering and Admin > $2 million@ 10%				$370,000
Total Engineering and Administration				**$370,000**
Total Estimated Cost				**$4,066,000**
Total Estimated Cost - Rounded				**$4,070,000**
Annual Cost - 30 Years @ 5% Interest				**$264,500**

Table D-20
Ranked Yield Enhancement Projects (Marginal Unit Cost < 600 per acre-ft)

Project ID	Group[1]	Project	Yield	Recycled Water	Storm Water Recharge Unit Cost	Capital Cost	Total Annual Cost
Recommended MZ3 Projects							
18a	i	CSI Storm Water Basin	81	0	$ 388	$ 440,000	$ 31,612
23a	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements[2,3]	3,166	2,905	$ 500	$ 19,552,000	$ 1,582,914
25a	i	Sierra	64	0	$ 537	$ 490,000	$ 34,262
Total MZ3			**3,311**	**2,905**	**$ 498**	**$ 20,482,000**	**$ 1,648,788**
Recommended MZ2 Projects							
11	i	Victoria Basin[2, 4]	43	120	$ 151	$ 75,000	$ 6,484
7	ii	San Sevaine Basins[2, 5]	642	1,911	$ 217	$ 1,775,000	$ 139,256
12	ii	Lower Day Basin (2010 RMPU)	789	0	$ 242	$ 2,480,000	$ 190,482
Total MZ2			**1,474**	**2,031**	**$ 228**	**$ 4,330,000**	**$ 336,222**
Recommended MZ1 Projects							
2	i	Montclair Basins	248	0	$ 415	$ 1,440,000	$ 102,876
Total MZ1			**248**	**0**	**$ 415**	**$ 1,440,000**	**$ 102,876**
Total Recommended Projects			**5,033**	**4,936**	**$ 415**	**$ 26,252,000**	**$ 2,087,887**
Other Projects							
19a	iii	Wineville Basin (2010 RMPU)	2,157	0	$ 184	$ 4,890,000	$ 397,924
20	iii	Jurupa Basin	421	0	$ 369	$ 2,150,000	$ 155,491
22a	ii, iii	RP3 Basin Improvements (2013 RMPU)	137	2,905	$ 915	$ 1,855,000	$ 125,787

Note - color shading within each MZ indicates mutually exclusive projects.

[1] The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; and iv- the project includes the "iii" group.

[2] At the July 18, 2013 Steering Committee Meeting, Ryan Shaw (IEUA) indicated that Project IDs 7, 11, and 22a are being recommended to be cost shared and the capital cost shown assumes a 50/50 split of the capital cost per Peace II Agreement Article VIII.

[3] Project ID 23a includes Project IDs 19a, 20, and 22a and associated conveyance facilities. The total capital cost represents an IEUA capital cost share for only Project ID 22a. The capital costs associated with Project IDs 19a and 20 and the associated conveyance facilities were not cost shared. The recycled water recharge shown represents the increase in Project ID 22a. The recycled water recharge associated with Project ID 19a was not included because the project was not recommended to be cost shared by IEUA. The total capital cost of Project ID 23a is about $21,300,000.

[4] The total capital cost for Project ID 11 is about $150,000.

[5] The total capital cost for Project ID 12 is about $3,550,000.

a - Project ID no.'s with an "a" extension indicate that the project includes excavation and haul-off costs, and the capital cost shown assumes that the project's excavation and haul-off costs are reduced by 90 percent with the excavated materials being used in another construction project.

Table D-21
Ranked Yield Enhancement Projects (Marginal Unit Cost < 600 per acre-ft Without Discounted Excavation Costs)

Project ID	Group[1]	Project	Yield	Recycled Water	Storm Water Recharge Unit Cost	Capital Cost	Total Annual Cost
Recommended MZ3 Projects							
23	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements[2,3]	3,166	2,905	$ 525	$ 20,772,000	$ 1,662,214
Total MZ3			**3,166**	**2,905**	**$ 525**	**$ 20,772,000**	**$ 1,662,214**
Recommended MZ2 Projects							
11	i	Victoria Basin[2, 4]	43	120	$ 151	$ 75,000	$ 6,484
7	ii	San Sevaine Basins[2, 5]	642	1,911	$ 217	$ 1,775,000	$ 139,256
12	ii	Lower Day Basin (2010 RMPU)	789	0	$ 242	$ 2,480,000	$ 190,482
Total MZ2			**1,474**	**2,031**	**$ 228**	**$ 4,330,000**	**$ 336,222**
Recommended MZ1 Projects							
2	i	Montclair Basins	248	0	$ 415	$ 1,440,000	$ 102,876
Total MZ1			**248**	**0**	**$ 415**	**$ 1,440,000**	**$ 102,876**
Total Recommended Projects			**4,888**	**4,936**	**$ 430**	**$ 26,542,000**	**$ 2,101,312**
Other Projects							
19	iii	Wineville Basin (2010 RMPU)	2,157	2,905	$ 226	$ 6,280,000	$ 488,324
20	iii	Jurupa Basin	421	0	$ 369	$ 2,150,000	$ 155,491
22	ii, iii	RP3 Basin Improvements (2013 RMPU)	137	0	$ 1,289	$ 2,645,000	$ 177,187

Note - color shading within each MZ indicates mutually exclusive projects.

[1] The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; and iv- the project includes the "iii" group.

[2] At the July 18, 2013 Steering Committee Meeting, Ryan Shaw (IEUA) indicated that Project IDs 7, 11, and 22a are being recommended to be cost shared and the capital cost shown assumes a 50/50 split of the capital cost per Peace II Agreement Article VIII.

[3] Project ID 23 includes Project IDs 19, 20, and 22 and associated conveyance facilities. The total capital cost represents an IEUA capital cost share for only Project ID 22. The capital costs associated with Project IDs 19 and 20 and the associated conveyance facilities were not cost shared. The recycled water recharge shown represents the increase in Project ID 22. The recycled water recharge associated with Project ID 19 was not included because the project was not recommended to be cost shared by IEUA. The total capital cost of Project ID 23 is about $23,324,000.

[4] The total capital cost for Project ID 11 is about $150,000.

[5] The total capital cost for Project ID 12 is about $3,550,000.

Table D-22
Ranked Yield Enhancement Projects (Melded Unit Cost < $600 acre-ft)

Project ID	Group[1]	Project	Yield	Recycled Water	Storm Water Recharge Unit Cost	Capital Cost	Total Annual Cost
Recommended MZ3 Projects							
18a	i	CSI Storm Water Basin	81	0	$ 388	$ 440,000	$ 31,612
23a	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements[2,3]	3,166	2,905	$ 500	$ 19,552,000	$ 1,582,914
25a	i	Sierra	64	0	$ 537	$ 490,000	$ 34,262
27	i	Declez Basin	241	0	$ 1,135	$ 4,070,000	$ 273,720
Total MZ3			**3,552**	**2,905**	**$ 541**	**$ 24,552,000**	**$ 1,922,509**
Recommended MZ2 Projects							
11	i	Victoria Basin[2, 4]	43	120	$ 151	$ 75,000	$ 6,484
7	ii	San Sevaine Basins[2, 5]	642	1,911	$ 217	$ 1,775,000	$ 139,256
12	ii	Lower Day Basin (2010 RMPU)	789	0	$ 242	$ 2,480,000	$ 190,482
14	i	Turner Basin	66	0	$ 916	$ 890,000	$ 60,338
15a	i	Ely Basin	221	0	$ 981	$ 3,200,000	$ 216,362
Total MZ2			**1,760**	**2,031**	**$ 348**	**$ 8,420,000**	**$ 612,922**
Recommended MZ1 Projects							
2	i	Montclair Basins	248	0	$ 415	$ 1,440,000	$ 102,876
Total MZ1			**248**	**0**	**$ 415**	**$ 1,440,000**	**$ 102,876**
Total Recommended Projects			**5,560**	**4,936**	**$ 474**	**$ 34,412,000**	**$ 2,638,307**
Other Projects							
19a	iii	Wineville Basin (2010 RMPU)	2,157	0	$ 184	$ 4,890,000	$ 397,924
20	iii	Jurupa Basin	421	0	$ 369	$ 2,150,000	$ 155,491
22a	ii, iii	RP3 Basin Improvements (2013 RMPU)	137	2,905	$ 915	$ 1,855,000	$ 125,787

Note - color shading within each MZ indicates mutually exclusive projects.

[1] The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; and iv- the project includes the "iii" group.

[2] At the July 18, 2013 Steering Committee Meeting, Ryan Shaw (IEUA) indicated that Project IDs 7, 11, and 22a are being recommended to be cost shared and the capital cost shown assumes a 50/50 split of the capital cost per Peace II Agreement Article VIII.

[3] Project ID 23a includes Project IDs 19a, 20, and 22a and associated conveyance facilities. The total capital cost represents an IEUA capital cost share for only Project ID 22a. The capital costs associated with Project IDs 19a and 20 and the associated conveyance facilities were not cost shared. The recycled water recharge shown represents the increase in Project ID 22a. The recycled water recharge associated with Project ID 19a was not included because the project was not recommended to be cost shared by IEUA. The total capital cost of Project ID 23a is about $21,300,000.

[4] The total capital cost for Project ID 11 is about $150,000.

[5] The total capital cost for Project ID 12 is about $3,550,000.

a - Project ID no.'s with an "a" extension indicate that the project includes excavation and haul-off costs, and the capital cost shown assumes that the project's excavation and haul-off costs are reduced by 90 percent with the excavated materials being used in another construction project.

Table D-23
Ranked Yield Enhancement Projects (Melded Unit Cost < $600 acre-ft Without Discounted Excavation Costs)

Project ID	Group[1]	Project	Yield	Recycled Water	Storm Water Recharge Unit Cost	Capital Cost	Total Annual Cost
Recommended MZ3 Projects							
23	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements[2,3]	3,166	2,905	$ 525	$ 20,772,000	$ 1,662,214
18	i	CSI Storm Water Basin	81	0	$ 756	$ 900,000	$ 61,512
25	i	Sierra	64	0	$ 1,057	$ 1,000,000	$ 67,462
27	i	Declez Basin	241	0	$ 1,135	$ 4,070,000	$ 273,720
Total MZ3			**3,552**	**2,905**	**$ 581**	**$ 26,742,000**	**$ 2,064,909**
Recommended MZ2 Projects							
11	i	Victoria Basin[2, 4]	43	120	$ 151	$ 75,000	$ 6,484
7	ii	San Sevaine Basins[2, 5]	642	1,911	$ 217	$ 1,775,000	$ 139,256
12	ii	Lower Day Basin (2010 RMPU)	789	0	$ 242	$ 2,480,000	$ 190,482
14	i	Turner Basin	66	0	$ 916	$ 890,000	$ 60,338
Total MZ2			**1,539**	**2,031**	**$ 258**	**$ 5,220,000**	**$ 396,560**
Recommended MZ1 Projects							
2	i	Montclair Basins	248	0	$ 415	$ 1,440,000	$ 102,876
Total MZ1			**248**	**0**	**$ 415**	**$ 1,440,000**	**$ 102,876**
Total Recommended Projects			**5,340**	**4,936**	**$ 480**	**$ 33,402,000**	**$ 2,564,345**
Other Projects							
19	iii	Wineville Basin (2010 RMPU)	2,157	0	$ 184	$ 6,280,000	$ 488,324
20	iii	Jurupa Basin	421	0	$ 369	$ 2,150,000	$ 155,491
22	ii, iii	RP3 Basin Improvements (2013 RMPU)	137	2,905	$ 1,289	$ 2,645,000	$ 177,187

Note - color shading within each MZ indicates mutually exclusive projects.

[1] The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; and iv- the project includes the "iii" group.

[2] At the July 18, 2013 Steering Committee Meeting, Ryan Shaw (IEUA) indicated that Project IDs 7, 11, and 22a are being recommended to be cost shared and the capital cost shown assumes a 50/50 split of the capital cost per Peace II Agreement Article VIII.

[3] Project ID 23 includes Project IDs 19, 20, and 22 and associated conveyance facilities. The total capital cost represents an IEUA capital cost share for only Project ID 22. The capital costs associated with Project IDs 19 and 20 and the associated conveyance facilities were not cost shared. The recycled water recharge shown represents the increase in Project ID 22. The recycled water recharge associated with Project ID 19 was not included because the project was not recommended to be cost shared by IEUA. The total capital cost of Project ID 23 is about $23,324,000.

[4] The total capital cost for Project ID 11 is about $150,000.

[5] The total capital cost for Project ID 12 is about $3,550,000.

Table D-24
Ranked Yield Enhancement Projects (Melded Unit Cost < $612 acre-ft)

Project ID	Group[1]	Project	Yield	Recycled Water	Storm Water Recharge Unit Cost	Capital Cost	Total Annual Cost
Recommended MZ3 Projects							
18a	i	CSI Storm Water Basin	81	0	$ 388	$ 440,000	$ 31,612
23a	iv	2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements[2,3]	3,166	2,905	$ 500	$ 19,552,000	$ 1,582,914
25a	i	Sierra	64	0	$ 537	$ 490,000	$ 34,262
27	i	Declez Basin	241	0	$ 1,135	$ 4,070,000	$ 273,720
Total MZ3			**3,552**	**2,905**	**$ 541**	**$ 24,552,000**	**$ 1,922,509**
Recommended MZ2 Projects							
11	i	Victoria Basin[2, 4]	43	120	$ 151	$ 75,000	$ 6,484
7	ii	San Sevaine Basins[2, 5]	642	1,911	$ 217	$ 1,775,000	$ 139,256
12	ii	Lower Day Basin (2010 RMPU)	789	0	$ 242	$ 2,480,000	$ 190,482
14	i	Turner Basin	66	0	$ 916	$ 890,000	$ 60,338
15a	i	Ely Basin	221	0	$ 981	$ 3,200,000	$ 216,362
17a	i	Lower San Sevaine Basin (2010 RMPU)	1,221	0	$ 1,239	$ 22,550,000	$ 1,512,065
Total MZ2			**2,981**	**2,031**	**$ 713**	**$ 30,970,000**	**$ 2,124,987**
Recommended MZ1 Projects							
2	i	Montclair Basins	248	0	$ 415	$ 1,440,000	$ 102,876
Total MZ1			**248**	**0**	**$ 415**	**$ 1,440,000**	**$ 102,876**
Total Recommended Projects			**6,781**	**4,936**	**$ 612**	**$ 56,962,000**	**$ 4,150,372**
Other Projects							
19a	iii	Wineville Basin (2010 RMPU)	2,157	0	$ 184	$ 4,890,000	$ 397,924
20	iii	Jurupa Basin	421	0	$ 369	$ 2,150,000	$ 155,491
22a	ii, iii	RP3 Basin Improvements (2013 RMPU)	137	2,905	$ 915	$ 1,855,000	$ 125,787

Note - color shading within each MZ indicates mutually exclusive projects.

[1] The project group column was created to determine the total yield from different combinations of projects. The group was determined as follows: i- the project can be standalone; ii- the project is mutually exclusive; iii- the project can be standalone but is also included in a multi-project scenario; and iv- the project includes the "iii" group.

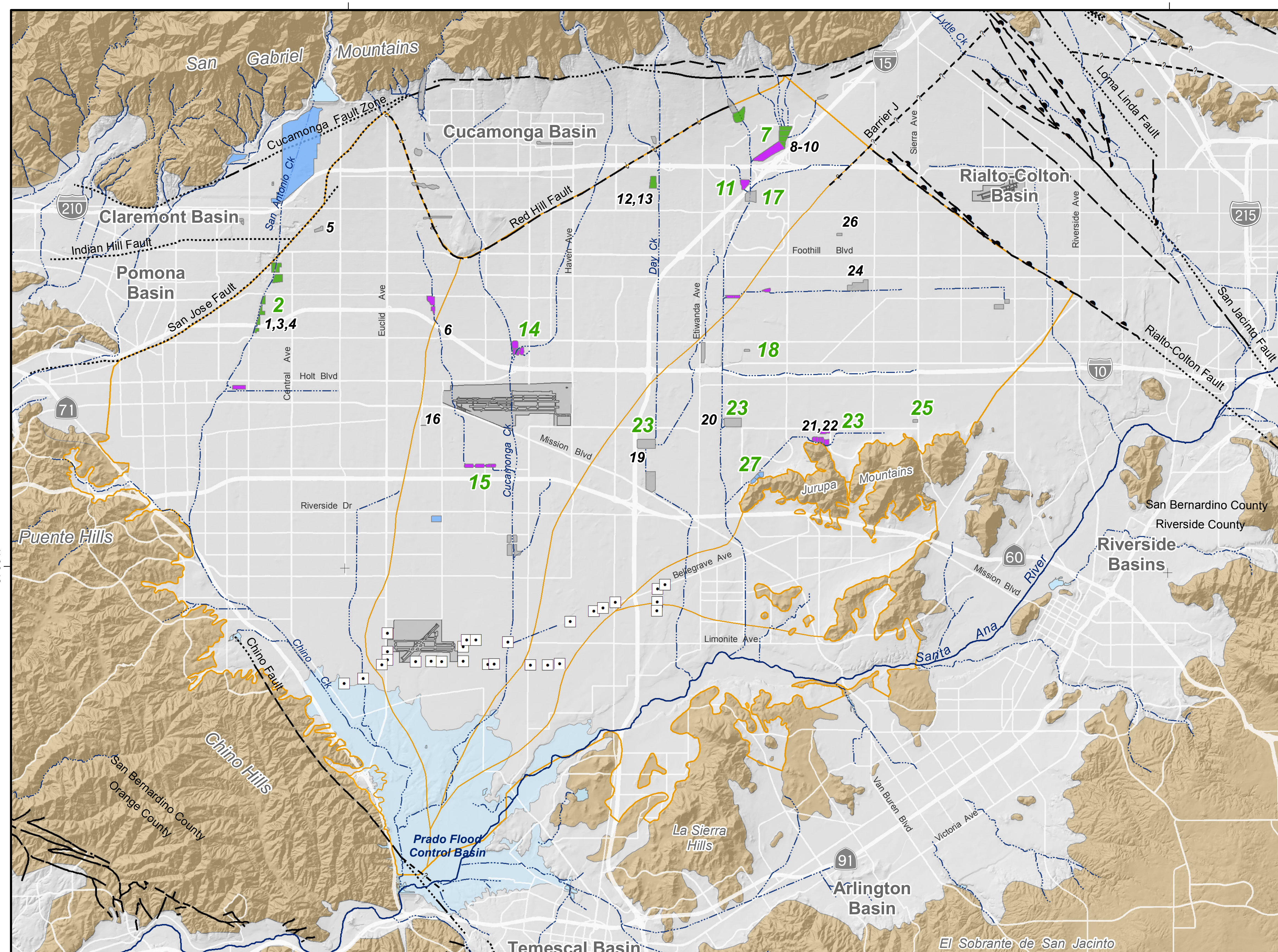
[2] At the July 18, 2013 Steering Committee Meeting, Ryan Shaw (IEUA) indicated that Project IDs 7, 11, and 22a are being recommended to be cost shared and the capital cost shown assumes a 50/50 split of the capital cost per Peace II Agreement Article VIII.

[3] Project ID 23a includes Project IDs 19a, 20, and 22a and associated conveyance facilities. The total capital cost represents an IEUA capital cost share for only Project ID 22a. The capital costs associated with Project IDs 19a and 20 and the associated conveyance facilities were not cost shared. The recycled water recharge shown represents the increase in Project ID 22a. The recycled water recharge associated with Project ID 19a was not included because the project was not recommended to be cost shared by IEUA. The total capital cost of Project ID 23a is about $21,300,000.

[4] The total capital cost for Project ID 11 is about $150,000.

[5] The total capital cost for Project ID 12 is about $3,550,000.

a - Project ID no.'s with an "a" extension indicate that the project includes excavation and haul-off costs, and the capital cost shown assumes that the project's excavation and haul-off costs are reduced by 90 percent with the excavated materials being used in another construction project.



Yield Enhancement Project (Project ID is for locational reference from Table D-1)

A Project ID with a green label is a recommended project (See Table D-24)

Recharge Basins (Symbolized by Recharged Water Type)

- Storm, Imported and Recycled Water
- Storm and Imported Water
- Storm Water
- Incidental Stormwater Only

OBMP Management Zones

Chino Desalter Well

Streams & Flood Control Channels

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

- Location Certain
- Location Approximate
- Approximate Location of Groundwater Barrier
- Location Concealed
- Location Uncertain

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Author: MJC

Date: 20130612

File: Figure_8-_WQ.mxd

0 1 2 3 4 5 Miles

0 2 4 6 8 KM

2013 Amendment to the 2010 RMPU

Location of the Projects that Were Analyzed in Detail

Figure D-1

Figure D-2a

Time Series Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume -- Upland Basin

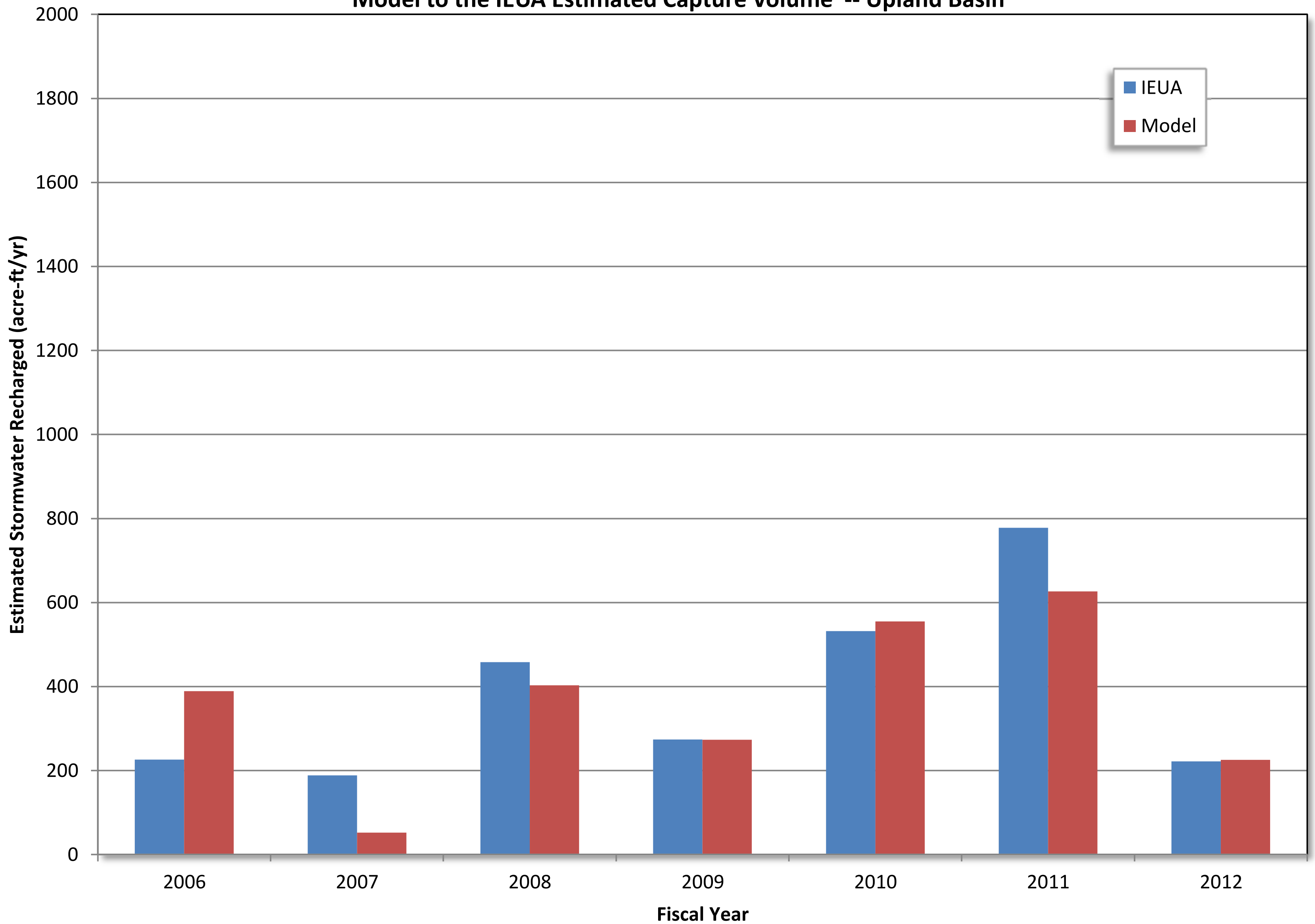

Figure D-2b
Scatter Plot Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume -- Upland Basin

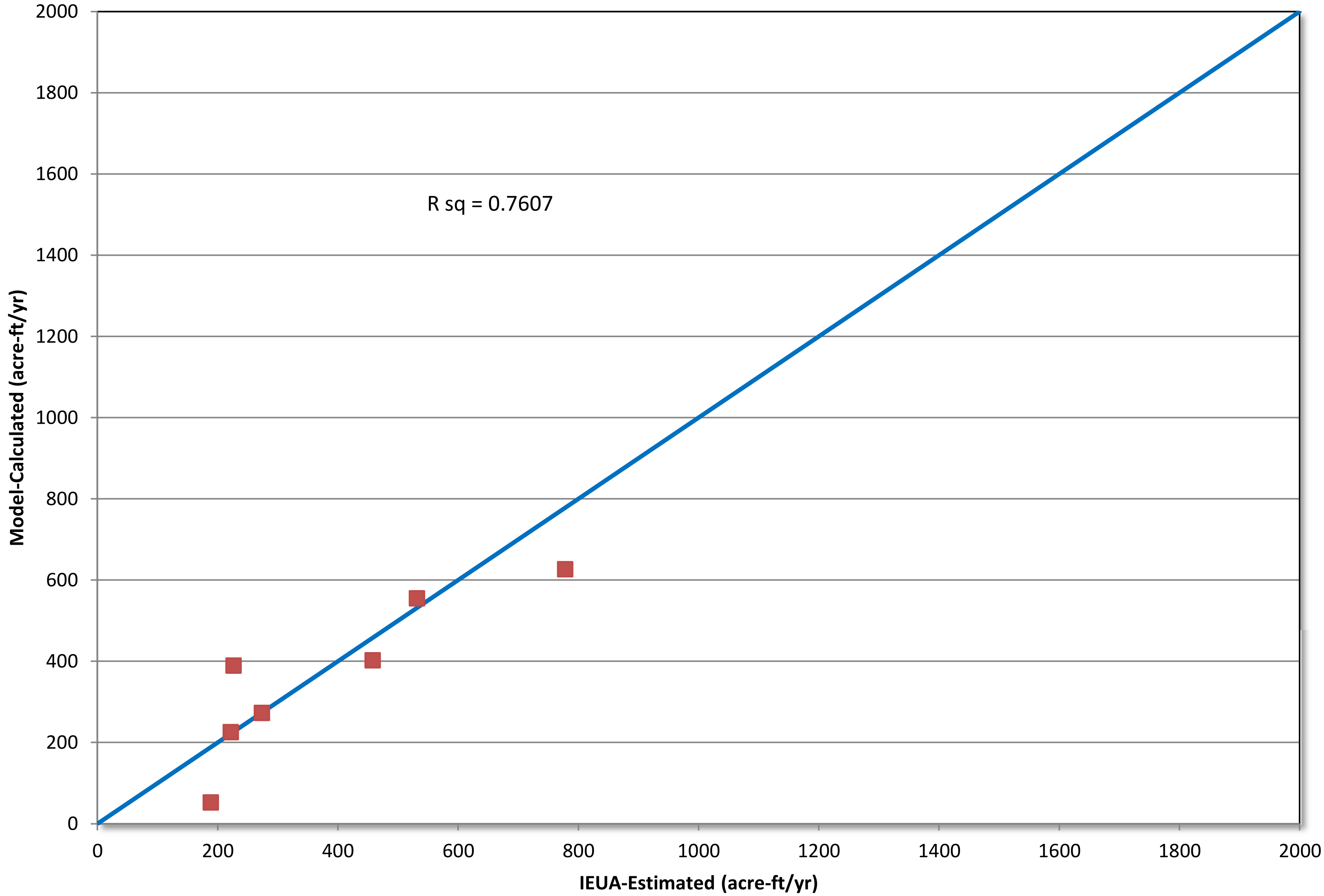

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Figure D-3a

Time Series Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume -- Montclair Basins

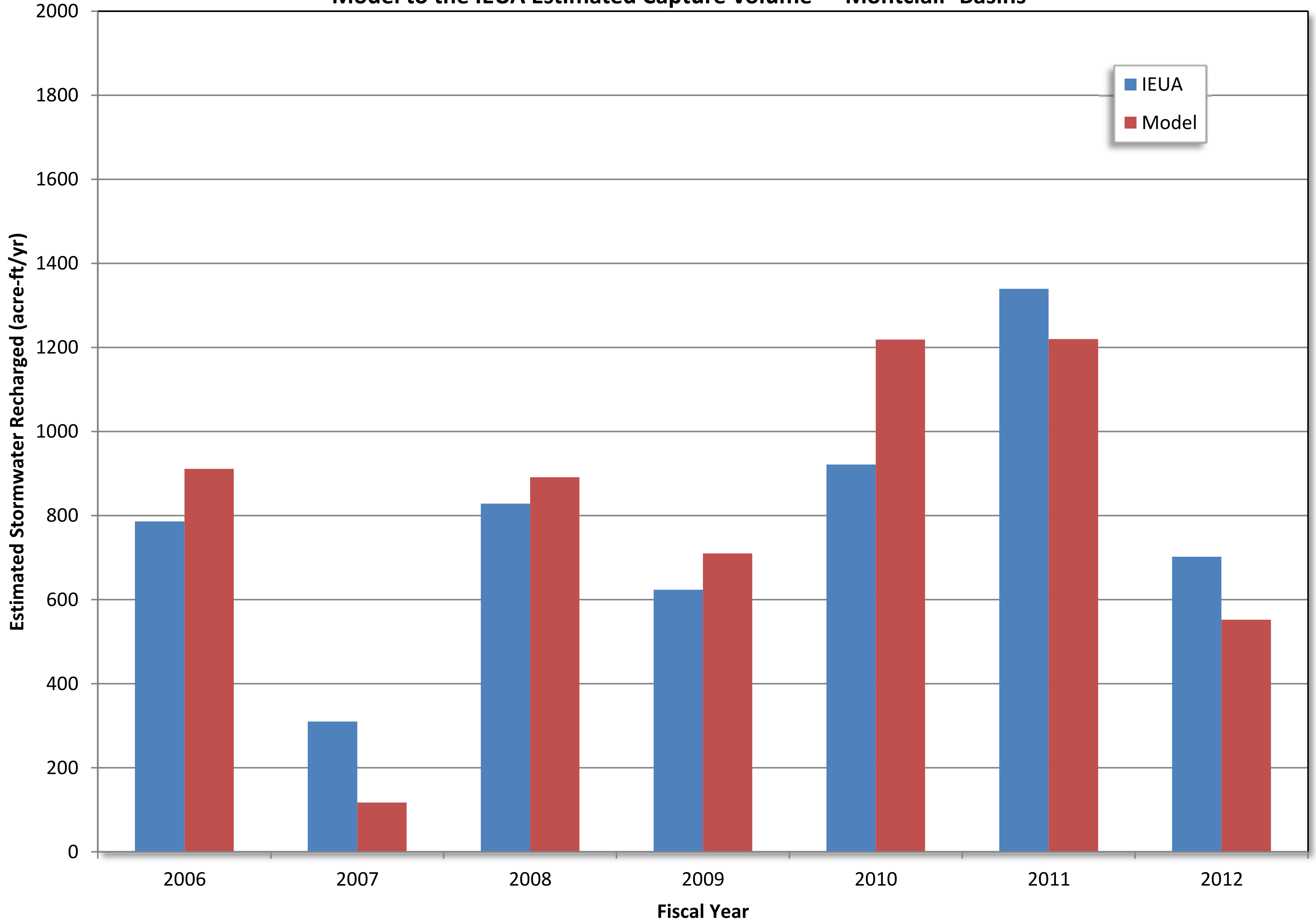
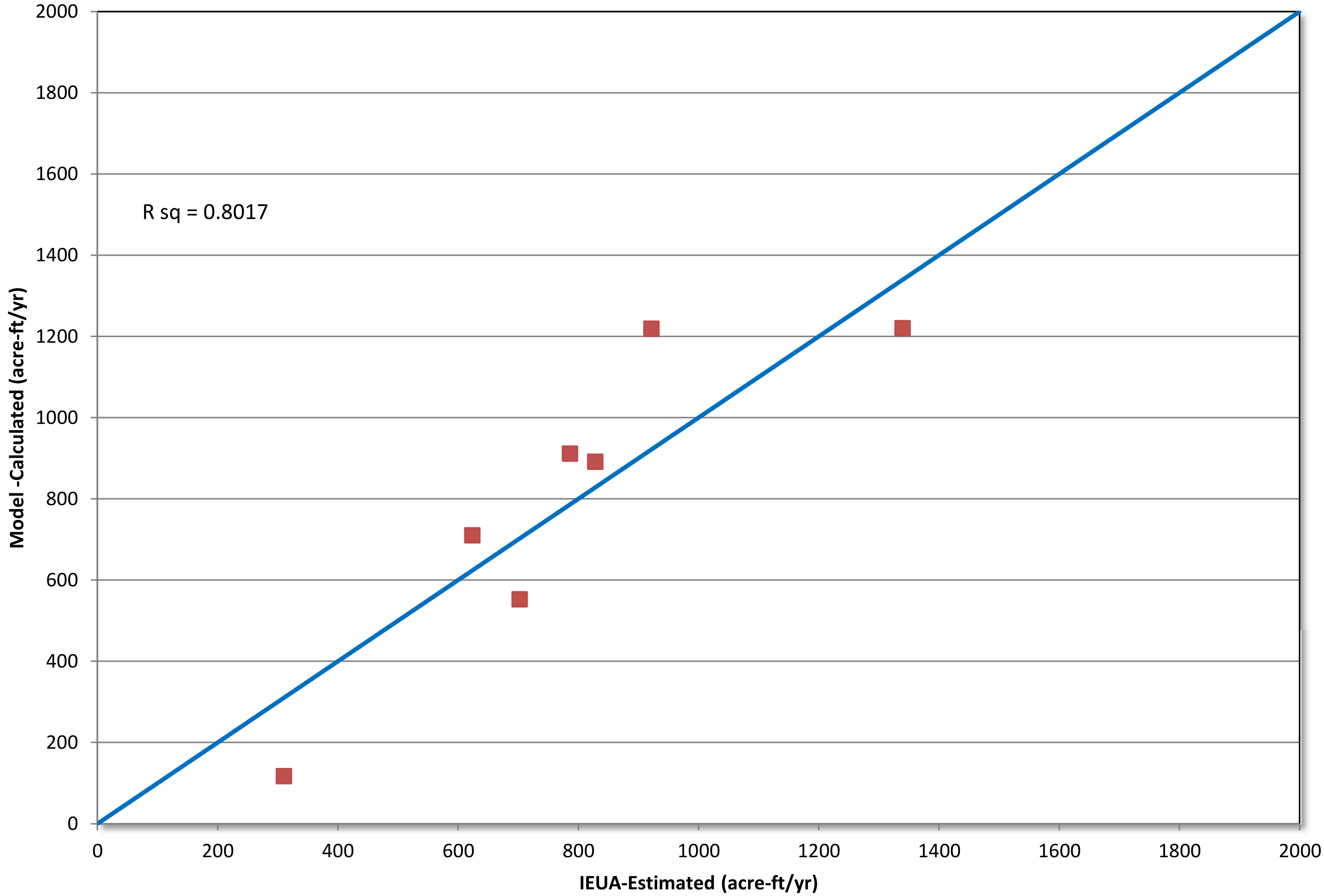


Figure D-3b
Scatter Plot Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume -- Montclair Basins



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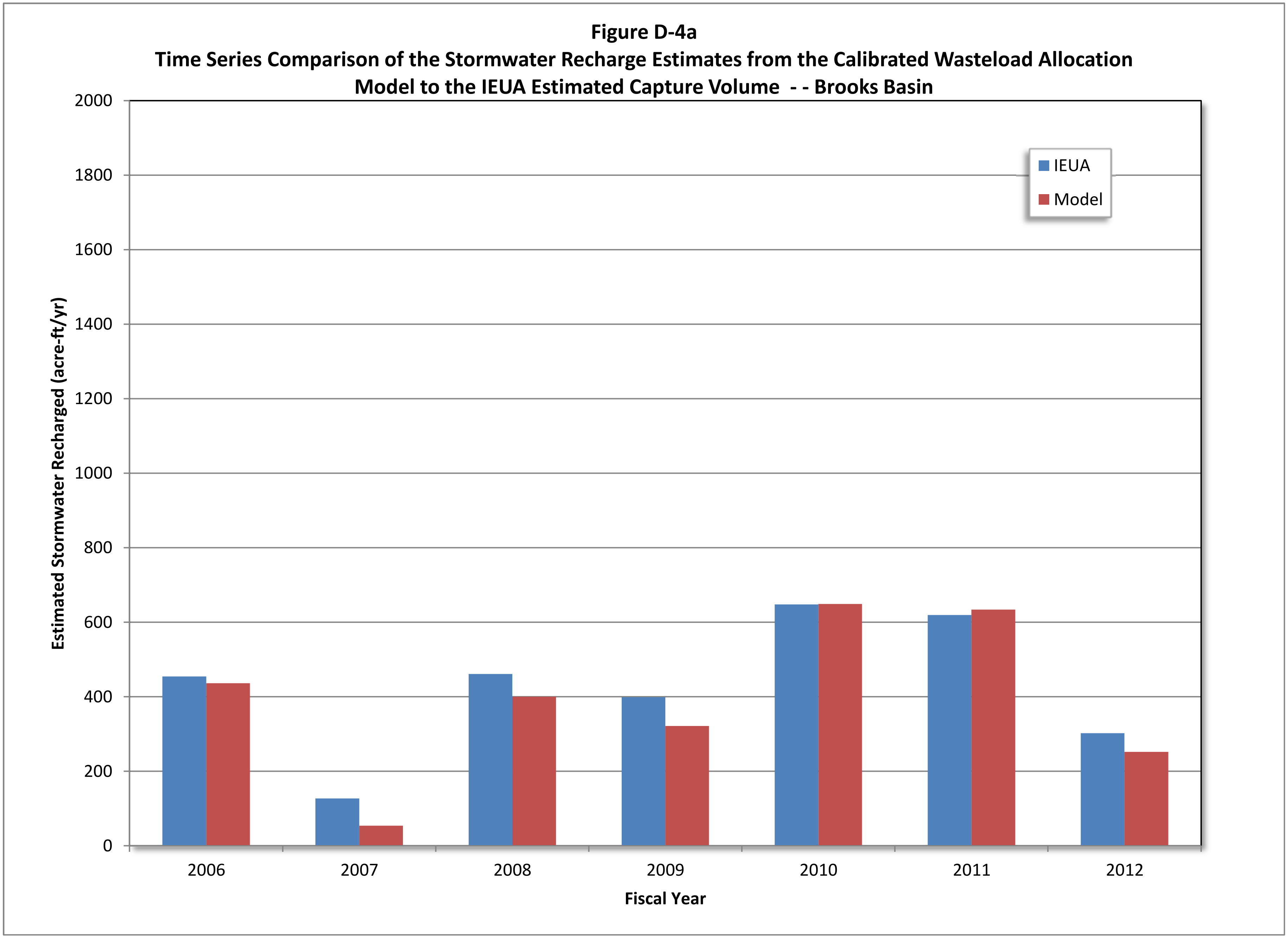

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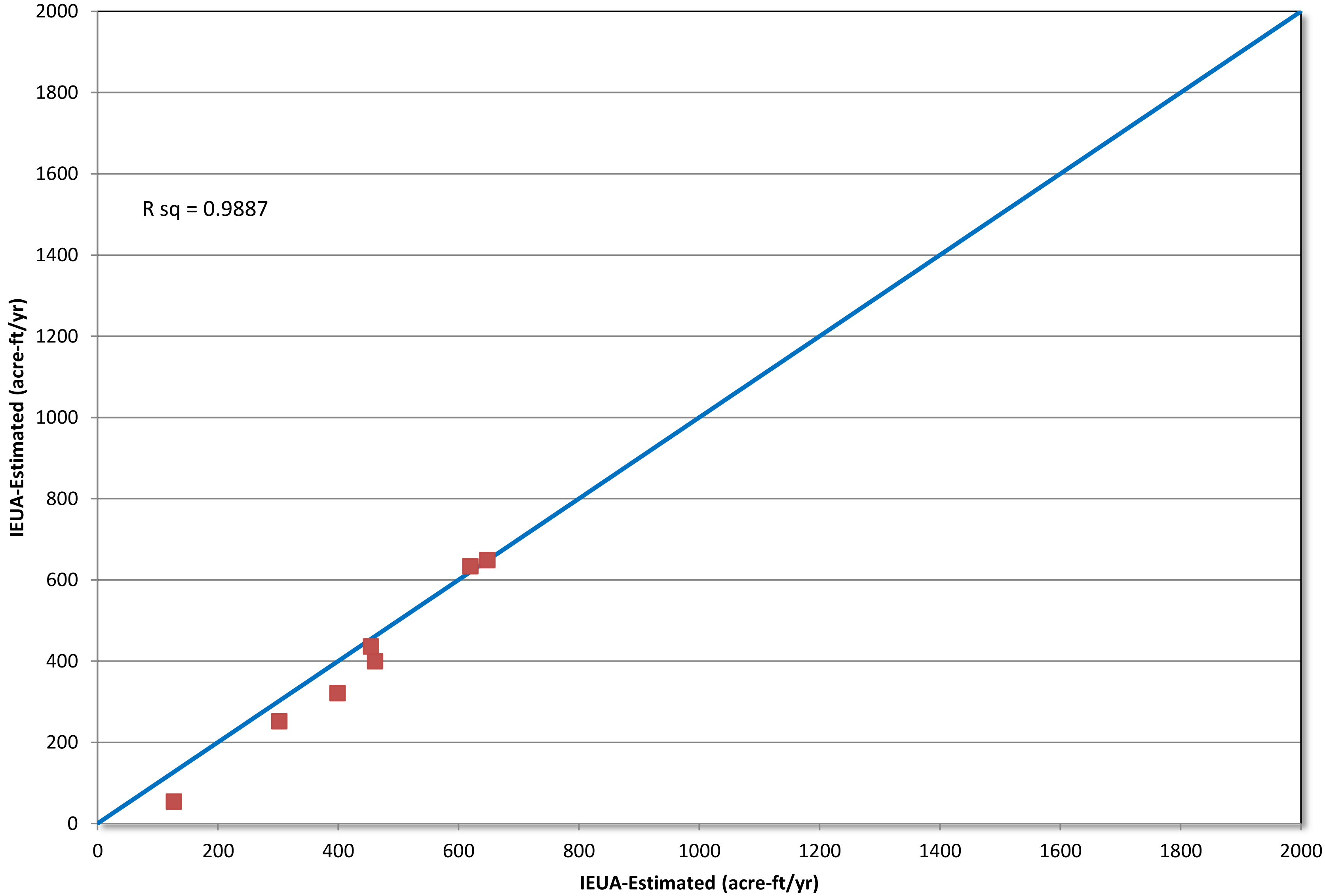
Figure D-4b
Scatter Plot Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume -- Brooks Basin



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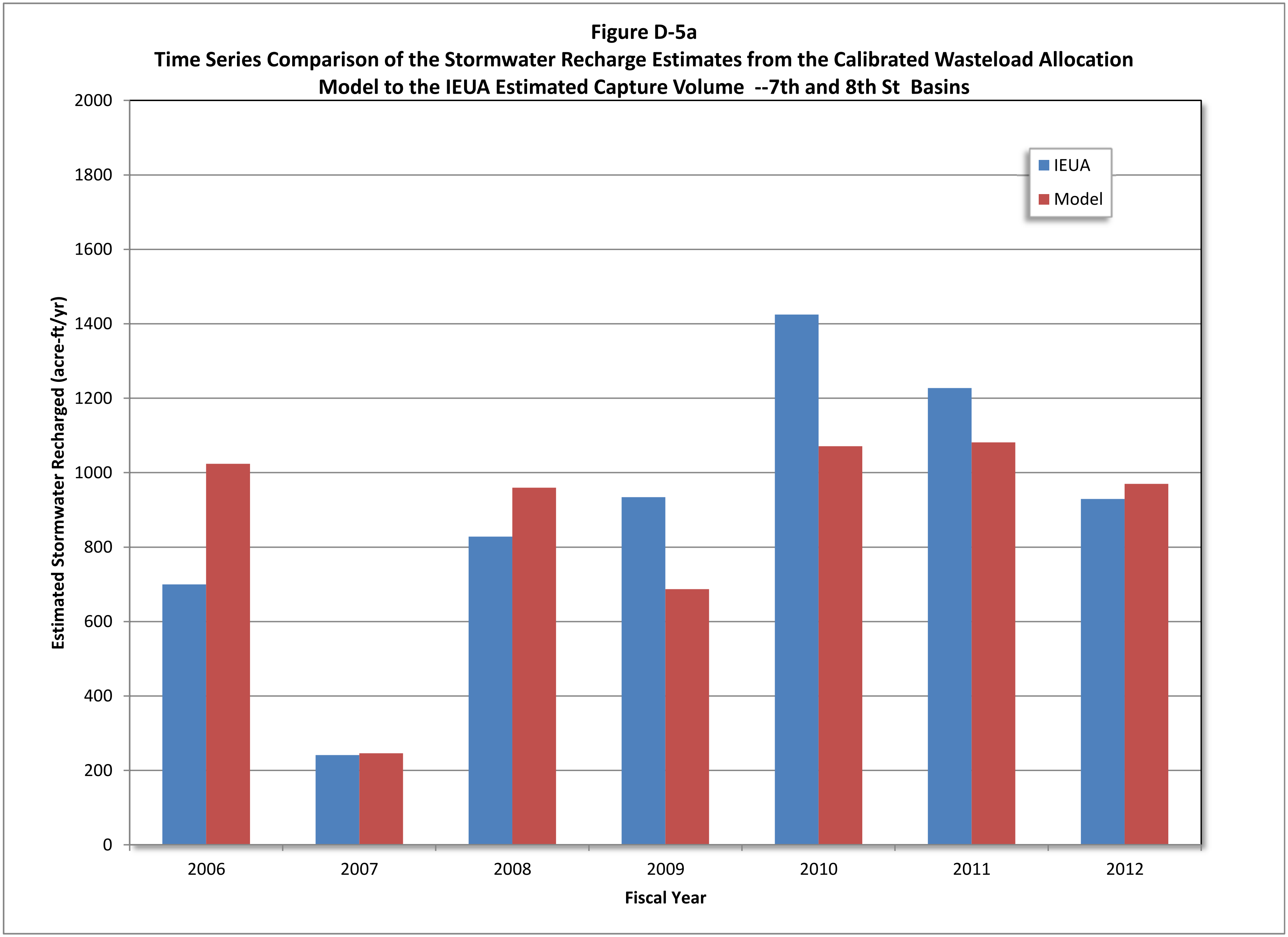

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Figure D-5b

Scatter Plot Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume -- 7th and 8th St Basis

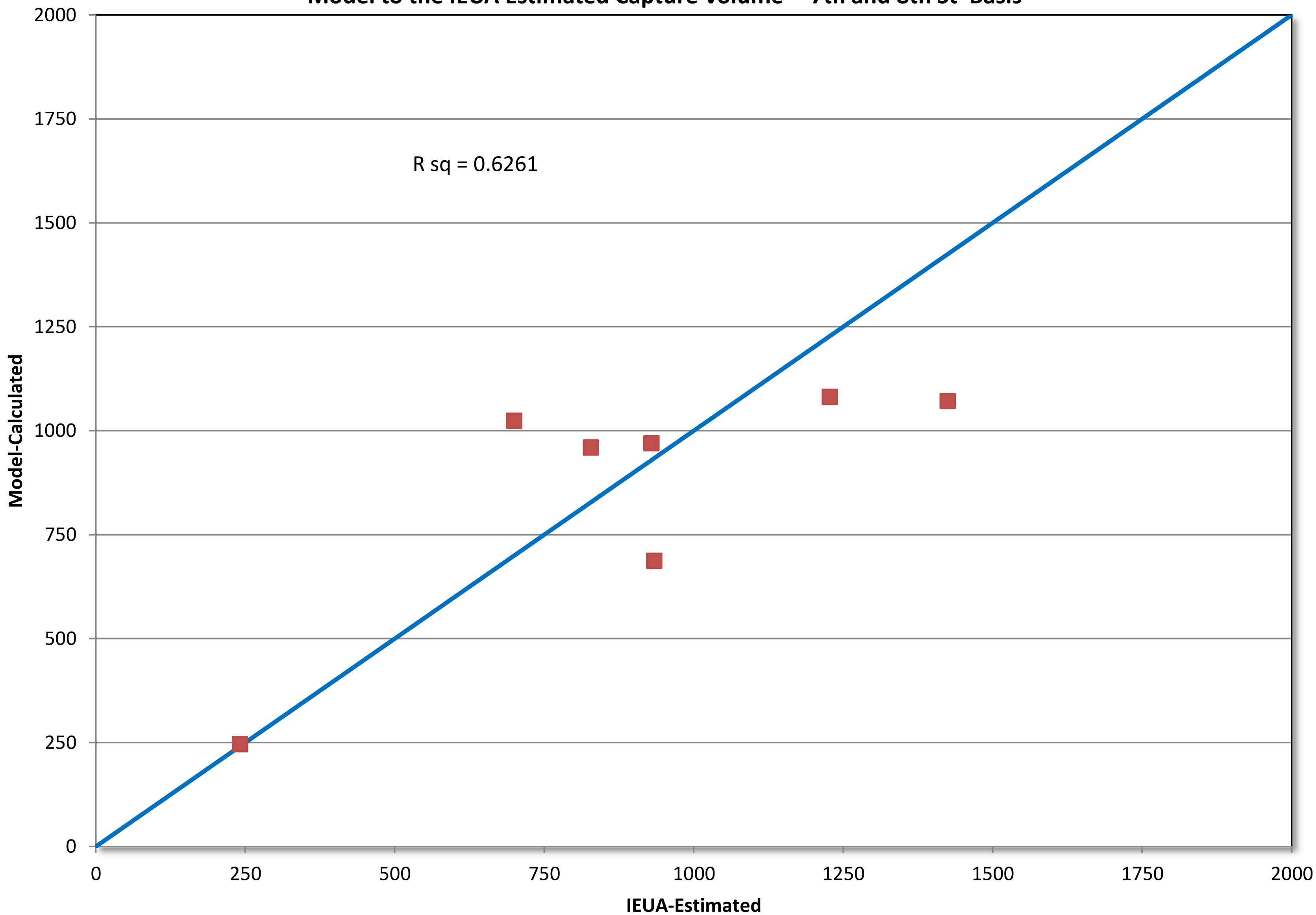

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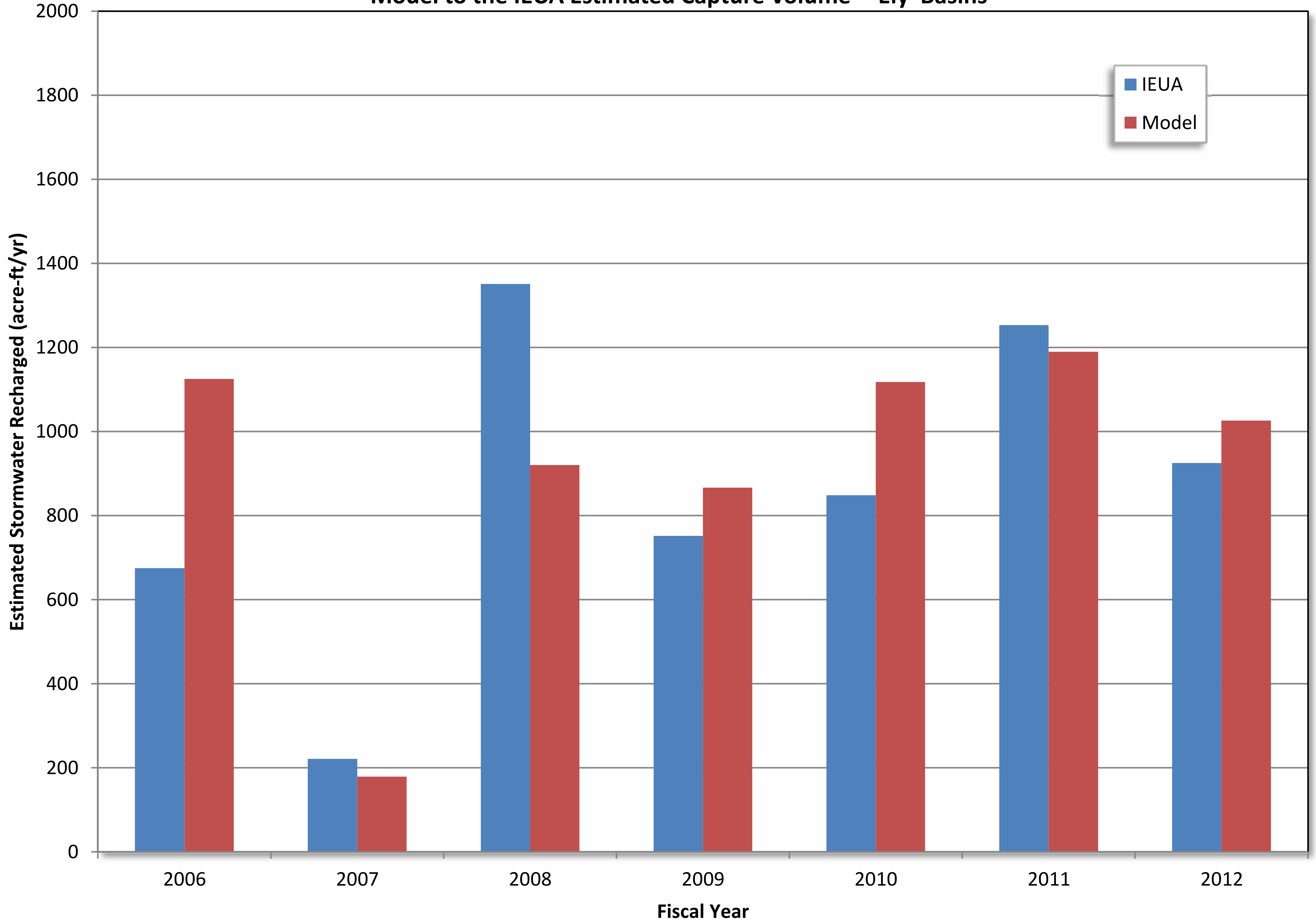
Figure D-6a
Time Series Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume --Ely Basins



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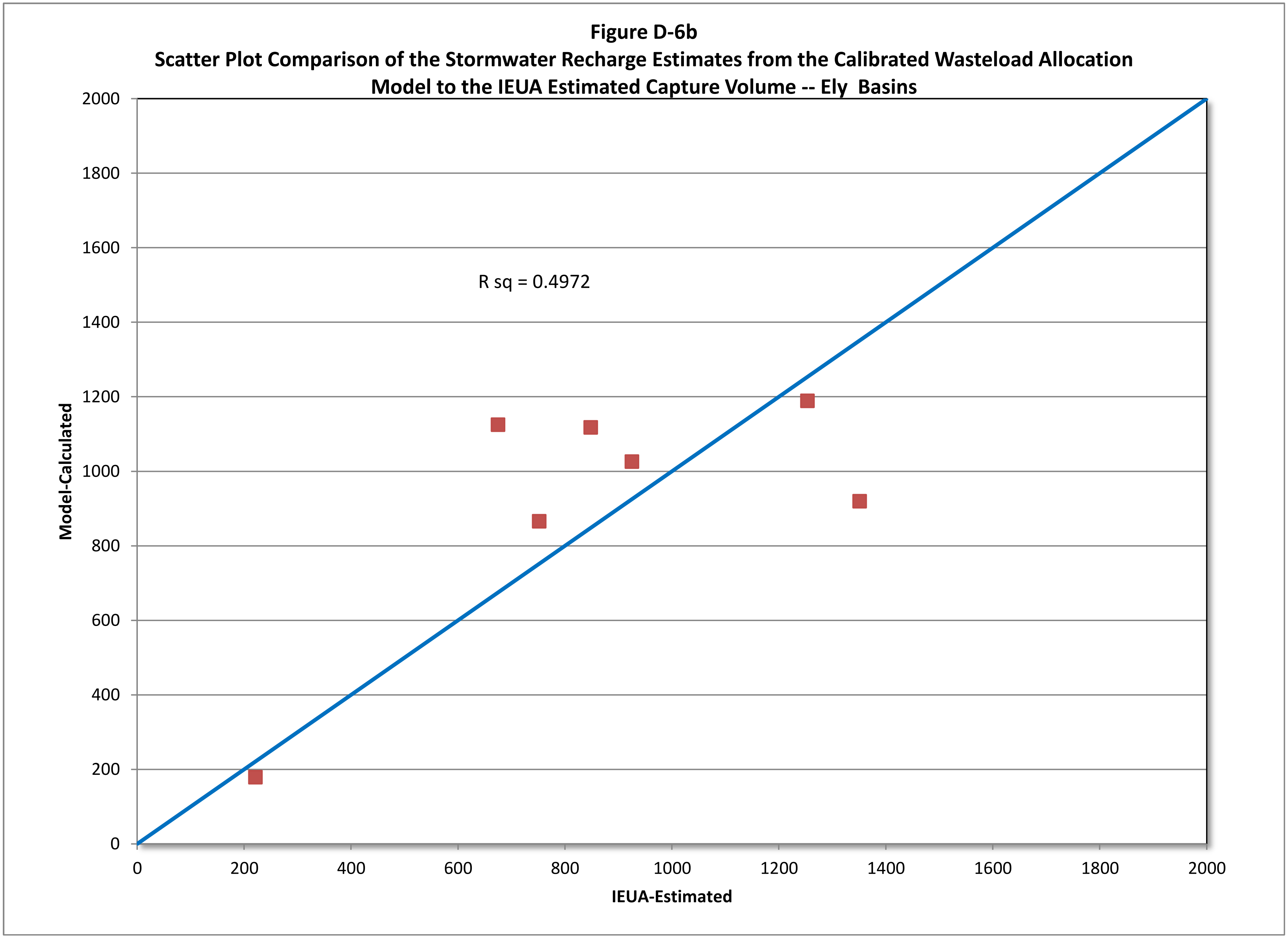

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Figure D-7a
Time Series Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume --Turner Basins

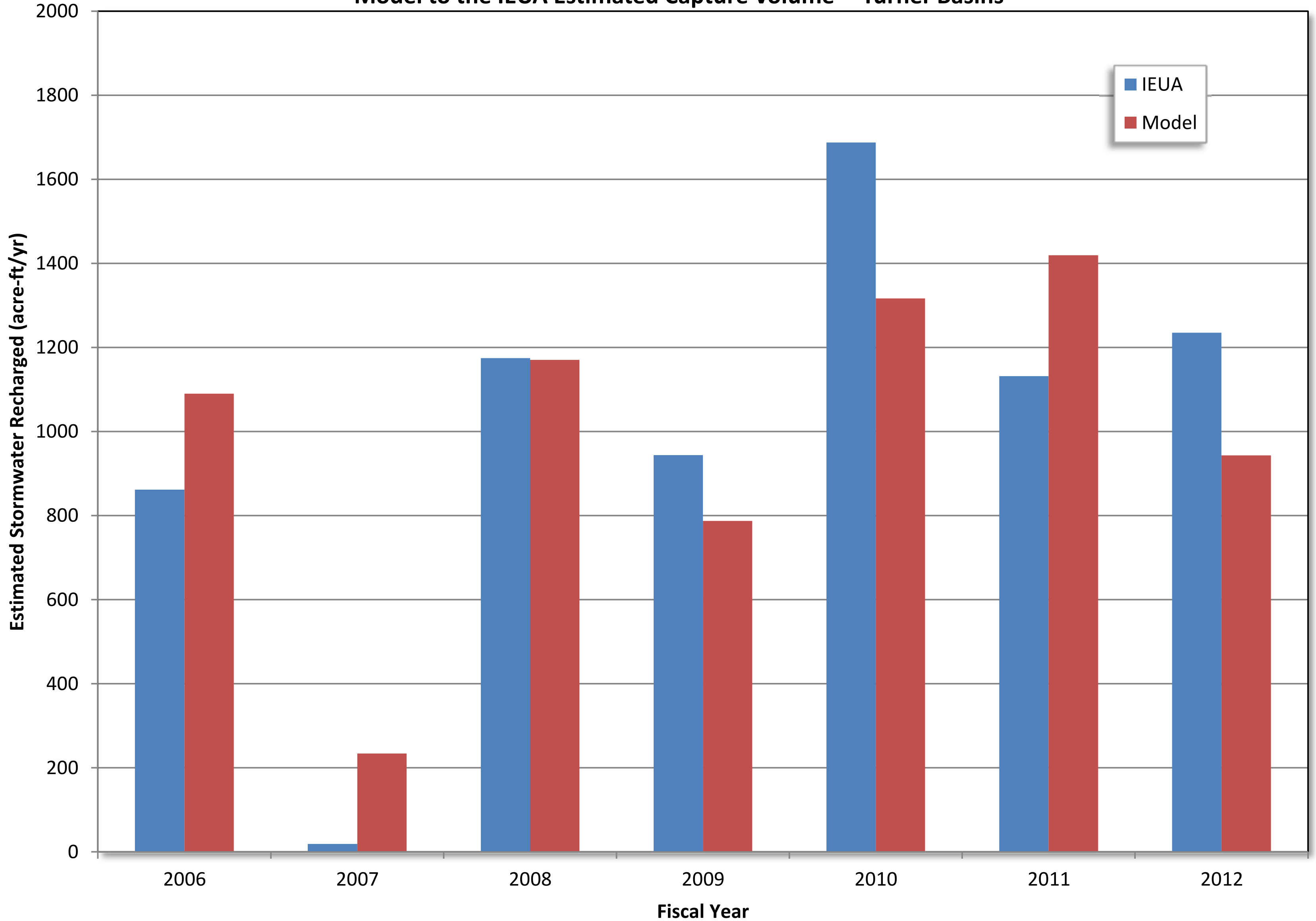

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Figure D-7b
Scatter Plot Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume -- Turner Basins

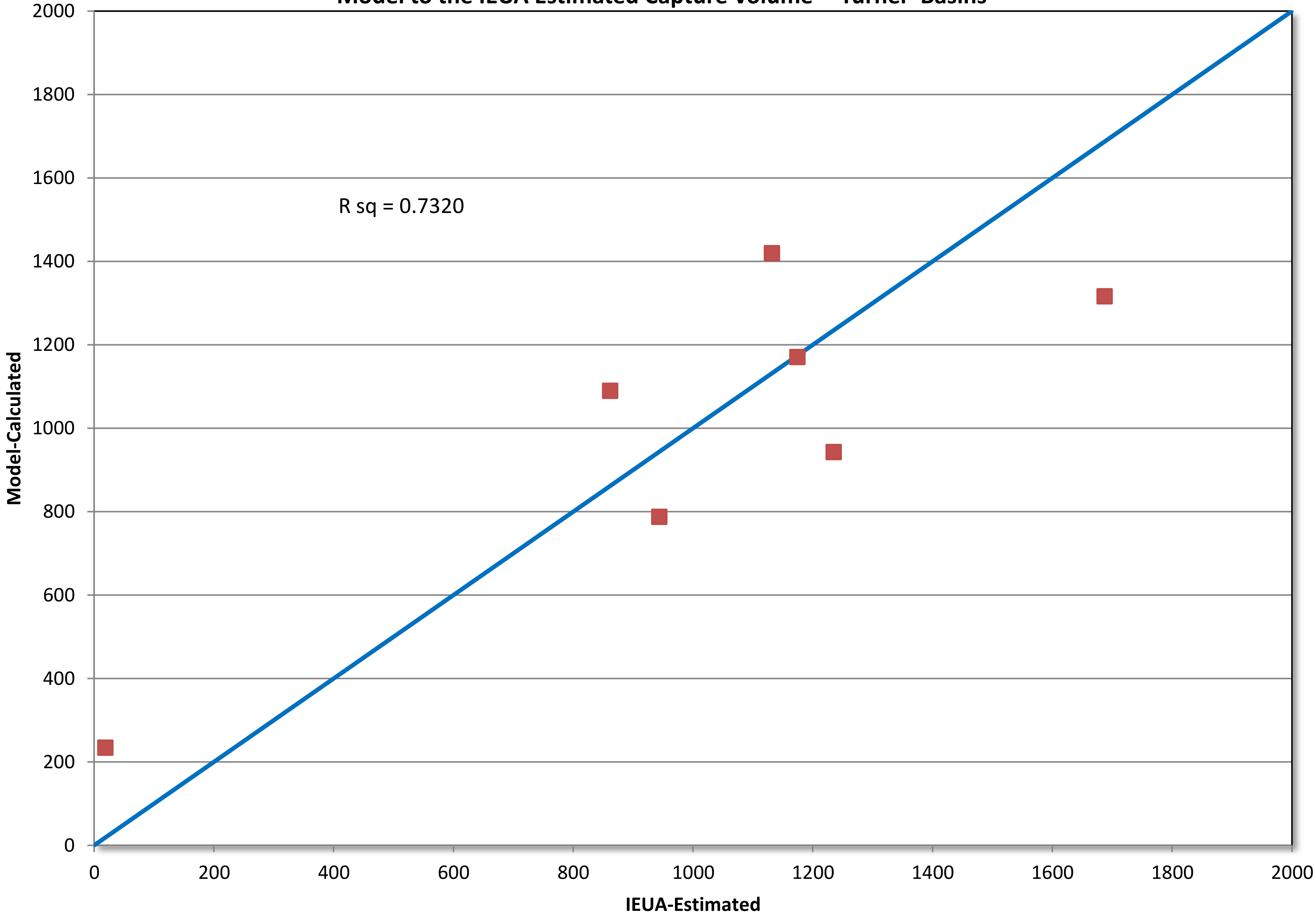

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Figure D-8a
Time Series Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume --Lower Day Basin

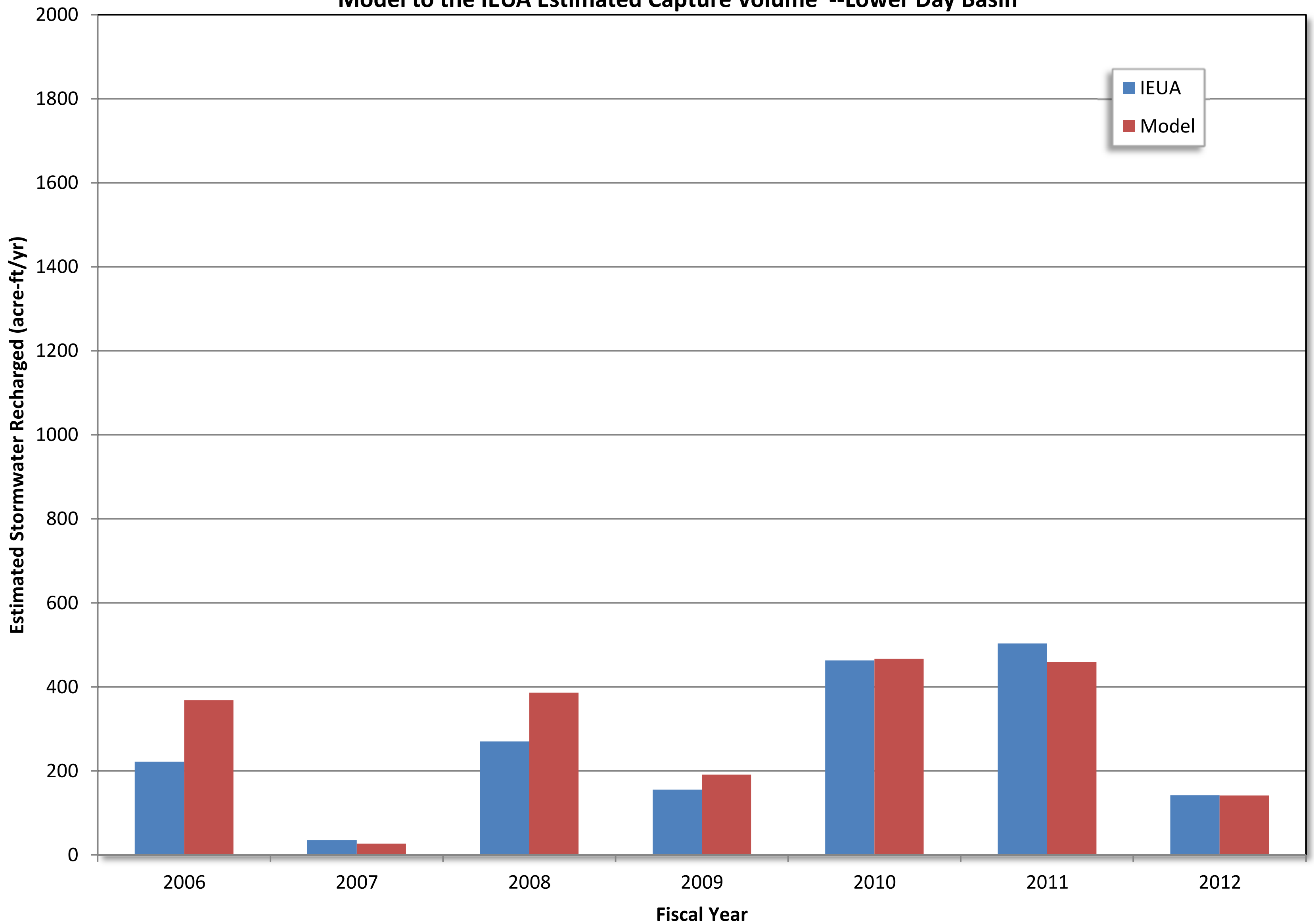

Figure D-8b

Scatter Plot Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume -- Lower Day Basin

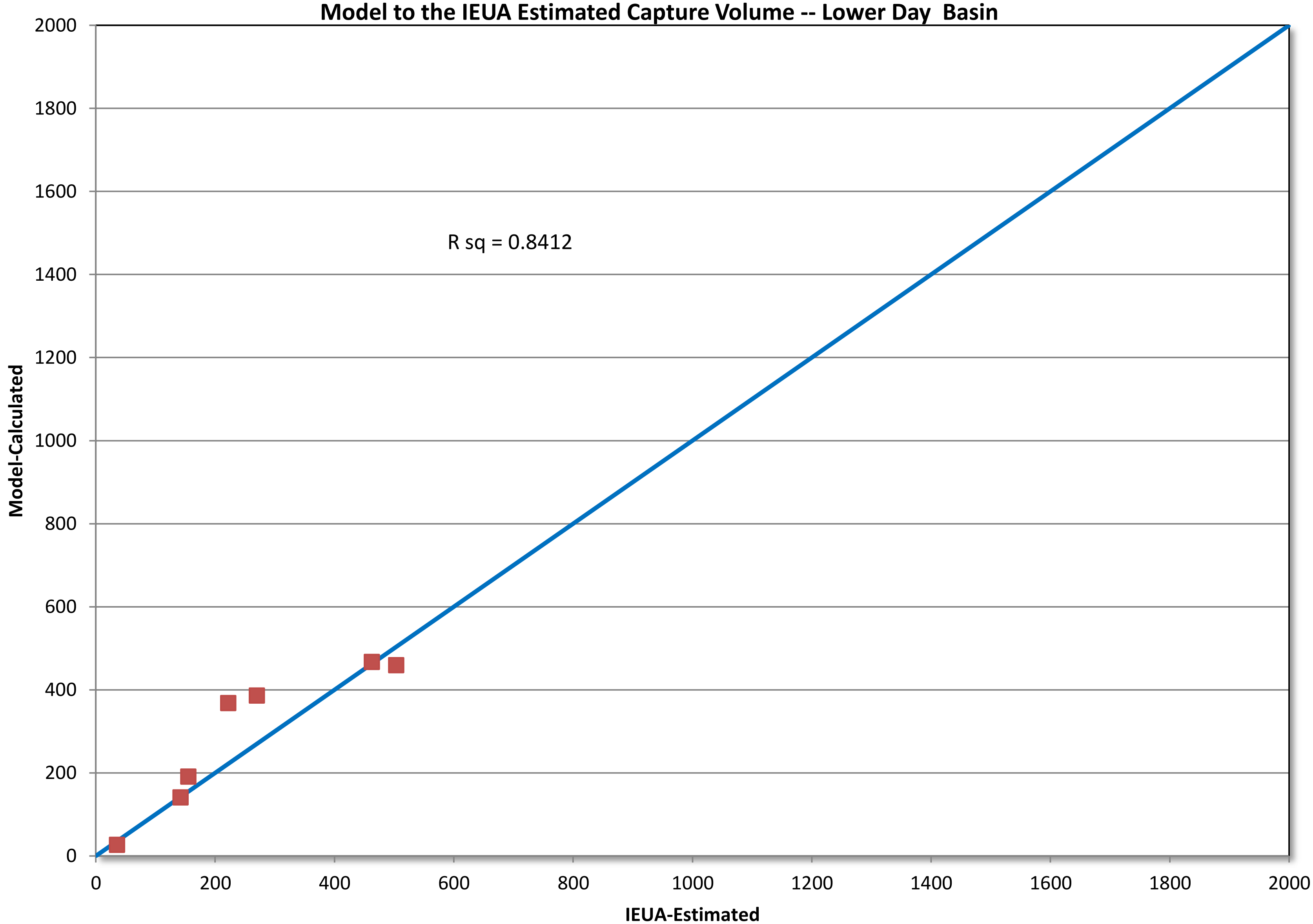

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Figure D-9a
Time Series Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume --Etiwanda Debris Basin

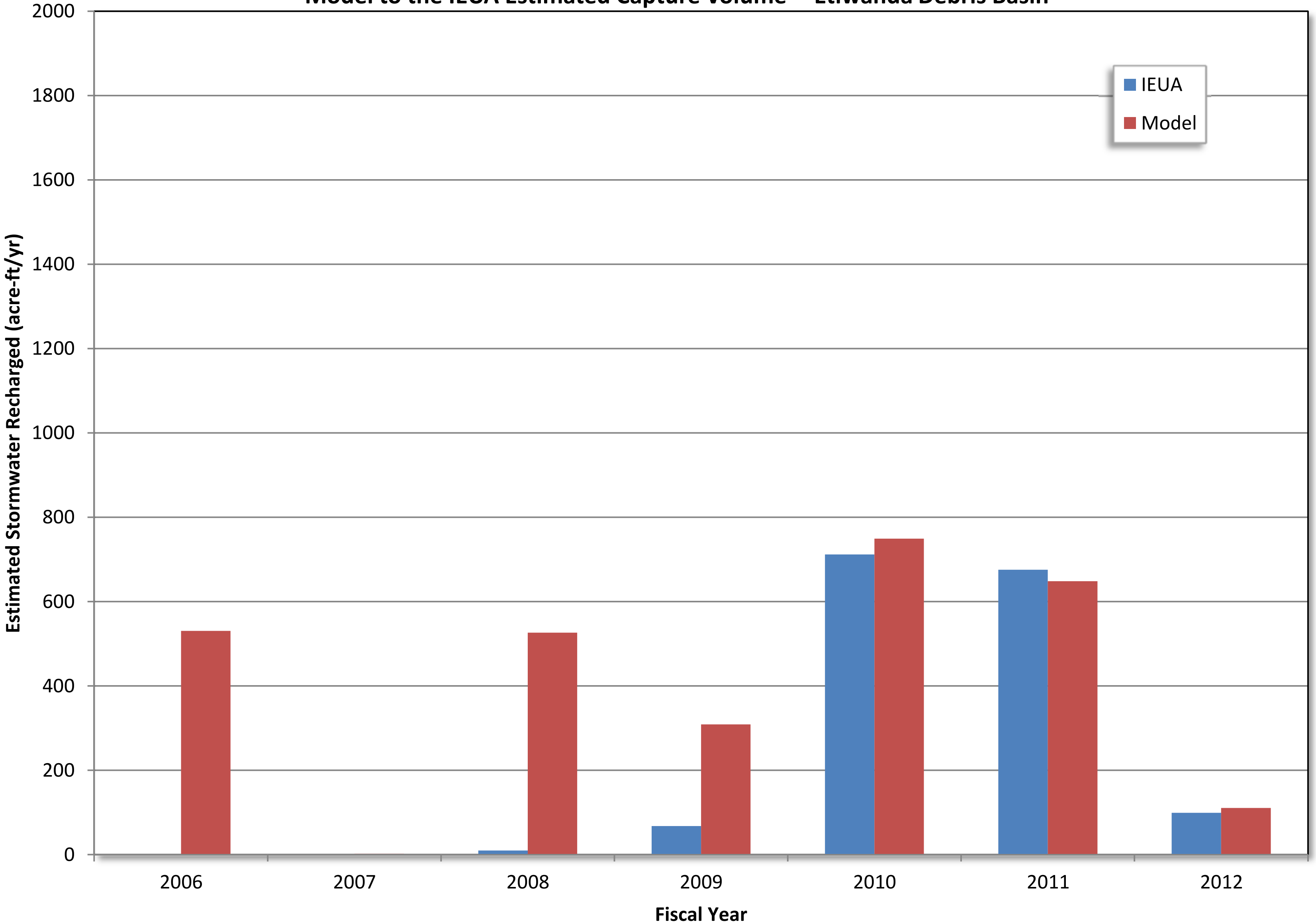


Figure D-9b

Scatter Plot Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume --Etiwanda Debris Basin

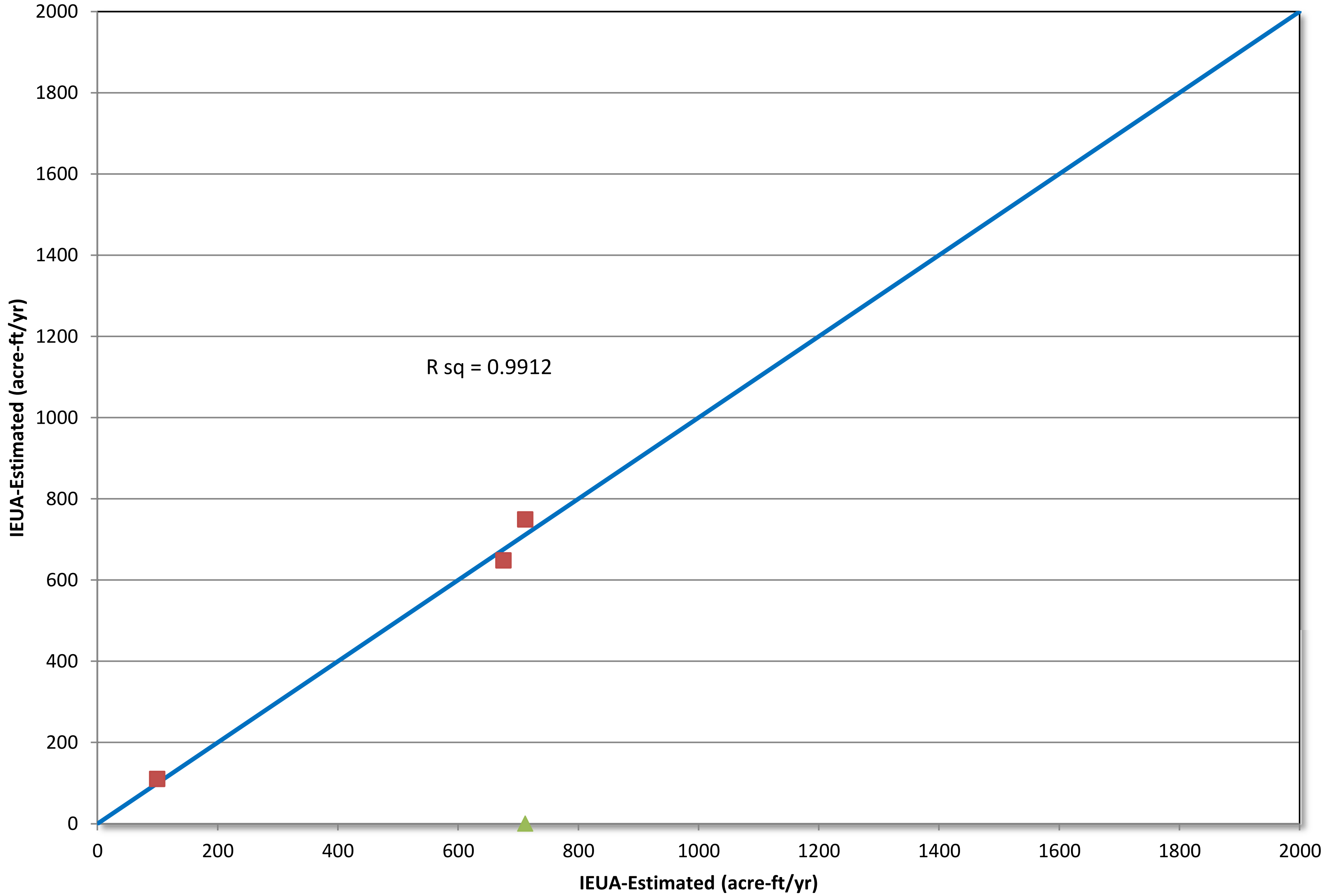


Figure D-10a
Time Series Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume --Victoria Basin

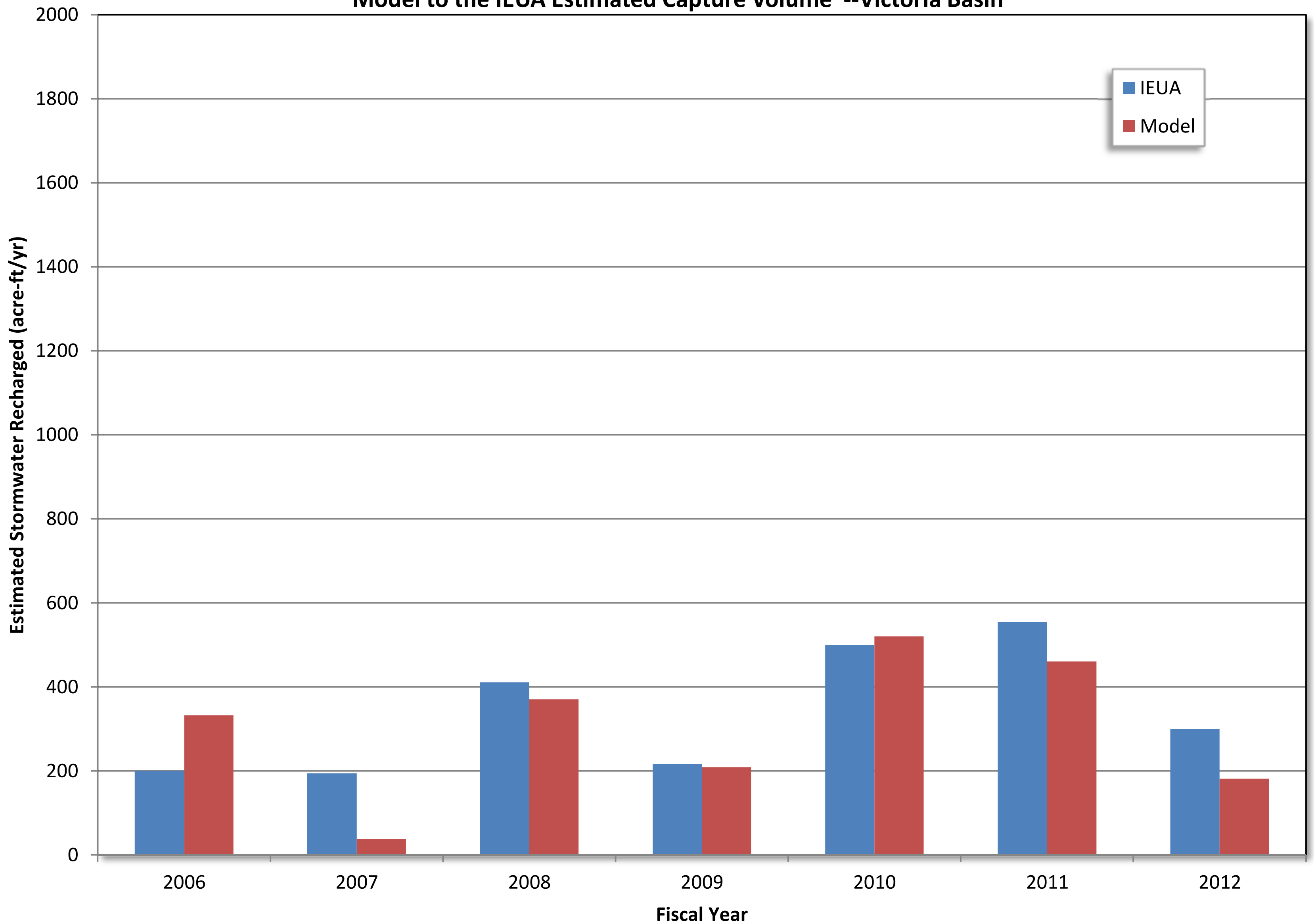
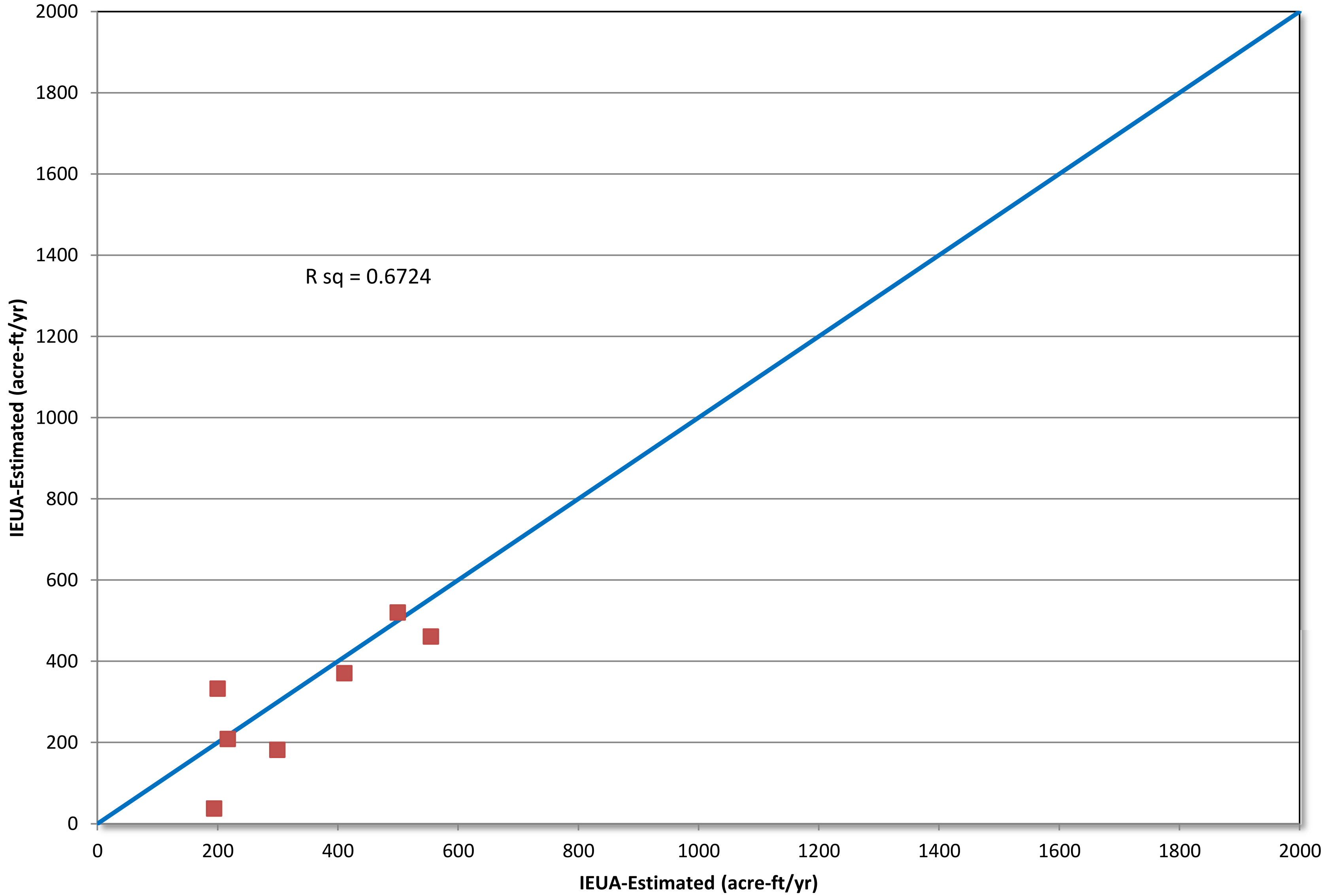


Figure D-10b
Scatter Plot Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume -- Victoria Basin



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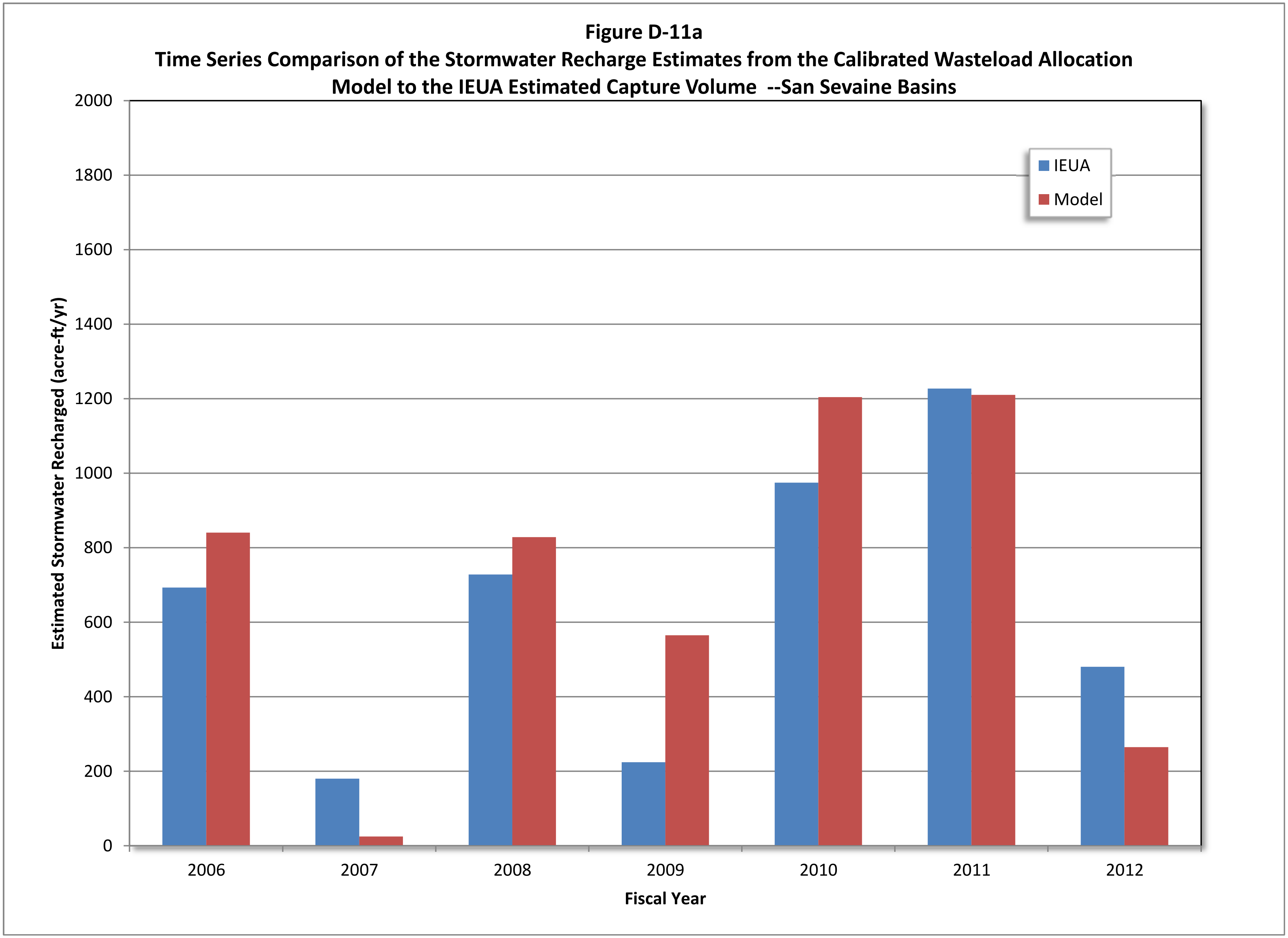
Figure D-11a
Time Series Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume --San Sevaine Basins
Estimated Stormwater Recharged (acre-ft/yr)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
IEUA
Model
2006
2007
2008
2009
2010
2011
2012
Fiscal Year

Figure D-11b

Scatter Plot Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume -- San Sevaine Basins

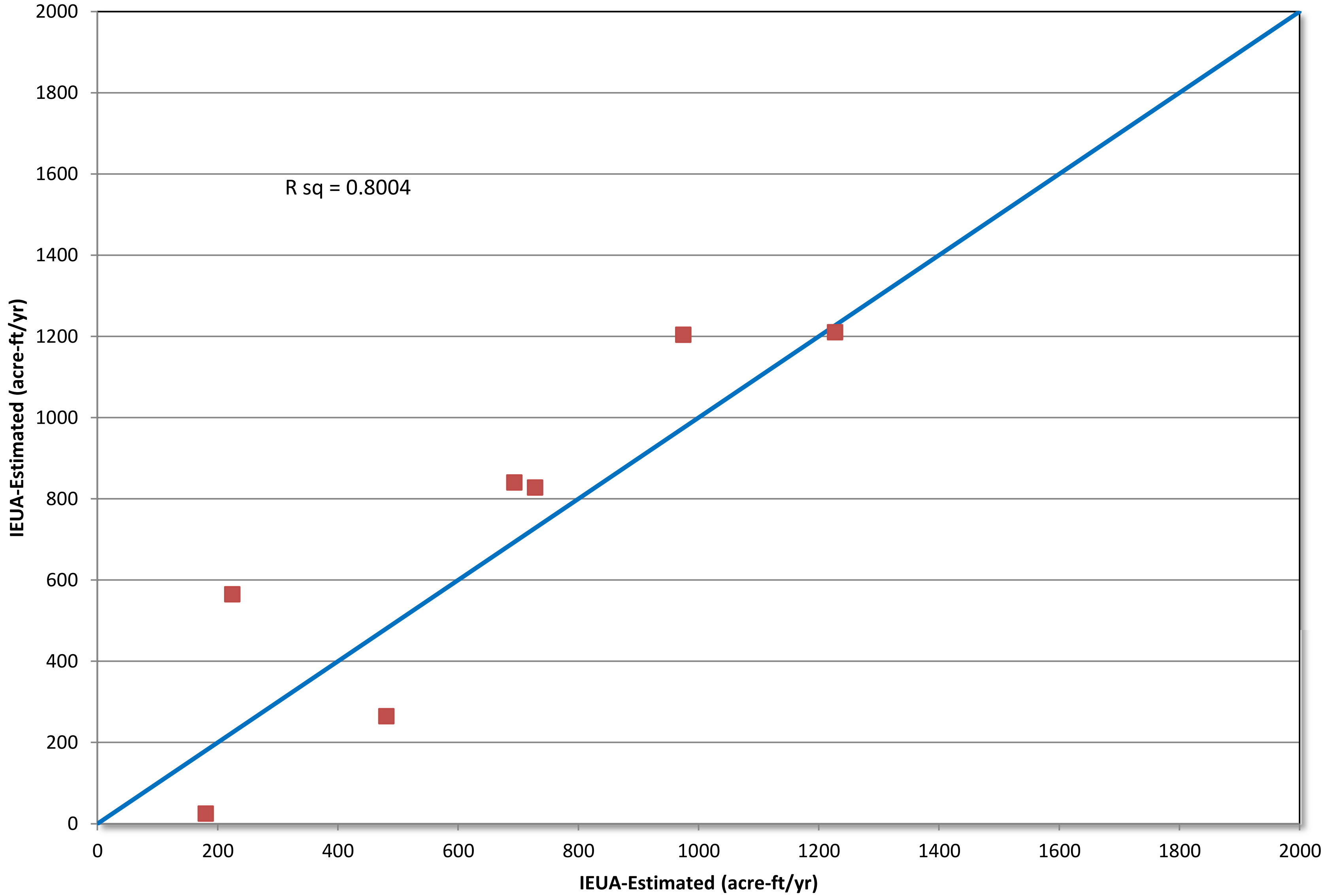

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Figure D-12a
Time Series Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume --Banana and Hickory Basins

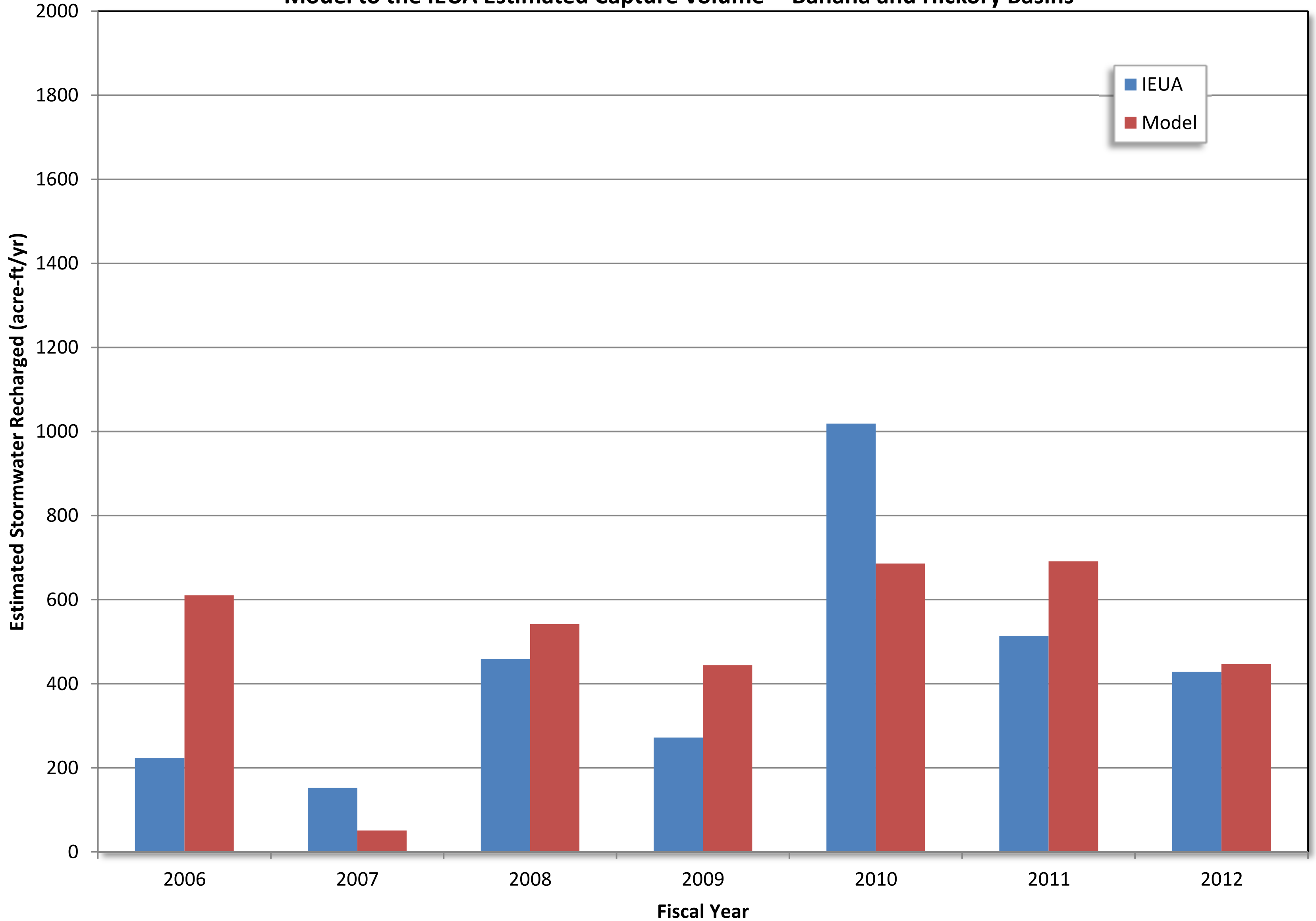

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Figure D-12b
Scatter Plot Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume -- Banana and Hickory Basins

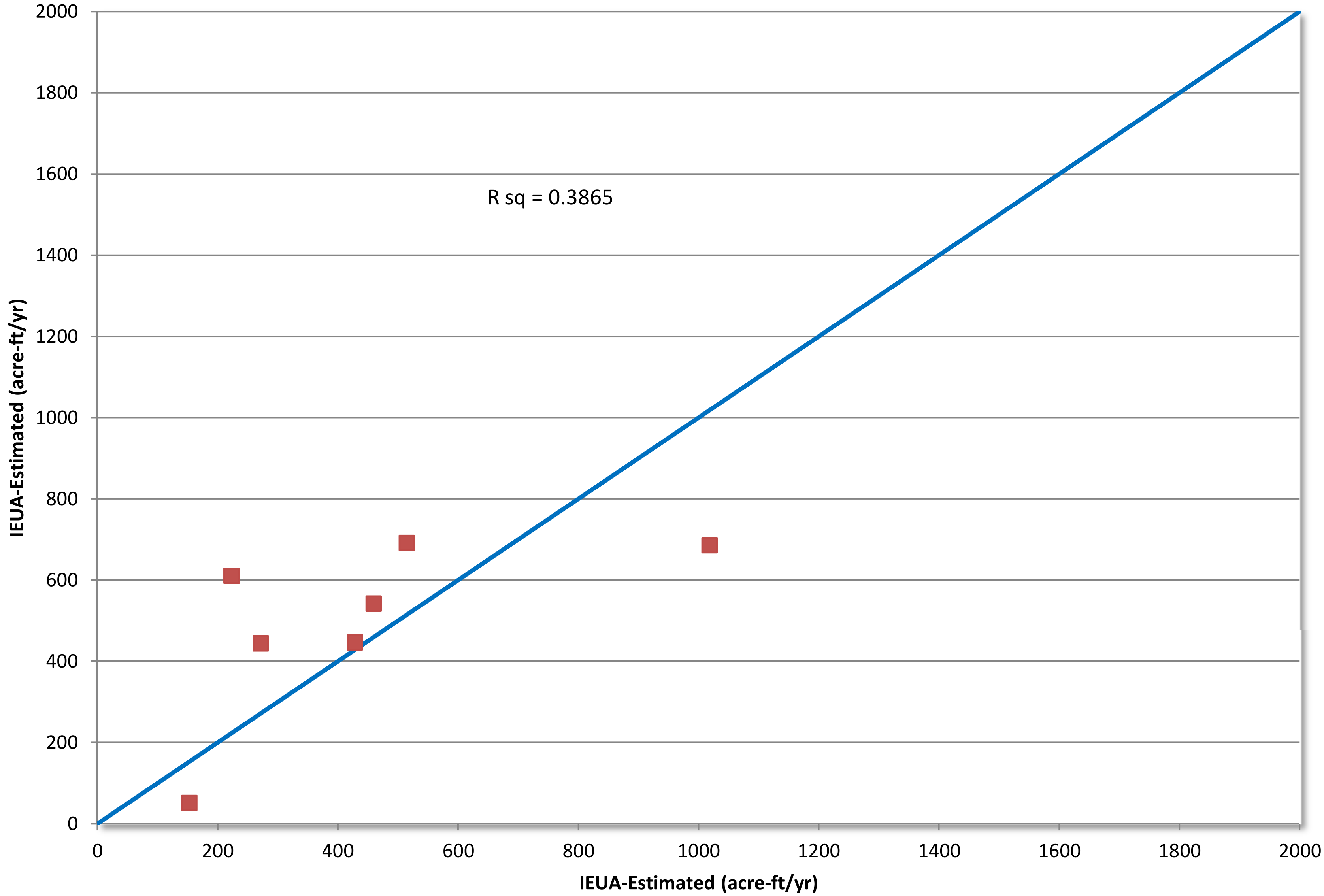

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Figure D-13a
Time Series Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume --RP3 Basins (3a ,3b, 4a, 4b)

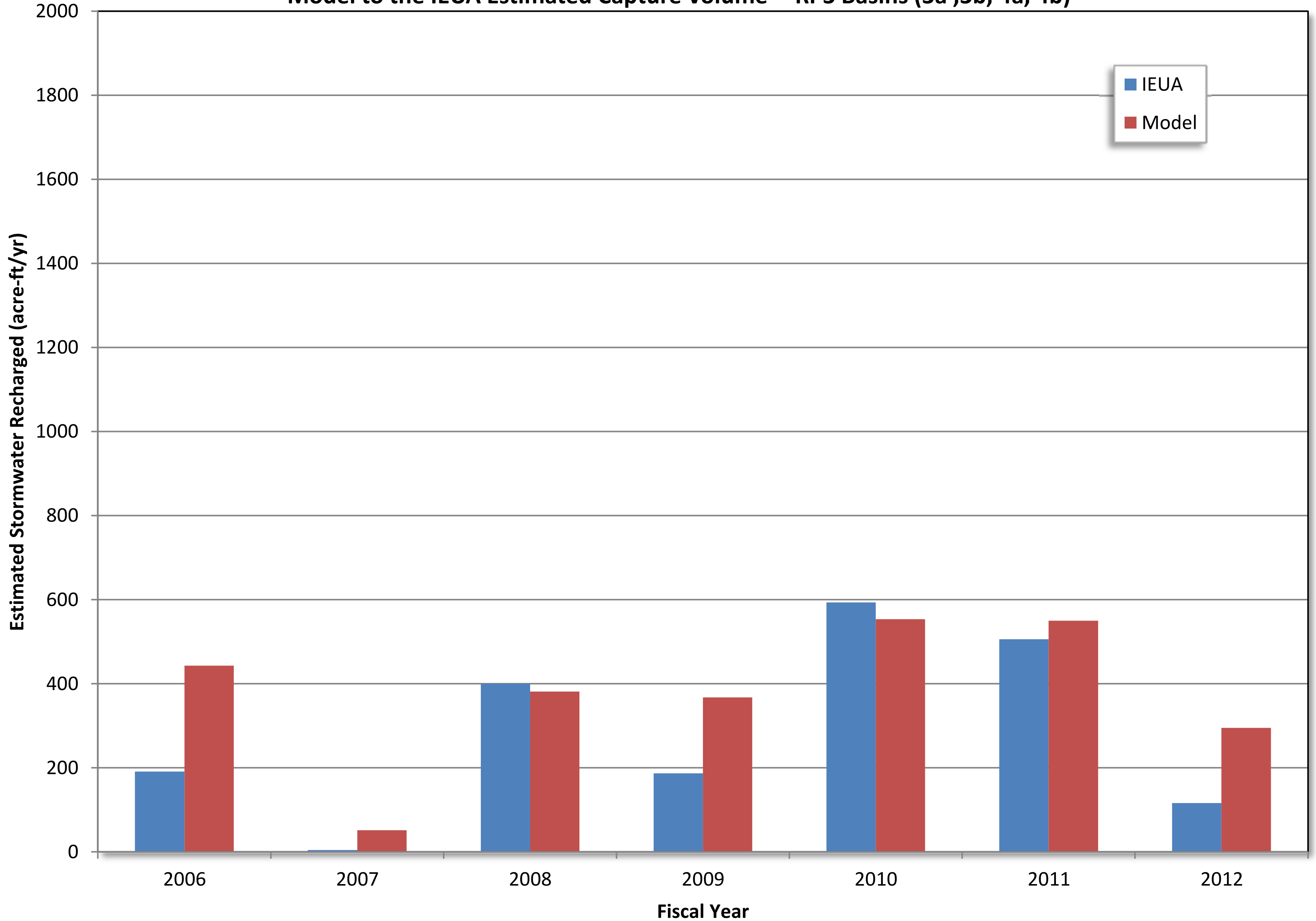

Figure D-13b

Scatter Plot Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume -- RP3 Basins (3a ,3b, 4a, 4b)

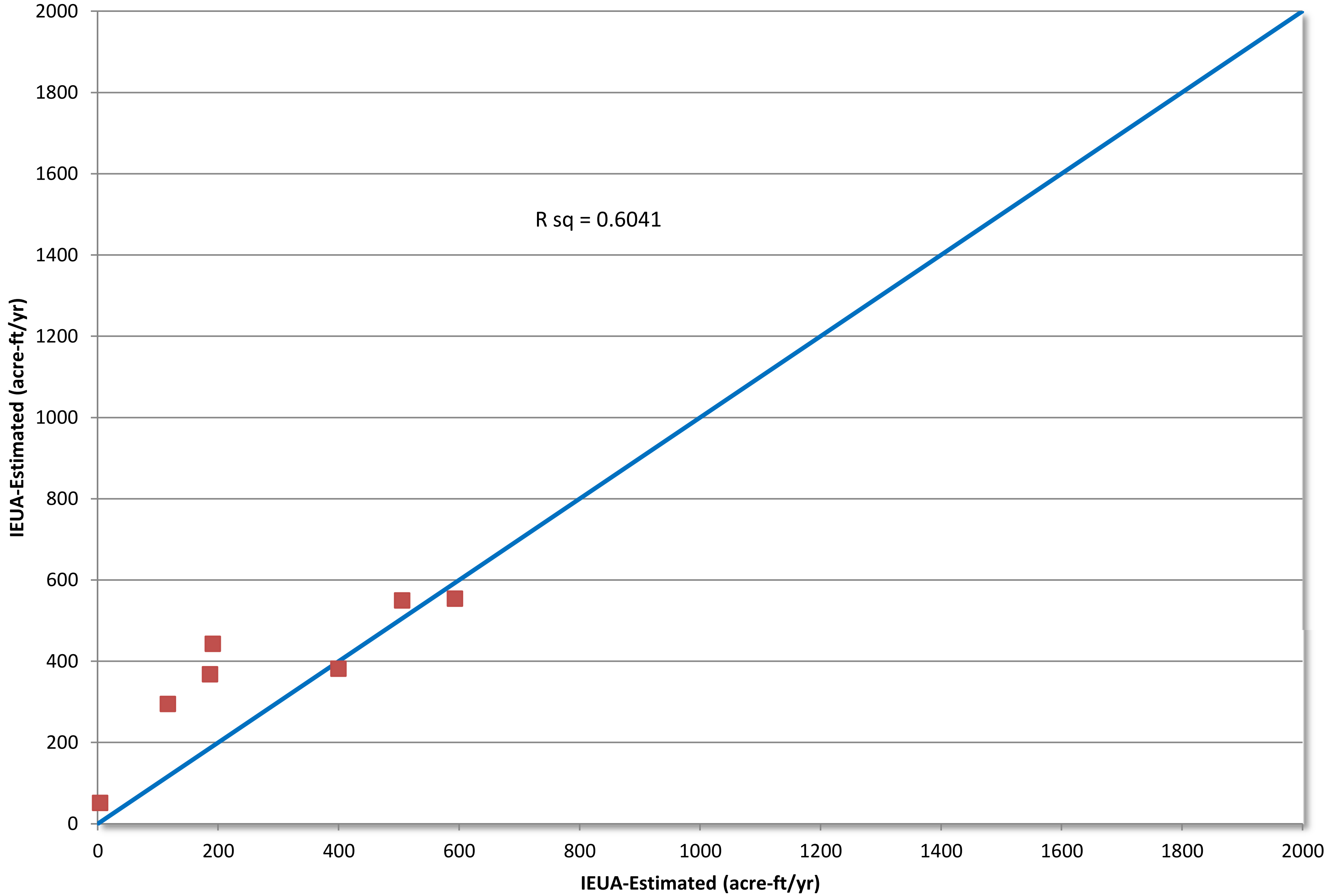

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Figure D-14a
Time Series Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume --Declez Basin

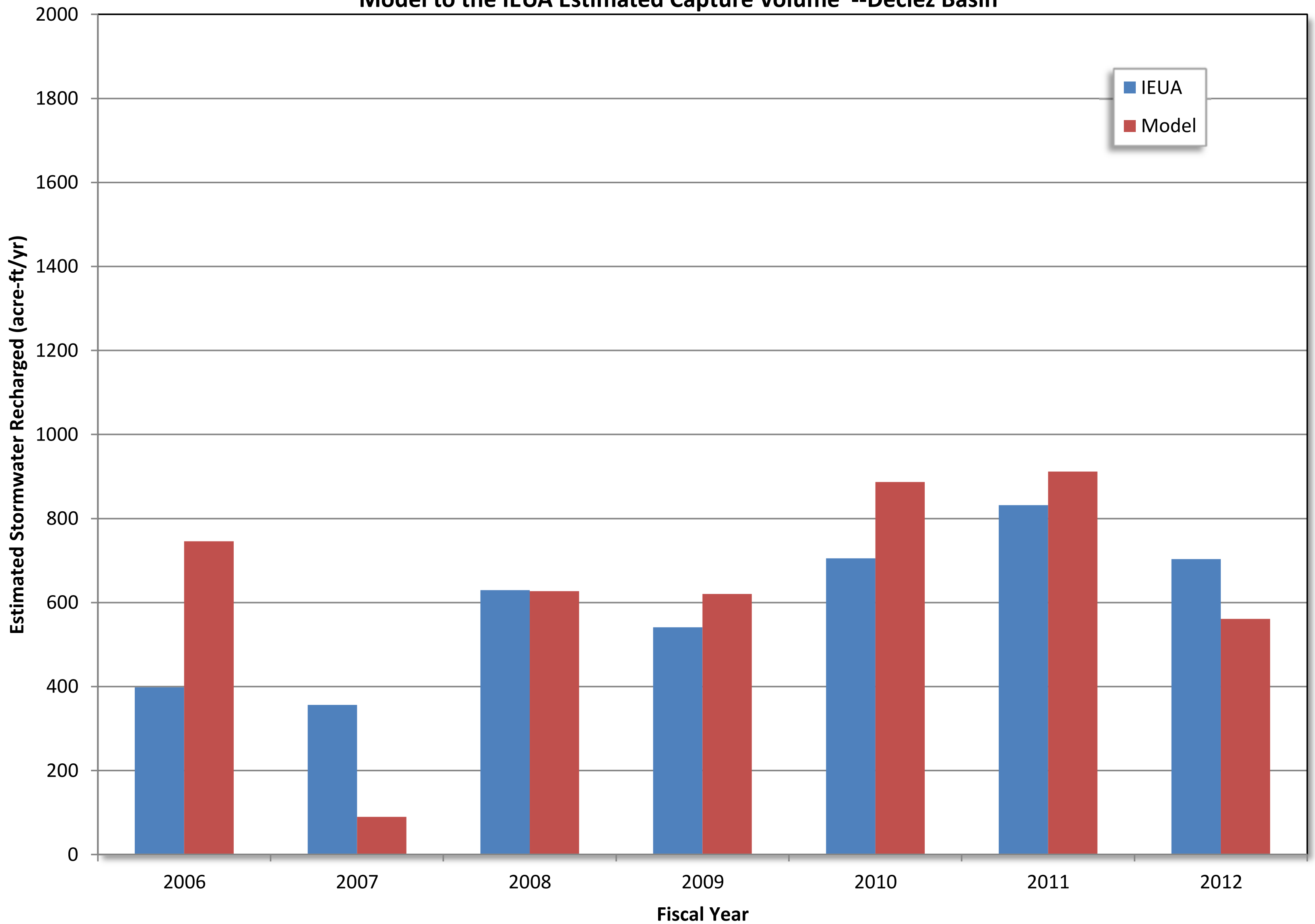

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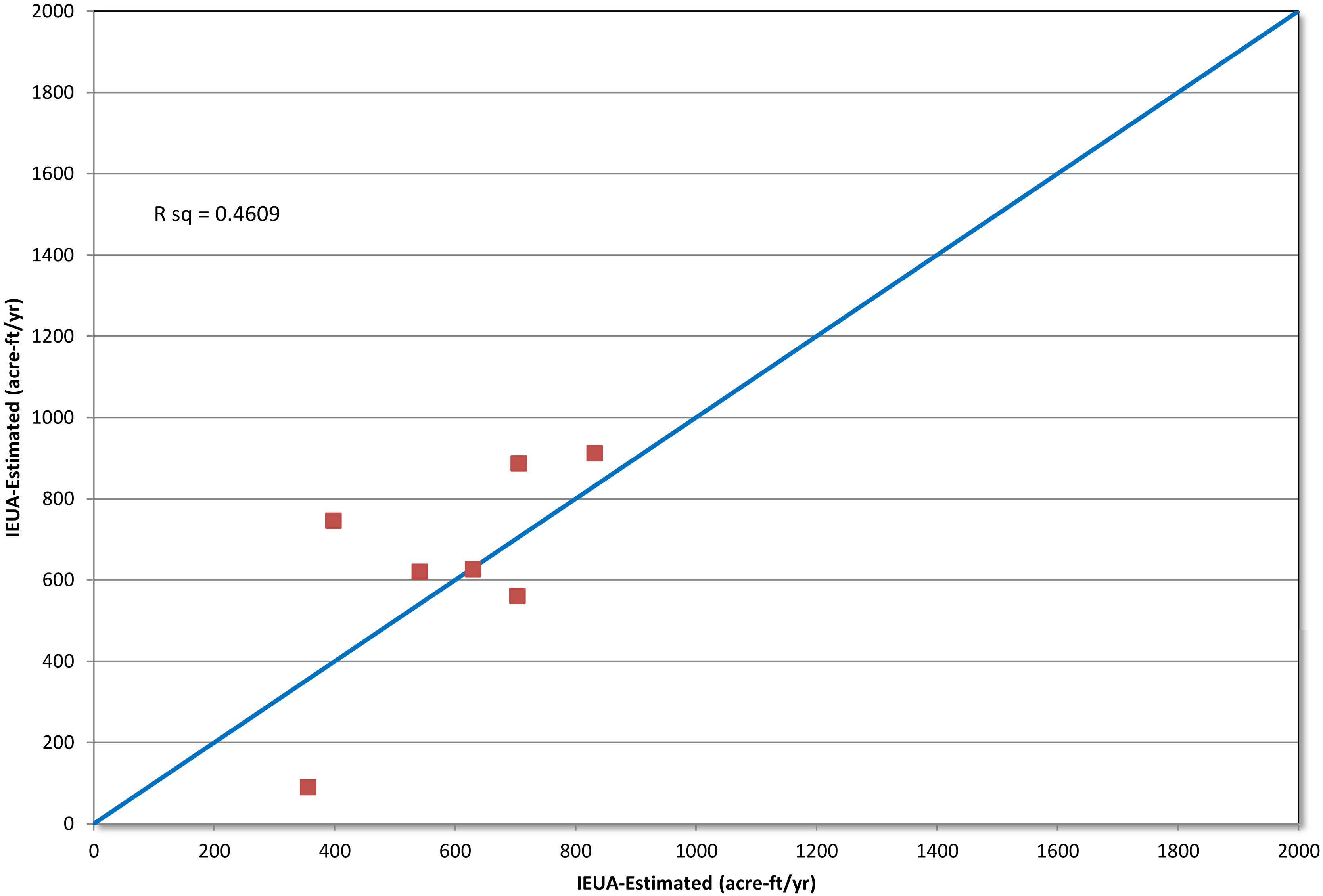
Figure D-14b
Scatter Plot Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume --Declez Basin



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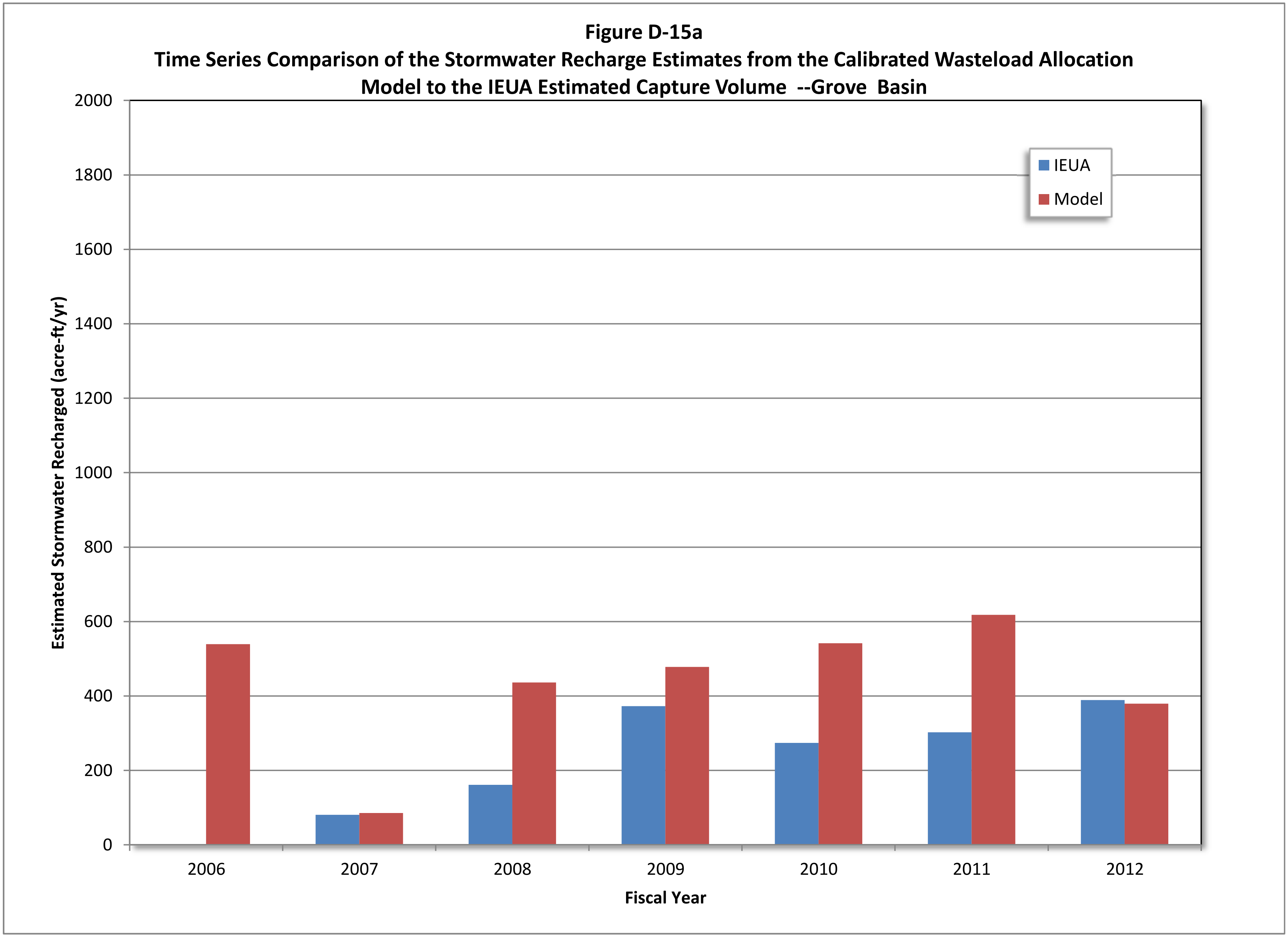
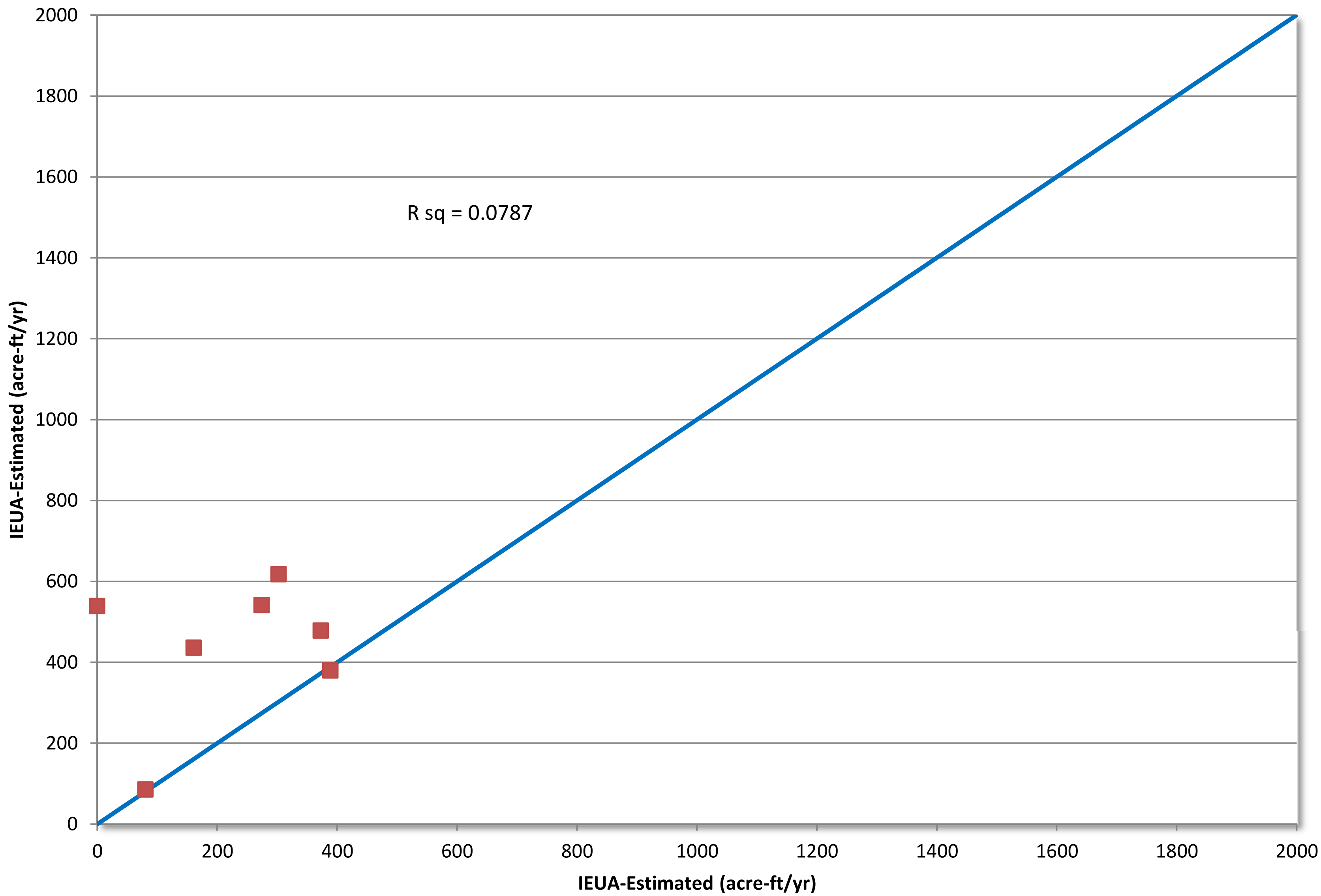
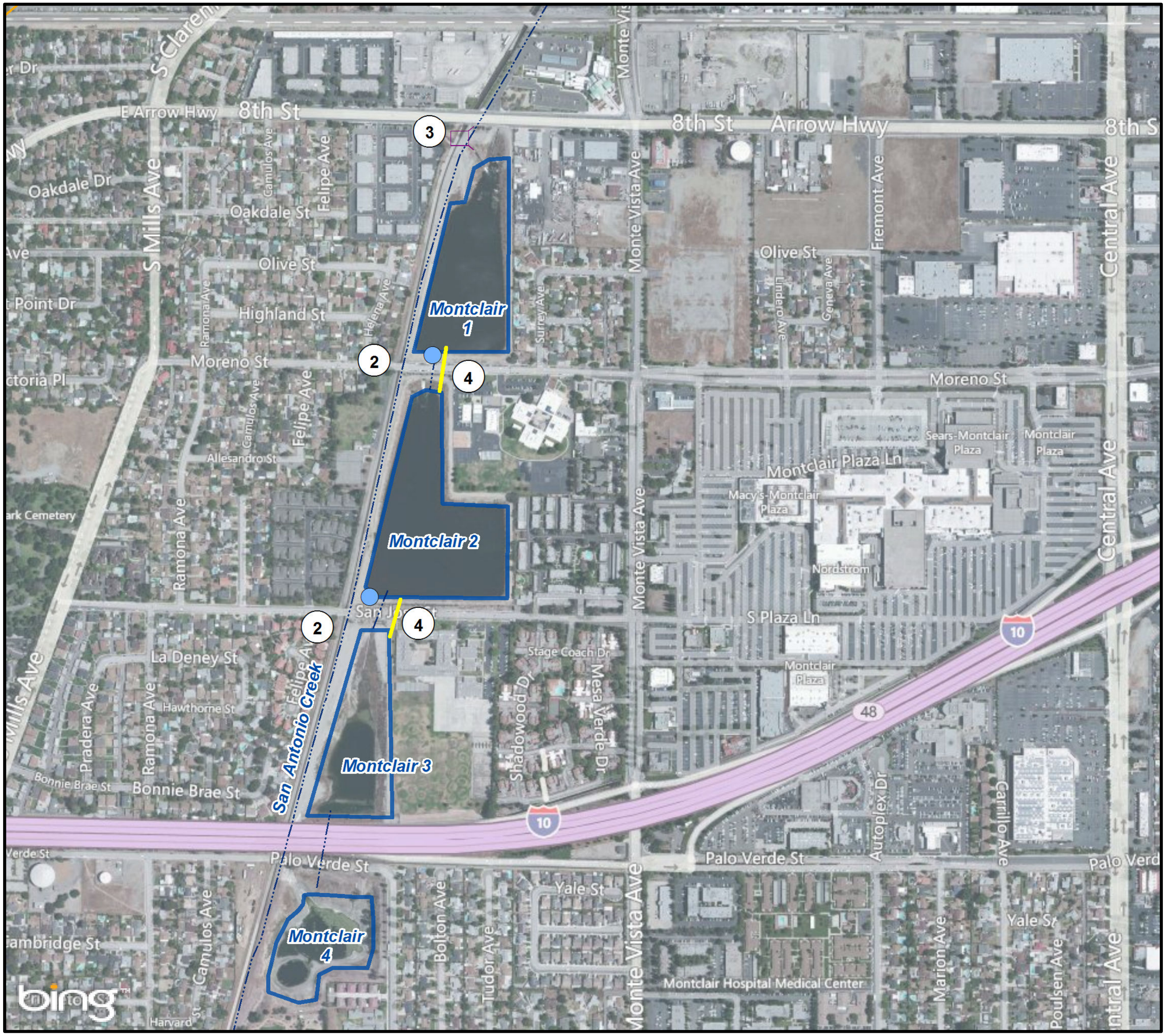


Figure D-15a
Time Series Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume --Grove Basin
Estimated Stormwater Recharged (acre-ft/yr)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
IEUA
Model
2006
2007
2008
2009
2010
2011
2012
Fiscal Year

Figure D-15b
Scatter Plot Comparison of the Stormwater Recharge Estimates from the Calibrated Wasteload Allocation Model to the IEUA Estimated Capture Volume --Grove Basin





Montclair Basins

Streams & Flood Control Channels

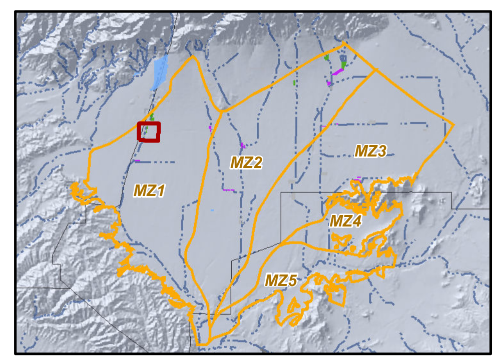
Water Diversion Structures

Drop Inlet

Sluice Gate

PID 2, 3, and 4 (See Table D-1 for Project Description)

Low Level Drains



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Author: MJC
Date: 9/3/2013
Name: Figure_D-16a

0 500 1,000 Feet

0 100 200 400 Meters

2013 Amendment to the 2010 RMPU

Location of the Montclair Basins Alternatives Schematic PID 2, 3, and 4

Figure D-16a

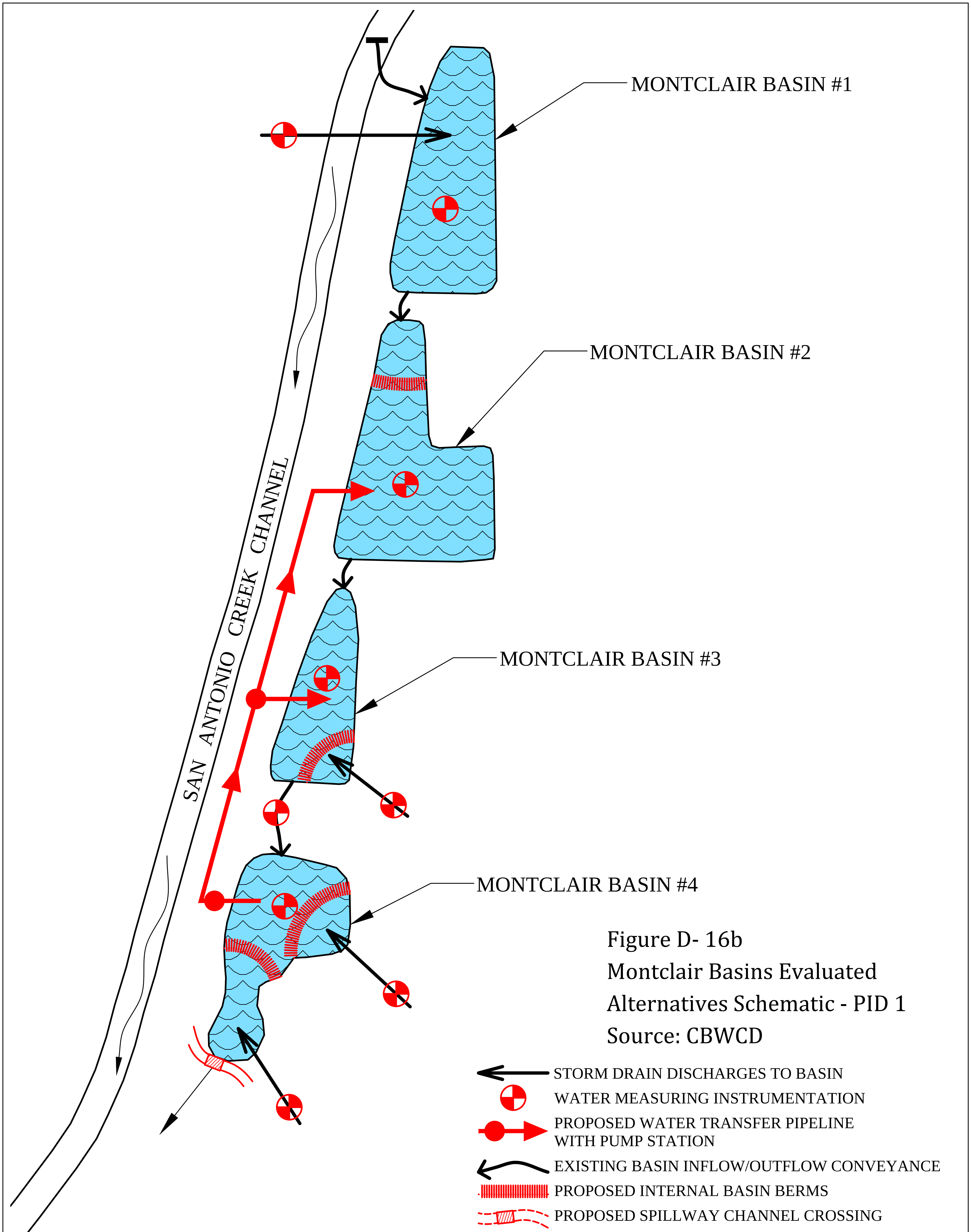
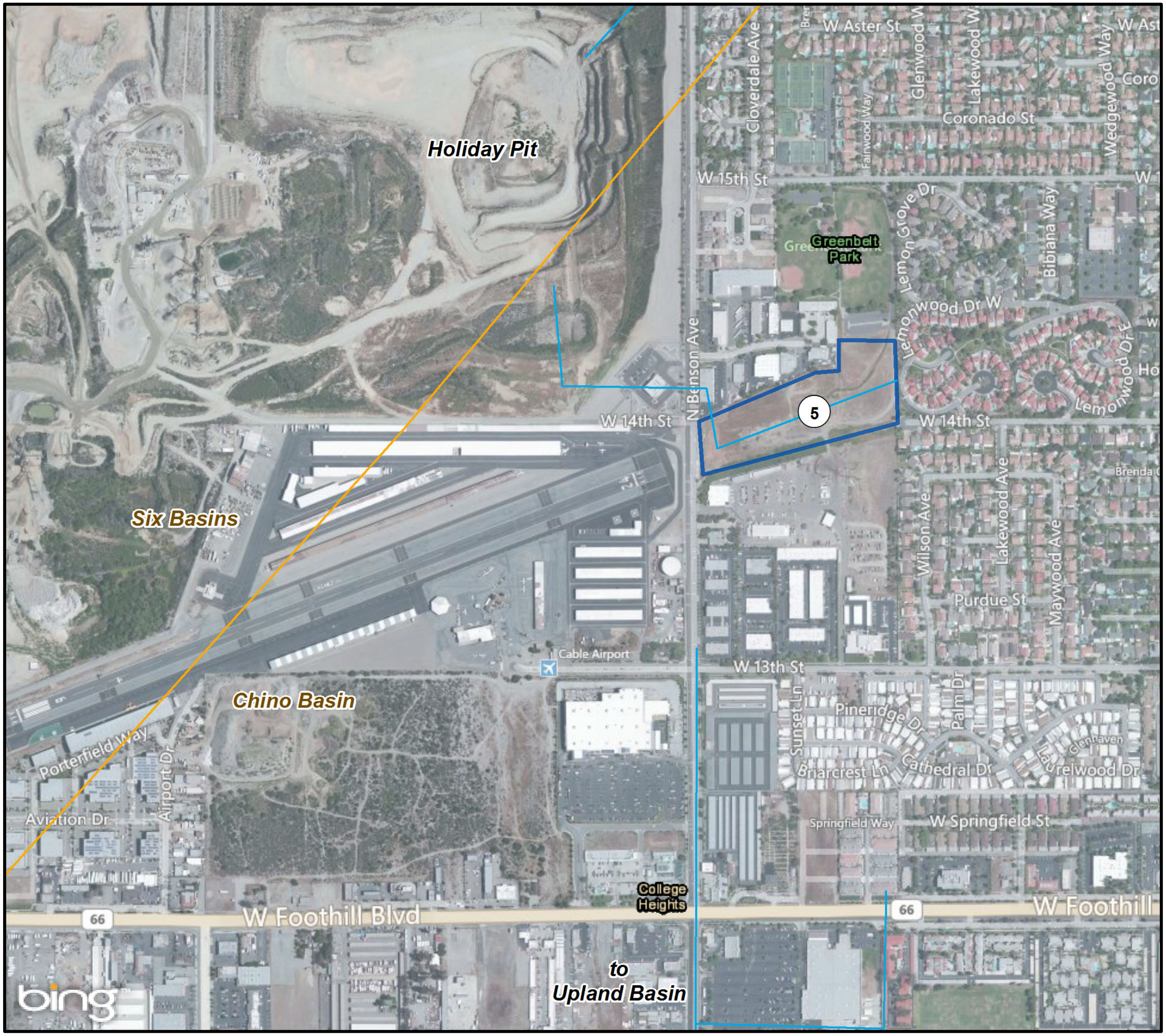


Figure D- 16b
Montclair Basins Evaluated
Alternatives Schematic - PID 1
Source: CBWCD

Q:\Drawings\Chino Basin Water Conservation District\Montclair Basin #4\Power Point Exhibit.dwg

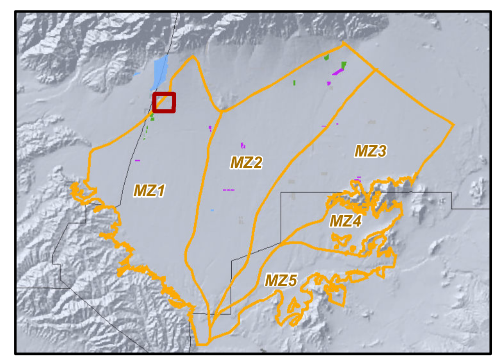
June 2012



Proposed North West Upland Basin

Existing Storm Drain

5 PID 5
(See Table D-1 for
Project Description)



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Author: MJC
Date: 9/4/2013
Name: Figure_D-17a

0 500 1,000 Feet
0 100 200 400 Meters

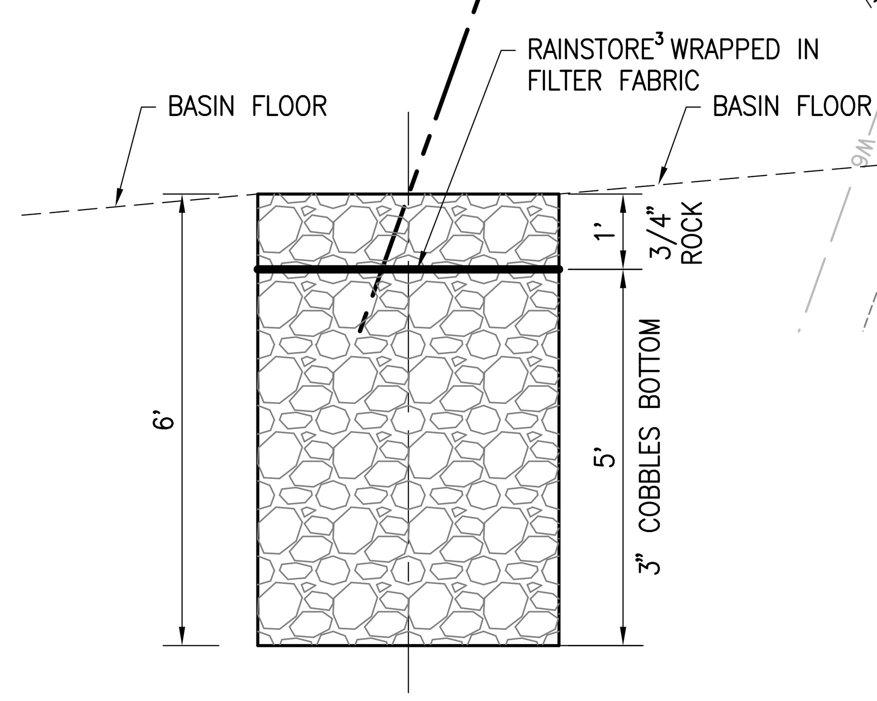
2013 Amendment to the
2010 RMPU

Location of the North West Upland Basin
PID 5

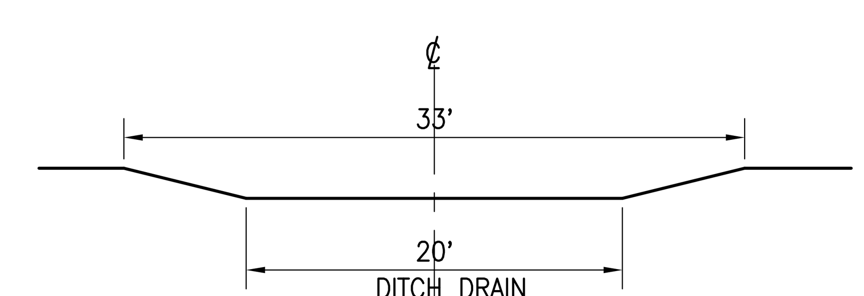
Figure D-17a

CONSTRUCTION NOTES:

4. CONSTRUCT 42" RCP. SEE PROFILE FOR D-LOAD. PIPE BEDDING PER LACFCD STD DWG NO 3080-2, CASE 3.
5. CONSTRUCT 66" RCP. SEE PROFILE FOR D-LOAD. PIPE BEDDING PER LACFCD STD DWG NO 3080-2, CASE 3.
6. CONSTRUCT 84" RCP. SEE PROFILE FOR D-LOAD. PIPE BEDDING PER LACFCD STD DWG NO 3080-2, CASE 3.
17. CONSTRUCT 18' X 9' CONC. OUTLET PER DETAIL 2 ON SHT 14.
19. CONSTRUCT ENERGY DISSIPATOR – IMPACT BASIN W/ VERTICAL BAFFLE WALL SPPWC STD DWG. 302-2. WIDTH (W) PER PLAN.
20. CONSTRUCT 24" R.C.P. SEE PROFILE FOR D-LOAD.
21. CONSTRUCT 1 FT WIDE CONCRETE LINED SWALE PER DETAIL C-206 ON SHT NO. 17.
24. CONSTRUCT NEW CURB AND GUTTER, MATCH IN-KIND.



ROCK TRENCH DETAIL 1
SCALE: NTS



DITCH DRAIN SECTION B
SCALE: NTS

GRAPHIC SCALE: 1" = 40' SCALE FEET

IMPORTANT NOTICE
Section 4216/4217 of the Government Code requires a Dig Alert Identification Number to be issued before a "Permit to Excavate" will be valid. For your Dig Alert I.D. Number call
CALL TOLL FREE
TWO WORKING DAYS BEFORE YOU DIG
UNDERGROUND SERVICE ALERT
1-800-227-2600

BENCH MARK NO. BM9F-86
ELEV.

REVISIONS

MARK	DATE	INITIAL	DESCRIPTION	DATE	APP'VD

AECOM
AECOM Technical Services, Inc.
1501 QUAIL ST
Newport Beach, CA 92658-9020
PHONE (949) 476-3300
FAX (949) 721-7141

DRAWN BY:
DESIGNED BY: E. LONG
CHECKED BY: Z. ISNASIOUS
RECOMMENDED BY:

REVIEWED BY CITY STAFF

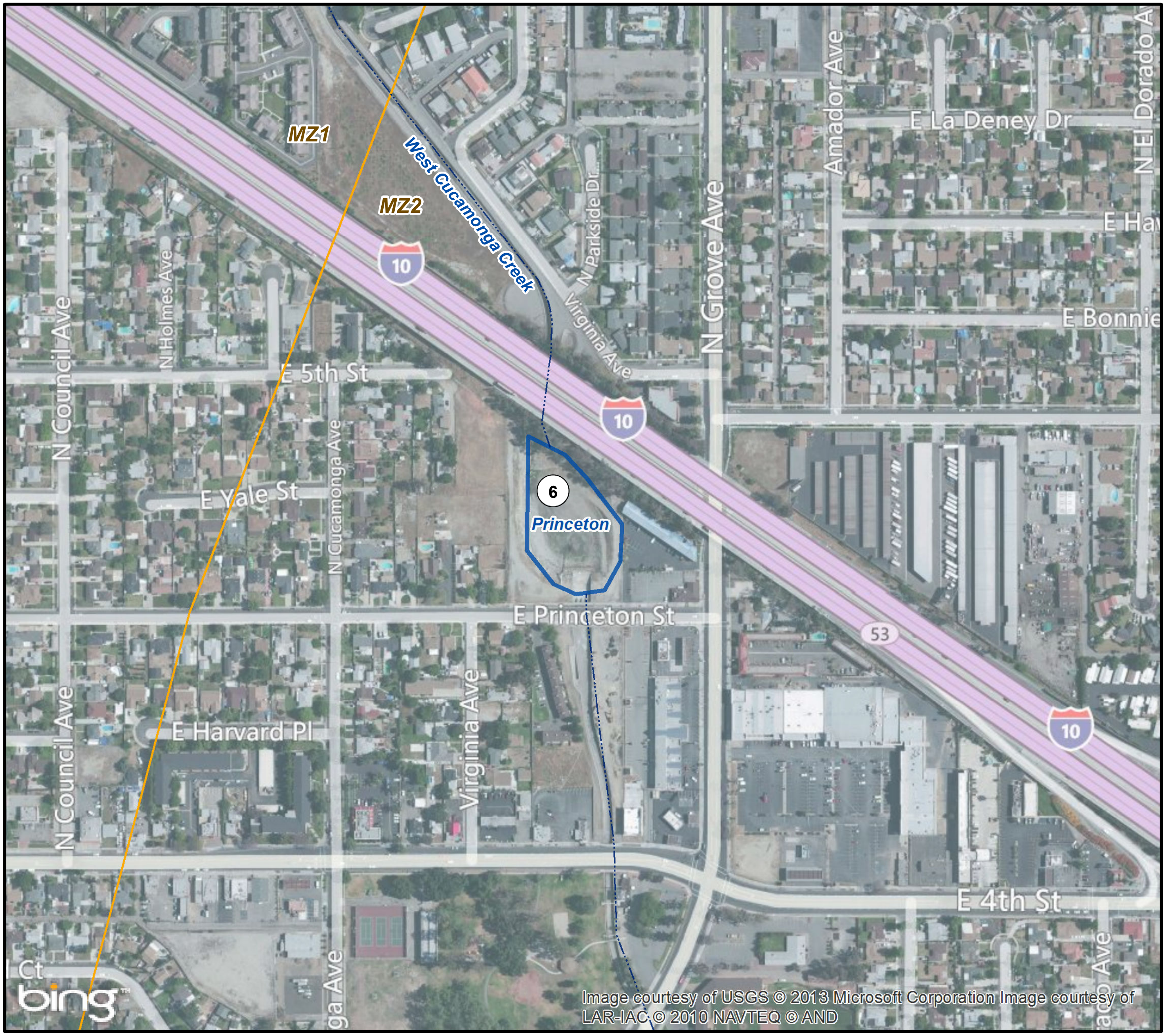
DEPARTMENT	INITIAL	DATE
PUBLIC WORKS (OPER.)		
PUBLIC WORKS (ENV.)		
PUBLIC WORKS (WATER)		
PUBLIC WORKS (TRAF.)		
FIRE DEPT.		

APPROVED BY:
PUBLIC WORKS DIRECTOR / CITY ENGINEER R.C.E. 53382 EXP. DATE 6/30/11 DATE
RECOMMENDED BY: ENGINEERING STAFF
RECOMMENDED BY: DEVELOPMENT SERVICES

14TH STREET WATER QUALITY REGIONAL FACILITY

Figure 17b
North West Upland Basin Alternative- PID 5
Source: City of Upland

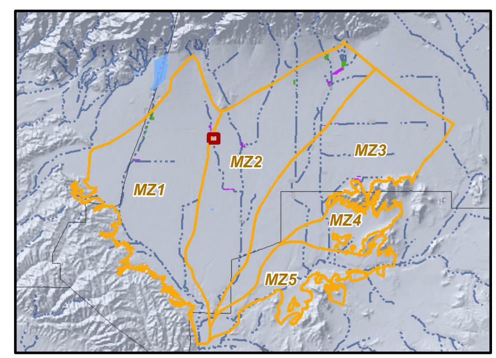
STORM DRAIN DWG NO. C-104
SHEET 6 OF 18 SHEETS
DRAWING NO.
PLAN NO: W-XXXX
PROJECT: XXXX



Princeton Basin

Streams & Flood Control Channels

6 PID 6
(See Table D-1 for Project Description)



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Lake Forest, CA 92630
949.420.3030
www.wildermuthenvironmental.com

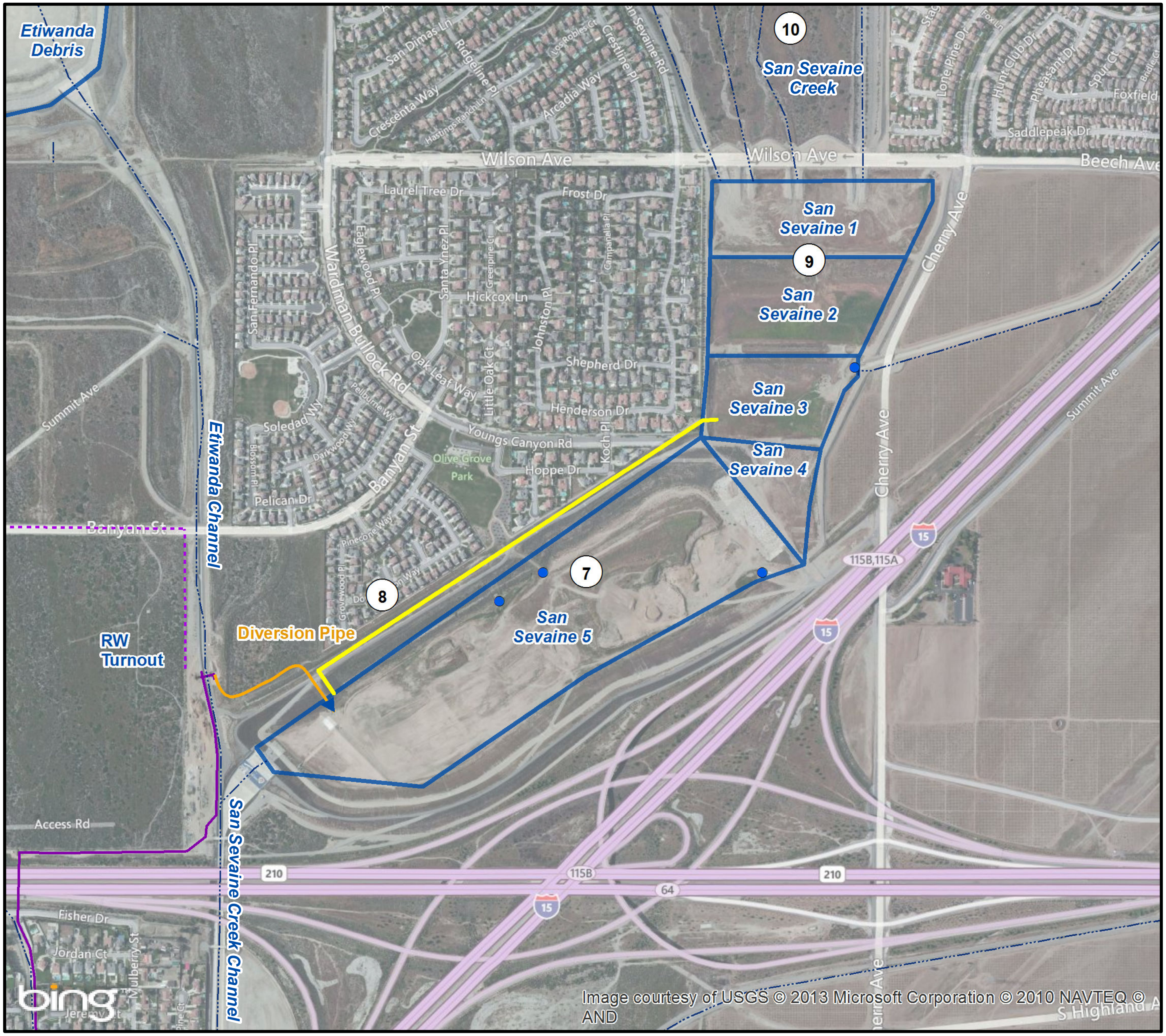
Author: MJC
Date: 9/6/2013
Name: Figure_D-18

0 500 1,000 Feet
0 50 100 200 Meters

2013 Amendment to the 2010 RMPU

Location of the Princeton Basin PID 6

Figure D-18



San Sevaine Basins

Streams & Flood Control Channels

Storm Drain Inlet

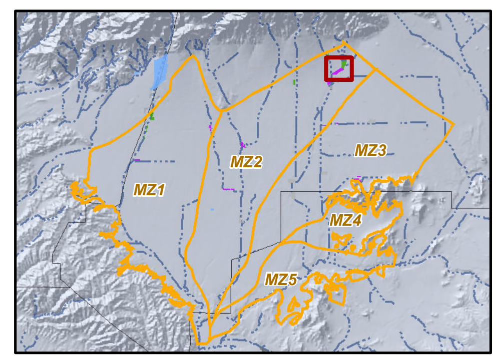
Recycled Water Pipelines

Operating

Planning

7 PID 7, 8, 9, and 10 (See Table D-1 for Project Description)

Conveyance Pipeline



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Lake Forest, CA 92630
949.420.3030
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Author: MJC
Date: 9/6/2013
Name: Figure_D-19

0 1,000 2,000 Feet
0 150 300 600 Meters

2013 Amendment to the 2010 RMPU

Location of the San Sevaine Basins Evaluated Alternatives Schematic PID 7 - 10

Figure D-19

Victoria Basin

Streams & Flood Control Channels

Water Diversion Structures

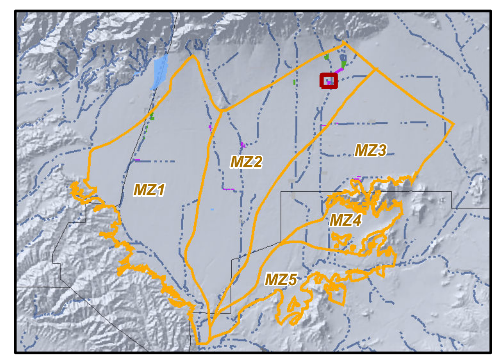
Sluice Gate

Recycled Water Pipelines

Operating

Planning

(11) PID 11
(See Table D-1 for Project Description)



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Lake Forest, CA 92630
949.420.3030
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Author: MJC
Date: 9/6/2013
Name: Figure_D-20

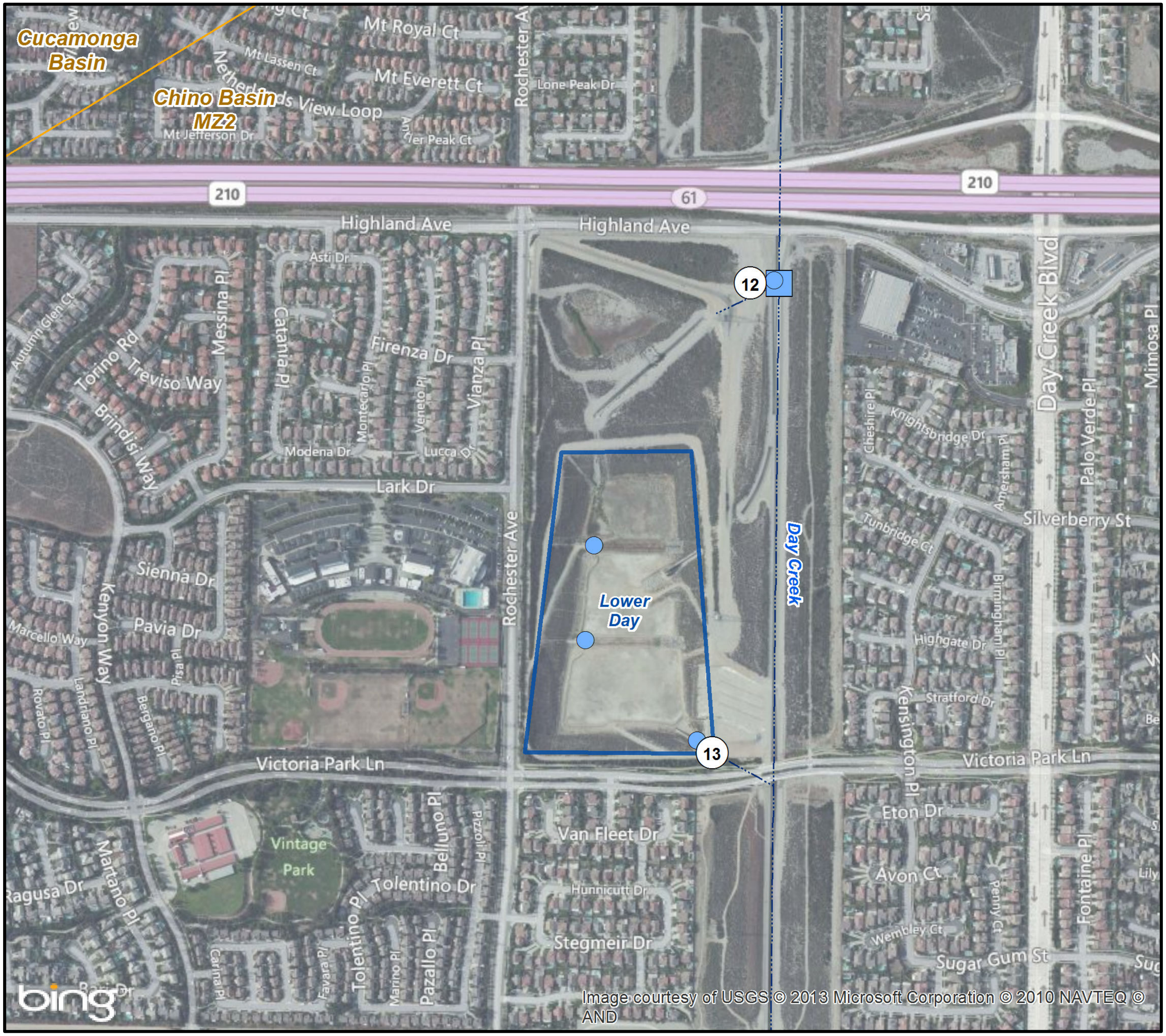
0 500 1,000 Feet

0 75 150 300 Meters

2013 Amendment to the 2010 RMPU

Location of the Victoria Basin Evaluated Alternatives Schematic PID 11

Figure D-20



Lower Day Basin

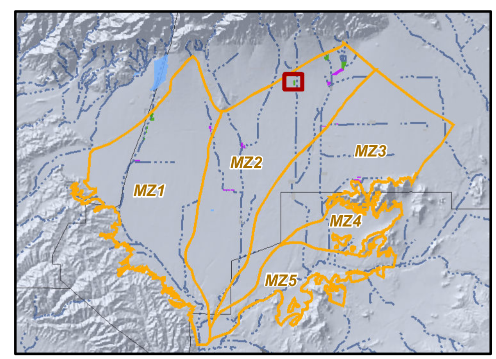
Streams & Flood Control Channels

Water Diversion Structures

Rubber Dam

Sluice Gate

13 PID 12 and 13 (See Table D-1 for Project Description)



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www.wildermuthenvironmental.com

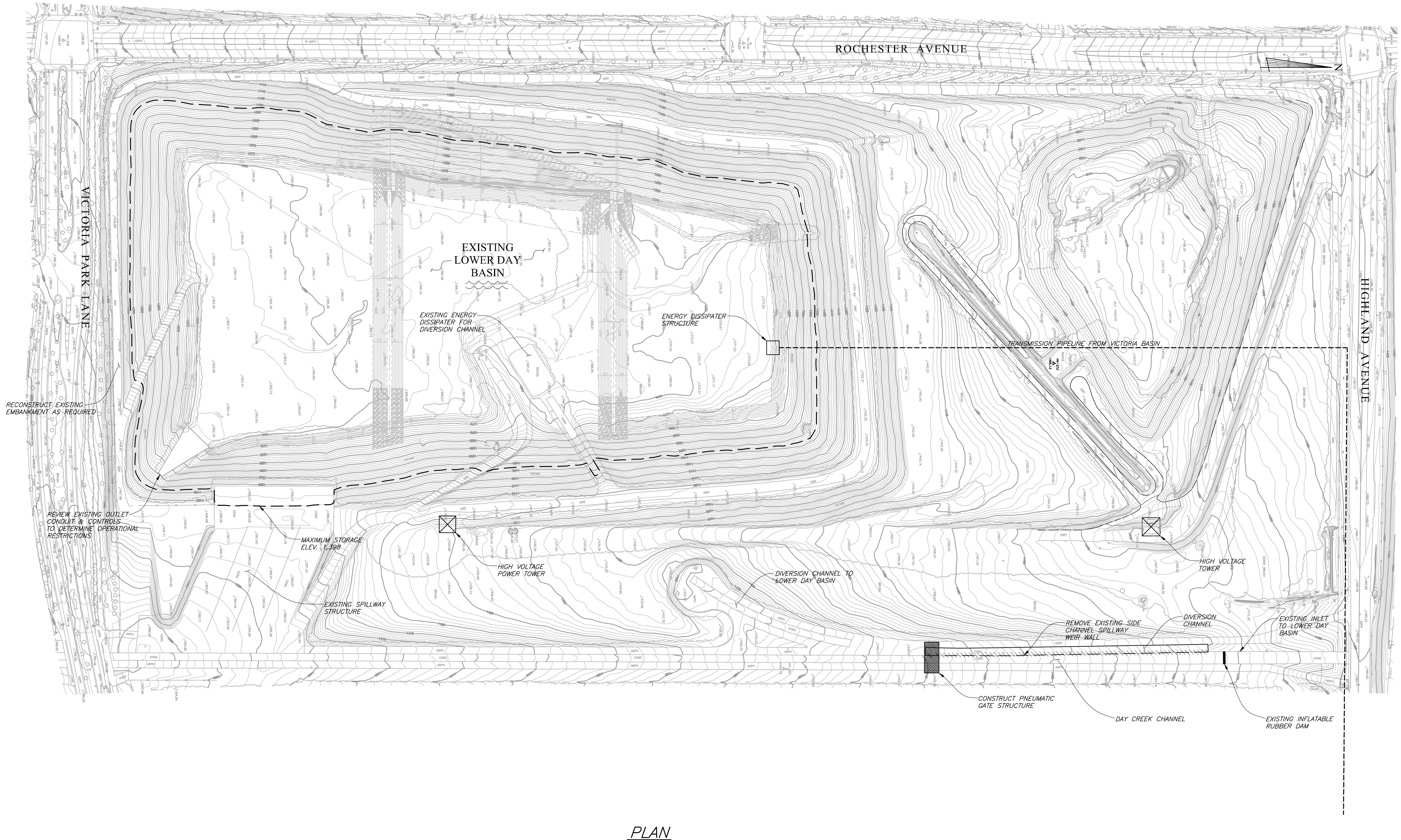
Author: MJC
Date: 9/6/2013
Name: Figure_D-21a

0 500 1,000 Feet
0 100 200 400 Meters

2013 Amendment to the 2010 RMPU

Location of the Lower Day Basin PID 12 and 13

Figure D-21a



NOTE:

TOPOGRAPHY PROVIDED BY WILDERMUTH ENVIRONMENTAL, INC., NOVEMBER 2009.

File Name	Preliminary Lower Day Basin Enhancement Rev4.dwg
Scale Factor	1
Plot Date	05-21-2010

PRELIMINARY NOT FOR CONSTRUCTION AND SUBJECT TO REVISION

REVISIONS

REF.	DESCRIPTION	APVD.	DATE

DRAFT

Designed By	D.P. LOUNSBURY
Drawn By	J. HERBERT/ P. INTHARATH
Checked By	R.C. WAGNER
Approved By	

Wagner&Bonsignore
Consulting Civil Engineers, A Corporation

2151 River Plaza,
Suite 100
Sacramento, CA 95833
Ph: 916-441-6850
Fx: 916-448-3866

CHINO BASIN WATER CONSERVATION DISTRICT

CHINO BASIN RECHARGE MASTER PLAN UPDATE

SHEET 1 OF 2 SHEETS

Figure D-21b
Site Plan of the Existing Lower Day Basin - PID 12
Source: 2010 RMPU

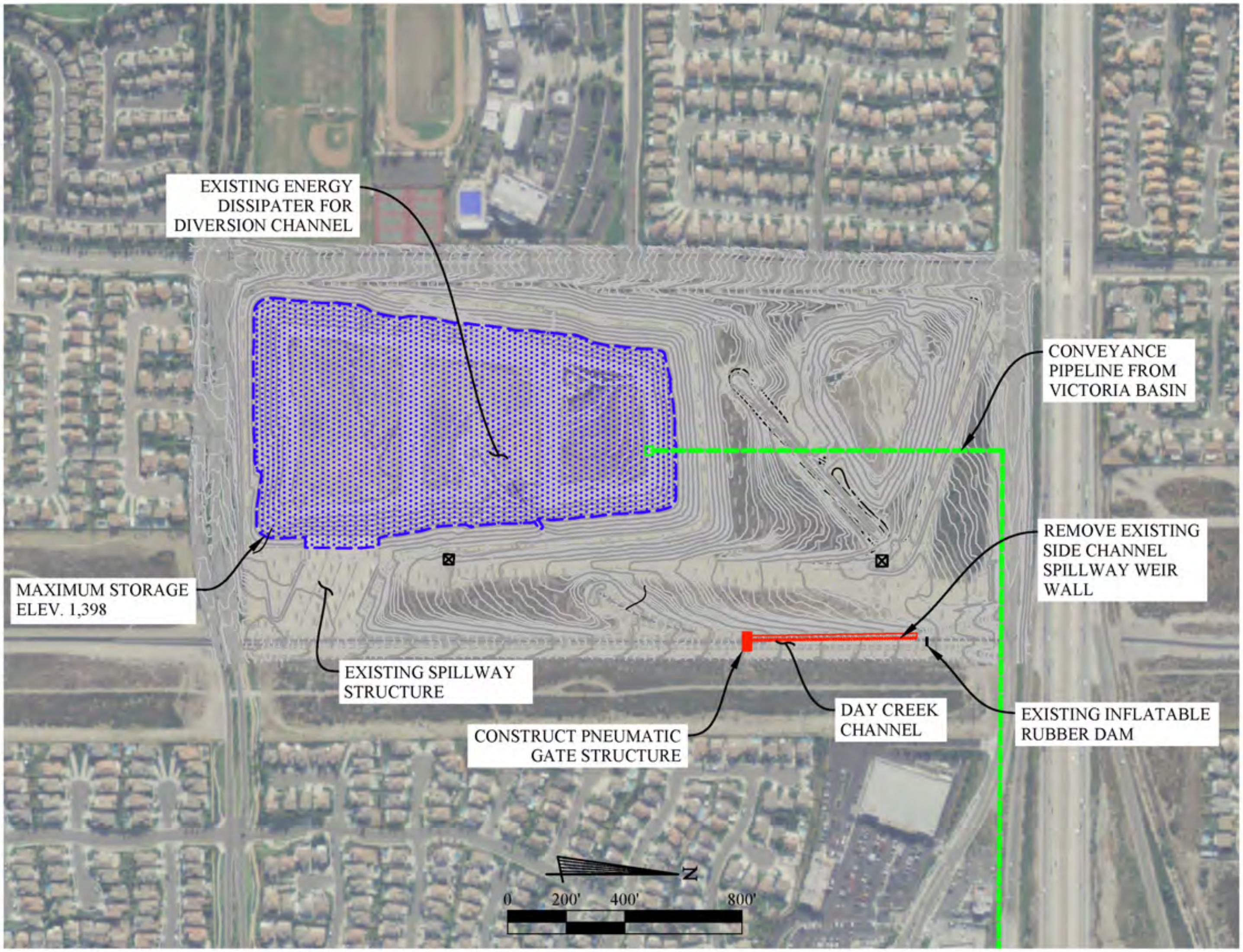
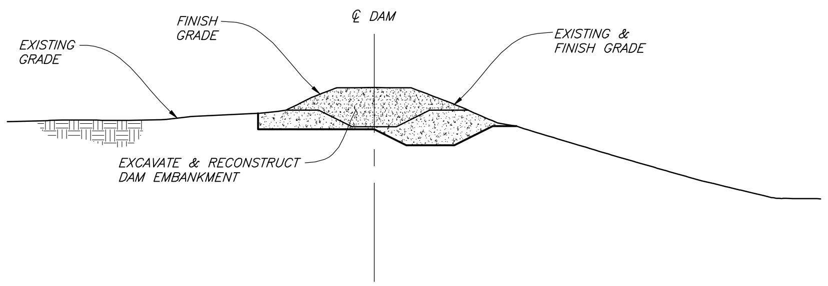
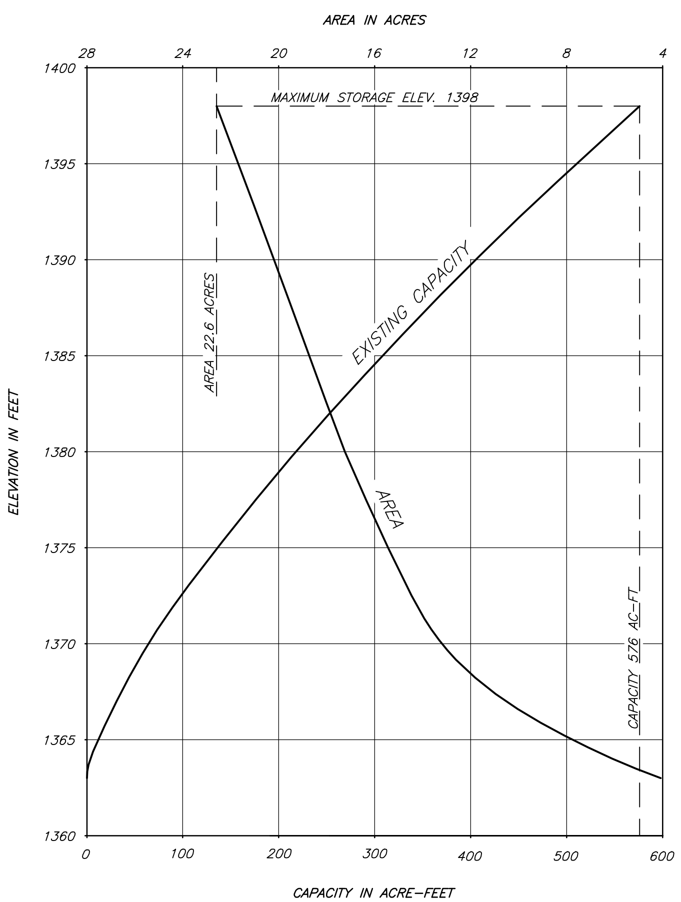


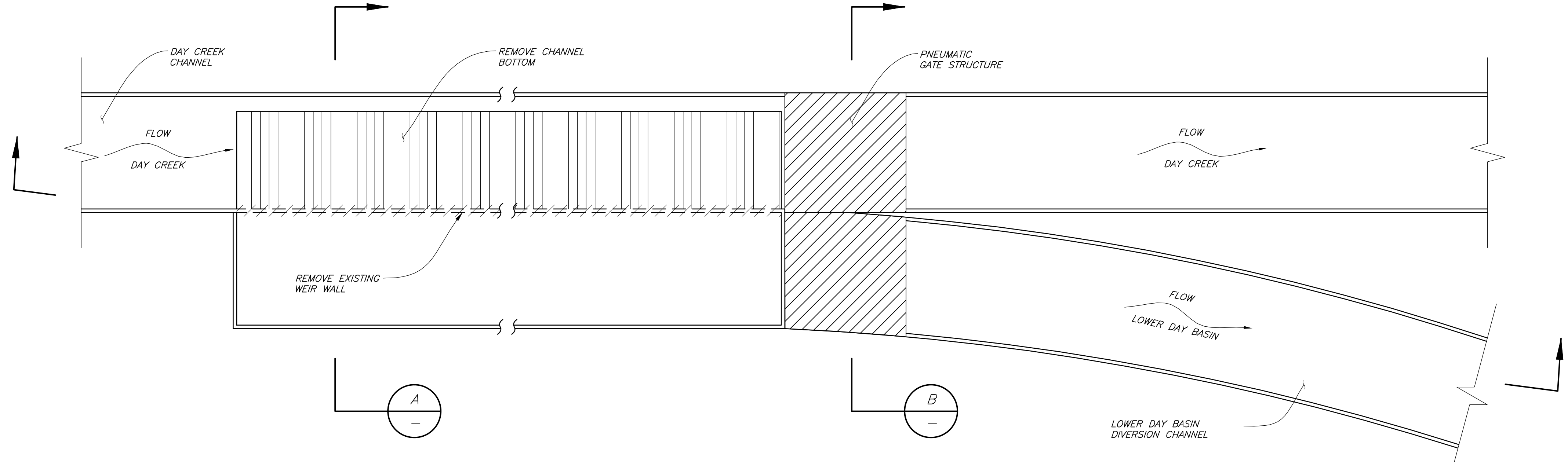
Figure D-21c
Lower Day Basin Evaluated Schematic - PID 12
Source: 2010 RMPU



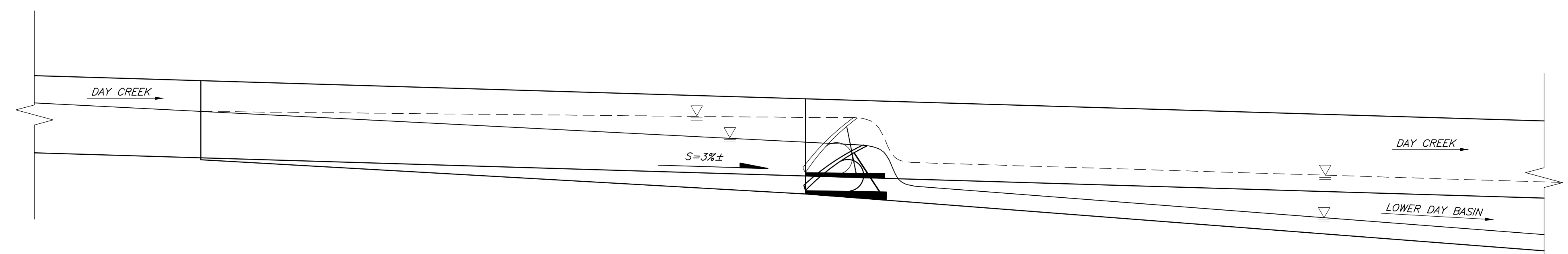
TYPICAL EMBANKMENT RECONSTRUCTION SECTION



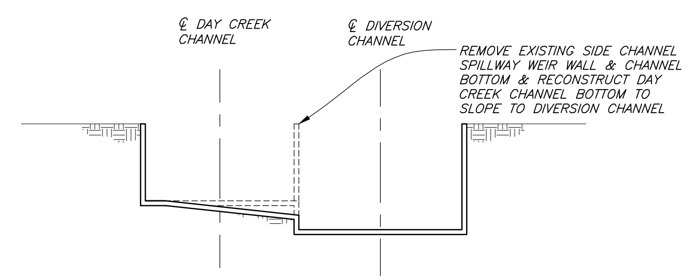
AREA/CAPACITY CURVES



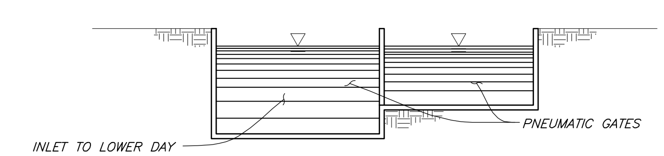
PLAN



PROFILE



SECTION A



SECTION B

DIVERSION CHANNEL IMPROVEMENTS

0' 10' 20' 40'

File Name: Preliminary Lower Day Basin Enhancement Rev4.dwg
Scale Factor: 1
Plot Date: 05-21-2010

**PRELIMINARY
NOT FOR CONSTRUCTION
AND
SUBJECT TO REVISION**

REVISIONS			
REF.	DESCRIPTION	APVD.	DATE

DRAFT

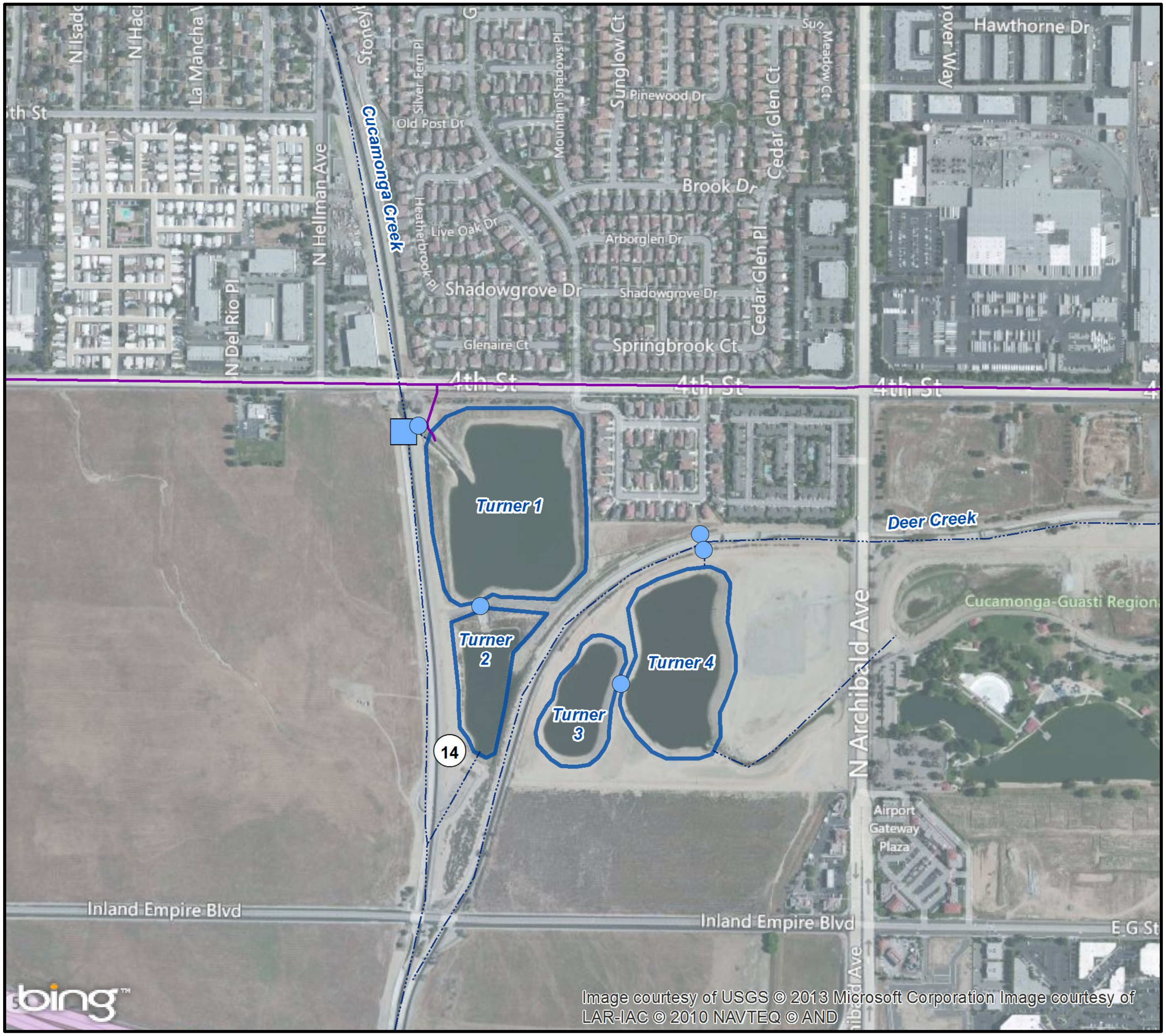
Designed By: D.P. LOUNSBURY
Drawn By: J. HERBERT/ P. INTHARATH
Checked By: R.C. WAGNER
Approved By:

Wagner&Bonsignore
Consulting Civil Engineers, A Corporation
2151 River Plaza,
Suite 100
Sacramento, CA 95833
Ph: 916-441-6850
Fx: 916-448-3866

CHINO BASIN WATER CONSERVATION DISTRICT

Figure D-21d
Lower Day Creek Inlet Details - PID 12
Source: 2010 RMPU

SHEET 2 OF 2 SHEETS



Turner Basins

Streams & Flood Control Channels

Water Diversion Structures

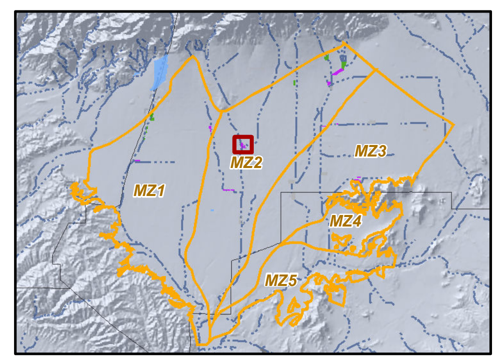
Rubber Dam

Sluice Gate

Recycled Water Pipelines

Operating

14 PID 14
See Table D-1 for
Project Description



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Author: MJC
Date: 9/6/2013
Name: Figure_D-22

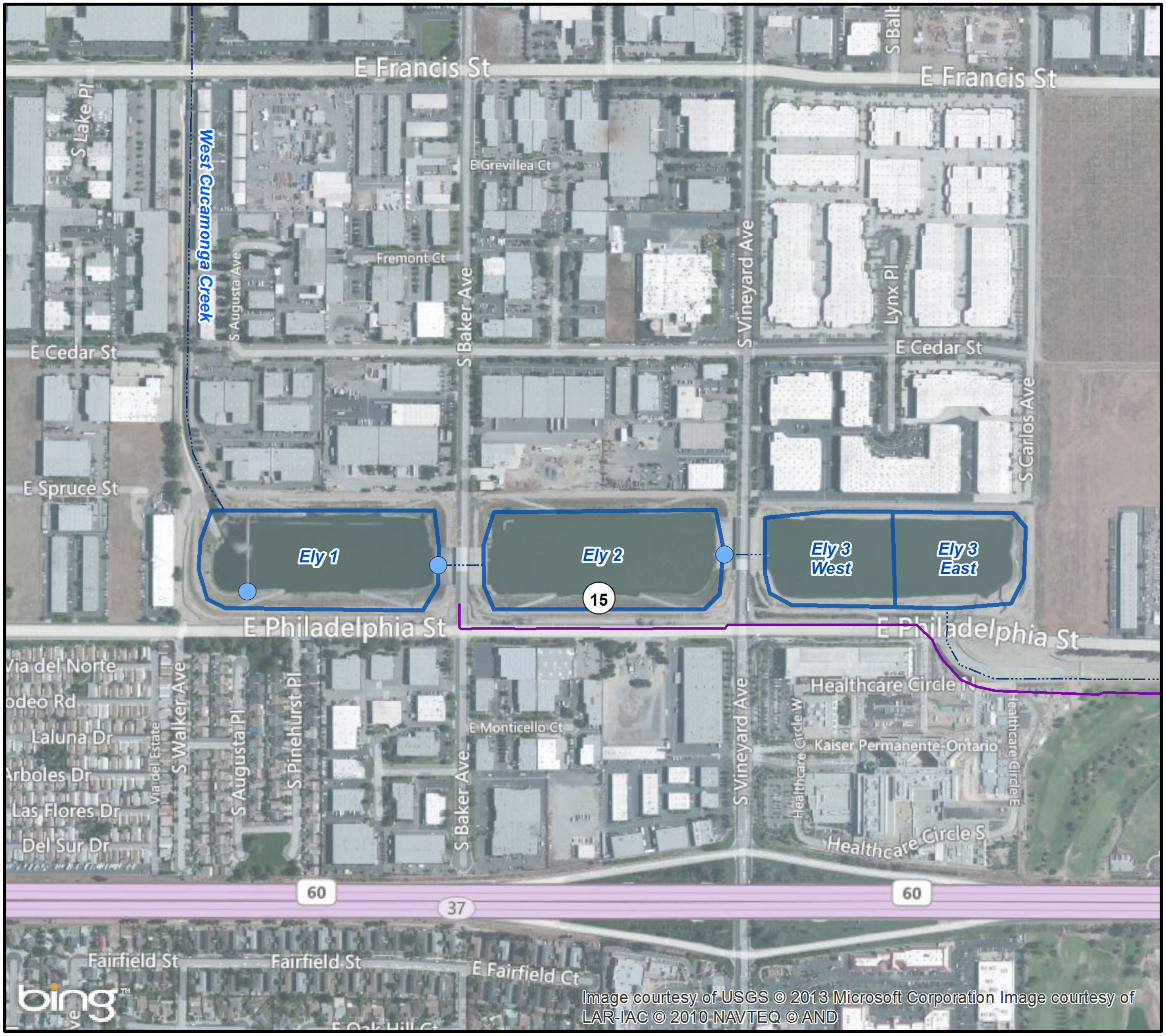
0 500 1,000 Feet

0 100 200 400 Meters

2013 Amendment to the
2010 RMPU

Location of the Turner Basins
Evaluated Alternatives Schematic
PID 14

Figure D-22



Ely Basins

Streams & Flood Control Channels

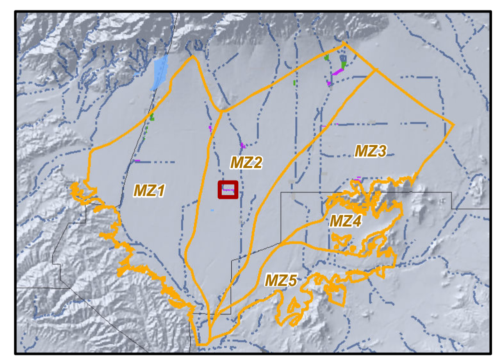
Water Diversion Structures

Sluice Gate

Recycled Water Pipelines

Operating

(15) PID 15
See Table D-1 for
Project Description



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949.420.3030
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Author: MJC
Date: 9/6/2013
Name: Figure_D-23

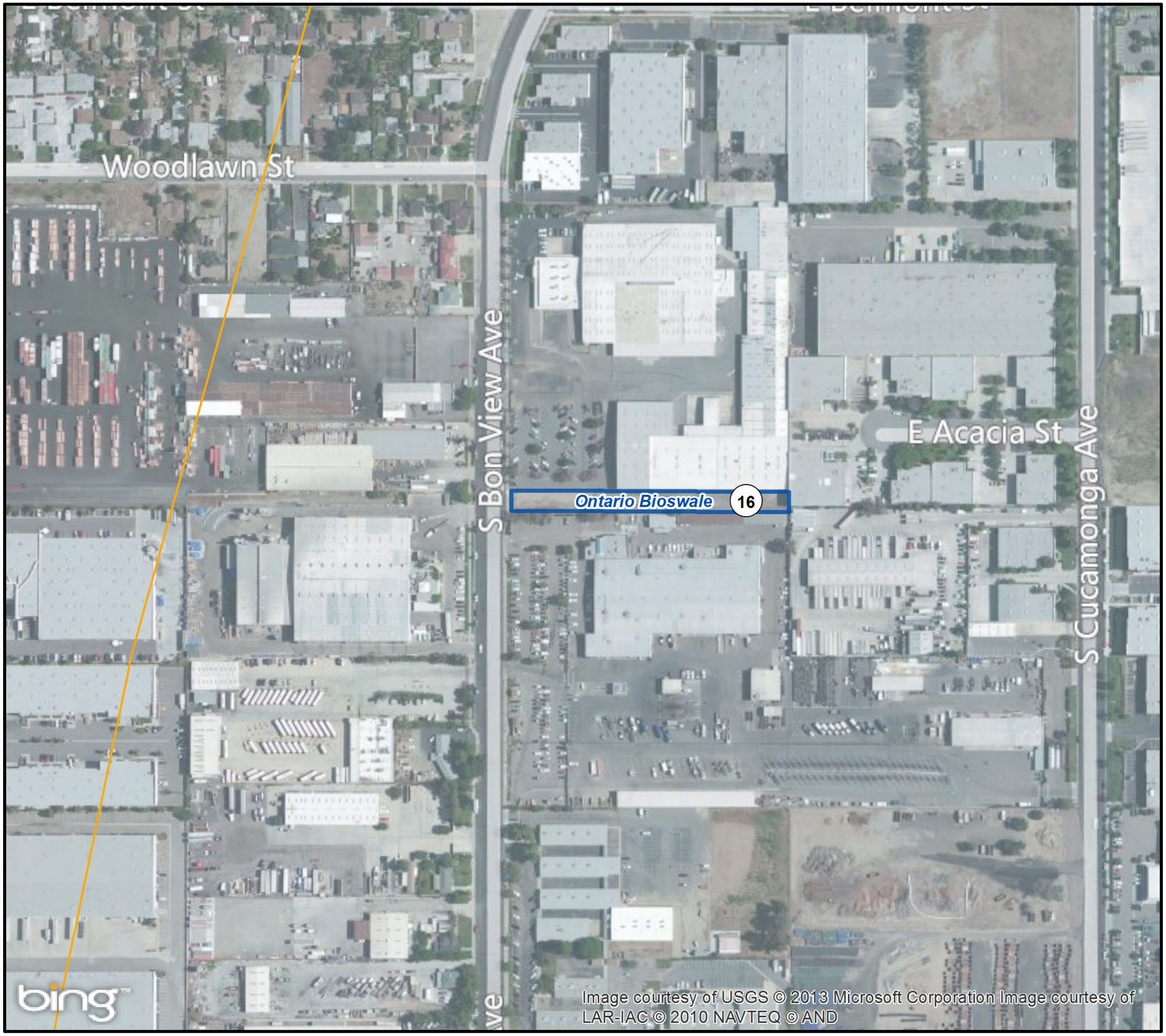
0 500 1,000 Feet
0 75 150 300 Meters

CHINO BASIN WATERMASTER — Partners in Basin Management

2013 Amendment to the 2010 RMPU

Location of the Ely Basins
Evaluated Alternatives Schematic
PID 15

Figure D-23

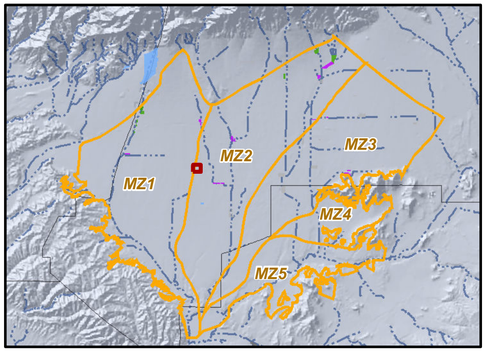


Ontario Bioswale

Water Diversion Structures

Sluice Gate

16 PID 16
See Table D-1 for
Project Description



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949.420.3030
www.wildermuthenvironmental.com

Author: MJC
Date: 9/6/2013
Name: Figure_D-24a

0 400 800 Feet

0 50 100 200 Meters

2013 Amendment to the
2010 RMPU

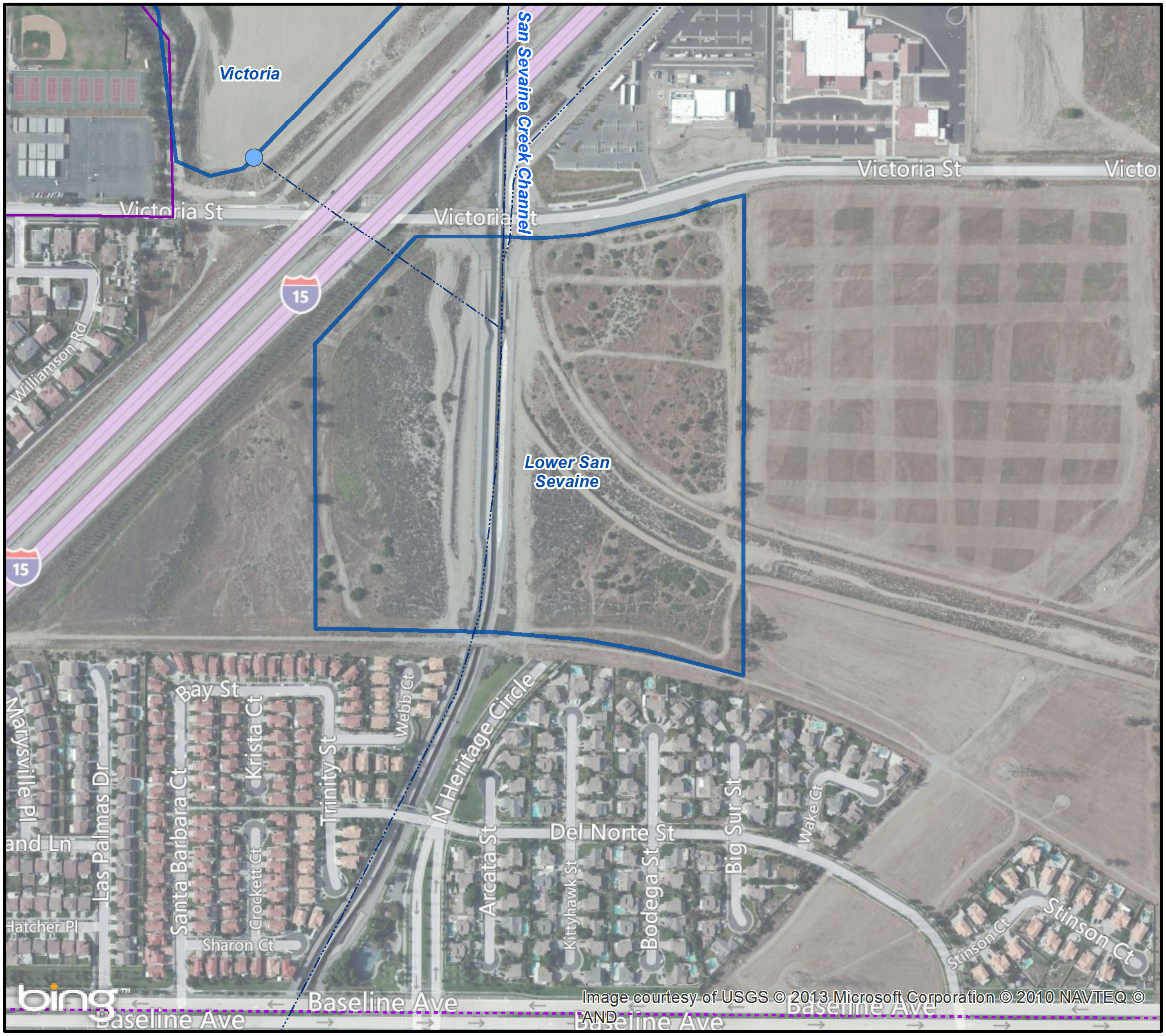
Location of the Ontario Municipal Services Center Bioswale Project Evaluated Alternatives Schematic PID 16

Figure D-24a

Figure D-24b

Ontario Bioswale Grading Plan - PID 16

Source: City of Ontario



Lower San Sevaine Basin

Streams & Flood Control Channels

Water Diversion Structures

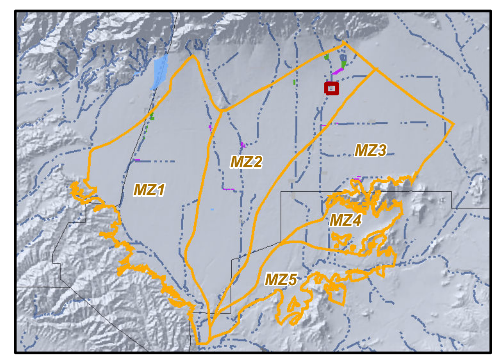
Sluice Gate

Recycled Water Pipelines

Operating

Planning

11 PID 17
(See Table D-1 for Project Description)



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Lake Forest, CA 92630
949.420.3030
www.wildermuthenvironmental.com

Author: MJC
Date: 9/6/2013
Name: Figure_D-25a

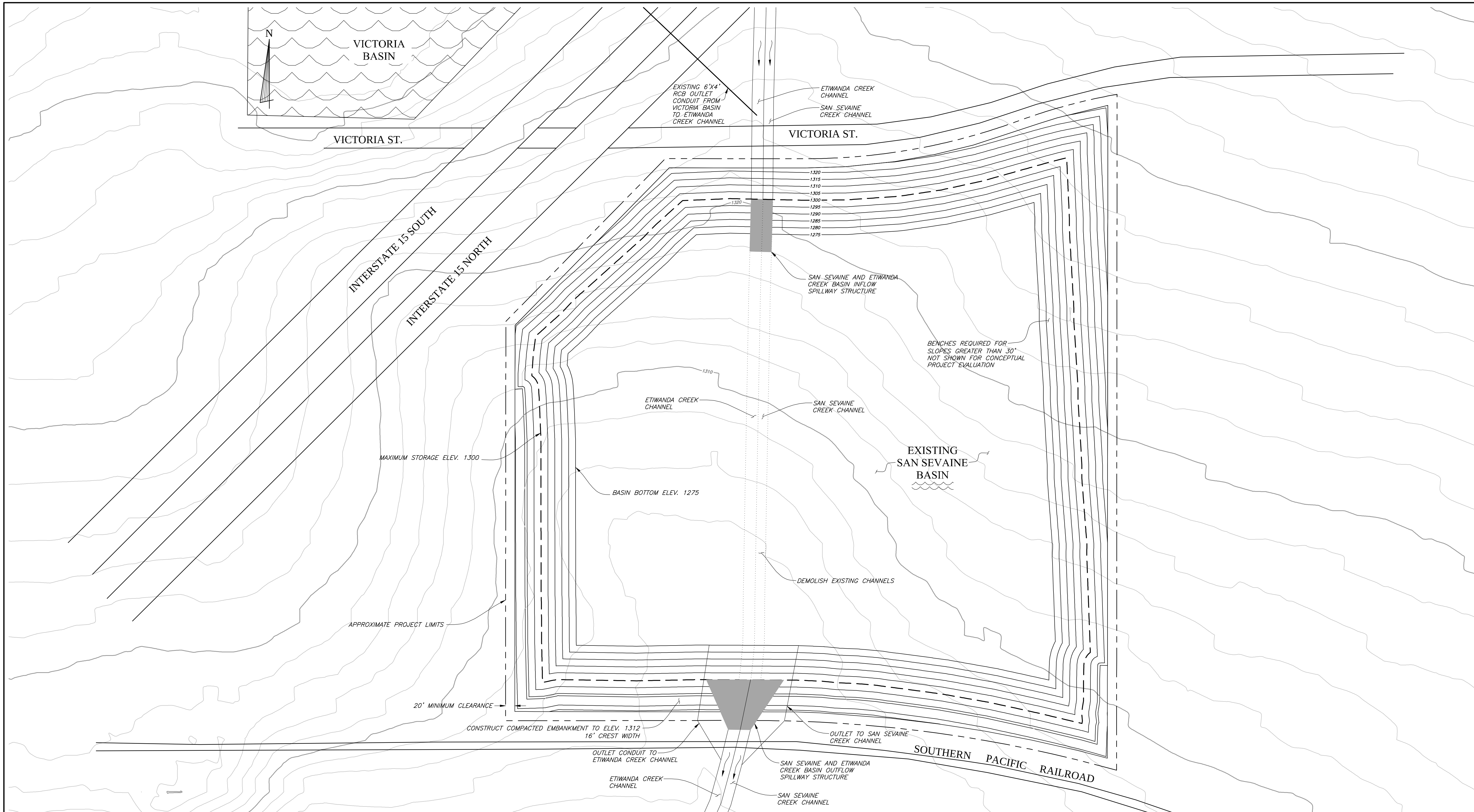
0 500 1,000 Feet
0 75 150 300 Meters

2013 Amendment to the 2010 RMPU

Location of the Lower San Sevaine Basin
PID 11

Figure D-25a

Figure D-25b
Lower San Sevaine Basin Alternative Schematic - PID 12
Source: 2010 RMPU



NOTE:

TOPOGRAPHY BASED ON DIGITAL ELEVATION MODEL OBTAINED FROM WILDERMUTH ENVIRONMENTAL, INC., NOVEMBER 2009.

PLAN

0' 50' 100' 200'

File Name: Proposed San Sevaine Channel Basin Rev3.dwg
Scale Factor: 1
Plot Date: 04-21-2010

PRELIMINARY
NOT FOR CONSTRUCTION
AND
SUBJECT TO REVISION

REVISIONS			
REF.	DESCRIPTION	APVD.	DATE

DRAFT

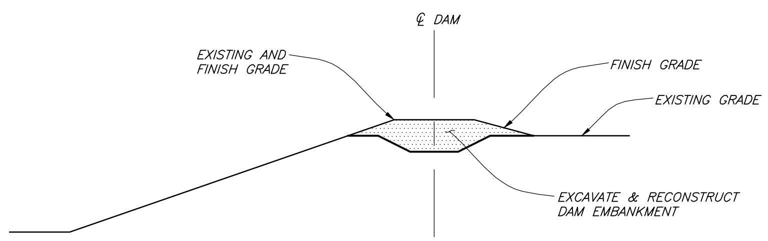
Designed By	D.P. LOUNSBURY
Drawn By	J. HERBERT/ P. INTHARATH
Checked By	R.C. WAGNER
Approved By	

Wagner&Bonsignore
Consulting Civil Engineers, A Corporation
2151 River Plaza,
Suite 100
Sacramento, CA 95833
Ph: 916-441-6850
Fx: 916-448-3866

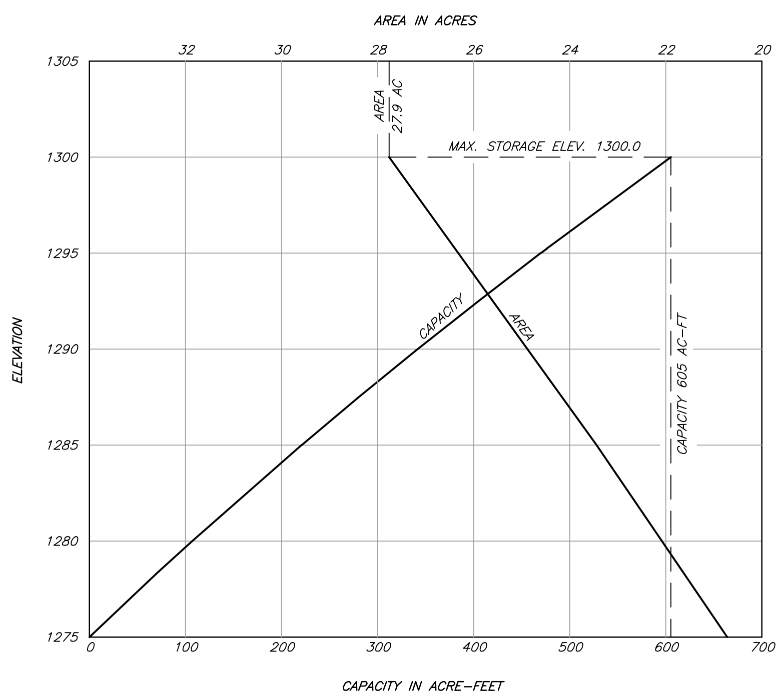
CHINO BASIN WATER CONSERVATION DISTRICT

Figure D-25c
Grading Plan of the Lower San Sevaine Basin - PID 17
Source: 2010 RMPU

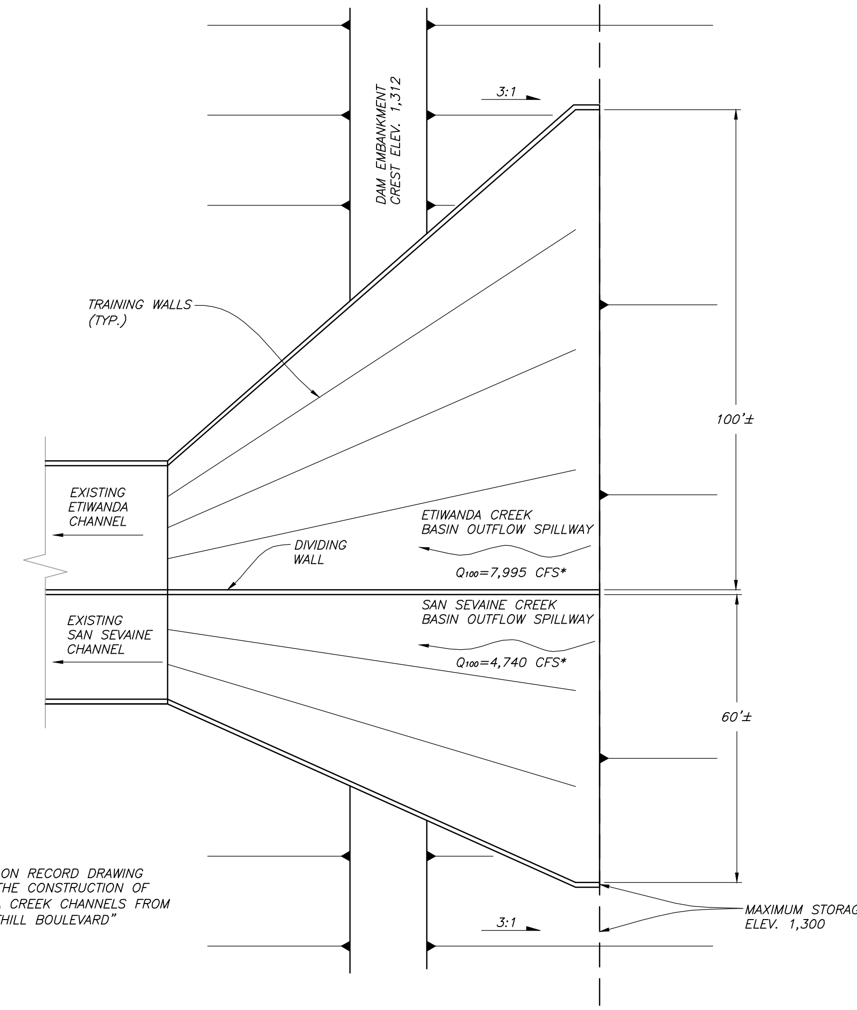
SHEET 1 OF 2 SHEETS



TYPICAL SECTION

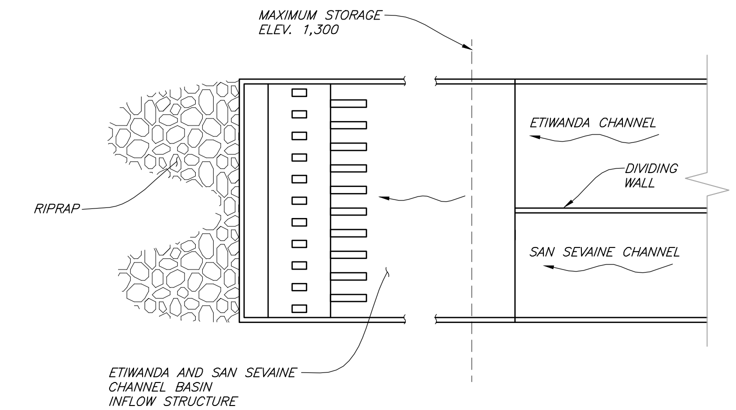


AREA/CAPACITY CURVES

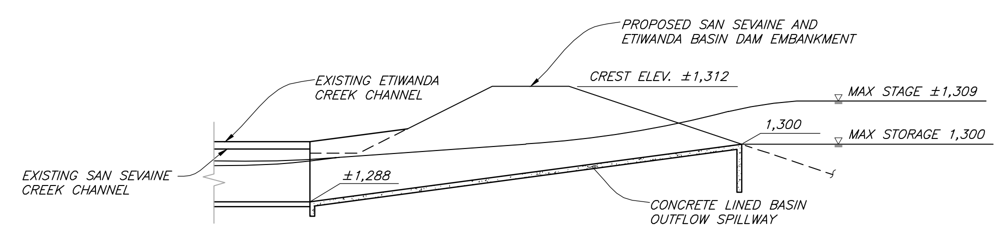


* FLOW VALUES AS SHOWN ON RECORD DRAWING OF SBCFCD, PLANS FOR THE CONSTRUCTION OF
* "SAN SEVAINE & ETIWANDA CREEK CHANNELS FROM VICTORIA AVENUE TO FOOTHILL BOULEVARD"

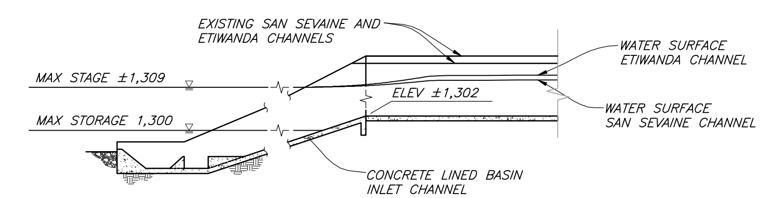
PLAN OF BASIN OUTFLOW SPILLWAY



PLAN OF BASIN INLET CHANNEL ENERGY DISSIPATION STRUCTURE



BASIN OUTFLOW SPILLWAY HYDRAULIC SCHEMATIC



BASIN INLET CHANNEL HYDRAULIC SCHEMATIC

File Name	Scale Factor	Plot Date
Proposed San Sevaine Channel Basin Rev3.dwg	1	04-21-2010

PRELIMINARY NOT FOR CONSTRUCTION AND SUBJECT TO REVISION

REVISIONS			
REF.	DESCRIPTION	APVD.	DATE

DRAFT

Designed By	D.P. LOUNSBURY
Drawn By	J. HERBERT/ P. INTHARATH
Checked By	R.C. WAGNER
Approved By	

Wagner&Bonsignore
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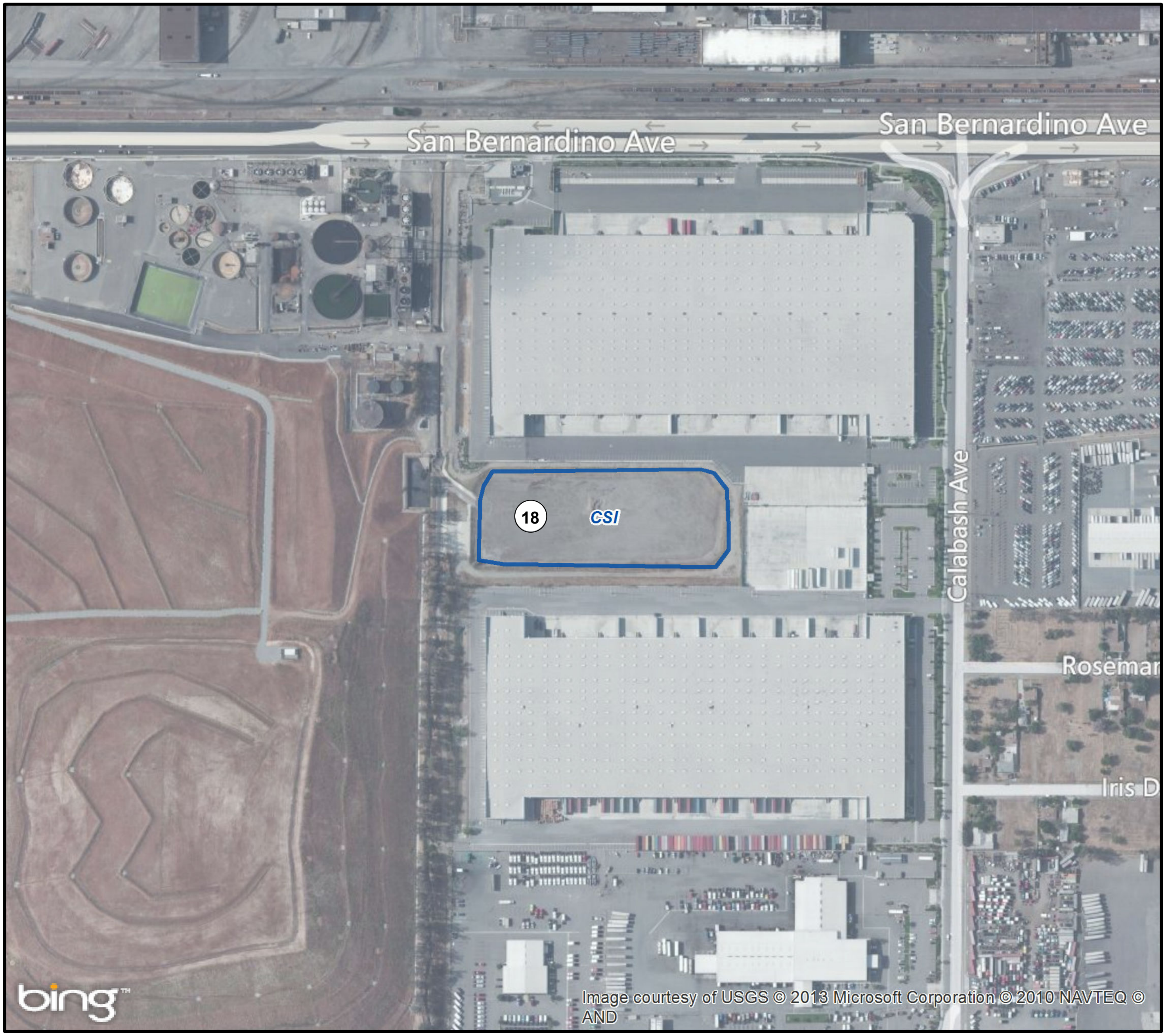
CHINO BASIN WATER CONSERVATION DISTRICT

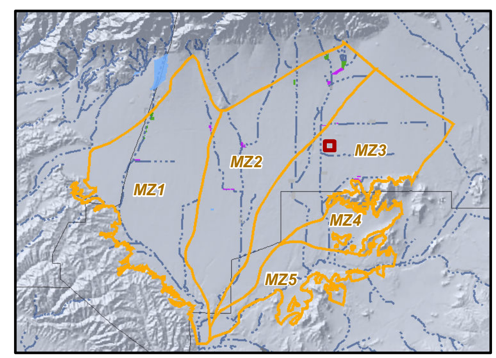
SHEET 2

Figure D-25d
Inlet and Outlet Details for the Lower San Sevaine Basin - PID 17
Source: 2010 RMPU



CSI Storm Water Basin

(18) PID - 18
See Table D-1 for
Project Description



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949.420.3030
www.wildermuthenvironmental.com

Author: MJC
Date: 9/6/2013
Name: Figure_D-26

0 400 800 Feet
0 50 100 200 Meters

2013 Amendment to the
2010 RMPU

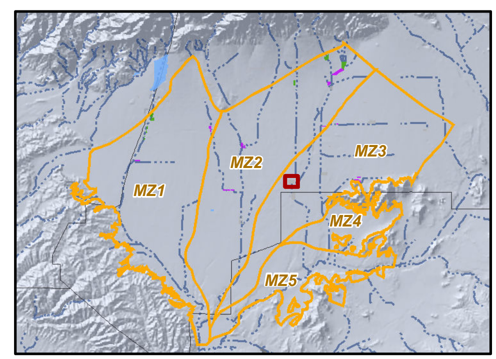
Location of the CSI Storm Water Basin
Evaluated Alternatives Schematic
PID 18

Figure D-26

Wineville Basin

(18) PID - 19
See Table D-1 for
Project Description

Recycled Water Pipeline (In Design)



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Lake Forest, CA 92630
949.420.3030
www.wildermuthenvironmental.com

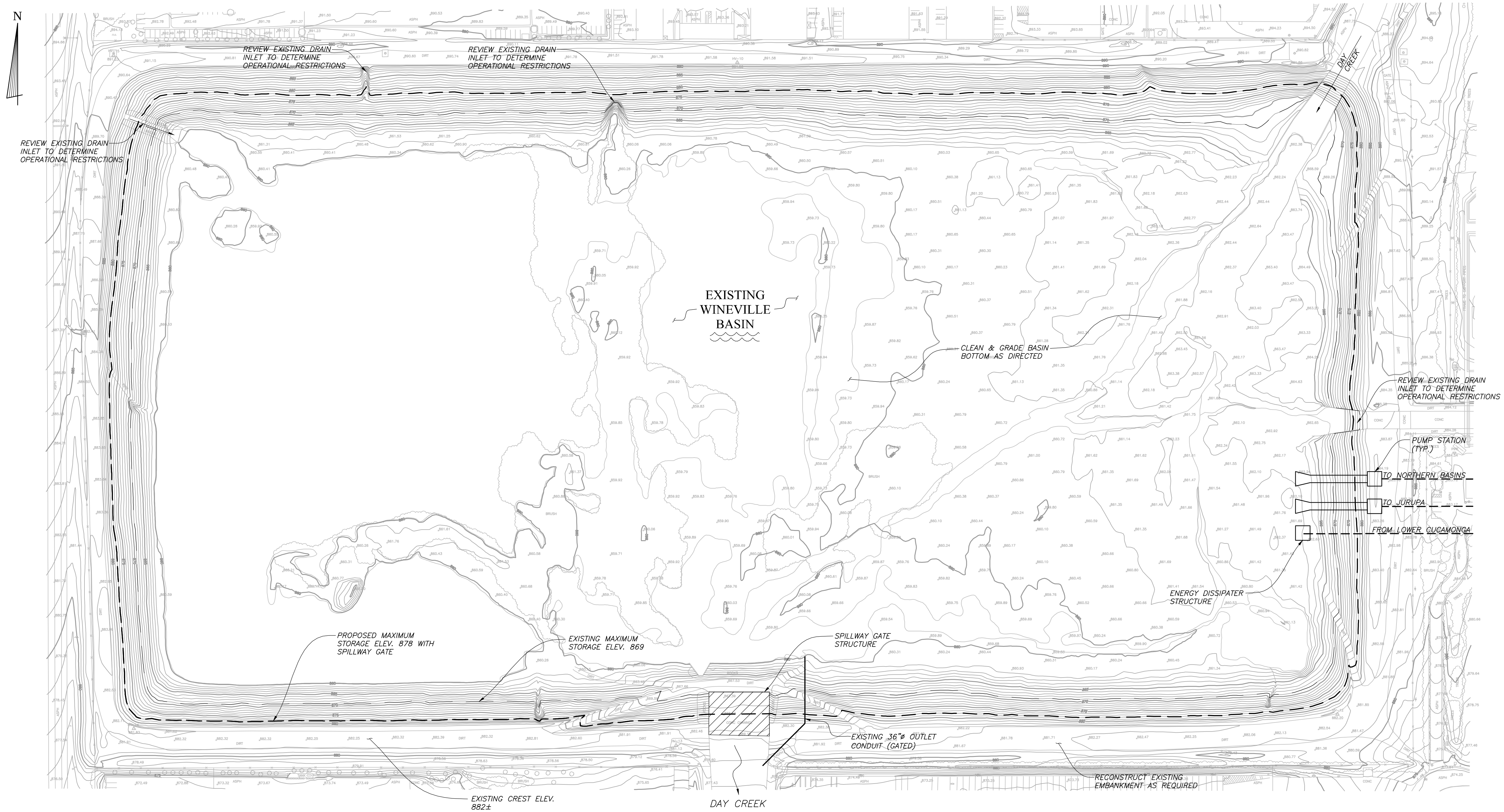
Author: MJC
Date: 9/6/2013
Name: Figure_D-27a

0 400 800 Feet
0 50 100 200 Meters

2013 Amendment to the 2010 RMPU

Location of the Wineville Basin
PID 19

Figure D-27a



PLAN

0' 50' 100' 200'

NOTE:

TOPOGRAPHY PROVIDED BY WILDERMUTH ENVIRONMENTAL INC., NOVEMBER 2009.

File Name: Preliminary Wineville Basin Enlargement Rev2.dwg
Scale Factor: 1
Plot Date: 04-21-2010

PRELIMINARY
NOT FOR CONSTRUCTION
AND
SUBJECT TO REVISION

REVISIONS

REF.	DESCRIPTION	APVD.	DATE

DRAFT

Designed By: D.P. LOUNSBURY
Drawn By: J. HERBERT/ P. INTHARATH
Checked By: R.C. WAGNER
Approved By:

Wagner&Bonsignore
Consulting Civil Engineers, A Corporation
2151 River Plaza,
Suite 100
Sacramento, CA 95833
Ph: 916-441-6850
Fx: 916-448-3866

CHINO BASIN WATER CONSERVATION DISTRICT

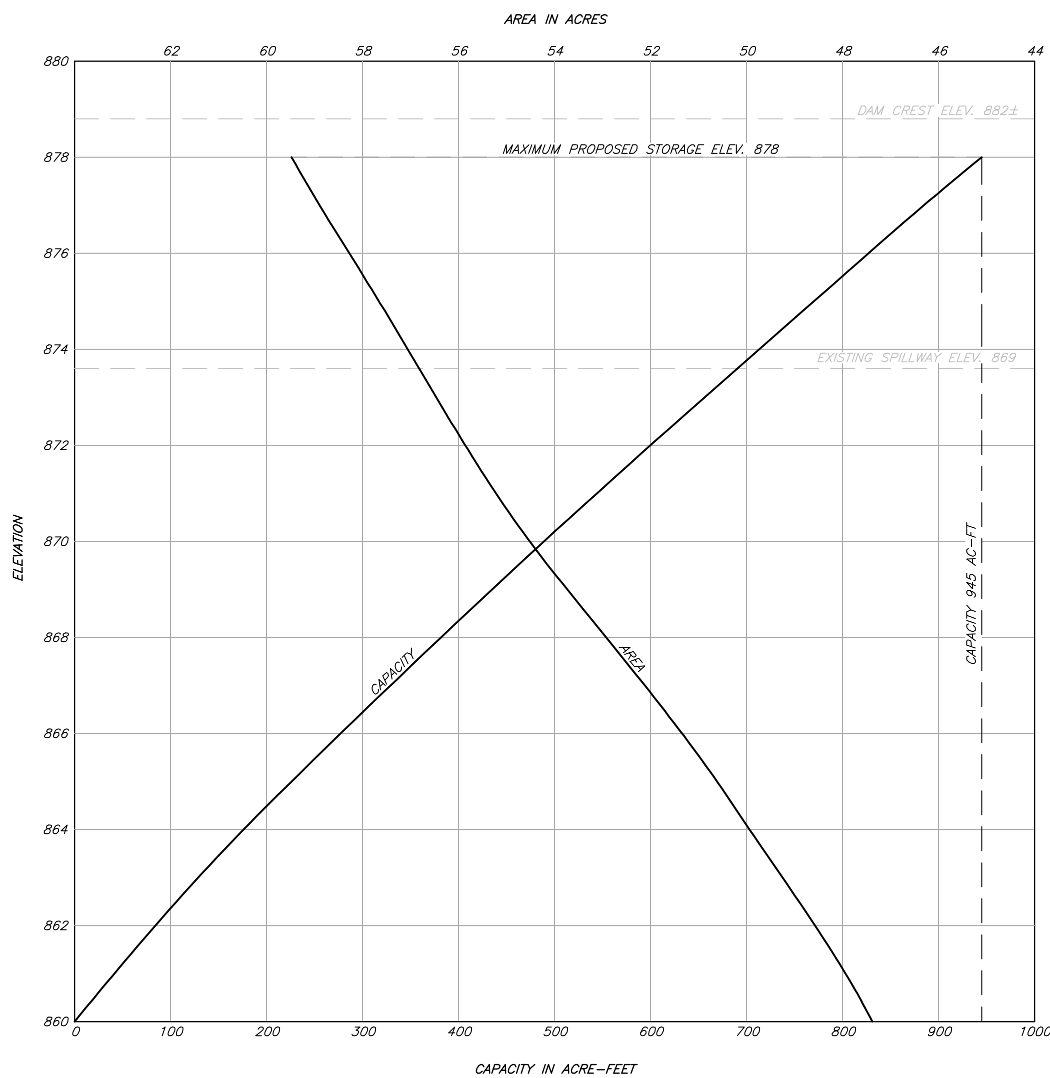
SHEET

Figure D-27b
Site Plan of the Existing Wineville Basin - PID 19
Source: 2010 RMPU

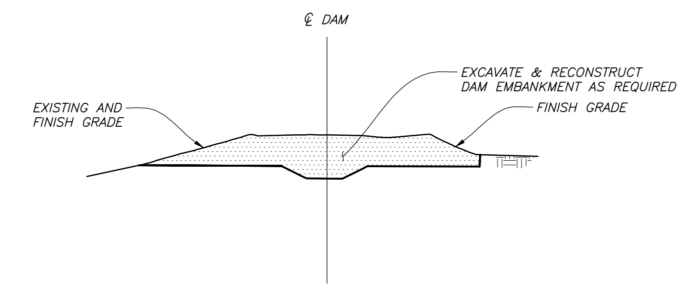
Figure D-27c

Wineville Basin Alternative Schematic - PID 19

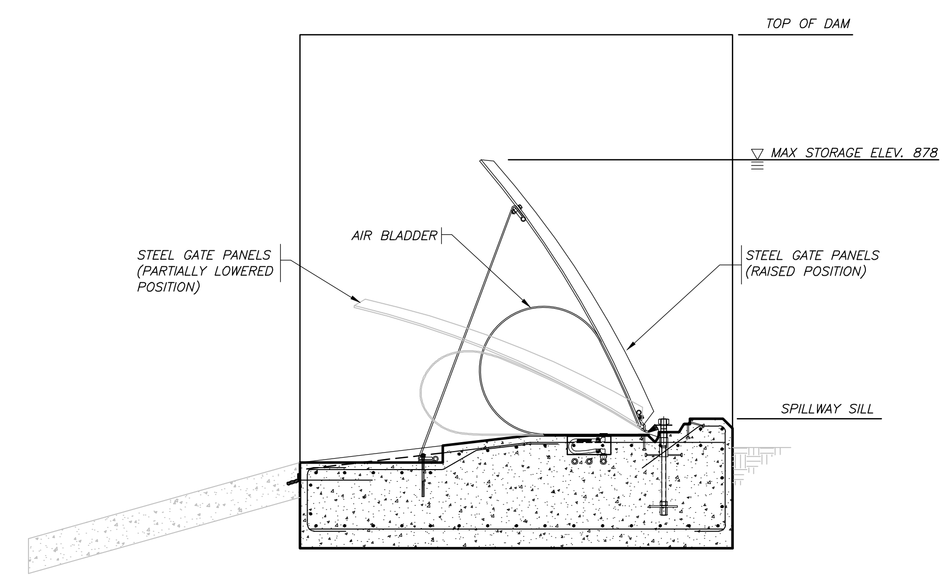
Source: 2010 RMPU



AREA/CAPACITY CURVE



TYPICAL EMBANKMENT RECONSTRUCTION SECTION



CONCEPTUAL SPILLWAY GATE SECTION

NOT TO SCALE

File Name	Preliminary Wineville Basin Enlargement Rev2.dwg
Scale Factor	1
Plot Date	04-21-2010

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AND
SUBJECT TO REVISION

REVISIONS

REF.	DESCRIPTION	APVD.	DATE

DRAFT

Designed By	D.P. LOUNSBURY
Drawn By	J. HERBERT/ P. INTHARATH
Checked By	R.C. WAGNER
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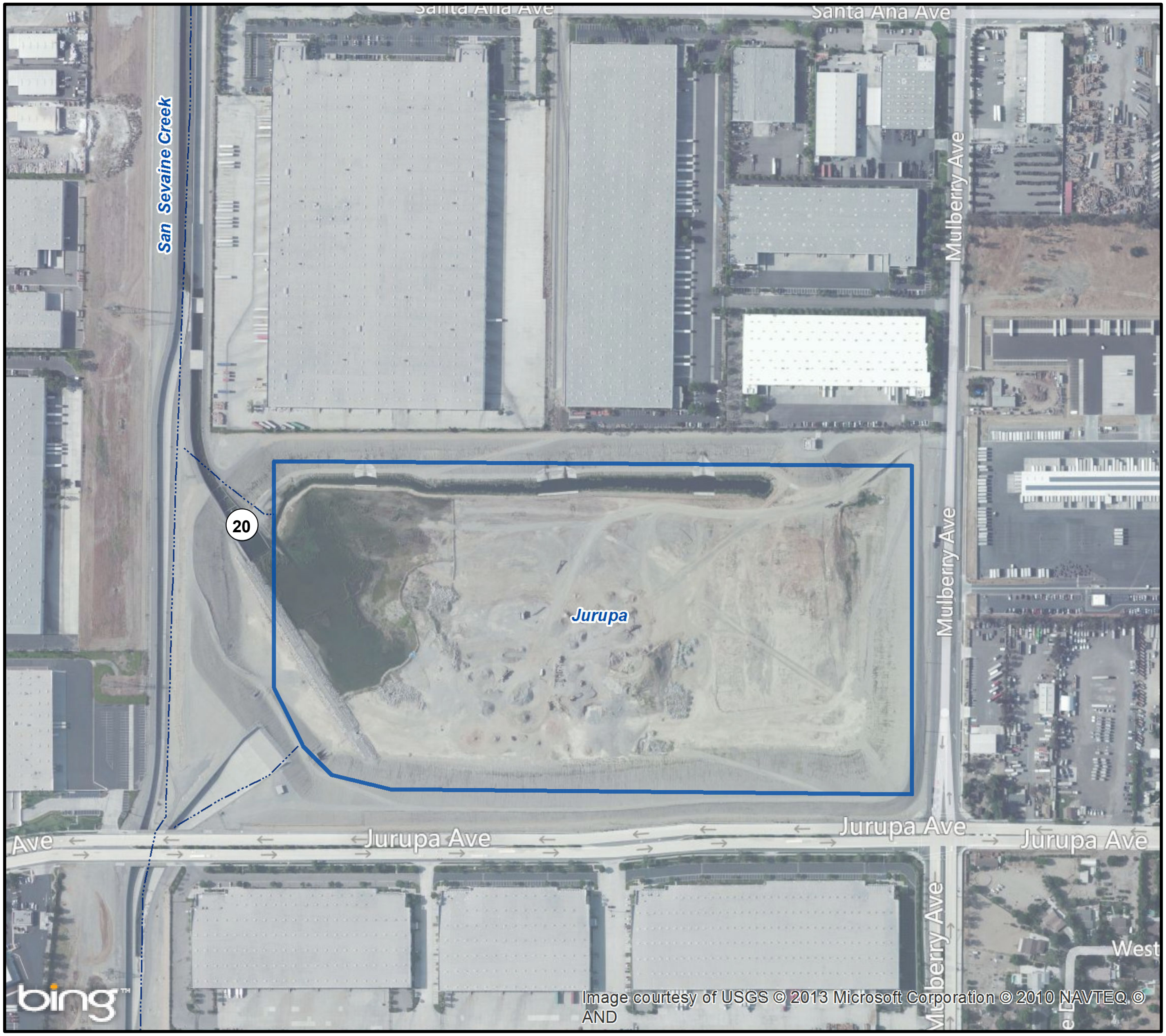
Figure D-27d

Wineville Basin Spillway Details - PID 19

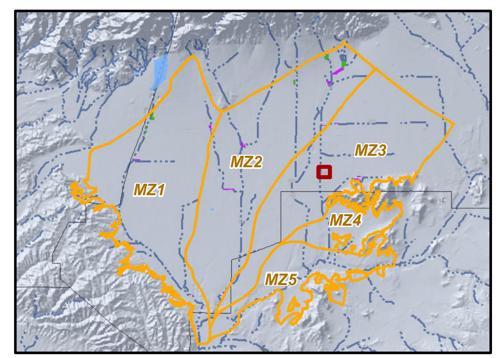
Source: 2010 RMPU



Wineville Basin

(18) PID - 20
See Table D-1 for
Project Description

Recycled Water Pipeline (In Design)



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Author: MJC
Date: 9/6/2013
Name: Figure_D-28a

0 400 800 Feet
0 50 100 200 Meters

2013 Amendment to the
2010 RMPU

Location of the Jurupa Basin
PID 20

Figure D-28a

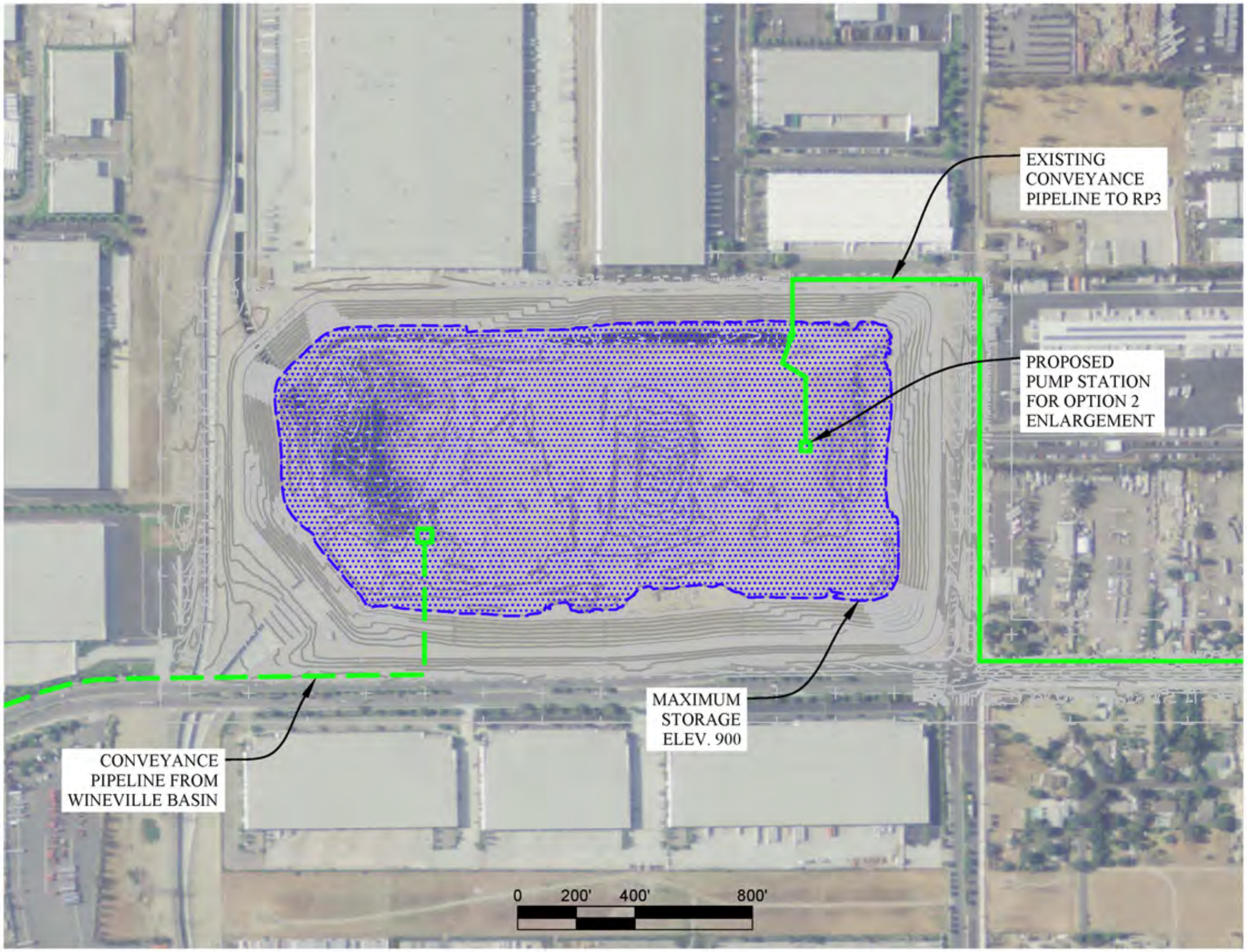
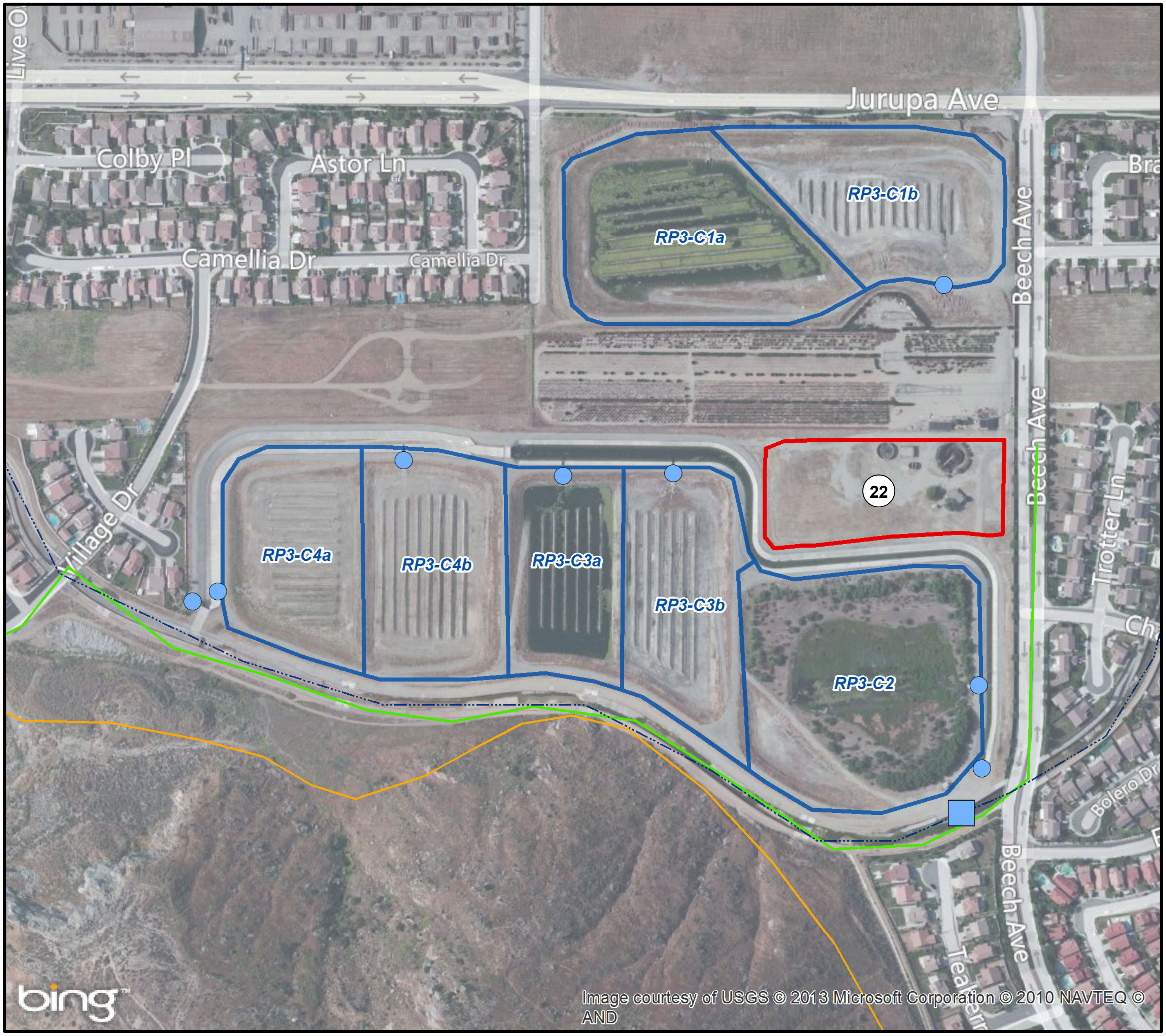


Figure D-28b
Jurupa Basin Alternative Schematic - PID 20
Source: 2010 RMPU



RP3 Basins

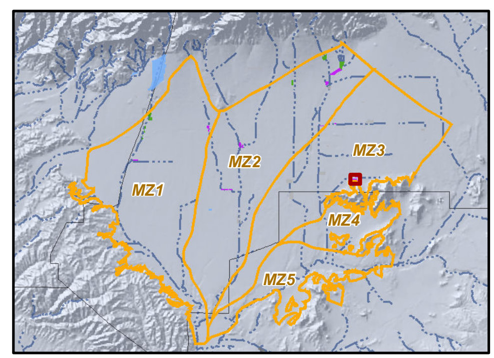
Proposed RP3 Cell

22 PID 21 and 22
See Table D-1 for
Project Description

Water Diversion Structures

Rubber Dam

Sluice Gate



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Author: MJC
Date: 9/8/2013
Name: Figure_D-29a

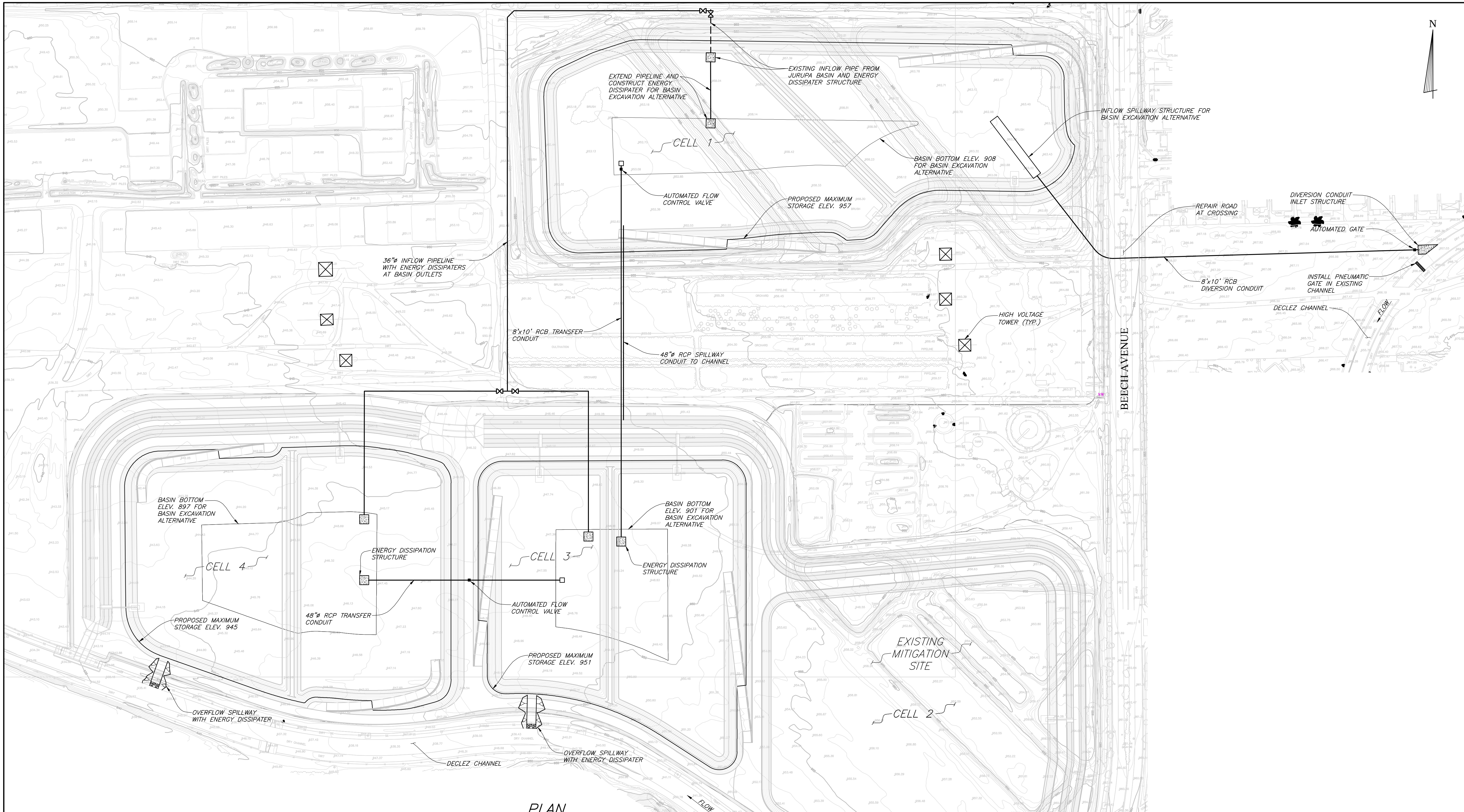
0 250 500 Feet

0 50 100 200 Meters

2013 Amendment to the
2010 RMPU

Location of the RP3 Basins
PID 21 and 22

Figure D-29a



NOTE:

TOPOGRAPHY PROVIDED BY WILDERMUTH ENVIRONMENTAL INC., NOVEMBER 2009.

File Name: RP3 Design Rev3.dwg
Scale Factor: 1
Plot Date: 04-21-2010

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REVISIONS			
REF.	DESCRIPTION	APVD.	DATE

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Figure D-29b
Site Plan of the Existing RP3 Basins - PID 21
Source: 2010 RMPU

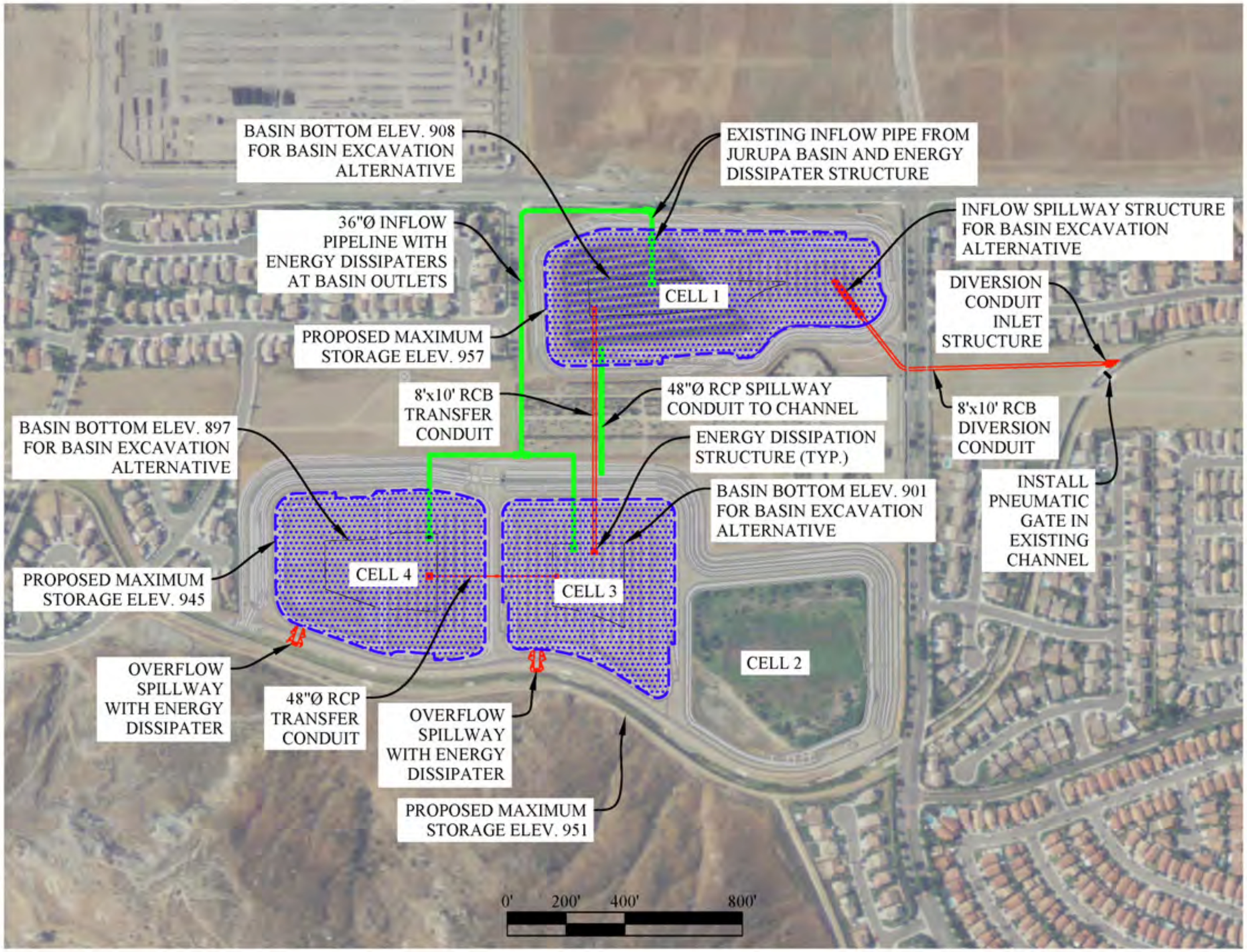
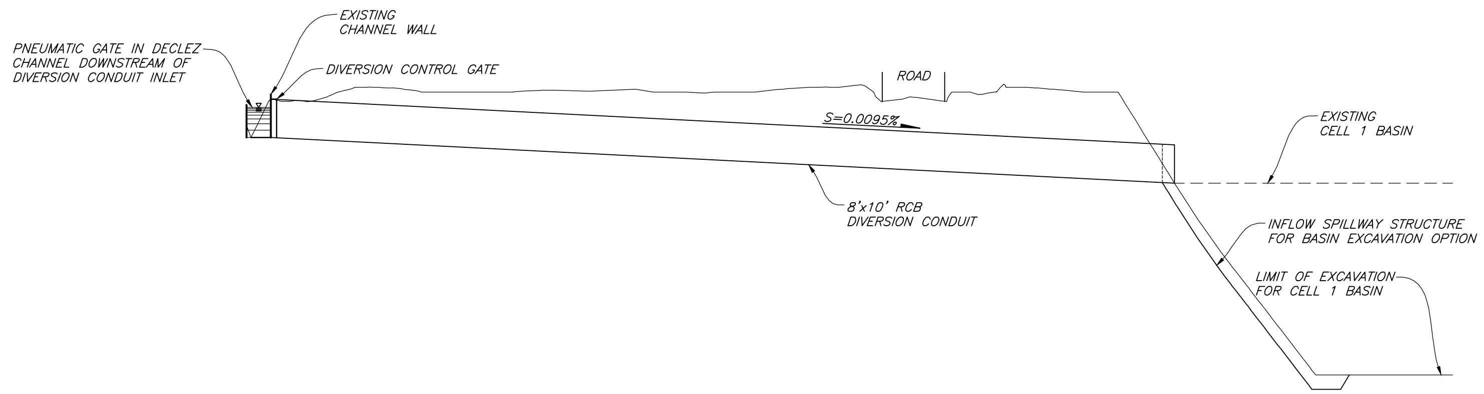
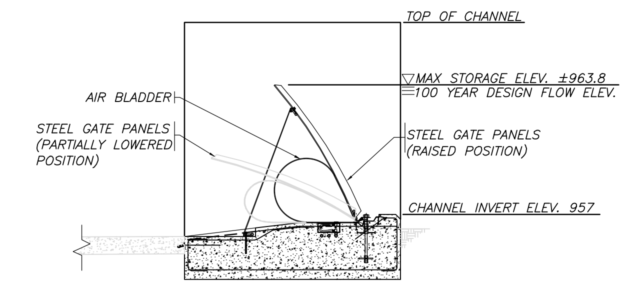


Figure D-29c
RP3 Basins Alternative Schematic- PID 21
Source: 2010 RMPU



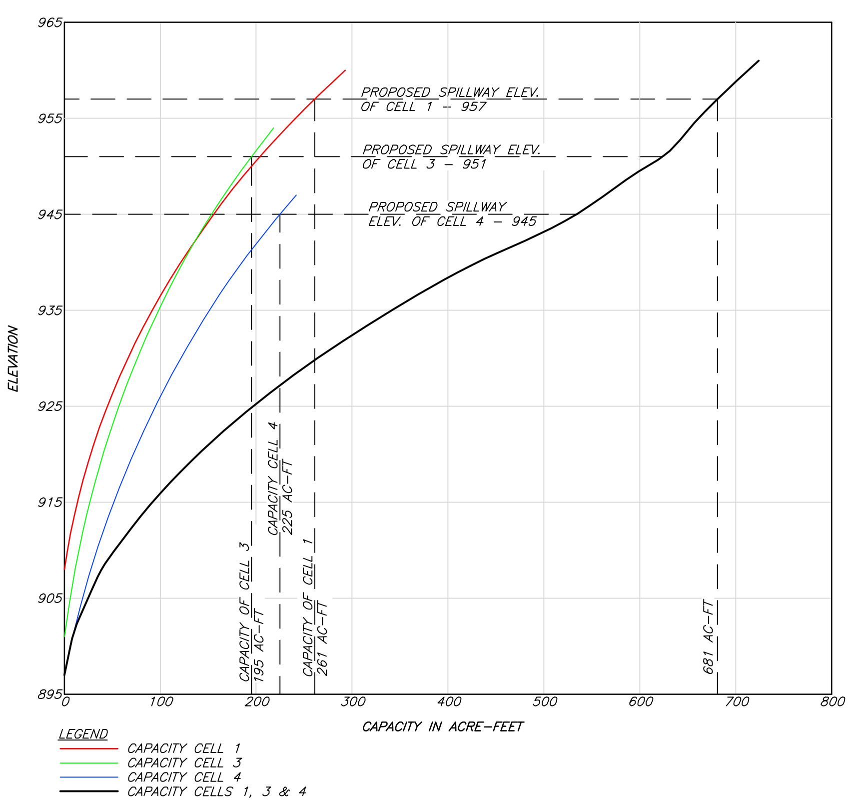
PROFILE OF DECLEZ CREEK DIVERSION CONDUIT

NOT TO SCALE

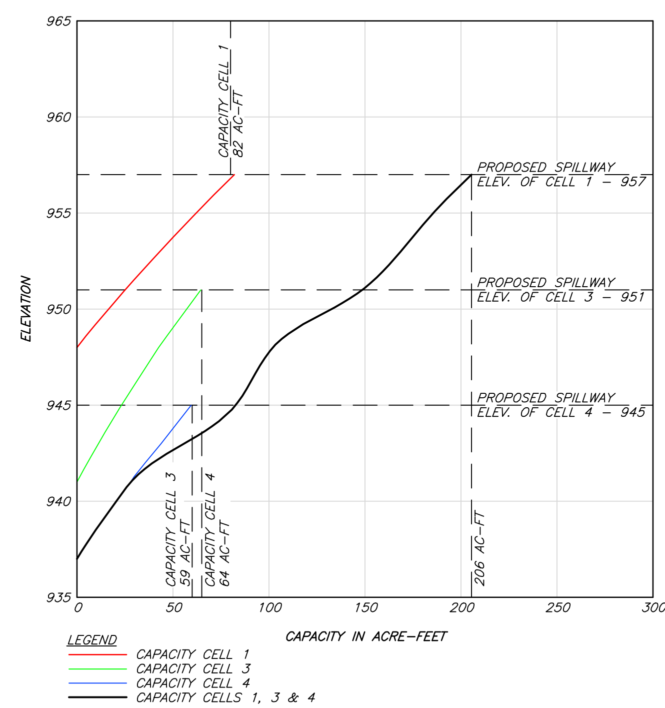


CONCEPTUAL DECLEZ CHANNEL GATE SECTION

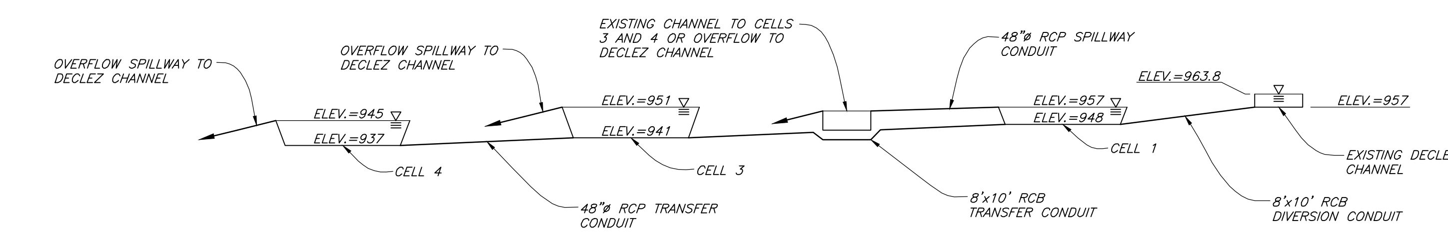
NOT TO SCALE



CAPACITY CURVES (WITH BASIN EXCAVATION)

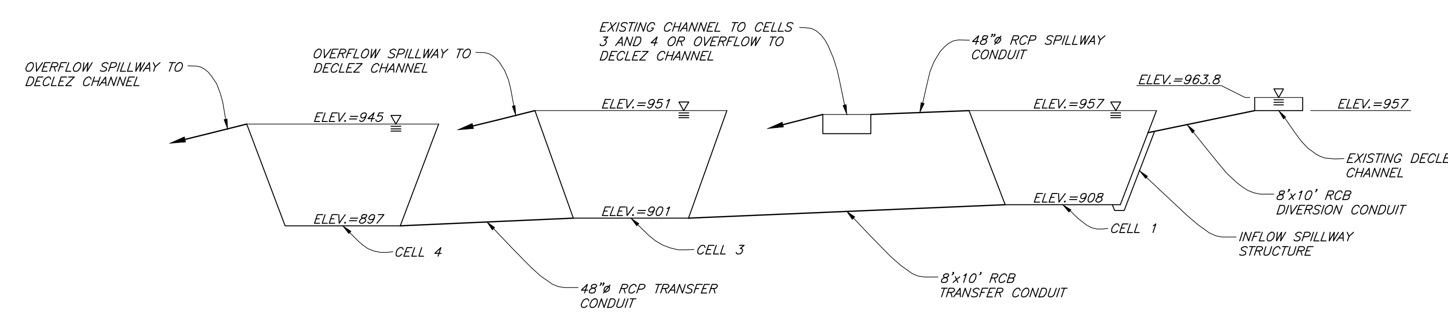


CAPACITY CURVES (NO BASIN EXCAVATION)



CONVEYANCE SYSTEM SCHEMATIC – NO EXCAVATION

NOT TO SCALE



CONVEYANCE SYSTEM SCHEMATIC – WITH EXCAVATION

NOT TO SCALE

File Name: RP3 Design Rev3.dwg
Scale Factor: 1
Plot Date: 04-21-2010

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AND
SUBJECT TO REVISION

REVISIONS			
REF.	DESCRIPTION	APVD.	DATE

DRAFT

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CHINO BASIN WATER CONSERVATION DISTRICT

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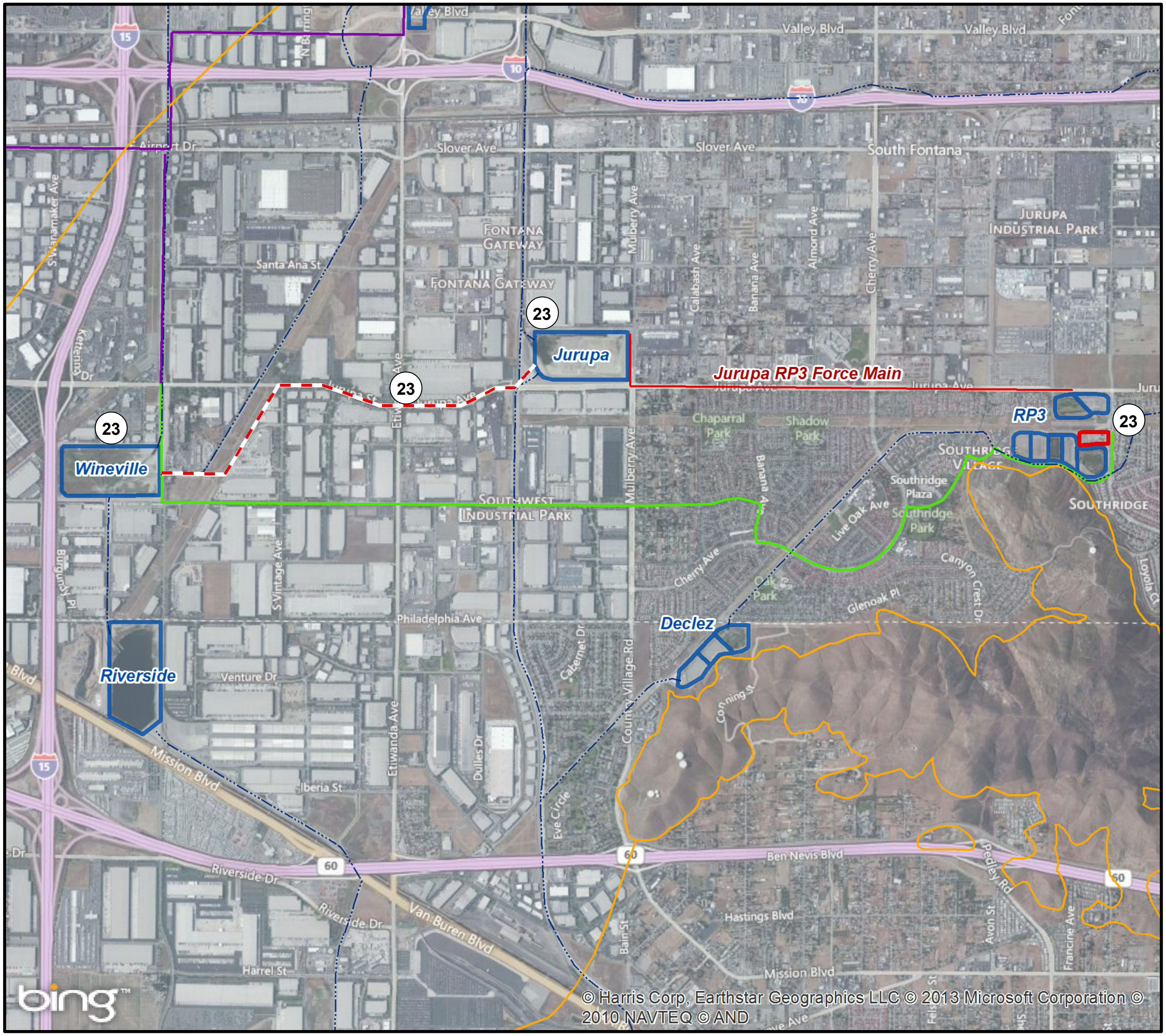
Figure D-29d

RP3 Basins Internal Conveyance Details - PID 21

Source: 2010 RMPU



RP3 Basins

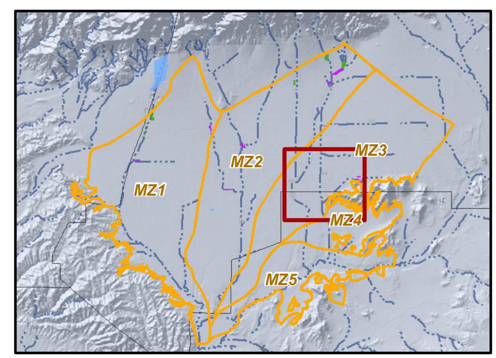
Proposed RP3 Cell

(23) PID - 23 See Table D-1 for Project Description

Proposed Conveyance Pipeline

Recycled Water Pipelines (Symbolized by Status)

Existing	In Construction
Planned	In Design



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Author: MJC
Date: 9/8/2013
Name: Figure_D-30

0 3,000 6,000 Feet

0 500 1,000 2,000 Meters

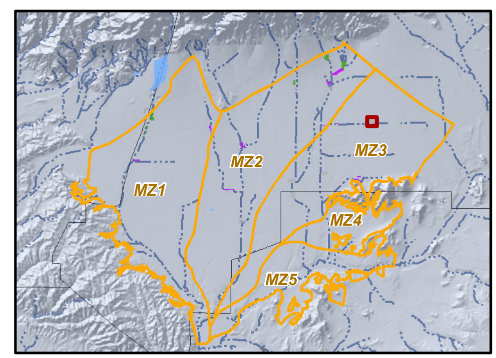
2013 Amendment to the 2010 RMPU

2013 RMPU Proposed Wineville PS to Jurupa, Expanded Jurupa PS to RP3 Basin, and 2013 Proposed RP3 Improvements PID 23

Figure D-30

Wineville Basin

27 PID - 24
See Table D-1 for
Project Description



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Author: MJC
Date: 9/8/2013
Name: Figure_D-31a_

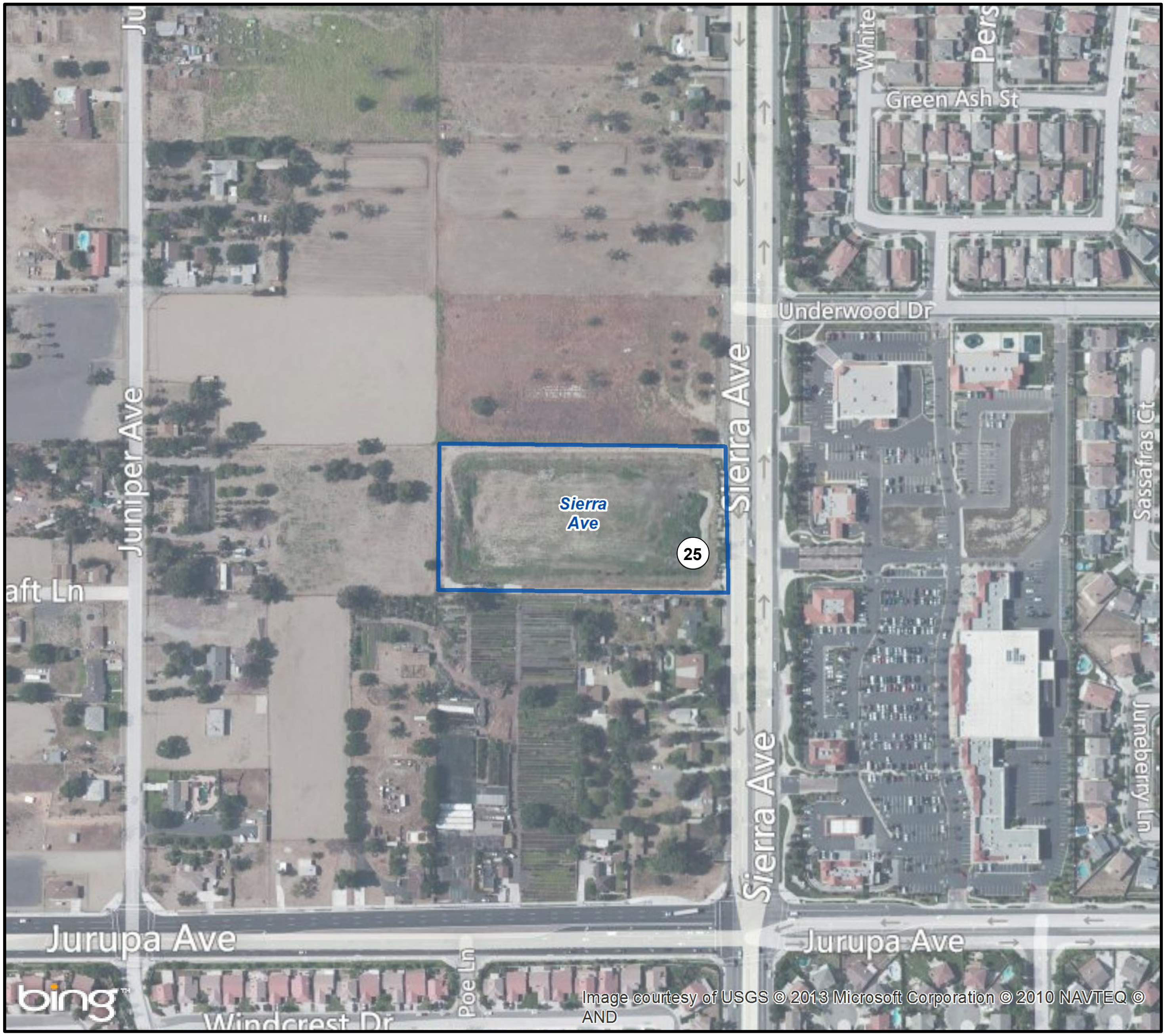
0 400 800 Feet
0 50 100 200 Meters

2013 Amendment to the 2010 RMPU

Location of the Vulcan Pit
PID 24

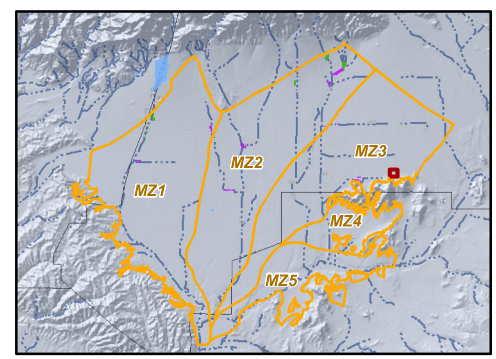
Figure D-34a

Figure D-31b
Vulcan Pit Alternative Schematic- PID 24
Source: 2010 RMPU



Sierra Ave Basin

25 PID 25
See Table D-1 for Project Description



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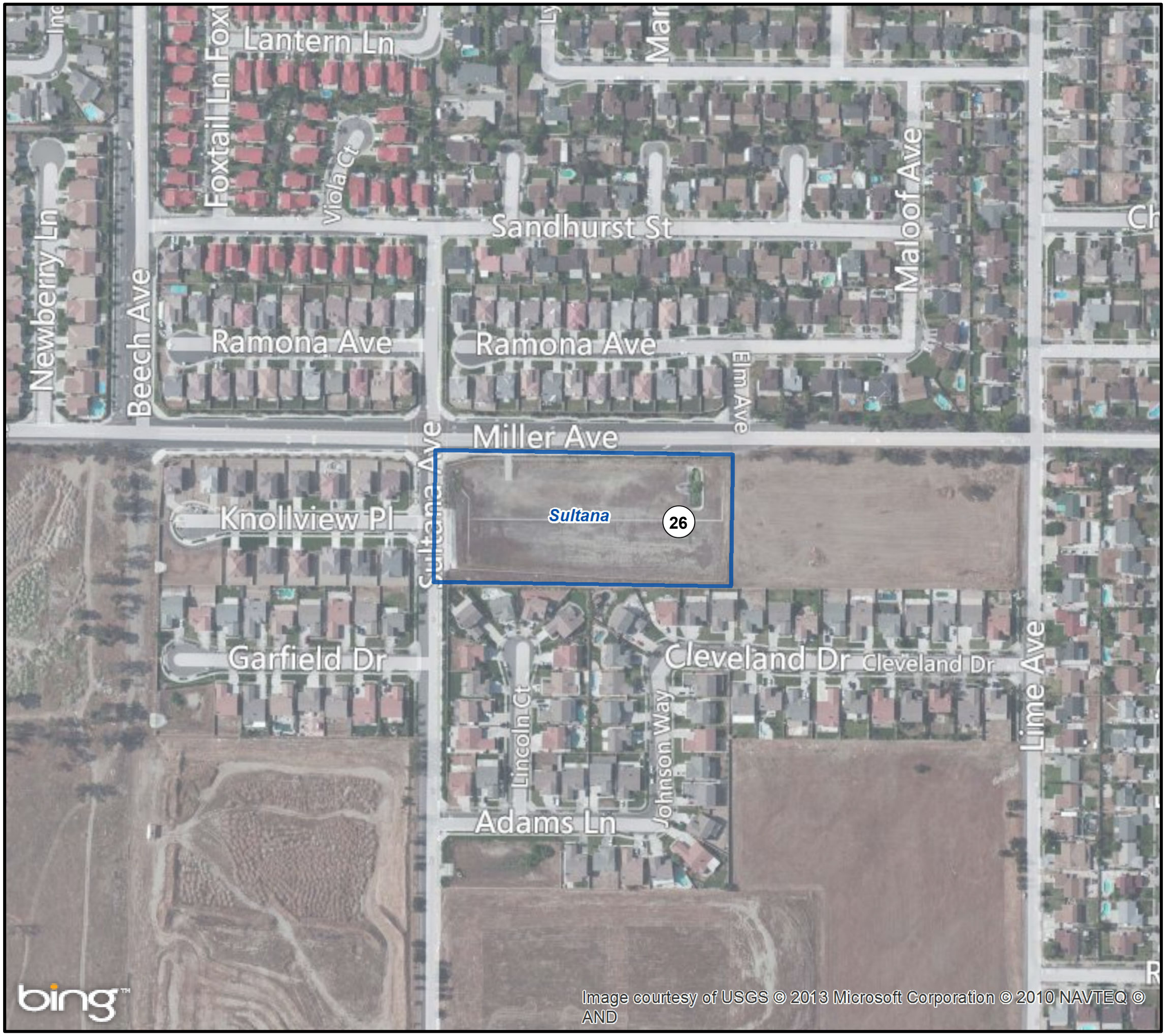
Author: MJC
Date: 9/11/2013
Name: Figure_D-32

0 250 500 Feet
0 50 100 200 Meters

2013 Amendment to the 2010 RMPU

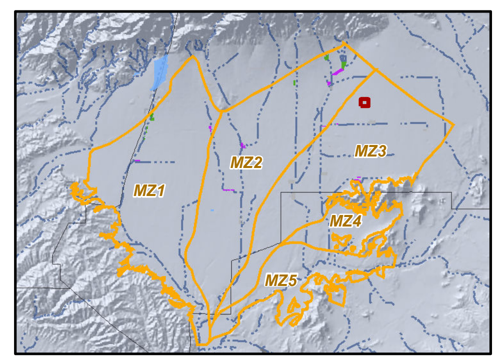
Location of the Sierra Basin PID 25

Figure D-32



Sultana Basin

26 PID 26
See Table D-1 for
Project Description



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Author: MJC
Date: 9/11/2013
Name: Figure_D-33

0 250 500 Feet
0 50 100 200 Meters

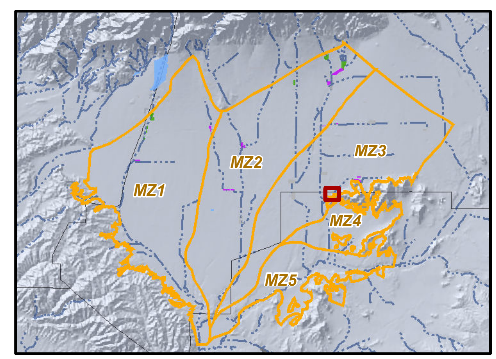
2013 Amendment to the 2010 RMPU

Location of the Sultana Basin
PID 26

Figure D-33

Wineville Basin

27 PID - 27
See Table D-1 for Project Description



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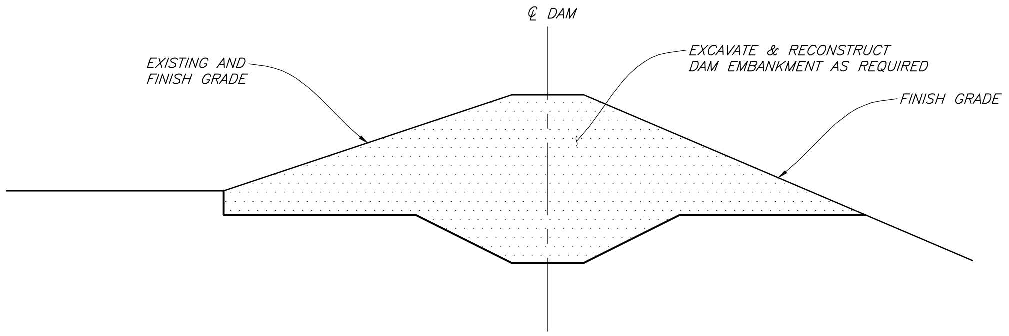
Author: MJC
Date: 9/6/2013
Name: Figure_D-34a

0 400 800 Feet
0 50 100 200 Meters

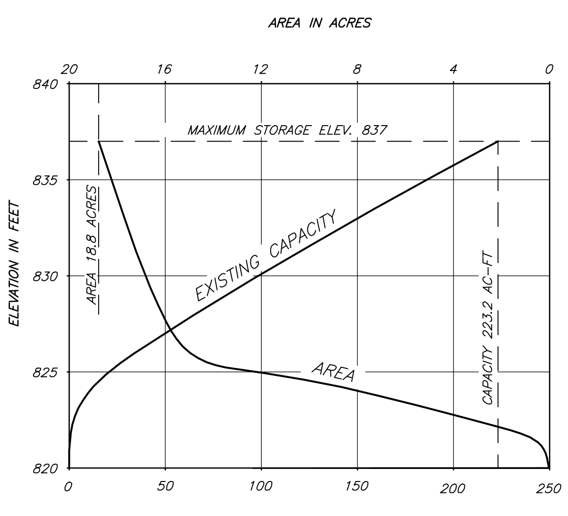
2013 Amendment to the 2010 RMPU

Location of the Declez Basin PID 27

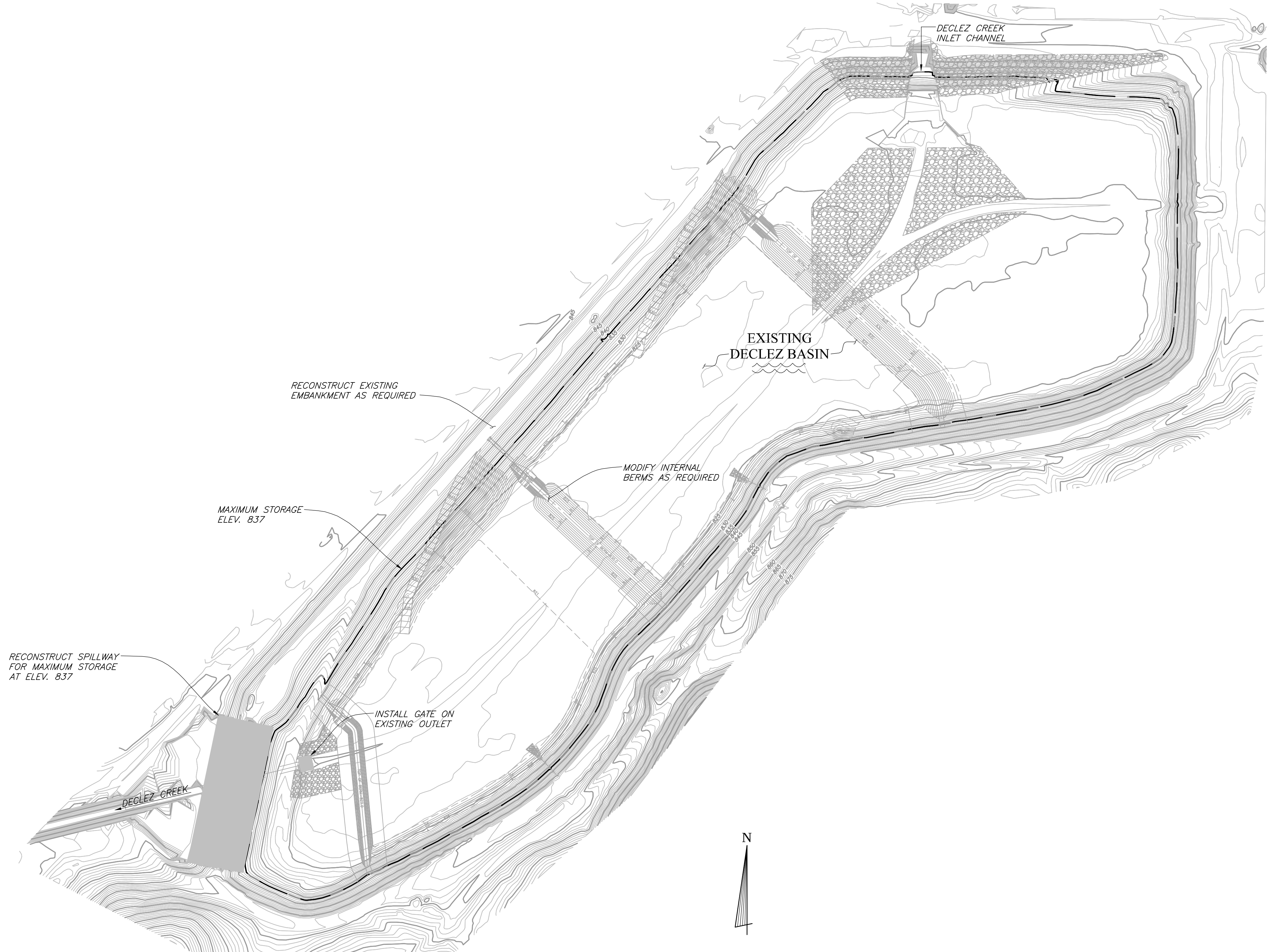
Figure D-34a



TYPICAL EMBANKMENT RECONSTRUCTION SECTION



AREA/CAPACITY CURVES



PLAN

0' 50' 100' 200'

REVISIONS			
REF.	DESCRIPTION	APVD.	DATE

File Name Declez.dwg
Scale Factor 1
Plot Date 04-21-2010

Designed By D.P. LOUNSBURY
Drawn By J. HERBERT/ P.INTHARATH
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Approved By

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CHINO BASIN WATER CONSERVATION DISTRICT

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Figure D-34b

Site Plan of the Existing Declez Basin - PID 27

Source: 2010 RMPU

Figure D-34c
Declez Basin Alternative Schematic- PID 27
Source: 2010 RMPU