GHCND:ANTIOCH	19820801	Aug-82	8	1982	0.00	72.5
GHCND:ANTIOCH	19820901	Sep-82	9	1982	1.22	70
GHCND:ANTIOCH	19821001	Oct-82	10	1982	1.31	63
GHCND:ANTIOCH	19821101	Nov-82	11	1982	4.23	48.6
GHCND:ANTIOCH	19821201	Dec-82	12	1982	1.96	46.6
GHCND:ANTIOCH	19830101	Jan-83	1	1983	5.20	42.8
GHCND:ANTIOCH	19830201	Feb-83	2	1983	3.76	50.5
GHCND:ANTIOCH	19830301	Mar-83	3	1983	6.26	54.1
GHCND:ANTIOCH	19830401	Apr-83	4	1983	3.31	55.4
GHCND:ANTIOCH	19830501	May-83	5	1983	0.38	63.9
GHCND:ANTIOCH	19830601	Jun-83	6	1983	0.00	70.5
GHCND:ANTIOCH	19830701	Jul-83	7	1983	0.00	72.3
GHCND:ANTIOCH	19830801	Aug-83	8	1983	0.06	73.9
GHCND:ANTIOCH	19830901	Sep-83	9	1983	0.63	73
GHCND:ANTIOCH	19831001	Oct-83	10	1983	0.06	64.8
GHCND:ANTIOCH	19831101	Nov-83	11	1983	3.99	53.2
GHCND:ANTIOCH	19831201	Dec-83	12	1983	4.11	50
GHCND:ANTIOCH	19840101	Jan-84	1	1984	0.13	45.7
GHCND:ANTIOCH	19840201	Feb-84	2	1984	1.00	49.8
GHCND:ANTIOCH	19840301	Mar-84	3	1984	0.86	58.3
GHCND:ANTIOCH	19840401	Apr-84	4	1984	0.19	59
GHCND:ANTIOCH	19840501	May-84	5	1984	0.01	71.6
GHCND:ANTIOCH	19840601	Jun-84	6	1984	0.00	71.6
GHCND:ANTIOCH	19840701	Jul-84	7	1984	0.00	78.4
GHCND:ANTIOCH	19840801	Aug-84	8	1984	0.01	75.4
GHCND:ANTIOCH	19840901	Sep-84	9	1984	0.04	76.1
GHCND:ANTIOCH	19841001	Oct-84	10	1984	1.75	61.5
GHCND:ANTIOCH	19841101	Nov-84	11	1984	3.82	51.8
GHCND:ANTIOCH	19841201	Dec-84	12	1984	0.85	43.9
GHCND:ANTIOCH	19850101	Jan-85	1	1985	0.44	40.3
GHCND:ANTIOCH	19850201	Feb-85	2	1985	0.84	51.1
GHCND:ANTIOCH	19850301	Mar-85	3	1985	1.90	50.9
GHCND:ANTIOCH	19850401	Apr-85	4	1985	0.22	62.4
GHCND:ANTIOCH	19850501	May-85	5	1985	0.00	62.1
GHCND:ANTIOCH	19850601	Jun-85	6	1985	0.22	77
GHCND:ANTIOCH	19850701	Jul-85	7	1985	0.00	72
GHCND:ANTIOCH	19850801	Aug-85	8	1985	0.00	72.3
GHCND:ANTIOCH	19850901	Sep-85	9	1985	0.16	68.9
GHCND:ANTIOCH	19851001	Oct-85	10	1985	0.54	63.7
GHCND:ANTIOCH	19851101	Nov-85	11	1985	2.23	52.2
GHCND:ANTIOCH	19851201	Dec-85	12	1985	2.03	41.7
GHCND:ANTIOCH	19860101	Jan-86	1	1986	1.82	50.9
GHCND:ANTIOCH	19860201	Feb-86	2	1986	7.30	54.1
GHCND:ANTIOCH	19860301	Mar-86	3	1986	3.71	57.9
GHCND:ANTIOCH	19860401	Apr-86	4	1986	0.70	59.2
GHCND:ANTIOCH	19860501	May-86	5	1986	0.18	66.2
GHCND:ANTIOCH	19860601	Jun-86	6	1986	0.00	71.2

GHCND:|ANTIOCH	19860701	Jul-86	7	1986	0.02	73.8
GHCND:|ANTIOCH	19860801	Aug-86	8	1986	0.00	72.9
GHCND:|ANTIOCH	19860901	Sep-86	9	1986	0.71	67.1
GHCND:|ANTIOCH	19861001	Oct-86	10	1986	0.05	65.3
GHCND:|ANTIOCH	19861101	Nov-86	11	1986	0.00	58.1
GHCND:|ANTIOCH	19861201	Dec-86	12	1986	0.52	45.9
GHCND:|ANTIOCH	19870101	Jan-87	1	1987	1.74	45.3
GHCND:|ANTIOCH	19870201	Feb-87	2	1987	3.04	52
GHCND:|ANTIOCH	19870301	Mar-87	3	1987	1.89	54.9
GHCND:|ANTIOCH	19870401	Apr-87	4	1987	0.16	64.2
GHCND:|ANTIOCH	19870501	May-87	5	1987	0.06	69.1
GHCND:|ANTIOCH	19870601	Jun-87	6	1987	0.00	72.3
GHCND:|ANTIOCH	19870701	Jul-87	7	1987	0.00	71.2
GHCND:|ANTIOCH	19870801	Aug-87	8	1987	0.00	73.4
GHCND:|ANTIOCH	19870901	Sep-87	9	1987	0.00	71.6
GHCND:|ANTIOCH	19871001	Oct-87	10	1987	0.43	68.5
GHCND:|ANTIOCH	19871101	Nov-87	11	1987	1.31	54.5
GHCND:|ANTIOCH	19871201	Dec-87	12	1987	3.56	46.9
GHCND:|ANTIOCH	19880101	Jan-88	1	1988	2.48	46.4
GHCND:|ANTIOCH	19880201	Feb-88	2	1988	0.49	53.4
GHCND:|ANTIOCH	19880301	Mar-88	3	1988	0.35	57.6
GHCND:|ANTIOCH	19880401	Apr-88	4	1988	0.44	60.8
GHCND:|ANTIOCH	19880501	May-88	5	1988	0.67	64.8
GHCND:|ANTIOCH	19880601	Jun-88	6	1988	0.44	72.3
GHCND:|ANTIOCH	19880701	Jul-88	7	1988	0.00	79.9
GHCND:|ANTIOCH	19880801	Aug-88	8	1988	0.00	74.5
GHCND:|ANTIOCH	19880901	Sep-88	9	1988	0.00	72.3
GHCND:|ANTIOCH	19881001	Oct-88	10	1988	0.45	64.9
GHCND:|ANTIOCH	19881101	Nov-88	11	1988	1.31	55.4
GHCND:|ANTIOCH	19881201	Dec-88	12	1988	1.86	45.9
GHCND:|ANTIOCH	19890101	Jan-89	1	1989	0.87	44.1
GHCND:|ANTIOCH	19890201	Feb-89	2	1989	1.00	46.9
GHCND:|ANTIOCH	19890301	Mar-89	3	1989	2.40	56.3
GHCND:|ANTIOCH	19890401	Apr-89	4	1989	0.09	62.8
GHCND:|ANTIOCH	19890501	May-89	5	1989	0.14	66.7
GHCND:|ANTIOCH	19890601	Jun-89	6	1989	0.20	72.5
GHCND:|ANTIOCH	19890701	Jul-89	7	1989	0.00	76.6
GHCND:|ANTIOCH	19890801	Aug-89	8	1989	0.04	72.9
GHCND:|ANTIOCH	19890901	Sep-89	9	1989	1.84	69.1
GHCND:|ANTIOCH	19891001	Oct-89	10	1989	1.33	64.2
GHCND:|ANTIOCH	19891101	Nov-89	11	1989	1.02	55.4
GHCND:|ANTIOCH	19891201	Dec-89	12	1989	0.00	44.1
GHCND:|ANTIOCH	19900101	Jan-90	1	1990	1.22	47.3
GHCND:|ANTIOCH	19900201	Feb-90	2	1990	1.69	47.8
GHCND:|ANTIOCH	19900301	Mar-90	3	1990	0.66	55.6
GHCND:|ANTIOCH	19900401	Apr-90	4	1990	0.34	63.7
GHCND:|ANTIOCH	19900501	May-90	5	1990	1.92	66.4

GHCND:|ANTIOCH	19900601	Jun-90	6	1990	0.00	72.1
GHCND:|ANTIOCH	19900701	Jul-90	7	1990	0.00	77.4
GHCND:|ANTIOCH	19900801	Aug-90	8	1990	0.00	76.3
GHCND:|ANTIOCH	19900901	Sep-90	9	1990	0.00	72.7
GHCND:|ANTIOCH	19901001	Oct-90	10	1990	0.09	68.2
GHCND:|ANTIOCH	19901101	Nov-90	11	1990	0.22	54.9
GHCND:|ANTIOCH	19901201	Dec-90	12	1990	1.61	42.8
GHCND:|ANTIOCH	19910101	Jan-91	1	1991	0.18	46.9
GHCND:|ANTIOCH	19910201	Feb-91	2	1991	2.16	54.7
GHCND:|ANTIOCH	19910301	Mar-91	3	1991	4.39	51.6
GHCND:|ANTIOCH	19910401	Apr-91	4	1991	0.17	57.9
GHCND:|ANTIOCH	19910501	May-91	5	1991	0.25	63.3
GHCND:|ANTIOCH	19910701	Jul-91	7	1991	0.00	74.8
GHCND:|ANTIOCH	19910801	Aug-91	8	1991	0.04	72.5
GHCND:|ANTIOCH	19910901	Sep-91	9	1991	0.00	73.4
GHCND:|ANTIOCH	19911001	Oct-91	10	1991	1.29	69.4
GHCND:|ANTIOCH	19911101	Nov-91	11	1991	0.11	56.1
GHCND:|ANTIOCH	19911201	Dec-91	12	1991	1.16	45.7
GHCND:|ANTIOCH	19920101	Jan-92	1	1992	0.93	42.3
GHCND:|ANTIOCH	19920201	Feb-92	2	1992	3.95	53.6
GHCND:|ANTIOCH	19920301	Mar-92	3	1992	1.86	56.7
GHCND:|ANTIOCH	19920401	Apr-92	4	1992	0.47	63.1
GHCND:|ANTIOCH	19920501	May-92	5	1992	0.00	71.2
GHCND:|ANTIOCH	19920601	Jun-92	6	1992	0.22	71.4
GHCND:|ANTIOCH	19920701	Jul-92	7	1992	0.00	75.2
GHCND:|ANTIOCH	19920801	Aug-92	8	1992	0.00	77.5
GHCND:|ANTIOCH	19920901	Sep-92	9	1992	0.00	72.5
GHCND:|ANTIOCH	19921001	Oct-92	10	1992	0.46	67.8
GHCND:|ANTIOCH	19921101	Nov-92	11	1992	0.12	56.3
GHCND:|ANTIOCH	19921201	Dec-92	12	1992	3.76	44.8
GHCND:|ANTIOCH	19930101	Jan-93	1	1993	6.97	46.2
GHCND:|ANTIOCH	19930201	Feb-93	2	1993	3.76	50.5
GHCND:|ANTIOCH	19930301	Mar-93	3	1993	1.98	58.1
GHCND:|ANTIOCH	19930401	Apr-93	4	1993	0.19	60.3
GHCND:|ANTIOCH	19930501	May-93	5	1993	0.50	66
GHCND:|ANTIOCH	19930601	Jun-93	6	1993	0.10	75.4
GHCND:|ANTIOCH	19930701	Jul-93	7	1993	0.00	78.3
GHCND:|ANTIOCH	19930801	Aug-93	8	1993	0.00	76.6
GHCND:|ANTIOCH	19930901	Sep-93	9	1993	0.00	72.3
GHCND:|ANTIOCH	19931001	Oct-93	10	1993	0.23	66.6
GHCND:|ANTIOCH	19931101	Nov-93	11	1993	1.86	54
GHCND:|ANTIOCH	19931201	Dec-93	12	1993	1.30	45.1
GHCND:|ANTIOCH	19940101	Jan-94	1	1994	0.93	46.4
GHCND:|ANTIOCH	19940201	Feb-94	2	1994	2.64	48.2
GHCND:|ANTIOCH	19940301	Mar-94	3	1994	0.13	57
GHCND:|ANTIOCH	19940401	Apr-94	4	1994	0.55	61.3
GHCND:|ANTIOCH	19940501	May-94	5	1994	1.06	65.1

GHCND:ANTIOCH	19940601	Jun-94	6	1994	0.00	72.1
GHCND:ANTIOCH	19940701	Jul-94	7	1994	0.00	74.5
GHCND:ANTIOCH	19940801	Aug-94	8	1994	0.00	75.2
GHCND:ANTIOCH	19940901	Sep-94	9	1994	0.01	71.6
GHCND:ANTIOCH	19941001	Oct-94	10	1994	0.42	63.9
GHCND:ANTIOCH	19941101	Nov-94	11	1994	3.50	49.5
GHCND:ANTIOCH	19941201	Dec-94	12	1994	1.25	44.4
GHCND:ANTIOCH	19950101	Jan-95	1	1995	6.02	52
GHCND:ANTIOCH	19950201	Feb-95	2	1995	0.06	52.7
GHCND:ANTIOCH	19950301	Mar-95	3	1995	5.74	53.8
GHCND:ANTIOCH	19950401	Apr-95	4	1995	0.28	58.5
GHCND:ANTIOCH	19950501	May-95	5	1995	1.21	62.2
GHCND:ANTIOCH	19950601	Jun-95	6	1995	0.64	69.6
GHCND:ANTIOCH	19950701	Jul-95	7	1995	0.00	74.7
GHCND:ANTIOCH	19950801	Aug-95	8	1995	0.00	75.4
GHCND:ANTIOCH	19950901	Sep-95	9	1995	0.00	71.6
GHCND:ANTIOCH	19951001	Oct-95	10	1995	0.00	66.6
GHCND:ANTIOCH	19951101	Nov-95	11	1995	0.00	59.7
GHCND:ANTIOCH	19951201	Dec-95	12	1995	5.05	51.8
GHCND:ANTIOCH	19960101	Jan-96	1	1996	2.77	48.9
GHCND:ANTIOCH	19960201	Feb-96	2	1996	3.32	52.9
GHCND:ANTIOCH	19960301	Mar-96	3	1996	1.94	56.3
GHCND:ANTIOCH	19960401	Apr-96	4	1996	1.16	61.3
GHCND:ANTIOCH	19960501	May-96	5	1996	1.23	66.7
GHCND:ANTIOCH	19960601	Jun-96	6	1996	0.00	72.9
GHCND:ANTIOCH	19960701	Jul-96	7	1996	0.00	77.7
GHCND:ANTIOCH	19960801	Aug-96	8	1996	0.00	77
GHCND:ANTIOCH	19960901	Sep-96	9	1996	0.00	70.3
GHCND:ANTIOCH	19961001	Oct-96	10	1996	0.89	64.2
GHCND:ANTIOCH	19961101	Nov-96	11	1996	2.65	55.6
GHCND:ANTIOCH	19961201	Dec-96	12	1996	3.47	50.2
GHCND:ANTIOCH	19970101	Jan-97	1	1997	6.01	48.6
GHCND:ANTIOCH	19970201	Feb-97	2	1997	0.12	52.5
GHCND:ANTIOCH	19970301	Mar-97	3	1997	0.16	57.9
GHCND:ANTIOCH	19970401	Apr-97	4	1997	0.00	62.8
GHCND:ANTIOCH	19970501	May-97	5	1997	0.32	72
GHCND:ANTIOCH	19970601	Jun-97	6	1997	0.31	72.9
GHCND:ANTIOCH	19970701	Jul-97	7	1997	0.00	75.7
GHCND:ANTIOCH	19970801	Aug-97	8	1997	0.01	74.5
GHCND:ANTIOCH	19970901	Sep-97	9	1997	0.00	74.3
GHCND:ANTIOCH	19971001	Oct-97	10	1997	0.44	64.4
GHCND:ANTIOCH	19971101	Nov-97	11	1997	3.35	56.5
GHCND:ANTIOCH	19971201	Dec-97	12	1997	1.47	45.7
GHCND:ANTIOCH	19980101	Jan-98	1	1998	4.93	48.4
GHCND:ANTIOCH	19980201	Feb-98	2	1998	9.03	50
GHCND:ANTIOCH	19980301	Mar-98	3	1998	1.63	55.6
GHCND:ANTIOCH	19980401	Apr-98	4	1998	1.31	56.8

GHCND:USC00040728	19980501	May-98	5	1998	2.09	59	
GHCND:USC00040728	19980601	Jun-98	6	1998	0.07	66.9	
GHCND:USC00040728	19980701	Jul-98	7	1998	0.00	76.5	
GHCND:USC00040728	19980801	Aug-98	8	1998	0.00	77.2	
GHCND:USC00040728	19980901	Sep-98	9	1998	0.48	72	
GHCND:USC00040728	19981001	Oct-98	10	1998	0.58	62.8	
GHCND:USC00040728	19981101	Nov-98	11	1998	1.58	53.4	
GHCND:USC00040728	19981201	Dec-98	12	1998	0.61	44.1	
GHCND:USC00040728	19990101	Jan-99	1	1999	1.76	45.7	
GHCND:USC00040728	19990201	Feb-99	2	1999	2.41	50	
GHCND:USC00040728	19990301	Mar-99	3	1999	1.72	52.2	
GHCND:USC00040728	19990401	Apr-99	4	1999	0.84	59.4	
GHCND:USC00040728	19990501	May-99	5	1999	0.00	64	
GHCND:USC00040728	19990601	Jun-99	6	1999	0.00	70	
GHCND:USC00040728	19990701	Jul-99	7	1999	0.00	72.7	
GHCND:USC00040728	19990801	Aug-99	8	1999	0.00	73.4	
GHCND:USC00040728	19990901	Sep-99	9	1999	0.16	72.1	
GHCND:USC00040728	19991001	Oct-99	10	1999	0.10	67.1	
GHCND:USC00040728	19991201	Dec-99	12	1999	0.55	48.6	
GHCND:USC00040728	20000101	Jan-00	1	2000	4.68	50.5	
GHCND:USC00040728	20000201	Feb-00	2	2000	4.46	52.3	
GHCND:USC00040728	20000401	Apr-00	4	2000	1.26	61.3	
GHCND:USC00040728	20000501	May-00	5	2000	0.59	66.9	
GHCND:USC00040728	20000601	Jun-00	6	2000	0.07	73.9	
GHCND:USC00040728	20000801	Aug-00	8	2000	0.00	74.1	
GHCND:USC00040728	20000901	Sep-00	9	2000	0.08	72	
GHCND:USC00040728	20001001	Oct-00	10	2000	1.28	62.1	
GHCND:USC00040728	20001101	Nov-00	11	2000	0.62	50	
GHCND:USC00040728	20010901	Sep-01	9	2001	0.00	70.3	
GHCND:USC00040728	20011001	Oct-01	10	2001	0.00	66.4	
GHCND:USC00040728	20011201	Dec-01	12	2001		47.8	-9999
GHCND:USC00040728	20020101	Jan-02	1	2002		46.8	-9999
GHCND:USC00040728	20020301	Mar-02	3	2002		58.1	-9999
GHCND:USC00040728	20020401	Apr-02	4	2002	0.00	64.6	
GHCND:USC00040728	20020501	May-02	5	2002	0.00	65.3	
GHCND:USC00040728	20020601	Jun-02	6	2002	0.00	73.2	
GHCND:USC00040728	20020701	Jul-02	7	2002	0.00	75.6	
GHCND:USC00040728	20020801	Aug-02	8	2002	0.00	72.9	
GHCND:USC00040728	20020901	Sep-02	9	2002	0.00	72.1	
GHCND:USC00040728	20021001	Oct-02	10	2002	0.00	64	
GHCND:USC00040728	20021101	Nov-02	11	2002	1.76	55	
GHCND:USC00040728	20021201	Dec-02	12	2002	5.77	48.9	
GHCND:USC00040728	20030101	Jan-03	1	2003		50	-9999
GHCND:USC00040728	20030201	Feb-03	2	2003	0.00	50.4	
GHCND:USC00040728	20030301	Mar-03	3	2003	1.34	56.5	
GHCND:USC00040728	20030401	Apr-03	4	2003	1.25	55.9	
GHCND:USC00040728	20030701	Jul-03	7	2003	0.00	77.5	

GHCND:|ANTIOCH	20030801	Aug-03	8	2003	0.35	73.6	
GHCND:|ANTIOCH	20030901	Sep-03	9	2003	0.00	73	
GHCND:|ANTIOCH	20031001	Oct-03	10	2003	0.00	68	
GHCND:|ANTIOCH	20031101	Nov-03	11	2003	1.09	51.8	
GHCND:|ANTIOCH	20031201	Dec-03	12	2003	4.02	48.6	
GHCND:|ANTIOCH	20040101	Jan-04	1	2004	1.78	45.5	
GHCND:|ANTIOCH	20040201	Feb-04	2	2004	4.21	51.6	
GHCND:|ANTIOCH	20040501	May-04	5	2004		66.6	-9999
GHCND:|ANTIOCH	20040601	Jun-04	6	2004	0.00	72.5	
GHCND:|ANTIOCH	20040701	Jul-04	7	2004	0.00	74.3	
GHCND:|ANTIOCH	20040801	Aug-04	8	2004	0.00	74.8	
GHCND:|ANTIOCH	20040901	Sep-04	9	2004	0.00	72.3	
GHCND:|ANTIOCH	20041001	Oct-04	10	2004	2.76	62.8	
GHCND:|ANTIOCH	20041101	Nov-04	11	2004	1.82	51.8	
GHCND:|ANTIOCH	20041201	Dec-04	12	2004	5.80	46.4	
GHCND:|ANTIOCH	20050101	Jan-05	1	2005	5.22	44.6	
GHCND:|ANTIOCH	20050201	Feb-05	2	2005	3.33	52.2	
GHCND:|ANTIOCH	20050301	Mar-05	3	2005	2.83	57	
GHCND:|ANTIOCH	20050401	Apr-05	4	2005	0.82	57.7	
GHCND:|ANTIOCH	20050501	May-05	5	2005	0.45	65.8	
GHCND:|ANTIOCH	20050601	Jun-05	6	2005	0.10	68.5	
GHCND:|ANTIOCH	20050701	Jul-05	7	2005	0.00	77.9	
GHCND:|ANTIOCH	20050801	Aug-05	8	2005	0.00	77	
GHCND:|ANTIOCH	20050901	Sep-05	9	2005	0.00	68.4	
GHCND:|ANTIOCH	20051001	Oct-05	10	2005	0.00	64	
GHCND:|ANTIOCH	20051101	Nov-05	11	2005	0.81	56.3	
GHCND:|ANTIOCH	20051201	Dec-05	12	2005	7.01	50.7	
GHCND:|ANTIOCH	20060101	Jan-06	1	2006	2.42	49.3	
GHCND:|ANTIOCH	20060201	Feb-06	2	2006	1.50	51.4	
GHCND:|ANTIOCH	20060301	Mar-06	3	2006	3.32	50.7	
GHCND:|ANTIOCH	20060401	Apr-06	4	2006	2.67	57.7	
GHCND:|ANTIOCH	20060501	May-06	5	2006	0.00	68	
GHCND:|ANTIOCH	20060601	Jun-06	6	2006	0.00	74.3	
GHCND:|ANTIOCH	20060701	Jul-06	7	2006	0.00	79.2	
GHCND:|ANTIOCH	20060801	Aug-06	8	2006	0.00	72.5	
GHCND:|ANTIOCH	20060901	Sep-06	9	2006	0.00	70.7	
GHCND:|ANTIOCH	20061001	Oct-06	10	2006	0.09	62.6	
GHCND:|ANTIOCH	20061101	Nov-06	11	2006	0.71	55	
GHCND:|ANTIOCH	20061201	Dec-06	12	2006	1.31	47.5	
GHCND:|ANTIOCH	20070101	Jan-07	1	2007	0.16	45.5	
GHCND:|ANTIOCH	20070201	Feb-07	2	2007	2.34	51.3	
GHCND:|ANTIOCH	20070301	Mar-07	3	2007		59.7	-9999
GHCND:|ANTIOCH	20070401	Apr-07	4	2007	1.05	61.5	
GHCND:|ANTIOCH	20070501	May-07	5	2007		67.1	-9999
GHCND:|ANTIOCH	20070601	Jun-07	6	2007	0.00	73.2	
GHCND:|ANTIOCH	20070701	Jul-07	7	2007	0.00	75.6	
GHCND:|ANTIOCH	20070801	Aug-07	8	2007	0.00	74.3	

GHCND:|ANTIOCH	20070901	Sep-07	9	2007	0.00	69.1	
GHCND:|ANTIOCH	20071001	Oct-07	10	2007	0.00	62.2	
GHCND:|ANTIOCH	20071101	Nov-07	11	2007	0.00	56.3	
GHCND:|ANTIOCH	20071201	Dec-07	12	2007	2.14	46.9	
GHCND:|ANTIOCH	20080101	Jan-08	1	2008	4.97	45.7	
GHCND:|ANTIOCH	20080201	Feb-08	2	2008	1.09	50.9	
GHCND:|ANTIOCH	20080301	Mar-08	3	2008		56.1	-9999
GHCND:|ANTIOCH	20080401	Apr-08	4	2008	0.00	59.7	
GHCND:|ANTIOCH	20080501	May-08	5	2008	0.00	67.6	
GHCND:|ANTIOCH	20080601	Jun-08	6	2008	0.00	73.6	
GHCND:|ANTIOCH	20080701	Jul-08	7	2008	0.00	76.3	
GHCND:|ANTIOCH	20080801	Aug-08	8	2008	0.00	75.9	
GHCND:|ANTIOCH	20080901	Sep-08	9	2008	0.00	72.7	
GHCND:|ANTIOCH	20081001	Oct-08	10	2008	0.08	65.5	
GHCND:|ANTIOCH	20081101	Nov-08	11	2008	0.62	57.6	
GHCND:|ANTIOCH	20081201	Dec-08	12	2008		44.2	-9999
GHCND:|ANTIOCH	20090201	Feb-09	2	2009	4.36	50.9	
GHCND:|ANTIOCH	20090301	Mar-09	3	2009	3.94	52.3	
GHCND:|ANTIOCH	20090401	Apr-09	4	2009		59.5	-9999
GHCND:|ANTIOCH	20090501	May-09	5	2009	0.02	69.3	
GHCND:|ANTIOCH	20090601	Jun-09	6	2009	0.00	69.4	
GHCND:|ANTIOCH	20090701	Jul-09	7	2009	0.00	75.7	
GHCND:|ANTIOCH	20090801	Aug-09	8	2009	0.00	74.8	
GHCND:|ANTIOCH	20090901	Sep-09	9	2009	0.00	75	
GHCND:|ANTIOCH	20091001	Oct-09	10	2009		61.9	-9999
GHCND:|ANTIOCH	20091201	Dec-09	12	2009		44.6	-9999
GHCND:|ANTIOCH	20100101	Jan-10	1	2010		46.6	-9999
GHCND:|ANTIOCH	20100201	Feb-10	2	2010		51.8	-9999
GHCND:|ANTIOCH	20100401	Apr-10	4	2010		56.5	-9999
GHCND:|ANTIOCH	20100501	May-10	5	2010		62.1	-9999
GHCND:|ANTIOCH	20100601	Jun-10	6	2010	0.00	73.2	
GHCND:|ANTIOCH	20100701	Jul-10	7	2010	0.00	74.1	
GHCND:|ANTIOCH	20100801	Aug-10	8	2010	0.00	71.6	
GHCND:|ANTIOCH	20100901	Sep-10	9	2010	0.00	72.7	
GHCND:|ANTIOCH	20101001	Oct-10	10	2010	0.00	64.8	
GHCND:|ANTIOCH	20101101	Nov-10	11	2010		54	-9999
GHCND:|ANTIOCH	20101201	Dec-10	12	2010		52	-9999
GHCND:|ANTIOCH	20110101	Jan-11	1	2011		46.2	-9999
GHCND:|ANTIOCH	20110201	Feb-11	2	2011		52	-9999
GHCND:|ANTIOCH	20110301	Mar-11	3	2011		56.8	-9999
GHCND:|ANTIOCH	20110401	Apr-11	4	2011		64.4	-9999
GHCND:|ANTIOCH	20110501	May-11	5	2011		64.6	-9999
GHCND:|ANTIOCH	20110601	Jun-11	6	2011		71.2	-9999
GHCND:|ANTIOCH	20110701	Jul-11	7	2011	0.00	75	
GHCND:|ANTIOCH	20110801	Aug-11	8	2011	0.00	74.8	
GHCND:|ANTIOCH	20110901	Sep-11	9	2011	0.00	75.9	
GHCND:|ANTIOCH	20111001	Oct-11	10	2011		67.3	-9999

GHCND:|ANTIOCH	20111101	Nov-11	11	2011		56.3	-9999
GHCND:|ANTIOCH	20111201	Dec-11	12	2011		49.6	-9999
GHCND:|ANTIOCH	20120101	Jan-12	1	2012		52.5	-9999
GHCND:|ANTIOCH	20120201	Feb-12	2	2012		54.7	-9999
GHCND:|ANTIOCH	20120301	Mar-12	3	2012		55.4	-9999
GHCND:|ANTIOCH	20120401	Apr-12	4	2012		61.7	-9999
GHCND:|ANTIOCH	20120601	Jun-12	6	2012	0.01	74.1	
GHCND:|ANTIOCH	20120701	Jul-12	7	2012	0.00	74.5	
GHCND:|ANTIOCH	20120901	Sep-12	9	2012	0.00	72	
GHCND:|ANTIOCH	20121101	Nov-12	11	2012	3.96	57	
GHCND:|ANTIOCH	20121201	Dec-12	12	2012	2.70	48.9	
GHCND:|ANTIOCH	20130101	Jan-13	1	2013	0.98	46.8	
GHCND:|ANTIOCH	20130201	Feb-13	2	2013	0.30	52.2	
GHCND:|ANTIOCH	20130301	Mar-13	3	2013	0.15	59	
GHCND:|ANTIOCH	20130401	Apr-13	4	2013	0.46	66.2	
GHCND:|ANTIOCH	20130501	May-13	5	2013	0.00	69.3	
GHCND:|ANTIOCH	20130601	Jun-13	6	2013	0.07	74.1	
GHCND:|ANTIOCH	20130701	Jul-13	7	2013	0.00	75.4	
GHCND:|ANTIOCH	20130801	Aug-13	8	2013	0.00	73.6	
GHCND:|ANTIOCH	20130901	Sep-13	9	2013	0.50	71.8	
GHCND:|ANTIOCH	20131001	Oct-13	10	2013	0.00	63.9	
GHCND:|ANTIOCH	20131101	Nov-13	11	2013	1.28	56.5	
GHCND:|ANTIOCH	20131201	Dec-13	12	2013	0.26	47.1	
GHCND:|ANTIOCH	20140101	Jan-14	1	2014	0.24	53.4	
GHCND:|ANTIOCH	20140201	Feb-14	2	2014	3.33	54.7	
GHCND:|ANTIOCH	20140301	Mar-14	3	2014	1.26	59.7	
GHCND:|ANTIOCH	20140401	Apr-14	4	2014	1.48	63	
GHCND:|ANTIOCH	20140501	May-14	5	2014	0.00	70.3	
GHCND:|ANTIOCH	20140601	Jun-14	6	2014	0.00	73.8	
GHCND:|ANTIOCH	20140701	Jul-14	7	2014	0.00	76.3	
GHCND:|ANTIOCH	20140801	Aug-14	8	2014	0.01	74.1	
GHCND:|ANTIOCH	20140901	Sep-14	9	2014	0.25	72.9	
GHCND:|ANTIOCH	20141001	Oct-14	10	2014	0.27	68	
GHCND:|ANTIOCH	20141101	Nov-14	11	2014	1.15	57.6	
GHCND:|ANTIOCH	20141201	Dec-14	12	2014	8.32	53.1	
GHCND:|ANTIOCH	20150101	Jan-15	1	2015	0.04	50.2	
GHCND:|ANTIOCH	20150201	Feb-15	2	2015	1.86	56.7	
GHCND:|ANTIOCH	20150301	Mar-15	3	2015	0.40	62.4	
GHCND:|ANTIOCH	20150401	Apr-15	4	2015	0.62	62.8	
GHCND:|ANTIOCH	20150501	May-15	5	2015	0.01	64	
GHCND:|ANTIOCH	20150601	Jun-15	6	2015	0.50	74.3	
GHCND:|ANTIOCH	20150701	Jul-15	7	2015	0.00	76.1	
GHCND:|ANTIOCH	20150801	Aug-15	8	2015	0.00	75.6	
GHCND:|ANTIOCH	20150901	Sep-15	9	2015	0.01	74.7	
GHCND:|ANTIOCH	20151001	Oct-15	10	2015	0.00	70.3	
GHCND:|ANTIOCH	20151101	Nov-15	11	2015	1.51	52.9	
GHCND:|ANTIOCH	20151201	Dec-15	12	2015	1.60	48	

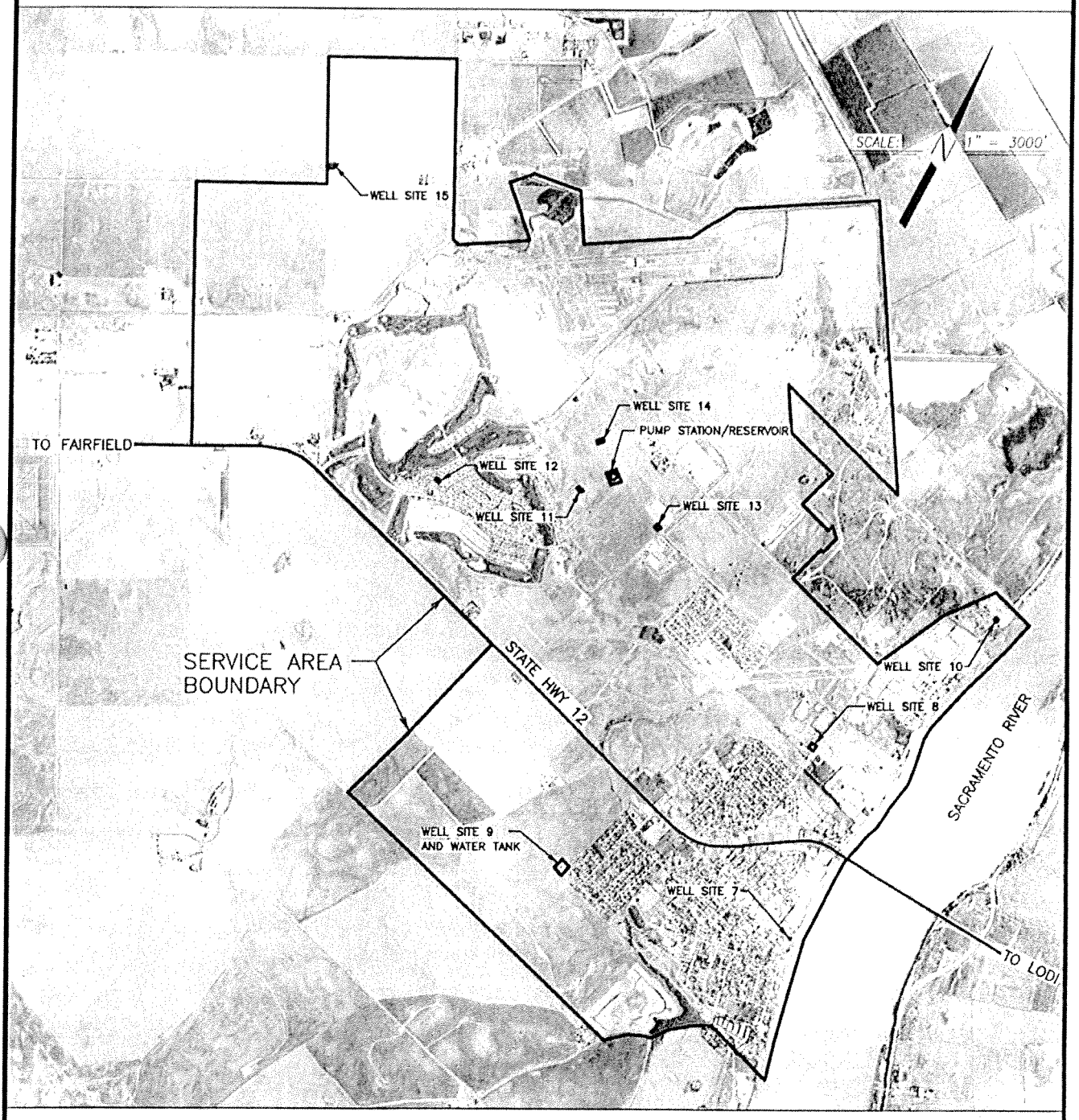
City of Rio Vista 2015 UWMP

Appendix D

- Water Service Area Map
- 2010 Census Populations
- ENGEO Water Well Supply Data
- ENGEO Water Well Monitoring Contract
- Rio Vista Housing Document Populations
- 2008-2013 Water Meter Rates

CITY OF RIO VISTA WATER SERVICE AREA

WATER SYSTEM NUMBER 4810004



R0808

1850-2010 Historical US Census Populations of Counties and Incoporated Cities/Towns in California

Prints to 8.5" x 14", legal paper

Revised March 25, 2013

County	Incorporated City or Town	Incorporation Date (1)	June 1, 1850	June 1, 1860	June 1, 1870	June 1, 1880	June 1, 1890 (2)	June 1, 1900	April 15, 1910	Jan. 1, 1920	April 1, 1930	April 1, 1940	April 1, 1950	April 1, 1960	April 1, 1970	April 1, 1980	April 1, 1990	April 1, 2000 (4)	April 1, 2010
Santa Cruz	Scotts Valley	1966													3,621	6,891	8,615	11,385	11,580
Santa Cruz	Watsonville	1868			1,151	1,799	2,149	3,528	4,446	5,013	8,344	8,937	11,572	13,293	14,569	23,662	31,099	44,265	51,199
Shasta		**1850**	**378**	**4,360**	**4,173**	**9,492**	**12,133**	**17,318**	**18,920**	**13,361**	**13,927**	**28,800**	**36,413**	**59,468**	**77,640**	**115,613**	**147,036**	**163,256**	**177,223**
Shasta	Anderson	1956												4,492	5,492	7,381	8,299	9,022	9,932
Shasta	Coram	i. 1910/ d.1918							666										
Shasta	Kennett	d.1930								464	124								
Shasta	Redding	1887					1,821	2,946	3,572	2,962	4,188	8,109	10,256	12,773	16,659	41,995	66,462	80,865	89,861
Shasta	Shasta Lake	1993																9,008	10,164
Sierra		**1852**		**11,387**	**5,619**	**6,623**	**5,051**	**4,017**	**4,098**	**1,783**	**2,422**	**3,025**	**2,410**	**2,247**	**2,365**	**3,073**	**3,318**	**3,555**	**3,240**
Sierra	Loyalton	1901							983	442	837	925	911	936	945	1,030	931	862	769
Siskiyou		**1852**		**7,629**	**6,848**	**8,610**	**12,163**	**16,962**	**18,801**	**18,545**	**25,480**	**28,598**	**30,733**	**32,885**	**33,225**	**39,732**	**43,531**	**44,301**	**44,900**
Siskiyou	Dorris	1908							214	424	762	863	892	973	840	836	892	886	939
Siskiyou	Dunsmuir	1909							1,719	2,528	2,256	2,359	2,256	2,873	2,214	2,253	2,129	1,923	1,650
Siskiyou	Etna	1878					361	271	500	518	425	379	456	649	596	667	754	835	781	737
Siskiyou	Fort Jones	1872					n/a	266	356	316	331	302	360	525	483	515	544	639	660	839
Siskiyou	Montague	1909								274	453	507	463	579	782	890	1,285	1,415	1,456	1,443
Siskiyou	Mount Shasta	1905								n/a	542	1,009	1,618	1,909	1,936	2,256	2,837	3,460	3,621	3,394
Siskiyou	Tulelake	1937											785	1,028	950	857	783	1,010	1,020	1,010
Siskiyou	Weed	1961														2,983	2,879	3,062	2,978	2,967
Siskiyou	Yreka	1857		1,328	1,063	1,059	1,100	1,254	1,134	1,277	2,126	2,485	3,227	4,759	5,394	5,916	6,948	7,290	7,765
Solano		**1850**	**580**	**7,169**	**16,871**	**18,475**	**20,946**	**24,143**	**27,559**	**40,602**	**40,834**	**49,118**	**104,833**	**134,597**	**171,989**	**235,203**	**340,421**	**394,542**	**413,344**
Solano	Benicia	1850	480	1,470	1,656	1,794	2,361	2,751	2,360	2,693	2,913	2,419	7,284	6,070	7,349	15,376	24,437	26,865	26,997
Solano	Dixon	1878				n/a	1,082	783	827	926	1,000	1,108	1,714	2,970	4,432	7,541	10,401	16,103	18,351
Solano	Fairfield	1903							834	1,008	1,131	1,312	3,118	14,968	44,146	58,099	77,211	96,178	105,321
Solano	Rio Vista	1894						682	884	1,104	1,309	1,666	1,831	2,616	3,135	3,142	3,316	4,571	7,360
Solano	Suisun City	1868			462	554	499	625	641	769	905	706	946	2,470	2,917	11,087	22,686	26,118	28,111
Solano	Vacaville	1892						1,220	1,177	1,254	1,556	1,614	3,169	10,898	21,690	43,367	71,479	88,625	92,428
Solano	Vallejo	1868			n/a	5,987	6,343	7,965	11,340	21,107	16,072	20,072	26,038	60,877	71,710	80,303	109,199	116,760	115,942
Sonoma		**1850**	**560**	**11,867**	**19,819**	**25,926**	**32,721**	**38,480**	**48,394**	**52,090**	**62,222**	**69,052**	**103,405**	**147,375**	**204,885**	**299,681**	**388,222**	**458,614**	**483,878**
Sonoma	Cloverdale	1872				430	763	750	823	718	759	809	1,292	2,848	3,251	3,989	4,924	6,831	8,618
Sonoma	Cotati	1963													1,368	3,346	5,714	6,471	7,265
Sonoma	Healdsburg	1867			959	1,133	1,485	1,869	2,011	2,412	2,296	2,507	3,258	4,816	5,438	7,217	9,469	10,722	11,254
Sonoma	Petaluma	1858		1,505	n/a	3,326	3,692	3,871	5,880	6,226	8,245	8,034	10,315	14,035	24,870	33,834	43,184	54,548	57,941
Sonoma	Rohnert Park	1962													6,133	22,965	36,326	42,236	40,971
Sonoma	Santa Rosa	1868			2,898	3,616	5,220	6,673	7,817	8,758	10,636	12,605	17,902	31,027	50,006	82,658	113,313	147,595	167,815
Sonoma	Sebastopol	1902							1,233	1,493	1,762	1,856	2,601	2,694	3,993	5,595	7,004	7,774	7,379
Sonoma	Sonoma	1883					757	652	957	801	980	1,158	2,015	3,023	4,112	6,054	8,121	9,128	10,648
Sonoma	Windsor	1992																22,744	26,801
Stanislaus		**1854**		**2,245**	**6,499**	**8,751**	**10,040**	**9,550**	**22,522**	**43,557**	**56,641**	**74,866**	**127,231**	**157,294**	**194,506**	**265,900**	**370,522**	**446,997**	**514,453**
Stanislaus	Ceres	1918								637	981	1,332	2,351	4,406	6,029	13,281	26,314	34,609	45,417
Stanislaus	Hughson	1972														2,943	3,259	3,980	6,640

n/a - Data not in census publications.

(1) City incorporation date. "i"-original incor. "d"-disincor. "ri"-reincor.

(2) City was disincorporated.

(3) Census 2000 counts includes count revisions. Data may not match Census 2000 reports.

Project No.
5462.000.002

May 6, 2016

Mr. Dave Melilli
Director of Public Works
City of Rio Vista
One Main Street
Rio Vista, CA 94571

Subject: Water Well Supply Study
Rio Vista, California

PROGRESS REPORT FOR EVALUATION OF WATER WELL SUPPLY DATA THROUGH APRIL 2016

References:

1. ENGEO; Groundwater Evaluation, Rio Vista, California; June 21, 2002; Project No. 5462.5.001.01.
2. ENGEO; Hydrogeologic and Available Water Supply Trend Analysis, Rio Vista, California; October 6, 2006; Project No. 5462.6.001.01.
3. ENGEO; Progress Report for Evaluation of Water Well Supply Data through June 2011; August 5, 2011; Project No. 5462.000.002.
4. ENGEO; Preliminary Report of Groundwater Elevation, Groundwater Supply Study, Rio Vista, California; Revised February 13, 2015; Project No. 5462.000.002.

Dear Mr. Melilli:

We are pleased to present this progress report for evaluation of water well supply data through April 2016 collected from nine municipal water supply wells in Rio Vista, California. This report is intended to provide data for the continued analysis of sustainability and water withdrawal from the aquifer under the City of Rio Vista.

The water well data is taken from transducers installed in the well and recorded by the Supervisory Control and Data Acquisition (SCADA) system, which was installed in February 2005 by the instrument contractor, Sierra Controls. Since the installation of the SCADA system, the water well data has been recorded and stored on the Rio Vista SCADA system. This report provides data intended to aid the on-going evaluation and analysis. It does not provide conclusions or opinions regarding long-term characterization, health or sustainability of the aquifer. This report merely updates the aggregation of the groundwater data provided by City of Rio Vista.

This report provides an updated summary of the water well data, along with a brief summary evaluation of observed trends in individual water supply wells. We have condensed the GWE data into monthly drawdown (lowest) and static (highest) elevations, estimated flow as estimated monthly total flow, and displayed the data in a chart format.

Data parameters, including well drawdown, flow rate, total flow and well pressure have historically been recorded from the City of Rio Vista's Water Supply Well Nos. 7, 8, 9, 10, 11, 12, 13, 14, and 15 (Figure 7). *It should be noted that Well Nos. 7 and 9 are not included in this progress report because the transducers were inoperable and only a minimal number of readings are available for Well Nos. 7. Moreover, Well Nos. 8 and 12 are no longer in service and were not included in this analysis. This report only reports on Well Nos. 10, 11, 13, 14, and 15.*

Table 1 - Well Summary

Well Number	Current Status	Manual Readings Currently Taken	Transducer Readings Currently Taken
7	No Transducer	Yes	No
8	Out of Service	No	No
9	No Transducer	No	No
10	Transducer Inoperable	Yes	No
11	Active	Yes	Yes
12	Out of Service	No	No
13	Active	Yes	Yes
14	Active	Yes	Yes
15	Active	Yes	Yes

COLLECTED DATA

This progress report provides and update of previous water supply data through April 2016; however we have compiled earlier well data information collected from May 2005 through July 2015. An important factor to consider in data collection is the presence of numerous and/or large gaps in the data, which may lead to reduced accuracy. In addition, it is not always possible to identify when the data is not accurate, so it is possible that some of the negative trends may in fact may not be occurring.

For this progress report we have plotted the available well data on charts to review trends of GWE for individual well locations. Also, one main consideration is to evaluate how the flow rate from each well affects the GWE; to review this information GWE data was aggregated into monthly values. The upper GWE represents an estimate of static well water elevation from the various aquifers that the wells are screened into. The drawdown GWE represents the lowest level of the well's water elevation while pumping.

It should be emphasized that most of the individual water wells had transducers that experienced periods of inoperability, which are indicated with a gray background on the charts. During those times, the GWEs are not accurate and are included only to provide consistency. In July 2014, a policy was instituted by the City's Department of Public Works to manually read the GWE for each well once a month in order to confirm that the transducers are working and providing accurate GWEs. The GWE trend represents an estimate as to the long-term elevation trend of various aquifers that of each well.

Well 10 (Figure 1)

Well No. 10's transducer was inoperable from July 2009 to August 2014, and became inoperable again in April 2015. During these times, the transducer did not record any groundwater elevations. A manual reading was taken in July 2014 and each month thereafter. The manual readings from the well, which were not taken at a consistent time from month to month, generally measure the ambient water table elevation and the drawdown elevation. In February and March 2015, the transducer recorded static GWE elevation 15 feet above the initial datum, which is inconsistent with the manual readings that report GWE at a lower elevation. It is most likely that GWE readings provided by the transducer are incorrect since it is unlikely that the GWE would have rebounded to fifteen feet above its initial level.

Based on the manual readings and Well No. 10's transducer readings, it appears that the static GWE of this well is stable, though the lack of representative data makes that assertion difficult to substantiate. The well's transducer is not recording any data though manual readings of the water surface elevation continued.

Well 11 (Figure 2)

Well No. 11's transducer was inoperable from June 2009 to August 2014. During this time, it appears that the transducer recorded lower elevations than the actual GWE in the well. A manual reading was recorded in July 2014, which demonstrated that the reported water level on the SCADA system was 120 feet lower than what was measured manually. We understand that the transducer was repaired and was correctly recording the water elevation, until it became inoperable again in June 2015 but was operable again in September of 2015.

Based on the manual readings and Well No. 11s's transducer readings, it appears that the static GWE of this well is stable, though the lack of representative data makes that assertion difficult to substantiate.

Well 13 (Figure 3)

Well No. 13's transducer was inoperable twice, once from March 2006 to June 2007 and again from June 2010 to August 2014. During the first period of inoperability, it appears that the recorded elevations were lower than the actual GWE in the well. During the second period of inoperability, the transducer did not report the GWE. During the period from August 2008 to June 2010, there were multiple readings that were above the estimated static GWE. It is likely

that the transducer was not properly calibrated to the water surface elevation. A manual reading was recorded in July 2014 and each month thereafter. The transducer was repaired and appears to be correctly reporting the water elevation after July 2014 though there were some anomalous readings in December 2015 and January 2016.

Based on the manual readings and Well No. 13's transducer readings, it appears that the static GWE of this well is stable, though the lack of representative data makes that assertion difficult to substantiate.

Well 14 (Figure 4)

Well No. 14's transducer was inoperable from September 2010 to August 2014. During that time, it appears to have recorded lower elevations than the actual GWE in the well. When a manual reading was taken in July 2014, it demonstrated that the reported water level on the SCADA system was 30 feet lower than what was measured manually. The transducer was repaired on July 2014 and appears to be correctly recording the water elevation.

Based on the manual readings and Well No. 14's transducer readings, it appears that the static GWE of this well is stable, though the lack of representative data makes that assertion difficult to substantiate.

Well 15 (Figure 5)

Well No. 15 became active in July of 2013. Based on the transducer data, the wells GWE lowers in the summer months and increases in the winter months. The most likely cause is the large amounts of pumping that takes place during the summer months. There is a discrepancy between the manual readings and the transducer readings between June 2015 and October 2015. During that period the well's transducer shows lower estimated ambient GWE than the manual readings. Further review of the manual readings and the transducer should be performed to evaluate the cause of the discrepancy.

Based on the manual readings and Well No. 15's transducer readings, it appears that the static GWE is seasonal but stable, though the lack of representative data makes that assertion difficult to substantiate.

DISCUSSION

The results of evaluation of water well supply data through April 2016 collected from the municipal water supply wells shows fluctuation in water levels. The general trend does not indicate significant change to the overall static GWE of any of the wells.

In order to provide reliable on going data, it is important that the City continue to maintain its well monitoring equipment. The following should be considered by the City regarding monitoring of the water supply wells:

- Continue manual GWE measurements of wells to verify the accuracy of the transducer measurements.

- Monthly monitoring of the SCADA system's well data to identify any transducers that may be incorrectly reporting data.

- Install a piezometer network to evaluated the static ground water elevation and monitor aquifer GWE. It is our understanding that the city is in the process of evaluating the optimal location for the piezometers and that they have allocated $160,000 for the first phase of piezometers to be installed in the 2016-2017 fiscal year.

We look forward to continuing to monitor and update the GWE and flow reports and providing groundwater analysis services to the City of Rio Vista. We are available at your convenience to discuss any questions or comments you may have.

Sincerely,

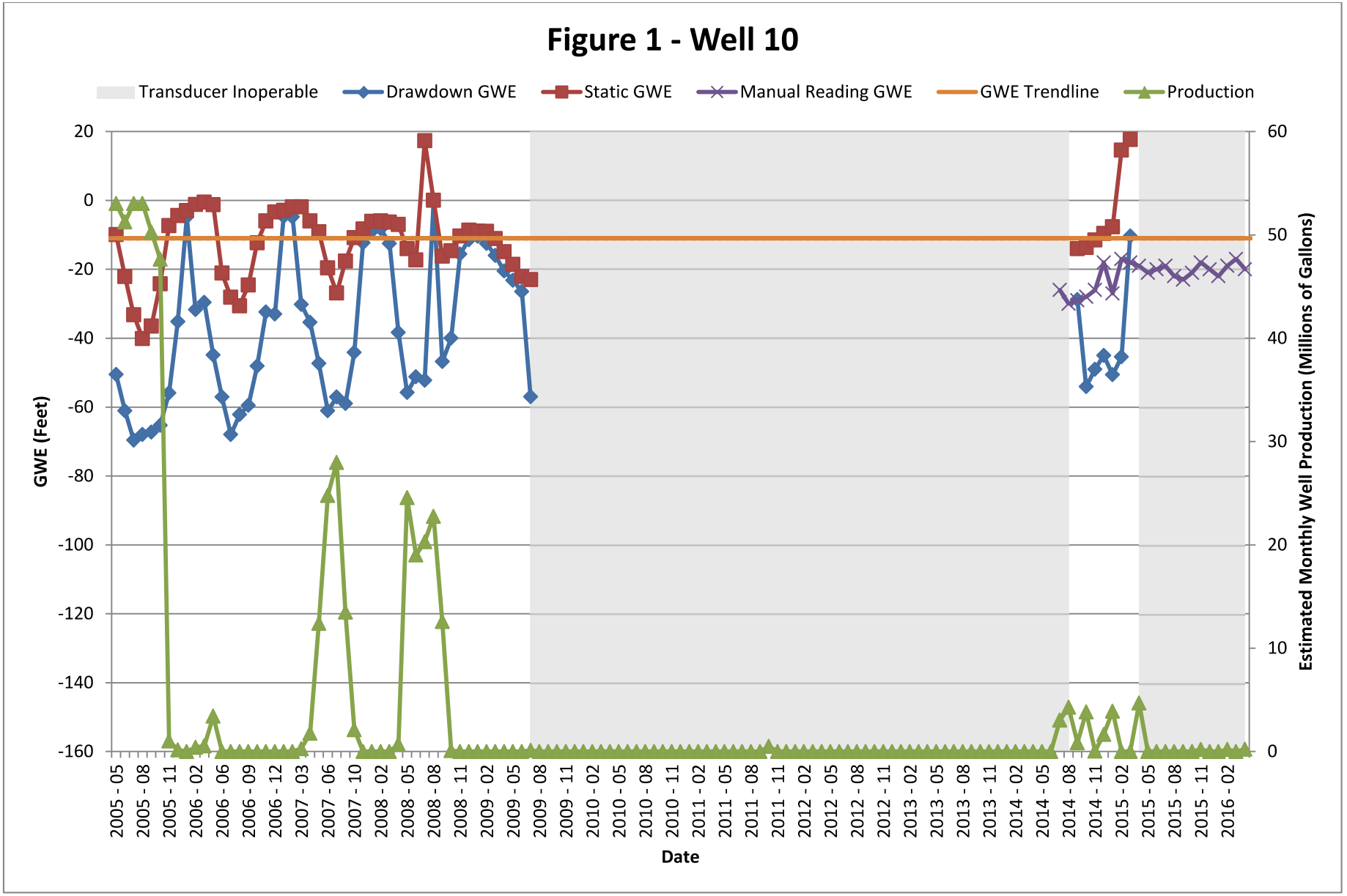
ENGEO Incorporated

Alan Moreira, PE QSD Theodore P. Bayham, CEG, GE
am/tpb/bvv

cc: Mr. Cecil Dillon, City Engineer

Attachments: Figure 1 – Well 10 Data
Figure 2 – Well 11 Data
Figure 3 – Well 13 Data
Figure 4 – Well 14 Data
Figure 5 – Well 15 Data
Figure 6 – Well Production by Month
Figure 7 – Well Locations

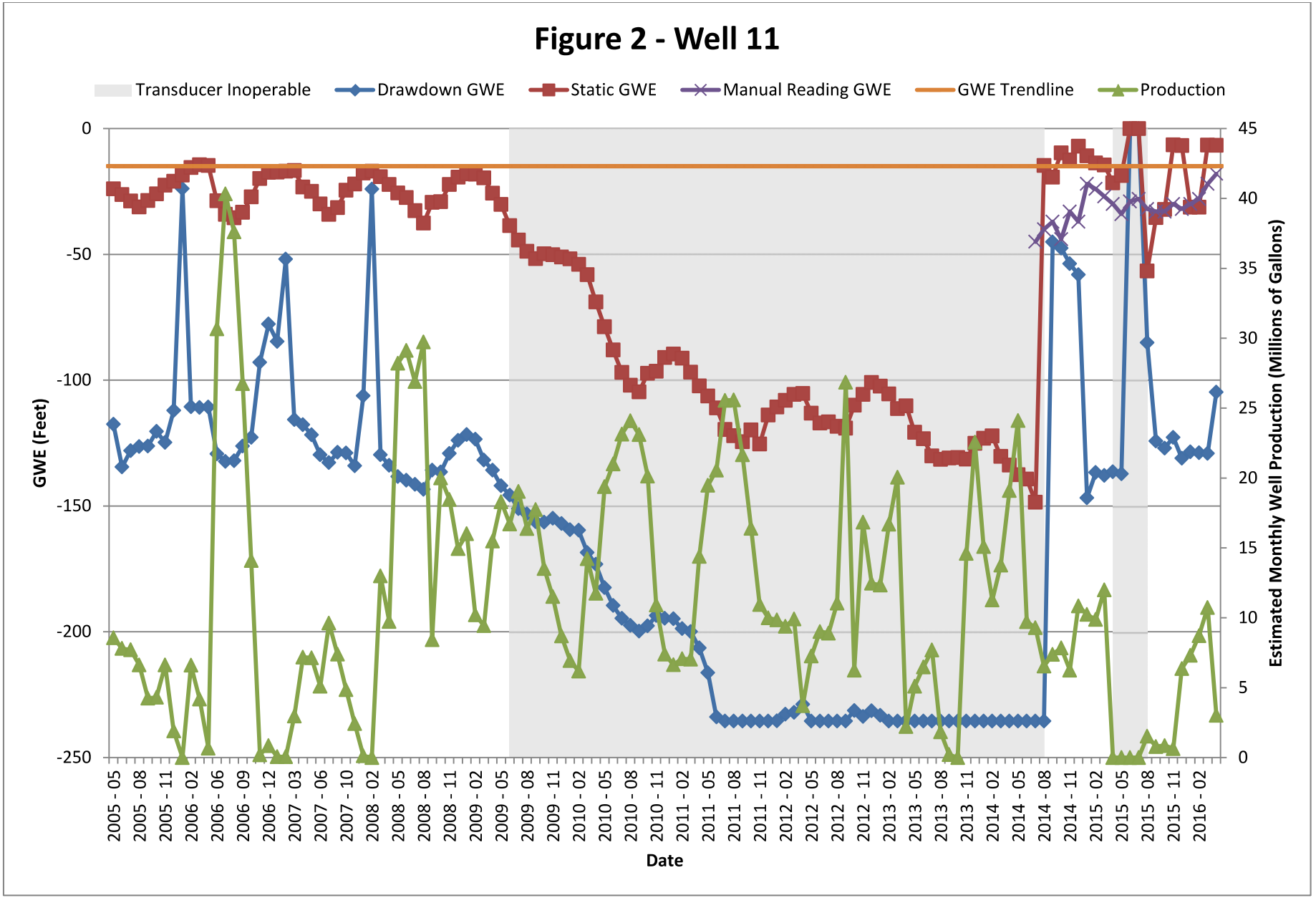
Figure 1 - Well 10



5462.000.002
May 6, 2016

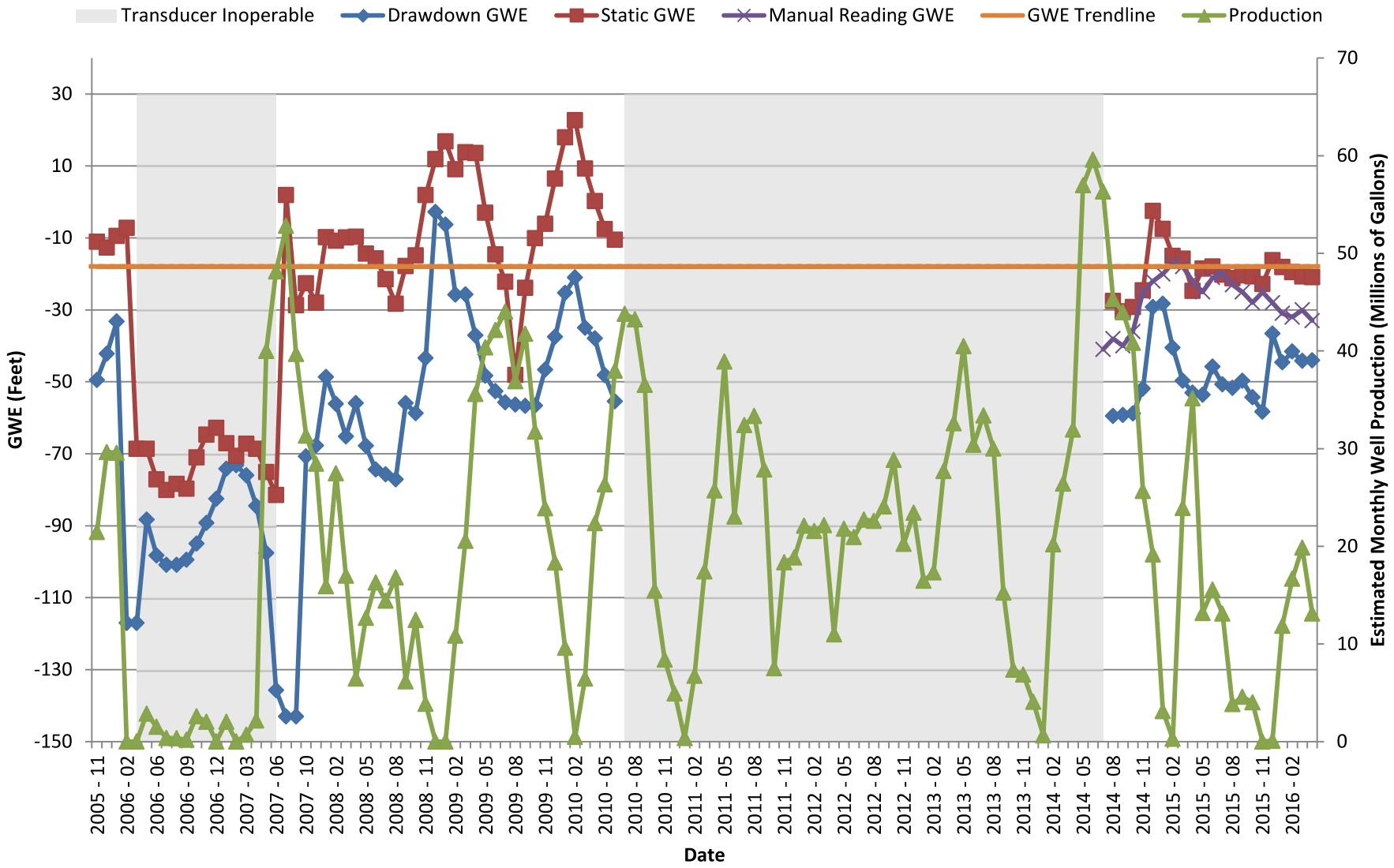
ENGEO
Expect Excellence

Figure 2 - Well 11



ENGEO
Expect Excellence

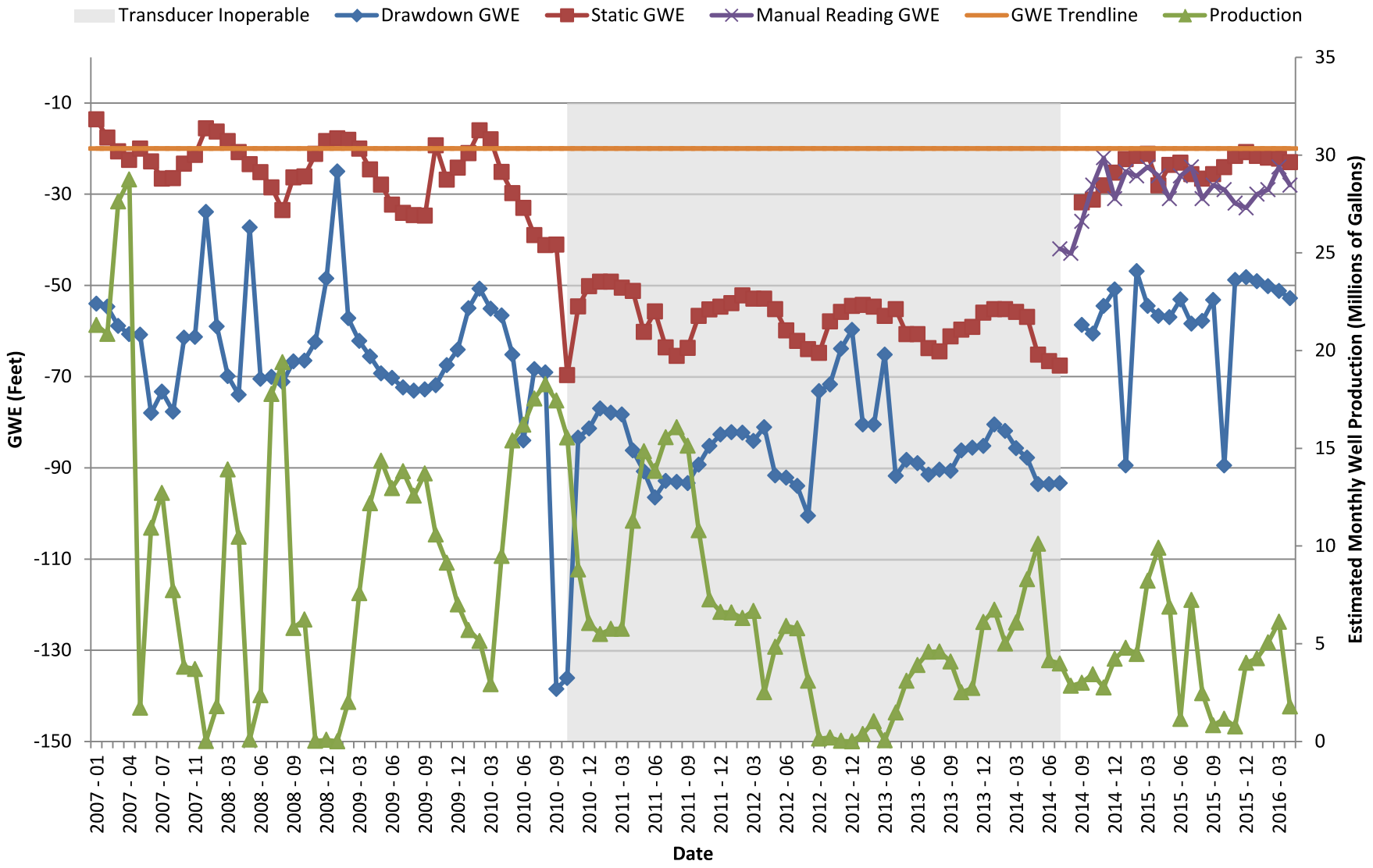
Figure 3 - Well 13



5462.000.002
May 6, 2016

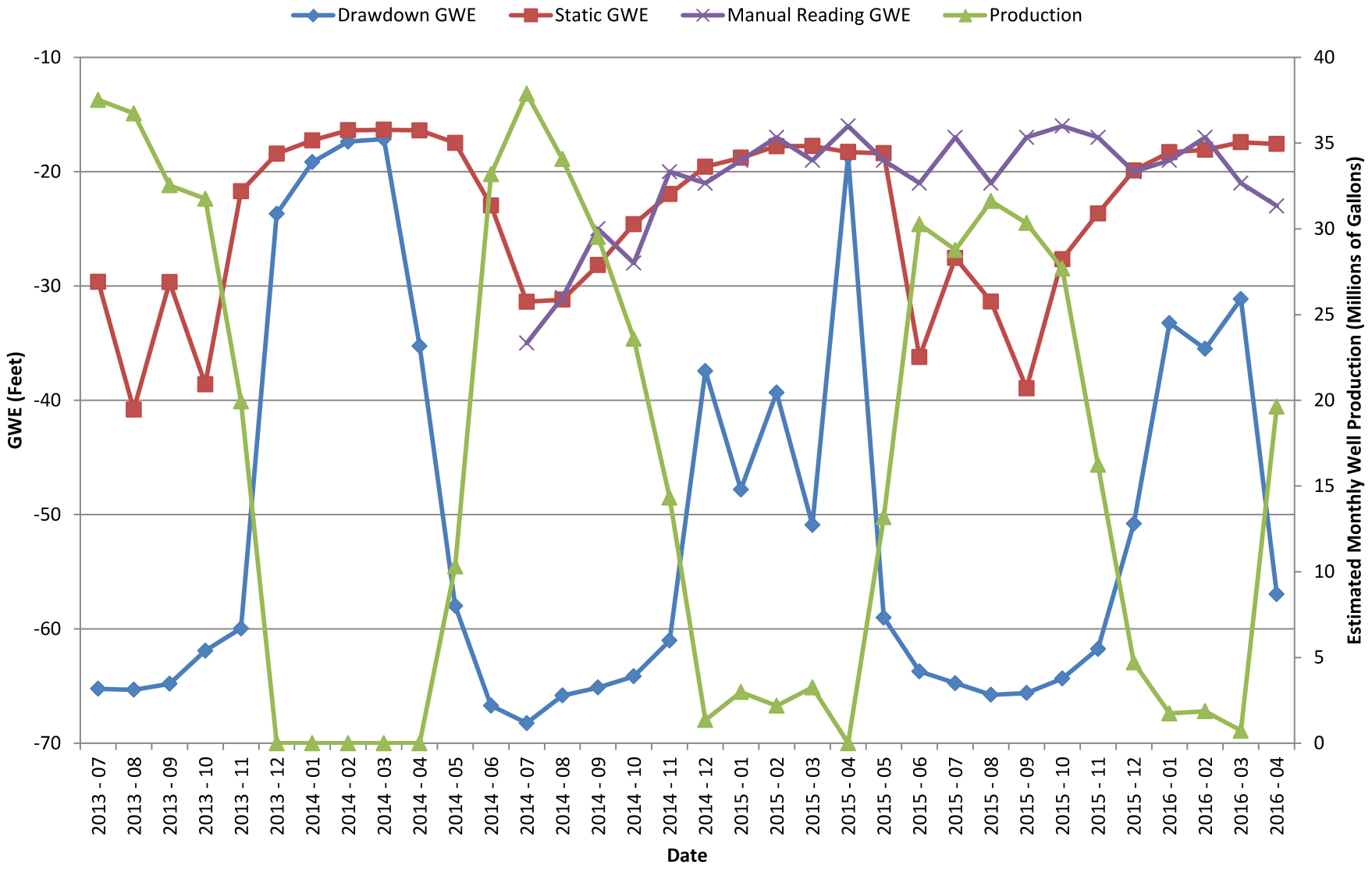
ENGEO
Expect Excellence

Figure 4 - Well 14



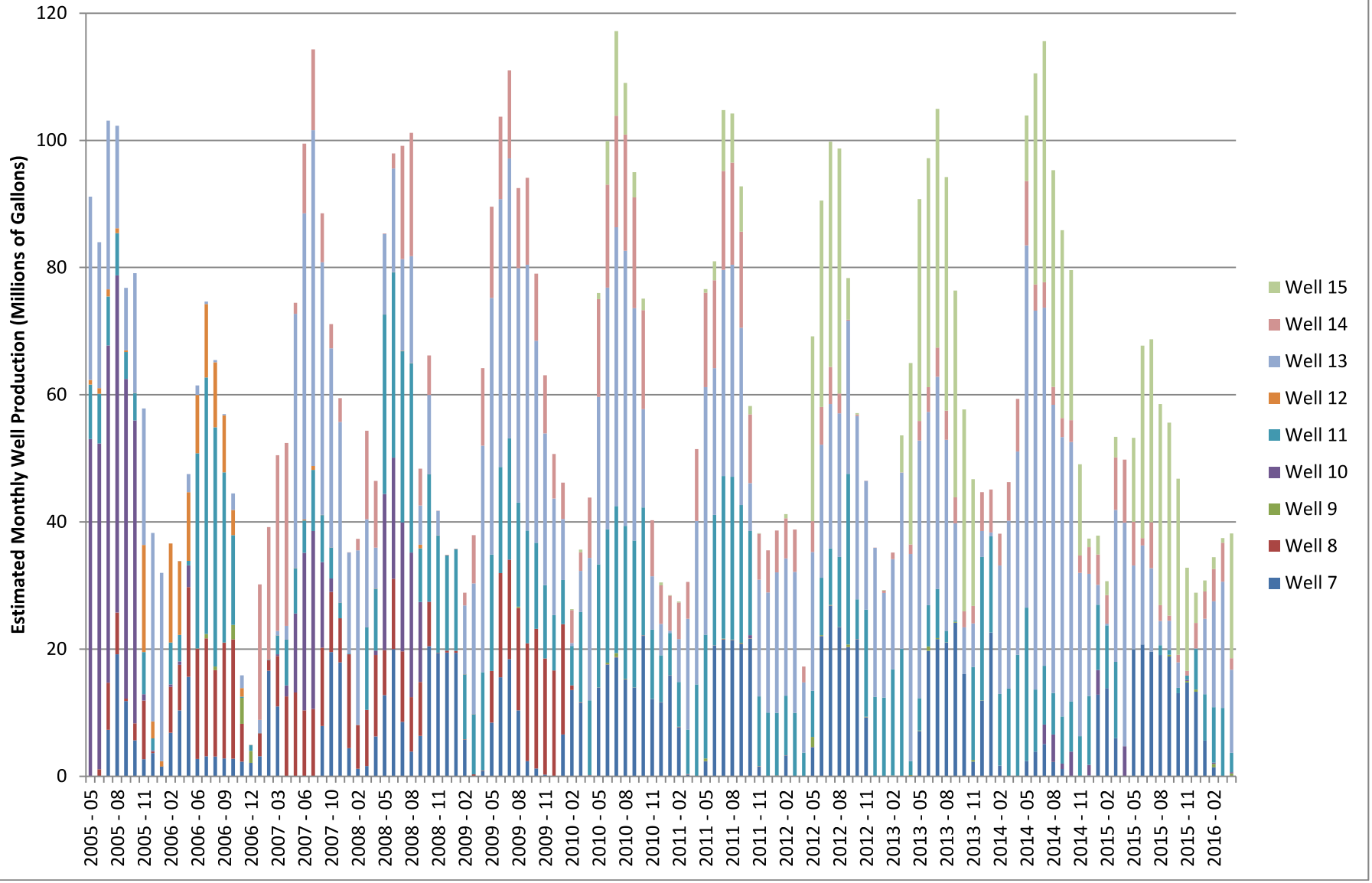
ENGEO
Expect Excellence

Figure 5 - Well 15



ENGEO
Expect Excellence

Figure 6 - Well Production by Month



ENGEO
Expect Excellence

Figure 7: Well Locaitons

ENGEO
Expect Excellence

GEOTECHNICAL
ENVIRONMENTAL
WATER RESOURCES
CONSTRUCTION SERVICES

Project No.
5462.000.004

May 10, 2016

Mr. Dave Melilli
Director of Public Works
City of Rio Vista
One Main Street
Rio Vista, CA 94571

Subject: Groundwater Analysis
Rio Vista, CA

PROPOSAL FOR GROUNDWATER INSTRUMENTATION ANALYSIS

References: 1. ENGEO Project No. 5462.000.001 Contract dated July 31, 2009.

Dear Mr. Melilli:

Thank you for requesting the analysis for the placement of groundwater instrumentation analysis. We have prepared this proposal to review the hydrologic conditions in Rio Vista and assess potential locations for groundwater instrumentation. Our scope and fee also includes the following tasks:

- Aggregation of Historical Data
  - Hydrologic/Subsurface Reports
  - Well Log Data (Both City and Public Wells)
- Analysis of City Property for Potential Locations
- Analysis of Offline Wells (Wells 8 & 12) and Test/Abandon Wells
- Evaluation of Optimal Groundwater Instrumentations/SCADA Connection with Sierra Controls
- Evaluation of Optimal Depths and Locations
- Meeting with City Officials
- Report and Map Creation of Potential Locations with Recommendations for:
  - Depths and Discrete Intervals (if appropriate)
  - Locations
  - Instrumentation
  - Communication System

We propose to offer these services for a fee of **$15,250.**

ENGEO
Expect Excellence

2010 Crow Canyon Place, Suite 250
San Ramon, CA 94583-4634
(925) 866-9000 ♦ FAX (888) 279-2698

ADDENDUM TO
PROFESSIONAL SERVICES AGREEMENT

TO: Mr. Dave Melilli
City of Rio Vista
One Main Street, P. O. Box 745
Rio Vista, CA 94571

DATE: May 10, 2016

ENGEO Project No. 05462.000.004
Phase: 001
ENGEO Contact: Brian Flaherty

PROJECT NAME: City of Rio Vista Groundwater Instrumentation Analysis

ORIGINAL CONTRACT NO.: ENGEO Project No. 5462.000.001

ORIGINAL CONTRACT DATE: July 31, 2009

The undersigned parties agree to make the following changes to the subject contract; all other provisions of the subject contract shall remain in effect.

If the undersigned party differs from that of the original contracting party, the undersigned agrees to all the original terms and conditions of the subject contract. Any limitations shall be an aggregate amount that applies to the original work and all subsequent change orders and/or addendums.

Additional Scope of Services: In accordance with the attached proposal dated May 10, 2016.

Estimated Fees: For a fee of $15,250, in accordance with the attached proposal dated May 10, 2016.

AGREED TO AND ACCEPTED BY:

ENGEO INCORPORATED	**CITY OF RIO VISTA**
BY: _____	BY: Greg Bowman
PRINT NAME: _____	PRINT NAME: GREG BOWMAN
TITLE: _____	TITLE: INTERIM CITY MANAGER
DATE: _____	DATE: 5-10-16

Internal Review: 1. AM 2. JAA

With an estimated average household size in the city of 2.30 persons in 2010, these developments could add approximately 12,400 people, increasing the City's population at buildout by 148 percent. The buildout date for these developments is currently uncertain, but with improved real estate market conditions, an initial portion of these units could be added within the 7.5-year planning period of this housing element

The current market downturn is anticipated to substantially slow population growth in the city for the next several years or until the market recovers. Therefore, while the average annual growth rate between 2000 and 2008 was robust at 7.4 percent (DOF 2008), models of population growth predicated on rapid annual growth rates since 2000 may not accurately reflect the change in market conditions and associated slowing in residential homebuilding. Between 2009 and 2010, the average annual housing growth rate was between 1.7% in 2009 (DOF 2009) and 1.0 % in 2010 (DOF 2010).

Long Term Growth

The 20 year vision of Rio Vista's General Plan allows for an approximate population of over 22,000 persons based on the build - out of all of the proposed planned unit developments including the various single-family, multiple-family and mixed-use areas allowed by policies and the zoning ordinance of the City.

ABAG is responsible for forecasting long-term changes to the population and economy of the Bay Area to assist local governments in identifying policies that address a changing environment. This effort includes *Projections*, ABAG's biennial forecast of population, housing, jobs, and income out to the year 2035 for the nine-county 101-city region. Since 2003, ABAG has included a set of policy assumptions in its models that assign more growth to areas around transit centers in recognition of evolving government polices and market conditions that promote growth in those areas. Past ABAG forecasts have typically been within five percent of actual population, household, and job growth, at the county level (ABAG 2008).

Population projections for the City of Rio Vista from ABAG's *Projections 2007* indicated that the city would have the fastest rate of growth of any city in the region, growing to 13,600 residents by 2015, 19,100 residents by 2025, and 24,500 residents by 2035 (ABAG 2007). In June 2009 ABAG released *Projections 2009* including revised projections for the City of Rio Vista of 11,400 population by 2020 and 15,300 persons by 2035. In addition, ABAG is projecting a total of about 6,240 households and 5,990 total jobs over the next 25 years (i.e. 2035) These revised projections factor in such issues as higher energy costs, environmental trends, and more transit and transit-oriented higher density housing concentrated in the redevelopment areas and larger urban centers (also called Priority Development Areas – or PDA's).

[6] No partial lot density is assumed for previously subdivided small parcels.

[7] Full listing of all parcels available upon request from City.

[8] With recent decline in home values, a substantial number of these R-1 parcels could be developed with housing affordable to households in the upper range of the lower income category. However, to provide a conservative estimate of homes likely to be affordable to lower income households, these parcels have been assumed to be affordable to those in the moderate and above income categories only.

[9] This parcel currently in use as trailer storage facility.

[10] Unit potential likely density assumes that 65 percent of the NC-designated area would be developed with residential uses at 15 dwelling units per acre. The NC land use district requires 50 – 80 percent residential uses and a minimum density of 10 units per acre, with a maximum density of 20 units per acre on an individual site, including necessary infrastructure. Please refer to Table 4-3 in the Land Use Element.

Pending Projects

In addition to ongoing development in the existing Brann and Gibbs Ranch subdivisions, three large residential subdivisions within the City limits are in various stages of the entitlement or construction process.

Trilogy

This age-restricted senior housing subdivision project located in the northwestern portion of the City began building in 1996 and is planned for approximately 3,000 single family units. Approximately 2,000 units have been constructed as of April 2009. The project is centered around an 18-hole public golf course and clubhouse/restaurant. As of April 2011 about five new homes were under construction.

Riverwalk

Riverwalk is an approved 236-acre Planned Unit Development north and east of the intersection of Highway 12 and Church Road. The Riverwalk Project would consist of approximately 743 single-family homes and 180 multi-family residential units, as well as commercial and open space development. The project is proposed to be carried out in six phases over a period of 12 to 15 years. An Environmental Impact Report (EIR) was prepared for the project in 2007. The EIR was certified by the City Council in January 2007, and the project was approved in October 2008.

Del Rio Hills

The Del Rio Hills project site (commonly known as the Esperson property) is located in the City of Rio Vista on approximately 505 acres immediately west of downtown Rio Vista, south of State Route 12, east of Amerada Road, and north of unincorporated Solano County. The project is a proposed Planned Unit Development, designed as a mixed-use community to include low, medium, and high-density residential development, as well as commercial uses, public facilities, school, parks, and open space uses. The current plan proposes to construct 759 low density units (<2-7.9 units per acre), 1,162 medium density units (8-14.9 units per acre), and 502 high density residential units (15-28 units per acre) in three phases. A draft Environmental Impact Report was circulated between December 2008 and April 2009, with public meetings held in February, March, and April to receive public comment. The Draft EIR has been on hold by the applicant since the end of 2009. During mid-2011, the applicant began completing a revised Draft EIR which will incorporate comments/responses provided during the initial review, and a

Water Rates

The rates to be charged and collected for water supplied to consumers by the city water department shall accrue, be computed and paid for as provided herein, and under the rules and regulations herein set forth, on the basis of the size of service connec-tions and meters and minimum quantities, measured in gallons or hundred cubic feet and consumed monthly as shown by water meters, excepting as is herein otherwise expressly provided.

Water shall be supplied each commercial consumer separately through a separate service tap and meter when possible, in which case a separate tap and meter shall be installed.

A. Effective October 1, 2009, the flat rate monthly minimum charge to each consumer (as the term is defined herein) for water supplied shall be:

	2008-2009	**2009-2010**	**2010-2011**	**2011-2012**	**2012-2013**
Residential Monthly Rate	$25.36	$43.99	$45.01	$45.02	$45.02
Multifamily Residential Monthly Rate	$19.29	$33.47	$34.24	$34.28	$34.31
Commercial/Industrial/Retail Base Rates Meter Size (Inches)					
¾	$ 19.29	$ 33.47	$ 34.24	$ 34.28	$ 34.32
1	48.24	83.68	85.59	85.69	85.79
1-½	96.47	167.35	171.18	171.39	171.58
2	154.36	267.76	273.89	274.22	274.52
3	289.42	502.05	513.54	514.16	514.73
4	482.37	836.75	855.91	856.94	857.88
6	964.74	1,673.50	1,711.82	1,713.88	1,715.75

Those single-family residences, and any future single-family residences, that are required to install one-inch meters for fire-flow purposes were treated as having standard 3/4-inch meters for the purposes of the city's rate study and are expected to be charged at the 3/4-inch meter rate plus the volume charge. Multifamily, commercial, industrial, and retail base customers will be charged a fixed meter rate plus the volume charge. Single-family residences that are unmetered or whose meters are not being read are charged a fixed monthly rate that is based on the 3/4-inch residential/industrial meter rate plus 20.2 hundred cubic feet (HCF) consumption multiplied by volume rate. 1 HCF = 748 gallons.

City of Rio Vista 2015 UWMP

Appendix E

- 2015 UWMP Urban Water Reatiler Tables

Table 2-1 Retail Only: Public Water Systems			
Public Water System Number	Public Water System Name	Number of Municipal Connections 2015	Volume of Water Supplied 2015
CA4810004	Rio Vista	4,450	1,793
	TOTAL	4,450	1,793
NOTES: number of connections from 2015 annual report to the drinking water program			

Table 2-2: Plan Identification			
Select Only One	**Type of Plan**		**Name of RUWMP or Regional Alliance** *if applicable* *drop down list*
☑	**Individual UWMP**		
	☐	Water Supplier is also a member of a RUWMP	
	☐	Water Supplier is also a member of a Regional Alliance	
☐	**Regional Urban Water Management Plan (RUWMP)**		
NOTES:The City of Rio Vista is a member of the Solano County Integrated Regional Water Management Group.			

Table 2-3: Agency Identification	
Type of Agency (select one or both)	
☐	Agency is a wholesaler
☑	Agency is a retailer
Fiscal or Calendar Year (select one)	
☑	UWMP Tables Are in Calendar Years
☐	UWMP Tables Are in Fiscal Years
If Using Fiscal Years Provide Month and Date that the Fiscal Year Begins (mm/dd)	
Units of Measure Used in UWMP (select from Drop down)	
Unit	AF
NOTES:	

Table 2-4 Retail: Water Supplier Information Exchange
The retail supplier has informed the following wholesale supplier(s) of projected water use in accordance with CWC 10631.
Wholesale Water Supplier Name *(Add additional rows as needed)*
N/A
NOTES:

Table 3-1 Retail: Population - Current and Projected						
Population Served	2015	2020	2025	2030	2035	2040*(opt)*
	10,112	11,900	13,250	14,600	15,300	
NOTES: Population values for 2015-2030 are based on the Association of Bay Area Govenments. Population projection for 2035 is based on the City of Rio Vista General Plan Housing Element (page 6-12).						

Table 4-1 Retail: Demands for Potable and Raw Water - Actual			
Use Type *(Add additional rows as needed)*	2015 Actual		
Drop down list *May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool*	Additional Description *(as needed)*	Level of Treatment When Delivered *Drop down list*	Volume
Single Family		Drinking Water	1,384
Multi-Family		Drinking Water	87
Commercial		Drinking Water	80
Industrial		Drinking Water	2
Institutional/Governmental		Drinking Water	0
Landscape		Drinking Water	25
Agricultural irrigation		Drinking Water	0
Other		Drinking Water	0
Losses		Drinking Water	215
		TOTAL	1,793
NOTES:Individual demand volume based on a percentage of total connections times the overall volume of water pumped in 2015. This method assumes the same demand for each type of user. To be updated when supplied with relevant information.			

Table 4-2 Retail: Demands for Potable and Raw Water - Projected						
Use Type *(Add additional rows as needed)*	Additional Description *(as needed)*	Projected Water Use *Report To the Extent that Records are Available*				
Drop down list *May select each use multiple times These are the only Use Types that will be recognized by the WUEdata online submittal tool*		2020	2025	2030	2035	2040-opt
Single Family		1,628	1,813	1,998	2,094	
Multi-Family		102	114	125	131	
Commercial		94	105	115	121	
Industrial		3	3	4	4	
Institutional/Governmental		0	0	0	0	
Landscape		30	33	36	38	
Agricultural irrigation		0	0	0	0	
Other		0	0	0	0	
Losses		253	282	310	325	
TOTAL		2,110	2,349	2,589	2,713	0
NOTES:						

Table 4-3 Retail: Total Water Demands						
	2015	2020	2025	2030	2035	2040 *(opt)*
Potable and Raw Water *From Tables 4-1 and 4-2*	1,793	2,110	2,349	2,589	2,713	0
Recycled Water Demand* *From Table 6-4*	0	65	144	239	333	0
TOTAL WATER DEMAND	1,793	2,175	2,494	2,827	3,046	0
**Recycled water demand fields will be blank until Table 6-4 is complete.*						
NOTES:						

Table 4-4 Retail: 12 Month Water Loss Audit Reporting	
Reporting Period Start Date (mm/yyyy)	Volume of Water Loss*
01/2015	215.04
** Taken from the field "Water Losses" (a combination of apparent losses and real losses) from the AWWA worksheet.*	
NOTES: As reported by general manager	

Table 4-5 Retail Only: Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections? (Refer to Appendix K of UWMP Guidebook) *Drop down list (y/n)*	Yes
If "Yes" to above, state the section or page number, in the cell to the right, where citations of the codes, ordinances, etc… utilized in demand projections are found.	Page 9, Section 3.2
Are Lower Income Residential Demands Included In Projections? *Drop down list (y/n)*	Yes
NOTES:	

Table 5-1 Baselines and Targets Summary
Retail Agency or Regional Alliance Only

Baseline Period	Start Year	End Year	Average Baseline GPCD*	2015 Interim Target *	Confirmed 2020 Target*
10-15 year	*2000*	*2009*	*310*	*279*	*248*
5 Year	*2005*	*2009*	*283*		

*All values are in Gallons per Capita per Day (GPCD)

NOTES: Reference page 9, section 3.2. Baseline calculated with 2010 census populations, 2000-2004 water demands from the 2010 uwmp, and 2005-2009 water demands from the ENGEO well pumping data

Table 5-2: 2015 Compliance

Retail Agency or Regional Alliance Only

Actual 2015 GPCD*	2015 Interim Target GPCD*	Optional Adjustments to 2015 GPCD Enter "0" if no adjustment is made *From Methodology 8*					2015 GPCD* *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2015? Y/N
		Extraordinary Events*	Economic Adjustment*	Weather Normalization*	TOTAL Adjustments*	Adjusted 2015 GPCD*		
158	279	0	0	0	0	158	158	Yes

**All values are in Gallons per Capita per Day (GPCD)*

NOTES: Reference page 9, section 3.2.

Table 6-1 Retail: Groundwater Volume Pumped						
☐	Supplier does not pump groundwater. The supplier will not complete the table below.					
Groundwater Type ***Drop Down List*** *May use each category multiple times*	Location or Basin Name	2011	2012	2013	2014	2015
Add additional rows as needed						
Alluvial Basin	Solano Sub-Basin	2238	2185	2442	2658	1793
	TOTAL	2,238	2,185	2,442	2,658	1,793
NOTES:						

Table 6-2 Retail: Wastewater Collected Within Service Area in 2015						
☐	There is no wastewater collection system. The supplier will not complete the table below.					
	Percentage of 2015 service area covered by wastewater collection system *(optional)*					
	Percentage of 2015 service area population covered by wastewater collection system *(optional)*					
Wastewater Collection			**Recipient of Collected Wastewater**			
Name of Wastewater Collection Agency	Wastewater Volume Metered or Estimated? *Drop Down List*	Volume of Wastewater Collected from UWMP Service Area 2015	Name of Wastewater Treatment Agency Receiving Collected Wastewater	Treatment Plant Name	Is WWTP Located Within UWMP Area? *Drop Down List*	Is WWTP Operation Contracted to a Third Party? *(optional)* *Drop Down List*
Add additional rows as needed						
City of Rio Vista	Estimated	498	City of Rio Vista	Beach Facility	Yes	No
City of Rio Vista	Estimated	225	City of Rio Vista	Northwest Facility	Yes	No
Total Wastewater Collected from Service Area in 2015:		723				
NOTES:						

Table 6-3 Retail: Wastewater Treatment and Discharge Within Service Area in 2015

☐ No wastewater is treated or disposed of within the UWMP service area.
The supplier will not complete the table below.

Wastewater Treatment Plant Name	Discharge Location Name or Identifier	Discharge Location Description	Wastewater Discharge ID Number *(optional)*	Method of Disposal *Drop down list*	Does This Plant Treat Wastewater Generated Outside the Service Area?	Treatment Level *Drop down list*	2015 volumes			
							Wastewater Treated	Discharged Treated Wastewater	Recycled Within Service Area	Recycled Outside of Service Area
Add additional rows as needed										
Beach Facility	Sacramento River	77 feet offshore	Discharge Point No. 001	River or creek outfall	No	Secondary, Disinfected - 23	498	422	0	0
Northwest Facility	Sacramento River	200 feet offshore	Discharge Point No. 001	River or creek outfall	No	Tertiary	225	220	0	0
						Total	723	642	0	0

NOTES:

Table 6-4 Retail: Current and Projected Recycled Water Direct Beneficial Uses Within Service Area

I	Recycled water is not used and is not planned for use within the service area of the supplier. The supplier will not complete the table below.

Name of Agency Producing (Treating) the Recycled Water:	North West Treatment Facility
Name of Agency Operating the Recycled Water Distribution System:	City of Rio Vista
Supplemental Water Added in 2015	0
Source of 2015 Supplemental Water	Treated Wastewater Effluent

Beneficial Use Type	General Description of 2015 Uses	Level of Treatment *Drop down list*	2015	2020	2025	2030	2035	2040 (opt)
Agricultural irrigation	n/a	Tertiary	0	0	0	0	0	
Landscape irrigation (excludes golf courses)	Residential Development Irrigation	Tertiary	0	62	142	236	330	
Golf course irrigation	n/a	Tertiary	0	0	0	0	0	
Commercial use	Chevron and Construction Use	Tertiary	0	3	3	3	3	
Industrial use	n/a	Tertiary	0	0	0	0	0	
Geothermal and other energy production	n/a	Tertiary	0	0	0	0	0	
Seawater intrusion barrier	n/a	Tertiary	0	0	0	0	0	
Recreational impoundment	n/a	Tertiary	0	0	0	0	0	
Wetlands or wildlife habitat	n/a	Tertiary	0	0	0	0	0	
Groundwater recharge (IPR)*	n/a	Tertiary	0	0	0	0	0	
Surface water augmentation (IPR)*	n/a	Tertiary		0	0	0	0	
Direct potable reuse	n/a	Tertiary		0	0	0	0	
Other *(Provide General Description)*	n/a	Tertiary	0	0	0	0	0	
		Total:	0	65	144	239	333	0

**IPR - Indirect Potable Reuse*

NOTES:

Table 6-5 Retail: 2010 UWMP Recycled Water Use Projection Compared to 2015 Actual			
☑	Recycled water was not used in 2010 nor projected for use in 2015. The supplier will not complete the table below.		
Use Type		**2010 Projection for 2015**	**2015 Actual Use**
Agricultural irrigation			
Landscape irrigation (excludes golf courses)			
Golf course irrigation			
Commercial use			
Industrial use			
Geothermal and other energy production			
Seawater intrusion barrier			
Recreational impoundment			
Wetlands or wildlife habitat			
Groundwater recharge (IPR)			
Surface water augmentation (IPR)			
Direct potable reuse			
Other	*Type of Use*		
Total		0	0
NOTES:			

Table 6-6 Retail: Methods to Expand Future Recycled Water Use			
☐	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation.		
4.5 page 15	Provide page location of narrative in UWMP		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Water Use
Add additional rows as needed			
Pipeline	NWTF Riverwalk Recycled Water Project	2020	62
Chevron	Company to buy 850,000 gallons / year	2020	3
Dust Control	Construction Activities	2020	0
		Total	65
NOTES: Construction Activity Recycled Water Use value TBD			

Table 6-7 Retail: Expected Future Water Supply Projects or Programs						
☐	No expected future water supply projects or programs that provide a quantifiable increase to the agency's water supply. Supplier will not complete the table below.					
☐	Some or all of the supplier's future water supply projects or programs are not compatible with this table and are described in a narrative format.					
3.3 page 10	Provide page location of narrative in the UWMP					
Name of Future Projects or Programs	Joint Project with other agencies?		Description (if needed)	Planned Implementation Year	Planned for Use in Year Type *Drop Down List*	Expected Increase in Water Supply to Agency *This may be a range*
	Drop Down List (y/n)	*If Yes, Agency Name*				
Add additional rows as needed						
North Bay Recharge Aquaduct Project	Yes	Solano County Water Agency	Conjuctive use groundwater recharge	2035	All Year Types	1,600
Well Augmentation Project	Yes	ENGEO	9 new 1000 gpm wells to meet increased water demands	2035	All Year Types	14,517
NOTES: Well Augmentation Project Planned Implementation Year TBD						

Table 6-8 Retail: Water Supplies — Actual				
Water Supply	Additional Detail on Water Supply	2015		
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		Actual Volume	Water Quality *Drop Down List*	Total Right or Safe Yield *(optional)*
Add additional rows as needed				
Groundwater	9 wells	1,793	Drinking Water	1,793
	Total	1,793		1,793
NOTES:				

Table 6-9 Retail: Water Supplies — Projected

Water Supply	Additional Detail on Water Supply	Projected Water Supply *Report To the Extent Practicable*									
Drop down list *May use each category multiple times. These are the only water supply categories that will be recognized by the WUEdata online submittal tool*		**2020**		**2025**		**2030**		**2035**		**2040** *(opt)*	
		Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*	Reasonably Available Volume	Total Right or Safe Yield *(optional)*
Add additional rows as needed											
Groundwater		3,241	3,241	3,537	3,537	3,817	3,817	3,917	3,917		
Recycled Water		65	65	144	144	239	239	333	333		
	Total	3,306	3,306	3,681	3,681	4,056	4,056	4,250	4,250	0	0

NOTES: Total Supply projected assumes per capita water use equals the maximum 2020 target water use (GPCD)

Table 7-1 Retail: Basis of Water Year Data

Year Type	Base Year *If not using a calendar year, type in the last year of the fiscal, water year, or range of years, for example, water year 1999-2000, use 2000*	Available Supplies if Year Type Repeats	
		☐ Quantification of available supplies is not compatible with this table and is provided elsewhere in the UWMP. Location _____	
		☑ Quantification of available supplies is provided in this table as either volume only, percent only, or both.	
		Volume Available	**% of Average Supply**
Average Year	2009	284	100%
Single-Dry Year	2013	232	82%
Multiple-Dry Years 1st Year	2012	216	76%
Multiple-Dry Years 2nd Year	2013	232	82%
Multiple-Dry Years 3rd Year	2014	243	86%
Multiple-Dry Years 4th Year *Optional*			
Multiple-Dry Years 5th Year *Optional*			
Multiple-Dry Years 6th Year *Optional*			

Agency may use multiple versions of Table 7-1 if different water sources have different base years and the supplier chooses to report the base years for each water source separately. If an agency uses multiple versions of Table 7-1, in the "Note" section of each table, state that multiple versions of Table 7-1 are being used and identify the particular water source that is being reported in each table.

NOTES: Volume available given as GPCD. 2013 has been selected as the driest single year on record in the NOAA data base for precipitation at the atioch pump plant 3 data center (1955-2015)

Table 7-2 Retail: Normal Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 *(Opt)*
Supply totals *(autofill from Table 6-9)*	3,306	3,681	4,056	4,250	0
Demand totals *(autofill from Table 4-3)*	2,175	2,494	2,827	3,046	0
Difference	1,131	1,188	1,228	1,204	0
NOTES: Supply based on maximum 2020 water use target, Demand based on current water use gpcd with population projections					

Table 7-3 Retail: Single Dry Year Supply and Demand Comparison					
	2020	2025	2030	2035	2040 (Opt)
Supply totals	3,092	3,443	3,794	3,976	
Demand totals	3,092	3,443	3,794	3,976	
Difference	0	0	0	0	0
NOTES:					

Table 7-4 Retail: Multiple Dry Years Supply and Demand Comparison						
		2020	2025	2030	2035	2040 (Opt)
First year	Supply totals	2,879	3,206	3,532	3,702	
	Demand totals	2,879	3,206	3,532	3,702	
	Difference	0	0	0	0	0
Second year	Supply totals	3,092	3,443	3,794	3,976	
	Demand totals	3,092	3,443	3,794	3,976	
	Difference	0	0	0	0	0
Third year	Supply totals	3,239	3,607	3,974	4,165	
	Demand totals	3,239	3,607	3,974	4,165	
	Difference	0	0	0	0	0
Fourth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Fifth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
Sixth year *(optional)*	Supply totals					
	Demand totals					
	Difference	0	0	0	0	0
NOTES:						

Table 8-1 Retail Stages of Water Shortage Contingency Plan		
Stage	Complete Both	
	Percent Supply Reduction[1] *Numerical value as a percent*	Water Supply Condition (*Narrative description)*
Add additional rows as needed		
Stage 1	15%	• Below average rainfall in the previous 12-24 months • 10% or more of City wells out of service due to noncompliance with drinking water standards or drop in static ground water levels* • Irrigation allotments by local irrigation districts reduced by 15% • Extended warm weather patterns typical of summer
Stage 2	25%	• Below average rainfall in the previous 24-36 months • Prolonged periods of low water pressure • 10% or more of City wells out of service due to noncompliance with drinking water standards or drop in groundwater • Irrigation allotments by local irrigation districts • Reduced by 25% • Extended warm weather patterns typical of summer
Stage 3	35%	• Below average rainfall in the previous 36-48 months • Prolonged periods of low water pressure. • 10% or more of City wells out of service due to noncompliance or drop in groundwater levels • Irrigation allotments by local irrigation reduced by 35% • Extended warm weather patterns typical of summer
Stage 4	50%	• Below average rainfall in the previous 48-60 months. • Prolonged periods of low water pressure • 10% or more of City wells out of service due to noncompliance with drinking water standards or drop in groundwater levels • Irrigation allotments by local irrigation districts reduced by 50% • Extended warm weather patterns typical of summer
[1] *One stage in the Water Shortage Contingency Plan must address a water shortage of 50%.*		
NOTES:		

Table 8-2 Retail Only: Restrictions and Prohibitions on End Uses			
Stage	Restrictions and Prohibitions on End Users ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*	Penalty, Charge, or Other Enforcement? *Drop Down List*
Add additional rows as needed			
1	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner		Yes
2	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water		Yes
2	Other - Prohibit use of potable water for washing hard surfaces	Sidewalk/Street Cleaning	Yes
4	Other	No New Service Connections	Yes
NOTES:			

Table 8-3 Retail Only: Stages of Water Shortage Contingency Plan - Consumption Reduction Methods		
Stage	Consumption Reduction Methods by Water Supplier ***Drop down list*** *These are the only categories that will be accepted by the WUEdata online submittal tool*	Additional Explanation or Reference *(optional)*
Add additional rows as needed		
4	Implement or Modify Drought Rate Structure or Surcharge	
4	Improve Customer Billing	
4	Provide Rebates on Plumbing Fixtures and Devices	
4	Increase Water Waste Patrols	
4	Increase Frequency of Meter Reading	
NOTES:		

Table 8-4 Retail: Minimum Supply Next Three Years			
	2016	2017	2018
Available Water Supply	3,199	3,233	3,262
NOTES: Prorated 2015-2020 population projections and maximum allowable water use per capita (20% reduction by 2020)			

Table 10-1 Retail: Notification to Cities and Counties		
City Name	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Benicia	☑	☑
Vacaville	☑	☑
Fairfield	☑	☑
American Canyon	☑	☑
County Name *Drop Down List*	60 Day Notice	Notice of Public Hearing
Add additional rows as needed		
Solano County	☑	☑
	☐	☐
Note:		

City of Rio Vista 2015 UWMP

Appendix F

- **City Code** related to Landscape Conservation Ordinance 643
- ***Water Conservation for Rio Vista***, Rio Vista Beacon, May 15, 2013.
- ***Water Conservation and Education Information***, Tri-fold Brochure, 2013.
- **Why Are Those Fire Hydrants Dripping Water**, News Release
- **Arsenic Protection for Your Drinking Water**, News Release
- ***Upgrading Rio Vista's Water Delivery System***, Rio Vista Beacon, September 4, 2013.
- ***City of Rio Vista Water Meter Retrofit Cost/Benefit Analysis***, Preliminary Report, MC Engineering, October 1, 2012
- DMM A Water Survey Program ***CBA***
- DMM F High Efficiency Washing Machine Rebate Program ***CBA***
- DMM H School Education Program ***CBA***
- DMM N High Efficiency Toilet Replacement Program ***CBA***
- ***Ordinance No. 006-2015***
- ***Ordinance No. 643***
- ***City of Rio Vista Water Conservation Urgency Ordinance Section 3 Section 17.68.025***
- ***Ordinance No. 02-2014***
- City of Rio Vista NWWWTF ***Recycled Water Use Feasibility Study***, Stantec, January 21, 2013

Adopted as Per Ordinance 643:

Chapter 17.68 WATER CONSERVATION AND LANDSCAPING

17.68.010 Purpose.

Water is a limited and precious resource. The purpose of this chapter is to assist the city of Rio Vista in achieving water conservation through proper plant selection, installation, and maintenance practices. The benefits of water conservation and landscape standards are many and diverse. For example, these standards are intended to maintain and improve the quality of development currently being established in the city of Rio Vista and to upgrade the appearance and function of existing developments; to buffer incompatible land uses; and to provide an attractive streetscape to pedestrians, bicyclists, and motorists.

These standards are intended to minimize or soften the visual impact of buildings and parking lots, reduce or eliminate heat and glare, prevent soil erosion, minimize impacts to native wildlife and vegetation, minimize surface runoff and water conservation standards, serve to preserve the city's water resources, and protect water quality. The following xeriscape principles serve as the primary means of achieving water conservation:

A. Appropriate planning and design for local conditions;
B. Limiting turf to locations where it provides functional benefits;
C. Efficient irrigation systems;
D. The use of soil amendments to improve the structural characteristics of the soil;
E. The use of mulches, where appropriate;
F. The use of drought-tolerant plants; and
G. Appropriate and timely maintenance. (Ord. 643 § 2, 2009)

17.68.020 Applicability.

The provisions of this chapter apply as follows:

A. Applicable Projects. This chapter applies to all new projects for which landscaping is proposed that are subject to use permit or site plan and architectural review, except as exempted under subsections B, C, and D of this section. Such projects include: landscaping associated with new commercial, institutional, and mixed-use development; common areas and developer-installed landscaping associated with new multifamily development; front yards and common areas associated with new residential planned unit developments; and common areas and developer-installed, front yard landscaping associated with single-family development of five or more units. This chapter also applies to replacement landscaping proposed for existing commercial, mixed-use, and multifamily development and to replacement landscaping associated with single-family residences previously subject to the requirements of this chapter.

B. Residential Exemptions. This chapter does not apply to private yard areas within single-family and multifamily developments. While the chapter applies to all requests for building permits for new single-family homes, it does not apply to new single-family homes already completed or under permitted construction on single-family lots created prior to the effective date of the ordinance codified in this chapter. Remodel projects for existing, le-

gally conforming, single-family homes and duplexes that entail less than fifty (50) percent of the structure to be remodeled, as determined by the community development director or designee, are also exempt from the provisions of this chapter. The city encourages landscape designers to follow the provisions of this chapter, regardless of this exemption.

C. Discretionary Exemptions. Schools, parks, playgrounds, common-use areas in multifamily residential developments (e.g., play areas and turf areas intended for passive or active recreational use), sports fields, registered historical sites, and cemeteries may be exempted from the water budget requirements set forth in Sections 17.68.030 and 17.68.060, subject to approval of the planning commission.

D. Agricultural Exemption. This chapter does not apply to areas devoted to agricultural cultivation.

E. No Exemption for Wells. The presence of a well on-site shall not be considered grounds for exempting a project that is subject to the provisions of this chapter from any of its requirements.

F. Exceptions to Standard Criteria. If the zoning administrator finds a proposed landscape plan is not in conformance with any of the criteria specified in Sections 17.68.030 through 17.68.090, the permit application shall be disapproved. The zoning administrator may elect, instead, to refer the application to the planning commission for consideration of an exception and/or due to the potential controversial nature of the proposal. In order to grant an exception, the commission must be able to make all of the following findings:

1. The proposed landscape plan would complement the character of surrounding development, the size of the subject property, and the scale of development on site; and

2. The proposed landscaping would not be injurious to the public health, safety or welfare; and

3. The applicant has successfully demonstrated that the majority of improvements to the site are in conformance with the intent of the code and the exception is necessary due to a hardship unique to the location. Hardship, for the purpose of this finding, shall not be based on economic considerations.

G. Appeal by Applicant. In the event that the applicant disagrees with an administrative determination on an application, including water budget requirements, the applicant may appeal to the planning commission in accordance with Chapter 17.60 of this title. The findings for an exception stated in subsection (F)(1)(2) and (3) of this section, must also be made for any such appeal(s) to be granted. The applicant may follow the same appeal procedures for application and fees to appeal a decision of the planning commission to the city council. (Ord. 643 § 2, 2009)

17.68.030 Landscape plans required.

A. General. Prior to the issuance of any building permit for projects subject to this chapter, the necessary landscape plans shall be submitted to, reviewed by, and approved by the community development director or designee. The project applicant shall be required to reimburse the city for staff costs associated with the review and processing of a landscape plan, pursuant to rates set forth in the city fee schedule at the time the application is submitted. The landscape plan may be referred to the planning commission for site plan and architectural review.

B. Nature Of Required Plans. Landscape plans for one existing single-family home or duplex, or for one existing commercial/industrial property developed with a facility less than ten thousand (10,000) square feet in building footprint, may be prepared by the property or business owner as long as they meet the basic requirement of subsection C of this section. For landscape projects associated with larger projects, the plans shall be prepared by a landscape architect, a certified irrigation consultant, or a licensed contractor.

C. Contents of Landscape Plans. Landscape plans shall include the following items:

1. A written summary statement addressing compliance with applicable provisions of this chapter;

2. A planting plan, drawn to scale and showing geographic north, setting forth the following items, as applicable to the project:

a. All landscape features, including areas of vegetation to be preserved, in context with property lines and street names,

b. The location and outline of existing and proposed buildings, and other improvements (fences, utilities, paved areas, etc.) on the site, if any,

c. Existing and proposed parking spaces, other vehicular areas, access aisles, driveways and similar features,

d. All plant materials, designated by name and location, to be installed, preserved or removed,

e. The boundaries of each hydrozone,

f. A legend including the botanical name, common name, container size, spacing if applicable, and quantities of all plant material to be installed,

g. Existing trees to be preserved or removed, labeled by name and size,

h. The location and characteristics of all other landscape materials to be used;

3. A tabulation clearly displaying the relevant statistical information necessary for the community development director or planning commission to evaluate compliance with the provisions of this chapter, which at a minimum shall include the following:

a. The gross landscape area in square feet, square footage of paved areas, and the number of trees to be planted and/or preserved,

b. The annual water budget allowed for the project area, calculated in accordance with Section 17.68.060 (Irrigation design standards and guidelines), and a tabulated estimate of the amount of water use per year (in CCF units) necessary for long-term maintenance based on estimated water needs following the establishment of the landscaping. This estimate shall be prepared in accordance with the landscape coefficient method described in the most recent edition of the Water Use Classification of Landscape Species (WUCOLS) guide (available from the California Department of Water Resources) and shall document estimated water use for each hydrozone based on water use by plant type, planting density, and microclimate,

c. Other such information that may be required by the community development director or planning commission that is reasonable and necessary to determine that the landscape plan meets the requirements of this chapter. (Ord. 643 § 2, 2009)

17.68.040 Landscaping design standards and guidelines.

A. Site Development Concepts for Water Conservation. The following site development concepts shall be applied to applicable projects in order to promote water conservation:

1. The preservation of existing plant communities;

2. The reestablishment of native plant communities;

3. Limited amount of lawn grass areas;

4. The use of site-specific and drought-tolerant plant materials;

5. Site development that retains storm water runoff on site;

6. The use of pervious paving materials.

B. Use Of Site-Specific and Adapted Planting Materials. Plants used in the landscape design shall to the greatest extent feasible:

1. Be appropriate to the conditions in which they are to be planted;

2. Encourage low maintenance, high-quality design;

3. Be otherwise consistent with the intent of this chapter.

Additionally, the use of plant materials adapted to the local microclimate is encouraged in order to reduce water consumption, general maintenance, and dependence on fertilizers and insecticides.

C. Lawn Grass (Turf) Areas.

1. General. A major portion of water demand used for landscape purposes is required for the irrigation of lawn areas. Properly managed non-grass landscape developments of site-specific plantings will typically be able to survive on a reduced water requirement and survive drought conditions better than lawn areas. For that reason, portions of landscaped areas that have been customarily designed as lawns shall be:

a. Preserved as native plant communities;

b. Planted as redeveloped native or locally-adapted drought tolerant areas; and/or

c. Planted in mixes of trees, shrubs, and ground covers at a low density.

2. Selection of Grass Species. Only drought-tolerant turf varieties suitable to the local climate shall be used.

3. Slope Limitation. Lawn grass shall not be planted on slopes that exceed ten (10) percent, unless otherwise authorized by the community development director or the planning commission to address special situations (e.g., berms and erosion control).

4. Windy Conditions. Winds in the Rio Vista area can bend, break, and/or disfigure plants and trees. The following standards will help to reduce damage and waste of landscaping investments:

a. A survey shall be performed by a landscaper to determine the prevailing wind directions in the area and plant vegetative barriers, where possible, to reduce wind effect.

b. Larger shrubs can and should be used to reduce effect on ground cover and small, flowering shrubs. Gardening publications such as the Sunset Western Garden Book shall be consulted to identify planting materials that thrive despite windy conditions.

c. Trees shall be staked with flexible material to allow root development to respond to windy conditions while training the young tree to grow upright.

d. The specifications in Section 17.68.060(D)(2) for required irrigation methods shall be followed.

e. Turf shall not be placed immediately adjacent to hardscape areas (such as sidewalks and roadways) as water will spread onto non-vegetated areas during windy conditions. Typical turf design for windy areas will be curved with a drought tolerant vegetative or non-vegetative ground cover located immediately adjacent to hardscape areas.

f. Drought tolerant ground cover shall be utilized to replace large landscaped areas that would historically have been landscaped with high water demand turf. Living (drought tolerant) ground cover is able to retain soils better and is more attractive in the long-term because nonliving mulch is more likely to be wind borne away for landscaped areas.

5. Riverfront Conditions. The stormwater drains throughout the city lead to the Sacramento River, and the city obtains its primary source of potable water from its ground water aquifer. In addition, pollution impacts local plant and wildlife species, which help to promote the local economy (an example being the bass population) and the aesthetics of the city. Consequently, pollution prevention measures are necessary to protect contamination of these resources. The following standards shall help to prevent pollution:

a. Design for On-Site Rainwater Graywater Use. Where possible, projects shall be designed so that rainwater shed from rooflines flows to landscaping rather than the storm drain sewer. This is especially important near driveway and parking aisles as the oils and pollutants from motorized vehicles will be carried by the rainwater into the storm drain system and then to the Sacramento River.

b. Mulch plantings, and continue to maintain mulching as this not only protects plants from drought conditions but reduces the impact of pests and the need for pesticides, which are carried by watering and rainfall to the Sacramento River and may infiltrate the city's ground water.

6. Trees. Trees conserve energy by shading and provide pollution filtering, oxygen and a pleasant appearance to the streetscape. Tree planting shall comply with the following standards:

a. Existing trees shall be retained and preserved whenever feasible.

b. Trees located in landscape planters or within ten (10) feet of a permanent structure or twenty (20) feet of a sidewalk or roadway shall be installed with root barriers.

c. Number of Trees.

i. Parking Areas. Trees shall be provided and maintained or replaced upon failure to thrive, within parking areas at a minimum ratio of one tree for each five parking spaces.

ii. Street Trees. One tree per two hundred (200) square feet of landscaped area with a minimum of one every twenty (20) feet of commercial frontage and one per thirty (30) feet of residential frontage (which every is more stringent). Street tree type must be approved by the public works director. (Ord. 643 § 2, 2009)

17.68.050 Plant material and installation standards and guidelines.

A. Amendment of Planting Soil. Urban soils that do not contain organic matter, are compacted, or eroded are often lifeless or do not contain needed nutrients for the proposed landscaping and have lost their ability to absorb water or filter pollutants out of the water. Prior to the installation of plant materials, a soils report shall be prepared, and soils within areas to be landscaped shall be amended in accordance with findings for all new development within the city; this requirement may be required for remodel projects as set forth in Section 17.68.020(B) of this chapter.

B. Use of Organic Mulches. The use of organic mulches reduces the growth of weeds and adds nutrients to the soil as well as retains moisture over the root zones of plant materials. The following minimum standard may be modified subject to the approval of the planning commission in the course of its review of a landscaping plan:

1. Application Specifications. A minimum of two inches of organic mulch shall be placed over all newly installed tree, shrub and ground cover planting areas, unless otherwise approved by the planning commission. No impervious materials shall be used under the mulch. (Ord. 643 § 2, 2009)

17.68.060 Irrigation design standards and guidelines.

A. Irrigation Systems Required. Landscaped areas shall be irrigated by the use of an automatic irrigation system with controllers set to apply water as noted in this section. High-water and low-water use areas shall be separately circuited as noted below. Rainfall sensing devices shall be required in order to avoid operation of the system during periods of increased rainfall.

B. Annual Water Budget. The irrigation system shall use an amount of water less than or equal to the allowable annual water budget for each applicable project area. The allowable annual water budget shall be determined by multiplying the total square footage of planting area by 0.257. This results in the number of units of one hundred (100) cubic feet water allowed per year within the planting area. The above multiplier was arrived by the following formula:

AWB = 55 x .75 x PA x .00623, where:

AWB = Annual water budget, also known as maximum water allowance;

55 = ETo, Average of annual reference evapotranspiration in inches per month for the Sacramento River Delta region;

.75 = Local ETo adjustment factor;

PA = Total planting area in square feet; and

.00623 = Conversion factor into 100 cubic feet.

C. Hydrozoning and Scheduling of Irrigation Systems. Water-efficient landscaping is best accomplished by the use of hydrozones in planting and irrigation design. Therefore, the following standards shall be considered the minimum requirements for landscape irrigation design within the city of Rio Vista:

1. Sprinkler Zoning. Irrigation fixtures shall be separately circuited in conformance with the hydrozones defined on the landscaping plan.

2. Control Systems. Automatically controlled irrigation systems shall be operated by an irrigation controller that is able to irrigate high-water requirement areas, such as turf, on a different schedule from low-water requirement areas. The controller shall be rescheduled as necessary and required to respond to a change of seasons and water demand, as well as the change from an establishment period for a newly-installed landscape to a long-term maintenance schedule.

D. Irrigation System Design Guidelines. Landscape irrigation systems shall incorporate the following design principles in order to maximize efficiency and reduce maintenance needs:

1. Impervious Areas. Sprinkler heads shall be selected and located to avoid direct overthrow onto impervious areas such as concrete sidewalks, patio pad areas, asphalt parking areas or roadway surfaces.

2. Wind Control. The use of low-trajectory spray nozzles and drip irrigation systems will reduce the effect of wind velocity on the irrigation system. The spacing of sprinklers on the upwind edge of irrigated areas shall be tightened. For spray type sprinklers, a maximum distance of twelve (12) feet is recommended. Rotor type sprinklers require closer spacing and generally require overlap of the spray line. On an upwind edge, more sprinkler heads are preferable to fewer.

3. Matched Precipitation Sprinklers. Sprinklers with matched precipitation rates will help ensure uniformity in water application.

4. Low Precipitation Sprinklers. The use of low-precipitation sprinklers will help match water application to soil infiltration rates and reduce run-off.

5. Check Valves. The use of check valves prevents the problem of water drainage from low elevation sprinkler heads and helps avoid problems caused by the introduction of air into the irrigation lines.

6. Master Valve and Excess Flow Sensing Devices. These features help prevent water loss from malfunctioning valves or broken irrigation lines.

7. Slopes. Irrigation design should take slopes into consideration in order to avoid run-off. (Ord. 643 § 2, 2009)

17.68.070 Building permit and inspection requirements.

A. Building Permit Required. A building permit shall be required for landscaping plans developed pursuant and subject to this chapter. The building permit plans shall include the landscaping plan as approved by the community development director or the planning commission and an irrigation plan that includes the following:

1. The location, types, and sizes of all components of the irrigation system, including electronic controllers, main lateral lines, valves, application devices, rain shut off and moisture sensors, backflow preventers, etc.;

2. The plan shall distinguish each irrigation circuit (or zone), and show valve size, flow rate in gallons per minute, and sprinkler precipitation rates;

3. Where possible, the landscape plan shall utilize drip irrigation systems.

B. Permit Requirements. Once landscaping subject to the provisions of this chapter has been installed, approval of the building permit and/or issuance of an occupancy permit shall be contingent upon the following:

1. An inspection performed by planning staff to review the landscaping for conformance with the approved plans; and

2. The submittal of a letter, signed by the property owner, verifying compliance with the provisions of this chapter and agreeing to provide ongoing maintenance of the landscaping and associated irrigation system. (Ord. 643 § 2, 2009)

17.68.080 Maintenance standards and guidelines for cultivated landscape areas.

A. General. The owner or assignee of land subject to this chapter shall be responsible for the maintenance of said land in good condition so as to present a healthy, neat, and orderly landscape area.

B. Replacement Requirements. Vegetation that is required to be planted or preserved by this chapter shall be replaced with equivalent vegetation if it is not living within one year of issuance of a certificate of occupancy.

C. Requirement for On-Going Maintenance. The required mulch layer shall be maintained on all landscape projects. Landscaped areas subject to the provisions of this chapter shall be maintained in a healthy, pest-free condition.

D. Watering.

1. General. All watering of planted areas shall be managed so as to conserve water and maintain healthy flora.

2. Operation of Irrigation Systems. Following the establishment of a landscape area, overhead irrigation systems shall be operated between the hours of seven p.m. and seven a.m. or as required by the city of Rio Vista engineer, whichever is more stringent.

3. Maintenance of Irrigation Systems. Irrigation systems shall be maintained as necessary to eliminate waste of water due to loss of heads, broken pipes, or misadjusted nozzles. (Ord. 643 § 2, 2009)

17.68.090 Requirement for separate water meters.

In all new commercial development subject to the provisions of this chapter, a separate water meter shall be required for the purpose of landscaping. A separate water meter shall also be required for common areas associated with new residential condominiums and planned unit developments. (Ord. 643 § 2, 2009)

17.68.100 Conflicts.

If the provisions of this chapter conflict with other ordinances or regulations, the more stringent limitation or requirement shall govern or prevail to the extent of the conflict. (Ord. 643 § 2, 2009)

17.68.110 Definitions.

The following definitions apply to this chapter:

Annual water budget. (AWB) The maximum amount of water per year permitted to be used to irrigate the applicable portion of a project site. The AWB is determined by a calculation outlined in Section 17.68.060 of this chapter.

Cultivated landscape area. Planted areas that are frequently maintained by mowing, irrigating, pruning, fertilizing, etc.

Development. Any proposed material change in the use or character or the land, including, but not limited to, land clearing or the placement of any structure or site improvements on the land.

Ground cover. Plants, other than turf grass, normally reaching an average maximum height of not more than twenty-four (24) inches at maturity.

Hydrozone. An area of landscaping having a consistent water use requirement and served with a single irrigation valve zone.

Irrigation system. A permanent, artificial watering system designed to transport and distribute water to plants.

Landscaping. Any combination of living plants (such as grass, ground cover, shrubs, vines, hedges, or trees) and nonliving hardscape materials or elements (such as rocks, pebbles, sand, mulch, walls, fences decks, patios, or decorative paving materials).

Mulch. Nonliving organic and synthetic materials customarily used in landscape design to retard erosion, retain moisture, and reduce weed growth.

Open space. Open space shall be interpreted to mean:

A. All areas of natural plant communities or area replanted with vegetation after construction, such as re-vegetated natural areas; tree, shrub, hedge or ground cover planting areas, and lawns; and

B. Other areas allowed to be counted as open space as per the city of Rio Vista Zoning Ordinance.

Replacement Landscaping. Replacement landscaping means the replacement of fifty (50) percent or more of an existing landscaped area (or combination of areas on a single parcel) having a minimum size of one thousand (1,000) square feet with new landscape materials that substantially differ in type, size, or water consumption.

Shrub. A self-supporting woody perennial plant of low to medium height characterized by multiple stems and branches continuous from the base, usually not more than ten (10) feet in height at its maturity.

Site-Specific Planting. The selection of plant material that is particularly well suited to withstand the physical growing conditions that are normal for that location.

Tree. Any self-supporting woody perennial plant which has a DBH (diameter at breast height) of two inches or more and which normally attains an overall height of at least fifteen (15) feet at maturity, usually with one main stem or trunk and many branches. It may appear to have several stems or trunks as in several varieties of oak.

Vegetation, Native. Any plant species with a geographic distribution indigenous to all or part of Solano County. (Plant species which have been introduced by man are not native vegetation.)

Yard, Front. A front or street-side yard as defined in Title 17 of the Rio Vista Municipal Code.

Yard, Private. A yard area, not otherwise defined as a front or street-side yard, associated with a single residential unit and intended for the private use of a household.

Xeriscape. Landscaping methods that conserve water through the use of drought-tolerant plants and planting techniques, as well as the design of irrigation systems. (Ord. 643 § 2, 2009)

Water Conservation Fo

Water is essential to life. It is available in limited quantities and must be used wisely. Therefore, conservation is essential. California requires every urban water supplier to prepare an Urban Water Management Plan (UWMP) every five years. The City of Rio Vista, with over 3,000 water connections, meets the requirement of an urban

water supplier. The goal of the plan is to ensure long-term resource planning so that adequate water supplies are available to meet existing and future water demands. It has been determined that for California to continue to have enough water to support its growing population, it needs to reduce the amount of water each person uses per day by 20 percent. Rio Vista's plan, to be included in its 2010 UWMP, is to assess the reliability of its water sources over the next 20 years for normal, dry and multiple dry years. When completed, the City's UWMP is submitted to the Department of Water Resources (DWR) for review to assure adequate completion of the requirements. Once DWR has approved the UWMP the City Council must formally adopt the plan at a public hearing, thereby committing the City to implement the plan as stated. The City cannot apply for State Revolving Funds (SRF) and Prop. 84 grants and loans until the City has an approved UWMP

Section 6 of the Rio Vista Urban Water Management Plan (UWMP) presents the City's plan for complying with a majority of the 14 Demand Management Measures (DDM) contained in the Water Code. It is also required to present the reasons specific measures may not be applicable, or economically justifiable at the present time.

DMM A Water Survey Programs for Single-Family and Multi-Family Residential Customers – Until meters are installed City-wide an overall survey is not possible. In the meantime residents will be asked to survey their own usage.

1.Irrigation-check settings and leaks, and whether sprinkler heads need realignment to spray only lawn.

2.Check for other leaks, i.e. faucets (place paper towel under faucet and determine if it becomes wet) and toilets (place food coloring in tank and see if it leaks into bowl)

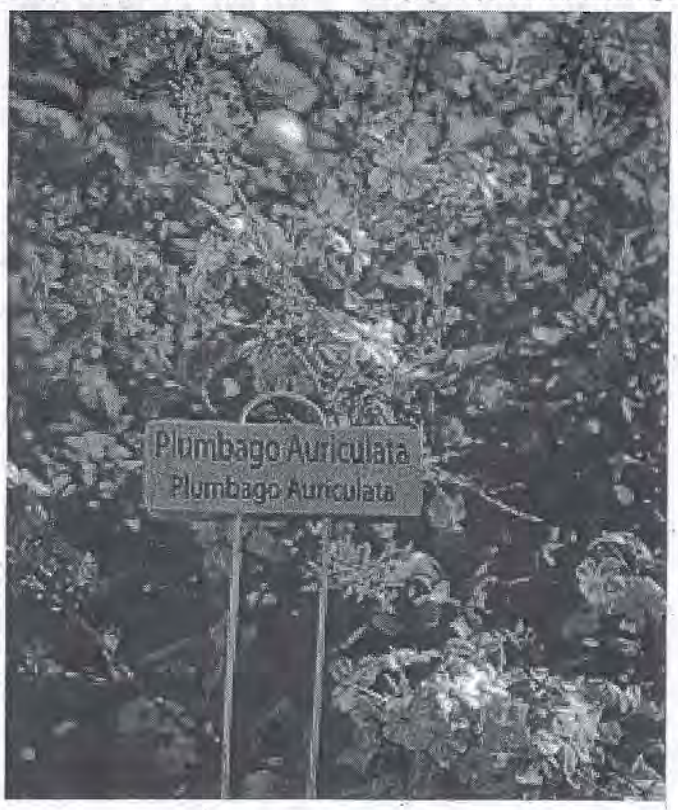
DMM B Residential Plumbing Retrofit –An overall plumbing retrofit (ie.rebate) program will not be implemented at this time. Rebate programs would need to be funded through water rates, which is why the City is not committing to fund them at this time. This may be an option in the future. Other than adopting the 2010 plumbing and green building codes, the City will urge residents to obtain and utilize water efficient appliances whenever and wherever possible.

DMM C System Water Audits, Leak Detection and Repair - System water audits, leak detection, and repairs will be addressed as part of the future water meter installation and retrofit program that is being developed. The Citizens Water Wastewater Monitoring Committee is currently interviewing water meter companies, and will make a recommendation to the City Council.

The City has replaced questionable water pipes to minimize the chance for development of leaks.

DMM D Metering with Commodity Rates Water for all New Connections and Retrofits of Existing Connections – Water usage audits, leak detection and repairs will be addressed as part of the future meter installation and retrofit program as identified in DMM C. A water rate study will be done after the water meter retrofit and usage evaluation are completed.

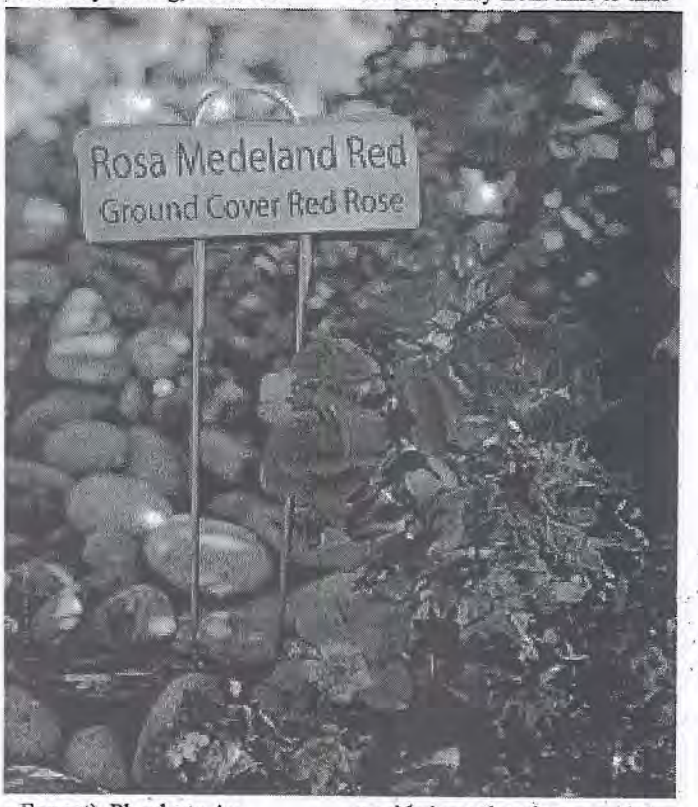
DMM E Large landscape Conservation Programs and Initiatives – The City of Rio Vista recently redesigned the irrigation system and landscaping



at the Rio Vista airport terminal building. The previous turf was removed and replaced with more water efficient plants that are more suited for the Rio Vista microclimate growing conditions. The space among the plants was covered with small stones to minimize water evaporation. The goal of the design of the irrigation system and landscaping demonstration garden is to provide an education source for residents to use more drip systems and more adaptable plants for the Rio Vista microclimate growing conditions. There are plant identification tags containing both the botanical and common name so that residents can obtain those plants they wish to use.

r Rio Vista

The plants in the landscaping rea are: Achillea M (Apple Blos- om, Yallow), Salvia leucantha salvia leucantha), Rosemary O Rosemary trailing, Lockwood



e Forrest), Plumbago Au- iculata (plumbago auriculata), Carpentena California (Bush nemone), Rosa Medeland Red Ground cover rose), Rhamnus Eve Case), Perovskia a. (Blue pire, Russian sage), Tulbagtua Violacea (Silver lace), Festuca California (California fescue).

DMM F High Efficiency Washing Machine –The City recommends that whenever possible residents upgrade their dish washing and clothes washing machines with high water efficiency units. Residents should also remember to use full loads for both dish and clothes washing each time they are done. However, a City funded rebate incentive program will not implemented at this time. Other utilities such as PG&E may from time to time provide incentives because higher efficiency machines typically save water and energy useage.

DDM G Public Information Programs –The City will continue to reach out to the community to help educate residents on water conservation measures and programs.

The City is preparing a notice that will be sent to the residents with their utility bill. The information being considered includes the following:

Laundry Room

Continued on page 11

Continued from page 10

•Use the washing machine for full loads only to save water and energy
•Install a water-efficient clothes washer Save: 16 gallons/load
Kitchen
•Run the dishwasher only when full to save water and energy.
•Install a water and energy-efficient dishwasher. Save 3-8 gallons/load
•Install aerators on the kitchen faucet to reduce flows to less than 1 gallon per minute.
Bathroom
•Install low-flow showerheads. Save: 2.5 gallons
•Take five-minute showers instead of 10-minute showers. Save: 12.5 gallons with a low flow showerhead, 25 gallons with a standard 5.0 gallon per minute showerhead
•Fill the bathtub halfway or less. Save: 12 gallons
•Install a high efficiency toilet. Save: 19 gallons per person per day
•Install aerators on bathroom faucets. Save: 1.2 gallons per person per day.
•Turn water off when brushing teeth or shaving. Save: approximately 10 gallons per day
•Do not use the toilet as a wastebasket.
Landscape
•Water early in the morning or later in the evening when temperatures are cooler. Save: 25 gallons each time you water.
•Check your sprinkler system frequently and adjust sprinklers so only your lawn is watered and not the house, sidewalk or street. Save: 12-15 gallons each time you water.
•Choose a water-efficient irrigation system such as drip irrigation for your trees, shrubs, and flowers. Save: 15 gallons each time you water.
•Put a layer of mulch round trees and plants to reduce evaporation and keep the soil cool. Organic mulch also improves the soil and prevents weeds. Save: 20-30 gallons per 1000 sq. ft each time you water.–
•Plant drought resistant trees and plants (see DMM E). Save: 30-60 gallons per 1000 sq. ft. each time you water
Further information may be obtained from the California Department of Water Resources at: www.water.ca/WaterUseEfficiency/landscape, Sunset magazine's plant finder is another great tool.

DMM H School Educational Programs – The City will continue to reach out to the school district to provide educational data and information for water conservation programs for students. Educating students about the importance of water conservation frequently results in their parents being more conservation conscious.

DMM I Conservation Programs for Commercial, Industrial, and Institutional Accounts –The City will continue to reach out to Commercial, Industrial, and Institutional Accounts and users to insure they are using good water conservation methods.

DMM J Wholesale Agency Programs – The City is not a water wholesaler. Therefore, this program is not applicable.

DMM K Conservation Pricing Programs –The City will consider water conservation pricing in concert with the water meter retrofit program when completed and a new rate analysis is undertaken.

DMM L Water Conservation Coordinator – The Director of Community Development and Public Works currently serves as the Water Conservation Coordinator for the City. As part of new projects that include landscape improvements (Section 17.68.040), the plans must include water conservation calculation per State A.B. 325 since 1992.
These plans are reviewed for compliance to City Water Conservation Ordinance section 6.12 and State requirements. The City Coordinator will track the time spent on these activities.

DMM M Water Wastage Prohibition – The City in order to eliminate waste of water (Section 13.04.190) and reduce high per capita consumption of water declares that it is unlawful for any person, persons, firm or entity to waste water and a determination of waste by such users shall cause the same to suffer that and those penalties hereafter described....

DMM N High Efficient Toilet Replacement - See DMM B.

Rio Vista Museum Hamburger BBQ

Donation: $7.00
Date: May 20, 2013
Time: 5:00 p.m. to 7:00 p.m.
Place: 401 Club, 401 Montezuma Street
Dine In or Take Out
Tickets Available at the Door or at the RV Museum

true nature
yoga | art | wellness
yoga for you.
goal-focused/therapeutic
private therapy & small group instruction
530/680-7044
33 north front st./rio vista
www.truenature.us.com

Jo Jo's Alterations

An Ounce of Prevention
You wouldn't drive your car 50,000 miles without

Why Are Those Fire Hydrants Dripping Water?

Driving around downtown Rio Vista, it is difficult to miss those large pressure relief valves attached to various fire hydrants. These were deployed to stabilize the water system while the Water Tank on Amador Circle was taken off-line for major repairs.

This tank was built in 1966. Although the structural integrity of this steel tank appears to be in good shape, the protective coating had been corroding for decades without repair. We are not aware of any coating work since that time. The cathodic protection in the tank also stopped working several years ago.

This tank had been in dire need of major renovation for decades. The corrosion needs to be sand blasted off. Then new epoxy coatings have to be added. The estimated cost approaches $500,000.

Due to the past water rates being too low, these types of major repairs were continually being deferred. Various advocates cried out that major repairs and maintenance did not exist and water rates should be kept low. Obviously the facts speak for themselves. The recent increase in water rates is now allowing these essential major repairs to be completed. Recent replacements of key water mains are also taking place in core Rio Vista.

When the renovation is completed, the water in this tank will be as clean as it was when pumped straight from the wells. Once back on-line again, the residents in Rio Vista from core Rio Vista to Trilogy can be assured that their water from this tank will not be contributing unwanted particles to their drinking water. Although located in core Rio Vista, these particles enter the main water system and circulate throughout all of Rio Vista.

The heavy corrosion on the entry door is the same as what is inside this steel tank.

This project was not budgeted. However, it became a top priority. Other projects were deferred so this one could be completed.

Arsenic Protection for Your Drinking Water

Arsenic filtration system construction-in-progress at Well 10 on River Road.

Your water capital improvement project funds in use.

Well 10 located on River Road is the best water producing well in the City. However, for the past few years it could only be used in emergencies, such as a significant fire.

Why Can Well 10 only be used in emergencies?

The Safe Water Drinking Act gives the US Environmental Protection Agency (EPA) the legal authority to set Maximum Concentration Levels (MCL). This is the level above which the EPA believes, based on the available information, that any compound is detrimental to human health. Well 10 consistently has arsenic concentrations above 14ppb. The MCL for arsenic was originally set at 50 ppb, and Well 10 could be used. On January 22, 2001 the EPA adopted a lower standard that became effective January 23, 2006. The new MCL was set at 10 ppb as new toxicology data provided evidence that levels above 10 ppb were detrimental to human health.

Well 13 and 14 also occasionally have arsenic levels above 10 ppb. By careful blending with water from well 11 in the City's two million gallon tank, the blend has slightly exceeded the 10 ppb MCL only three times in the past three years.

What can be done to make Well 10 useable?

The City hired Stantec. a company with considerable drinking water arsenic removal expertise to evaluate how to best and most economically remove the arsenic. Following a pilot study, Stantec recommended that a filtration method utilizing Green Sand be used to remove the arsenic. The land next to the well necessary to erect the filtration system was owned by a City resident. The City obtained the land from the resident and construction has begun. The project will cost $3,000,000 and require approximately a year to complete. The money to pay for this capital improvement project will come from the Water Enterprise Fund.

This picture of the arsenic filtration vessels at Live Oak offers a vision of Rio Vista's future for water quality.