



November 1, 2010

City of Beaumont
Attention: David Dillon
Director of Economic Development
550 East 6th Street
Beaumont, CA 92223

Yucaipa Valley Water District
Attention: Joseph Zoba
General Manager
12770 Second Street
Yucaipa, CA 92399

Subject: Preliminary Assessment of Assimilative Capacity for TDS and Nitrogen in the San Timoteo Management Zone

Dear Messrs. Dillon and Zoba:

On February 22, 2010, Wildermuth Environmental, Inc. (WEI), on behalf of the City of Beaumont (City), the Yucaipa Valley Water District (YVWD), and Regional Board staff met to discuss compliance with the Maximum Benefit objectives and commitments in the San Timoteo Management Zone (STMZ). During the meeting, the parties discussed the locations of new monitoring wells planned for construction pursuant to their October 30, 2008 monitoring well work plan (WEI, 2008b), a revised schedule for well completion, and the Regional Board's directive to perform a preliminary assessment of assimilative capacity in the STMZ in parallel with the watershed-wide effort to re-compute ambient groundwater quality that is being conducted by the Basin Monitoring Program Task Force (BMPTF). Official correspondence from the Regional Board, dated July 27, 2010, mandated that the City and the YVWD perform a Preliminary Assessment of Assimilative Capacity for TDS and Nitrogen in the STMZ (preliminary assessment) by October 30, 2010. The City and the YVWD subsequently retained WEI to work with the Regional Board to develop a methodology and perform the preliminary assessment. This report summarizes the background, technical approach, results, and next steps of the preliminary assessment.

BACKGROUND

The methodology for computing groundwater quality objectives, current ambient groundwater quality, and assimilative capacity for total dissolved solids (TDS) and nitrate as nitrogen (nitrate-N) in groundwater management zones was developed by the N/TDS Task Force in 2000 and is documented in the TIN/TDS Study – Phase 2A Final Technical Memorandum (WEI, 2000). The

Water Quality Control Plan for the Santa Ana River Basin (Basin Plan) was amended in January 2004 to include the results and methodology from the TIN/TDS Study. As part of 2004 Basin Plan amendment, the TDS and nitrate-N objectives for the STMZ (and a few other management zones) were raised to create assimilative capacity to encourage reclamation and the maximum beneficial use of State waters. These “maximum benefit” water quality objectives are contingent on the implementation of certain projects and programs by the stakeholders that petitioned for the “maximum benefit” objectives.

The TDS and Nitrogen Management Implementation Plan outlined in Section 5 of the Basin Plan requires that ambient groundwater quality be recomputed every three years using the same methodology developed by the N/TDS Task Force to compute the objectives. The triennial recomputation requirement is reiterated as a specific commitment in the Maximum Benefit Implementation Plan for Salt Management in the STMZ.

In 2003 and 2006, current ambient groundwater quality was estimated in management zones across the entire watershed, but insufficient data were available in the STMZ. In the current (2009) ambient water quality recomputation period, the data are still insufficient in the STMZ to compute ambient water quality per the adopted methodology, despite increased monitoring efforts and the construction of new monitoring wells. Thus, the Regional Board mandated that the City and the YVWD develop a comparable, alternative methodology to make a preliminary estimation of current ambient groundwater quality and assimilative capacity in the STMZ.

TECHNICAL APPROACH

In general, the recomputation effort is performed per the following steps (i) development of statistics for TDS and nitrate-N at wells for the current time period, (ii) estimation (contour mapping) of TDS and nitrate-N across the management zone, and (iii) computation of a volume-weighted estimate of current ambient TDS and nitrate-N based on the groundwater quality, groundwater levels, aquifer geometry, and aquifer properties. A moving 20-year period of water quality data from wells is used in each recomputation. In order to compute TDS and nitrate-N statistics at a well, at least one water-quality sample must have been collected in a minimum of three separate calendar years within the 20-year time period. A step-by-step description of the methodology to estimate ambient groundwater quality is included in the Recomputation of Ambient Water Quality in the Santa Ana Watershed for the Period 1987 to 2006 Final Technical Memorandum (WEI, 2008a).

The 20-year period for the 2009 recomputation of ambient groundwater quality is January 1, 1990 to December 31, 2009. As previously stated, the data from wells in the STMZ for the 2009 recomputation is insufficient to estimate current ambient TDS and nitrate-N concentrations. In order to make a preliminary assessment of current ambient TDS and nitrate-N concentrations in the STMZ, the ambient water quality methodology was modified as follows:

- The computation period was shifted to the 20-year period of January 1, 1991 to December 31, 2010 to allow for inclusion of results from monitoring wells constructed in 2010. This shift also allows for the calculation of a TDS and nitrate-N statistic at three wells that would not have had a statistic calculated in the 2009 time period.
- A water-quality sample and groundwater-elevation measurement were collected at all wells in the STMZ that were able to be sampled during August 2010.

- For those wells with a TDS or nitrate-N statistic for the 1991 to 2010 time period, TDS and nitrate-N contours were drawn to the statistic value.
- For those wells that do not have the minimum three-year dataset required to compute a TDS or nitrate-N statistic for 1991 to 2010 time period, TDS and nitrate-N contours were drawn to the average value of all sample results available during the 20-year time period.
- For those wells that were sampled for the first time in August 2010, TDS and nitrate-N contours were drawn to the single sampling result for TDS and nitrate-N.
- Groundwater volume was based on groundwater elevation contours for measurements made in August 2010.

The maximum benefit objectives for TDS and nitrate-N in the STMZ are 400 milligrams per liter (mg/L) and 5.0 mg/L, respectively. The preliminary current ambient concentrations of TDS and nitrate-N are to be compared against the “maximum benefit” objectives for the STMZ to determine if assimilative capacity exists. Assimilative capacity is described as:

If the preliminary current ambient TDS or nitrate-N concentration of the management zone is equal to or greater than the objectives, then assimilative capacity does not exist. If the preliminary current ambient TDS or nitrate-N concentration is less than the water quality objectives, then assimilative capacity exists. In the later case, the difference between the objective and the preliminary current ambient TDS or nitrate-N concentration is the amount of assimilative capacity available.

The preliminary assessment methodology was developed by WEI in cooperation with the Regional Board and was presented to the BMPTF on July 21, 2010.

PRELIMINARY ASSESSMENT RESULTS

The results of the preliminary assessment of assimilative capacity in the STMZ are summarized in the following table.

Constituent	Antidegradation Objective (mg/L)	Maximum Benefit Objective (mg/L)	2010 Preliminary Current Ambient Concentration (mg/L)	2010 Preliminary Assimilative Capacity (mg/L)
TDS	300	400	420	- 20
nitrate-N	2.7	5	0.8	4.2

Included with this letter report are a series of figures and tables that further describe the data used in the analysis. Figure 1 shows the location of all wells in the STMZ used in the preliminary analysis. Tables 1 and 2 summarize the TDS and nitrate-N at the wells, including the total number of samples, the number of annual averages, the average constituent concentration, the current ambient statistic, the August 2010 sample result, and the value used to contour the management zone. Figures 2 and 3 show the current ambient statistics, the average values, and the contours of TDS and nitrate-N, respectively. Figure 4 shows the groundwater elevation

contours for August 2010. Figures 5 and 6 show the aquifer volume by grid-cell, as a percent of the total volume, overlain by the TDS and nitrate-N contours.

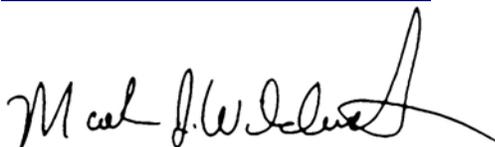
All groundwater well, water-level, and water-quality data used in the preliminary assessment are provided in an access database included on the enclosed CD. Also included on the CD are the GIS shapefiles created and used in the assessment, including points, contours, and the management zone grid.

NEXT STEPS

Per the July 27, 2010 letter from the Regional Board, each agency is required to prepare a salt-offset plan to mitigate discharges above the Maximum Benefit objectives for which there is no assimilative capacity. The salt-offset plan is due to the Regional Board by December 30, 2010. We recommend that you set up a meeting with Regional Board staff as soon as possible to discuss the results of this analysis, their expectations for the salt-offset plan, and to clarify any additional monitoring and reporting requirements related to the Maximum Benefit commitments in the STMZ.

Please call me if you have any questions or concerns regarding this report. It has been our pleasure to assist the City and the YVWD on this important and timely assignment.

Wildermuth Environmental, Inc



Mark J. Wildermuth, MS, PE
Chairman



Samantha S. Adams
Senior Scientist

Encl. Tables 1 and 2; Figures 1 – 6; Compact Disc with data and GIS files
Cc. Kurt Berchtold and Cindy Li/Santa Ana Regional Water Quality Control Board

REFERENCES

- Wildermuth Environmental, Inc. (2000). *TIN/TDS Phase 2A: Tasks 1 through 5. TIN/TDS Study of the Santa Ana Watershed*. Technical Memorandum. July 2000.
- Wildermuth Environmental, Inc. (2008a). *Recomputation of Ambient Water Quality in the Santa Ana Watershed for the Period 1987 to 2006, Final Technical Memorandum*. August 2008.
- Wildermuth Environmental, Inc. (2008b). *San Timoteo Management Zone Monitoring Network Development Workplan*. October 2008.

Table 1
Summary of Total Dissolved Solids (TDS) Data for Wells in the San Timoteo Management Zone
1991 - 2010

Well ID	Well Owner	Well Name	Sample Count	TDS Average (mg/L)	TDS August 2010 (mg/L)	TDS Statistic (mg/L)	TDS Contour Value (mg/L)
1003044	Hudson, O.	NA	4	243	not sampled	263	263
1003049	El Casco Lake Ranch	ONE	3	653	660	676	676
1003079	Rutherford, Mark	Fishermen's Retreat 1	6	570	580	582	582
1201539	Schwenckert, Henry	1	4	843	820	878	878
1201582	Fisherman's Retreat	Fishermen's Retreat 2	5	416	450	434	434
1205019	County of San Bernardino	ST-02	60	315	*	337	337
1205020	County of San Bernardino	ST-03	27	504	*	514	514
1205021	County of San Bernardino	ST-05C	60	326	*	322	322
1205023	County of San Bernardino	ST-07	23	348	*	353	353
1205024	County of San Bernardino	ST-08	50	433	*	445	445
1205025	County of San Bernardino	ST-10	47	389	*	399	399
1205026	County of San Bernardino	ST-11	39	284	*	315	315
1207472	County of San Bernardino	ST-07A	24	231	*	250	250
1207756	East Valley Golf Club	335645117024201	1	242	not sampled	n/a	242
1208660	City of Beaumont	Heartland Well	4	380	390	446	446
1220051	Metropolitan Water District	BH-9	2	400	260	n/a	400
1220052	Metropolitan Water District	BH-19	3	720	590	815	815
1221779	Yucaipa Valley Water District	YVWD GMMW-3	3	473	470	n/a	473
1221780	Yucaipa Valley Water District	YVWD GMMW-2	2	530	550	n/a	530
1221782	Yucaipa Valley Water District	YVWD GMMW-4	1	570	570	n/a	570
1222061	City of Beaumont	SanTim-1	2	420	420	n/a	420
1222079	City of Beaumont	San Tim-2B/1	2	285	260	n/a	253
1222080	City of Beaumont	San Tim-2B/2	2	220	240	n/a	253
1222103	Yucaipa Valley Water District	YVWD GMMW-5A	3	477	430	n/a	411
1222104	Yucaipa Valley Water District	YVWD GMMW-5B	3	497	490	n/a	411
1222105	Yucaipa Valley Water District	YVWD GMMW-5C	1	260	260	n/a	411
1222106	Martie Wells	Deep Well	10	380	400	n/a	380

Notes:

*San Timoteo Landfill wells are sampled by the County of San Bernardino, the most recent sample date is June 2010

n/a indicates that data are insufficient to compute an ambient water quality statistic for TDS

Contour point values in bold indicate that the contour value is the average of the "TDS average" values for nested monitoring wells

Table 2
Summary of Nitrate as Nitrogen (NO₃-N) Data for Wells in the San Timoteo Management Zone
1991 - 2010

Well ID	Well Owner	Well Name	Sample Count	NO ₃ -N Average (mg/L)	NO ₃ -N August 2010 (mg/L)	NO ₃ -N Statistic (mg/L)	NO ₃ -N Contour Value (mg/L)
1003044	Hudson, O.	NA	4	0.92	not sampled	1.33	1.33
1003049	El Casco Lake Ranch	ONE	3	0.11	ND	0.05	0.05
1003079	Fisherman's Retreat	Fishermen's Retreat 1	4	0.12	ND	0.05	0.05
1201539	Schwenckert, Henry	1	4	28.84	30	29.44	29.44
1201582	Fisherman's Retreat	Fishermen's Retreat 2	5	0.13		0.05	0.05
1205019	County of San Bernardino	ST-02	60	3.77	*	3.5	3.5
1205020	County of San Bernardino	ST-03	27	2.07	*	2.18	2.18
1205021	County of San Bernardino	ST-05C	60	2.18	*	2.25	2.25
1205023	County of San Bernardino	ST-07	23	0.09	*	0.06	0.06
1205024	County of San Bernardino	ST-08	50	0.53	*	0.79	0.79
1205025	County of San Bernardino	ST-10	47	2.99	*	3.05	3.05
1205026	County of San Bernardino	ST-11	39	0.06	*	0.05	0.05
1207472	County of San Bernardino	ST-07A	24	0.71	*	0.76	0.76
1208660	City of Beaumont	Heartland Well	4	1.23	0.95	1.53	1.53
1220051	Metropolitan Water District	BH-9	2	3.35	2	n/a	3.35
1220052	Metropolitan Water District	BH-19	3	0.12	ND	0.05	0.05
1221779	Yucaipa Valley Water District	YVWD GWMW-3	3	0.3	ND	n/a	0.3
1221780	Yucaipa Valley Water District	YVWD GWMW-2	2	0.84	0.77	n/a	0.84
1221782	Yucaipa Valley Water District	YVWD GWMW-4	1	0.32	ND	n/a	0.32
1222061	City of Beaumont	SanTim-1	2	1.1	1.2	n/a	1.1
1222079	City of Beaumont	San Tim-2B/1	2	3	2.6	n/a	1.86
1222080	City of Beaumont	San Tim-2B/2	2	0.72	0.34	n/a	1.86
1222103	Yucaipa Valley Water District	YVWD GWMW-5A	3	2.83	1.7	n/a	2.39
1222104	Yucaipa Valley Water District	YVWD GWMW-5B	3	2.05	1.9	n/a	2.39
1222105	Yucaipa Valley Water District	YVWD GWMW-5C	1	2.3	2.3	n/a	2.39
1222106	Martie Wells	Deep Well	10	0.24	ND	n/a	0.24

Notes:

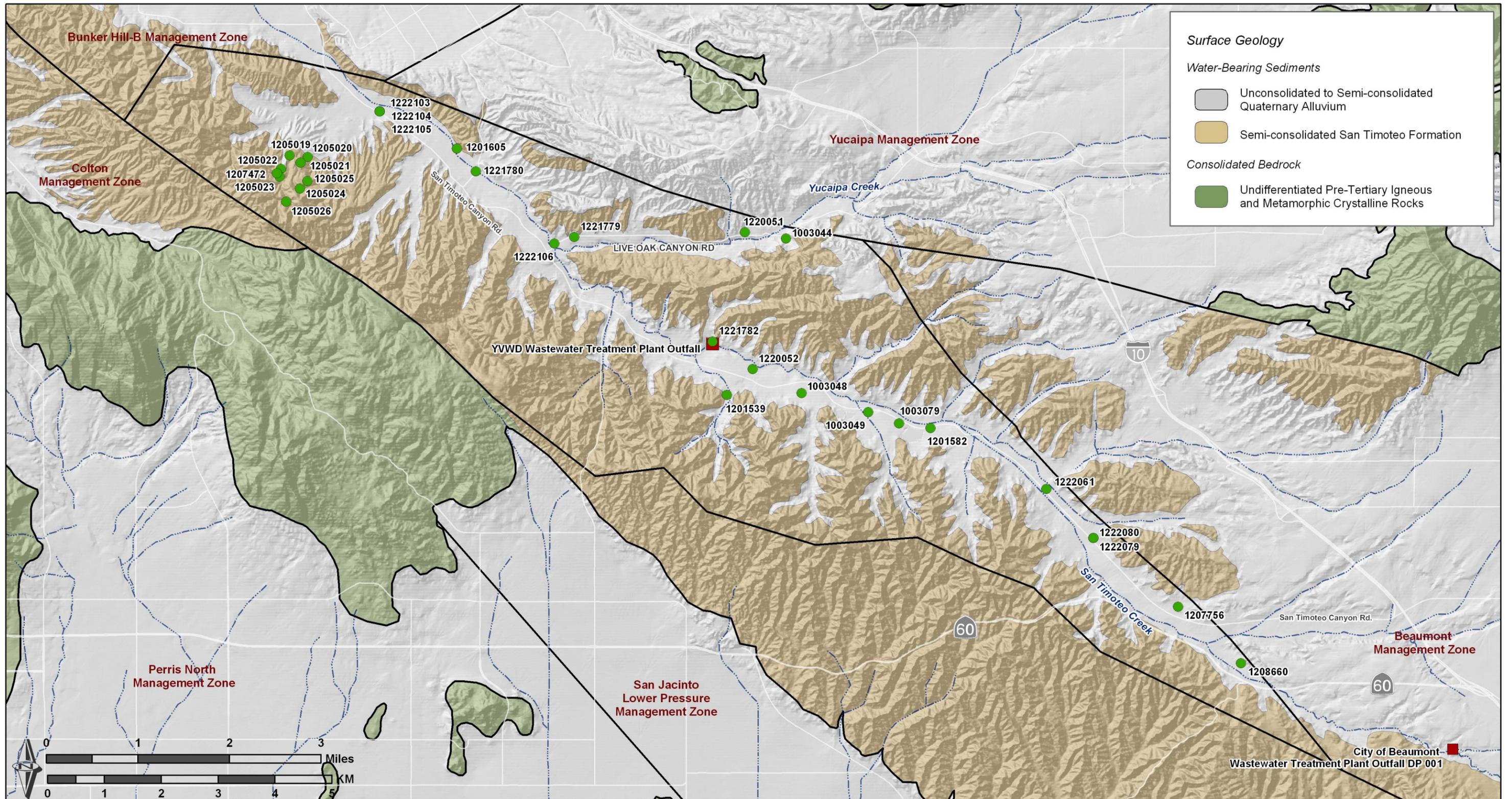
*Landfill wells last sampled in June 2010, not August

For wells with non-detect results, the nitrate as nitrogen average result was calculated by dividing the detection limit by the square root of 2

"ND" values represent Non-Detect result for August 2010

"n/a" indicates that data are insufficient to compute an ambient water quality statistic for nitrate as nitrogen

Contour point values in **bold** indicate that the contour value is the average of the "NO₃-N average" values for nested monitoring wells



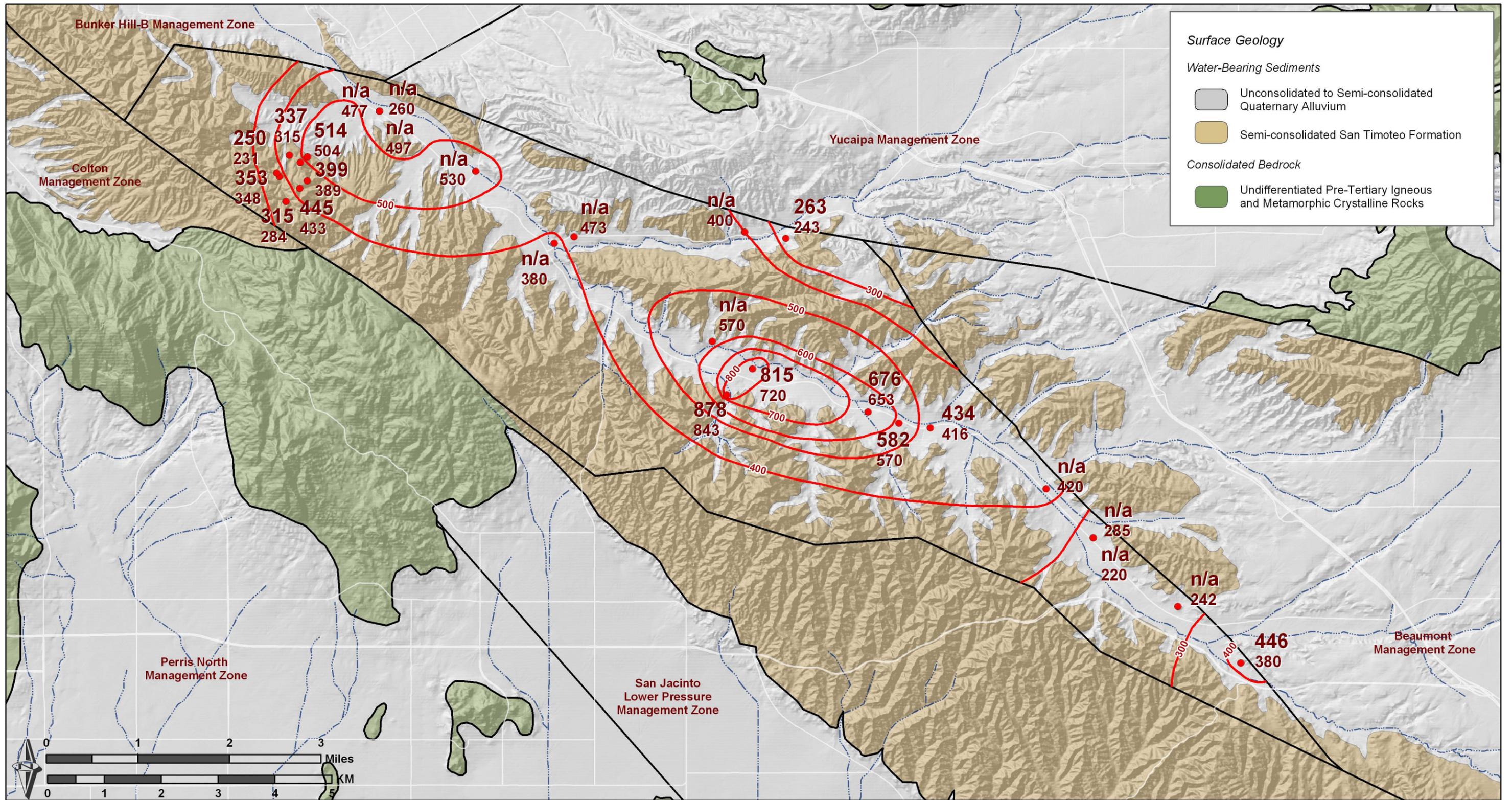
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Author: SSA/ETL
 Date: 201001006
 File: Draft WL Elevation Contours.mxd

- 1208660 Well ID of STMZ Wells Used in the Preliminary Assessment
- Management Zone Boundary
- Wastewater Treatment Plant Discharge Points
- Rivers and Streams

**Preliminary Assessment Wells
 San Timoteo Management Zone
 Figure 1**

*Prepared for:
 City of Beaumont & YVWD*



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 Date: 201001006
 File: TDS Contours.mxd

— 400 — TDS Concentration Contour (mg/L)
 - - - 450 - - -

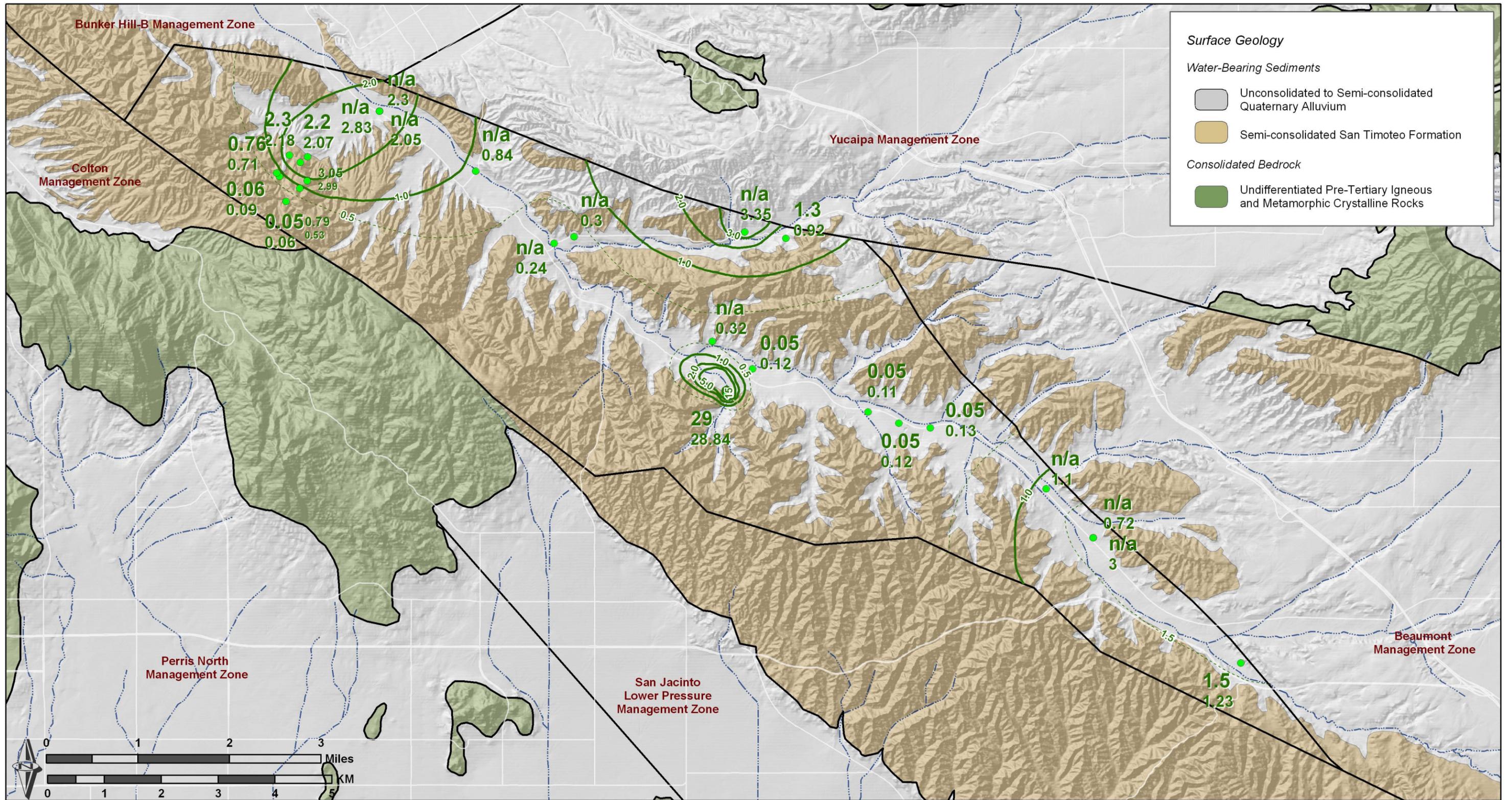
● 446
 ● 380 TDS Statistic*
 TDS Average
 (*n/a indicates data insufficient to compute statistic)

▭ Management Zone Boundary

⋯ Rivers and Streams

**TDS Concentration Contours
 San Timoteo Management Zone
 Figure 2**

Prepared for:
 City of Beaumont & YVWD



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 Date: 201001006
 File: Nitrate-N Contours.mxd

— 1.0 — Nitrate-N Concentration Contour (mg/L)
 - - - 0.5 - - -

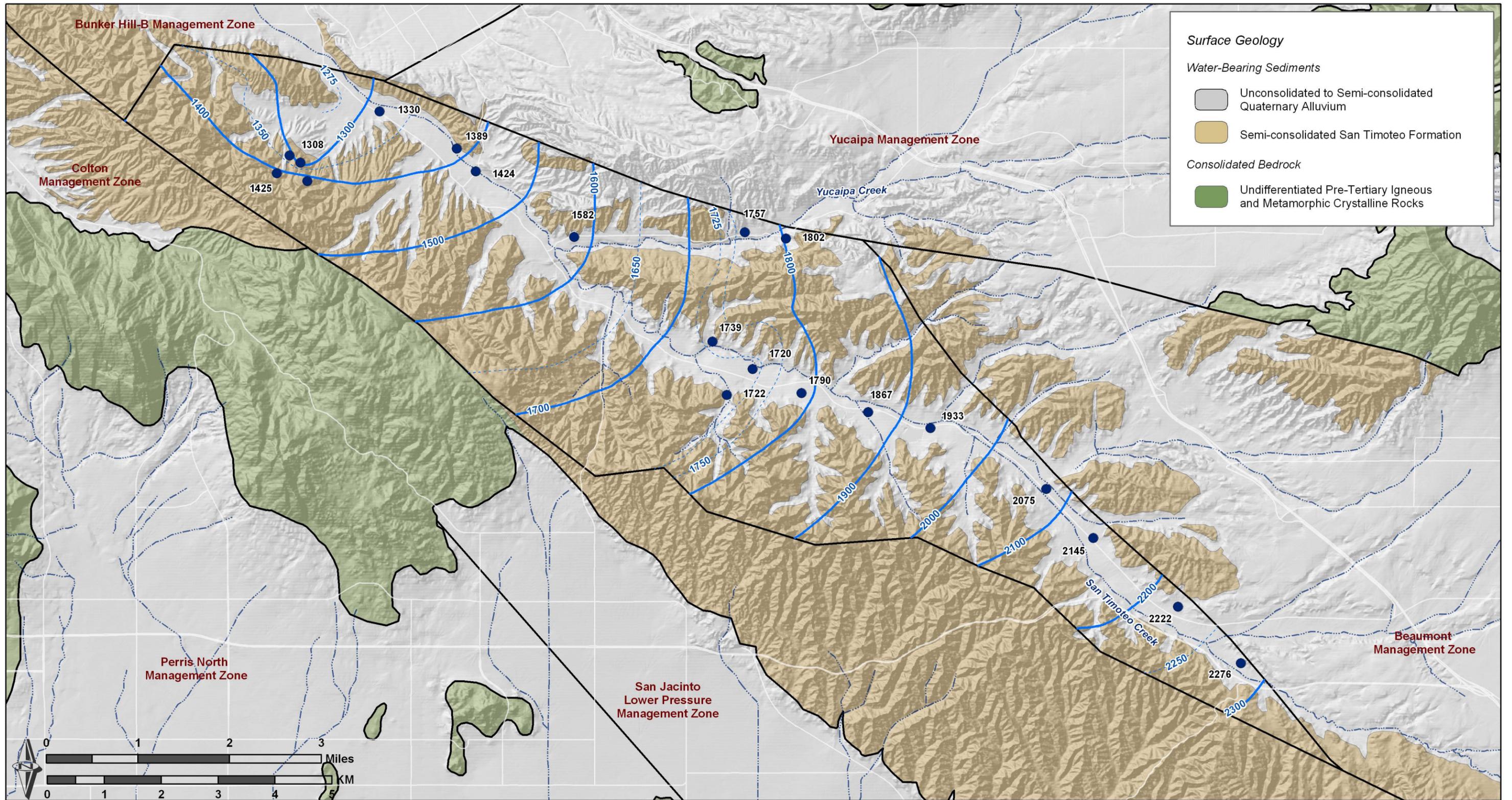
● 1.5
 ● 1.23 Nitrate-N Statistic*
 Nitrate-N Average
 (*n/a indicates data insufficient to compute statistic)

▭ Management Zone Boundary

- - - Rivers and Streams

**Nitrate-N Concentration Contours
 San Timoteo Management Zone
 Figure 3**

Prepared for:
 City of Beaumont & YVWD



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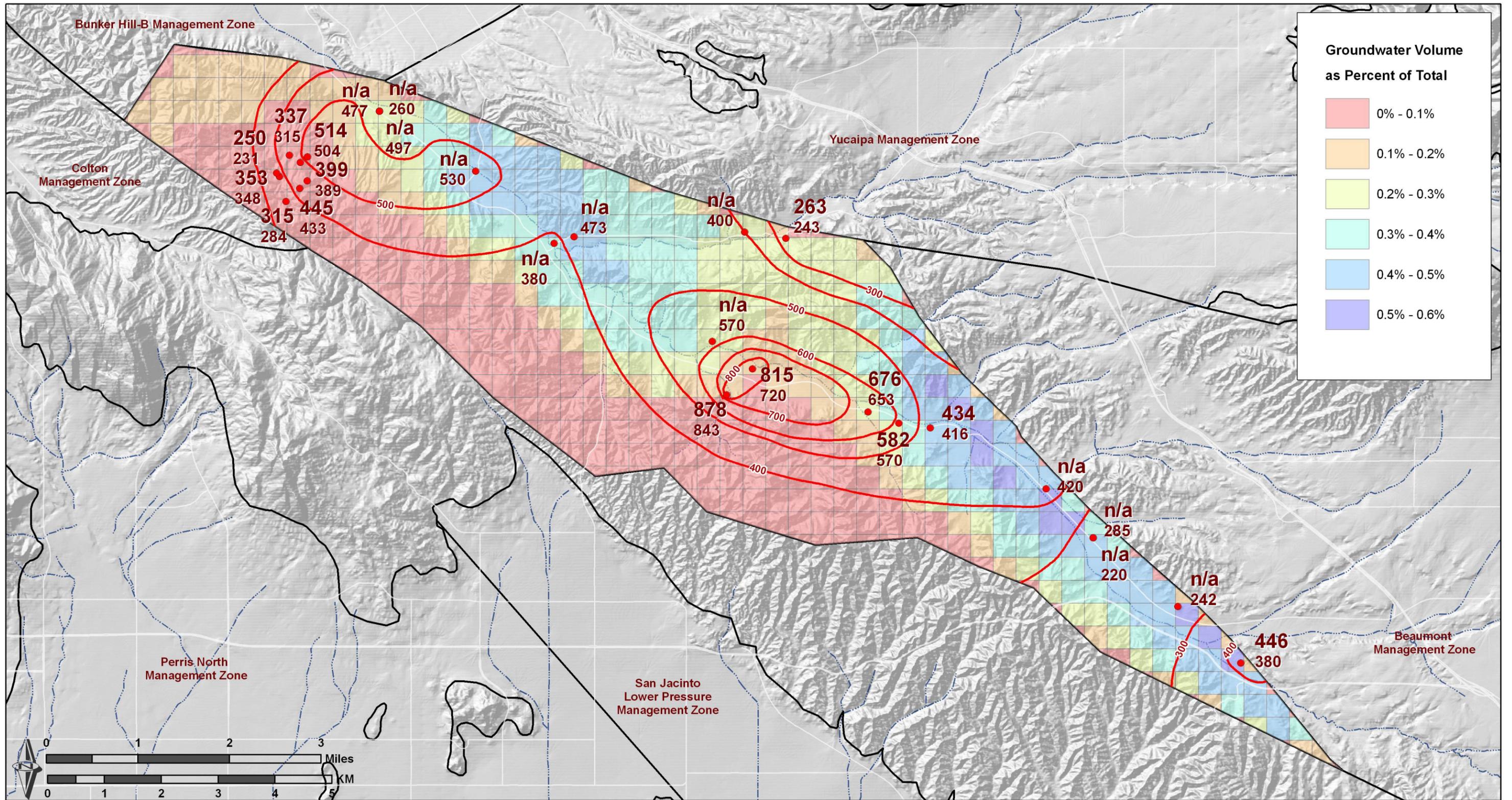
Author: SSA/ETL
 Date: 201001006
 File: Draft WL Elevation Contours.mxd

—2200— Groundwater Level Elevation Contour (feet above mean sea level)
 - - - 2250 - - -

● 2276 Measured August 2010 Elevation
 □ Management Zone Boundary
 - - - - - Rivers and Streams

**Groundwater Level Elevation Contours
 San Timoteo Management Zone
 Figure 4**

*Prepared for:
 City of Beaumont & YVWD*



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Author: SSA/ETL
 Date: 201001026
 File: TDS Contours.mxd

400 TDS Concentration Contour (mg/L)

450 TDS Concentration Contour (mg/L)

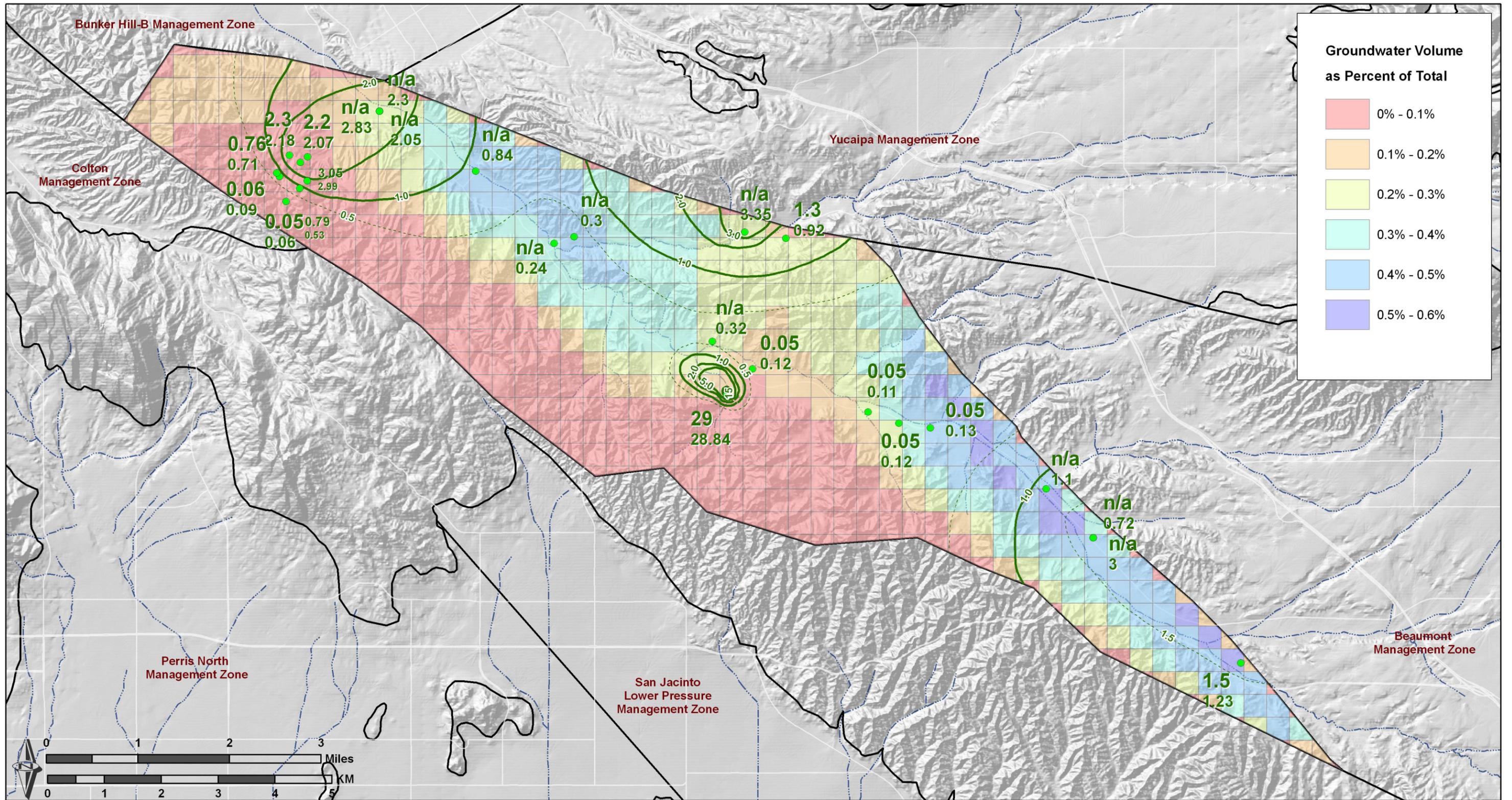
446
380 TDS Statistic*
 TDS Average
 (*n/a indicates data insufficient to compute statistic)

Management Zone Boundary

Rivers and Streams

**TDS Concentration Contours
 San Timoteo Management Zone
 Figure 5**

Prepared for:
 City of Beaumont & YVWD



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Author: SSA/ETL
 Date: 201001026
 File: Nitrate-N and Volume.mxd

— 1.0 — Nitrate-N Concentration Contour (mg/L)
 - - - 0.5 - - -

● 1.5
 ● 1.23 Nitrate-N Statistic*
 Nitrate-N Average
 (*n/a indicates data insufficient to compute statistic)

▭ Management Zone Boundary

⋯ Rivers and Streams

**Nitrate-N Concentration Contours
 San Timoteo Management Zone
 Figure 6**

Prepared for:
 City of Beaumont & YVWD