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RIVERSIDE REGIONAL WATER QUALITY CONTROL PLANT
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CITY OF RIVERSIDE
RIVERSIDE REGIONAL WATER QUALITY CONTROL PLANT
TOTAL DISSOLVED SOLIDS
LOCAL LIMITS DEVELOPMENT REPORT

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EXECUTIVE SUMMARY AND AND CONCLUSIONS

SECTION I
EXECUTIVE SUMMARY AND CONCLUSIONS

The purpose of this report is to recommend an updated technically based local industrial user discharge limits (local limits) for a single Pollutant of Concern (POC), Total Dissolved Solids (TDS), for the City of Riverside's (City's) Publically Owned Treatment Works (POTW) Industrial Waste Pretreatment Program.

Discharges from the City's Regional Water Quality Control Plant (RWQCP) are regulated by the National Pollutant Discharge Elimination System Permit No. CA0105350, Order No. R8-2013-0016 (NPDES Permit), issued by the California Regional Water Quality Control Board, Santa Ana Region (Regional Board). The NPDES Permit includes limitations on discharges of TDS of 650 milligrams/liter (mg/l) and 250 mg/l above the average TDS concentration in the water supply (incremental limit), both as 12-month running averages. Since 2009, the City has assessed compliance with the incremental limit at a point in the treatment chain prior to the addition of disinfection chemicals (Pre-Disinfection Effluent (PDE)), in accordance with the NPDES Permit.

The City currently has an industrial user local limit of 2,500 mg/l, established along with other industrial user local limits in 1999.

On March 26, 2015, the City engaged Krieger & Stewart to perform a Local Limits Study to review existing data, obtain new data, and establish a revised local limit for TDS, if feasible and appropriate, that would allow the City to consistently comply with the limitations in the NPDES Permit and any other applicable standards.

After incorporation of comments by City staff, a sampling plan was prepared and submitted to the City on December 8, 2015.

Sampling within the collection system was performed by the City during the summer of 2016. Based on the results of this sampling, the domestic (residential and commercial) wastewater background TDS concentration was determined to be approximately 596 mg/l.

The average influent, PDE, and effluent TDS values measured at the RWQCP from October 1, 2015 through September 20, 2016 indicate that the treatment plant is currently adding approximately 46 mg/l of TDS via the disinfection process, but that it is not adding a significant quantity of additional TDS to the

final effluent on a net basis. Based on the data evaluated, the RWQCP exhibited an average removal efficiency at the PDE point of 0.09 (9%); and a net, overall, average TDS removal efficiency at the final effluent discharge point of 0.018 (1.8%). However, due to the daily variation in TDS change between influent and effluent, this final effluent removal efficiency is considered negligible herein for purposes of local limits development.

Allowable headworks TDS loading was computed for both the NPDES limit of 650 mg/l and the incremental NPDES limit of 250 mg/l above the background domestic water supply concentration. The 650 mg/l limit was determined to be the more conservative (and thus governing) limit, with an allowable headworks TDS loading of approximately 140,946 pounds per day (lbs/d).

The background domestic water supply concentration was determined to be 366 mg/l (see **Table IV-4**) based on data submitted to and recorded by City staff. Information from Consumer Confidence Reports (CCRs) from the City (for areas served by the City), Rubidoux Community Services District (RCSD) for the last five years, Jurupa Community Services District (JCSD) for the last two years, and from Western Municipal Water District (WMWD) for 2016 was also reviewed as a check.

Based on the allowable headworks loading and the domestic wastewater background TDS concentration and hauled waste TDS loading, the allowable industrial headworks TDS loading was determined to be approximately 16,466 lbs/d. Using a safety factor of 5% and the uniform concentration method, this loading yields an allowable industrial user TDS local limit of 1,210 mg/l.

Adoption of the recommended revision to the TDS local limit would not constitute a "substantial modification" of the POTW Pretreatment Program as defined in 40 CFR 403.18 (b).

SECTION II

BACKGROUND

SECTION II
BACKGROUND

A. RIVERSIDE REGIONAL WATER QUALITY CONTROL PLANT

The City owns and operates the RWQCP, which collects and treats wastewater from the City, RCSD, JCSD, and Edgemont Community Services District (ECSD). The City's collection system serves over 300,000 residents and consists of approximately 800 miles of gravity sewers ranging in size from 6 inches to 48 inches in diameter, and 18 wastewater pump stations (City of Riverside Salinity Study Draft, Carollo 2015).

The RWQCP began operation in 1978 and provides preliminary, primary, secondary, and tertiary level treatment. A small portion of the tertiary treated effluent is recycled for irrigation, and the remainder of the flow is discharged to the Santa Ana River, all in accordance with the requirements of the NPDES Permit, issued by the Regional Board.

The RWQCP is situated on a 121-acre site on Acorn Street in Riverside, collecting wastewater from six trunk sewers. Each trunk sewer is individually metered and sampled. The treatment processes consist of screening and grit removal, primary sedimentation, aeration, secondary sedimentation, flow equalization, filtration, and disinfection (see **Figure II-1** attached herein). The RWQCP consists of two separate primary and secondary treatment plants, with a common tertiary treatment plant. The disinfection process utilizes sodium hypochlorite and sodium bisulfite, which contribute to the TDS concentration in the final effluent.

The City is currently constructing a plant-wide expansion which will increase the treatment capacity from 40 million gallons per day (MGD) to 46 MGD, which is the maximum capacity allowed by the City's current NPDES Permit. The Plant is currently operating at an average flow of approximately 28 MGD, which is less than 60% of design treatment capacity. Construction began in the fall of 2012 and is expected to be completed by July, 2017 (per City staff).

B. PRETREATMENT PROGRAM

The City's NPDES Permit requires it to implement an Industrial Waste Pretreatment Program to prohibit the discharge of pollutants from industrial users of the sewer system at levels which could cause *pass-through* (direct violation of discharge limitations) or *interference* (impairment of treatment processes leading to violation of discharge limitations, or safety hazards). As part of the Pretreatment Program, the City is required, per National Pretreatment Standard 40 CFR 403.5(c), to develop and enforce technically based local industrial user discharge limits (local limits) or demonstrate that such local limits are not necessary. Local limits, both narrative and numeric, are imposed as necessary by POTW operating agencies to protect receiving waters, collection and treatment system facilities, workers, recycled water and bio-solids beneficial uses, and the public from the detrimental effects of high concentrations of industrial pollutants.

C. TDS LOCAL LIMIT

The POC for this report is TDS, also known as Total Filterable Residue (TFR) or salinity. TDS occurs in the domestic water supply as a result of runoff and/or leaching of natural mineral deposits. It is incrementally increased by evaporation or by any use of water that can add salts.

Sources of TDS discharges to the City's POTW include wastewater from:

1. Residences within the City service area
2. Commercial businesses and institutions within the City service area
3. Industrial users within the City service area
4. Residences within tributary community services districts
5. Commercial businesses and institutions within tributary community services districts
6. Industrial users within tributary community services districts
7. Disinfection chemicals and other chemicals added for wastewater treatment purposes

Of the above sources, only Sources 3 and 6 are considered controllable sources. The other sources are considered non-controllable sources, although TDS discharges from other sources can be limited by such measures as public education, implementation of best management practices (BMPs), and careful management of treatment facilities. TDS from industrial users (Sources 3 and 6) can be regulated by the development and enforcement of a local limit included in industrial user discharge permits.

TDS (in expected concentrations) can potentially cause pass-through, but not interference. Therefore, the principal criteria upon which a tds local limit must be based are the POTW's wastewater discharge limits as set forth in its NPDES Permit.

The current City's NPDES Permit includes effluent discharge limits (Section IV.A.1.c.) and recycled water specifications (Section IV.B.1.b.) for TDS, applicable to the discharge from the RWQCP, which are as follows:

Condition 1: *The 12-month running average TDS concentration and mass emission rate shall not exceed 650 mg/l and 216,480 lbs/day (derived from 40 MGD x 8.34 x 650 mg/l), or*

Condition 2: *The 12-month running average TDS concentration shall not exceed the 12-month running average TDS concentration in the water supply by more than 250 mg/l.*

Whichever is more restrictive.

The NPDES Permit contains a provision allowing an exception to the above limits in the case of exceedances caused by chemical additions in the treatment process needed to meet waste discharge requirements (e.g., disinfection chemicals). In accordance with this provision, assessment of compliance with the incremental limit has been made at a point in the RWQCP treatment chain prior to the addition of disinfection chemicals since April, 2009.

The above-listed effluent discharge limits are intended to be protective of both receiving waters and recycled water beneficial uses. The NPDES Permit does not include any additional numeric standards for protection of receiving waters.

The City's current local limit for TDS is 2,500 mg/l as an instantaneous limit, implemented in 1999. The current local limit has not prevented violation of Condition 2 above. In July, 2008, in response to continuously exceeding Condition 2 above, RWQCP staff monitored TDS and prepared the *Total Dissolved Solids Investigation White Paper*, dated March, 2009, which concluded that the disinfection process (mandated by the NPDES Permit) was a major contributor to the final TDS concentration leaving the plant; increasing concentrations by 40 to 70 mg/l at the time of the study.

Further, in recent years, water conservation efforts have been intensifying to combat the effects of the current drought being experienced in the state, and in response to mitigate mandates implemented at the state and local levels. Decreases in water use, and increases in water recycling, can increase the TDS of wastewater flowing to the headworks. Therefore, current data is necessary to properly re-evaluate the TDS local limit.

D. TDS ASSESSMENT AND SAMPLING PLAN

As part of the process for developing revised local limits for TDS, a TDS Assessment and Sampling Plan (Sampling Plan) was prepared to provide guidance in compiling the necessary data to effectively determine the appropriate local limits for TDS of the wastewater entering the RWQCP. Specifically, the Sampling Plan identified representative sampling locations, adequate sampling and monitoring frequencies and durations, appropriate sample types, and quality control procedures, as described in detail in the following section. The Sampling Plan was implemented by City forces over the summer of 2016.

SECTION III

SAMPLING PROGRAM

SECTION III
SAMPLING PROGRAM

A. SAMPLING LOCATIONS

The TDS Sampling Plan identified representative sampling locations to effectively characterize domestic and industrial wastewater sources to determine the allowable TDS loading at the RWQCP headworks. Sampling locations did not include all trunk-line locations that are routinely monitored for TDS, but instead at selected representative locations throughout the treatment process at the RWQCP and throughout the collection system.

1. Sampling Locations at the RWQCP

Sampling was performed before and after each stage of each major treatment process, to quantify any removal efficiency (or incremental addition) of TDS at the plant. **Table III- 1** identifies the sampling locations throughout the treatment system.

TABLE III-1
RWQCP SAMPLING LOCATIONS

Location
Treatment Plant Influent
Plant 1 Primary Effluent/Plant 1 Secondary Influent
Plant 2 Primary Effluent/Plant 2 Secondary Influent
Plant 1 Secondary Effluent/Tertiary Influent
Plant 2 Secondary Effluent/Tertiary Influent
Pre-Disinfection Effluent
Final Effluent

2. Collection System Sampling Locations

Sampling locations throughout the City's service area were selected to generally characterize the TDS sources and to identify any areas of concern requiring further attention. The locations cited in the 2009 *Total Dissolved Solids Investigation White Paper* were mapped, and additional locations were selected based on the existing residential, commercial, and industrial areas within the City, in an effort to fully characterize the wastewater collection system and the contributing TDS concentrations.

The initial collection system sampling locations provided to City staff were identified by location, size of line, map references, and manhole number (where available). Some of the sampling locations were modified during the sampling process to accommodate accurate flow monitoring and ensure worker safety. The final sampling locations are identified, along with sampling results, in **Table IV-2**.

B. SAMPLING FREQUENCY

Collection system manhole sampling took place from late April through early August, 2016, with each manhole being sampled at least once, along with flow measurements. Additional samples were collected on a second day for some manholes. Plant influent and final effluent sample results were obtained on a daily basis from August 1, 2015 through September 20, 2016. Sampling at intermediate points within the treatment process was performed over a period of six days during late September and early October, 2016.

C. SAMPLE DURATIONS, SIZES, AND TYPES

Samples were 24-hour composite samples, and collection system samples included recorded flow measurements. Each sample was collected in one quart unpreserved sample bottles.

D. ANALYTICAL DETECTION LIMITS

The analytical detection limit for TDS under the Environmental Protection Agency (EPA) approved Standard Method 2540C-2011 is approximately 10 mg/l (EPA Method 160.1). Samples were collected and analyzed per the 2540C-2011 Method by City staff, as described in the following sections. No TDS sample was lower than the 10 mg/l detection limit.

E. SAMPLING PROCEDURES

Samples were collected and analyzed in accordance with the City of Riverside's ***Standard Operating Procedure: SM 2540C-2011***, dated May 15, 2014 (see **Appendix C**), as summarized below:

- Samples are to be collected in crack resistant glass or plastic bottles.

- Samples collected are to be cooled to ≤ 4°C while being transported from the sample point to the laboratory and analyzed as soon as possible.
- Samples are recommended to be at room temperature prior to filter testing.

F. SAMPLING ANALYSIS

The sampling analysis for TDS consists of filtering a sample through a glass-fiber filter paper washed with Reverse Osmosis (RO) water. The filtrate is transferred to a glass dish, then evaporated in a drying oven at 180°C. The change in weight of the evaporating dish represents the TDS concentration of that sample.

The procedures per the City's ***Standard Operating Procedure: SM 2540C-2011***, dated May 15, 2014, are summarized below:

- Clean evaporating dishes thoroughly with 30% acetic acid solution as necessary and rinse with deionized water.
- Allow dishes to dry overnight in 180°C oven. If volatile dissolved solids are detected, ignite at 550°C for one hour. Allow to cool in desiccator until needed.
- Prepare the glass-fiber filter papers by placing the paper, woven side down, onto the filtration apparatus and turning on the vacuum.
- Wash the filter paper with three 20 milliliter (mL) portions of deionized water, allowing the vacuum to remove the water from the paper between washes.
- Stir the sample thoroughly and measure 25 mL. Transfer sample to filter and allow it to filter completely.
- Wash the filter with three successive 10 mL volumes of deionized water, allowing the vacuum to remove the water after each wash. Continue vacuum until filtering is complete.
- Transfer the filtrate and wash water to a weighted evaporation dish and rinse the filtering flask with approximately 10 mL of deionized water and add to the dish.
- Evaporate the filtrate in a 180°C oven overnight. Remove from the oven to cool in a desiccator to room temperature for two hours and weigh.

- If volatile dissolved solids are to be determined, ignite the dish and weighed residue in a 550°C oven for 15 to 20 minutes. Remove to a desiccator and cool to room temperature, and weigh.

G. QUALITY ASSURANCE / QUALITY CONTROL

Samples were collected and analyzed by City staff in accordance with City protocols and the EPA Standard Operating Procedure Method 2540C (see **Appendix A**). During analysis of the samples, the following considerations were observed:

- All applicable City safety protocols were followed.
- All evaporating dishes were thoroughly cleaned and dried according to City laboratory protocols after use.
- A blank and a duplicate were run for each batch or every ten samples, and the results of the blank sampled was recorded on the lab worksheet. The duplicate relative percent difference was not to exceed 10%. Results greater than 10% were reanalyzed.
- A trip (or field) blank, which is deionized water, was treated as a sample and transported with the other samples for each sampling trip, and analyzed with each sample collected during the sampling trip.
- Oven temperatures were checked and recorded at least daily.
- Desiccants were changed, dried, and replaced as necessary, per City laboratory protocols.

SECTION IV

DATA REVIEW AND SCREENING

SECTION IV
DATA REVIEW AND SCREENING

A. DISCUSSION OF SAMPLING PROGRAM RESULTS

Sampling program results are included in **Appendices B and C**, and summarized in **Table IV-1A and Table IV-1B** (RWQCP influent/effluent monitoring) and **Table IV-4** (sewer system monitoring). All samples were collected during dry weather, thus minimizing the contribution of potentially diluting flows from infiltration and inflow (I/I).

1. RWQCP Monitoring

The average influent, PDE, and final effluent TDS values measured at the RWQCP from October 1, 2015 through September 20, 2016 (see **Table IV-1A and Table IV-1B**) indicate that the treatment plant is currently adding approximately 46 mg/l of TDS via the disinfection process, but that it is not adding a significant quantity of additional TDS to the final effluent on a net basis. Over the sampling period, the change in wastewater TDS between influent and PDE ranges from a net removal of 34 mg/l to a net removal of 109 mg/l, with an overall average removal of 58 mg/l and a standard deviation of 19.4. The change in wastewater TDS between influent and final effluent ranges from a net addition of 18 mg/l to a net removal of 50 mg/l, with an overall average removal of 12 mg/l and a standard deviation of 19.3. Based on the data evaluated, the RWQCP exhibited a fractional removal efficiency at the PDE point of 0.093; and a net overall average fractional TDS removal efficiency at the final effluent discharge point of 0.018 (including TDS added by the disinfection process). Due to the relative magnitude of the daily variation in TDS change between influent and effluent over the overall removal efficiency, however, the final effluent removal efficiency is considered negligible for purposes of local limits development.

TABLE IV-1A
AVERAGE INFLUENT AND EFFLUENT TDS AT THE RWQCP
AUGUST 15, 2015 THROUGH SEPTEMBER 16, 2016

Month	Monthly Average TDS (mg/l)						Removal Efficiency	
	Combined Influent	Pre-Disinfection Effluent (PDE)	Inf-PDE Change	Final Effluent	PDE-Eff Change	Inf-Eff Change	Inf-PDE	Inf-Eff
Aug 2015	667	599	-68	646	47	-21	0.102	0.031
Sep 2015	663	588	-75	660	72	-3	0.113	0.005
Oct 2015	623	580	-43	641	61	18	0.069	-0.029
Nov 2015	603	555	-48	610	55	7	0.080	-0.012
Dec 2015	607	552	-55	600	48	-7	0.091	0.012
Jan 2016	664	555	-109	614	59	-50	0.164	0.075
Feb 2016	621	552	-69	594	42	-27	0.111	0.043
Mar 2016	602	546	-56	591	45	-11	0.093	0.018
Apr 2016	634	577	-57	604	27	-30	0.090	0.047
May 2016	618	584	-34	617	33	-1	0.055	0.002
Jun 2016	664	616	-48	655	39	-9	0.072	0.014
Jul 2016	670	621	-49	656	35	-14	0.073	0.021
Aug 2016	685	611	-74	656	45	-29	0.108	0.042
Sep 2016	638	587	-51	646	59	8	0.080	-0.013
Average	**639.9**	**580.2**	**-59.7**	**627.9**	**47.6**	**-12.1**	**0.093**	**0.018**

According to the internal plant monitoring data set forth in **Table IV-1B**, the primary treatment unit process at the Activated Sludge Plant 2 appears to be increasing the overall TDS from the influent concentration (probably by addition of coagulants) by approximately 15 mg/l, but the increased TDS from primary treatment, along with some of the original TDS, appears to be being removed during secondary treatment; with some of the TDS being restored in the disinfection process. Overall, as shown in **Table IV-1A**, the difference between combined influent and final effluent is essentially negligible, and is so considered herein.

TABLE IV-1B
IN-PLANT TDS CONCENTRATIONS

Sample Dates	MBR P1 Primary Effluent(1)	MBR P1 Secondary Effluent(1)	Activated P2 Primary Effluent(1)	Activated P2 Secondary Effluent(1)	Final Effluent (JB16)
9/28/2016	600	590	646	574	620
9/29/2016	662	572	650	566	628
10/2/2016	616	618	568	570	628
10/3/2016	616	678	680	636	648
10/4/2016	616	632	694	562	628
10/5/2016	654	680	622	564	638
Average	**627**	**628**	**643**	**579**	**632**

(1) TDS, mg/l

2. Collection System Monitoring

Raw data from collection system monitoring are included in **Appendix C**, and are summarized in **Table IV-2**. The flow-weighted average of all the TDS levels measured in the sewer system monitoring effort (from events that included flow monitoring) was 648 mg/l.

Sites with TDS exceeding the flow-weighted average TDS were: 1, 2, 4, 5, 6, 9, 12, 16, 19, 26, 27, 28, 32A, 32B, 32C, 34, 40B, 43, 47, and 54. Sites 1, 16, 19, 26, 40B, and 54 had TDS levels greater than 800 mg/l, and Sites 1, 16, 19, and 54 had TDS levels greater than 1,000 mg/l. The site with the highest TDS was Site 16, with a TDS of 1,598 mg/l.

TABLE IV-2
SEWER SYSTEM SAMPLING RESULTS

Site No.	Manhole Asset No.	Location	Address	Sampling Event	Date of Sampling	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Peak Flow (gpm)	Min. Flow (gpm)	Average Flow (gpm)	Flow Total (gpm)
1	COL-MWS- 2008677	Eastridge Avenue and Lance Drive	1590 Eastridge Avenue	1	April 14, 2016 - April 15, 2016	993	1924	402	1216	292.4	50.8	176.8	255,000.0
2	COL-MWS- 2012414	Eastridge Avenue and 215 Freeway	21390 Eastridge Avenue	1	April 27, 2016 - April 28, 2016	668	1381	187	720	817.4	333.4	555.0	799,171.0
3	COL-MWS- 2008667	Sycamore Canyon Boulevard and Cottonwood Avenue	6470 Sycamore Canyon Boulevard	1	May 2, 2016 - May 3, 2016	342	1004	340	592	2,515.7	458.0	1,412.8	2,034,462.0
4	COL-MWS- 2008693	5900 Sycamore Canyon Boulevard and north of Box Springs Boulevard	6000 Sycamore Canyon Boulevard	1	May 16, 2016 - May 17, 2016	522	1100	422	696	324.8	1,062.1	2,175.3	312,158.3
5	COL-MWS- 2014585	Central Avenue and Quail Run Road	360 Central Avenue	1	May 2, 2016 - May 3, 2016	376	1204	482	650	2,981.5	1,355.7	2,291.1	3,299,231.6
6	COL-MWS- 2013566	Alessandro Boulevard and Camino Del Oro	14015 Camino Del Oro	1	June 20, 2016 - June 21, 2016	372	810	376	692	685.6	511.5	649.6	881,887.0
7	COL-MWS- 4008612	Trautwein Road north of Mission Grove Parkway	1181 Trautwein Road	1		232	657	444	516	-	-	-	-
				2	August 29, 2016 - August 30, 2016	474	991	454	500	346.5	30.8	115.0	165,600.0
8	COL-MWS- 4010724	Arlington Avenue and Royale Place	2380 Arlington Avenue	1	April 14, 2016 - April 15, 2016	222	508	179	496	109.3	39.4	89.2	128,400.0
9	COL-MWS- 4007838	Washington Street and Harvest Lane	2763 Washington Street	1	July 12, 2016 - July 13, 2016	234	626	448	656	2,158.1	1,176.5	1,638.0	2,360,000.0
10	COL-MWS- 4014702	Arlington Avenue and McMahon Street	3434 Arlington Avenue	1	August 2, 2016 - August 3, 2016	278	1074	390	572	131.1	12.5	45.4	65,391.0
11	COL-MWS- 3006725	Chicago Avenue and Central Avenue	5201 Chicago Avenue	1	May 4, 2016 - May 5, 2016	268	596	278	524	9,762.7	5,107.3	7,174.8	10,330,000.0
12	COL-MWS- 3012830	Chicago Avenue in the park, lower parking lot	5091 Chicago Avenue	1						4,022.4	1,838.9	2,919.7	4,200,000.0
				2	May 16, 2016 - May 17, 2016	432	1138	288	680	8,051.6	4,066.9	6,243.2	8,990,253.4
13	COL-MWS- 2005548	1795 Prince Albert Drive	1795 Prince Albert Drive	1	May 16, 2016 - May 17, 2016	185	436	304	488	191.2	27.4	112.2	161,600.0
14	COL-MWS- 3002215	Chicago Avenue and La Conte Drive	4985 Chicago Avenue	1	July 12, 2016 - July 13, 2016	360	812	456	574	1,116.2	547.7	918.0	1,320,000.0
15	COL-MWS- 1000970	Chicago Avenue and Spruce Street	2080 Spruce Street	1	June 23, 2016 - June 24, 2016	292	612	316	614	2,656.5	1,541.1	2,190.0	3,150,000.0
16	COL-MWS- 1000734	Palmyrita Avenue and La Cadena Drive	1700 Palmyrita Avenue	1	July 27, 2016 - July 28, 2016	854	1886	844	1598	1,862.8	249.2	750.0	1,080,000.0
17	COL-MWS- 1000731	La Cadena Drive at Oxford Street	999 E. La Cadena Drive	1	July 27, 2016 - July 28, 2017	306	732	740	572	187.8	58.5	109.0	156,960.0
18	COL-MWS- 1000739	Columbia Avenue and La Cadena Drive		-		-	-	-	-	-	-	-	-
19	COL-MWS- 1005968	La Cadena Drive and Marlborough Avenue	1500 E. La Cadena Drive	1	May 9, 2016 - May 10, 2016	585	1528	476	1140	615.8	221.1	342.1	492,603.6

TABLE IV-2
SEWER SYSTEM SAMPLING RESULTS

Site No.	Manhole Asset No.	Location	Address	Sampling Event	Date of Sampling	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Peak Flow (gpm)	Min. Flow (gpm)	Average Flow (gpm)	Flow Total (gpm)
20	COL-MWS- 1009364	La Cadena Drive and Marlborough Avenue	1608 E. La Cadena Drive	1	May 9, 2016 - May 10, 2017	336	1052	388	516	412.8	144.3	310.3	446,843.1
21	COL-MWS- 1000608	Main Street and Weyer Street	1270 Arthur Avenue	1	August 4, 2016 - August 5, 2016	974	2564	3975	576	66.5	0.7	22.9	32,920.0
22	COL-MWS- 1000727	3695 Elliotta Drive	3660 Elliotta Drive	1	July 12, 2016 - July 13, 2016	321	844	512	600	344.7	76.2	177.5	255,504.0
23	COL-MWS- 1005898	Storm Channel and Sutton Court	4001 Sutton Court	1	June 7, 2016 - June 8, 2016	317	510	352	524	147.7	38.8	91.3	131,440.0
24	COL-MWS- 1012105	Strong Street and Fairmont Boulevard	3891 Strong Street	1		221	478	208	562	-	-	-	-
				2	July 12, 2016 - July 13, 2016	756	1216	756	622	70.9	18.1	44.9	64,614.8
25	COL-MWS- 1005725	Strong Street and Main Street	1690 Main Street	1	June 7, 2016 - June 8, 2016	307	766	560	636	3.1	0.3	1.2	1,666.4
26	COL-MWS- 1013968	Fairmont Boulevard and Market Street	2400 Fairmount	1	June 1, 2016 - June 2, 2016	589	2372	828	844	7,044.3	2,137.7	5,146.9	7,411,571.0
27	COL-MWS- 1011765	Fairmont Boulevard and Market Street	2400 Fairmount Boulevard	1	June 1, 2016 - June 2, 2017	366	745	272	650	60.3	4.0	21.6	31,100.0
28	COL-MWS- 1012136	4483 Redwood Drive and Banks Drive	2401 Fairmount Boulevard	1	June 1, 2016 - June 2, 2018	987	1742	804	680	3,949.8	1,804.0	3,148.5	4,518,049.3
*29	COL-MWS- 1000038	North of Mission Inn Avenue and west of Scout Lane	4747 Mission Inn Avenue	-		718	1256	443	685	-	-	3,354.0	4,830,000.0
30	COL-MWS- 1014806	Brockton Avenue	4481 Brockton Avenue	1	May 23, 2016 - May 24, 2017	303	636	192	634	1,932.0	967.4	1,517.9	288,141.8
31	COL-MWS- 1006426	Hillside Trunkline north of Jurupa Avenue	5701 Jurupa Avenue	1	May 10, 2016 - May 11, 2017	208	434	334	592	9,671.2	5,071.7	7,960.0	11,460,000.0
*32	COL-MWS- 1014065	*Tequesquite Avenue before split	5102 Santa Ana River Trail	-		552	1071	417	665	-	-	6,194.0	8,920,000.0
*32A	COL-MWS- 1014295	#32A Tributary - Tequesquite Avenue before split	5100 Santa Ana River Trail	1		406	928	416	664	-	-	-	-
				2	May 23, 2016 - May 24, 2017	305	777	356	616	4,085.9	975.9	2,838.0	4,090,000.0
*32B	COL-MWS- 1012573	#32B Tributary - Santa Ana River Trail and Tequesquite Avenue	Grand and Santa Ana River Trail	1		922	1528	530	680	-	-	-	-
				2	May 23, 2016 - May 24, 2017	486	904	308	696	4,076.4	1,463.2	2,950.0	4,250,000.0
*32C	COL-MWS- 1012568	#32C Tributary - Santa Ana River Trail and Tequesquite Avenue	Grand and Santa Ana River Trail	1		976	1752	710	726	-	-	-	-
				2	May 23, 2016 - May 24, 2017	666	1354	524	606	603.7	156.0	400.0	576,000.0
33	COL-MWS- 3001710	Wilderness Avenue and Santa Ana Trail	Pedley and Santa Ana River Trail	1	July 26, 2016 - July 27, 2016	344	858	672	552	16,055.0	4,301.0	10,965.0	15,800,000.0
34	COL-MWS- 3001718	Wilderness Avenue and Santa Ana Trail	Rubidoux Boulevard and Santa Ana River Trail	1	July 26, 2016 - July 27, 2017	680	1496	508	688	14,327.0	7,351.0	11,810.0	17,000,000.0

TABLE IV-2
SEWER SYSTEM SAMPLING RESULTS

Site No.	Manhole Asset No.	Location	Address	Sampling Event	Date of Sampling	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Peak Flow (gpm)	Min. Flow (gpm)	Average Flow (gpm)	Flow Total (gpm)
35	COL-MWS- 3015094	On Arlington Avenue and east of California Avenue	5270 Arlington Avenue	1	June 9, 2016 - June 10, 2017	915	1826	844	624	1,668.4	646.1	1,280.0	1,840,000.0
*36	COL-MWS- 3002533	Arlington Avenue and Jefferson Street	5560 Arlington Avenue	-	June 9, 2016 - June 10, 2018	832	1677	777	617	-	-	1,507.0	2,170,000.0
*36A	COL-MWS- 3002532	#36A Supplemental Site - On Jefferson Street in front of the school office	4308 Jefferson Street	1	June 9, 2016 - June 10, 2019	369	846	404	580	324.9	99.3	230.0	331,200.0
37	COL-MWS- 3000278	Jefferson Street north of Garfield Street	4000 Jefferson Street	1	June 9, 2016 - June 20, 2020	277	765	520	518	419.5	124.1	242.7	349,454.9
38	COL-MWS- 5011104	Monroe Street and north of the 91 Freeway	3660 Monroe Street	1	June 27-28, 2016	326	814	480	530	639.8	336.2	518.1	746,105.8
39	COL-MWS- 5011649	Arlington Avenue and Monroe Street	8960 Pembroke Avenue	1	June 9, 2016 - June 10, 2019	457	1274	784	602	166.7	72.1	107.0	154,015.4
40	COL-MWS- 7006843	*Arlington Avenue and Copperlantern Drive	8151 Arlington Avenue	-	June 25, 2016 - June 26, 2016	421	895	316	743	-	-	206.0	296,000.0
*40A	COL-MWS- 7006851	#40A Tributary- Copperlantern Drive and Zinnia Place	6440 Copperlantern Drive	1	June 27, 2016 - June 28, 2016	343	807	400	594	200.1	19.4	80.0	115,200.0
*40B	COL-MWS- 7006879	#40B Tributary - On Arlington Avenue east of Copperlantern Drive	7951 Arlington Avenue	1	June 27, 2016 - June 28, 2017	471	951	262	838	180.6	91.5	125.7	181,008.0
41	COL-MWS- 6020066	Behind the strip mall, north of Philbin Avenue, west of Van Buren Boulevard	5700 Van Buren Boulevard	1		-	-	-	-	10,680.3	3,265.4	7,457.7	10,739,061.7
42	COL-MWS- 5010477	Jackson Street near Van Buren Boulevard		-		-	-	-	-	-	-	-	-
43	COL-MWS- 5010476	Behind the building at 5941 Van Buren Boulevard in the parking lot	5180 Jackson Street	1		-	-	-	-	482.0	466.8	430,544.0	658,764.0
				2	May 26, 2016 - May 27, 2017	353	805	624	688	530.6	312.3	2,030.0	2,920,000.0
44	COL-MWS- 5003516	At 4811 Van Buren, middle of street	4811 Van Buren Boulevard	1		-	-	-	-	3,173.6	2,183.9	2,763.6	3,979,641.0
				2		302	863	400	554	-	-	-	-
				3	June 6, 2016 - June 7, 2017	649	1666	1700	636	763.5	275.8	540.0	778,000.0
				4	September 1, 2016 - September 2, 2016	320	956	420	636	901.6	363.6	519.0	747,360.0
45	COL-MWS- 6008185	Collett Avenue and Sunrose Drive	4238 Sunrose Drive	1	July 21, 2016 - July 22, 2017	338	851	334	604	1,614.5	666.0	1,245.0	1,790,000.0
46	COL-MWS- 6004794	Churchill Drive and Norfolk Drive	11221 Churchill Drive	1		309	746	500	644	-	-	-	-
				2	August 30, 2016 - August 31, 2016	315	822	426	590	75.2	10.0	31.2	44,928.0
47	COL-MWS- 6015425	4090 Purdy Street, near PS15	4095 Purdy Street	1	June 19, 2016 - June 20, 2017	416	1039	306	682	10,015.3	3,379.5	5,973.6	8,598,138.3
48	COL-MWS- 6015461	Storm Channel west of Pierce Street		-		-	-	-	-	-	-	-	-

TABLE IV-2
SEWER SYSTEM SAMPLING RESULTS

Site No.	Manhole Asset No.	Location	Address	Sampling Event	Date of Sampling	BOD (mg/l)	COD (mg/l)	TSS (mg/l)	TDS (mg/l)	Peak Flow (gpm)	Min. Flow (gpm)	Average Flow (gpm)	Flow Total (gpm)
*49	COL-MWS- 6004682	*Pierce Street, south of the 91 Freeway	4001 Pierce Street	-	June 21, 2016 - June 22, 2017	545	1430	974	567	-	-	192.0	276,000.0
*49A	COL-MWS- 6004666	#49A Tributary -At 12155 Magnolia Avenue, east end of complex	12155 Magnolia Avenue	1	June 21, 2016 - June 22, 2018	623	1704	1188	576	201.8	90.5	148.8	214,260.0
*49B	COL-MWS- 6011450	#49B Tributary - Hancock Drive and Taylor Street	11841 Hancock Drive	1	June 21, 2016 - June 22, 2019	264	476	208	532	81.2	16.1	40.5	58,320.0
*49C	COL-MWS- 6004679	#49C Tributary - On Magnolia Avenue at 91 Freeway entrance	17800 Magnolia Avenue	1	June 21, 2016 - June 22, 2020	472	1436	616	616	69.8	1.5	21.0	4,027.6
50	COL-MWS- 7010252	11045 Arlington Avenue and La Sierra Crossing	11045 Arlington Avenue	1	May 19, 2016 - May 20, 2017	315	846	304	606	542.0	235.0	395.0	568,800.0
51	COL-MWS- 7004112	At intersection of Tulsa Avenue and Anacapa Place		-		-	-	-	-	-	-	-	-
52	COL-MWS- 7013752	On Riverwalk Parkway and south of Flat Rock Road	4240 Riverwalk Parkway	1	July 19, 2016 - July 20, 2017	338	598	488	618	309.5	158.1	247.0	355,680.0
53	COL-MWS- 7000516	Collett Avenue and Pierce Street in the dog park parking lot	4000 Pierce Street	1		-	-	-	-	608.3	145.4	443.9	639,147.8
				2	June 13, 2016 - June 14, 2016	351	791	380	580	-	-	-	-
				3	August 2, 2016 - August 3, 2016	378	613	602	518	454.9	266.5	323.0	465,120.0
54	COL-MWS- 7014157	On Pierce Street at Riverwalk Parkway	11870 Pierce Street	1	June 21, 2016 - June 22, 2020	200	417	448	1200	120.8	60.6	86.7	124,803.0

*Note: Locations of each sampling location are shown on the aerial photographic maps included in **Appendix C**.*

B. COMPUTATION OF BACKGROUND DOMESTIC SEWAGE AND WASTE HAULER TDS

Sites 7, 8, 9, 10, 11, 12, 13, 14, 22, 23, 24, 25, 31, 35, 36A, 38, 39, 40A, 45, 46, 49B, 49C, 50, and 53 were selected as appropriate sites for assessing the representative TDS of background domestic sewage within the City of Riverside. The sewage sampled at these sampling sites contains negligible contributions from industrial discharges. TDS of the sewage samples collected from these sites ranged from 488 to 680 mg/l. The results of this monitoring effort are summarized in **Table IV-3.** In addition to the results from the representative sample sites described above, **Table IV-3** includes estimates of the domestic sewage TDS concentration from the three regional sewering agencies. These estimates were computed using total TDS values measured at the RWQCP headworks during June 2016 for JCSD and RCSD, and subtracting known industrial contributions on a mass basis using industrial user monitoring data and permitted flows for the same time period. The TDS for ECSD is based on a grab sample collected by City staff in December, 2016. As shown in **Table IV-3**, the flow-weighted average TDS concentration of the representative, flow-weighted domestic sewage samples discussed above is 610 mg/l.

The RWQCP accepts direct discharges of liquid waste (septage only) from septic waste haulers within the City's service area. Waste hauler loads are monitored for electrical conductivity at the time of discharge, and a load is rejected if it exceeds the equivalent of 2,000 mg/l TDS. According to information provided by City staff, the total waste hauler discharge was 10.219 million gallons (MG) during 2015. Monitoring of waste hauler discharges by City staff during 2014 indicates an average TDS of 821 mg/l. Combining these figures, the total average TDS loading from waste haulers is approximately 192 lbs/d.

C. COMPUTATION OF BACKGROUND WATER SUPPLY TDS

The average TDS of the background water supply is required for computing the TDS local limit based on the incremental TDS discharge limitation. The background water supply TDS of 366 mg/l was computed using data submitted to City RWQCP staff, as set forth in **Table IV-4.** An alternative background water supply TDS was computed as a check, based on data published in CCRs by the City of Riverside, RCSD, JCSD, and WMWD. The percent contribution of the different water supplies, for flow-weighted averaging, was based on flow information provided by City staff. The alternative value of 385 mg/l was not selected for use in developing the local limit because it would have resulted in a higher allowable headworks TDS loading (and would thus be less conservative), because it included older data, and because it included data from CCRs, which do not necessarily reflect the domestic water contribution to sewage flows as accurately as the data submitted directly to the RWQCP. The averages shown in **Table IV-4** are reasonably comparable to those shown in Table 6 of the 2015 City of Riverside Salinity Study Draft.

TABLE IV-3
BACKGROUND DOMESTIC SEWAGE TDS CONCENTRATION

Sample Site	Wastewater Type[1]	Concentration (C) TDS, mg/l	Flow (Q) Total Flow, gpd	CQ
7	Res/Comm	500	165,600	82,800,000
8	Res	496	128,400	63,686,400
9	Res	656	2,360,000	1,548,160,000
10	Res	572	65,391	37,403,652
11	Res/Comm	524	10,330,000	5,412,920,000
12	Res	680	8,990,253	6,113,372,040
13	Res	488	161,600	78,860,800
14	Res	574	1,320,000	757,680,000
22	Res	600	255,504	153,302,400
23	Res	524	131,440	68,874,560
24	Res	622	64,615	40,190,530
25	Res	636	1,666	1,059,576
31	Res/Light Comm	592	11,460,000	6,784,320,000
35	Res/Some Comm	624	1,840,000	1,148,160,000
36A	Res	580	331,200	192,096,000
38	Res/Comm	530	746,106	395,436,180
39	Res/Light Comm	602	154,015	92,717,030
40A	Res	594	115,200	68,428,800
45	Res	604	1,790,000	1,081,160,000
46	Res	590	44,928	26,507,520
49B	Res	532	58,320	31,026,240
49C	Res	616	4,028	2,481,248
50	Res	606	568,800	344,692,800
53	Res	518	465,120	240,932,160
RCSD [3]	Res/Comm	836	1,740,066	1,454,695,176
JCSD[3]	Res/Comm	682	3,421,700	2,333,599,400
ECSD[4]	Res/Comm	518	536,031	277,663,847
Flow Weighted Average [2]		**610**		

Notes:
(1) Wastewater Types - Residential (Res) and Commercial (Comm)
(2) Flow Weighted Average TDS Concentration is the sum of CQ divided by sum of Q (SCQ/SQ).
(3) TDS and Flow for JCSD and RCSD are averaged for the month of June 2016 to correspond to schedule for manhole sampling. Known industrial TDS contributions have been subtracted.
(4) ECSD TDS grab sample collected on 12/1/2016, flow averaged for June 2016.

TABLE IV-4
BACKGROUND WATER SUPPLY
TDS CONCENTRATION

Average TDS Based on City Data (mg/l)				
Parameter	**Riverside**	**RCSD**	**JCSD**	**WMWD/ECSD**
TDS: 7/2015 - 6/2016[1]	357	508	360	342
% Contribution[2]	70.36	7.05	12.08	10.52
Total Weighted Average TDS in Water Supply (June 2016):				**366**

Average TDS based on CCRs (mg/l)				
CCR Year	**Riverside[3]**	**RCSD[3]**	**JCSD[4]**	**WMWD/ECSD**
2016	370	507	384	327
2015	363	506	413	---
2014	385	486	364	---
2013	379	492	526	---
2012	377	442	497	---
2011	367	495	468	---
Average	**373.5**	**488**	**442**	**327**
Total Weighted Average TDS in Water Supply (based on CCRs)[5]				**385**

Notes:
(1) 12-month average
(2) For June 2016
(3) From individual CCRs for each agency
(4) 2014-2016 from CCRs, 2011-2013 from City of Riverside data
(5) Using % Contribution from City Data for June 2016

The monthly average final effluent TDS values measured at the RWQCP and the average incremental TDS over the calculated background water supply (measured at the PDE) are shown in **Table IV-5** for the period from August, 2015 through September, 2016, along with 12-month running averages for the period. No violations of the NPDES Permit limitations were noted for the 12-month running average values; even though several of the monthly average values during the summer months exceeded the 12-month running average NPDES Permit limitation numbers.

TABLE IV-5
EFFLUENT TDS DISCHARGE
AND INCREMENTAL TDS DISCHARGE FROM RWQCP
AUGUST 15, 2015 THROUGH SEPTEMBER 16, 2016

Month	Average TDS (mg/l)					
	Final Effluent		Pre-Disinfection Effluent (PDE)		PDE Increment Over Water Supply	
	Monthly Average	12-Month Average[1]	Monthly Average	12-Month Average	Monthly Average	12-Month Average[2]
Aug 2015	646	627	599	588	222	207
Sep 2015	660	629	588	589	202	208
Oct 2015	641	630	580	589	216	210
Nov 2015	610	628	555	587	201	211
Dec 2015	600	627	552	585	201	212
Jan 2016	614	627	555	579	202	209
Feb 2016	594	624	552	577	200	210
Mar 2016	591	622	546	571	187	205
Apr 2016	604	622	577	573	218	206
May 2016	617	622	584	574	215	207
Jun 2016	655	624	616	576	213	208
Jul 2016	656	624	621	577	255 [3]	211
Aug 2016	656	625	611	578	245 [3]	213
Sep 2016	646	624	587	578	221 [3]	215

Notes:
(1) NPDES Permit limitation = 650 mg/l as 12-month running average.
(2) NPDES Permit limitation = 250 mg/l as 12-month running average.
(3) Water supply TDS concentration assumed to be 366 mg/l.

D. PERMITTED INDUSTRIAL USER DISCHARGE FLOWS

The TDS local limit will be applied to permitted industrial users of the sewer collection systems of the City of Riverside, RCSD, and JCSD. The total discharge flow from the permitted industrial users is required to compute the TDS local limit from the allowable industrial headworks loading. Computation of the total discharge flow from permitted industrial users is shown in **Table IV-5**. **Table IV-5** also includes estimates of TDS contributions from permitted industrial users in both mg/l and lbs/d.

The 2015 draft Salinity Study indicated that 74 industrial users (22 monitored) discharged approximately 1.4 MGD to the collection system in 2010, with a total TDS loading of 12,000 lbs/d (11,000 lbs/d of which was discharged by the top 10 industrial users). The 1.27 MGD figure shown in **Table IV-6** is based on permitted flows from 26 industrial user discharge permits provided by City staff in October, 2016.

TABLE IV-6
PERMITTED INDUSTRIAL USER DISCHARGES

Unit	City[1]	RCSD[2]	JCSD[3]	ECSD[4]	Total
Gallons per Day (gpd)	1,272,000	269,921	7,700	0	1,549,621
Million Gallons per Day (MGD)	1.27	0.27	0.01	0.00	1.55
Percent of RWQCP Flow	4.5%	1.0%	0.0%	0.0%	5.5%
TDS, mg/l [5]	1,115	1,492	1,135	0	---
TDS, lbs/d [6]	11,836	3,361	73	0	15,269

Notes:
(1) From City records, October 14, 2016, 26 industrial users.
(2) From RCSD Industrial User List, October 2016, 14 industrial users.
(3) From JCSD Quarterly Pretreatment Report, Second Quarter 2016, two industrial users.
(4) ECSD has no Significant Industrial Users
(5) Estimated, based on 2014-2016 numeric average for monitored industrial users
(6) Estimated, based on permitted discharges and numeric average TDS

SECTION V

CALCULATIONS OF TDS LOCAL LIMIT

SECTION V
CALCULATION OF TDS LOCAL LIMIT

A. APPLICABLE CRITERIA AND STANDARDS

The following factors contribute to the development of numeric local limits:

1. Numeric effluent limitations for specific pollutants in the POTW's NPDES Permit;

2. Effluent toxicity criteria contained in the POTW's NPDES Permit (not applicable at expected concentrations of TDS);

3. Inhibition levels for specific pollutants for activated sludge, nitrification, and anaerobic digestion processes (not applicable per City staff);

4. Treatment process stage pollutant removal rates (not applicable for TDS);

5. Specific pollutant concentration limits for sludge, dependent on sludge reuse or disposal methods, as set forth in Table 3, Part 503.13 of Title 40 of the Code of Federal Regulations (clean sludge pollutant concentrations) and Section 66261.24 of Title 22 of the California Code of Regulations (hazardous waste toxicity criteria) (not applicable for TDS);

6. Design limitations of individual unit processes (not applicable for TDS);

7. Potential worker safety problems such as fire and explosion hazard and fume toxicity (not applicable for TDS);

8. Collection system concerns, such as corrosion or accumulation/blockage (not applicable for TDS);

8. For recycled waters used for groundwater recharge and agricultural irrigation, primary drinking water standards (there is only a secondary drinking water standard for TDS) and agricultural plant toxicity levels must also be considered.

In summary, of the above factors, the only ones applicable to the present analysis are Item 1, numeric effluent limitations, and Item 9, recycled water limitations, including agricultural plant toxicity levels.

Applicable factors are described in more detail in the following paragraphs.

As stated in **Section II**, numeric pollutant discharge limitations for discharges of TDS from the RWQCP are set forth in the current NPDES Permit. These limitations are 1) 650 mg/l as a 12-month running average, and 2) an increment of 250 mg/l above the TDS of the water supply (less TDS added at the RWQCP for wastewater disinfection), also as a 12-month running average; whichever is more restrictive. These limitations are applicable to both discharges of effluent from the RWQCP to either surface water or groundwater, and to recycled water use.

According to the website for the U.S. Salinity Laboratory of the U.S. Department of Agriculture Agricultural Research Service (USDA ARS), the salinity threshold for irrigation water producing a decrease in yield of 50% for crops with low salinity tolerance is between 2 and 4 decisiemens/meter (dS/m) of electrical conductivity. For purposes of determining an appropriate standard for use herein, we have chosen an electrical conductivity threshold of 3 dS/m, or 3,000 microsiemens/centimeter (μS/cm). Using a factor of 0.65, the corresponding TDS concentration is 1,950 mg/l. This factor is not an enforceable regulatory standard, but is being evaluated herein to ensure usability of the treated effluent for irrigation purposes.

B. LOCAL LIMITS DEVELOPMENT

The assumed conditions and formulas that were utilized in developing the allowable headworks loadings for the RWQCP and the local limit based on the Uniform Concentration Method are set forth in **Table V-1**. All formulas are based on formulas presented in the U.S. EPA Guidance Manual. City staff requested that the TDS local limit be computed using the Uniform Concentration Method, which assigns the same numeric local limit to all permitted industrial users (as opposed to assigning different numerical local limits to different users or user groups based on need or on status as an existing or new industrial user).

The calculations used to determine the maximum allowable headworks loading for TDS based on the governing criteria are set forth in **Tables V-2 and V-3**.

TABLE V-1
ASSUMED CONDITIONS AND FORMULAS

BASIC CONDITIONS

					Source/Historic Basis
1.	Average Daily Dry Weather POTW Flow:	Q_{POTW}	=	26.00 MGD	Measured Effluent Flow, August 2015 - September 2016
2.	Permitted IU Flow:	Q_{IU}	=	1.55 MGD	2016 Permitted Industrial User Lists
3.	Average Hauled Waste Wastewater Flow:	Q_{HW}	=	0.03 MGD	2015 Hauler Log
4.	Background Domestic Sewage TDS Concentration:	C_{DOM}	=	610 mg/l	Table IV-3
5.	Average Hauled Waste TDS Concentration:	C_{LW}	=	821 mg/l	2014 Hauler Sampling Records
6.	Background Water Supply TDS Concentration:	C_{SUP}	=	366 mg/l	Table IV-4

FORMULAS

Allowable Headworks Loading Based on Prevention of Pass-Through

1. Compliance with NPDES Permit Effluent Limits

The following equation was used to convert a pollutant-specific concentration (based on NPDES permit limit into an allowable headworks loading).

$$AHL_{NPDES} = \frac{(8.34)\,(C_{NPDES})\,(Q_{POTW})}{(1 - R_{POTW}1)}$$

Where:

AHL_{NPDES} = Allowable headworks loading based on NPDES limit, lb/day
C_{NPDES} = NPDES permit limit, mg/l
Q_{POTW} = POTW average flow rate, MGD
$R_{POTW}1$ = Assumed removal efficiency across POTW for determining compliance with effluent limits (expressed as a decimal)

2. Compliance with Incremental NPDES Permit Effluent Limits

The following equation was used to convert a pollutant-specific concentration - based on NPDES permit limit into an allowable headworks loading.

$$AHL_{NPDES\text{-}i} = \frac{(8.34)\,(C_{NPDES\text{-}i} + C_{SUP})\,(Q_{POTW})}{(1 - R_{POTW}1)}$$

Where:

$AHL_{NPDES\text{-}i}$ = Allowable headworks loading based on incremental NPDES limit, lb/day
$C_{NPDES\text{-}i}$ = Incremental NPDES permit limit, mg/l
C_{SUP} = Background Water Supply TDS Concentration, mg/l
Q_{POTW} = POTW average flow rate, MGD
$R_{POTW}1$ = Assumed removal efficiency across POTW for determining compliance with effluent limits (expressed as a decimal)

3. Compliance with Reclamation Criteria

The following equation was used to convert a reclamation criterion into an allowable headworks loading.

$$AHL_{RECL} = \frac{(8.34)\,(C_{RECL})\,(Q_{POTW})}{(1 - R_{POTW}1)}$$

Where:

AHL_{RECL} = Allowable headworks loading based on reclamation criterion, lbs/d
C_{RECL} = Reclamation criterion, mg/l
Q_{POTW} = POTW average flow rate, MGD
$R_{POTW}1$ = Assumed removal efficiency across POTW for determining compliance with reclamation criteria (expressed as a decimal)

TABLE V-1
ASSUMED CONDITIONS AND FORMULAS

FORMULAS (continued)

Local Limit for Industrial Users

The following equations were used to compute the local limit applicable to permitted Industrial Users, using the Uniform Concentration Method.

$MAHL$ = Lowest of the AHLs determined previously

$L_{DOM} = 8.34 * C_{DOM} * Q_{DOM}$

$Q_{DOM} = Q_{POTW} - Q_{IND} - Q_{HW}$

$L_{HW} = 8.34 * C_{LW} * Q_{HW}$

$MAIL = MAHL(1-SF) - (L_{DOM} + L_{HW})$

$$C_{IND} = \frac{MAIL/8.34}{Q_{IU}}$$

Where:

- C_{IND} = Allowable IU Local Limit, mg/l
- SF = Safety Factor (expressed as a decimal)
- MAHL = Maximum allowable headworks loading, lb/day
- MAIL = Allowable industrial headworks loading, lb/day
- Q_{IU} = Total permitted IU flow, MGD
- C_{DOM} = Estimated background domestic wastewater pollutant concentration, mg/l
- Q_{DOM} = Estimated domestic wastewater flow, MGD
- C_{HW} = Average hauled waste pollutant concentration, mg/l
- Q_{HW} = Average hauled waste wastewater flow, MGD
- Q_{POTW} = POTW average flow rate, MGD

NOTE:
All formulas shown above are based on the "Local Limits Development Guidance" manual, prepared by the U.S. Environmental Protection Agency (EPA), July 2004.

TABLE V-2
CALCULATION OF ALLOWABLE HEADWORKS LOADING
BASED ON NON-INCREMENTAL EFFLUENT LIMITS

LIMITATIONS

Description	Parameter	Unit	Reference
NPDES Permit Effluent Limits (C_{NPDES})	**650**	mg/l	Order R8-2013-0016 (12-month Average)
State Drinking Water Quality Standards - Primary MCL	N/A	mg/l	Title 22, Chapter 15, Section 64431
Reclamation Criteria (C_{RECL})			
1. Agricultural Plant Toxicity	1,950	mg/l	U.S. Salinity Laboratory Website
WWTP Removal Efficiencies (Expressed as Decimal)			
1. Across Primary Treatment (R_{PRIM})	N/A		Not applicable for TDS
2. Across POTW for:			
a. Determining Compliance with Effluent Limits ($R_{POTW}1$)	0		Plant Influent/Effluent data, August 2015-September 2016
b. Preventing Digester Inhibition and Complying with Sludge Disposal Standards ($R_{POTW}2$)	N/A		Not applicable for TDS
Minimum WWTP Inhibition Thresholds			
1. Secondary Treatment (C_{STCRIT})			
a. Activated Sludge Process	N/A	mg/l	Not applicable for TDS
b. Nitrification Process	N/A	mg/l	Not applicable for TDS
2. Anaerobic Digestion (C_{ADCRIT})	N/A	mg/l	Not applicable for TDS
Sludge Disposal Regulations - Dry Weight Basis (C_{SLCRIT})			
1. Federal Maximum Concentration for Application to Land (Not Subject to Cumulative Loading Rate)	N/A	mg/kg	40 CFR 503.13(a)(2)(ii)
2. State Hazardous Substance Criteria - Total Threshold Limit Concentration (TTLC)	N/A	mg/kg	Title 22, Section 66261.24(a)(2)(A)

Notes:
Parameters used to determine required headworks limit are shown in bold.
N/A: Not Applicable or Not Available

CALCULATIONS

Allowable Headworks Loading Based on Prevention of Pass-Through

1. Compliance with NPDES Permit Effluent Limits

$$AHL_{NPDES} = \frac{(8.34)\,(C_{NPDES})\,(Q_{POTW})}{(1 - R_{POTW}1)} = 140{,}946.0 \text{ lbs per day}$$

Where:
C_{CRIT} = 650 mg/l (NPDES permit limit)
Q_{POTW} = 26.00 MGD
$R_{POTW}1$ = 0.00

2. Compliance with Reclamation Criteria

$$AHL_{RECL} = \frac{(8.34)\,[\,(C_{RECL})\,(Q_{POTW})\,]}{(1 - R_{POTW}1)} = 422{,}838.0$$

Where:
C_{RECL} = 1950 mg/l
Q_{POTW} = 26.00 MGD
$R_{POTW}1$ = 0.00

TABLE V-3
CALCULATION OF ALLOWABLE HEADWORKS LOADING
BASED ON INCREMENTAL EFFLUENT LIMIT

LIMITATIONS

Description	Parameter	Unit	Reference
NPDES Incremental Permit Effluent Limits ($C_{NPDES-i}$)	**250**	mg/l	Order R8-2013-0016 (12-month Average)
State Drinking Water Quality Standards - Primary MCL	N/A	mg/l	Title 22, Chapter 15, Section 64431
Reclamation Criteria (C_{RECL})			
1. Agricultural Plant Toxicity	N/A	mg/l	Salinity Lab Website
WWTP Removal Efficiencies (Expressed as Decimal)			
1. Across Primary Treatment (R_{PRIM})	N/A		Not applicable for TDS
2. Across POTW for:			
a. Determining Compliance with Effluent Limits ($R_{POTW}1$)	0.093		Plant Influent/Effluent data, August 2015-September 2016
b. Preventing Digester Inhibition and Complying with Sludge Disposal Standards ($R_{POTW}2$)	N/A		Not applicable for TDS
Minimum WWTP Inhibition Thresholds			
1. Secondary Treatment (C_{STCRIT})			
a. Activated Sludge Process	N/A	mg/l	Not applicable for TDS
b. Nitrification Process	N/A	mg/l	Not applicable for TDS
2. Anaerobic Digestion (C_{ADCRIT})	N/A	mg/l	Not applicable for TDS
Sludge Disposal Regulations - Dry Weight Basis (C_{SLCRIT})			
1. Federal Maximum Concentration for Application to Land (Not Subject to Cumulative Loading Rate)	N/A	mg/kg	40 CFR 503.13(a)(2)(ii)
2. State Hazardous Substance Criteria - Total Threshold Limit Concentration (TTLC)	N/A	mg/kg	Title 22, Section 66261.24(a)(2)(A)

Notes:
Parameters used to determine required headworks limit are shown in bold.
N/A: Not Applicable or Not Available

CALCULATIONS

Allowable Headworks Loading Based on Prevention of Pass-Through

1. Compliance with NPDES Permit Effluent Limits

$$AHL_{NPDES-i} = \frac{(8.34)\,(C_{NPDES-i} + C_{SUP})\,(Q_{POTW})}{(1 - R_{POTW}1)} = \mathbf{147{,}380.8\ lbs\ per\ day}$$

Where:

$C_{NPDES-i}$ = 250 mg/l (NPDES permit limit)
C_{SUP} = 366 mg/l
Q_{POTW} = 26.00 MGD
$R_{POTW}1$ = 0.09

The development of the proposed TDS local limit from the allowable headworks loadings determined in **Tables V-2 and V-3** is set forth in **Table V-4.** The allowable headworks loadings from **Tables V-2 and V-3** are shown along with the limiting parameter that resulted in the selection. The headworks loading from contributions of domestic sewage and waste haulers is shown based on a background domestic sewage concentration of 610 mg/l, a treatment plant flow of 28 MGD, a total industrial user flow of 1.55 MGD, and a TDS loading from waste haulers of 192 lbs/d. An Allowable Industrial Headworks Loading was developed by subtracting the Domestic Sewage and Waste Hauler Headworks Loading from the Allowable Headworks Loading. An Allowable Industrial Headworks Concentration was then developed from the Allowable Industrial Headworks Loading and a total industrial user flow of 1.55 MGD.

A safety factor was then applied to the Allowable Industrial Headworks Concentration. The U.S. EPA recommends a 10% safety factor in most cases. In this case, a 5% safety factor was selected because other aspects of the calculation were conservative and represent default safety factors; namely, the applicable NPDES Permit limitations are 12-month running average limitations, and the calculated local limit is recommended to be implemented as a quarterly average limit.

After application of the safety factor, the lowest (most conservative) value of 1,210 mg/l was selected, which was the value based on the NPDES Permit limit of 650 mg/l.

TABLE V-4
CALCULATION OF LOCAL LIMITS

Pollutant		Headworks Loading				Concentration Limits			Type of Limit	Existing Local Limit (Instantaneous) (mg/l)
		Allowable Headworks Loading Rate (lbs/d)	Headworks Loading from Domestic Sewage (lbs/d)	Headworks Loading from Liquid Waste Haulers (lbs/d)	Allowable Industrial Headworks Loading (lbs/d)	Allowable Industrial Headworks Concentration (mg/l)	Allowable Headworks IU Incremental Concentration with 5% Safety Factor[2] (mg/l)	Proposed Industrial User Local Limits (mg/l)		
Dissolved Solids, Total	**NPDES**	**140,946**	124,288	192	**16,466**	**1,274**	**1,210**	**1,210**	Quarterly Average	2,500
	Reclamation	422,838			298,358	23,086	21,932			
Increment[1]	NPDES	147,381			22,901	1,772	1,683			

Notes:

(1) Parameters used to determine final local limit are shown in bold.

(2) U.S. EPA recommends a 10% safety factor in most cases. A 5% safety factor was selected in this case because the removal rate across the treatment facilities of 0.78 was taken to be zero, and because the calculated local limit is a quarterly average limit being used to avoid violation of a 12-month average NPDES limit.

SECTION VI

INDUSTRIAL COMPLIANCE DETERMINATION

SECTION VI
INDUSTRIAL COMPLIANCE DETERMINATION

As shown in **Table VI-1**, current discharges from eight of the eleven Class I industrial users in the City of Riverside, and both of the Class I industrial users in RCSD would not be in consistent compliance with the proposed quarterly average local limit set forth in **Table V-5**. Of the City's eight industrial users that would not be in consistent compliance with the new local limit, six would be in relatively consistent non-compliance with the new local limit, and four are currently not in consistent compliance with the existing instantaneous local limit of 2,500 mg/l.

TABLE VI-1
CLASS I INDUSTRIAL USER TDS COMPLIANCE EVALUATION

Facility Name	Sample Date	TDS (mg/l)	Data Source[3]	Quarterly Avgerage TDS (mg/l)
City of Riverside				
CarbonLITE Industries LLC	10/2/2014	1016	Sample	968
	10/7/2014	920	SMR	
	1/6/2015	732	Sample	741
	1/8/2015	750	SMR	
	4/7/2015	1200	SMR	1125
	4/7/2015	1050	Sample	
	7/22/2015	1844	Sample	**1572**
	7/23/2015	1300	SMR	
	10/1/2015	1900	Sample	**1356**
	10/1/2015	349	Sample	
	10/2/2015	1275	Sample	
	10/22/2015	1900	SMR	
	1/14/2016	1368	Sample	**1334**
	1/14/2016	1300	SMR	
	4/18/2016	1292	Sample	1322
	4/19/2016	1352	Sample	
	7/20/2016	1466	Sample	**1433**
	7/21/2016	1400	SMR	
Corona College Heights	10/21/2014	1384	Sample	898
	10/22/2014	460	SMR	
	10/22/2014	850	SMR	
	1/8/2015	1800	SMR	888
	1/8/2015	500	SMR	
	1/12/2015	964	Sample	
	1/13/2015	288	Sample	
	4/3/2015	650	SMR	654
	4/3/2015	480	SMR	
	4/21/2015	406	Sample	
	4/21/2015	1080	Sample	
	7/9/2015	780	SMR	753
	7/9/2015	420	SMR	
	7/16/2015	924	Sample	
	7/16/2015	888	Sample	

TABLE VI-1
CLASS I INDUSTRIAL USER TDS COMPLIANCE EVALUATION

Facility Name	Sample Date	TDS (mg/l)	Data Source[3]	Quarterly Avgerage TDS (mg/l)
City of Riverside (continued)				
Corona College Heights (continued)	10/7/2015	880	SMR	843
	10/15/2015	1136	Sample	
	10/15/2015	512	Sample	
	1/13/2016	596	Sample	493
	1/13/2016	307	Sample	
	1/13/2016	405	Sample	
	1/14/2016	612	Sample	
	1/15/2016	520	SMR	
	1/15/2016	520	SMR	
	4/19/2016	662	Sample	579
	4/19/2016	496	Sample	
	7/12/2016	590	SMR	642
	7/12/2016	570	SMR	
	8/3/2016	688	Sample	
	8/4/2016	718	Sample	
Jimenez Distributors Inc.	10/22/2014	472	Sample	510
	10/23/2014	548	Sample	
	4/2/2015	**4346**	Sample	**3023**
	4/28/2015	1700	SMR	
	7/9/2015	660	Sample	501
	7/28/2015	300	SMR	
	8/13/2015	544	Sample	
	10/30/2015	192	SMR	535
	11/3/2015	877	Sample	
	1/28/2016	155	SMR	155
	4/29/2016	695	SMR	695
	8/5/2016	81	SMR	81
Kroger Company - Ralphs Distribution and Creamery Operations	10/17/2014	1100	SMR	1024
	10/23/2014	948	Sample	
	1/8/2015	1100	SMR	1085
	2/26/2015	1070	Sample	
	4/1/2015	1100	SMR	1199
	4/9/2015	996	Sample	
	4/14/2015	1500	SMR	
	7/14/2015	1264	Sample	1097
	7/22/2015	930	SMR	
	10/19/2015	972	Sample	**1610**
	10/20/2015	1068	Sample	
	10/22/2015	2200	SMR	
	11/24/2015	2200	SMR	
	1/19/2016	1200	SMR	1162
	1/21/2016	1124	Sample	
	4/12/2016	1460	Sample	1155
	4/20/2016	850	SMR	
	7/6/2016	1700	SMR	**1458**
	7/8/2016	1216	Sample	

TABLE VI-1
CLASS I INDUSTRIAL USER TDS COMPLIANCE EVALUATION

Facility Name	Sample Date	TDS (mg/l)	Data Source[3]	Quarterly Avgerage TDS (mg/l)
City of Riverside (continued)				
Molded Devices, Inc.	10/8/2014	436	Sample	658
	10/9/2014	880	SMR	
	1/7/2015	700	SMR	647
	1/27/2015	593	Sample	
	4/13/2015	810	SMR	721
	4/23/2015	632	Sample	
	7/8/2015	616	Sample	618
	7/27/2015	620	SMR	
	10/14/2015	616	Sample	638
	10/22/2015	660	SMR	
	1/11/2016	740	SMR	668
	1/27/2016	596	Sample	
	4/7/2016	464	Sample	472
	4/27/2016	480	SMR	
	7/7/2016	592	Sample	586
	7/15/2016	580	SMR	
OSI Industries, LLC	10/16/2014	1428	Sample	**1514**
	10/24/2014	1600	SMR	
	1/6/2015	720	Sample	897
	1/19/2015	1200	SMR	
	2/24/2015	770	SMR	
	4/7/2015	1348	Sample	1174
	4/20/2015	1000	SMR	
	7/20/2015	2100	SMR	**2111**
	7/22/2015	2440	Sample	
	8/3/2015	1792	Sample	
	10/1/2015	860	Sample	**1280**
	10/19/2015	1700	SMR	
	1/11/2016	1456	Sample	**1528**
	1/18/2016	1600	SMR	
	4/14/2016	1736	Sample	**1368**
	4/18/2016	1000	SMR	
	7/18/2016	1200	SMR	1160
	8/1/2016	1120	Sample	
Pepsi Beverages Company	10/14/2014	750	SMR	1061
	10/23/2014	1372	Sample	
	1/6/2015	1000	SMR	1196
	1/8/2015	1392	Sample	
	4/9/2015	1652	Sample	1116
	4/13/2015	580	SMR	
	7/1/2015	2400	SMR	**2024**
	8/26/2015	1648	Sample	
	10/12/2015	470	SMR	483
	10/15/2015	804	Sample	
	10/15/2015	175	Sample	
	1/11/2016	680	SMR	1136
	1/21/2016	1592	Sample	
	4/15/2016	2072	Sample	**2727**
	4/21/2016	1300	SMR	
	6/30/2016	**4810**	Sample	

TABLE VI-1
CLASS I INDUSTRIAL USER TDS COMPLIANCE EVALUATION

Facility Name	Sample Date	TDS (mg/l)	Data Source[3]	Quarterly Avgerage TDS (mg/l)
City of Riverside (continued)				
Pepsi Beverages Company (continued)	7/7/2016	2212	Sample	**1737**
	7/19/2016	1400	SMR	
	9/9/2016	1600	SMR	
Prudential Overall Supply	10/7/2014	1200	SMR	1196
	10/16/2014	1192	Sample	
	1/8/2015	1200	SMR	1258
	3/5/2015	1316	Sample	
	4/6/2015	1100	SMR	1130
	4/22/2015	1160	Sample	
	7/1/2015	1500	SMR	**1470**
	7/23/2015	1440	Sample	
	10/8/2015	830	Sample	
	10/8/2015	1456	Sample	**1229**
	10/12/2015	1400	SMR	
	1/7/2016	896	Sample	873
	1/18/2016	850	SMR	
	4/7/2016	1300	SMR	**1442**
	4/7/2016	1584	Sample	
	7/11/2016	1300	SMR	**1415**
	8/16/2016	1530	Sample	
Stremicks Heritage Foods	10/6/2014	1340	Sample	1230
	10/20/2014	1120	SMR	
	1/13/2015	1304	Sample	**1632**
	1/15/2015	1960	SMR	
	4/16/2015	1638	Sample	**1624**
	5/20/2015	1610	SMR	
	7/9/2015	1180	SMR	**1540**
	7/9/2015	1900	Sample	
	10/5/2015	496	Sample	**1234**
	10/6/2015	**2840**	Sample	
	10/6/2015	826	Sample	
	10/22/2015	774	SMR	
	1/19/2016	1800	SMR	**1469**
	1/28/2016	1804	Sample	
	2/12/2016	1080	SMR	
	2/17/2016	1190	SMR	
	4/14/2016	1790	SMR	**1721**
	4/21/2016	1652	Sample	
	7/21/2016	2020	SMR	**1724**
	8/3/2016	1428	Sample	
Triple H Food Processors, LLC	10/7/2014	932	Sample	716
	10/28/2014	500	SMR	
	1/22/2015	430	SMR	527
	1/27/2015	624	Sample	

TABLE VI-1
CLASS I INDUSTRIAL USER TDS COMPLIANCE EVALUATION

Facility Name	Sample Date	TDS (mg/l)	Data Source[3]	Quarterly Avgerage TDS (mg/l)
City of Riverside (continued)				
Triple H Food Processors, LLC (continued)	4/22/2015	2078	Sample	**1939**
	4/27/2015	1800	SMR	
	7/15/2015	2200	SMR	**2129**
	7/23/2015	**5260**	Sample	
	8/13/2015	1300	SMR	
	8/13/2015	816	Sample	
	9/10/2015	1896	Sample	
	10/16/2015	**2700**	SMR	**1467**
	10/22/2015	1616	Sample	
	11/13/2015	620	SMR	
	12/3/2015	1200	SMR	
	12/31/2015	1200	SMR	
	1/7/2016	1400	SMR	**1473**
	1/12/2016	1812	Sample	
	1/19/2016	1800	SMR	
	2/17/2016	880	SMR	
	4/7/2016	2320	Sample	**1575**
	4/12/2016	830	SMR	
	7/22/2016	680	SMR	**2040**
	7/26/2016	**3400**	Sample	
Von Zabern Surgical	10/6/2014	327	SMR	478
	10/16/2014	628	Sample	
	1/6/2015	290	SMR	345
	1/27/2015	376	Sample	
	1/27/2015	368	Sample	
	4/6/2015	325	SMR	340
	4/16/2015	354	Sample	
	7/6/2015	303	SMR	346
	7/9/2015	388	Sample	
	10/7/2015	234	SMR	285
	10/26/2015	298	Sample	
	10/27/2015	324	Sample	
	1/4/2016	242	SMR	329
	1/7/2016	416	Sample	
	4/4/2016	290	SMR	323
	4/5/2016	356	Sample	
	7/14/2016	320	SMR	377
	8/16/2016	434	Sample	

TABLE VI-1
CLASS I INDUSTRIAL USER TDS COMPLIANCE EVALUATION

Facility Name	Sample Date	TDS (mg/l)	Data Source[3]	Quarterly Avgerage TDS (mg/l)
Rubidoux Community Services District (RCSD)				
Aramark Uniform Services	3/20/2014	2100	SMR	**2100**
	9/26/2014	1200	SMR	1200
	3/19/2015	1700	SMR	**1700**
	9/18/2015	2000	SMR	**2000**
	3/30/2016	1800	SMR	**1800**
	9/27/2016	1940	SMR	**1940**
Sierra Aluminum	5/7/2014	1420	SMR	**1420**
	11/5/2014	1130	SMR	1130
	5/12/2015	835	SMR	835
	11/20/2015	1129	SMR	1129
	5/4/2016	1206	SMR	1206
	11/1/2016	1450	SMR	**1450**

Notes:
(1) TDS values in shaded cells in the "TDS" column violate current TDS local limit of 2500 mg/l.
(2) TDS values in shaded cells in the "Quarterly Average TDS" column exceed proposed quarterly average TDS Local Limit of 1210 mg/l.
(3) Data Source information obtained from Self-Monitoring Report (SMR) or Sample.

SECTION VII

IMPLEMENTATION RECOMMENDATIONS

SECTION VII
IMPLEMENTATION RECOMMENDATIONS

A. PROCEDURE

The recommended local limit in **Table V-4** should be adopted by resolution of the Riverside City Council. The new local limit may then be enforced by the City in accordance with procedures set forth in its Pretreatment Ordinance.

B. IMPLEMENTATION AS A QUARTERLY AVERAGE LIMIT

The NPDES Permit limitations on which the proposed local limit is based are 12-month running average limitations. However, City staff has indicated that compliance needs to be assessed on a quarterly basis, and that implementation of a 12-month running average local limit for TDS would not be practical for compliance assessment purposes. To simplify compliance assessment, it is recommended that the proposed local limit be implemented as a quarterly average limit. If only a single sample is collected and analyzed during a given quarter, the limit would be applied to that sample. If more than one sample is collected per quarter, the limit would apply to the average of the sample results from that quarter. This would provide industrial users an opportunity to correct minor issues, re-sample during the same quarter, and potentially remain in compliance with their permit conditions.

C. APPLICATION TO EXISTING INDUSTRIAL USERS

The City may, at its discretion, apply a special consideration to existing industrial users under current permits. Special considerations may include:

- Preserving the existing TDS local limit for existing industrial users ("grandfather clause")
- Enforcing the proposed quarterly average local limit as 12-month running average local limit
- Establishing mass discharge limits for existing Significant Industrial Users based on their historic TDS loadings

Any such special consideration should be reevaluated periodically in the light of the RWQCP's ability to comply with its NPDES Permit limitations.

D. FUTURE RE-EVALUATION

The following conditions are potential triggers for re-evaluation of the TDS limit:

1. Issuance of revised Waste Discharge Requirements by the Regional Board.

2. Completion of the RWQCP expansion project, and any other major modification to the RWQCP that could result in changes to removal rates.

3. Submission of plans for construction of any industrial facility or facilities which is proposed to discharge more than a total of 20,000 gallons per day (gpd) of nondomestic wastewater.

4. An increase in the permitted discharge flow rates for any industrial user by more than a total of 20,000 gpd of nondomestic wastewater.

5. Occurrence of any significant, repeated exceedance of TDS discharge standards which can be traced to industrial user discharges.

6. Indication of significant reduction of industrial user TDS discharges, either through removal of one or more significant TDS dischargers from the system or reducing their TDS discharge by changes in process, production, treatment, or point of discharge.

7. Changes in the City's policy regarding acceptance of hauled waste discharges at the RWQCP.

8. Changes in the City's policies regarding allowable sources of TDS discharges.

9. Indication that removal rates, plant flow rates, or headworks loading rates have changed substantially from those indicated herein.

SECTION VIII

REFERENCES

SECTION VIII
REFERENCES

- *City of Riverside Public Works Department Wastewater Division Total Dissolved Solids Investigation White Paper*, Riverside Water Quality Control Plant, March 12, 2009
- *City of Riverside Salinity Study Draft*, Prepared by Carollo Engineers, June 2015
- United States Environmental Protection Agency, *Local Limits Development Guidance*, EPA 833-R-04-002A, July 2004
- United States Environmental Protection Agency, *Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program*, December 1987

APPENDIX A

CITY OF RIVERSIDE
STANDARD OPERATING PROCEDURE METHOD 2540C

CITY OF RIVERSIDE

Laboratory Services

TOTAL DISSOLVED SOLIDS (TDS)
DRIED AT 180°C (TOTAL FILTERABLE SOLIDS)
SM2540C-2011

Version: TDS – 051514

(Review Date: May 15, 2014)

Kevin Sudds ***Laboratory Analyst II***	***Anicia Yambot*** ***Laboratory Manager***
Standard Operating Procedure: SM 2540C-2011 ***Next Review Date: May 15, 2015***	

METHOD: Total Dissolved Solids Dried at 180°C (Total Filterable Solids) Method 2540C-2011

REFERENCE: *Standard Methods for the Examination of Water and Wastewater, 22nd Edition, 2012*

1.0 SCOPE AND APPLICATION:

1.1 This analytical method is to be used for determining total dissolved solids in drinking water, surface water, wastewater, and industrial wastes.

1.2 Total dissolved solids is the portion of total solids which passes through a standard glass fiber filter.

2.0 SUMMARY OF METHOD:

2.1 A well-mixed sample is filtered through a standard, glass-fiber filter paper which has been previously washed with RO water. The filtrate is then transferred to a clean, tared glass dish, evaporated in a drying oven and dried in a 180°C oven to constant weight.

2.2 The increase in weight of the tared evaporating dish represents the total dissolved solids (or filterable residue).

3.0 SAFETY:

3.1 Read MSDS for all chemicals used for health and safety risks. Treat all laboratory samples as potential biohazards.

3.2 Wear appropriate safety equipment, such as gloves, lab coat or apron, safety glasses, and face shield if necessary. Work in hood or wear a respirator when working with reagents/samples that can produce hazardous vapors, dusts, or fumes.

3.3 Be sure to wear heatproof gloves when transferring samples between ovens, furnaces, and desiccators in order to avoid being burned. Do not leave hot evaporating dishes where others can accidentally come into contact with them.

3.4 Disinfect lab benches, carts, and other lab areas at the end of each analysis.

3.5 Consult laboratory manager if you have any safety concerns or questions.

4.0 QUALITY CONTROL:

4.1 A batch shall be defined as a set of no more than ten regulatory samples, prepared and/or analyzed with the same process and personnel, using the same lot(s) of reagents.

4.2 A method blank and a duplicate should be run for each batch or every ten samples. Results of duplicate analysis should be recorded in the appropriate lab QA worksheet. Duplicate relative percent difference (RPD) should not exceed 10%. If greater than 10% all regulatory samples should be reanalyzed.

4.3 An ERA reference sample (Laboratory Control Sample or LCS) should be analyzed per Batch to check for accuracy of the method and recorded in the lab QA worksheet. Recovery should be 85-115%; otherwise all regulatory samples should be reanalyzed.

4.4 Initial Demonstration of Capability: Prior to analysis of samples or when a significant change is made to the method, an Initial Demonstration of Capability (IDOC) is performed. Analyze four replicates of the Laboratory Control Sample. Average percent recoveries of these samples must be 85-115% with a maximum %RSD of 10.

4.5 An MDL study is performed annually, or whenever major equipment or procedural changes are made. Refer to the laboratory MDL SOP for instructions on how to perform the MDL study. MDL studies are kept on the server at G:\Sewer\DeptCommon\LAB_COMMON\MDL STUDIES.

4.6 The EC of all regulatory samples is measured (see the *Conductivity* SOP) in order to determine the TDS/EC ratio. This ratio should be between 0.55 and 0.70. If the ratio falls outside of these limits, the sample should be reanalyzed. Several plant samples frequently fall outside of these limits due to possible interferences. In such cases, the data may be entered provided all other QA/QC criteria are met and the result is qualified on the worksheet as follows:

**Data qualified – historical data prove that influent samples don't normally meet the TDS/EC ratio limits due to interference.*

4.7 Temperatures of ovens used in the analysis shall be checked and recorded daily. Adjust thermostat as necessary to keep ovens running at the appropriate temperature.

4.8 Desiccants should be dried or replaced as necessary.

4.9 Analytical balance should be checked against certified weights on a daily basis and should be calibrated by a qualified technician annually. Perform internal calibration if necessary. Record data in the balance calibration/maintenance logbook.

4.10 Enter results into the appropriate logbooks and computer databases.

4.11 Quality Control Charts for all laboratory analyses are maintained on the server at G:\Sewer\DeptCommon\LAB_COMMON\LABQA\NEW LAB QA.

5.0 APPARATUS AND MATERIALS:

5.1 Graduated cylinders for measuring samples.

5.2 Analytical Balance, capable of weighing to 0.1mg.

5.3 Oven, operating at 180°C.

5.4 Muffle Furnace, operating at 550°C.

5.5 Desiccators, with color indicating desiccant.

5.6 Glass Fiber filter papers, 5.5cm 40-60um pore size (Whatman 934AH or equivalent).

5.7 Vacuum filtration apparatus with reservoir and filter support.

5.8 100mL Vicor Glass Evaporating Dishes, Coors Porcelain Evaporating Dishes or equivalent.

6.0 REAGENTS:

6.1 Deionized Reagent Water.

7.0 CALIBRATION AND MAINTENANCE:

7.1 Temperatures of ovens and furnaces should be monitored with thermometers and recorded daily. Thermometers will be calibrated against an NIST certified thermometer at least annually.

7.2 Analytical balances will be checked for calibration with certified weights daily. This should be recorded in the appropriate logbook.

7.3 Keep the vacuum apparatus in good operating condition with the pump pressure maintained at approximately 20in H_2O. When the vacuum pressure falls below this amount, drain the pump in the back room.

8.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING:

8.1 Samples should be collected in resistant-glass or plastic bottles. Sample should not adhere to the container walls.

8.2 Preferably, analyze samples immediately. If this is not possible, refrigerate samples at 4°C (to minimize decomposition) and analyze within seven days.

8.3 It is recommended to bring samples to room temperature before filtering.

9.0 PREVENTION OF INTERFERENCES:

9.1 Samples containing a high concentration of minerals may be hygroscopic and draw moisture from the air during the drying, cooling, and weighing cycle.

9.2 Samples high in bicarbonate will need careful and prolonged drying and possibly several cycles of drying, desiccation and weighing to assure complete conversion of bicarbonate to carbonate.

9.3 Limit sample size to at most yielding approximately 600mg of residue retained by the filter.

9.4 During sample filtering, be sure to wash the filter well, to assure that dissolved solids are fully washed through the filter.

9.5 The type of filter, pore size, porous area, and thickness of the filter and the nature of the sample being filtered all affect the separation of suspended from dissolved solids.

9.6 Sampling, subsampling, and pipetting two- and three-phase samples may introduce errors. Keep all samples homogenous.

10.0 PROCEDURE:

10.1 Preparing glass-fiber filter papers:

10.1.1 Place glass-fiber filter paper, woven side down, onto the filtration apparatus. Turn the vacuum on.

10.1.2 Wash the filter with three 20mL portions of deionized water. Allow the vacuum to remove the water from paper between washings.

10.1.3 Continue suction until all water is removed from the filter paper. Discard washings.

10.2 Preparation of the Evaporating Dish:

10.2.1 Clean the evaporating dish thoroughly. It may be necessary to acid wash the dish with a 30% solution of acetic acid to remove all deposits.

10.2.2 Rinse the dish well with deionized water.

10.2.3 Allow the dish to dry overnight in a 180°C oven.

10.2.4 If volatile dissolved solids are to be measured, ignite at 550°C in a muffle furnace for one hour.

10.2.5 Cool and store the prepared dishes in a desiccator until needed.

10.3 Sample Filtration and Analysis:

10.3.1 Stir sample well, either with a magnetic stirrer or by shaking the sample well. Measure sample quickly and immediately after mixing to prevent settling.

10.3.2 Use a 25mL graduated cylinder to measure the appropriate sample size (25mL is generally appropriate). Use a samplethat is expected to yield at most approximately 600mg residue. Transfer the sample onto the prepared filter and allow the sample to filter completely through.

10.3.3 Wash the filter with three successive 10mL volumes of deionized water. Allow the vacuum to remove the water completely from filter between washings. Continue vacuum until the filtration is complete.

10.3.4 Transfer the total filtrate, including washings, to a prepared, weighed evaporating dish. Carefully rinse the filtering flask with a small amount (10mL) of deionized water and add this to the dish also.

10.3.5 Evaporate the filtrate to dryness in a 180°C oven overnight. Remove from the oven, cool in a desiccator to room temperature for two hours, and weigh.

10.3.6 Repeat the drying, cooling, weighing procedure described in 10.3.5 until a constant weight is obtained.

10.3.7 If volatile dissolved solids are to be determined, ignite the dish and weighed

residue in a 550°C muffle furnace for 15-20 minutes. Remove to a desiccator and cool to room temperature. Weigh and record the weight of each filter paper.

10.3.8 Repeat the igniting, cooling, weighing procedure described in 10.3.7 until a constant weight is obtained.

11.0 CALCULATIONS:

11.1 Total Dissolved Solids, mg/L $= \frac{(A-B) \times 1000}{C}$

11.2 Volatile Dissolved Solids, mg/L $= \frac{(A-D) \times 1000}{C}$

Where:
A = Weight of dried residue + dish (mg)
B = Weight of dish (mg)
C = Sample Volume Filtered (mL)
D = Weight of residue + dish, after ignition (mg)

11.3 TDS/EC Ratio $= \frac{TDS}{EC}$ (no units)

STANDARD METHOD CHANGES TO DOCUMENT

Standard Operating Procedure: **EPA Method #2540C**	Revision Date: **October 26, 2011**
Reason for Change: Section 5.0: Edited since the lab has stopped using the 80 – 90°C oven. Sample dishes now placed directly into 180°C oven. Section 9.3: Changed to accommodate increased allowable TDS residue for FCE and Pre Chlorination samples. Section 9.7: Erased since the lab has stopped using the 80 – 90°C oven. Sample dishes now placed directly into 180°C oven. Section 10.32: Changed to accommodate increased allowable TDS residue for FCE and Pre Chlorination samples. Section 10.35: Edited since the lab has stopped using the 80 – 90°C oven. Sample dishes now placed directly into 180°C oven.	
Signed:	**Date:**
Approved:	**Date:**

Standard Operating Procedure: **EPA Method #2540C**	Revision Date: **January 30th,2013**
Reason for Change: **Section 4.1:** Definition of batch added. Method Blank and Duplicate information moved to Section 4.2. **Section 4.2:** Method Blank and Duplicate information added, corrective action added. Reference information moved to Section 4.3. **Section 4.3:** Reference information added. Temperatures information moved to Section 4.6. **Section 4.4:** IDOC information added. Desiccant information moved to Section 4.7. **Section 4.5:** MDL information added. Logbook and database information moved to Section 4.9. **Section 4.6:** Added. **Section 4.7:** Added. **Section 4.8:** Added.	

Section 4.9: Added. **Section 4.10:** Added. **Section 11.3:** Added.	
Signed:	**Date:**
Approved:	**Date:**
Standard Operating Procedure: **EPA Method #2540C-2011**	Revision Date: **May 15, 2014**
Reason for Change: Reviewed. Minor spelling errors corrected.	
Signed:	**Date:**
Approved:	**Date:**

Standard Operating Procedure: **EPA Method #2540C-2011**	Revision Date: **July 10, 2014**
Reason for Change: **Section 4.6:** Added TDS/EC ratio information. Original information moved to Section 4.7. **Section 4.7:** Original information moved to Section 4.8. **Section 4.8:** Original information moved to Section 4.9. **Section 4.9:** Original information moved to Section 4.10. **Section 4.10:** Original information moved to Section 4.11. **Section 4.11:** Added.	
Signed:	**Date:**
Approved:	**Date:**

APPENDIX B

RWQCP INFLUENT AND EFFLUENT DATA: AUGUST 2015 THROUGH SEPTEMBER 2016

SITE #	Manhole Asset Number	LOCATION	Sampling Event	BOD	COD	TSS	TDS	Peak	min	Average	Flow Total	COMMENTS
1	COL-MWS- 2008677	Eastridge St	1	993	1924	402	1216	292.4	50.8	176.8	255,000.0	Entrance to Kroger area
2	COL-MWS- 2012414	Eastridge and 215FWY	1	668	1381	187	720	817.4	333.4	555.0	799,171.0	In a field
3	COL-MWS- 2008667	Sycamore Cnyn and Cottonwood	1	342	1004	340	592	2,515.7	458.0	1,412.8	2,034,462.0	On side of road
4	COL-MWS- 2008693	Sycamore Cnyn and North of Box Springs	1	522	1100	422	696	324.8	1,062.1	2,175.3	312,158.3	Changed to "#4 Alternate"
5	COL-MWS- 2014585	Central and Quail Run	1	376	1204	482	650	2,981.5	1,355.7	2,291.1	3,299,231.6	Moved location to sidewalk manhole
6	COL-MWS- 2013566	Alessandro and Camino Del Ore	1	372	810	376	692	685.6	511.5	649.6	881,887.0	
7	COL-MWS- 4008612	Trautwein North of Mission Grove	1	232	657	444	516	-	-	-	-	
	4008612	Trautwein North of Mission Grove	2	474	991	454	500	346.5	30.8	115.0	165,600.0	
8	COL-MWS- 4010724	Sunset Ranch Drive	1	222	508	179	496	109.3	39.4	89.2	128,400.0	*Changed to "#8 Alternate"
9	COL-MWS- 4007838	Victoria and Washington	1	234	626	448	656	2,158.1	1,176.5	1,638.0	2,360,000.0	Changed to "#9 Alternate"
10	COL-MWS- 4014702	Arlington and McMahon	1	278	1074	390	572	131.1	12.5	45.4	65,391.0	Changed to "#10 Alternate"
11	COL-MWS- 3006725	Chicago and Central	1	268	596	278	524	9,762.7	5,107.3	7,174.8	10,330,000.0	At a park
12	COL-MWS- 3012830	Chicago and 213 ft from manhole SN49	1					4,022.4	1,838.9	2,919.7	4,200,000.0	*Changed to "#12 Alternate"
			2	432	1138	288	680	8,051.6	4,066.9	6,243.2	8,990,253.4	
13	COL-MWS- 2005548	1795 Prince Albert Dr	1	185	436	304	488	191.2	27.4	112.2	161,600.0	
14	COL-MWS- 3002215	Chicago Ave and La Conte Dr	1	360	812	456	574	1,116.2	547.7	918.0	1,320,000.0	
15	COL-MWS- 1000970	Chicago Ave and Spruce Street	1	292	612	316	614	2,656.5	1,541.1	2,190.0	3,150,000.0	Changed to "#15 Alternate"
16	COL-MWS- 1000734	Palmyrita	1	854	1886	844	1598	1,862.8	249.2	750.0	1,080,000.0	Changed to #16 Alternate; Not in CADME, new Construction, used plans to determine diameter and slope
17	COL-MWS- 1000731	La Cadena at Palmyrita	1	306	732	740	572	187.8	58.5	109.0	156,960.0	Changed to #17 Alternate; Not in CADME, new Construction, used plans to determine diameter and slope
18	COL-MWS- 1000739	Columbia Ave and La Cadena	-	-	-	-	-	-	-	-	-	Provides the same information as #19- not sampled
19	COL-MWS- 1005968	La Cadena and Strong Street	1	585	1528	476	1140	615.8	221.1	342.1	492,603.6	Changed to "#19 Alternate"
20	COL-MWS- 1009364	La Cadena and Strong Street	1	336	1052	388	516	412.8	144.3	310.3	446,843.1	Changed to "#20 Alternate"
21	COL-MWS- 1000608	Main St and Witt Ave	1	974	2564	3975	576	66.5	0.7	22.9	32,920.0	Changed to "#21 Alternate"
22	COL-MWS- 1000727	3695 Elliotta Dr	1	321	844	512	600	344.7	76.2	177.5	255,504.0	Changed to "#22 Alternate"
23	COL-MWS- 1005898	Strong St and Fairmont Blvd	1	317	510	352	524	147.7	38.8	91.3	131,440.0	Changed to "#23 Alternate"
24	COL-MWS- 1012105	Strong St and Fairmont Blvd	1	221	478	208	562	-	-	-	-	
			2	756	1216	756	622	70.9	18.1	44.9	64,614.8	
25	COL-MWS- 1005725	Strong St and Fairmont Blvd	1	307	766	560	636	3.1	0.3	1.2	1,666.4	
26	COL-MWS- 1013968	Fairmont Blvd North of 60 FWY at 27" VCP	1	589	2372	828	844	7,044.3	2,137.7	5,146.9	7,411,571.0	Changed to "#26 Alternate"
27	COL-MWS- 1011765	Fairmont Blvd South of 60 FWY at 18" VCP	1	366	745	272	650	60.3	4.0	21.6	31,100.0	Changed to "#27 Alternate"
28	COL-MWS- 1012136	Banks Dr	1	987	1742	804	680	3,949.8	1,804.0	3,148.5	4,518,049.3	Changed to "#28 Alternate"
*29	COL-MWS- 1000038	North of Mission Inn Ave and West of Scout Ln	-	718	1256	443	685	-	-	3,354.0	4,830,000.0	Calculated from 32B + 32C
30	COL-MWS- 1014806	Brockton Ave	1	303	636	192	634	1,932.0	967.4	1,517.9	288,141.8	
31	COL-MWS- 1006426	Hillside Trunkline North of Jurupa Ave	1	208	434	334	592	9,671.2	5,071.7	7,960.0	11,460,000.0	
*32	COL-MWS- 1014065	*Tequesquite before split	-	552	1071	417	665	-	-	6,194.0	8,920,000.0	Calculated from 32A + 32B + 32C
*32A	COL-MWS- 1014295	#32A Tributary	1	406	928	416	664	-	-	-	-	**These three tributary sites 32A, B, C combined, profile the flow and concentrations of analytes of interest. It is not possible to accurately measure flow at the original site, and no, single, alternative was available.**
			2	305	777	356	616	4,085.9	975.9	2,838.0	4,090,000.0	
*32B	COL-MWS- 1012573	#32B Tributary	1	922	1528	530	680	-	-	-	-	
			2	486	904	308	696	4,076.4	1,463.2	2,950.0	4,250,000.0	
*32C	COL-MWS- 1012568	#32C Tributary	1	976	1752	710	726	-	-	-	-	
			2	666	1354	524	606	603.7	156.0	400.0	576,000.0	

SITE #	Manhole Asset Number	LOCATION	Sampling Event	BOD	COD	TSS	TDS	Peak	min	Average	Flow Total	COMMENTS
33	COL-MWS- 3001710	Rubidoux Ave and Santa Ana Trail	1	344	858	672	552	16,055.0	4,301.0	10,965.0	15,800,000.0	Changed to #33 Alternate; Not in CADME, new Construction, used plans to determine diameter and slope
34	COL-MWS- 3001718	Santa Ana River Trail and Fremont St	1	680	1496	508	688	14,327.0	7,351.0	11,810.0	17,000,000.0	Changed to "#34 Alternate" Actually a MH U/S of #33--same line
35	COL-MWS- 3015094	Arlington Ave and Madison St West of Paloma Way	1	915	1826	844	624	1,668.4	646.1	1,280.0	1,840,000.0	Changed to "#35 Alternate"
*36	COL-MWS- 3002533	Arlington Ave and Jefferson St	-	832	1677	777	617	-	-	1,507.0	2,170,000.0	Calculated from 36A + 35
*36A	COL-MWS- 3002532	#36A Supplemental Site	1	369	846	404	580	324.9	99.3	230.0	331,200.0	This supplemental site, plus the results of "#35" yields the flow and concentration of the originally selected #36 site.
37	COL-MWS- 3000278	Jefferson St North of Garfield	1	277	765	520	518	419.5	124.1	242.7	349,454.9	
38	COL-MWS- 5011104	Indiana Avenue and Monroe St	1	326	814	480	530	639.8	336.2	518.1	746,105.8	Changed to "#38 Alternate"
39	COL-MWS- 5011649	Arlington Ave and Monroe St	1	457	1274	784	602	166.7	72.1	107.0	154,015.4	Changed to "#39 Alternate"
40	COL-MWS- 7006843	*Arlington Ave and Copper Lantern Dr	-	421	895	316	743	-	-	206.0	296,000.0	Calculated from 40A + 40B
*40A	COL-MWS- 7006851	#40A Tributary	1	343	807	400	594	200.1	19.4	80.0	115,200.0	These two tributary sites 40A, 40B combined, profile the flow and concentrations of analytes of interest. It is not possible to accurately measure flow at the original site, and no, single, alternative was available.
*40B	COL-MWS- 7006879	#40B Tributary	1	471	951	262	838	180.6	91.5	125.7	181,008.0	
41	COL-MWS- 6020066	Van Buren Blvd trunkline near Jackson St	1	-	-	-	-	10,680.3	3,265.4	7,457.7	10,739,061.7	*Changed to "#41 Alternate"
			2	482	1113	816	622	10,377.0	3,209.0	7,300.0	10,500,000.0	
42	COL-MWS- 5010477	Jackson St near Van Buren Blvd	-	-	-	-	-	-	-	-	-	*Terminal U/S MH, Possibly not Needed
43	COL-MWS- 5010476	Van Buren Blvd and Albion Dr	1	-	-	-	-	482.0	466.8	430,544.0	658,764.0	Changed to "#43 Alternate"
			2	353	805	624	688	530.6	312.3	2,030.0	2,920,000.0	
44	COL-MWS- 5003516	Van Buren Blvd 237 ft North of Challen Ave	1	-	-	-	-	3,173.6	2,183.9	2,763.6	3,979,641.0	Changed to "#44 Alternate"
			2	302	863	400	554	-	-	-	-	
			3	649	1666	1700	636	763.5	275.8	540.0	778,000.0	
			4	320	956	420	636	901.6	363.6	519.0	747,360.0	
45	COL-MWS- 6008185	Collet Ave and Sunrose Dr	1	338	851	334	604	1,614.5	666.0	1,245.0	1,790,000.0	
46	COL-MWS- 6004794	La Sierra Ave and Vista Terrace	1	309	746	500	644	-	-	-	-	Changed to "#46 Alternate"
			2	315	822	426	590	75.2	10.0	31.2	44,928.0	
47	COL-MWS- 6015425	4090 Purdy St near PS15	1	416	1039	306	682	10,015.3	3,379.5	5,973.6	8,598,138.3	Changed to "#47 Alternate"
48	COL-MWS- 6015461	Storm Channel West of Pierce Street	-	-	-	-	-	-	-	-	-	**Private Line**
*49	COL-MWS- 6004682	*Pierce Street, South of the 91 FWY	-	545	1430	974	567	-	-	192.0	276,000.0	Calculated from 49A + 49B + 49C
*49A	COL-MWS- 6004666	#49A Tributary	1	623	1704	1188	576	201.8	90.5	148.8	214,260.0	**These three tributary sites 49A, B, C combined, profile the flow and concentrations of analytes of interest. It is highly difficult to sample the originally selected site, and no, single, alternative was available. These sites privides more information and options for future sampling.**
*49B	COL-MWS- 6011450	#49B Tributary	1	264	476	208	532	81.2	16.1	40.5	58,320.0	
*49C	COL-MWS- 6004679	#49C Tributary	1	472	1436	616	616	69.8	1.5	21.0	4,027.6	
50	COL-MWS- 7010252	11045 Arlington Ave and La Sierra Crossing	1	315	846	304	606	542.0	235.0	395.0	568,800.0	
51	COL-MWS- 7004112	Tulsa Ave and Anacap Place	-	-	-	-	-	-	-	-	-	Original site had too many elbows making it impossible to accurately measure flow.
52	COL-MWS- 7013752	4000 Riverwalk Pkwy	1	338	598	488	618	309.5	158.1	247.0	355,680.0	Changed to "#52 Alternate"
53	COL-MWS- 7000516	Collet Ave and Pierce St	1	-	-	-	-	608.3	145.4	443.9	639,147.8	Changed to "#53 Alternate"
			2	351	791	380	580	-	-	-	-	

SITE #	Manhole Asset Number	LOCATION	Sampling Event	BOD	COD	TSS	TDS	Peak	min	Average	Flow Total	COMMENTS
			3	378	613	602	518	454.9	266.5	323.0	465,120.0	
54	COL-MWS- 7014157	Pierce St	1	200	417	448	1200	120.8	60.6	86.7	124,803.0	

CITY OF RIVERSIDE, RWQCP All INFLUENTS - EFFLUENT TDS SUMMARY REPORT
April 2016 to August 2016

Date	Acorn/ Arlanza mg/L	Rubidoux mg/L	Jurupa mg/L	Riverside/ Hillside mg/L	Combined Influents mg/L	JB16 Final Effluent mg/L
4/1/2016						
4/2/2016						
4/3/2016						605
4/4/2016	634	874	646	640	642	585
4/5/2016					614	598
4/6/2016						
4/7/2016						
4/8/2016						
4/9/2016						
4/10/2016						604
4/11/2016						
4/12/2016					642	594
4/13/2016						
4/14/2016						
4/15/2016						
4/16/2016						
4/17/2016						596
4/18/2016						
4/19/2016					650	621
4/20/2016						
4/21/2016						
4/22/2016						
4/23/2016						
4/24/2016						616
4/25/2016						
4/26/2016					668	619
4/27/2016						
4/28/2016					588	602
4/29/2016						
4/30/2016						
Minimum	634	874	646	640	588	585
Maximum	634	874	646	640	668	621
Total	634	874	646	640	3,804	6,040
Average	634	874	646	640	634	604

Date	Acorn/ Arlanza mg/L	Rubidoux mg/L	Jurupa mg/L	Riverside/ Hillside mg/L	Combined Influents mg/L	JB16 Final Effluent mg/L
5/1/2016						628
5/2/2016	584	844	580	600	624	598
5/3/2016					602	604
5/4/2016						
5/5/2016						
5/6/2016						
5/7/2016						
5/8/2016						615
5/9/2016						
5/10/2016					612	608
5/11/2016						
5/12/2016						
5/13/2016						
5/14/2016						
5/15/2016						624
5/16/2016						
5/17/2016					592	616
5/18/2016						
5/19/2016						
5/20/2016						
5/21/2016						
5/22/2016						625
5/23/2016						
5/24/2016					642	624
5/25/2016						
5/26/2016						
5/27/2016						
5/28/2016						641
5/29/2016						
5/30/2016						
5/31/2016					634	608
Minimum	584	844	580	600	592	598
Maximum	584	844	580	600	642	641
Total	584	844	580	600	3,706	6,791
Average	584	844	580	600	618	617

Date	Acorn/ Arlanza mg/L	Rubidoux mg/L	Jurupa mg/L	Riverside/ Hillside mg/L	Combined Influents mg/L	JB16 Final Effluent mg/L
6/1/2016						
6/2/2016						
6/3/2016						
6/4/2016						
6/5/2016						624
6/6/2016	658	972	684	628	634	654
6/7/2016					678	640
6/8/2016						
6/9/2016						
6/10/2016						
6/11/2016						
6/12/2016						654
6/13/2016						
6/14/2016					650	642
6/15/2016						
6/16/2016						
6/17/2016						
6/18/2016						
6/19/2016						651
6/20/2016						
6/21/2016					684	653
6/22/2016						
6/23/2016						
6/24/2016						
6/25/2016						
6/26/2016						696
6/27/2016						
6/28/2016					674	677
6/29/2016						
6/30/2016						
Minimum	658	972	684	628	634	624
Maximum	658	972	684	628	684	696
Total	658	972	684	628	3,320	5,891
Average	658	972	684	628	664	655

Date	Acorn/ Arlanza mg/L	Rubidoux mg/L	Jurupa mg/L	Riverside/ Hillside mg/L	Combined Influents mg/L	JB16 Final Effluent mg/L
7/1/2016						
7/2/2016						
7/3/2016						648
7/4/2016						
7/5/2016						716
7/6/2016						
7/7/2016						
7/8/2016						
7/9/2016						
7/10/2016						676
7/11/2016	630	900	700	630	662	624
7/12/2016					682	663
7/13/2016						
7/14/2016						
7/15/2016						
7/16/2016						
7/17/2016						650
7/18/2016						
7/19/2016					648	638
7/20/2016						
7/21/2016						
7/22/2016						
7/23/2016						
7/24/2016						660
7/25/2016						
7/26/2016					642	660
7/27/2016						
7/28/2016						
7/29/2016						
7/30/2016						
7/31/2016						640
Minimum	630	900	700	630	642	624
Maximum	630	900	700	630	716	700
Total	630	900	700	630	3,350	6,559
Average	630	900	700	630	670	656

Date	Acorn/ Arlanza mg/L	Rubidoux mg/L	Jurupa mg/L	Riverside/ Hillside mg/L	Combined Influents mg/L	JB16 Final Effluent mg/L
8/1/2016	670	934	716	650	702	693
8/2/2016					694	684
8/3/2016						
8/4/2016						
8/5/2016						
8/6/2016						
8/7/2016						638
8/8/2016						
8/9/2016					732	665
8/10/2016						
8/11/2016						
8/12/2016						
8/13/2016						
8/14/2016						635
8/15/2016						
8/16/2016					690	677
8/17/2016						
8/18/2016						
8/19/2016						
8/20/2016						
8/21/2016						653
8/22/2016						
8/23/2016					672	653
8/24/2016						
8/25/2016						
8/26/2016						
8/27/2016						
8/28/2016						639
8/29/2016						
8/30/2016					622	627
8/31/2016						
Minimum	670	934	716	650	622	627
Maximum	670	934	716	650	732	693
Total	670	934	716	650	4,112	6,564
Average	670	934	716	650	685	656

Date	Acorn/ Arlanza mg/L	Rubidoux mg/L	Jurupa mg/L	Riverside /Hillside mg/L	Combined Influents mg/L	JB16 Final Effluent mg/L
9/1/2016						
9/2/2016						
9/3/2016						
9/4/2016						655
9/5/2016	648	732	726	590	664	665
9/6/2016					622	660
9/7/2016						
9/8/2016						
9/9/2016						
9/10/2016						
9/11/2016						634
9/12/2016						
9/13/2016					652	632
9/14/2016						
9/15/2016						
9/16/2016						
9/17/2016						
9/18/2016						649
9/19/2016						
9/20/2016					612	630
9/21/2016						
9/22/2016						
9/23/2016						
9/24/2016						
9/25/2016						
9/26/2016						
9/27/2016						
9/28/2016						
9/29/2016						
9/30/2016						
Minimum	648	732	726	590	612	630
Maximum	648	732	726	590	664	665
Total	648	732	726	590	2,550	4,525
Average	648	732	726	590	638	646

APPENDIX C

CITY OF RIVERSIDE
SAMPLING SUMMARIES AND RAW DATA (DVD)

TO BE SUBMITTED WITH HARD COPY