

**Spanish Fork City WRF
Pretreatment Program
Local Limit
Development Document**

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INTRODUCTION

The Spanish Fork City WRF UPDES permit requires local limits to be evaluated. The primary pollutant data used for this evaluation was gathered between First quarter of 2014 thru last quarter of 2015. The data for conventional pollutants were based on data gathered between the first Quarter of 2014 and last Quarter of 2015. The WRF currently treats average flow of 4.0 Million Gallons per Day (MGD), of which approximately 0.05 MGD is from Industrial Users (IU). The design capacity of the Spanish Fork City WRF is 6.0 MGD for average daily flow with peak hour flow of 12.0 MGD. The City is required to maintain a pretreatment program because of 40 CFR 403.8. The regulation requires all WRF with a design flow above 5 MGD to implement a pretreatment program. This document establishes the local limits that can be allocated by the WRF for the future industrial users.

LEGAL AUTHORITY

United States Code of Federal Regulations 40 CFR 403.5.

City of Spanish Fork chapter 20 Ordinance No. O-06-0009.

SPANISH FORK CITY WRF ORGANIZATION

The Spanish Fork Wastewater Treatment Facility, originally constructed in 1956, was last upgraded in 2013. The facility serves the City of Spanish Fork and the City of Mapleton. The ownership is split between the two cities with Spanish Fork owning 73.6 % and Mapleton owning 26.4% of the capacity in the facility. The average design flow is 6.0 MGD, which equates to a design population equivalent of 84,500. The facility consists of two mechanical bar screens and an aerated grit chamber, followed by a division between the three primary clarifiers. The overflow from all three primary clarifiers goes to an intermediate pump station that combines the effluent from the three primary clarifiers and lifts the flow for the distribution to biological processes. Following the primary clarification, biological nutrient removal is done by a trickling filter and STM aerotor basins. After the biological treatment the effluent goes to two of the final clarifiers for separation of return activated sludge or waste activated sludge or cleaned water for final disinfection. The disinfection is done by chlorine basins and effluent from the basin goes through dechlorination before discharged to Dry Creek prior to receiving water being Utah Lake. The primary sludge off of the primary clarifiers is pumped to a sludge thickener prior to the two primary digesters and another set of two secondary digesters. All of the waste activated sludge is sent to the dewatering system and drying bed that produces class B biosolids at 13% solid content. All biosolids are tested and land applied to farmland in Utah County. The facility is located at 150 East 2160 N in Spanish Fork City, Utah County, UT, with Latitude 40.137916° and longitude -111.651901° with STORET Number 499602.

ACRONYMS and DEFINITIONS

CFR: Code of Federal Regulation
DEQ: Department of Environmental Quality
DWQ: Department of Water Quality

EPA: Environmental Protection Agency
IU: Industrial Users
MAHL: Maximum Allowable Headworks Load
MGD: Million Gallons per Day
MH: Manhole
MRE: Maximum Removable Efficiency
PPM: Parts per Million
SIU: Significant Industrial Users
UPDES: Utah Pollutant Discharge Elimination System
WRF: Water Reclamation Facility

DEVELOPMENT BACKGROUND

Water Quality Standard

Table 1 below summarizes the Spanish Fork City’s current Waste Load Analysis (UPDES UT0020109). The permit is issued for the flow of 5.0 MGD. These values refer to the most stringent value of the acute and chronic limitations to be conservative with the local limit development.

	Statement of Basis End of Pipe Standard (mg/L) (Waste-Load Analysis)
ARSENIC	0.385
CADMIUM	0.0086
CHROMIUM	0.0129 (VI) 0.2374 (III)
COPPER	0.0309
LEAD	0.0175
MERCURY	0.000014
MOLYBDENUM	N/A
NICKEL	0.171
SELENIUM	0.0054
SILVER	0.0334
ZINC	0.3648
CYANIDE	0.0042
PHENOLS	0.01

Table 1 WLA – Effluent Standard

Sludge Disposal Criteria

The Spanish Fork City WRF produces approximately 700 dry metric tons of biosolids per year (Personal Communication, September, 2016). The biosolid from the Spanish Fork City WRF is classified as Class B and currently land applied. The pollutant concentration of the sludge needs to meet 40 CFR 503.13 since it is more stringent than Table 3, except for Molybdenum. For Molybdenum, the concentration was adapted from the Table 1 of 40 CFR 503.13. The pollutant concentration used to calculate the Local Limit for Spanish Fork City can be found in Table 3Table 2.

	Sludge Pollutant Concentration (ppm) (Table 3 CFR 503.13)
ARSENIC	41
CADMIUM	39
CHROMIUM	N/A
COPPER	1500
LEAD	300
MERCURY	17
MOLYBDENUM	75 (Table 1 – 40 CFR 503.13)
NICKEL	420
SELENIUM	100
SILVER	N/A
ZINC	2800
CYANIDE	N/A
PHENOLS	N/A

Table 2 Sludge Pollutant Concentration

Treatment Plant Removal Efficiencies and Sampling Criteria

The samples of influent, effluent, and biosolids were collected from First quarter of 2014 and Last quarter of 2015 and used to develop the local limit. The spreadsheet developed by Utah DEQ was used for the analysis and is attached to this document. Several of the sample values were below detection limit on both influent and effluent samples which complicated the mass balance calculations used to determine removal efficiencies.

Sampling Plan

The samples that were taken at the treatment plant include influent, effluent and sludge. The influent samples were taken from headworks and the effluent samples were taken at the contact basin at the treatment facility. The sludge samples were taken from belt press. The sample location within the plant is indicated on the general plan view of the facility attached as Appendix D. Sampling schedule used in this facility is summarized in Table 3.

Samples	Sampling Location	Frequency
BOD, TSS	Influent/Effluent	2 times/week
Ammonia (Effluent)	Effluent	2 times/week
Oil & Grease (Effluent)	Effluent	Monthly
Metals (Liquid)	Influent/Effluent	Quarterly
Metals (Sludge)	Belt Press	Quarterly

Table 3 Sampling Schedule

Discharging Significant Industrial Users currently include; Klune Industries and Sapa, and it is currently using ~0.05 MGD as total volume. The City also regulates several other industrial dischargers. The quality of the wastewater from IUs and SIUs are tested at least once a year.

A set of the domestic samples were taken from a manhole within the city on 9/19/2016, located at 2600E 1250S for this local limit evaluation. A map with the locations of the manholes is attached as Appendix D.

Removal Efficiencies

Removal efficiencies were calculated based on the sampling results collected throughout 2014 and 2015. Removal efficiency was not obtained from the sampling for Cadmium, Cyanide, and Phenols due sampling limitations on the minimum detection limit. Where removal efficiencies could not be calculated literature values of removal efficiencies were used. The literature removal efficiencies can be found in “EPA Local Limits Development Guidance Appendices.” The removal efficiency on the metals is summarized as Table 4.

	Removal Efficiency %	Source Obtained from
ARSENIC	17.0	Average MRE and ADRE
CADMIUM	67.0	Literature Value
CHROMIUM	65.4	Average MRE and ADRE
COPPER	56.7	Average MRE and ADRE
LEAD	71.3	Average MRE and ADRE
MERCURY	78.7	Average MRE and ADRE
MOLYBDENUM	22.2	Average MRE and ADRE
NICKEL	24.9	Average MRE and ADRE
SELENIUM	29.2	Average MRE and ADRE
SILVER	35.4	Average MRE and ADRE
ZINC	45.1	Average MRE and ADRE
CYANIDE	69.0	Literature Value
PHENOLS	90.0	Literature Value

Table 4 Removal Efficiencies

Flow

The flow of 5.0 MGD was used in the spreadsheet calculation to determine the maximum allocation headworks load for the Spanish Fork City WRF. The WRF is currently receiving total of 4 MGD, where 0.05 MGD is industrial influent.

Analytical Methods

All wastewater samples were collected, preserved and analyzed using methods approved under 40 CFR Part 136 and 40 CFR Part 403 Appendix E. Sludge sampling and analyses

were performed in accordance with 40 CFR 503.8. List of the analytical method used for each pollutant can be found in Appendix C.

Sample Types

Spanish Fork City WRF influent and effluent and biosolids samples were collected as required by the UPDES permit.

PRIORITY POLLUTANT ANALYSIS

The following pollutants were evaluated for the local limit analysis:

Arsenic	Molybdenum	5- Day Biochemical
Cadmium	Nickel	Oxygen Demand
Chromium	Selenium	Total Suspended Solids
Copper	Silver	Ammonia
Cyanide	Zinc	pH
Mercury	Lead	

During this Local Limits evaluation, influent and effluent analytical data from 2014 and 2015, as well as biosolid data from 2014 and 2015 were used to determine the local limits. The spreadsheet developed by Utah DWQ was utilized to determine the removal efficiency and the headwork loads allocation.

Several of the sample values were below detection limits which complicated the mass balance calculations used to determine removal efficiencies. Where removal efficiencies could not be calculated due to sampling limitations, literature values of removal efficiencies were used.

Values found in Table 5 are the pollutants and their maximum allowable headwork load (MAHL). MAHL for BOD, and TSS were calculated based on the design loading for the facility, 180 mg/L for both BOD and TSS as well as the design loading of Ammonia, 40 mg/L. Detailed information on the development can be found in the supporting documents.

Pollutant of Concern	Governing MAHL	Source (Water Quality, Biosolids)
	lbs/day	
BOD ₅	9,007	Plant Capacity
TSS	9,007	Plant Capacity
Ammonia-N	2,000	Plant Capacity
Arsenic	0.87	Biosolids
Cadmium	0.10	Water Quality
Total Chromium	34.50	Water Quality
Copper	2.98	Water Quality
Lead	1.51	Biosolids
Mercury	0.0027	Water Quality
Molybdenum	1.22	Biosolids
Nickel	6.07	Biosolids
Selenium	0.32	Water Quality
Silver	2.16	Water Quality
Zinc	22.35	Biosolids
Cyanide	0.56	Water Quality
Phenol	4.17	Water Quality

Table 5 MAHL Summary

The MAHLs above are using the most stringent values of the MAHL calculated based off of the concentration in the biosolid samples and the water quality samples to be protective of the WRF. The values of MAHL were derived using spreadsheets developed by DWQ. The MAHL value included in the table above is the most stringent MAHL based on WLA's acute standard, chronic standard, 40 CFR 503.13 Table 1 and Table 3.

LOCAL LIMITS DETERMINATION

Metals

To determine the local limit, safety factor of 20 % (10% safety factor + 10 % growth factor) and current mass load were subtracted from MAHL.

Spanish Fork Compatible Pollutants

To determine the local limit, safety factor of 20 % (10% safety factor + 10 % growth factor) and current mass load were subtracted from MAHL. The monthly average BOD₅, and TSS loadings to the plant from 2015 were 6,606 lbs/day and 6,473 lbs/day, respectively.

Non-Petroleum Oil and Grease Limitation

Petroleum based oil and grease are prohibited in accordance with 40 CFR 403.5(b)(6). The typical wastewater treatment plant treating most domestic wastewater, as Spanish Fork City WRF, will reliably remove at least 90 % of all oil and grease entering the system.

The UPDES permit for the City allows a maximum oil and grease discharge of 10 mg/L. As such, the uniform maximum concentration allowed at the Industrial User discharge point will be 100 mg/L.

pH

In accordance with 40 CFR 403.5 (b)(2) the minimum pH is 5. The maximum pH is not established in the federal regulations. However, any liquid that has pH values more than 12.5 is considered hazardous by federal regulation. Subsequently, daily maximum pH values shall be set at less than 12.5 at any time to prevent any damage it could cause at the facility and the collection system. A monthly average of less than 10 was selected to protect the treatment facility, collection system and plant personnel.

LOCAL LIMITS

LOCAL LIMITS – EFFECT ON INDUSTRY

This local limit is developed for the future industrial users and the local limit will not affect any of the existing industrial users.

LOCAL LIMITS – IMPLEMENTATION

There is no update requirement on permits for the Spanish Fork City WRF due to this local limit development.

INFORMATION REGARDING PUBLIC NOTICING OF LOCAL LIMITS

Refer to the City of Spanish Fork Pretreatment Ordinance for the method of public noticing.

POLLUTANTS TO BE EVALUATED FURTHER

There are no pollutants that need to be evaluated further.

SUMMARY OF LOCAL LIMITS

Table 6 summarizes the weight based Maximum Allocatable Load of each constituent for future users. The values found in Table 6 is the most stringent of the daily and the monthly allocatable loadings in lbs/day to be the most conservative to protect the POTW. As long as the allocatable industrial loading stays within the most stringent limit, they will not violate the less strict standard for each constituent that is listed.

Due to the limitation of Spanish Fork's testing method for mercury (E245.1), the sampling data is misleading with MAIL calculation. It was assumed that the mercury concentration in domestic water quality data is similar to another facility within Utah, and the domestic sampling data from Central Valley Wastewater Treatment Facility of 0.00005 mg/L was used in place of Spanish Fork's data since they use EPA method 1631E, that has lower detection limit on mercury. The data from Central Valley Wastewater Treatment facility was collected from 6 different location during May and November of 2014.

The loadings that is currently allocated to the two SIUs are converted to lbs/day and subtracted from MAIL. Adjusted MAIL values are shown on the rightmost column for the future SIUs.

<i>Constituent</i>	<i>Maximum Allocatable Industrial Load (lbs/day)</i>	<i>Currently Allocated Load (lbs/day)</i>	<i>Adjusted Maximum Allocatable Industrial Load (lbs/day)</i>
Arsenic	0.68		0.68
Cadmium	0.07	0.015	0.055
Total Chromium	27.49 (26.3 (III), 1.18 (VI))	0.43	27.13
Copper	1.15	0.124	1.02
Lead	1.18	0.102	1.08
Mercury	0.0005		0.005
Molybdenum	0.94	0.44	0.50
Nickel	4.77	0.009	4.76
Selenium	0.19		0.19
Silver	1.71	0.011	1.70
Zinc	12.93	0.68	12.25
Cyanide	0.29	0.12	0.17
Phenol	3.34		3.34
BOD	2,400		2,400
TSS	2,030		2,030
Oil & Grease	100 mg/L		100 mg/L
pH	5 < pH < 10		5 < pH < 10

Table 6 Maximum Allocatable Load

APPENDIX A
LOCAL LIMIT CALCULATIONS

safety factor used 10% (EPA standard)

growth factor used 10% (industrial growth expected within next 5 to 10 years, personal communication)

POLLUTANT	WQ AIL (lbs/day)	Biosolid AIL	MAIL (most stringent)	SIU Allocation	MAIL Adjusted
Arsenic	7.06	0.68	0.68	0	0.68
Cadmium	0.07	0.16	0.07	0.015	0.06
Chromium	1.18	NA	27.49	0.436	27.05
Copper	1.15	6.39	1.15	0.124	1.02
Lead	2.00	1.18	1.18	0.102	1.08
Mercury	0.0005	0.061	0.0005	0	0.00
Molybdenum	NA	0.94	0.94	0.44	0.50
Nickel	7.54	4.77	4.77	0.009	4.76
Selenium	0.19	0.92	0.19	0	0.19
Silver	1.71	NA	1.71	0.011	1.70
Zinc	18.95	12.93	12.93	0.68	12.25
Cyanide	0.29	NA	0.29	0.116	0.17
Phenol	3.34	NA	3.34	0	3.34

POLLUTANT	WQ MAHL	Biosolid MAHL	MAHL (most stringent)
	(lbs/day)		
Arsenic	8.84	0.87	0.87
Cadmium	0.10	0.21	0.10
Chromium	1.55	NA	1.55
Copper	2.98	9.52	2.98
Lead	2.54	1.51	1.51
Mercury	0.0027	0.08	0.0027
Molybdenum	NA	1.22	1.22
Nickel	9.49	6.07	6.07
Selenium	0.32	1.23	0.32
Silver	2.16	NA	2.16
Zinc	27.71	22.35	22.35
Cyanide	0.56	NA	0.56
Phenol	4.17	NA	4.17

	Current Allocation (lbs/day)		
	Sapas	Klune	Total
POLLUTANT			0
Arsenic			0
Cadmium		0.015	0.015
Chromium	0.083	0.353	0.436
Copper		0.124	0.124
Lead		0.102	0.102
Mercury			0
Molybdenum	0.44		0.44
Nickel		0.009	0.009
Selenium			0
Silver		0.011	0.011
Zinc	0.32	0.36	0.68
Cyanide	0.07	0.046	0.116
Phenol			0

POTW Influent (Headworks) Sampling Results

Use the most recently collected samples											
Input data in the light blue shaded boxes!											
Date ->	2014 Qt 1	2014 Qt 2	2014 Qt 3	2014 Qt 4	2015 Qt 1	2015 Qt 2	2015 Qt 3	2015 Qt 4	mg/l	mg/l	Det Limit
Influent parameters	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/L
ARSENIC	0.0056	0.0049	0.0046	0.0043	0.0039	0.0053	0.0053	0.005			0.00200
CADMIUM	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025	0.00025			0.00025
CHROMIUM	0.0093	0.0071	0.0088	0.0067	0.0071	0.0124	0.0124	0.0043			0.00200
COPPER	0.043	0.046	0.03	0.037	0.048	0.0355	0.0355	0.0102			0.00200
LEAD	0.0033	0.0023	0.0018	0.001	0.0036	0.0014	0.0014	0.0009			0.00200
MERCURY	0.0001	0.0001	0.0005	0.0005	0.0000373	0.0002	0.0002	0.0002			0.00005
MOLYBDENUM	0.025	0.035	0.0099	0.014	0.016	0.0301	0.0301	0.071			0.00200
NICKEL	0.0025	0.0053	0.0055	0.0031	0.0032	0.00472	0.00472	0.00371			0.00200
SELENIUM	0.0022	0.0054	0.001	0.001	0.0044	0.003	0.003	0.003			0.00200
SILVER	0.00025	0.00025	0.00069	0.00061	0.0005	0.00025	0.00025	0.00025			0.00200
ZINC	0.13	0.12	0.11	0.088	0.1	0.08	0.08	0.038			0.00500
CYANIDE	0.0025	0.0025	0.0025	0.0025	0.005	0.005	0.005	0.005			0.0025
PHENOLS											0.05000
BOD-5											
COD											
TSS											
OIL & GREASE											
AMMONIA**											
<p>* Aluminum and Antimony are often not considered pollutants of concern any longer.</p> <p>** Percent removal for ammonia should be done for trickling filter plants only. Ammonia is <u>not</u> a conservative parameter. Ammonia removal from a trickling filter plant is greatly affected by operational practices. Ammonia in an activated sludge plant is calculated using capacity (as is BOD and TSS), found on treatment plant design sheets.</p>											

POTW Effluent Sampling Results

Use the most recently collected samples

Input data in the light blue shaded boxes!

Date ->	2014 Qt 1	2014 Qt 2	2014 Qt 3	2014 Qt 4	2015 Qt 1	2015 Qt 2	2015 Qt 3	2015 Qt 4	2016 Qt 1	2016 Qt 2	Det Limit
Effluent parameter	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/L
ALUMINUM											0.1
ANTIMONY											
ARSENIC	0.00415	0.00415	0.00415	0.00415	0.003875	0.003875	0.003875	0.003875			0.002
CADMIUM	0.00025	0.00025	0.00025	0.00025	0.001056	0.001056	0.001056	0.001056			0.0005
CHROMIUM	0.0025	0.0025	0.0025	0.0025	0.003075	0.003075	0.003075	0.003075			0.002
COPPER	0.007275	0.007275	0.007275	0.007275	0.0186	0.0186	0.0186	0.0186			0.002
LEAD	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005			0.002
MERCURY	0.0005	0.0005	0.0005	0.0005	0.000035	0.000035	0.000035	0.000035			0.0005
MOLYBDENUM	0.019	0.019	0.019	0.019	0.03605	0.03605	0.03605	0.03605			0.002
NICKEL	0.002225	0.002225	0.002225	0.002225	0.0051	0.0051	0.0051	0.0051			0.002
SELENIUM	0.001875	0.001875	0.001875	0.001875	0.00235	0.00235	0.00235	0.00235			0.002
SILVER	0.000315	0.000315	0.000315	0.000315	0.00028	0.00028	0.00028	0.00028			0.002
ZINC	0.0635	0.0635	0.0635	0.0635	0.036	0.036	0.036	0.036			0.005
CYANIDE	0.0025	0.0025	0.0025	0.0025	0.0045	0.0045	0.0045	0.0045			0.005
PHENOLS											0.05
BOD-5											
COD											
TSS											
OIL & GREASE											
AMMONIA											
											3

Metal Concentrations in Biosolids

Plant Flow = MGD
 Biosolids Flow Anaerobic lbs/day
 Biosolids Flow Aerobic lbs/day

	→	→	→	→	Y/N
Are your biosolids treated anaerobically?					Y
Are your biosolids treated aerobically?					N
Does your plant have both processes for biosolids?					N

(Biosolids flow is dry weight)

Remember: Fill in only the light blue shaded boxes!

							Constituent Flow		
	Date ->	2014	2015					Average	In Biosolids
	CONSTITUENT	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	lbs/day
ANAEROBIC									
ARSENIC	9.44	10.92					10.2	0.0366	
CADMIUM	1.2	1.38					1.3	0.0046	
CHROMIUM							NA	NA	
COPPER	400.75	527.75					464.3	1.6713	
LEAD	19	25.03					22.0	0.0793	
MERCURY	1.35	1.04					1.2	0.0043	
MOLYBDENUM	18.25	35.38					26.8	0.0965	
NICKEL	18.18	19.7					18.9	0.0682	
SELENIUM	15.63	9.26					12.4	0.0448	
SILVER							NA	NA	
ZINC	854	1036					945.0	3.4020	
CYANIDE							NA	NA	

Calculated Removal Efficiencies Using Influent and Effluent

Do not put data in the pink shaded boxes! They contain formulas based on your input data!

	MEAN		MRE PERCENT REMOVAL %	AVERAGE DAILY								ADRE PERCENT REMOVAL %	REMOVAL EFFICIENCY (BIOSOLIDS DATA) %		
	Average Influent	Average Effluent		Daily Removal Efficiencies											
				%	%	%	%	%	%	%	%				
ARSENIC	0.0048625	0.004013	17.5	25.89	15.31	9.78	3.49	0.64	26.89	26.89	22.50	16.4	18.074	17.0 ARSENIC	
CADMIUM	0.00025	0.000653	-161.2	0.00	0.00	0.00	0.00					0.0	44.547	-80.6 CADMIUM	
CHROMIUM	0.0085125	0.002788	67.3	73.12	64.79	71.59	62.69	56.69	75.20	75.20	28.49	63.5	#DIV/0!	65.4 CHROMIUM	
COPPER	0.03565	0.012938	63.7	83.08	84.18	75.75	80.34	61.25	47.61	47.61	-82.35	49.7	112.424	56.7 COPPER	
LEAD	0.0019625	0.0005	74.5	84.85	78.26	72.22	50.00	86.11	64.29	64.29	44.44	68.1	96.845	71.3 LEAD	
MERCURY	0.00013955	0.000035	74.9						82.50	82.50	82.50	82.5	73.927	78.7 MERCURY	
MOLYBDENUM	0.0288875	0.027525	4.7	24.00	45.71						49.23	39.6	8.014	22.2 MOLYBDENUM	
NICKEL	0.00409375	0.003663	10.5	11.00	58.02	59.55	28.23					39.2	39.942	24.9 NICKEL	
SELENIUM	0.002875	0.002113	26.5	14.77	65.28			46.59	21.67	21.67	21.67	31.9	37.370	29.2 SELENIUM	
SILVER	0.00038125	0.000298	22.0			54.35	48.36	44.00				48.9	#DIV/0!	35.4 SILVER	
ZINC	0.09325	0.04975	46.6	51.15	47.08	42.27	27.84	64.00	55.00	55.00	5.26	43.5	87.488	45.1 ZINC	
CYANIDE	0.00375	0.0035	6.7	0.00	0.00	0.00	0.00	10.00	10.00	10.00	10.00	5.0	#DIV/0!	5.8 CYANIDE	
PHENOLS	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0! PHENOLS
BOD-5															
COD															
TSS															
OIL & GREASE															
AMMONIA (TF)															

Note 1: Determination of a removal efficiency (RE) is critical and many times difficult. Sometimes it is a judgement call made by comparing the calculated values for MRE, ADRE, and the RE from biosolids data and comparing that with literature values (contained in the EPA *Local Limits Development Guidance*, Appendix R)

Note 2: The accuracy of calculated removal efficiencies is very much dependent on how good your monitoring data is, a low detection limit is critical. Good data obtained by using the proper laboratory method is the most important part of this process.

Facility Name:	Spanish Fork	WQ MAHL Daily:	19.34	WQ Local Limits for Arsenic	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	8.84	AIL Daily, #/day: 15.46	
Domestic Flow:	4.95	WQ MAIL Daily:	19.32	AIL Monthly, #/day: 7.06	
Domestic Max Concentration:	0.0005	WQ MAIL Monthly:	8.82	AIL Daily, Concentration: 37.07	
Domestic Ave Concentration:	0.0005	Biosolids MAHL Daily:	1.59	AIL Monthly, Concentration: 16.92	
Industrial Flow:	0.05	Biosolids MAHL Monthly:	0.87	Biosolids Local Limits for Arsenic	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	1.57	AIL Daily, #/day: 1.25	
Metal:	Arsenic	Biosolids MAIL Monthly:	0.85	AIL Monthly, #/day: 0.68	
% removal in decimal:	0.17			AIL Daily, Concentration: 3.01	
Safety Factor:	0.1			AIL Monthly, Concentration: 1.63	
Growth Factor:	0.1			Local Limits for Arsenic	
WQ Acute Standard, mg/L:	0.385			AIL Daily, #/day: 1.25	
WQ Chronic Standard, mg/L:	0.176			AIL Monthly, #/day: 0.68	
Biosolids Table 1:	75			AIL Daily, Concentration: 3.01	
Biosolids Table 3:	41			AIL Monthly, Concentration: 1.63	

Facility Name:	Spanish Fork	WQ MAHL Daily:	1.09	WQ Local Limits for Cadmium	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	0.10	AIL Daily, #/day: 0.86	
Domestic Flow:	4.95	WQ MAIL Daily:	1.08	AIL Monthly, #/day: 0.07	
Domestic Max Concentration:	0.0002	WQ MAIL Monthly:	0.09	AIL Daily, Concentration: 2.07	
Domestic Ave Concentration:	0.0002	Biosolids MAHL Daily:	0.46	AIL Monthly, Concentration: 0.18	
Industrial Flow:	0.05	Biosolids MAHL Monthly:	0.21	Biosolids Local Limits for Cadmium	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	0.45	AIL Daily, #/day: 0.36	
Metal:	Cadmium	Biosolids MAIL Monthly:	0.20	AIL Monthly, #/day: 0.16	
% removal in decimal:	0.67			AIL Daily, Concentration: 0.86	
Safety Factor:	0.1			AIL Monthly, Concentration: 0.39	
Growth Factor:	0.1			Local Limits for Cadmium	
WQ Acute Standard, mg/L:	0.0086			AIL Daily, #/day: 0.36	
WQ Chronic Standard, mg/L:	0.0008			AIL Monthly, #/day: 0.07	
Biosolids Table 1:	85			AIL Daily, Concentration: 0.86	
Biosolids Table 3:	39			AIL Monthly, Concentration: 0.18	

Chromium III

Enter data into yellow cells only

Facility Name:	Spanish Fork	WQ MAHL Daily:	686.84	WQ Local Limits for Chromium	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	32.95	AIL Daily, #/day:	549.42
Domestic Flow:	4.95	WQ MAIL Daily:	686.77	AIL Monthly, #/day:	26.30
Domestic Max Concentration:	0.0018	WQ MAIL Monthly:	32.88	AIL Daily, Concentration:	1317.55
Domestic Ave Concentration:	0.0018	Biosolids MAHL Daily:	NA	AIL Monthly, Concentration:	63.07
Industrial Flow:	0.05	Biosolids MAHL Monthly:	NA	Biosolids Local Limits for Chromium	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	NA	AIL Daily, #/day:	NA
Metal:	Chromium	Biosolids MAIL Monthly:	NA	AIL Monthly, #/day:	NA
% removal in decimal:	0.654			AIL Daily, Concentration:	NA
Safety Factor:	0.1			AIL Monthly, Concentration:	NA
Growth Factor:	0.1			Local Limits for Chromium	
WQ Acute Standard, mg/L:	5.699			AIL Daily, #/day:	549.42
WQ Chronic Standard, mg/L:	0.2734			AIL Monthly, #/day:	26.30
Biosolids Table 1:	NA			AIL Daily, Concentration:	1317.55
Biosolids Table 3:	NA			AIL Monthly, Concentration:	63.07

Chromium VI

Enter data into yellow cells only

Facility Name:	Spanish Fork	WQ MAHL Daily:	2.15	WQ Local Limits for Chromium	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	1.55	AIL Daily, #/day:	1.66
Domestic Flow:	4.95	WQ MAIL Daily:	2.07	AIL Monthly, #/day:	1.18
Domestic Max Concentration:	0.0018	WQ MAIL Monthly:	1.48	AIL Daily, Concentration:	3.97
Domestic Ave Concentration:	0.0018	Biosolids MAHL Daily:	NA	AIL Monthly, Concentration:	2.84
Industrial Flow:	0.05	Biosolids MAHL Monthly:	NA	Biosolids Local Limits for Chromium	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	NA	AIL Daily, #/day:	NA
Metal:	Chromium	Biosolids MAIL Monthly:	NA	AIL Monthly, #/day:	NA
% removal in decimal:	0.654			AIL Daily, Concentration:	NA
Safety Factor:	0.1			AIL Monthly, Concentration:	NA
Growth Factor:	0.1			Local Limits for Chromium	
WQ Acute Standard, mg/L:	0.0178			AIL Daily, #/day:	1.66
WQ Chronic Standard, mg/L:	0.0129			AIL Monthly, #/day:	1.18
Biosolids Table 1:	NA			AIL Daily, Concentration:	3.97
Biosolids Table 3:	NA			AIL Monthly, Concentration:	2.84

Facility Name:	Spanish Fork	WQ MAHL Daily:	4.76	WQ Local Limits for Copper	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	2.98	AIL Daily, #/day: 2.57	
Domestic Flow:	4.95	WQ MAIL Daily:	3.22	AIL Monthly, #/day: 1.15	
Domestic Max Concentration:	0.0373	WQ MAIL Monthly:	1.44	AIL Daily, Concentration: 6.17	
Domestic Ave Concentration:	0.0373	Biosolids MAHL Daily:	27.30	AIL Monthly, Concentration: 2.75	
Industrial Flow:	0.05	Biosolids MAHL Monthly:	9.52	Biosolids Local Limits for Copper	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	25.76	AIL Daily, #/day: 20.61	
Metal:	Copper	Biosolids MAIL Monthly:	7.98	AIL Monthly, #/day: 6.39	
% removal in decimal:	0.567			AIL Daily, Concentration: 49.42	
Safety Factor:	0.1			AIL Monthly, Concentration: 15.32	
Growth Factor:	0.1			Local Limits for Copper	
WQ Acute Standard, mg/L:	0.0494			AIL Daily, #/day: 2.57	
WQ Chronic Standard, mg/L:	0.0309			AIL Monthly, #/day: 1.15	
Biosolids Table 1:	4300			AIL Daily, Concentration: 6.17	
Biosolids Table 3:	1500			AIL Monthly, Concentration: 2.75	

Facility Name:	Spanish Fork	WQ MAHL Daily:	65.22	WQ Local Limits for Lead	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	2.54	AIL Daily, #/day:	52.15
Domestic Flow:	4.95	WQ MAIL Daily:	65.19	AIL Monthly, #/day:	2.00
Domestic Max Concentration:	0.0009	WQ MAIL Monthly:	2.51	AIL Daily, Concentration:	125.06
Domestic Ave Concentration:	0.0009	Biosolids MAHL Daily:	4.24	AIL Monthly, Concentration:	4.81
Industrial Flow:	0.05	Biosolids MAHL Monthly:	1.51	Biosolids Local Limits for Lead	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	4.20	AIL Daily, #/day:	3.36
Metal:	Lead	Biosolids MAIL Monthly:	1.48	AIL Monthly, #/day:	1.18
% removal in decimal:	0.713			AIL Daily, Concentration:	8.07
Safety Factor:	0.1			AIL Monthly, Concentration:	2.83
Growth Factor:	0.1			Local Limits for Lead	
WQ Acute Standard, mg/L:	0.4489			AIL Daily, #/day:	3.36
WQ Chronic Standard, mg/L:	0.0175			AIL Monthly, #/day:	1.18
Biosolids Table 1:	840			AIL Daily, Concentration:	8.07
Biosolids Table 3:	300			AIL Monthly, Concentration:	2.83

Facility Name:	Spanish Fork	WQ MAHL Daily:	0.55	WQ Local Limits for Mercury	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	0.00274	AIL Daily, #/day: 0.44	
Domestic Flow:	4.95	WQ MAIL Daily:	0.55	AIL Monthly, #/day: 0.0005	
Domestic Max Concentration:	0.00005	WQ MAIL Monthly:	0.00068	AIL Daily, Concentration: 1.05	
Domestic Ave Concentration:	0.00005	Biosolids MAHL Daily:	0.26	AIL Monthly, Concentration: 0.00	
Industrial Flow:	0.05	Biosolids MAHL Monthly:	0.08	Biosolids Local Limits for Mercury	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	0.26	AIL Daily, #/day: 0.21	
Metal:	Mercury	Biosolids MAIL Monthly:	0.08	AIL Monthly, #/day: 0.06	
% removal in decimal:	0.787			AIL Daily, Concentration: 0.50	
Safety Factor:	0.1			AIL Monthly, Concentration: 0.15	
Growth Factor:	0.1			Local Limits for Mercury	
WQ Acute Standard, mg/L:	0.0028			AIL Daily, #/day: 0.21	
WQ Chronic Standard, mg/L:	0.000014			AIL Monthly, #/day: 0.0005	
Biosolids Table 1:	57			AIL Daily, Concentration: 0.50	
Biosolids Table 3:	17			AIL Monthly, Concentration: 0.00	

Facility Name:	Spanish Fork	WQ MAHL Daily:	NA	WQ Local Limits for Molybdenum	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	NA	AIL Daily, #/day: NA	
Domestic Flow:	4.95	WQ MAIL Daily:	NA	AIL Monthly, #/day: NA	
Domestic Max Concentration:	0.0011	WQ MAIL Monthly:	NA	AIL Daily, Concentration: NA	
Domestic Ave Concentration:	0.0011	Biosolids MAHL Daily:	1.22	AIL Monthly, Concentration: NA	
Industrial Flow:	0.05	Biosolids MAHL Monthly:	NA	Biosolids Local Limits for Molybdenum	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	1.17	AIL Daily, #/day: 0.94	
Metal:	Molybdenum	Biosolids MAIL Monthly:	NA	AIL Monthly, #/day: NA	
% removal in decimal:	0.222			AIL Daily, Concentration: 2.25	
Safety Factor:	0.1			AIL Monthly, Concentration: NA	
Growth Factor:	0.1			Local Limits for Molybdenum	
WQ Acute Standard, mg/L:	NA			AIL Daily, #/day: 0.94	
WQ Chronic Standard, mg/L:	NA			AIL Monthly, #/day: NA	
Biosolids Table 1:	75			AIL Daily, Concentration: 2.25	
Biosolids Table 3:	NA			AIL Monthly, Concentration: NA	

Facility Name:	Spanish Fork	WQ MAHL Daily:	84.68	WQ Local Limits for Nickel	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	9.49	AIL Daily, #/day:	68.44
Domestic Flow:	4.95	WQ MAIL Daily:	76.05	AIL Monthly, #/day:	7.54
Domestic Max Concentration:	0.0044	WQ MAIL Monthly:	8.38	AIL Daily, Concentration:	164.13
Domestic Ave Concentration:	0.0044	Biosolids MAHL Daily:	6.07	AIL Monthly, Concentration:	18.09
Industrial Flow:	0.05	Biosolids MAHL Monthly:	6.07	Biosolids Local Limits for Nickel	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	5.30	AIL Daily, #/day:	4.77
Metal:	Nickel	Biosolids MAIL Monthly:	5.30	AIL Monthly, #/day:	4.77
% removal in decimal:	0.249			AIL Daily, Concentration:	11.44
Safety Factor:	0.1			AIL Monthly, Concentration:	11.44
Growth Factor:	0.1			Local Limits for Nickel	
WQ Acute Standard, mg/L:	1.525			AIL Daily, #/day:	4.77
WQ Chronic Standard, mg/L:	0.171			AIL Monthly, #/day:	4.77
Biosolids Table 1:	420			AIL Daily, Concentration:	11.44
Biosolids Table 3:	420			AIL Monthly, Concentration:	11.44

Facility Name:	Spanish Fork	WQ MAHL Daily:	1.24	WQ Local Limits for Selenium	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	0.32	AIL Daily, #/day: 0.93	
Domestic Flow:	4.95	WQ MAIL Daily:	1.16	AIL Monthly, #/day: 0.19	
Domestic Max Concentration:	0.002	WQ MAIL Monthly:	0.24	AIL Daily, Concentration: 2.23	
Domestic Ave Concentration:	0.002	Biosolids MAHL Daily:	1.23	AIL Monthly, Concentration: 0.45	
Industrial Flow:	0.05	Biosolids MAHL Monthly:	1.23	Biosolids Local Limits for Selenium	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	1.15	AIL Daily, #/day: 0.92	
Metal:	Selenium	Biosolids MAIL Monthly:	1.15	AIL Monthly, #/day: 0.92	
% removal in decimal:	0.292			AIL Daily, Concentration: 2.21	
Safety Factor:	0.1			AIL Monthly, Concentration: 2.21	
Growth Factor:	0.1			Local Limits for Selenium	
WQ Acute Standard, mg/L:	0.0211			AIL Daily, #/day: 0.92	
WQ Chronic Standard, mg/L:	0.0054			AIL Monthly, #/day: 0.19	
Biosolids Table 1:	100			AIL Daily, Concentration: 2.21	
Biosolids Table 3:	100			AIL Monthly, Concentration: 0.45	

Facility Name:	Spanish Fork	WQ MAHL Daily:	2.16	WQ Local Limits for Silver	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	NA	AIL Daily, #/day: 1.71	
Domestic Flow:	4.95	WQ MAIL Daily:	2.14	AIL Monthly, #/day: NA	
Domestic Max Concentration:	0.0005	WQ MAIL Monthly:	NA	AIL Daily, Concentration: 4.10	
Domestic Ave Concentration:	0.0005	Biosolids MAHL Daily:	NA	AIL Monthly, Concentration: NA	
Industrial Flow:	0.05	Biosolids MAHL Monthly:	NA	Biosolids Local Limits for Silver	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	NA	AIL Daily, #/day: NA	
Metal:	Silver	Biosolids MAIL Monthly:	NA	AIL Monthly, #/day: NA	
% removal in decimal:	0.354			AIL Daily, Concentration: NA	
Safety Factor:	0.1			AIL Monthly, Concentration: NA	
Growth Factor:	0.1			Local Limits for Silver	
WQ Acute Standard, mg/L:	0.0334			AIL Daily, #/day: 1.71	
WQ Chronic Standard, mg/L:	NA			AIL Monthly, #/day: NA	
Biosolids Table 1:	NA			AIL Daily, Concentration: 4.10	
Biosolids Table 3:	NA			AIL Monthly, Concentration: NA	

Facility Name:	Spanish Fork	WQ MAHL Daily:	27.71	WQ Local Limits for Zinc	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	29.88	AIL Daily, #/day:	17.21
Domestic Flow:	4.95	WQ MAIL Daily:	21.52	AIL Monthly, #/day:	18.95
Domestic Max Concentration:	0.15	WQ MAIL Monthly:	23.69	AIL Daily, Concentration:	41.28
Domestic Ave Concentration:	0.15	Biosolids MAHL Daily:	59.87	AIL Monthly, Concentration:	45.45
Industrial Flow:	0.05	Biosolids MAHL Monthly:	22.35	Biosolids Local Limits for Zinc	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	53.67	AIL Daily, #/day:	42.94
Metal:	Zinc	Biosolids MAIL Monthly:	16.16	AIL Monthly, #/day:	12.93
% removal in decimal:	0.451			AIL Daily, Concentration:	102.97
Safety Factor:	0.1			AIL Monthly, Concentration:	31.00
Growth Factor:	0.1			Local Limits for Zinc	
WQ Acute Standard, mg/L:	0.3648			AIL Daily, #/day:	17.21
WQ Chronic Standard, mg/L:	0.3934			AIL Monthly, #/day:	12.93
Biosolids Table 1:	7500			AIL Daily, Concentration:	41.28
Biosolids Table 3:	2800			AIL Monthly, Concentration:	31.00

Facility Name:	Spanish Fork	WQ MAHL Daily:	0.56	WQ Local Limits for Cyanide	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	3.46	AIL Daily, #/day: 0.29	
Domestic Flow:	4.95	WQ MAIL Daily:	0.36	AIL Monthly, #/day: 2.60	
Domestic Max Concentration:	0.005	WQ MAIL Monthly:	3.25	AIL Daily, Concentration: 0.69	
Domestic Ave Concentration:	0.005	Biosolids MAHL Daily:	NA	AIL Monthly, Concentration: 6.24	
Industrial Flow:	0.05	Biosolids MAHL Monthly:	NA	Biosolids Local Limits for Cyanide	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	NA	AIL Daily, #/day: NA	
Metal:	Cyanide	Biosolids MAIL Monthly:	NA	AIL Monthly, #/day: NA	
% removal in decimal:	0.69			AIL Daily, Concentration: NA	
Safety Factor:	0.1			AIL Monthly, Concentration: NA	
Growth Factor:	0.1			Local Limits for Cyanide	
WQ Acute Standard, mg/L:	0.0042			AIL Daily, #/day: 0.29	
WQ Chronic Standard, mg/L:	0.0257			AIL Monthly, #/day: 2.60	
Biosolids Table 1:	NA			AIL Daily, Concentration: 0.69	
Biosolids Table 3:	NA			AIL Monthly, Concentration: 6.24	

Facility Name:	Spanish Fork	WQ MAHL Daily:	4.17	WQ Local Limits for Phenol	
POTW WLA Flow in MGD:	5	WQ MAHL Monthly:	NA	AIL Daily, #/day:	3.34
Domestic Flow:	4.95	WQ MAIL Daily:	4.17	AIL Monthly, #/day:	NA
Domestic Max Concentration:	0	WQ MAIL Monthly:	NA	AIL Daily, Concentration:	8.00
Domestic Ave Concentration:	0	Biosolids MAHL Daily:	NA	AIL Monthly, Concentration:	NA
Industrial Flow:	0.05	Biosolids MAHL Monthly:	NA	Biosolids Local Limits for Phenol	
Biosolids Flow in #/day:	3,600	Biosolids MAIL Daily:	NA	AIL Daily, #/day:	NA
Metal:	Phenol	Biosolids MAIL Monthly:	NA	AIL Monthly, #/day:	NA
% removal in decimal:	0.9			AIL Daily, Concentration:	NA
Safety Factor:	0.1			AIL Monthly, Concentration:	NA
Growth Factor:	0.1			Local Limits for Phenol	
WQ Acute Standard, mg/L:	0.01			AIL Daily, #/day:	3.34
WQ Chronic Standard, mg/L:	NA			AIL Monthly, #/day:	NA
Biosolids Table 1:	NA			AIL Daily, Concentration:	8.00
Biosolids Table 3:	NA			AIL Monthly, Concentration:	NA

APPENDIX B
ORGANIZATION CHART

Dennis R Sorensen

WWTP Manager
Pretreatment Coordinator

Ben Winn

Chief Operator

Bryce Jackson

Operator

APPENDIX C
SUMMARY OF SAMPLING DATA

	TEST METHOD	
	LIQUID	SOLID
ALUMINUM	E200.7	SW6010C
ANTIMONY		
ARSENIC	E200.8	SW6020A
CADMIUM	E200.8	SW6020A
CHROMIUM	E200.7	SW6010C
COPPER	E200.8	SW6020A
LEAD	E200.8	SW6010C
MERCURY	E245.1	SW7471B
MOLYBDENUM	E200.7	SW6020C
NICKEL	E200.8	SW6020A
SELENIUM	E200.8	SW6020A
SILVER	E200.8	SW6020A
ZINC	E200.8	SW6020A
CYANIDE	E200.8	SW9012B
BOD-5	SM5210B	
TSS	SM2540D	
OIL&GREASE	E1664A	
AMMONIA	E350.1	

APPENDIX D
MAP of SAMPLING LOCATIONS

CAL 07/28/2009 X:\Spanish Fork Digester Upgrade 2008\Drawings\CIVIL\YARD PIPING.dwg

Effluent Sampling Point Contact Basin before the weir

Influent Sampling Point Pre-screen influent

LEGEND

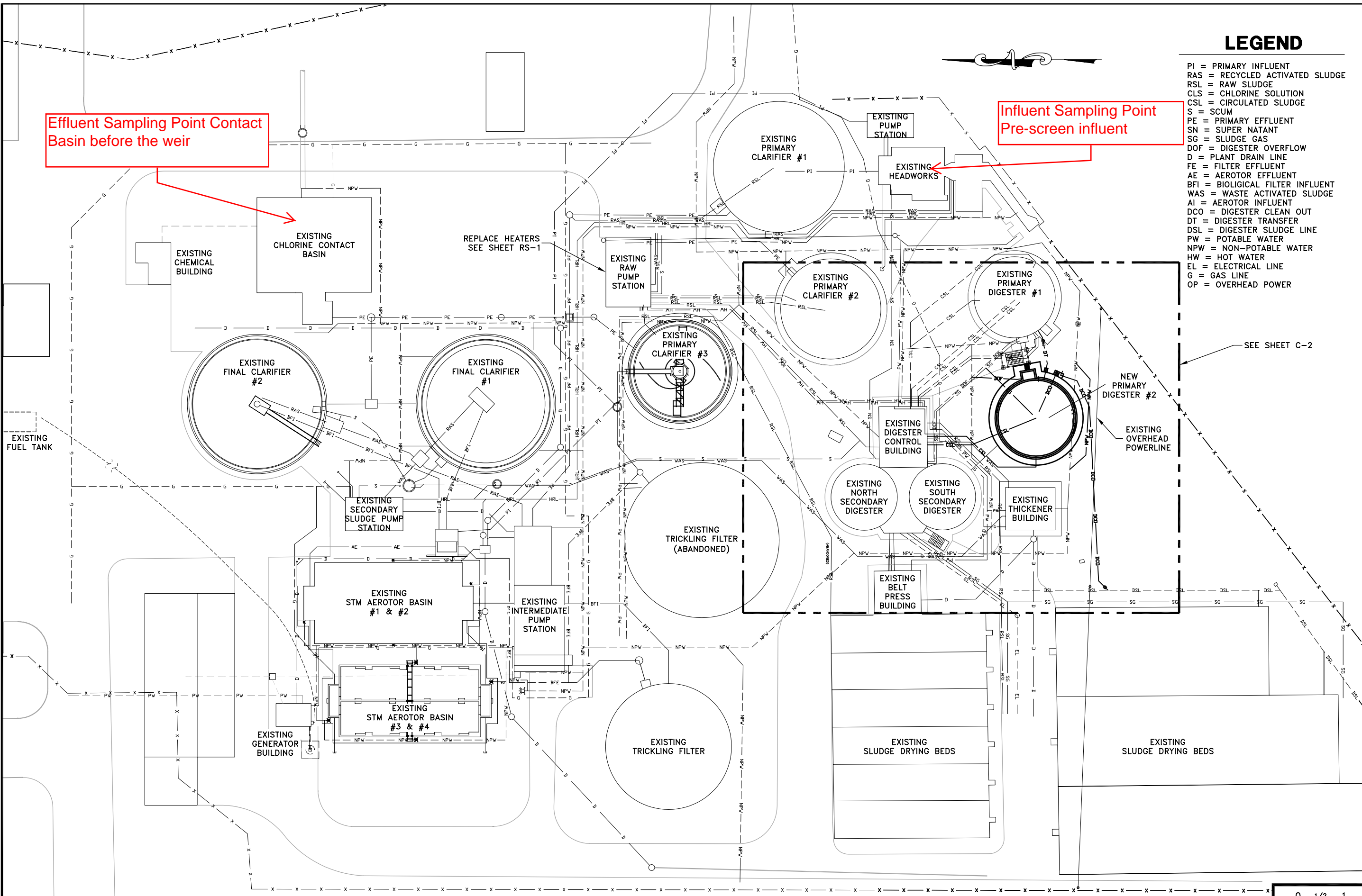
- PI = PRIMARY INFLUENT
- RAS = RECYCLED ACTIVATED SLUDGE
- RSL = RAW SLUDGE
- CLS = CHLORINE SOLUTION
- CSL = CIRCULATED SLUDGE
- S = SCUM
- PE = PRIMARY EFFLUENT
- SN = SUPER NATANT
- SG = SLUDGE GAS
- DOF = DIGESTER OVERFLOW
- D = PLANT DRAIN LINE
- FE = FILTER EFFLUENT
- AE = AEROTOR EFFLUENT
- BFI = BIOLOGICAL FILTER INFLUENT
- WAS = WASTE ACTIVATED SLUDGE
- AI = AEROTOR INFLUENT
- DCO = DIGESTER CLEAN OUT
- DT = DIGESTER TRANSFER
- DSL = DIGESTER SLUDGE LINE
- PW = POTABLE WATER
- NPW = NON-POTABLE WATER
- HW = HOT WATER
- EL = ELECTRICAL LINE
- G = GAS LINE
- OP = OVERHEAD POWER

NO.	DATE	DESIGN	DRAWN	CHECKED
0	01/15/09	BP	KRB	BMR

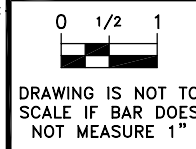
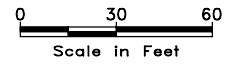
SPANISH FORK CITY
 WATER RECLAMATION FACILITY
 ANAEROBIC DIGESTER UPGRADE
 OVERALL YARD PIPING PLAN

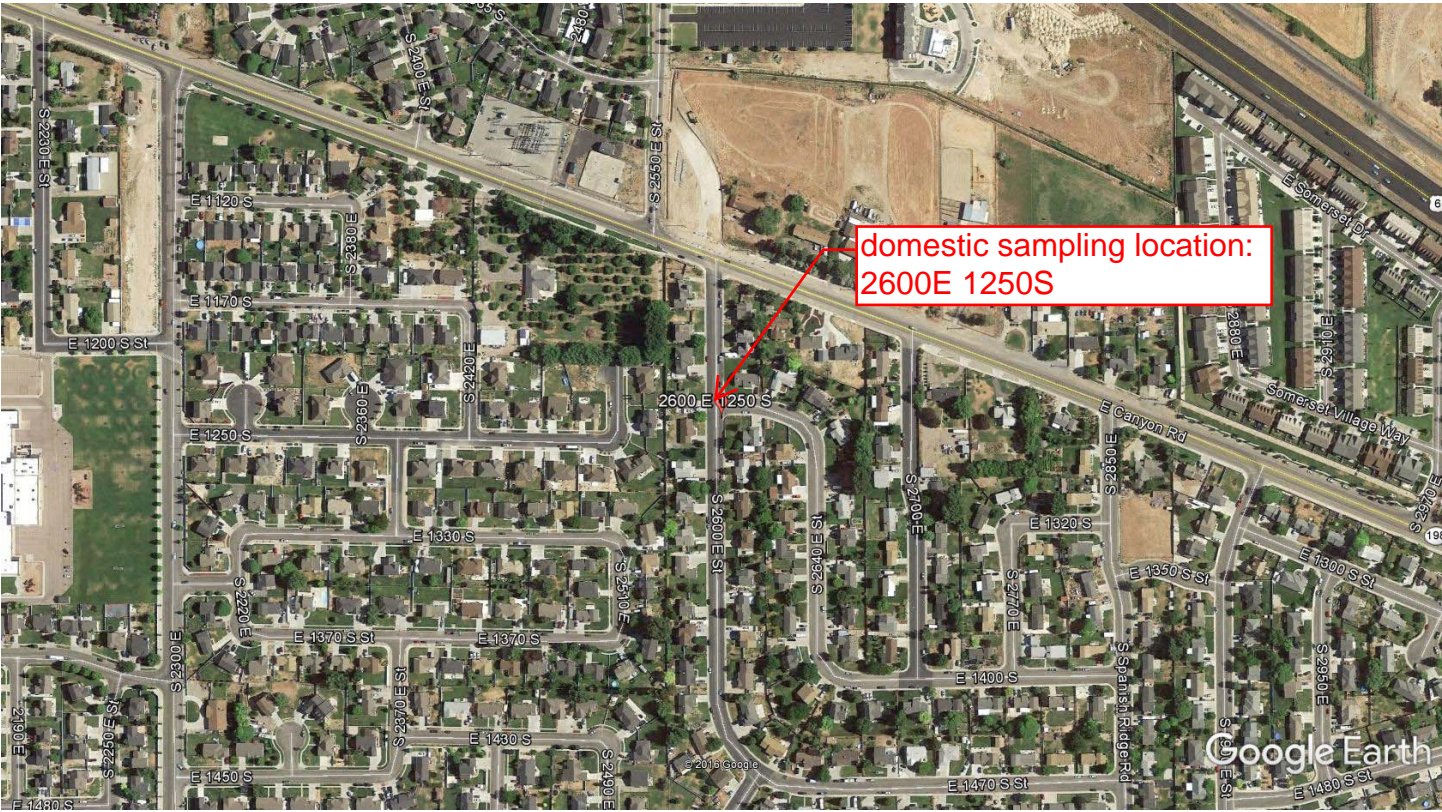
AQUA
 ENGINEERING, INC.
 533 W. 2800 S., SUITE 275 BOUNTIFUL, UT 84010
 PHONE (801) 298-1327 FAX (801) 298-0153

SHEET
C-1



YARD PIPING PLAN
 SCALE: 1"=30'





Google Earth



APPENDIX E
WASTELOAD ANALYSIS

WASTELOAD ANALYSIS [WLA]

Date: 2/13/2014

Appendix B: Mass Balance Mixing Analysis for Conservative Constituents

Discharging Facility:	Spanish Fork WWTP		
UPDES No:	UT-0021741		
Permit Flow [MGD]:	5.00	Maximum Monthly Flow	
	10.00	Maximum Daily Flow	
Receiving Water:	Dry Creek		
Stream Classification:	2B, 3E, 4		
Stream Flows [cfs]:	1.70	Summer (July-Sept)	Critical Low Flow
	11.40	Fall (Oct-Dec)	
	10.10	Winter (Jan-Mar)	
	10.20	Spring (Apr-June)	
Acute River Width:	100.0%		
Chronic River Width:	100.0%		

Modeling Information

A simple mixing analysis was used to determine these effluent limits.

Model Inputs

The following is upstream and discharge information that was utilized as inputs for the analysis. Dry washes are considered to have an upstream flow equal to the flow of the discharge.

Headwater/Upstream Information

	7Q10 Flow
	cfs
Summer	1.7
Fall	11.4
Winter	10.1
Spring	10.2

Discharge Information

	Flow
	MGD
Maximum Daily	10.0
Maximum Monthly	5.0

All model numerical inputs, intermediate calculations, outputs and graphs are available for discussion, inspection and copy at the Division of Water Quality.

Effluent Limitations

Current State water quality standards are required to be met under a variety of conditions including in-stream flows targeted to the 7-day, 10-year low flow (R317-2-9).

Other conditions used in the modeling effort reflect the environmental conditions expected at low stream flows.

Utah Division of Water Quality

Effluent Limitations for Protection of Recreation (Class 2B Waters)

Parameter	Maximum Concentration
Physical	
pH Minimum	6.5
pH Maximum	9.0
Bacteriological	
E. coli (30 Day Geometric Mean)	206 (#/100 mL)
E. coli (Maximum)	668 (#/100 mL)

Effluent Limitations for Protection of Aquatic Wildlife (Class 3D Waters)

Parameter	Maximum Concentration	
	Standard	Limit
Physical		
Inorganics		
	Chronic Standard (4 Day Average)	
	Standard	Limit
Phenol	0.010	0.010 mg/L
Hydrogen Sulfide (Undissociated)	0.002	0.002 mg/L

Total Recoverable Metals

Parameter (µg/L)	Chronic Standard (4 Day Average)			Acute Standard (1 Hour Average)		
	Standard	Background	Limit	Standard	Background	Limit
Aluminum	87.0	43.5	101.8	750.0	43.5	870.1
Arsenic	150.0	75.0	175.5	340.0	75.0	385.1
Cadmium	0.7	0.3	0.8	7.4	0.3	8.6
Chromium VI	11.0	5.5	12.9	16.0	5.5	17.8
Chromium III	233.7	116.8	273.4	4888.7	116.8	5699.9
Copper	26.4	13.2	30.9	44.1	13.2	49.4
Cyanide	22.0	11.0	25.7	5.2	11.0	4.2
Iron				1000.0	500.0	1085.0
Lead	15.0	7.5	17.5	384.8	7.5	448.9
Mercury	0.012	0.006	0.014	2.4	0.0	2.8
Nickel	146.2	73.1	171.0	1314.6	73.1	1525.7
Selenium	4.6	2.3	5.4	18.4	2.3	21.1
Silver				30.7	15.4	33.4
Tributyltin	0.072	0.036	0.084	0.46	0.04	0.53
Zinc	336.3	168.1	393.4	336.3	168.1	364.8

Based upon a Hardness of 338 mg/l as CaCO₃

Utah Division of Water Quality

Organics [Pesticides]

Parameter (µg/L)	Chronic Standard (4 Day Average)			Acute Standard (1 Hour Average)		
	Standard	Background	Limit	Standard	Background	Limit
Aldrin				1.500	0.750	1.628
Chlordane	0.0043	0.00215	0.0050	1.200	0.600	1.302
DDT, DDE	0.001	0.0005	0.0012	0.550	0.275	0.597
Diazinon	0.17	0.085	0.199	0.17	0.085	0.184
Dieldrin	0.0056	0.0028	0.0066	0.240	0.120	0.260
Endosulfan, a & b	0.056	0.028	0.066	0.110	0.055	0.119
Endrin	0.036	0.018	0.042	0.086	0.043	0.093
Heptachlor & H. epoxide	0.0038	0.0019	0.0044	0.260	0.130	0.282
Lindane	0.08	0.04	0.09	1.000	0.500	1.085
Methoxychlor				0.030	0.015	0.033
Mirex				0.001	0.001	0.001
Nonylphenol	6.6	3.3	7.7	28.0	14.0	30.4
Parathion	0.0130	0.0065	0.0152	0.066	0.033	0.072
PCB's	0.014	0.007	0.016			
Pentachlorophenol	15.00	7.5	17.6	19.000	9.500	20.615
Toxephene	0.0002	0.0001	0.000234	0.730	0.365	0.792

Radiological

Parameter	Maximum Concentration
Gross Alpha	15 pCi/L

Effluent Limitation for Protection of Agriculture (Class 4 Waters)

Parameter	Maximum Concentration		
	Standard	Background	Limit
Total Dissolved Solids (mg/L)	1200	637	1296
Boron (µg/L)	75	37.5	81.4
Arsenic (µg/L)	100	50	109
Cadmium (µg/L)	10	5	10.9
Chromium (µg/L)	100	50	109
Copper (µg/L)	200	100	217
Lead (µg/L)	100	50	109
Selenium (µg/L)	50	25	54.3
Gross Alpha (pCi/L)	15	7.5	16.3