City of Buford

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September 28, 2020

Ms. Whitney Fenwick, Unit Manager
Georgia Department of Natural Resources
Watershed Protection Branch
Industrial Permitting Unit
2 Martin Luther King Jr. Drive SE
Suite 1152 East
Atlanta, Georgie 30334

RE: Industrial Pretreatment Program
Local Limits Update
Buford, Georgia
NPDES Permits No. GA0023167
& GA0023175

Dear Ms. Fenwick:

Since the issuance of the subject NPDES permits in 2019 for the Southside Wastewater Plant and the Westside Wastewater Plant at the City, we completed a review and update of the local limits for the City's Industrial Pretreatment Program. Transmitted herewith for your review and approval is one copy of the completed evaluation memo and attachments dated September 25, 2021 prepared by our engineers, Keck & Wood, Inc. Also attached is a separate copy of the revised Table 4.9 that shows the proposed local limit changes to selected parameters in red text. Before we implement these permit changes, we request your review and approval of these revised limits to the affected parameters.

We will wait for your reply on this submittal before proceeding further with any changes to the permits issued by the City to the affected industries.

Should you need anything further, let me know.

Sincerely,

Robbie Isaacs

Robbie Isaacs
Buford Industrial Pretreatment Director

xc: Bryan Kerlin, City Manager

Keck+Wood
COLLABORATION BY DESIGN

MEMO

To: Mr. Bryan Kerlin, Buford City Manager
Ms. Robbie Isaacs, Buford Industrial Pretreatment Director
Project Name: Update IPP Local Limits Derivation Tables for new NPDES Permit Issuance
K&W Project Number: 201140.00
Date: September 25, 2020
From: Michael J. Moffitt, PE

Bryan and Robbie,

With Georgia EPD issuing the new NPDES discharge permits for the Southside Plant and for the Westside Plant in 2019, EPD also requires that the local limits used in the Industrial Pretreatment Program be evaluated and updated as needed based on the new permits. The local limits are described in a series of tables in Section 4 of the Program documents and included in Appendix F of those documents. This memo summarizes the results of that evaluation and presents updated information in the tables. Several of the permit limits used for industry permit holders should be revised as a result of this evaluation and are described at the end of this memo. A copy of this memo and attachments should be submitted to Georgia EPD for review and approval before taking action on the permits issued to the industries.

The last update to these limits was done in 2009 and 2013 as a result of issues with aluminum concentrations, WET testing concerns, and the G&K industrial permit issues. Our current evaluation reviewed recent Georgia EPD stream flows and water quality data used in the preparation of the new permits We also examined recent EPA criteria and literature on aluminum water quality data and guidance on instream total recoverable metal concentrations.

This update also includes a reduction in the number of industries in the Program showing only Cardinal and Heraeus Quartz North America as permit holders. The total flow from industries is now just 0.090 MGD (90,000 gallons/day) compared to the previous flow of 0.157 MGD from five industries.

A summary of the changes to each of the tables in the Program and attachments to the tables is described below for your review.

Table 4.2 Sampling Test Results for Priority Pollutants (1 page)
The data present laboratory results for numerous parameters for the Westside plant sludge, Southside plant sludge, and Southside plant effluent. Sampling dates are shown in the table. In general, the results indicate lower levels than the previous sampling results done in 2000, which is encouraging.

Attachments to Table 4.3 and Table 4.4 (3 pages)
These attachments show the allowable instream concentration and total recoverable permit limit for many parameters and show the calculations used. The data is used to calculate the allowable pollutant loadings at the plant headworks. The results changed slightly due to water quality criteria revisions and the change in stream hardness and flows for 7Q10 and 1Q10 values used in the new NPDES permits.

Southside Example Calculation (2 pages)
Similar to the original example calculations, these pages show the results for the copper limit based on the updated stream flows and water quality criteria in the new NPDES permits.

Table 4.3 Allowable Headworks Loadings for Acute Discharges Based on Receiving Stream Water Quality Protection Criteria (1 page)
Overall, loading values were reduced from previous levels due to water quality criteria revisions and the change in stream hardness and flows for 1Q10 values used in the new NPDES permits.

Table 4.4 Allowable Headworks Loadings for Chronic Discharges Based on Receiving Stream Water Quality Protection Criteria (1 page)
The majority of loading values reduced slightly from previous levels due to water quality criteria revisions and the change in stream hardness and flows for 7Q10 values used in the new NPDES permits.

Table 4.5 Allowable Headworks Loadings Based on Process Inhibition Prevention Criteria (1 page)
The majority of loading values remained the same or reduced slightly from previous levels due to water quality criteria revisions and the change in stream hardness and flows for 7Q10 values used in the new NPDES permits.

Table 4.6 Maximum Allowable Headworks Loadings Summary (1 page)
The majority of loading values remained the same or reduced slightly from previous levels due to water quality criteria revisions and the change in stream hardness and flows for 7Q10 values used in the new NPDES permits.

Table 4.7 Allocation of Maximum Allowable Headworks Loadings Based on Uniform Concentration (1 page)
The majority of parameter results were reduced slightly from previous levels due to water quality criteria revisions and the change in stream hardness and stream flows used in the new NPDES permits.

Table 4.8 Summary of Allowable Headworks Loadings and Local Limits for Each POTW (1 page)
The majority of parameter results remained the same or were reduced slightly from previous levels due to water quality criteria revisions and the change in stream hardness and stream flows used in the new NPDES permits. Chromium parameter increased now that they are reviewing both Chromium 3 and Chromium 6.

Table 4.9 Proposed Permit Limits for Significant Industrial Users (SIUs) (1 page)
This table presents the new permit limits for industrial permit holders once Georgia EPD approves the changes. I also attached a highlighted version showing changed values in red text to more easily identify the change. Several parameters increased in level due to the lower industrial flows with just two current permit holders. However, the levels for Bis(2-Ethylhexyl)Phthalate and Ammonia – N decreased due to water quality criteria revisions.

Table 4.10 Estimated Permit Limits for Future Dischargers (1 page)
This table presents potential permit limits for future SIU customers in Buford based on the updated limits in Table 4.9. The areas for future wastewater flow projections are based on the land use maps in the recently completed Buford 2040 Comprehensive Plan.

Please review this information and get back to us with any questions you may have. If these tables are acceptable, the next step would be submittal to Georgia EPD for their review and approval of the permit parameter changes. We can help with that submittal to EPD. Just let us know if you need our help.

Table 4.2 Sampling Test Results for Priority Pollutants

	Westside Plant (1)		Southside Plant (2)			
Parameter	Sludge (mg/L)	Rep. Limit (mg/L)	Sludge (mg/L)	Rep. Limit (mg/L)	Effluent (mg/L)	Rep. Limit (mg/L)
Cadmium	BRL	0.0250	BRL	0.0250	BRL	0.0007
Chromium	BRL	0.0500	BRL	0.0500	BRL	0.0005
Copper					0.0338	0.0005
Lead	BRL	0.0500	BRL	0.0500	BRL	0.0001
Nickel					0.0182	0.0005
Selenium	BRL	0.100	BRL	0.100	BRL	0.0005
Zinc					BRL	0.0010
Arsenic	BRL	0.25	BRL	0.25	BRL	0.0005
Silver	BRL	0.0250	BRL	0.0250	BRL	0.0005
Mercury	BRL	0.004	BRL	0.004	BRL	0.0002
Cyanide					BRL	0.010
Aluminum	BRL	1.00	BRL	1.00	0.106	0.050
Barium	1.88	0.50				
Endrin					BRL	0.00005
Bis(2-Ethylhexyl)Phthalate					BRL	0.0010
Toluene					BRL	0.0005

(1) Based on Test Results from Sampling in April, 2013

(2) Based on Test Results from Sampling in May, 2020

BRL = Below Reporting Limit. Reporting limits are based on dilution factors.

* Denotes value in mg/kg

Attachments to Tables 4.3 and 4.4 - Derivation of Allowable Dissolved Instream Concentrations for Metals

Parameter	K_{po} (stream)	a (stream)	Westside WPCP SS (mg/L)	Westside WPCP K_p (L/kg)	Westside WPCP C_d/C_T	Southside WPCP SS (mg/L)	Southside WPCP K_p (L/kg)	Southside WPCP C_d/C_T
Arsenic	4.80E+05	-0.729	17.4	59,913.55	0.49	28.6	41,680.1	0.46
Cadmium	4.00E+06	-1.131	17.4	158,343.64	0.27	28.6	90,163.4	0.28
Chromium III or VI	3.36E+06	-0.930	17.4	235,679.19	0.20	28.6	148,277.7	0.19
Copper	1.04E+06	-0.744	17.4	124,368.95	0.32	28.6	85,875.9	0.29
Lead	2.80E+06	-0.800	17.4	285,023.80	0.17	28.6	191,355.6	0.15
Mercury	2.91E+06	-1.136	17.4	113,594.14	0.34	28.6	64,524.7	0.35
Nickel	4.90E+05	-0.572	17.4	95,684.62	0.38	28.6	71,968.1	0.33
Silver	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	1.25E+06	-0.704	17.4	167,476.71	0.26	28.6	117,956.7	0.23

	Diss. Instream Criteria (mg/L)				C_{CRIT} - Total Recoverable Permit Limit (mg/L)		C_{CRIT} - Total Recoverable Permit Limit (mg/L)	
	Acute		Chronic					
	Westside	Southside	Westside	Southside	Acute	Chronic	Acute	Chronic
Arsenic	0.34	0.34	0.15	0.15	0.69	0.31	0.75	0.33
Cadmium	0.00043	0.00093	0.00008	0.00014	0.0016	0.0003	0.0033	0.0005
Chromium III	0.15498	0.29626	0.02016	0.03854	0.790	0.103	1.553	0.202
Chromium VI	0.016	0.016	0.011	0.011	0.082	0.035	0.055	0.038
Copper	0.00301	0.00633	0.00230	0.00453	0.0095	0.0073	0.0219	0.0157
Lead	0.01104	0.02681	0.00043	0.00104	0.0657	0.0026	0.1736	0.0068
Mercury	0.0014	0.0014	0.000012	0.000012	0.0042	0.00004	0.0040	0.00003
Nickel	0.12201	0.23828	0.01355	0.02647	0.325	0.036	0.729	0.081
Silver	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	0.03047	0.05957	0.03072	0.06006	0.119	0.120	0.261	0.263

Plant data: Westside WPCP Permitted Flow = 0.25 MGD
Richland Creek 7Q10 Flow = 0.4395 MGD
Richland Creek Hardness at 7Q10 = 20.4 mg/l

Westside WPCP TSS Permit Limit = 30 mg/l
1Q10 Flow = 0.3878 MGD (EPD - 2019 NPDES Permit)
Upstream TSS = 10.22 mg/l

Southside WPCP Permitted Flow = 2.00 MGD
Suwanee Creek 7Q10 Flow = 0.142 MGD
Suwanee Creek Hardness at 7Q10 = 45 mg/l

Southside WPCP TSS Permit Limit = 30 mg/l
1Q10 Flow = 0.1034 MGD (EPD - 2019 NPDES Permit)
Upstream TSS = 9.16 mg/l

Equations to Use When Calculating Total Recoverable Permit Limits for Metals Using Dissolved Instream Criteria

Calculation of the site-specific linear partition coefficient

$K_p = (K_{po})(SS)^a$

- K_p = site-specific linear partition coefficient (l/kg)
- K_{po} = linear partition coefficient (l/kg)
- a = metal-specific constant
- SS = concentration of suspended solids in the receiving stream (mg/l)

$$SS = \frac{\text{(upstream TSS (mg/l) X 7Q10 (MGD)) + (Permitted TSS (mg/l) X Permitted Flow (MGD))}}{\text{7Q10 (MGD) + Permitted Flow (MGD)}}$$

Equation to determine the fraction of dissolved to total recoverable metals in the receiving stream

$C_d/C_T = 1/[1 + (K_p)(SS)(10^{-6})]$

- C_d/C_T = fraction of dissolved to total recoverable metal in the receiving stream
- K_p = Site-specific linear partition coefficient (l/kg)
- SS = concentration of suspended solids in the receiving stream (mg/l)

Calculation of the site-specific total recoverable instream criteria

$$\text{Total Recoverable Permit Limit (mg/l)} = \frac{\text{Dissolved Instream Criteria (mg/l)}}{C_d/C_T}$$

- Dissolved Instream Criteria = Instream Criteria in the Rules and Regulations
- C_d/C_T = fraction of dissolved to total recoverable metal in the receiving stream
- Acute Dilution Factor = $\frac{1Q10 + \text{discharger design flow}}{\text{discharger design flow}}$
- Chronic Dilution Factor = $\frac{7Q10 + \text{discharger design flow}}{\text{discharger design flow}}$

Table of Constants and Conversion Factors for Aquatic Life Metals

Freshwater Aquatic Life Data

Parameter	K_{po} (Stream)	a (Stream)	K_{po} (Lake)	a (Lake)
Arsenic	4.80×10^5	-0.7286	--	--
Cadmium	4.00×10^6	-1.1307	3.52×10^6	-0.9246
Chromium +3	3.36×10^6	-0.9304	2.17×10^6	-0.2662
Chromium +6	3.36×10^6	-0.9304	2.17×10^6	-0.2662
Copper	1.04×10^6	-0.7436	2.85×10^5	-0.9000
Lead	2.80×10^6	-0.8	2.0×10^6	-0.5337
Mercury	2.91×10^6	-1.1356	1.97×10^6	-1.1718
Nickel	4.90×10^5	-0.5719	2.21×10^6	-0.7578
Silver	NA	NA	NA	NA
Zinc	1.25×10^6	-0.7038	3.34×10^6	-0.6788

Saltwater Aquatic Life Data

Parameter	K_{po}	a
Arsenic	4.80×10^5	-0.7286
Cadmium	4.00×10^6	-1.1307
Chromium +3	3.36×10^6	-0.9304
Chromium +6	3.36×10^6	-0.9304
Copper	1.04×10^6	-0.7436
Lead	3.10×10^5	-0.1856
Mercury	2.91×10^6	-1.1356
Nickel	4.90×10^5	-0.5719
Selenium	NA	NA
Silver	NA	NA
Zinc	1.25×10^6	-0.7038

Example - Local Limits Derivation for Copper Discharged to the Southside WPCP

Plant data:	Southside WPCP Permitted Flow	=	2.0	MGD
	Suwanee Creek 7Q10 Flow	=	0.142	MGD (EPD)
	Suwanee Creek 1Q10 Flow	=	0.1034	MGD (EPD)
	Southside WPCP TSS Permit Limit	=	30	mg/L

Upstream TSS = 9.16 mg/l

1. Calculate Instream Criteria

Refer to the attachments #2 and #3 to Tables 4.3 and 4.4 for equations and coefficients -

$$SS = \frac{(\text{Upstream TSS} * 7Q10) + (\text{Permitted TSS} * \text{Permitted Flow})}{7Q10 + \text{Permitted Flow}}$$

$$SS = \frac{9.16 * 0.142 + 30 * 2.0}{0.142 + 2.0} = 28.6 \text{ mg/L}$$

Copper $K_p = (1.04 \times 10^6) * SS^{-0.7436} = 85{,}875.9$ L/kg

Copper $C_d/C_T = \frac{1}{1 + (Kp\ L/kg)(SS\ mg/L)(10^{-6})} = 0.29$

Instream Criteria for Copper (freshwater, hardness = 45 mg/L):

Acute	6.33	µg/L	= 0.00633 mg/L
Chronic	4.53	µg/L	= 0.00453 mg/L

Therefore, the Total Recoverable Permit limit is:

Acute $C_{CRIT} = \frac{0.00633}{0.29} = 0.0219$ mg/L

Chronic $C_{CRIT} = \frac{0.00453}{0.29} = 0.0157$ mg/L

Acute $L_{IN} = \frac{\{[C_{CRIT}\ mg/L * (1Q10\ MGD + Permitted\ Flow\ MGD)\} - 0 * 1Q10\ M}{(1-0.86)} = 2.74$ lb/day (see Table 4.3)

Chronic $L_{IN} = \frac{\{[C_{CRIT}\ mg/L * (7Q10\ MGD + Permitted\ Flow\ MGD)\} - 0 * 7Q10\ M}{(1-0.86)} = 2.00$ lb/day (see Table 4.4)

2. Calculate Process Inhibition Criteria

$$L_{IN} = \frac{8.34\ (1.0\ mg/L)(2.0\ MGD)}{(1-0)} = 16.68 \text{ lb/day}$$ (see Table 4.5)

3. Calculate MAHL

Compare Acute Instream Limit, Chronic Instream Limit, and Process Inhibition Limit. Select Lowest Value.

Acute	L_{IN}	=	2.74 lb/day
Chronic	L_{IN}	=	2.00 lb/day
Process	L_{IN}	=	16.68 lb/day

Example - Local Limits Derivation for Copper Discharged to the Southside WPCP

Plant data:	Southside WPCP Permitted Flow	=	2.0	MGD	
	Suwanee Creek 7Q10 Flow	=	0.142	MGD (EPD)	
	Suwanee Creek 1Q10 Flow	=	0.1034	MGD (EPD)	
	Southside WPCP TSS Permit Limit	=	30	mg/L	

Upstream TSS = 9.16 mg/l

Select L_{IN} = 2.00 lb/day = MAHL for Copper (see Table 4.6)

4. Calculate Uniform Daily Concentration Limit

Use safety factor = 15% for Southside Plant (reserve for future users)

Reserved loading = 2.00 lb/day* 0.15 = 0.30 lb/day (see Table 4.7)

Allowable loading for existing users:

L_{MAHL} = 2.00 lb/day* 0.85 = 1.70 lb/day (see Table 4.7)

Estimate existing domestic load contribution:

L_{DOM} = 8.34*0.109 mg/l* 1.91 MGD = 1.74 lb/day (see Table 4.7)

Calculate allowable industrial user loading:

L_{ALL} = 1.70 - 1.74 = 0.00 lb/day (see Table 4.7)

Calculate uniform industrial user daily concentration limit:

$$C_{LIM} = \frac{0.00 \text{ lb/day}}{8.34 * 0.09 \text{ MGD}} = 0.109 \text{ mg/L}$$ (see Table 4.7)

5. Calculate Monthly Limit

Set monthly limit = 66% or 2/3 of daily limit:

Monthly C_{LIM} = 0.109 mg/L * 0.667 = 0.07 mg/L (see Table 4.8)

6. Calculate Individual Permit Limits

Use Cardinal limit as example:

Cardinal average industrial discharge flow = 0.06 MGD

Concentration Limits = Daily C_{LIM} = 0.109 mg/L

Monthly C_{LIM} = 0.07 mg/L

Therefore, Cardinal's allowable loading = 0.109 mg/L*8.34 * 0.06 = 0.055 lb/day (see Table 4.9)

Table 4.3 Allowable Headworks Loadings for Acute Discharges Based on Receiving Stream Water Quality Protection Criteria

	Westside Plant				Southside Plant				
Parameter	C_{CRIT} (mg/L)	R_{POTW} (%)	$1-R_{POTW}$ (decimal)	L_{IN} (lbs/day)	C_{CRIT} (mg/L)	R_{POTW} (%)	$1-R_{POTW}$ (decimal)	C_{STR} (mg/L)	L_{IN} (lbs/day)
Arsenic	0.69	45%	0.55	6.71	0.75	45%	0.55		23.78
Cadmium	0.0016	67%	0.33	0.03	0.0033	67%	0.33		0.18
Chromium III	0.7902	82%	0.18	23.35	1.5534	82%	0.18		151.39
Chromium VI	0.0816	82%	0.18	2.41	0.0553	82%	0.18		5.39
Copper	0.0095	86%	0.14	0.36	0.0219	86%	0.14		2.74
Lead	0.0657	61%	0.39	0.90	0.1736	61%	0.39		7.81
Mercury	0.0042	60%	0.40	0.06	0.0040	60%	0.40		0.17
Nickel	0.3251	42%	0.58	2.98	0.7290	42%	0.58		22.05
Selenium	0.0050	50%	0.50	0.05	0.0050	50%	0.50		0.18
Zinc	0.1192	79%	0.21	3.02	0.2607	79%	0.21		21.77
Silver	**	75%	0.25	0.00	**	75%	0.25		0.00
Cyanide	0.0052	69%	0.31	0.09	0.0052	69%	0.31		0.29
Aluminum					0.5600	25%	0.75	0.17	13.10
Q_{STR} & Q_{POTW} (MGD)	Q_{POTW} = 0.25		Q_{STR} = 0.3878		Q_{POTW} = 2.00		Q_{STR} = 0.1034		

$$L_{IN} = \frac{(8.34)[C_{CRIT}(Q_{STR} + Q_{POTW}) - (C_{STR}Q_{STR})]}{(1-R_{POTW})}$$

Source: EPA's *Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program* (12/87)

L_{IN} = Allowable headworks loading, (lbs/day)

C_{CRIT} = Georgia EPD Instream Water Quality Standard (mg/L). Aluminum uses EPA 2018 Aquatic Life Ambient Water Quality Criteria for Aluminum, Criteria Maximum Concentration. Suwanee Ck pH = 7.0, DOC = 0.5 mg/l, Hardness = 50

Q_{STR} = 1Q10 flow of receiving stream = 0.3878 MGD for Richland Creek = 0.1034 MGD for Suwanee Creek

Q_{POTW} = POTW design discharge flow = 0.25 MGD for Westside Plant = 2.0 MGD for Southside Plant

C_{STR} = Receiving stream background level (assumed to be 0 mg/L)

R_{POTW} = Removal efficiency across POTW (used applicable median values from Tables 3-9 through 3-12, pages 3-55 through 3-58). Aluminum is based on plant sample results from July to Oct. 2008.

** Regulated under Georgia E.R. 391-3-6-.06 through whole effluent biomonitoring. Assumed instream standard is 0 mg/L.

Table 4.4 Allowable Headworks Loadings for Chronic Discharges Based on Receiving Stream Water Quality Protection Criteria

	Westside Plant				Southside Plant				
Parameter	C_{CRIT} (mg/L)	R_{POTW} (%)	$1-R_{POTW}$ (decimal)	L_{IN} (lbs/day)	C_{CRIT} (mg/L)	R_{POTW} (%)	$1-R_{POTW}$ (decimal)	C_{STR} (mg/L)	L_{IN} (lbs/day)
Arsenic	0.31	45%	0.55	3.20	0.33	45%	0.55		10.68
Cadmium	0.0003	67%	0.33	0.01	0.0005	67%	0.33		0.03
Chromium III	0.1028	82%	0.18	3.28	0.2021	82%	0.18		20.05
Chromium VI	0.0348	82%	0.18	1.11	0.0380	82%	0.18		3.77
Copper	0.0073	86%	0.14	0.30	0.0157	86%	0.14		2.00
Lead	0.0026	61%	0.39	0.04	0.0068	61%	0.39		0.31
Mercury	0.0000	60%	0.40	0.00	0.0000	60%	0.40		0.00
Nickel	0.0361	42%	0.58	0.36	0.0810	42%	0.58		2.49
Selenium	0.0050	50%	0.50	0.06	0.0050	50%	0.50		0.18
Zinc	0.1202	79%	0.21	3.29	0.2628	79%	0.21		22.36
Silver	**	75%	0.25	0.00	**	75%	0.25		0.00
Cyanide	0.0052	69%	0.31	0.10	0.0052	69%	0.31		0.30
Aluminum					0.2700	25%	0.75	0.17	6.16
*Bis(2-Ethylhexyl)Phthalate	0.0022	72%	0.28	0.241	0.0022	72%	0.28		0.89
Q_{STR} & Q_{POTW} (MGD)	$Q_{POTW} = 0.25$		$Q_{STR} = 0.4395$		$Q_{POTW} = 2.00$		$Q_{STR} = 0.142$		

$$L_{IN} = \frac{(8.34)[C_{CRIT}(Q_{STR} + Q_{POTW}) - (C_{STR}Q_{STR})]}{(1-R_{POTW})}$$

Source: EPA's *Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program* (12/87)

L_{IN} = Allowable headworks loading, (lbs/day)

C_{CRIT} = Georgia EPD Instream Water Quality Standard (mg/L). Aluminum uses EPA 2018 Aquatic Life Ambient Water Quality Criteria for Aluminum, Criteria Continuous Concentration. Suwanee Ck pH = 7.0, DOC = 0.5 mg/l, Hardness = 50

Q_{STR} = 7Q10 flow of receiving stream = 0.4395 MGD for Richland Creek, = 0.142 MGD for Suwanee Creek

Q_{POTW} = POTW design discharge flow = 0.25 MGD for Westside Plant = 2.0 MGD for Southside Plant

C_{STR} = Receiving stream background level (assumed to be 0 mg/L)

R_{POTW} = Removal efficiency across POTW (used applicable median values from Tables 3-9 through 3-12, pages 3-55 through 3-58). Aluminum is based on plant sample results from July to Oct. 2008.

* Q_{STR} = annual average flow of receiving stream (Georgia E.R. 391-3-6-.03(5)(e)(iv)), Richland Ck = 3.4255 MGD, Suwanee Ck = 11.634 MGD

** Regulated under Georgia E.R. 391-3-6-.06 through whole effluent biomonitoring. Assumed instream standard is 0 mg/L.

*** Removal efficiency data not provided. Assumed removal efficiency is 0% (pass through pollutants).

Table 4.5 Allowable Headworks Loadings Based on Process Inhibition Prevention Criteria

	Westside Plant				Southside Plant			
Parameter	C_{CRIT} (mg/L)	R_{PRIM} (%)	$1-R_{PRIM}$ (decimal)	L_{IN} (lbs/day)	C_{CRIT} (mg/L)	R_{PRIM} (%)	$1-R_{PRIM}$ (decimal)	L_{IN} (lbs/day)
Arsenic	0.1	0%	1.00	0.21	0.1	0%	1.00	1.67
Cadmium	1.0	0%	1.00	2.09	1.0	0%	1.00	16.68
Chromium III	10.0	0%	1.00	20.85	10.0	0%	1.00	166.80
Chromium VI	1.0	0%	1.00	2.09	1.0	0%	1.00	16.68
Copper	1.0	0%	1.00	2.09	1.0	0%	1.00	16.68
Lead	0.1	0%	1.00	0.21	0.1	0%	1.00	1.67
Mercury	0.1	0%	1.00	0.21	0.1	0%	1.00	1.67
Nickel	1.00	0%	1.00	2.09	1.00	0%	1.00	16.68
Zinc	0.08	0%	1.00	0.17	0.08	0%	1.00	1.33
Silver	0.25	0%	1.00	0.52	0.25	0%	1.00	4.17
Cyanide	0.1	0%	1.00	0.21	0.1	0%	1.00	1.67
Aluminum					0.56	0%	1.00	9.34

$$L_{IN} = \frac{(8.34)(C_{CRIT})(Q_{POTW})}{(1-R_{PRIM})}$$

Source: EPA's *Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program* (12/87)

L_{IN} = Allowable headworks loading, (lbs/day)

C_{CRIT} = Minimum threshold inhibition level (mg/L); (pages 3-44, 3-45, 3-47)

Q_{POTW} = POTW design discharge flow = 0.25 MGD Westside Plant = 2.00 MGD Southside Plant

R_{PRIM} = Removal efficiency across primary treatment only = 0%
(No primary treatment at either plant)

Aluminum C_{CRIT} = 0.56 using EPA 2018 Aquatic Life Ambient Water Quality criteria and failed WET tests in 2008 due to high influent aluminum levels that were not significantly reduced at plant effluent.

Table 4.6 Maximum Allowable Headworks Loading Summary

	Westside Plant					Southside Plant				
Parameter	Acute WQ Protection (lbs/day)	Chronic WQ Protection (lbs/day)	Process Protection (lbs/day)	Plant Design (lbs/day)	MAHL (lbs/day)	Acute WQ Protection (lbs/day)	Chronic WQ Protection (lbs/day)	Process Protection (lbs/day)	Plant Design (lbs/day)	MAHL (lbs/day)
Arsenic	6.71	3.20	0.21	N/A	**0.21**	23.78	10.68	1.67	N/A	**1.67**
Cadmium	0.03	0.01	2.09	N/A	**0.01**	0.18	0.03	16.68	N/A	**0.03**
Chromium III	23.35	3.28	20.85	N/A	**3.28**	151.39	20.05	166.80	N/A	**20.05**
Chromium VI	2.41	1.11	2.09	N/A	**1.11**	5.39	3.77	16.68	N/A	**3.77**
Copper	0.36	0.30	2.09	N/A	**0.30**	2.74	2.00	16.68	N/A	**2.00**
Lead	0.90	0.04	0.21	N/A	**0.04**	7.81	0.31	1.67	N/A	**0.31**
Mercury	0.06	0.00	0.21	N/A	**0.00**	0.17	0.00	1.67	N/A	**0.00**
Nickel	2.98	0.36	2.09	N/A	**0.36**	22.05	2.49	16.68	N/A	**2.49**
Selenium	0.05	0.06	N/A	N/A	**0.05**	0.18	0.18	N/A	N/A	**0.18**
Zinc	3.02	3.29	0.17	N/A	**0.17**	21.77	22.36	1.33	N/A	**1.33**
Silver	0.00	0.00	0.52	N/A	**0.00**	0.00	0.00	4.17	N/A	**0.00**
Cyanide	0.09	0.10	0.21	N/A	**0.09**	0.29	0.30	1.67	N/A	**0.29**
Aluminum						13.10	6.16	9.34	N/A	**6.16**
*Bis(2-Ethylhexyl)Phthalate	N/A	0.241	N/A	N/A	**0.241**	N/A	0.89	N/A	N/A	**0.89**
*BOD_5				521	**521**				5,004	**5,004**
*TSS				521	**521**				5,004	**5,004**
*COD				1,043	**1,043**				8,340	**8,340**
*Phosphorous-P				21	**21**				167	**167**
*Ammonia-N				21	**21**				167	**167**

* Based on plant design values and Sewer Use Ordinance limits.

Table 4.7 Allocation of Maximum Allowable Headworks Loadings Based on Uniform Concentrations

	Westside Plant							Southside Plant						
Parameter	MAHL (lbs/day)	Reserved for Growth (lbs/day)	L_{MAHL} (lbs/day)	C_{DOM} (mg/L)	L_{DOM} (lbs/day)	L_{ALL} (lbs/day)	Daily C_{LIM} (mg/L)	MAHL (lbs/day)	Reserved for Growth (lbs/day)	L_{MAHL} (lbs/day)	C_{DOM} (mg/L)	L_{DOM} (lbs/day)	L_{ALL} (lbs/day)	Daily C_{LIM} (mg/L)
Arsenic	0.21	0.02	0.19	0.007	0.01	0.17	1.667	1.67	0.25	1.42	0.007	0.11	1.31	1.740
Cadmium	0.0053	0.0005	0.0048	0.008	0.016	0.0000	0.008	0.027	0.004	0.023	0.008	0.13	0.00	0.008
Chromium III	3.28	0.33	2.96	0.006	0.01	2.94	28.24	20.05	3.01	17.05	0.006	0.10	16.95	22.58
Chromium VI	1.11	0.11	1.00	0.028	0.06	0.94	9.06	3.77	0.57	3.21	0.028	0.45	2.76	3.68
Copper	0.30	0.03	0.27	0.109	0.22	0.05	0.511	2.00	0.30	1.70	0.109	1.74	0.00	0.109
Lead	0.04	0.00	0.03	0.116	0.23	0.00	0.116	0.31	0.05	0.26	0.116	1.85	0.00	0.116
Mercury	0.00	0.00	0.00	0.002	0.00	0.00	0.002	0.00	0.00	0.00	0.002	0.03	0.00	0.002
Nickel	0.36	0.04	0.32	0.047	0.09	0.23	2.197	2.49	0.37	2.12	0.047	0.75	1.37	1.827
Selenium	0.05	0.01	0.05	***	0.00	0.05	0.459	0.18	0.03	0.15	***	0.00	0.15	0.199
Zinc	0.17	0.02	0.15	0.212	0.42	0.00	0.212	1.33	0.20	1.13	0.212	3.38	0.00	0.212
Silver	0.00	0.00	0.00	0.019	0.04	0.00	0.019	0.00	0.00	0.00	0.019	0.30	0.00	0.019
Cyanide	0.09	0.01	0.08	0.082	0.16	0.00	0.082	0.29	0.04	0.25	0.082	1.31	0.00	0.082
Aluminum								6.16	0.92	5.24	0.200	3.19	2.05	2.734
Bis(2-Ethylhexyl)Phthalate	0.241	0.02	0.217	0.006	0.00	0.22	2.079	0.89	0.13	0.76	0.006	0.00	0.76	1.012
*BOD_5	521	52	469	225	446	23	225	5,004	751	4,253	250	3,982	271	300
*TSS	521	52	469	225	446	23	225	5,004	751	4,253	250	3,982	271	300
*COD	1,043	104	938	450	891	47	450	8,340	1,251	7,089	500	7,965	0	500
*Phosphorous-P	21	2	19	10	20	0	10	167	25	142	10	159	0	10
*Ammonia-N	21	2	19	10	20	0	10	167	25	142	10	159	0	10

SF = Safety/Growth Factor = 10.0% for Westside Plant = 15.0% for Southside Plant

Q_{POTW} = Plant Flow = 0.25 MGD for Westside Plant = 2.00 MGD for Southside Plant

Q_{IND} = Industrial Flow = 0.0125 MGD for Westside Plant = 0.090 MGD for Southside Plant

Q_{DOM} = Non-industrial Flow = 0.238 MGD for Westside Plant = 1.91 MGD for Southside Plant

Note: C_{DOM} concentrations based on EPA's *Supplemental Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program* (05/91), Table 2 and 3, and Wastewater Engineering: Treatment, Disposal and Reuse, Fourth Ed., Metcalf & Eddy, Inc., Table 3-15, and actual plant operating data. Aluminum data is based on Second Edition, Metcalf & Eddy, Inc. Table 3-7.

* C_{LIM} = Either the calculated value or the Sewer Use Ordinance Limit, whichever is lower.

*** Data not provided. C_{DOM} assumed to be 0 mg/L (negligible).

L_{MAHL} = Maximum allowable headworks loading, lb/day = MAHL(1-SF)

L_{DOM} = Domestic/background wastewater pollutant loading, lb/day = $Q_{DOM} \times C_{DOM} \times 8.34$

L_{ALL} = Maximum allowable industrial headworks loading, lb/day = $L_{MAHL} - L_{DOM}$ (= 0 where $L_{DOM} > L_{MAHL}$)

C_{LIM} = Uniform concentration limit, mg/L = $L_{ALL} / (8.34 \times Q_{IND})$

Where $L_{ALL} < 0$, $C_{LIM} = C_{DOM}$

Source: EPA's *Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program* (12/91)

Table 4.8 Summary of Allowable Headworks Loadings and Local Limits for Each POTW

	Westside Plant			Southside Plant		
Parameter	Daily C_{LIM} (mg/L)	Mass Loading (lbs/day)	Monthly C_{LIM} (mg/L)	Daily C_{LIM} (mg/L)	Mass Loading (lbs/day)	Monthly C_{LIM} (mg/L)
Arsenic	1.67	0.17	1.11	1.74	1.31	1.16
Cadmium	0.01	0.00	0.01	0.01	0.01	0.01
Chromium III	28.24	2.94	18.82	22.58	16.95	15.06
Chromium VI	9.06	0.94	6.04	3.68	2.76	2.45
Copper	0.51	0.05	0.34	0.11	0.08	0.07
Lead	0.12	0.01	0.08	0.12	0.09	0.08
Mercury	0.002	0.00	0.001	0.002	0.00	0.001
Nickel	2.20	0.23	1.46	1.83	1.37	1.22
Selenium	0.46	0.05	0.31	0.20	0.15	0.13
Zinc	0.21	0.022	0.14	0.21	0.16	0.14
Silver	0.02	0.002	0.01	0.02	0.01	0.01
Cyanide	0.08	0.01	0.05	0.08	0.06	0.05
Aluminum				2.73	2.05	1.82
Bis(2-Ethylhexyl)Phthalate	2.079	0.22	1.39	1.01	0.76	0.67
BOD_5	225	23	150	300	271	200
TSS	225	23	150	300	271	200
COD	450	47	300	500	375	333
Phosphorous-P	10	1.0	7	10	7.5	7
Ammonia-N	10	1.0	7	10	7.5	7

Note: Monthly limit = 66% of Daily Limit

EXHIBIT "A"

Table 4.9 Proposed Permit Limits for Significant Industrial Users (SIUs)

	Cardinal (Flow = 0.060 MGD)			Heraeus Quartz N. A. (Flow = 0.030 MGD)		
Parameter	Permitted Monthly Avg. (mg/L)	Permitted Daily Max. (mg/L)	Permitted Loading (lbs/day)	Permitted Monthly Avg. (mg/L)	Permitted Daily Max. (mg/L)	Permitted Loading (lbs/day)
Arsenic	1.16	1.74	0.87	1.16	1.74	0.44
Cadmium	0.01	0.01	0.00	0.01	0.01	0.00
Chromium III	15.06	22.58	11.30	15.06	22.58	5.65
Chromium VI	2.45	3.68	1.84	2.45	3.68	0.92
Copper	0.07	0.11	0.05	0.07	0.11	0.03
Lead	0.08	0.12	0.06	0.08	0.12	0.03
Mercury	0.001	0.002	0.00	0.001	0.002	0.00
Nickel	1.22	1.83	0.91	1.22	1.83	0.46
Selenium	0.13	0.20	0.10	0.13	0.20	0.05
Zinc	0.141	0.21	0.11	0.141	0.21	0.05
Silver	0.01	0.02	0.01	0.01	0.02	0.00
Cyanide	0.05	0.08	0.04	0.05	0.08	0.02
Aluminum	1.82	2.73	1.37	1.82	2.73	0.68
Bis(2-Ethylhexyl)Phthalate	0.67	1.01	0.51	0.67	1.01	0.25
BOD_5	200	300	150	200	300	75
TSS	200	300	150	200	300	75
COD	333	500	250	333	500	125
Phosphorous-P	7	10	5.0	7	10	2.5
Ammonia-N	7	10	5.0	7	10	2.5
Other	pH between 5.5 and 9.0.			pH between 5.5 and 9.0.		
	Discharge flow rate limit = 0.50 mgd			Discharge flow rate limit = 0.50 mgd		

Table 4.10 Estimated Permit Limits for Future Dischargers

	Westside Plant					Southside Plant				
Parameter	Total Mass Loading Reserved (lbs/day)	C_{DOM} (mg/L)	L_{DOM} (lbs/day)	L_{ALL} (lbs/day)	Uniform Future SIU Permit Limits (mg/L)	Total Mass Loading Reserved (lbs/day)	C_{DOM} (mg/L)	L_{DOM} (lbs/day)	L_{ALL} (lbs/day)	Uniform Future SIU Permit Limits (mg/L)
Arsenic	0.021	0.007	0.017	0.004	0.012	0.25	0.007	0.031	0.22	0.188
Cadmium	0.00	0.008	0.019	0.00	0.008	0.00	0.008	0.035	0.00	0.008
Chromium III	0.328	0.006	0.015	0.31	0.941	3.01	0.006	0.027	2.98	2.554
Chromium VI	0.11	0.028	0.068	0.04	0.130	0.57	0.028	0.124	0.44	0.379
Copper	0.03	0.109	0.264	0.00	0.109	0.30	0.109	0.482	0.00	0.109
Lead	0.00	0.116	0.281	0.00	0.116	0.05	0.116	0.513	0.00	0.116
Mercury	0.00	0.002	0.005	0.00	0.002	0.00	0.002	0.009	0.00	0.002
Nickel	0.04	0.047	0.114	0.00	0.047	0.37	0.047	0.208	0.17	0.142
Selenium	0.01	***	0.000	0.01	0.016	0.03	***	0.000	0.03	0.023
Zinc	0.017	0.212	0.513	0.00	0.212	0.20	0.212	0.937	0.00	0.212
Silver	0.00	0.019	0.046	0.00	0.019	0.00	0.019	0.084	0.00	0.019
Cyanide	0.01	0.082	0.198	0.00	0.082	0.04	0.082	0.362	0.00	0.082
Aluminum						0.92	0.200	0.884	0.04	0.035
Bis(2-Ethylhexyl)Phthalate	0.02	0.01	0.000	0.02	0.072	0.13	0.006	0.000	0.13	0.115
BOD_5	52	225	544	0.00	225	751	250	1,105	0.00	300
TSS	52	225	544	0.00	225	751	250	1,105	0.00	300
COD	104	450	1,088	0.00	450	1,251	500	2,210	0.00	500
Phosphorous-P	2.1	10	24	0.00	10	25	10	44	0.00	10
Ammonia-N	2.1	10	24	0.00	10	25	10	44	0.00	10
pH					5.5-9.0					5.5-9.0

Industrial Flow Rate Reserved for Westside Plant is approximately 0.04 MGD.
Industrial Flow Rate Reserved for Southside Plant is approximately 0.14 MGD.

Non-industrial Flow Rate Reserved for Westside Plant is approximately 0.29 MGD.
Non-industrial Flow Rate Reserved for Southside Plant is approximately 0.53 MGD.

Based on a maximum of 750 gallons/day per acre flow for future industrial land use category.
Future industrial land use for Westside Plant flow is approximately 47.8 acres
Future industrial land use for Southside Plant flow is approximately 186.3 acres

Based on a maximum of 400 gallons/day per acre flow for future non-industrial land use category.
Future non-industrial land use for Westside Plant flow is approx. 717.4 acres
Future non-industrial land use for Southside Plant flow is approx. 1,317.4 acres

*** Data not provided. C_{DOM} assumed to be 0 mg/L (negligible).

$$\text{Future SIU Permit Limits (mg/L)} = \frac{\text{Reserved Mass Loading (lbs/day)}}{\text{Future Industrial Flow Rate (MGD)*8.34}}$$

where future limits are < 0, future limits = C_{DOM} concentrations or Sewer Use Ordinance limits.

Majority of industrial land use in Buford does not require SIU permit holders. Therefore, future industrial land use SIU wastewater flow projection is based on 25% of the total vacant future industrial land use area.

EXHIBIT "A"

Table 4.9 Proposed Permit Limits for Significant Industrial Users (SIUs)

	Cardinal (Flow = 0.060 MGD)			Heraeus Quartz N. A. (Flow = 0.030 MGD)		
Parameter	Permitted Monthly Avg. (mg/L)	Permitted Daily Max. (mg/L)	Permitted Loading (lbs/day)	Permitted Monthly Avg. (mg/L)	Permitted Daily Max. (mg/L)	Permitted Loading (lbs/day)
Arsenic	1.16	1.74	0.87	1.16	1.74	0.44
Cadmium	0.01	0.01	0.00	0.01	0.01	0.00
Chromium III	15.06	22.58	11.30	15.06	22.58	5.65
Chromium VI	2.45	3.68	1.84	2.45	3.68	0.92
Copper	0.07	0.11	0.05	0.07	0.11	0.03
Lead	0.08	0.12	0.06	0.08	0.12	0.03
Mercury	0.001	0.002	0.00	0.001	0.002	0.00
Nickel	1.22	1.83	0.91	1.22	1.83	0.46
Selenium	0.13	0.20	0.10	0.13	0.20	0.05
Zinc	0.141	0.21	0.11	0.141	0.21	0.05
Silver	0.01	0.02	0.01	0.01	0.02	0.00
Cyanide	0.05	0.08	0.04	0.05	0.08	0.02
Aluminum	1.82	2.73	1.37	1.82	2.73	0.68
Bis(2-Ethylhexyl)Phthalate	0.67	1.01	0.51	0.67	1.01	0.25
BOD_5	200	300	150	200	300	75
TSS	200	300	150	200	300	75
COD	333	500	250	333	500	125
Phosphorous-P	7	10	5.0	7	10	2.5
Ammonia-N	7	10	5.0	7	10	2.5
Other	pH between 5.5 and 9.0.			pH between 5.5 and 9.0.		
	Discharge flow rate limit = 0.50 mgd			Discharge flow rate limit = 0.50 mgd		