

SCENARIO ONE

Maple Lake Leachate Concentration Calculations (North plume)

$$C_T = (Q_1 C_1 + Q_2 C_2) / Q_T$$

where

$Q_1 =$	contribution from property ($m^3/year$)	Area	162485 m^2	16.2485 ha
$Q_1 =$	area (m^2) x infiltration rate ($m/year$)	Infiltration rate	0.2 $m/year$	
$Q_1 =$	32497			

$Q_2 =$	contribution from landfill ($m^3/year$)	Area	22988 m^2	2.30 ha
$Q_2 =$	area (m^2) x infiltration rate ($m/year$)	Infiltration rate	0.2 $m/year$	
$Q_2 =$	4597.6			

Chloride

$C_1 =$	upgradient concentration (mg/L)
$C_1 =$	9

$C_2 =$	leachate concentration (mg/L)
$C_2 =$	990

$Q_T =$	total off-site discharge ($m^3/year$)
$Q_T =$	$Q_1 + Q_2$
$Q_T =$	37094.6

$C_T =$	concentration at downgradient property boundary (mg/L)
$C_T =$	$(Q_1 C_1 + Q_2 C_2) / Q_T$
$C_T =$	130.6 mg/L
RUC =	126

Alkalinity

$C_1 =$	34 mg/L
$C_2 =$	249 mg/L
$CT =$	60.6 mg/L
RUC =	258

Ammonia

$C_1 =$	1.7 mg/L
$C_2 =$	2 mg/L
$CT =$	1.7 mg/L
RUC =	n/a

Barium

$C_1 =$	0.027 mg/L
$C_2 =$	0.321 mg/L
$CT =$	0.1 mg/L
RUC =	0.3

Boron

$C_1 =$	0.04 mg/L
$C_2 =$	9.88 mg/L
$CT =$	1.3 mg/L
RUC =	2.5

DOC

$C_1 =$	3.2 mg/L
$C_2 =$	22.7 mg/L
$CT =$	5.6 mg/L
RUC =	3.2

Iron

$C_1 =$	0.09 mg/L
$C_2 =$	1.7 mg/L
$CT =$	0.3 mg/L
RUC =	0.17

Sodium

$C_1 =$	1.04 mg/L
$C_2 =$	361 mg/L
$CT =$	45.7 mg/L
RUC =	100

Sulphate

$C_1 =$	14.7 mg/L
$C_2 =$	2100 mg/L
$CT =$	273.2 mg/L
RUC =	256

TDS

$C_1 =$	80 mg/L
$C_2 =$	3500 mg/L
$CT =$	503.9 mg/L
RUC =	277

Notes:

1. RUC means Reasonable Use Concept.
2. Shading indicates values exceeding the RUC.
3. n/a indicates no RUC limit for this parameter.

SCENARIO ONE

Maple Lake Leachate Concentration Calculations (South Plume)

$$C_T = (Q_1 C_1 + Q_2 C_2) / Q_T$$

where

$Q_1 =$	contribution from property ($m^3/year$)	Area	212174 m^2	21.2174 ha
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$Q_1 =$	area (m^2) x infiltration rate ($m/year$)	Infiltration rate	0.2 $m/year$	
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$$Q_1 = 42434.8$$

$Q_2 =$	contribution from landfill ($m^3/year$)	Area	7039 m^2	0.70 ha
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$Q_2 =$	area (m^2) x infiltration rate ($m/year$)	Infiltration rate	0.2 $m/year$	
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$$Q_2 = 1407.8$$

Chloride

$C_1 =$	upgradient concentration (mg/L)
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$$C_1 = 9$$

$C_2 =$	leachate concentration (mg/L)
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$$C_2 = 990$$

$Q_T =$	total off-site discharge ($m^3/year$)
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$$Q_T = Q_1 + Q_2$$

$$Q_T = 43842.6$$

$C_T =$	concentration at downgradient property boundary (mg/L)
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$$C_T = (Q_1 C_1 + Q_2 C_2) / Q_T$$

$$C_T = 40.5 \text{ mg/L}$$

$$RUC = 126$$

Alkalinity

$C_1 =$	34 mg/L
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$C_2 =$	249 mg/L
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$CT =$	40.9 mg/L
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$RUC =$	258
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Ammonia

$C_1 =$	1.7 mg/L
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$C_2 =$	2 mg/L
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$CT =$	1.7 mg/L
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$RUC =$	n/a
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Barium

$C_1 =$	0.027 mg/L
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$C_2 =$	0.321 mg/L
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$CT =$	0.04 mg/L
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$RUC =$	0.3
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Boron

$C_1 =$	0.04 mg/L
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$C_2 =$	9.88 mg/L
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$CT =$	0.4 mg/L
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$RUC =$	2.5
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DOC

$C_1 =$	3.2 mg/L
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$C_2 =$	22.7 mg/L
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$CT =$	3.8 mg/L
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$RUC =$	3.2
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Iron

$C_1 =$	0.09 mg/L
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$C_2 =$	1.7 mg/L
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$CT =$	0.14 mg/L
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$RUC =$	0.17
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Sodium

$C_1 =$	1.04 mg/L
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$C_2 =$	361 mg/L
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$CT =$	12.6 mg/L
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$RUC =$	100
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Sulphate

$C_1 =$	14.7 mg/L
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$C_2 =$	2100 mg/L
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$CT =$	81.7 mg/L
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$RUC =$	256
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TDS

$C_1 =$	80 mg/L
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$C_2 =$	3500 mg/L
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$CT =$	189.8 mg/L
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$RUC =$	277
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Notes:

1. RUC means Reasonable Use Concept.
2. Shading indicates values exceeding the RUC.
3. n/a indicates no RUC limit for this parameter.

SCENARIO TWO

Maple Lake Leachate Concentration Calculations (North plume)

$$C_T = (Q_1 C_1 + Q_2 C_2) / Q_T$$

where

$Q_1 =$	contribution from property ($m^3/year$)	Area	169258 m^2	16.9258 ha
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$Q_1 =$	area (m^2) x infiltration rate ($m/year$)	Infiltration rate	0.2 $m/year$
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$$Q_1 = 33851.6$$

$Q_2 =$	contribution from landfill ($m^3/year$)	Area	16215 m^2	1.62 ha
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$Q_2 =$	area (m^2) x infiltration rate ($m/year$)	Infiltration rate	0.2 $m/year$
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$$Q_2 = 3243$$

Chloride

$$C_1 = \text{upgradient concentration (mg/L)}$$

$$C_1 = 9$$

$$C_2 = \text{leachate concentration (mg/L)}$$

$$C_2 = 990$$

$$Q_T = \text{total off-site discharge (m}^3\text{/year)}$$

$$Q_T = Q_1 + Q_2$$

$$Q_T = 37094.6$$

$$C_T = \text{concentration at downgradient property boundary (mg/L)}$$

$$C_T = (Q_1 C_1 + Q_2 C_2) / Q_T$$

$$C_T = 94.8 \text{ mg/L}$$

$$RUC = 126$$

Alkalinity

$$C_1 = 34 \text{ mg/L}$$

$$C_2 = 249 \text{ mg/L}$$

$$C_T = 52.8 \text{ mg/L}$$

$$RUC = 258$$

Ammonia

$$C_1 = 1.7 \text{ mg/L}$$

$$C_2 = 2 \text{ mg/L}$$

$$C_T = 1.7 \text{ mg/L}$$

$$RUC = \text{n/a}$$

Barium

$$C_1 = 0.027 \text{ mg/L}$$

$$C_2 = 0.321 \text{ mg/L}$$

$$C_T = 0.1 \text{ mg/L}$$

$$RUC = 0.3$$

Boron

$$C_1 = 0.04 \text{ mg/L}$$

$$C_2 = 9.88 \text{ mg/L}$$

$$C_T = 0.9 \text{ mg/L}$$

$$RUC = 2.5$$

DOC

$$C_1 = 3.2 \text{ mg/L}$$

$$C_2 = 22.7 \text{ mg/L}$$

$$C_T = 4.9 \text{ mg/L}$$

$$RUC = 3.2$$

Iron

$$C_1 = 0.09 \text{ mg/L}$$

$$C_2 = 1.7 \text{ mg/L}$$

$$C_T = 0.2 \text{ mg/L}$$

$$RUC = 0.17$$

Sodium

$$C_1 = 1.04 \text{ mg/L}$$

$$C_2 = 361 \text{ mg/L}$$

$$C_T = 32.5 \text{ mg/L}$$

$$RUC = 101$$

Sulphate

$$C_1 = 14.7 \text{ mg/L}$$

$$C_2 = 2100 \text{ mg/L}$$

$$C_T = 197.0 \text{ mg/L}$$

$$RUC = 256$$

TDS

$$C_1 = 80 \text{ mg/L}$$

$$C_2 = 3500 \text{ mg/L}$$

$$C_T = 379.0 \text{ mg/L}$$

$$RUC = 277$$

Notes:

1. RUC means Reasonable Use Concept.
2. Shading indicates values exceeding the RUC.
3. n/a indicates no RUC limit for this parameter.

SCENARIO TWO

Maple Lake Leachate Concentration Calculations (South Plume)

$$C_T = (Q_1 C_1 + Q_2 C_2) / Q_T$$

where

$Q_1 =$	contribution from property (m ³ /year)	Area	205401 m ²	20.5401 ha
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$Q_1 =$	area (m ²) x infiltration rate (m/year)	Infiltration rate	0.2 m/year	
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$$Q_1 = 41080.2$$

$Q_2 =$	contribution from landfill (m ³ /year)	Area	13812 m ²	1.38 ha
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$Q_2 =$	area (m ²) x infiltration rate (m/year)	Infiltration rate	0.2 m/year	
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$$Q_2 = 2762.4$$

Chloride

$$C_1 = \text{upgradient concentration (mg/L)}$$

$$C_1 = 9$$

$$C_2 = \text{leachate concentration (mg/L)}$$

$$C_2 = 990$$

$$Q_T = \text{total off-site discharge (m}^3\text{/year)}$$

$$Q_T = Q_1 + Q_2$$

$$Q_T = 43842.6$$

$$C_T = \text{concentration at downgradient property boundary (mg/L)}$$

$$C_T = (Q_1 C_1 + Q_2 C_2) / Q_T$$

$$C_T = 70.8 \text{ mg/L}$$

$$RUC = 126$$

Alkalinity

$$C_1 = 34 \text{ mg/L}$$

$$C_2 = 249 \text{ mg/L}$$

$$C_T = 47.5 \text{ mg/L}$$

$$RUC = 258$$

Ammonia

$$C_1 = 1.7 \text{ mg/L}$$

$$C_2 = 2 \text{ mg/L}$$

$$C_T = 1.7 \text{ mg/L}$$

$$RUC = \text{n/a}$$

Barium

$$C_1 = 0.027 \text{ mg/L}$$

$$C_2 = 0.321 \text{ mg/L}$$

$$C_T = 0.05 \text{ mg/L}$$

$$RUC = 0.3$$

Boron

$$C_1 = 0.04 \text{ mg/L}$$

$$C_2 = 9.88 \text{ mg/L}$$

$$C_T = 0.7 \text{ mg/L}$$

$$RUC = 2.5$$

DOC

$$C_1 = 3.2 \text{ mg/L}$$

$$C_2 = 22.7 \text{ mg/L}$$

$$C_T = 4.4 \text{ mg/L}$$

$$RUC = 3.2$$

Iron

$$C_1 = 0.09 \text{ mg/L}$$

$$C_2 = 1.7 \text{ mg/L}$$

$$C_T = 0.19 \text{ mg/L}$$

$$RUC = 0.17$$

Sodium

$$C_1 = 1.04 \text{ mg/L}$$

$$C_2 = 361 \text{ mg/L}$$

$$C_T = 23.7 \text{ mg/L}$$

$$RUC = 101$$

Sulphate

$$C_1 = 14.7 \text{ mg/L}$$

$$C_2 = 2100 \text{ mg/L}$$

$$C_T = 146.1 \text{ mg/L}$$

$$RUC = 256$$

TDS

$$C_1 = 80 \text{ mg/L}$$

$$C_2 = 3500 \text{ mg/L}$$

$$C_T = 295.5 \text{ mg/L}$$

$$RUC = 277$$

Notes:

1. RUC means Reasonable Use Concept.
2. Shading indicates values exceeding the RUC.
3. n/a indicates no RUC limit for this parameter.

SCENARIO THREE

Maple Lake Leachate Concentration Calculations (North plume)

$$C_T = (Q_1 C_1 + Q_2 C_2) / Q_T$$

where

$Q_1 =$	contribution from property ($m^3/year$)	Area	165973 m^2	16.5973 ha
$Q_1 =$	area (m^2) x infiltration rate ($m/year$)	Infiltration rate	0.2 $m/year$	
$Q_1 =$	33194.6			

$Q_2 =$	contribution from landfill ($m^3/year$)	Area	19500 m^2	1.95 ha
$Q_2 =$	area (m^2) x infiltration rate ($m/year$)	Infiltration rate	0.2 $m/year$	
$Q_2 =$	3900			

Chloride

$C_1 =$	upgradient concentration (mg/L)
$C_1 =$	9

$C_2 =$	leachate concentration (mg/L)
$C_2 =$	990

$Q_T =$	total off-site discharge ($m^3/year$)
$Q_T =$	$Q_1 + Q_2$
$Q_T =$	37094.6

$C_T =$	concentration at downgradient property boundary (mg/L)
$C_T =$	$(Q_1 C_1 + Q_2 C_2) / Q_T$
$C_T =$	112.1 mg/L
RUC =	126

Alkalinity	Ammonia	Barium
$C_1 =$ 34 mg/L	$C_1 =$ 1.7 mg/L	$C_1 =$ 0.027 mg/L
$C_2 =$ 249 mg/L	$C_2 =$ 2 mg/L	$C_2 =$ 0.321 mg/L
$CT =$ 56.6 mg/L	$CT =$ 1.7 mg/L	$CT =$ 0.1 mg/L
RUC = 258	RUC = n/a	RUC = 0.3

Boron	DOC	Iron
$C_1 =$ 0.04 mg/L	$C_1 =$ 3.2 mg/L	$C_1 =$ 0.09 mg/L
$C_2 =$ 9.88 mg/L	$C_2 =$ 22.7 mg/L	$C_2 =$ 1.7 mg/L
$CT =$ 1.1 mg/L	$CT =$ 5.3 mg/L	$CT =$ 0.3 mg/L
RUC = 2.5	RUC = 3.2	RUC = 0.17

Sodium	Sulphate	TDS
$C_1 =$ 1.04 mg/L	$C_1 =$ 14.7 mg/L	$C_1 =$ 80 mg/L
$C_2 =$ 361 mg/L	$C_2 =$ 2100 mg/L	$C_2 =$ 3500 mg/L
$CT =$ 38.9 mg/L	$CT =$ 233.9 mg/L	$CT =$ 439.6 mg/L
RUC = 101	RUC = 256	RUC = 277

Notes:

1. RUC means Reasonable Use Concept.
2. Shading indicates values exceeding the RUC.
3. n/a indicates no RUC limit for this parameter.

SCENARIO THREE

Maple Lake Leachate Concentration Calculations (South Plume)

$$C_T = (Q_1 C_1 + Q_2 C_2) / Q_T$$

where

$Q_1 =$	contribution from property ($m^3/year$)	Area	208713 m^2	20.8713 ha
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$Q_1 =$	area (m^2) x infiltration rate ($m/year$)	Infiltration rate	0.2 $m/year$	
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$$Q_1 = 41742.6$$

$Q_2 =$	contribution from landfill ($m^3/year$)	Area	10500 m^2	1.05 ha
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$Q_2 =$	area (m^2) x infiltration rate ($m/year$)	Infiltration rate	0.2 $m/year$	
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$$Q_2 = 2100$$

Chloride

$C_1 =$	upgradient concentration (mg/L)
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$$C_1 = 9$$

$C_2 =$	leachate concentration (mg/L)
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$$C_2 = 990$$

$Q_T =$	total off-site discharge ($m^3/year$)
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$$Q_T = Q_1 + Q_2$$

$$Q_T = 43842.6$$

$C_T =$	concentration at downgradient property boundary (mg/L)
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$$C_T = (Q_1 C_1 + Q_2 C_2) / Q_T$$

$$C_T = 56.0 \text{ mg/L}$$

$$RUC = 126$$

Alkalinity

$C_1 =$	34 mg/L
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$C_2 =$	249 mg/L
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$CT =$	44.3 mg/L
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$RUC =$	258
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Ammonia

$C_1 =$	1.7 mg/L
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$C_2 =$	2 mg/L
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$CT =$	1.7 mg/L
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$RUC =$	n/a
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Barium

$C_1 =$	0.027 mg/L
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$C_2 =$	0.321 mg/L
---------	--------------

$CT =$	0.04 mg/L
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$RUC =$	0.3
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Boron

$C_1 =$	0.04 mg/L
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$C_2 =$	9.88 mg/L
---------	-------------

$CT =$	0.5 mg/L
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$RUC =$	2.5
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DOC

$C_1 =$	3.2 mg/L
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$C_2 =$	22.7 mg/L
---------	-------------

$CT =$	4.1 mg/L
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$RUC =$	3.2
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Iron

$C_1 =$	0.09 mg/L
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$C_2 =$	1.7 mg/L
---------	------------

$CT =$	0.17 mg/L
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$RUC =$	0.17
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Sodium

$C_1 =$	1.04 mg/L
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$C_2 =$	361 mg/L
---------	------------

$CT =$	18.3 mg/L
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$RUC =$	101
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Sulphate

$C_1 =$	14.7 mg/L
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$C_2 =$	2100 mg/L
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$CT =$	114.6 mg/L
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$RUC =$	256
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TDS

$C_1 =$	80 mg/L
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$C_2 =$	3500 mg/L
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$CT =$	243.8 mg/L
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$RUC =$	277
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Notes:

1. RUC means Reasonable Use Concept.
2. Shading indicates values exceeding the RUC.
3. n/a indicates no RUC limit for this parameter.