

Figure: 30 TAC §309.20(b)(3)(B)

TABLE 1
WATER BALANCE EXAMPLE
(All Units are Inches of Water per Acre of Irrigated Area)

	a	b	Ri	c	d			e	f	g
Month	Avg. Precip.	Average Runoff	Average Infiltrated Rainfall	Evapotrans- piration	Required Leaching	Total Water Needs (5)+(6)	Effluent Needed in Root Zone (7)-(4)	Evaporation from Reservoir surface	Effluent to be applied to Land (8) /K	Consumption from Reservoir (9)+(10)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Jan.	2.11	0.40	1.71	0.80	0.00	0.80	0.00	0.02	0.00	0.02
Feb.	2.43	0.57	1.86	1.20	0.00	1.20	0.00	0.01	0.00	0.01
Mar.	2.02	0.36	1.66	2.80	0.20	3.00	1.34	0.09	1.58	1.67
April	3.19	1.03	2.16	3.40	0.22	3.63	1.46	0.05	1.72	1.77
May	4.19	1.74	2.45	6.10	0.64	6.74	4.29	0.10	5.05	5.15
June	3.30	1.10	2.20	6.50	0.76	7.26	5.06	0.20	5.95	6.15
July	2.20	0.45	1.75	6.70	0.87	7.57	5.82	0.34	6.85	7.19
Aug.	2.12	0.41	1.71	4.60	0.51	5.11	3.40	0.34	4.00	4.34
Sept.	3.58	1.30	2.28	5.10	0.50	5.60	3.32	0.19	3.91	4.10
Oct.	3.09	0.96	2.13	4.10	0.35	4.45	2.32	0.14	2.73	2.87
Nov.	2.23	0.46	1.77	2.10	0.06	2.16	0.39	0.07	0.46	0.53
Dec.	2.34	0.52	1.82	1.00	0.00	1.00	0.00	0.03	0.00	0.03
	32.80	9.30	23.50	44.40	4.11	48.51	27.40	1.58	32.25	33.83

- a. Up-to-date rainfall and evaporation data sets are available from the Texas Natural Resource Information System.
- b. Runoff should be determined by an acceptable method such as the Soil Conservation Service method found in SCS Technical Release No. 55. For example, purposes only, a CN value of 74 was assumed for good pasture with Class "C" soils.
- c. Suggested source of values is the "Bulletin 6019, Consumptive Use of Water by Major Crops in Texas," Texas Board of Water Engineers.
- d. In low rainfall areas, this is the required leaching to avoid salinity build-up in the soil is calculated using the following equation:

$$L = \frac{Ce (E-Ri)}{Cl-Ce}$$

Where:

Ce = Electrical Conductivity of Effluent

E = Evapotranspiration

Ri = Infiltrated Rainfall

Cl= Maximum Allowable Conductivity of Soil Solution (Table 3)

For example purposes only, a Ce value of 1.5 millimhos/cm at 25°C and a Cl value of 10.0 (Bermuda Grass) were used.

- e. Net Average Evaporation from Reservoir Surface. For example purposes only, irrigation area = 100 acres and reservoir surface area = 5 acres. Therefore, values are 5% of Evaporation figures of Austin, Texas.
- f. K is the irrigation efficiency. K value is 0.85 unless specific information is provided to support a different value.
- g. The total of this column is the maximum allowable application rate in acre-inch per acre per year.

TABLE 2
EXAMPLE CALCULATION OF STORAGE VOLUME REQUIREMENTS
(All Units are Inches of Water per Acre of Irrigated Area)

	a	b	c			d	e	f
Month	Effluent Received for Application or Storage	Rainfall Highest Year in Past 25 Year	Runoff Highest Year in Past 25 Year	Infiltrated Rainfall (14) - (15)	Available Water (13) + (16)	Net 25 Year Low Evaporation from Regul. Surf.	Storage	Accumulated Storage
(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)
Jan.	2.70	3.28	1.09	2.19	4.89	0.00	2.69	8.49
Feb.	2.70	3.80	1.45	2.35	5.05	0.01	2.69	11.18
Mar.	2.70	3.18	1.02	1.26	4.86	0.04	1.67	12.85
April	2.70	4.98	2.35	2.63	5.33	0.02	1.51	14.36
May	2.70	6.57	3.67	2.90	5.60	0.04	-1.86	12.50
June	2.70	5.13	2.47	2.66	5.36	0.09	-2.80	9.70
July	2.70	3.44	1.20	2.24	4.94	0.16	-3.73	5.97
Aug.	2.70	3.33	1.12	2.21	4.91	0.16	-0.87	5.10
Sept.	2.70	5.59	2.84	2.75	5.45	0.08	-0.74	4.36
Oct.	2.70	4.82	2.22	2.60	5.30	0.07	0.45	0.45
Nov.	2.70	3.49	1.23	2.26	4.96	0.03	2.67	3.12
Dec.	2.70	3.64	1.34	2.30	5.00	0.02	2.68	5.80
	32.40	51.25	22.00	29.25	61.65	0.73		

- a. For example purposes only, disposal rate is for a 240,000 gpd facility (2.7 acre-feet per acre per year) irrigating 100 acres. Maximum values for Column 13 are the value (total) of Column 11 divided by 12. Note that the values in Column 13 could be adjusted to allow for seasonal variation in effluent output.
- b. Annual rainfall amount from the highest year in past 25 years of data. Total rainfall is then distributed proportional to monthly averages.
- c. Using rainfall figures in Column 14, calculate runoff with the same method used in Column 3.

- d. Lowest annual evaporation in past 25 years from reservoir surface. Distribute annual value proportionally to monthly average evaporation expressed in inches per irrigated acre. For example purposes only, irrigation area = 100 acres and reservoir surface area = 5 acres. Therefore, values in Column 18 are 5% of evaporation figures for Austin, Texas.
- e. $\text{Storage} = [(13) - (18)] - \{[(7) - (16)]/k\}$. If the term $\{[(7) - (16)]/k\}$ is negative, then the value for storage = $[(13) - (18)]$. Irrigation efficiency is 0.85 unless specific information is provided to support a different value.
- f. To allow for the worst condition, the summation was started in October which gives a maximum storage requirement of 14.36 inches per irrigated acre or 120 acre-feet.

TABLE 3
Salt Tolerance of Various Crop Plants

Best growth yields of each crop would occur at a salinity level below the salinity range given.

Relatively Nontolerant	Moderately Salt Tolerant	Relatively Salt Tolerant	Highly Salt Tolerant
2.0 - 4.0	4.0 - 6.0	6.0 - 8.0	8.0 - 12.0
Field Crops			
Field bean Cowpeas Corn (field)	Sorghum (grain) Rye (grain) Castorbean Soybean	Cotton Sugar beet Wheat (grain) Oats (grain) Rice	Barley (grain) Rape
Forage Crops			
White clover Alsike clover Red clover Ladino clover Crimson clover Rose clover Burnet clover	Tall fescue Meadow fescue Orchard-grass Millet Sour clover Birdsfoot trefoil	Wheat-grasses Sudan grass Sweetclover Alfalfa Ryegrass Rye (hay) Wheat (hay) Oats (hay)	Alkali sacaton Bermuda grass Barley (hay) Rhodesgrass Blue grama Panicgrass