ATTACHMENT A

The Blaney-Cridde (B-C) Methodology

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The basic B-C formula states that the consumptive use (U) is equal to a seasonal consumptive use factor coefficient (k), times a monthly consumptive use factor (f), therefore U = k*f. F is a function of the mean monthly temperature in degrees Fahrenheit (t) times the monthly percent of daylight hours (p), divided by 100, expressed as f=t*p/100. K is a factor relating the plant water usage for a specific species. K factors are generated under experimental conditions where F and U are measured under tightly controlled conditions. This analysis uses a modified B-C method beginning with a modified k factor. Here, k is equal to a climatic coefficient which is related to the mean air temperature (kt), times a coefficient reflecting the growth stage of the crop (kc) expressed as k=kt*kc. In order to approximate evapotranspiration, the following calculation must first be completed:

$f(m) = (t(m) * p(m))/100$
$kt(m) = (0.0173 * t(m) – 0.314$
$kt\ f(m) = f(m) * kt(m)$
$u(m) = kt\ f\ (m) * kc(m)$

where:
m = month of year
f(m) = monthly evapotranspiration factor
r(m) = average monthly temperature
p(m) = monthly percentage of annual daylight hours
kt(m) = kt
u(m) = monthly evapotranspiration
kc(m) = monthly crop coefficient`

The effective rainfall for crop evapotranspiration is calculated as a function of the 1-in-10 year drought rainfall as:

$Rt(1) = (0.70917 * (Rt(m)^{(0.82416)}) – 0.11556$
$U1(m) = 10^{(0.01226*U(m))}$
$F1 = 0.531747 + (0.295154 * D) – (0.057697 * D^2) + (0.003804 * D^3)$
$Re(m) = Rt1(m) * U1(m) * F1$

where:
Rt1(m) = monthly effective rainfall factor considering 1-in-10 rainfall
Rt(m) = 1-in-10 monthly rainfall
U1(m) = monthly effective rainfall factor considering monthly evapotranspiration
F1 = soil factor
D = net depth of application
Re(m) = monthly effective rainfall

After the monthly evapotranspiration, U(m) and the monthly 1-in-10 effective rainfall, Re(m) has been determined, the monthly supplemental crop requirement, Sup(m) is calculated as:
Sup(m) = U(m) – Re(m) for each month of the year.

Finally, the irrigation quantity needed to supply the supplemental crop requirement Sup(m) is determined by:

$$Q(m) = Sup(m) * Ka * A$$

Where:

Ka = allocation coefficient multiplier for the irrigation system specified

A = irrigated acreage for the crop

Reuse Factors for Temporal Distribution of Blaney-Criddle Supplemental Irrigation Requirements

In order to calculate temporal distribution of supplemental irrigation requirements for wastewater service areas, the values for current reclaimed demand water demand for the areas were totaled for each month and the total for each month was divided by the annual average demand as shown in the table below. The reuse factor was then applied by taking the total annual volume, dividing it by the number of days in the year, multiplying it by the number of days in the month, and then multiplying this value times the reuse factor.

	Actual Reclaimed System Demand* (MGD)											
Facility	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Fiesta Village[a]	1.0	1.3	1.1	1.2	1.2	0.6	0.4	0.4	0.2	0.9	1.3	1.0
Ft. Myers Beach[a]	2.1	1.9	3.6	3.6	2.8	2.1	2.0	2.0	1.2	2.6	2.8	2.1
Ft. Myers Central[b]	0.6	0.7	0.8	0.8	0.8	0.7	0.7	0.7	0.6	0.7	0.7	0.6
Ft. Myers South[b]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gulf Environmental Services[c]	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.8	0.8
Total	**4.5**	**4.5**	**6.2**	**6.3**	**5.5**	**4.1**	**3.9**	**3.8**	**2.8**	**5.0**	**5.6**	**4.5**
Reuse Factor	**0.95**	**0.96**	**1.32**	**1.33**	**1.16**	**0.88**	**0.82**	**0.81**	**0.58**	**1.06**	**1.19**	**0.96**