Example Problem 4A-5_3, Shallow Concentrated Flow

Determine ($T_{c\ shallow}$) for a shallow concentrated flow length of 150 feet.

Given:

K_u = 33, shallow flow equation conversion factor for English units

Intercept coefficient: k = 0.457 (grassed waterway, see Table 7)

Flow length: L = 150 ft.

Average slope: S = 2% (0.02 ft/ft)

Recurrence interval: T = 10 years

Solution:

Use Equations 4A-5_5 & 4A-5_6 to find $T_{c\ shallow}$:

$$V = K_u k\sqrt{S} = 33 \times 0.457\sqrt{0.02} = 2.13 \text{ ft/s}$$

$$T_{c\ shallow} = \frac{L}{60V} = \frac{150}{60 \times 2.13} = 1.2 \text{ min. (round to 1 min.)}$$

Discussion:

Round $T_{c\ shallow}$ to the nearest minute. If $T_{c\ shallow}$ is less than 0.50 minutes, $T_{c\ shallow}$ can be ignored.