DETERMINE UNTREATED FOR $Q_{10}$:

$$Q_{REM} = Q_{10\,POST} - Q_{ACT}$$

$$Q_{REM} = 2.656 - 0.47$$

$$Q_{REM} = 2.186 \text{ INCHES}$$

CALCULATE $CN_{ADJ}$ FOR 10 YR EVENT: P = 3.99

$$CN_{ADJ} = \left( \frac{200}{(P + 2 * (Q_{REM}) + 2^{1/2}) - \sqrt{(5 * P * Q_{REM} + 4 * Q_{REM}^2)}} \right)$$

$$CN_{ADJ} = \left( \frac{200}{(3.99 + 2 * (2.186) + 2^{1/2}) - \sqrt{(5 * 3.99 * 2.186 + 4 * (2.186)^2}} \right)$$

$CN_{ADJ} = 81.89$ USE 82

CALCULATE $T_C$ PER 2.2.4.3 USING WATERSHED LAG.

TAKE AVERAGE OF 4 DEVELOPED FLOW PATHS. ~~AND~~

① SLOPE = $\frac{4.6}{220} = 0.0209$

② slope = $\frac{7.1}{615} = 0.0115$

③ slope = $\frac{6}{995} = 0.006$

④ slope = $\frac{4.5}{610} = 0.0074$

$\Sigma 0.0458 \div 4 = 0.01145$

$Y = 1.15\%$

DETERMINE FLOW LENGTH ($l$):

$$l = 209 A^{0.6}$$

$$l = 209(6.44)^{0.6}$$

$$l = 639 \text{ FT}$$

CALCULATE POST-DEVELOPMENT $T_c$, 10-YR STORM:

$$T_c = \frac{(l)^{0.8}\left[\left(\frac{1000}{CN} - 10\right) + 1\right]^{0.7}}{1140\, Y^{0.5}}$$

$$T_c = \frac{639^{0.8}\left[\left(\frac{1000}{82} - 10\right) + 1\right]^{0.7}}{1140(1.15)^{0.5}}$$

$T_c = 0.32$ HRS $\longrightarrow$ 19.4 MINS.

DETERMINE $T_c$ EXISTING CONDITION PER SECT. 2.2.4.3

(A) SLOPE: $\frac{\cancel{10.8}\ 11.3}{315} = 0.036$

(B) SLOPE: $\frac{9.5}{845} = 0.012$

(C) SLOPE: $\frac{4}{180} = 0.022$

(D) SLOPE: $\frac{4}{355} = 0.0113$

(E) slope: $\frac{4.5}{610} = 0.0074$

$\Sigma = 0.088 \div 5 = 0.0176$

$Y = 1.76\%$

CALCULATE PRE-DEVELOPED $T_C$, 10-YR STORM:

$$T_C = \frac{L^{0.8}\left[\left(\frac{1000}{CN'} - 10\right) + 1\right]^{0.7}}{1140(Y)^{0.5}}$$

$$T_C = \frac{639^{0.8}\left[\left(\frac{1000}{77} - 10\right) + 1\right]^{0.7}}{1140(1.76)^{0.5}}$$

CN = 77 FROM HYDROCAD.

$T_C = 0.306$ HR $\longrightarrow$ 18.3 MIN

$T_C$ ALT ~32 21.7 MIN

USE HYDROCAD MODEL TO DEMONSTRATE COMPLIANCE W/ $Q_{P10}$

$$Q_{POST\ 10} < Q_{PRE\ 10}$$

$Q_{P100}$ STANDARD WAIVED

IMPERVIOUS SURFACE ASSOCIATED W/ SITE, COMMON PLAN OF DEVELOPMENT < 10 ACRES.