BROWNSVILLE
On the Border, By the Sea

ON-SITE DETENTION

ALL SITES WITH AREA OF 0.5 ACRE OR MORE MUST INCLUDE ON SITE DETENTION AS PART OF THE DESIGN. THE RELEASE RATE IS THE "Q" ATTRIBUTABLE TO THE SITE IN ITS UNDEVELOPED STATE. THE INFLOW RATE IS THE "Q" ATTRIBUTABLE TO THE SITE IN ITS DEVELOPED STATE. THE FOLLOWING ARE DESIGN STORM FREQUENCIES USED FOR VARIOUS SIZE SITES:

AREA	* FREQUENCY
LESS THAN 0.5 ACRE	DETERMINED ON A CASE BY CASE BASIS
0.5 ACRE TO 1.0 ACRE	5 YEARS
1.0 ACRE TO 5.0 ACRE	10 YEARS
5 - 10 ACRE	25 YEARS
10 - 25 ACRE	50 YEARS
OVER 25 ACRE	100 YEARS

* THESE FREQUENCIES ASSUME AN OUTLET FOR THE SITE.

THE RATIONAL FORMULA, Q = CIA IS USED. ATTACHED ARE NOMOGRAPHS FOR TIME OF CONCENTRATION AND INTENSITY, A CHART FOR VALUES OF "C", AND A WORKSHEET FOR COMPUTING DETENTION VOLUME REQUIRED.

TABLE I

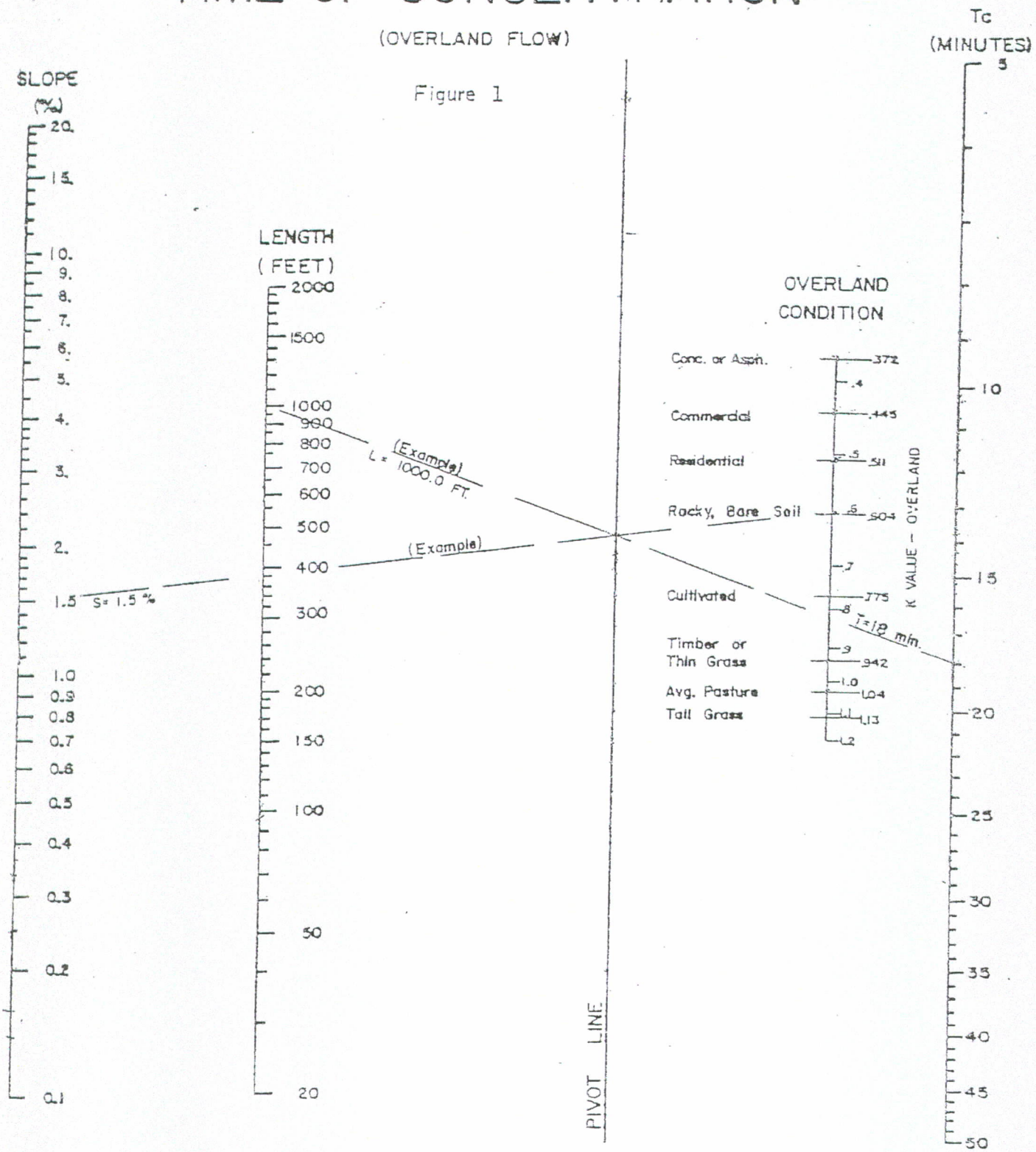
VALUES OF C (RUN-OFF COEFFICIENT) IN FORMULA Q = CIA

		SOIL CLASSIFICATION					
SLOPE	LAND USE (ESTIMATE UP TO 20 YEARS IN FUTURE)	ROLLING PLAINS		SANDY OR SANDY LOAM SOILS (PERVIOUS)		BLACK OR LOESSIAL SOLIS (IMPERVIOUS)	
		MIN.	MAX.	MIN.	MAX.	MIN.	MAX.
FLAT	CULTIVATED			0.25	0.35	0.30	0.40
(0% - 1%)	WOODLANDS			0.15	0.20		
	PASTURE			0.20	0.25		
	PAVED	0.90		0.90		0.90	
	RESIDENTIAL	0.50	0.60	0.50	0.60	0.50	0.60
	COMMERCIAL	0.60	0.90	0.60	0.90	0.60	0.90
ROLLING	CULTIVATED	0.40	0.45	0.45	0.65	0.50	0.70
(1% - 3.5)	WOODLANDS			0.15	0.20	0.18	0.25
	PASTURE	0.25	0.30	0.30	0.40	0.35	0.45
	PAVED	0.90		0.90		0.90	
	RESIDENTIAL	0.55	0.60	0.50	0.60	0.35	0.60
	COMMERCIAL	0.60	0.90	0.60	0.90	0.60	0.90
HILLY	CULTIVATED			0.60	0.75	0.70	0.85
(3.55 - 5.5%)	WOODLANDS			0.20	0.25	0.25	0.30
	PASTURE			0.35	0.45	0.45	0.55
	PAVED	0.90		0.90		0.90	
	RESIDENTIAL	0.60		0.50	0.60	0.50	0.60
	COMMERCIAL	0.60	0.90	0.60	0.90	0.60	0.90
MOUNTAINOUS	WOODLANDS					0.70	0.80
(5.5% +)	BARE					0.80	0.90
STEEP GRASSED SLOPES		0.70		0.70		0.70	

TIME OF CONCENTRATION

(OVERLAND FLOW)

Figure 1



EXAMPLE: Bare, Rocky Soil on 1.5% Slope. Find Time of Concentration for Channel Length of 1000 Feet.

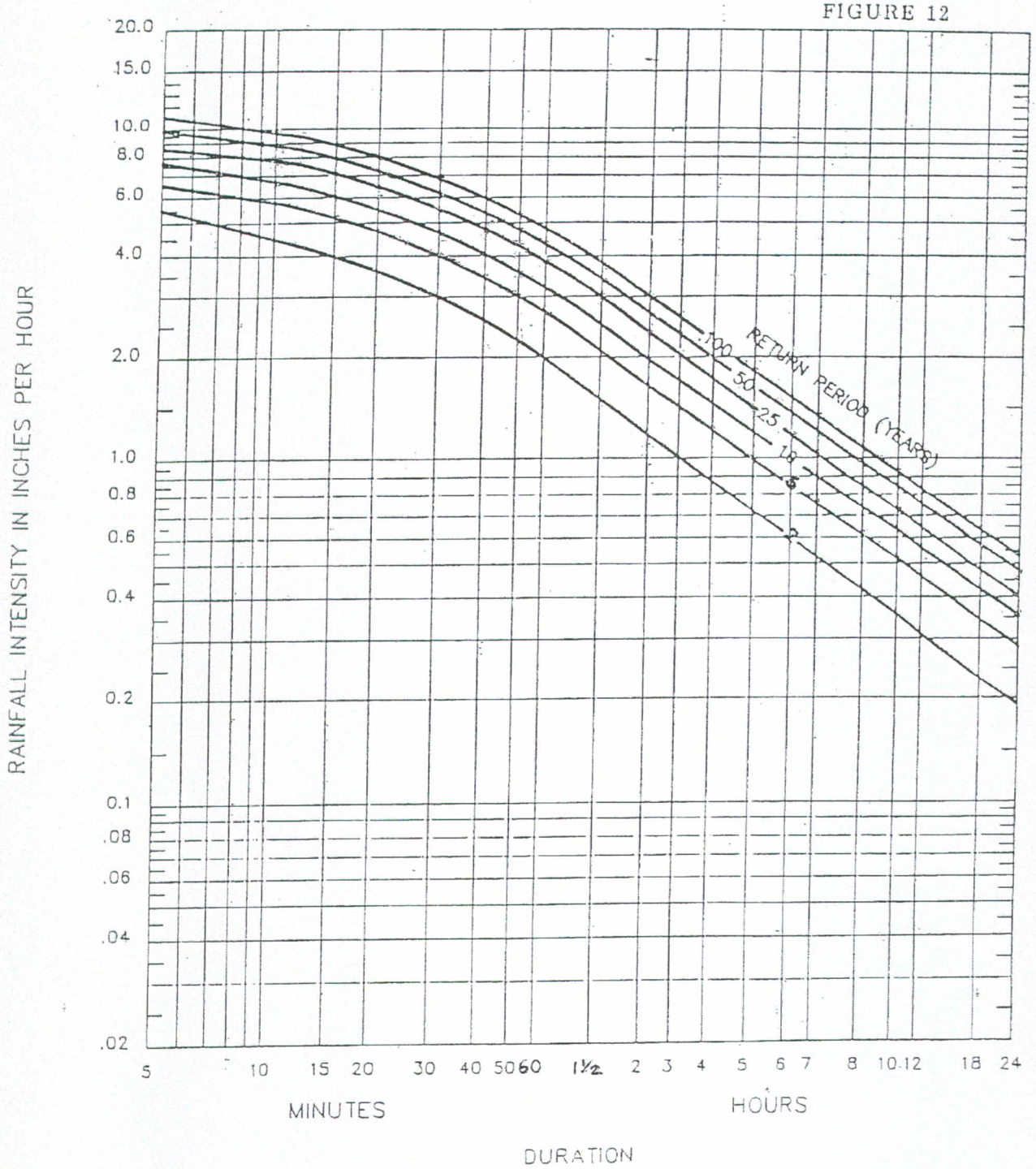
PROCEDURE: Connect Overland Condition with Slope Value. Locate Pivot Point on Pivot Line. Pass Line thru Length and Pivot Point. Read Tc Where Line Intercepts Tc Line.

Adapted from Formula $T_c = k(L^{.37}/S^{.2})$

RAINFALL INTENSITY – DURATION – FREQUENCY CURVES

BROWNSVILLE, TEXAS
1923 – 1951

FIGURE 12



– NOTE –
FREQUENCY ANALYSIS BY METHOD O
EXTREME VALUES. AFTER GUMBEL

WORKSHEET FOR DETENTION FACILITY: _____

TOTAL TRIBUTARY ARE (A):

DEVELOPED RUNOFF COEFFICIENT (C):

RELEASE RATE: .

STORAGE VOLUME DETERMINATION:

RUNOFF FACTOR	STORM DURATION	RAINFALL INTENSITY	DRAINAGE AREA	INFLOW RATE	RELEASE RATE	STORAGE RATE	STORAGE REQUIRED
C	T (HR.)	I (IN./HR.)	A (AC.)	Q1 = CIA (CFS.)	QO (CFS.)	(Q1-Q0) (CFS.)	1/12 (Q1-Q0) X (T) (AC.-FT.)
	0.17 HR..						
	0.33 HR.						
	0.50 HR.						
	0.67 HR.						
	0.83 HR.						
	1.0 HR.						
	1.5 HR.						
	2.0 HR.						
	3.0 HR.						
	4.0 HR.						
	5.0 HR.						
	6.0 HR.						
	7.0 HR.						
	8.0 HR.						
	9.0 HR.						
	10.0 HR.						

ACTUAL STORAGE VOLUME:

ACTUAL RELEASE RATE: