CITY UTILITIES WATER THAT WORKS	**City Utilities Design Standards Manual**	Exhibit SW5-1 Time of Concentration Worksheet
		Version: June 2024

Project _____ By_____ Date _____

Location _____ Checked_____ Date _____

Select one: Select

NOTES: Space for as many as two segments per flow type can be used for each worksheet.
Include a map, schematic, or description of flow segments.

		Segment 1	Segment 2	
Overland (Sheet) flow (Applicable as part of T_c computation only)	Segment ID			
1. Surface description : paved or unpaved		Select	Select	
2. Manning's roughness coeff., n				
3. Flow Length, L (total L ≤ 300 for unpaved, L ≤ 100 for paved)	ft			
4. Two-yr 24-hr rainfall, P_2	in			
5. Land slope, s	ft/ft			
6. Calculate $T_t = \frac{0.007\,(nL)^{0.8}}{P_2^{0.5} s^{0.4}}$	hr		+	=
Shallow concentrated flow	Segment ID			
7. Surface description: paved or unpaved		Select	Select	
8. Flow length, L	ft			
9. Watercourse slope, s	ft/ft			
10. Average velocity, $V_{unpaved}=16.1345(s)^{0.5}$, or $V_{paved}=20.3282(s)^{0.5}$	ft/s			
11. Calculate $T_t = \frac{L}{3600\,V}$	hr		+	=
Channel flow	Segment ID			
12. Cross sectional flow area, a	ft^2			
13. Wetted perimeter, p_w	ft			
14. Calculate Hydraulic radius, $r_H = \frac{a}{p_w}$	ft			
15. Channel slope, s	ft/ft			
16. Manning's roughness coeff., n (Exhibit 205.3.1)				
17. Calculate $V = \frac{1.49\, r^{2/3} s^{1/2}}{n}$	ft/s			
18. Flow length, L	ft			
19. Calculate $T_t = \frac{L}{3600\,V}$	hr		+	=
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)	hr			