

Drainage Plan for Existing Vs Developed Site Detention Analysis (onsite only)

Existing/Undeveloped Condition:
Total Site Area= 4.25 Acres
Impervious Area= 0.41 Acres
Grass Area=3.84 Acres
Soil Group B with average slope less than 1%

Area #	Acres	Tc min	C2	I2	C5	I5	C10	I10	C25	I25	C100	I100	Remark
A	0.41	15	0.86	3.83	0.87	4.56	0.88	5.22	0.89	6.06	0.90	7.37	Parking and Bldg. draining into the N Arkansas Ave.
B	3.84	26	0.16	2.90	0.18	3.50	0.24	4.05	0.32	4.72	0.37	5.79	Site draining into the ex. 2'X2' Area Inlet
Off-site	4.94	30	0.16	2.67	0.18	3.24	0.24	3.76	0.32	4.39	0.37	5.40	Offsite draining into the ex. 2'X2' Area Inlet

Area #	Existing Q, cfs				
	Q2	Q5	Q10	Q25	Q100
A	1.35	1.63	1.88	2.21	2.72
B	1.78	2.42	3.73	5.80	8.23
Off-Site	2.11	2.88	4.46	6.94	9.87

Developed Condition:
Total Site Area= 4.25 Acres
Land Use: New School

Area #	Acres	Tc min	C2	I2	C5	I5	C10	I10	C25	I25	C100	I100	Remark
A	0.71	15	0.76	3.83	0.77	4.56	0.78	5.22	0.80	6.06	0.81	7.37	Parking and Bldg. draining into the Arkansas Ave.
B	3.54	22	0.51	3.17	0.53	3.81	0.58	4.40	0.63	5.12	0.66	6.26	Site draining into Dry ED Pond
Off-Site	4.94	30	0.16	2.67	0.18	3.24	0.24	3.76	0.32	4.39	0.37	5.40	Site draining into the ex. 12" RCP

TC calculation:
Area A: Minimum inlet time = 15 min.
Area B (Developed):
Total Flow length=422 ft,
Sheet flow 150ft (Tc=16.9 min)
Shallow Conc Flow 148ft (Tc=1.6 min)
Channel Flow 124ft (Tc=3.9min)
Total Time of Conc=22.4 min=22 min
Offsite: Total Flow Length= 570ft
Sheet Flow 150ft (Tc=23.4 min)
Shallow Conc Flow 420ft (Tc=7.0 min)
Total Time of Conc = 30.4=30 min

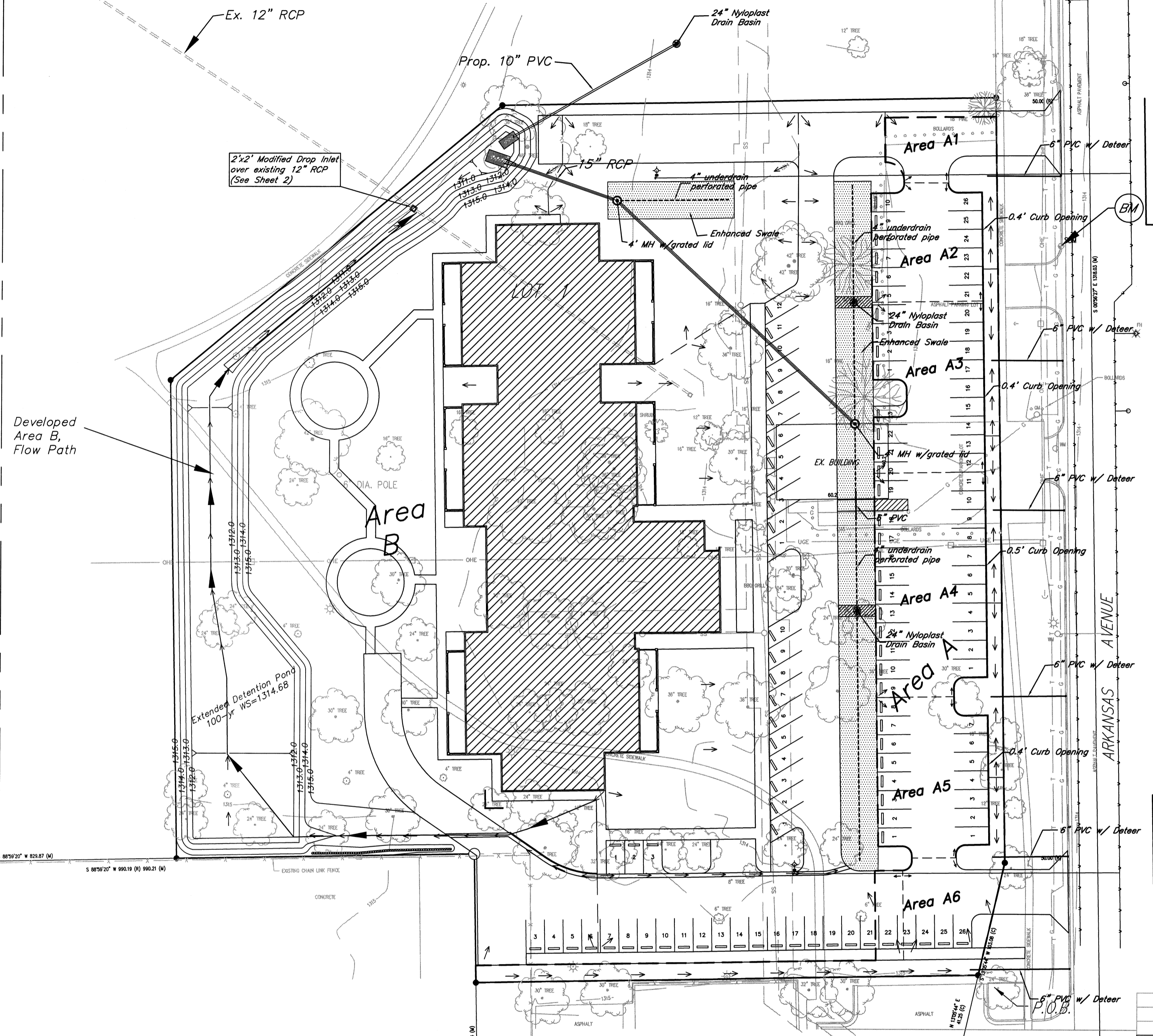
Area #	Developed Q, cfs					Qout, cfs					Remark
	Q2	Q5	Q10	Q25	Q100	Q2	Q5	Q10	Q25	Q100	
A	2.07	2.49	2.89	3.44	4.24	1.47	1.71	1.95	2.28	2.69	Detention in parking lot and grassed swale (See table below for detail calculation) Out flow from Dry ED draining into ex. 12" RCP. See Sheet 3 for detail analysis
B	5.72	7.15	9.03	11.42	14.63	2.08	2.29	2.53	2.85	3.22	
Off-Site	2.11	2.88	4.46	6.94	9.87						

Area #	Acres	Developed Q, cfs					Qout, cfs					Remark
		Q2	Q5	Q10	Q25	Q100	Q2	Q5	Q10	Q25	Q100	
A1	0.06	0.17	0.21	0.24	0.29	0.36	0.20	0.25	0.29	0.34	0.42	Draining through grassed swale
A2	0.08	0.23	0.28	0.33	0.39	0.48	0.18	0.21	0.24	0.29	0.32	Detention in parking lot (0.4'X0.5' opening) and grassed swale
A3	0.14	0.41	0.49	0.57	0.68	0.84	0.24	0.28	0.32	0.37	0.43	Detention in parking lot (0.4'X0.5' opening) and grassed swale
A4	0.16	0.47	0.56	0.65	0.78	0.96	0.31	0.36	0.41	0.47	0.54	Detention in parking lot (0.5'X0.5' opening) and grassed swale
A5	0.14	0.41	0.49	0.57	0.68	0.84	0.22	0.25	0.28	0.33	0.38	Detention in parking lot (0.4'X0.5' opening) and grassed swale
A6	0.13	0.38	0.46	0.53	0.63	0.78	0.32	0.36	0.41	0.48	0.60	Draining through grassed swale
Total Peak Runoff to Arkansas Ave.						1.47	1.71	1.95	2.28	2.69		

Calculation for water quality volume (WQV=P*Rv*A/12)					Soil Group 'B'		
85th percentile storm event (1.2 inches), P =	1.2	inches	Calculation of Rv				
Total area, A =	3.51	acres	Rainfall Coeff. Rv =	0.555	Coeff for undisturbed area, Rv _u =	0.03	Area
Required Vol. for Water Quality =	0.19	ac-ft	Coeff for turf, Rv _t =	0.20	Coeff for impervious area, Rv _i =	0.95	1.66
Dry Extended Detention Pond					Weighted, Rv = 0.555		
Elevn	Area sqft	Area, Acres	Storage, Ac-ft	Cum Storage (Ac-ft)			
1310.6	20.0	0.00					
1311.0	1078.9	0.02	0.01	0.013			
1311.5	4241.6	0.10	0.06	0.074			
1312.0	11764.0	0.27	0.18	0.257			
1312.5	13267.3	0.30	0.29	0.545			
1313.0	14766.7	0.34	0.32	0.867			
1313.5	16319.2	0.37	0.36	1.224			
1314.0	17867.1	0.41	0.39	1.616			
1314.5	19429.2	0.45	0.43	2.044			
1315.0	21005.4	0.48	0.46	2.508			
Pipe elevation for Water Quality =				1311.83			

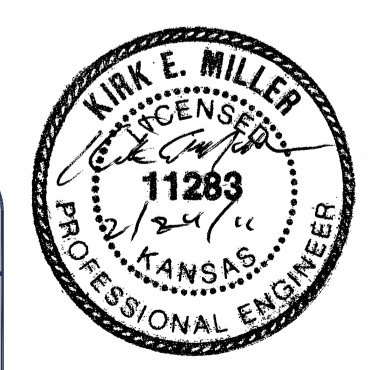
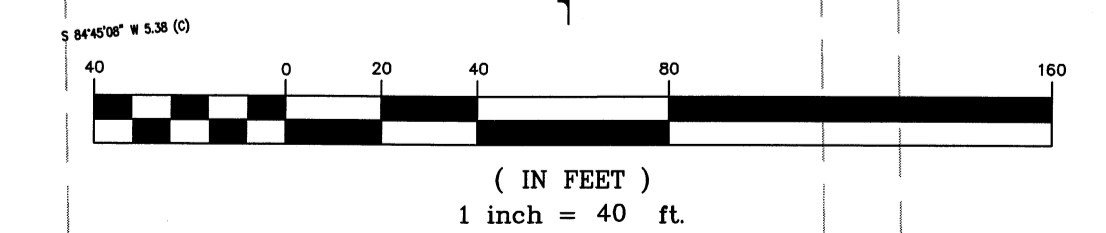
Calculation for water quality volume (WQV=P*Rv*A/12)			Soil Group 'B'				
85th percentile storm event (1.2 inches), P =	1.2	inches	Calculation of Rv				
Total area, A =	0.71	acres	Rainfall Coeff. Rv =	0.813	Coeff for undisturbed area, Rv _u =	0.03	0.00
Required Vol. for Water Quality =	0.058	ac-ft	Coeff for turf cover, disturbed, Rv _t =	0.20	Coeff for impervious area, Rv _i =	0.95	0.58
			Weighted, Rv =		0.813		

Size of orifice at 1310.6 for WQV extended detention = 2" (Minimum requirement)



Engineer's Note:
Site drainage calculations developed using the Rational Method for peak runoff. "C" & "T" values established from the City of Wichita Design Criteria and Documentation.

Benchmark:
See drawing for location.
Elevation = 1314.13



**TOP - North Central
Drainage Plan
Wichita, Kansas**

PROJECT NUMBER			
KEM NO. 10147	FILE	DATE 12/2010	SHEET 6.0
DESIGN KM	DRAWN GP	REVISED	