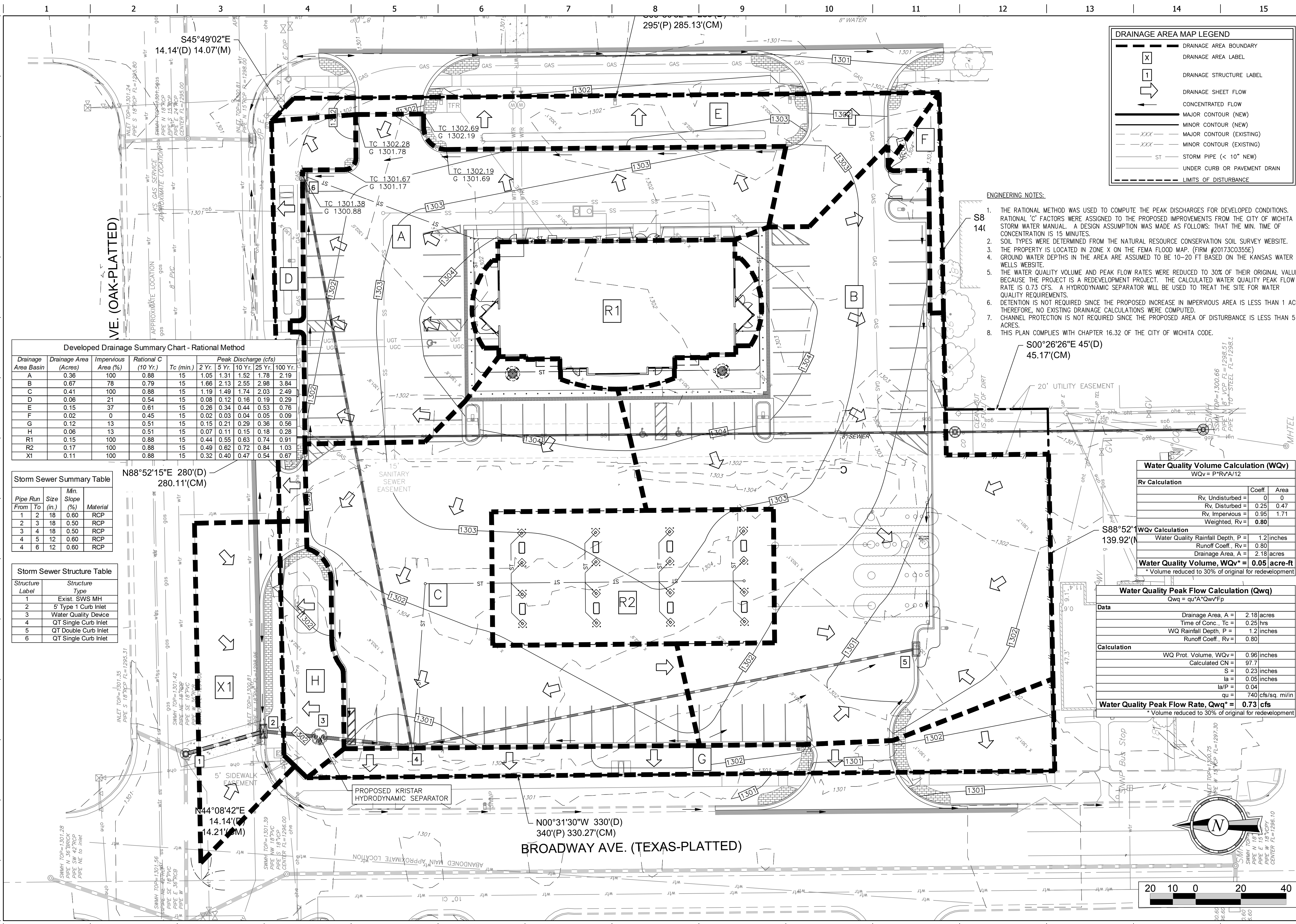


FILE LOCATION: \\Drawing Files\Project AMG 9-16-13\VT #0391R\DWG\03-0391 Drainage Plan.dwg USER:eng2 SAVED:10/28/2014 8:19 AM PLOTTED:10/28/2014 8:22 AM



**DRAINAGE AREA MAP LEGEND**

- DRAINAGE AREA BOUNDARY
- DRAINAGE AREA LABEL
- DRAINAGE STRUCTURE LABEL
- DRAINAGE SHEET FLOW
- CONCENTRATED FLOW
- MAJOR CONTOUR (NEW)
- MINOR CONTOUR (NEW)
- MAJOR CONTOUR (EXISTING)
- MINOR CONTOUR (EXISTING)
- STORM PIPE (< 10" NEW)
- UNDER CURB OR PAVEMENT DRAIN
- LIMITS OF DISTURBANCE

- ENGINEERING NOTES:**
1. THE RATIONAL METHOD WAS USED TO COMPUTE THE PEAK DISCHARGES FOR DEVELOPED CONDITIONS. RATIONAL 'C' FACTORS WERE ASSIGNED TO THE PROPOSED IMPROVEMENTS FROM THE CITY OF WICHITA STORM WATER MANUAL. A DESIGN ASSUMPTION WAS MADE AS FOLLOWS: THAT THE MIN. TIME OF CONCENTRATION IS 15 MINUTES.
  2. SOIL TYPES WERE DETERMINED FROM THE NATURAL RESOURCE CONSERVATION SOIL SURVEY WEBSITE.
  3. THE PROPERTY IS LOCATED IN ZONE X ON THE FEMA FLOOD MAP. (FIRM #2017300355E)
  4. GROUND WATER DEPTHS IN THE AREA ARE ASSUMED TO BE 10-20 FT BASED ON THE KANSAS WATER WELLS WEBSITE.
  5. THE WATER QUALITY VOLUME AND PEAK FLOW RATES WERE REDUCED TO 30% OF THEIR ORIGINAL VALUES BECAUSE THE PROJECT IS A REDEVELOPMENT PROJECT. THE CALCULATED WATER QUALITY PEAK FLOW RATE IS 0.73 CFS. A HYDRODYNAMIC SEPARATOR WILL BE USED TO TREAT THE SITE FOR WATER QUALITY REQUIREMENTS.
  6. DETENTION IS NOT REQUIRED SINCE THE PROPOSED INCREASE IN IMPERVIOUS AREA IS LESS THAN 1 ACRE. THEREFORE, NO EXISTING DRAINAGE CALCULATIONS WERE COMPUTED.
  7. CHANNEL PROTECTION IS NOT REQUIRED SINCE THE PROPOSED AREA OF DISTURBANCE IS LESS THAN 5 ACRES.
  8. THIS PLAN COMPLIES WITH CHAPTER 16.32 OF THE CITY OF WICHITA CODE.

**Developed Drainage Summary Chart - Rational Method**

Drainage Area Basin	Drainage Area (Acres)	Impervious Area (%)	Rational C (10 Yr.)	Tc (min.)	Peak Discharge (cfs)				
					2 Yr.	5 Yr.	10 Yr.	25 Yr.	100 Yr.
A	0.36	100	0.88	15	1.05	1.31	1.52	1.78	2.19
B	0.67	78	0.79	15	1.66	2.13	2.55	2.98	3.64
C	0.41	100	0.88	15	1.19	1.49	1.74	2.03	2.49
D	0.66	21	0.54	15	0.08	0.12	0.16	0.19	0.28
E	0.15	37	0.61	15	0.26	0.34	0.44	0.53	0.76
F	0.02	0	0.45	15	0.02	0.03	0.04	0.05	0.09
G	0.12	13	0.51	15	0.15	0.21	0.28	0.36	0.56
H	0.06	13	0.51	15	0.07	0.11	0.15	0.18	0.28
R1	0.15	100	0.88	15	0.44	0.55	0.63	0.74	0.91
R2	0.17	100	0.88	15	0.49	0.62	0.72	0.84	1.03
X1	0.11	100	0.88	15	0.32	0.40	0.47	0.54	0.67

**Storm Sewer Summary Table**

Pipe Run From	Pipe Run To	Size (in.)	Min. Slope (%)	Material
1	2	18	0.60	RCP
2	3	18	0.50	RCP
3	4	18	0.50	RCP
4	5	12	0.60	RCP
4	6	12	0.60	RCP

**Storm Sewer Structure Table**

Structure Label	Structure Type
1	Exist. SWS MH
2	5' Type 1 Curb Inlet
3	Water Quality Device
4	QT Single Curb Inlet
5	QT Double Curb Inlet
6	QT Single Curb Inlet

**Water Quality Volume Calculation (WQv)**  
WQv = P\*RA/12

Rv Calculation	Coeff.	Area
Rv, Undisturbed	0	0
Rv, Disturbed	0.25	0.47
Rv, Impervious	0.95	1.71
Weighted, Rv	<b>0.80</b>	

**WQv Calculation**  
Water Quality Rainfall Depth, P = 1.2 inches  
Runoff Coeff., Rv = 0.80  
Drainage Area, A = 2.18 acres  
**Water Quality Volume, WQv\* = 0.05 acre-ft**  
\* Volume reduced to 30% of original for redevelopment

**Water Quality Peak Flow Calculation (Qwq)**  
Qwq = qu\*A\*Qwv\*Fp

Data	Value
Drainage Area, A	2.18 acres
Time of Conc., Tc	0.25 hrs
WQ Rainfall Depth, P	1.2 inches
Runoff Coeff., Rv	0.80

**Calculation**  
WQ Prot. Volume, WQv = 0.96 inches  
Calculated CN = 97.7  
S = 0.23 inches  
Ia = 0.05 inches  
Ia/P = 0.04  
qu = 740 cfs/sq. mi/in  
qu = 740 cfs/sq. mi/in

**Water Quality Peak Flow Rate, Qwq\* = 0.73 cfs**  
\* Volume reduced to 30% of original for redevelopment

**HARRIS DALE FORBES**  
LICENSE # 10891  
10.27.14  
PROFESSIONAL ENGINEER  
KANSAS

PROJECT NO.: 20142192

**CED**  
CERTIFIED ENGINEERING DESIGN, P.A.  
1935 W. MAPLE STREET  
WICHITA, KANSAS 67213  
PH: (316) 262-8808  
FAX: (316) 262-1669

**QuikTrip 18th Addition**  
730 NORTH BROADWAY STREET  
WICHITA, KS

**QT**

© COPYRIGHT QUIKTRIP CORPORATION 2011  
ANY UNAUTHORIZED USE, REPRODUCTION,  
PUBLICATION, DISTRIBUTION, OR SALE IN  
WHOLE OR IN PART, IS STRICTLY FORBIDDEN.

PROTOTYPE: P-80 (08/01/14)  
DIVISION:  
VERSION: 001  
DESIGNED BY:  
DRAWN BY:  
REVIEWED BY:

REV	DATE	DESCRIPTION

SHEET TITLE:  
**DRAINAGE PLAN**

SHEET NUMBER:  
**1**

ORIGINAL ISSUE DATE:

