

**DRAINAGE PLAN  
AND  
SUPPORTING CALCULATIONS**

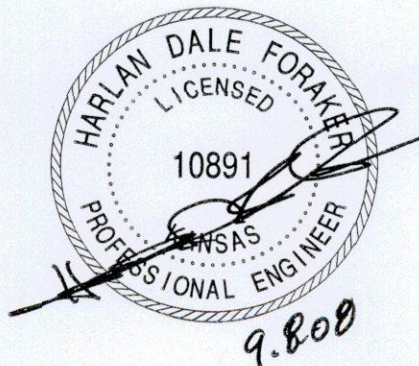
**FOR  
MCPEAK 2ND ADDITION  
AN ADDITION TO  
THE CITY OF WICHITA  
SEDGWICK COUNTY, KANSAS**

**PREPARED FOR:  
MR. AND MRS. CRAIG MCPEAK  
258 N. SOCORA  
WICHITA, KS 67212**

**AUGUST 29, 2008**

**PREPARED BY:**

**CERTIFIED ENGINEERING DESIGN, P.A.  
810 WEST DOUGLAS, SUITE C  
WICHITA, KANSAS 67203-6105  
(316)262-8808 PHONE  
(316)262-1669 FAX**



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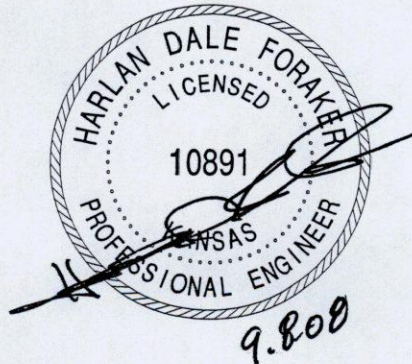
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### Public Works, Engineering Division Final Drainage Plan Submittal Checklist

Reviewer: _____	Date: _____
Subdivision Name: <u>McPeak 2<sup>nd</sup> Addition</u>	Location: <u>SW 1/4 Sec 21 T27S R1W</u>
Total Land Area Of Ownership: <u>2.9</u> Acres	
Type: <input checked="" type="checkbox"/> Residential _____ Commercial _____ Industrial _____ Recreation _____ Municipal _____ Other _____	
Applicant: _____	Contact: _____ Phone #: _____
Engineer: _____	Contact: _____ Phone #: _____

Please check the appropriate box:

I = Included; NA = Non-Applicable; R= Required prior to development  
(If "NA" is checked, an explanation must be entered)

Tab 1. Project Narrative	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Site Location Map, using USGS Map	<input checked="" type="checkbox"/>				
B. Discussion of development, existing conditions, and proposed impacts on stormwater, wetland, riparian, and flood plain	<input checked="" type="checkbox"/>				
C. Discussion of offsite conditions	<input checked="" type="checkbox"/>				
D. Summary of runoff calculations (pre/post development) No increase in peak discharge for all storm series	<input checked="" type="checkbox"/>		<i>100yr No increase</i>		
E. Narrative description of the type and function of the permanent best management practices that are incorporated into the site design					
F. Copy of the plat	<input checked="" type="checkbox"/>				
G. Preliminary grading plan (The final grading plan shall be sealed, signed and dated prior to Engineering receiving the final sanitary sewer plans. One plan sheet and PDF shall be submitted to the Subdivision Engineer.)					
H. Professional Engineer seal, signature and date on cover of report	<input checked="" type="checkbox"/>				
I. CD of drainage plan in PDF format (one file) and one paper copy bound with this checklist included behind the cover					

Tab 2. Existing Conditions Runoff Calculations	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Copy of applicable orthophoto showing proposed project boundaries (preferable in color)	<input checked="" type="checkbox"/>				
B. Runoff Method (Rational, Hydrograph Method, or other approved methods by Engineering)	<input checked="" type="checkbox"/>				
C. Existing topography (no greater than 2-foot contours, 1-foot recommend)	<input checked="" type="checkbox"/>				
D. Total Site Area and Total Impervious Area (acres)	<input checked="" type="checkbox"/>				
E. Benchmarks used for site control	<input checked="" type="checkbox"/>				
F. Streams, creeks, and waterway labeled		<input checked="" type="checkbox"/>			
G. Predominant soils from USDA soil surveys, and/or on site soil borings	<input checked="" type="checkbox"/>				
H. Location and boundaries of natural features such as wetlands, lakes, and ponds with the normal water elevation noted		<input checked="" type="checkbox"/>			
I. Location of existing roads, buildings, parking lots and other impervious areas.	<input checked="" type="checkbox"/>				



J. Location of existing utilities (e.g., water, sewer, gas, electric) and easements	κ				
K. Location of existing conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	κ				
L. Flow paths	κ				
M. Location and dimensions of existing channels, bridges or culvert crossings	κ				
N. Existing conditions hydrologic analysis for runoff rates, volumes and velocities showing methodologies used and supporting calculations (2, 5, 10, 25 & 100 year, 24-hour storm events) or Critical Duration	κ				
O. Assumed pre-developed runoff curve numbers	κ				
P. Existing time of concentrations used in calculations	κ				
Q. Evaluate immediate downstream drainage capacity, not to exceed more than 0.25 miles downstream of site					
R. Existing structural elevations (e.g., invert of pipes, manholes, etc.)		κ			
S. Cross-section data for open channels		κ			
T. Ground water elevations, if applicable		κ			

Tab 3. Post-Development Hydrologic Analysis	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Proposed (post-development) conditions hydrologic and hydraulic analysis for runoff rates, volumes, HGL, and velocities showing the methodologies used and supporting calculations for all applicable design storms (2, 5, 10, 25 & 100 year, 24-hour storm events)	κ				
B. Proposed time of concentrations used in calculations	κ				
C. Assumed post-developed runoff curve numbers	κ				
D. Proposed contours for detention facilities (to equal area used in outlet rating curves)	κ				
E. Preliminary sizing calculations for stormwater controls including contributing drainage area, storage, and outlet configuration	κ				
F. Stage-storage-discharge or outlet rating curves and inflow and outflow hydrographs for storage facilities		κ			
G. Final analysis of potential upstream/downstream impact/effects of project, where necessary					
H. Existing and proposed structural elevations (e.g., invert of pipes, manholes, etc.)		κ			
I. Design water surface elevations and normal pool elevation for ponds.		κ			
J. Typical detail for outlet structures, embankments, spillways, grade control structures, conveyance channels, etc. To include height, width, elevation, and/or diameter.		κ			
K. Proposed limits of clearing and grading	κ				
L. Location of existing and proposed roads, buildings, parking lots and other impervious areas.	κ				
M. Location of existing and proposed utilities (e.g., water, sewer) and easements	κ				
N. Location of existing and proposed conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	κ				
O. Preliminary location and dimensions of proposed channel modifications, such as bridge or culvert crossings		κ			



P. Preliminary selection and location of stormwater controls		X		
Q. Emergency overflow structure's flow path		X		
R. Detention facility provides one-foot of freeboard above the HWL and emergency outfall shown (top of berm elevation shown)		X		
S. The 100-year 24-hour HWL delineated on the plan for detention pond		X		
T. Lowest opening elevations table on the plat for structures located adjacent to channels or ponds		X		
U. Stormwater Management Facilities located within a Reserve		X		
V. Maintenance responsibility of stormwater management facility shall be specified in the plat text. (e.g. HOA, Lot Owners Association, or lot)		X		
W. Off-site drainage easements or agreements required, where necessary		X		

Tab 4. Floodplain Submittal	Applicant			Engr	
	I	NA	Explanation / Location in Plan	I	NA
A. Provide source of flood profile		X			
B. Nearest base flood elevations		X			
C. Delineation of pre-developed regulatory floodplain/floodway limits		X			
D. Delineation of post-developed regulatory floodplain and floodway limits		X			
E. Floodplain boundary determination per elevation (project limits shown)		X			
F. Provide source of floodway data table and discharges		X			
G. Provide all hydrologic and hydraulic study information for site-specific floodplain studies, unnumbered Zone A area elevation determinations and flood plain map revisions or required permits		X			
H. Provide regulatory floodway and four natural profile models (10,50,100, and 500-yr) for existing and future watershed conditions		X			
I. Location of floodplain/floodway limits and relationship of site to upstream/downstream properties (floodplain limits to be per elevation and scaled location)		X			
J. Flood plains and floodways located within a Reserve, where necessary		X			

Tab 5. Federal, State and Local Permits (to be provided prior to construction unless otherwise specified)	Applicant			Engr	
	I/R	NA	Explanation / Location in Plan	I/R	NA
A. US Army Corps of Engineers - Regulatory program permits (404 water quality certification)		X			
B. Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Flood Plain Fill, Levee, Water Appropriations, Dam safety permit, etc.)		X			
C. Federal Emergency Management Agency (FEMA) Letter of Map Changes (LOMA, LOMR, LOMR-f, CLOMR, etc.) Shall be included and approved when project modifies the limits of the floodway.		X			
D. Kansas Department of Transportation		X			
E. Sedgwick County Right-of-way Permit		X			

McPeak 2<sup>nd</sup> Addition  
Drainage Plan(Con't)  
Mr. Scott Lindebak, P.E.  
August 29, 2008

**CERTIFIED ENGINEERING DESIGN, P.A**  
810 West Douglas, Suite C  
Wichita, KS 67203-6105  
(316)262-8808 Office  
(316)262-1669 Fax

## **LETTER OF TRANSMITTAL**

DATE: August 29, 2008

TO: Mr. Scott Lindebak  
Department of Public Works  
1144 S. Seneca  
Wichita, KS 67202

RE: Drainage Plan  
McPeak 2nd Addition  
Wichita, KS

FROM: Harlan D. Foraker, P.E. *HDF*

### **I. PROJECT NARRATIVE**

The project consists of the replat of an existing city lot and the platting of an adjacent unplatted tract to allow residential infill to occur. There is an existing home located on what will be Lot 1. Lot 1 will be approximately 1/3 acre. A new home will be constructed on Lot 2 which will be approximately 2.6 acres. The site is located on the east side of Socora Drive and south of 2<sup>nd</sup> Street North. The site is in the Southwest ¼ of Section 21, Township 27 South, Range 1 West of the 6<sup>th</sup> Principle Meridian. The SCS soil present is Milan loam.

### **II. EXISTING CONDITIONS RUNOFF CALCULATIONS**

The rational method will be used to determine the peak discharges from the study area. Rational 'C' Factors were assigned to the existing site and proposed improvements from "Interim Drainage and Storm Sewer Policy for Design Criteria and Documentation" for the City of Wichita, Kansas. Rainfall Intensity tables from the same policy were utilized to determine the rainfall intensity for the 2, 5, 10, 25, and 100 year design storms.

The Soil Conservation Service TR-55 manual was used to compute the Time of Concentration for the drainage subareas. A design assumption was made as follows: that the minimum subarea time of concentration is 15 minutes.

McPeak 2<sup>nd</sup> Addition  
 Drainage Plan(Con't)  
 Mr. Scott Lindebak, P.E.  
 August 29, 2008

Soil types were determined from the Natural Resources Conservation Service's Soil Survey web site. The SCS soil present is a Milan Loam which is a SCS Class B Soil. The Milan Loam is listed with a slope of 1 to 3 percent.

The developed drainage subareas have been delineated on the 1" = 50' site and topographic mapping survey performed for this site.

Design Storm Events Evaluated: 2, 5, 10, 25, and 100 yr. storm events

The runoff calculations for the property have been completed utilizing the 5 storm events.

The area to the north and east were developed in recent years and drain to storm sewers in 2<sup>nd</sup> Street North and Woodchuck. These residential areas are fully developed. The area to the south and west continues to be large unplatted tracts that is slowly having newer larger homes built on the tracts.

The drainage from the parcel currently eventually works its way to Socora Drive. Socora Drive is a seal coat/cold mix road with open ditches. From Socora the water eventually works its way north to the storm sewer system that serves 2<sup>nd</sup> Street North.

The following table summarizes the peak discharge for the existing condition for McPeak 2<sup>nd</sup> Addition:

**EXISTING PEAK RUNOFF**

Description	C	Tc	I	Area	Q(cfs)
Existing Drainage Area (2 yr.)	0.26	57	1.76	2.93	1.34
Existing Drainage Area (5 yr.)	0.29	57	2.22	2.93	1.89
Existing Drainage Area (10 yr.)	0.36	57	2.61	2.93	2.75
Existing Drainage Area (25 yr.)	0.42	57	3.07	2.93	3.78
Existing Drainage Area (100 yr.)	0.52	57	3.84	2.93	5.85

McPeak 2<sup>nd</sup> Addition  
 Drainage Plan(Con't)  
 Mr. Scott Lindebak, P.E.  
 August 29, 2008

### III. POST DEVELOPMENT HYDROLOGIC ANALYSIS

Design Storm Events Evaluated: 2, 5, 10, 25, and 100 yr. storm events

The runoff calculations for the property have been completed utilizing the 5 storm events.

The developed condition for two lots will be as residential lots. Lot 1 is estimated to have more than 3,000 square feet of existing impervious surface. Lot 2 has approximately 1,800 square feet of existing impervious surface. The drainage pattern is the same as the existing and will continue to drain in the same manner as it currently does.

The following table summarizes the peak discharge for developed conditions for the Lots 1 and 2 of the McPeak 2nd Addition.

#### PROPOSED PEAK RUNOFF

Description	C	Tc	I	Area	Q(cfs)
Drainage Area (2 yr.)	0.29	57	1.76	2.93	1.50
Drainage Area (5 yr.)	0.31	57	2.22	2.93	2.02
Drainage Area (10 yr.)	0.38	57	2.61	2.93	2.91
Drainage Area (25 yr.)	0.43	57	3.07	2.93	3.87
Drainage Area (100 yr.)	0.52	57	3.84	2.93	5.85

#### PROPOSED CHANGES IN PEAK RUNOFF

Description	Q(cfs) Existing	Q(cfs) Proposed	Q(cfs) Incr.	Percent (%) Q Increase
Drainage Area (2 yr.)	1.34	1.50	0.16	12
Drainage Area (5 yr.)	1.89	2.02	0.13	7
Drainage Area (10 yr.)	2.75	2.91	0.16	6
Drainage Area (25 yr.)	3.78	3.87	0.09	2
Drainage Area (100 yr.)	5.85	5.85	0.00	0

McPeak 2<sup>nd</sup> Addition  
Drainage Plan(Con't)  
Mr. Scott Lindebak, P.E.  
August 29, 2008

The developed site is proposed to be two residential lots totaling just under 3 acres. The current site has approximately 4,800 impervious surface while the developed condition is estimated to add approximately 5-6,000 square feet.

As the previous tables show the peak runoff from the storms do not change substantially. While there is additional runoff in the 2 year storm, the increase is only 0.16 cfs. By the time the 100 year storm is taken into consideration the change in peak flow has decreased to zero.

**IV. FLOODPLAIN SUBMITTAL** – No FEMA floodplain is located on this plat.

**V. FEDERAL, STATE AND LOCAL PERMITS**

- A. US Army Corp of Engineers-Not Applicable
- B. Kansas Dept. of Agriculture-Not Applicable
- C. FEMA- Not Applicable
- D. Kansas Department of Transportation-Not Applicable
- E. Sedgwick County Right-of-Way Permit-Not Applicable

**VII. APPENDIX I:**

All charts, graphs, tables including a 1"=50' scale drainage plan map are included for review.

# APPENDIX

# McPeak 2nd Addition



(C) 2008 Sedgwick County GIS

## Legend

### Historic Site Buffers

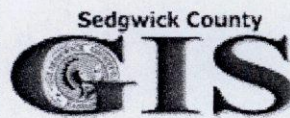
- 1000' National Historic Site Buffers
- 500' Local Historic Site Buffers
- Historic Districts
- Nationally Registered Historic Sites
- Locally Registered Historic Sites
- Special Use Cases

### Zoning Districts

- Rural Residential
- Single Family 20,000
- Single Family 10,000
- Single Family 5,000
- Two-Family
- Multi-Family 18 d.u./ac
- Multi-Family 29 d.u./ac
- Multi-Family 75 d.u./ac
- Manufactured Housing

- Neighborhood Office
- General Office
- Neighborhood Retail
- Limited Commercial
- Office Warehouse
- General Commercial
- Industrial Park
- Industrial Park - Airport
- Central Business District

- Limited Industrial
- General Industrial
- University
- Planned Unit Development
- Air Force Base
- Unknown
- Not Zoned



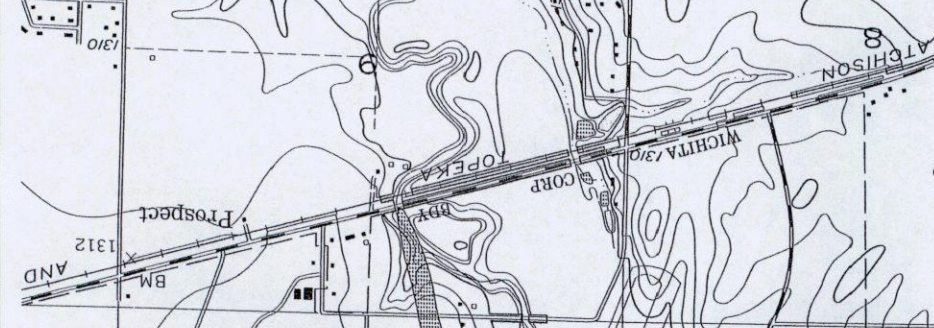
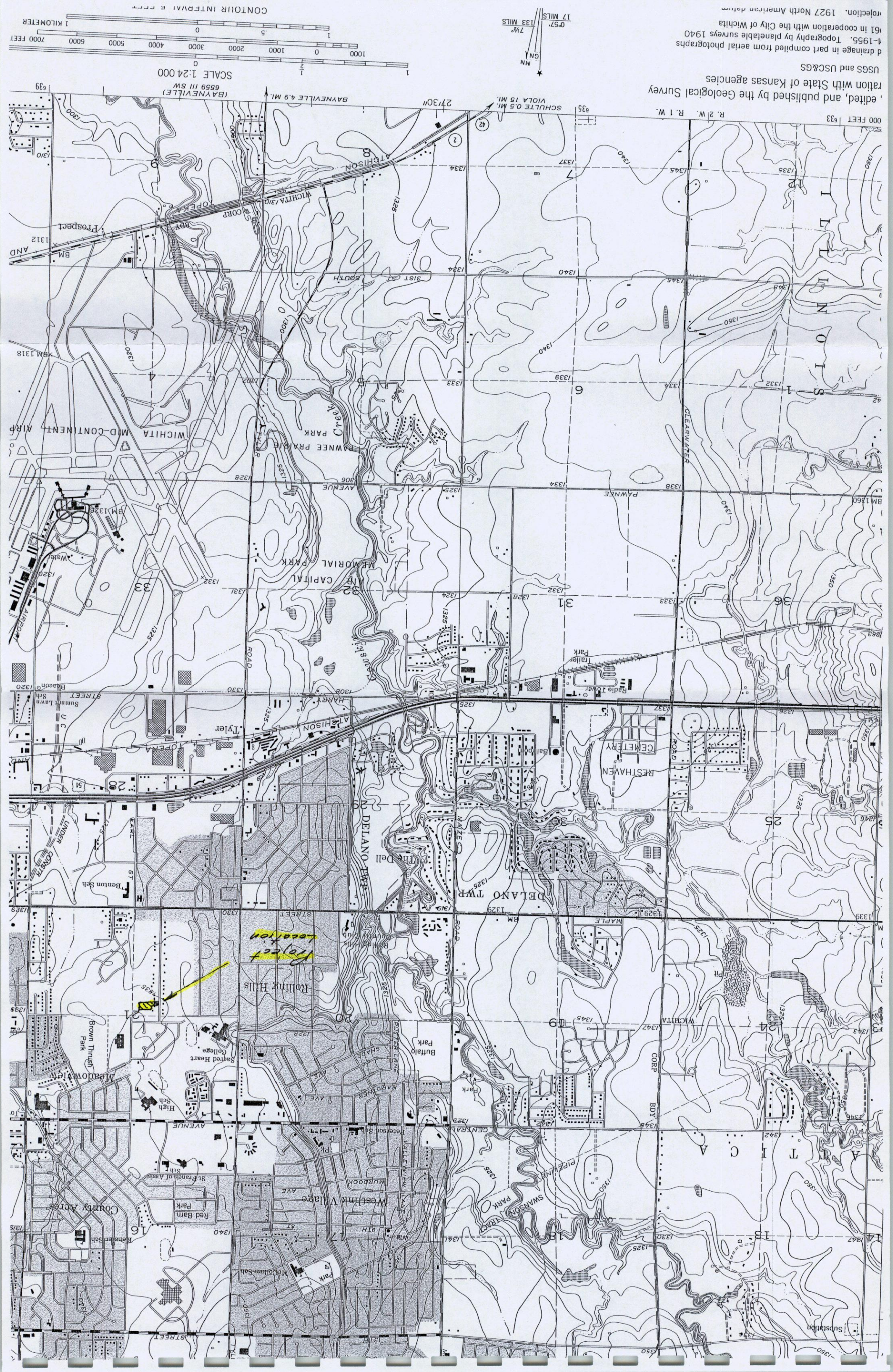
**Sedgwick County**  
**Geographic Information Services**  
 Division of Information & Operations  
[www.sedgwickcounty.org/gis](http://www.sedgwickcounty.org/gis)  
 525 N. Main, Suite 212, Wichita, KS 67203  
 Tel: 316.660.9290 Fax: 316.262.1174

**DISCLAIMER:** It is understood that, while Sedgwick County Geographic Information Services (SCGIS), City of Wichita GIS, (for purposes of the road centerline file), participating agencies, and information suppliers, have no indication or reason to believe that there are inaccuracies in information provided, SCGIS, its suppliers make no representations of any kind, including, but not limited to, warranties of merchantability or fitness for a particular use, nor are any such warranties to be implied with respect to the information, data or services furnished herein. In no event shall the Data Providers become liable to users of these data, or any other party, for any loss or damages, consequential or otherwise, including but not limited to time, money, or goodwill, arising from the use, operation or modification of the data. In using these data, users further agree to indemnify, defend, and hold harmless the Data Providers for any and all liability of any nature arising out of or resulting from the lack of accuracy or correctness of the data, or the use of the data. No person shall sell, give or receive for the purpose of selling or offering for sale, any portion of the information provided herein.

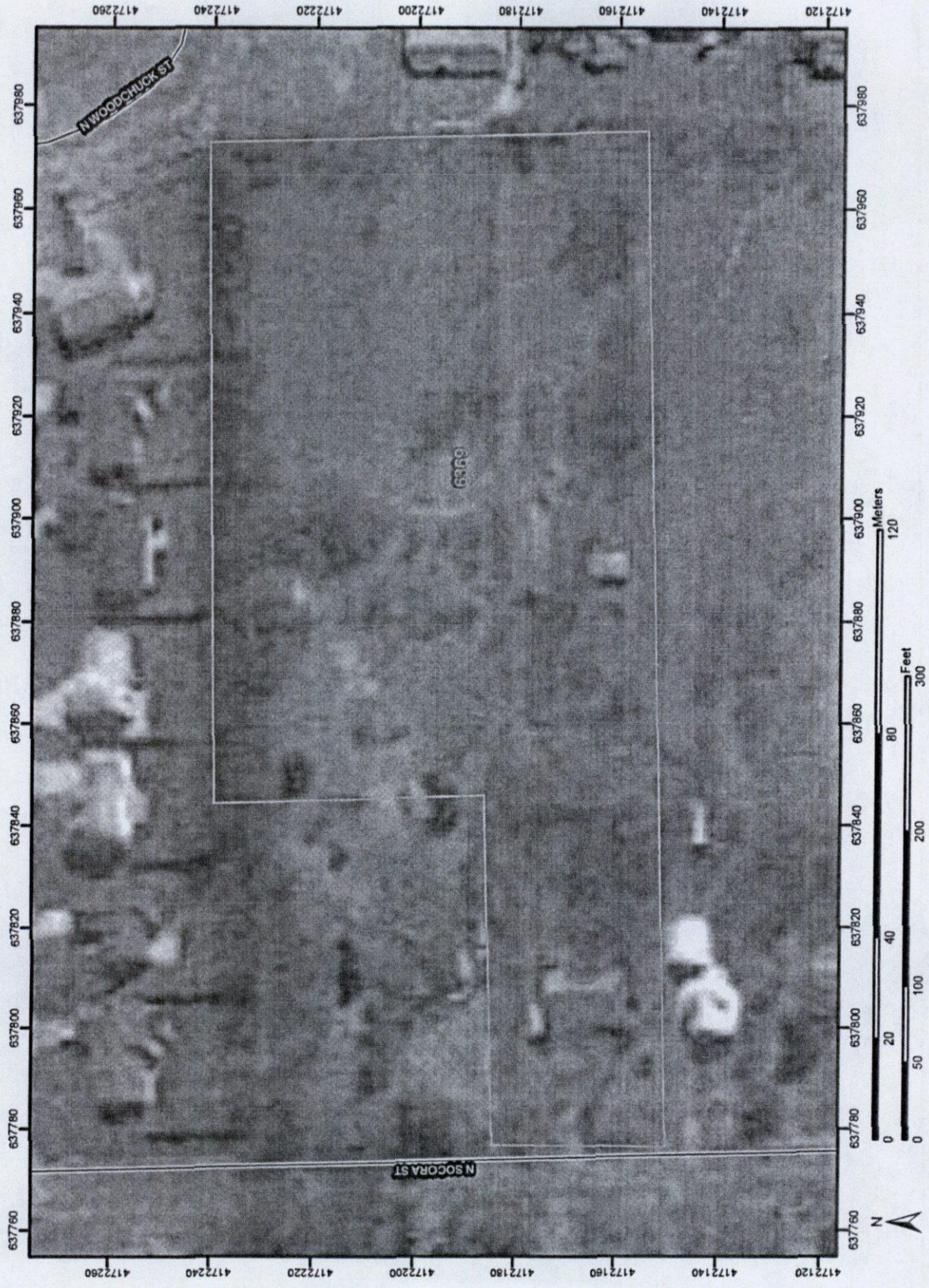
USGS and USCS&GS  
ration with State of Kansas agencies  
, edited, and published by the Geological Survey

drainage in part compiled from aerial photographs  
1-1955. Topography by plane-table surveys 1940  
in cooperation with the City of Wichita

1927 North American datum  
projection.



Soil Map—Sedgwick County, Kansas  
(McPeak 2nd)



USDA  
Natural Resources  
Conservation Service

Web Soil Survey 2.0  
National Cooperative Soil Survey

### MAP LEGEND

- Area of Interest (AOI)
  - Area of Interest (AOI)
- Soils
  - Soil Map Units
- Special Point Features
  - Blowout
  - Borrow Pit
  - Clay Spot
  - Closed Depression
  - Gravel Pit
  - Gravelly Spot
  - Landfill
  - Lava Flow
  - Marsh
  - Mine or Quarry
  - Miscellaneous Water
  - Perennial Water
  - Rock Outcrop
  - Saline Spot
  - Sandy Spot
  - Severely Eroded Spot
  - Sinkhole
  - Slide or Slip
  - Sodic Spot
  - Spoil Area
  - Stony Spot
- Special Line Features
  - Gully
  - Short Sleep Slope
  - Other
- Political Features
  - Municipalities
  - Cities
  - Urban Areas
- Water Features
  - Oceans
  - Streams and Canals
- Transportation
  - Rails
  - Roads
    - Interstate Highways
    - US Routes
    - State Highways
    - Local Roads
    - Other Roads
- Very Stony Spot
- Wet Spot
- Other

### MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL: <http://websoilsurvey.nrcs.usda.gov>  
Coordinate System: UTM Zone 14N

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sedgwick County, Kansas  
Survey Area Data: Version 4, Dec 29, 2007

Date(s) aerial images were photographed: 3/20/1996; 3/31/1996

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Sedgwick County, Kansas (KS173)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6369	Milan loam, 1 to 3 percent slopes	3.4	100.0%
Totals for Area of Interest (AOI)		3.4	100.0%

WORKSHEET 3: TIME OF CONCENTRATION

Project: McPeak 2nd Addition

By

Date

Section: Sec 21 T 27 S R 1 W

Checked

Date

Parcel Description: \_\_\_\_\_ Urban 2+ acre lot

Existing            Developed

Sheet Flow

- |   |                                                    |                |
|---|----------------------------------------------------|----------------|
| 1 | Surface Description (Table 3-1): _____ urban lot   |                |
| 2 | Manning's Roughness Coefficient, n (Table 3-1)     | 0.24           |
| 3 | Flow Length, L<=300 ft                             | 300 ft.        |
| 4 | Two-yr 24-hr rainfall, P2                          | 3.5 in         |
| 5 | Land Slope, s                                      | 0.0062 ft./ft. |
| 6 | T = $\frac{0.007 (nL)^{0.8}}{(P2^{0.5})(s^{0.4})}$ | 0.87493 hr     |

Shallow Concentrated Flow

- |    |                                          |                |
|----|------------------------------------------|----------------|
| 7  | Surface Description ( Paved or Unpaved ) | unpaved        |
| 8  | Flow Length, L                           | 346 ft.        |
| 9  | Watercourse Slope, s                     | 0.0062 ft./ft. |
| 10 | Average Velocity, V (Figure 3-1)         | 1.2 ft./s      |
| 11 | T = L / 3600 V                           | 0.08009 hr     |

Channel Flow

- |    |                                   |                   |
|----|-----------------------------------|-------------------|
| 12 | Cross sectional Flow Area, a      | 0 ft <sup>2</sup> |
| 13 | Wetted Perimeter, P               | 0 ft.             |
| 14 | Hydraulic Radius r = a / P        | 0 ft.             |
| 15 | Channel Slope, S                  | 0 ft./ft.         |
| 16 | Mannin's Roughness Coeff., n      |                   |
| 17 | V = $1.49 (r^{2/3})(s^{1/2}) / n$ | ##### ft./s       |
| 18 | Flow Length, L                    | ft.               |
| 19 | T = L / 3600 V                    | 0 hr              |
| 20 | T = T + T + T                     | 0.96 hr           |
- 57 minutes

PROJECT: Mc Peak 2<sup>nd</sup> Addition

DATE \_\_\_\_\_

LOCATION: NW 1/4 SW 1/4 Sec 21 T27S R1W

BY \_\_\_\_\_ CKD \_\_\_\_\_

CLIENT: \_\_\_\_\_

JOB NO. \_\_\_\_\_ SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

*Existing*

Drainage Area 2.93 Acres

Soil Type

Milan loam B 0-1%

*Time of Concentration*

Use 57 minutes

$$L_2 = 1.76$$

$$L_5 = 2.22$$

$$L_{10} = 2.61$$

$$L_{25} = 3.07$$

$$L_{100} = 3.84$$

*"L" Factor*

Use 1/3 Acre house + remainder urban lawn

$$C_2 = .12 (.39) + .88 .24 = .26$$

$$C_5 = .12 (.41) + .88 .27 = .29$$

$$C_{10} = .12 (.47) + .88 .35 = .36$$

$$C_{25} = .12 (.51) + .88 .41 = .42$$

$$C_{100} = .12 (.57) + .88 .51 = .52$$

*Peak Flow*

$$Q_2 = .26 \quad 1.76 \quad 2.93 = 1.34 \text{ cfs}$$

$$Q_5 = .29 \quad 2.22 \quad 2.93 = 1.89$$

$$Q_{10} = .36 \quad 2.61 \quad 2.93 = 2.75$$

$$Q_{25} = .42 \quad 3.07 \quad 2.93 = 3.78$$

$$Q_{100} = .52 \quad 3.84 \quad 2.93 = 5.85$$

PROJECT: Mc Peak 2nd Addition

DATE \_\_\_\_\_

LOCATION: SW 1/4 Sec 21 T27S R1W

BY \_\_\_\_\_ CKD \_\_\_\_\_

CLIENT: \_\_\_\_\_

JOB NO. \_\_\_\_\_ SHEET NO. \_\_\_\_\_ OF \_\_\_\_\_

### Proposed

Drainage Area 2.93 Acres

Soil Type

Milon loam 0-1% B

### Time of Concentration

USE 57 minutes

$$L_2 = 1.76$$

$$L_5 = 2.22$$

$$L_{10} = 2.61$$

$$L_{25} = 3.07$$

$$L_{100} = 3.84$$

### "C" Factor

USE  $\frac{1}{8}$  acre hse .12      1 acre hse .34      1.6 ac urban lawn .54

$$C_2 = .12(.35) + .34(.33) + .54(.24) = .29$$

$$C_5 = .12(.41) + .34(.35) + .54(.27) = .31$$

$$C_{10} = .12(.47) + .34(.40) + .54(.35) = .38$$

$$C_{25} = .12(.51) + .34(.43) + .54(.41) = .43$$

$$C_{100} = .12(.57) + .34(.51) + .54(.51) = .52$$

### Peak Flow

$$Q = C I A$$

$$Q_2 = .29 (1.76) 2.93 = 1.50 \text{ cfs}$$

$$Q_5 = .31 (2.22) 2.93 = 2.02 \text{ cfs}$$

$$Q_{10} = .38 (2.61) 2.93 = 2.91 \text{ cfs}$$

$$Q_{25} = .43 (3.07) 2.93 = 3.87$$

$$Q_{100} = .52 (3.84) 2.93 = 5.85$$

## ATTACHMENT D

## DRAINAGE CRITERIA

## CITY OF WICHITA, KANSAS

RECOMMENDED RUNOFF COEFFICIENTS FOR RATIONAL METHOD  
AND PERCENT IMPERVIOUS FOR UNIT HYDROGRAPH METHOD

Land Use or Surface Characteristics	Percent Impervious	Frequency			
		<u>2</u>	<u>5</u>	<u>10</u>	<u>100</u>
1. Business:					
Downtown Areas	95	0.84	0.85	0.87	0.91
Neighborhood Areas	70	0.68	0.69	0.73	0.80
2. Residential:					
<u>Single Family (Soil Group D)</u>					
1/8 Acre	50	0.57	0.61	0.66	0.79
1/4 Acre	38	0.50	0.54	0.62	0.76
1/3 Acre	30	0.46	0.50	0.59	0.73
1/2 Acre	25	0.42	0.48	0.56	0.72
3/4 Acre	22	0.42	0.46	0.55	0.71
1 Acre	20	0.41	0.45	0.54	0.71
<u>Multi-Family (Soil Group D)</u>					
Multi-Unit (detached)	60	0.62	0.66	0.72	0.82
Multi-Unit (attached)	65	0.64	0.68	0.73	0.83
Apartments	75	0.70	0.73	0.79	0.86
<u>Single Family (Soil Group C)</u>					
1/8 Acre	50	0.55	0.58	0.64	0.73
1/4 Acre	38	0.48	0.51	0.57	0.68
1/3 Acre	30	0.43	0.46	0.53	0.65
1/2 Acre	25	0.40	0.43	0.50	0.63
3/4 Acre	22	0.39	0.42	0.49	0.62
1 Acre	20	0.37	0.40	0.48	0.61
<u>Multi-Family (Soil Group C)</u>					
Multi-Unit (detached)	60	0.60	0.63	0.69	0.77
Multi-Unit (attached)	65	0.63	0.66	0.71	0.79
Apartments	75	0.68	0.72	0.77	0.83
<u>Single-Family (Soil Group B)</u>					
1/8 Acre	50	0.52	0.54	0.59	0.67
1/4 Acre	38	0.44	0.46	0.52	0.61
1/3 Acre	30	0.39	0.41	0.47	0.57
1/2 Acre	25	0.36	0.38	0.44	0.54
3/4 Acre	22	0.34	0.36	0.42	0.52
1 Acre	20	0.33	0.35	0.40	0.51
<u>Multi-Family (Soil Group B)</u>					
Multi-Unit (detached)	60	0.58	0.60	0.65	0.72
Multi-Unit (attached)	65	0.61	0.64	0.68	0.75
Apartments	75	0.67	0.70	0.74	0.80

Land Use or face Characteristics	Percent Impervious	Frequency			
		<u>2</u>	<u>5</u>	<u>10</u>	<u>100</u>
<u>Single Family (Soil Group A)</u>					
1/8 Acre	50	0.47	0.50	0.54	0.60
1/4 Acre	38	0.39	0.41	0.45	0.52
1/3 Acre	30	0.33	0.35	0.39	0.47
1/2 Acre	25	0.30	0.31	0.35	0.44
3/4 Acre	22	0.28	0.29	0.33	0.42
1 Acre	20	0.26	0.28	0.32	0.40
<u>Multi-Family (Soil Group A)</u>					
Multi-Unit (detached)	60	0.55	0.57	0.61	0.67
Multi-Unit (attached)	65	0.58	0.60	0.64	0.70
Apartments	75	0.65	0.68	0.72	0.77
3. Industrial:					
Light Areas	70	0.68	0.69	0.73	0.80
Heavy Areas	80	0.74	0.76	0.79	0.84
4. Playgrounds:	15	0.33	0.35	0.42	0.55
5. Schools:	40	0.49	0.51	0.56	0.66
6. Railroad Yard Areas:	30	0.43	0.45	0.50	0.62
Undeveloped Urban Areas: Offsite Flow Analysis (when land use not defined)	45	0.52	0.54	0.59	0.68
8. Streets:					
Paved	99	0.87	0.88	0.90	0.93
Gravel	00	0.24	0.26	0.33	0.48
9. Drive, Parking Lots and Walks:	96	0.87	0.87	0.88	0.89
10. Roofs:	90	0.80	0.85	0.90	0.93
11. Urban Lawn Areas (See Note No. 1 below):					
<u>Soil Group A</u>					
Slope less than 1%	00	0.08	0.09	0.13	0.23
Slope 1% to 4%	00	0.12	0.13	0.17	0.27
Slope more than 4%	00	0.16	0.17	0.21	0.31
<u>Soil Group B</u>					
Slope less than 1%	00	0.16	0.18	0.24	0.37
Slope 1% to 4%	00	0.20	0.22	0.28	0.41
Slope more than 4%	00	0.24	0.26	0.32	0.45
<u>Soil Group C</u>					
Slope less than 1%	00	0.24	0.27	0.35	0.51
Slope 1% to 4%	00	0.26	0.29	0.37	0.53
Slope more than 4%	00	0.28	0.31	0.39	0.55

Land Use or Face Characteristics	Percent Impervious	Frequency			
		<u>2</u>	<u>5</u>	<u>10</u>	<u>100</u>
<u>Soil Group D</u>					
Slope less than 1%	00	0.28	0.33	0.43	0.63
Slope 1% to 4%	00	0.30	0.35	0.45	0.65
Slope more than 4%	00	0.32	0.37	0.47	0.67

Note No. 1: Coefficients shown in the above table are for pervious open space areas with thick turf which includes pervious areas in parks and cemeteries. Coefficients shown above must be increased 0.02 for use with agricultural pasture areas. Coefficients shown above must be reduced by 0.04 for use with agricultural cultivated areas. Group A soils are well-drained, coarse textured sands with high infiltration rates. Group B soils are moderately well-drained, moderately coarse textured soils with moderate infiltration rates. Group C soils are moderately poor-drained, moderately fine textured soils with slow infiltration rates. Group D soils are poor-drained, fine textured soils with very slow infiltration rates.

GENERAL NOTE: These Rational Formula Coefficients may not be valid for basins 320 acres or larger.

April 15, 1986

- ATTACHMENT A  
DRAINAGE CRITERIA MANUAL

CITY OF WICHITA, KANSAS

RAINFALL INTENSITY TABLE FOR SEDGWICK COUNTY, KANSAS

The following tabulation contains rainfall intensity in inches per hour as derived from ESSA Weather Bureau Technical Paper 40 Modified to NWS Hydro-35, 1977 During First Hour

$(\frac{1}{2})$ DURATION IN MINUTES	RETURN PERIODS OF						
	1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
5	$i = 4.18$	5.57	6.53	7.41	8.52	9.48	10.32
6	3.99	5.32	6.25	7.09	8.16	9.09	9.89
7	3.81	5.09	5.99	6.81	7.84	8.74	9.50
8	3.66	4.89	5.75	6.55	7.55	8.42	9.15
9	3.52	4.70	5.54	6.31	7.28	8.13	8.83
10	3.39	4.52	5.34	6.09	7.04	7.86	8.54
11	3.27	4.36	5.16	5.89	6.81	7.61	8.27
12	3.18	4.21	4.99	5.71	6.60	7.38	8.02
13	3.05	4.08	4.84	5.53	6.41	7.17	7.79
14	2.96	3.95	4.69	5.37	6.23	6.97	7.57
15	2.87	3.83	4.56	5.22	6.06	6.78	7.37
16	2.78	3.72	4.43	5.08	5.90	6.60	7.18
17	2.71	3.61	4.31	4.95	5.75	6.44	7.00
18	2.63	3.51	4.20	4.83	5.61	6.29	6.84
19	2.56	3.42	4.10	4.71	5.47	6.14	6.68
20	2.50	3.33	4.00	4.60	5.35	6.00	6.53
21	2.44	3.25	3.90	4.50	5.23	5.87	6.39
22	2.38	3.17	3.81	4.40	5.12	5.75	6.26
23	2.32	3.10	3.73	4.31	5.01	5.63	6.13
24	2.27	3.03	3.65	4.22	4.91	5.52	6.01
25	2.22	2.96	3.57	4.13	4.81	5.41	5.90
26	2.20	2.90	3.50	4.05	4.72	5.31	5.79
27	2.16	2.84	3.43	3.98	4.63	5.21	5.69
28	2.14	2.78	3.37	3.90	4.55	5.12	5.59
29	2.11	2.72	3.30	3.83	4.47	5.03	5.49
30	2.08	2.67	3.24	3.76	4.39	4.94	5.40
31	2.05	2.62	3.19	3.70	4.32	4.86	5.32
32	2.02	2.57	3.10	3.63	4.25	4.79	5.22
33	1.99	2.52	3.05	3.57	4.18	4.71	5.14
34	1.96	2.48	3.01	3.51	4.11	4.63	5.07
35	1.93	2.44	2.98	3.46	4.05	4.56	5.00
36	1.91	2.39	2.93	3.41	3.99	4.50	4.93
37	1.89	2.35	2.88	3.36	3.93	4.43	4.86
38	1.87	2.32	2.84	3.31	3.87	4.37	4.79
39	1.85	2.28	2.80	3.26	3.82	4.31	4.73
40	1.83	2.24	2.76	3.22	3.76	4.25	4.66
41	1.81	2.21	2.72	3.17	3.71	4.19	4.60
42	1.79	2.18	2.68	3.13	3.66	4.13	4.54
43	1.77	2.14	2.64	3.09	3.61	4.08	4.49
44	1.75	2.11	2.61	3.05	3.57	4.03	4.43
45	1.73	2.08	2.57	3.01	3.52	3.98	4.38

ATTACHMENT A CONTINUED  
Page 2

DURATION IN MINUTES	RETURN PERIODS OF						
	1-YR	2-YR	5-YR	10-YR	25-YR	50-YR	100-YR
46	1.70	2.05	2.54	2.97	3.48	3.93	4.33
47	1.67	2.02	2.50	2.93	3.44	3.88	4.28
48	1.66	2.00	2.47	2.90	3.39	3.84	4.23
49	1.64	1.97	2.44	2.86	3.35	3.79	4.18
50	1.61	1.95	2.41	2.83	3.32	3.75	4.13
51	1.59	1.92	2.38	2.79	3.28	3.71	4.09
52	1.56	1.89	2.35	2.76	3.24	3.67	4.05
53	1.54	1.86	2.33	2.73	3.20	3.63	4.00
54	1.52	1.84	2.30	2.70	3.17	3.59	3.96
55	1.50	1.81	2.27	2.67	3.14	3.55	3.92
56	1.47	1.79	2.25	2.64	3.10	3.51	3.88
57	1.45	1.76	2.22	2.61	3.07	3.48	3.84
58	1.43	1.74	2.20	2.59	3.04	3.44	3.81
59	1.42	1.72	2.18	2.56	3.01	3.41	3.77
60	1.40	1.69	2.15	2.53	2.98	3.37	3.73
61	1.38	1.67	2.13	2.51	2.95	3.34	3.70
62	1.36	1.65	2.11	2.48	2.92	3.31	3.67
63	1.34	1.63	2.09	2.46	2.89	3.28	3.63
64	1.33	1.61	2.07	2.44	2.86	3.25	3.60
65	1.31	1.59	2.05	2.41	2.84	3.22	3.57
66	1.30	1.57	2.03	2.39	2.81	3.19	3.54
67	1.28	1.56	2.01	2.37	2.79	3.16	3.51
68	1.26	1.54	1.99	2.35	2.76	3.13	3.48
69	1.25	1.52	1.97	2.33	2.74	3.10	3.45
70	1.24	1.50	1.95	2.31	2.71	3.08	3.42
71	1.22	1.49	1.93	2.28	2.69	3.05	3.39
72	1.21	1.47	1.92	2.26	2.67	3.02	3.36
73	1.20	1.46	1.90	2.25	2.64	3.00	3.34
74	1.18	1.44	1.88	2.23	2.63	2.98	3.31
75	1.17	1.43	1.86	2.21	2.61	2.95	3.29
76	1.16	1.41	1.85	2.19	2.58	2.93	3.26
77	1.15	1.40	1.83	2.17	2.55	2.90	3.24
78	1.13	1.38	1.82	2.15	2.53	2.88	3.22
79	1.12	1.37	1.80	2.14	2.50	2.86	3.19
80	1.11	1.36	1.79	2.12	2.48	2.84	3.16
81	1.10	1.34	1.77	2.10	2.46	2.82	3.13
82	1.09	1.33	1.76	2.08	2.43	2.79	3.10
83	1.08	1.32	1.74	2.06	2.41	2.76	3.07
84	1.07	1.31	1.73	2.04	2.39	2.74	3.04
85	1.06	1.30	1.72	2.02	2.37	2.71	3.01
86	1.05	1.28	1.70	2.00	2.34	2.69	2.99
87	1.04	1.27	1.69	1.99	2.32	2.66	2.96
88	1.03	1.26	1.68	1.97	2.30	2.64	2.93
89	1.02	1.25	1.68	1.95	2.28	2.62	2.91
90	1.01	1.24	1.66	1.93	2.26	2.59	2.88

## EXHIBIT NO. 1

## SOIL LEGEND

<u>SYMBOL</u>	<u>HYDROLOGIC GROUP</u>	<u>NAME</u>
Aa	B	Albion-Shellabarger sandy loams, 1 to 4 percent slopes
Ab	B	Albion and Shellabarger sandy loams, 7 to 15 percent slopes
Ba	C	Blanket silt loam, 0 to 1 percent slopes
Bb	C	Blanket silt loam, 1 to 3 percent slopes
Ca	B	Canadian fine sandy loam
Cb	B	Canadian-Waldeck fine sandy loams
Cc	D	Carwile fine sandy loam
Cd	B	Clark-Ost clay loams, 1 to 4 percent slopes
Ce	C	Clime silty clay, 3 to 6 percent slopes
Ea	B	Elandco silt loam
Eb	B	Elandco silt loam, occasionally flooded
Ec	B	Elandco silt loam, frequently flooded
Fa	B	Farnum loam, 0 to 1 percent slopes
Fb	B	Farnum loam, 1 to 3 percent slopes
Fc	B	Farnum loam, sandy substratum, 0 to 1 percent slopes
Ga	D	Goessel silty clay, 0 to 1 percent slopes
Gb	D	Goessel silty clay, 1 to 2 percent slopes
Ia	D	Irwin silty clay loam, 1 to 3 percent slopes
Ib	D	Irwin silty clay loam, 3 to 6 percent slopes
Ic	D	Irwin silty clay loam, 2 to 6 percent slopes, eroded
La	C	Lesho loam
Lb	A	Lincoln soils
Ma	B	Milan loam, 1 to 3 percent slopes
Mb	B	Milan form, 3 to 6 percent slopes
Mc	B	Milan clay loam, 2 to 6 percent slopes, eroded
Na	B	Naron fine sandy loam
Oc	D	Owens clay loam, 1 to 3 percent slopes
Od	D	Owens-Rock outcrop complex, 3 to 10 percent slopes
Pa		Pits
Pb	D	Plevna fine sandy loam
Pc	A	Pratt loamy fine sand, undulating
Pd	A	Pratt-Tivoli complex, rolling
Ra	D	Renfrow silty clay loam, 1 to 3 percent slopes
Rb	D	Renfrow silty clay loam, 3 to 6 percent slopes
Rc	D	Renfrow-Owens clay loams, 1 to 4 percent slopes
Rd	D	Rosehill silty clay, 1 to 3 percent slopes
Sa	B	Shellabarger sandy loam, 1 to 3 percent slopes
Sb	B	Shellabarger sandy loam, 3 to 6 percent slopes
Sc	B	Shellabarger sandy loam, 3 to 6 percent slopes, eroded
Ta	D	Tabler silty clay loam
Tb	D	Tabler-Drummond complex
Ua	B	Urban land-Canadian complex
Ub	B	Urban land-Elandco complex
Uc	B	Urban land-Farnum complex, 0 to 3 percent slopes
Ud	D	Urban land-Irwin complex, 1 to 3 percent slopes
Ue	D	Urban land-Tabler complex
Va	B	Vanoss silt loam, 0 to 1 percent slopes
Yb	B	Vanoss silt loam, 1 to 3 percent slopes
Yc	B	Vanoss silt loam, 3 to 6 percent slopes
Yd	B	Vanoss silt loam, 3 to 6 percent slopes, eroded
Ye	D	Vernon sandy loam, 1 to 3 percent slopes
Vf	D	Vernon sandy loam, 3 to 6 percent slopes
Wa	C	Waldeck sandy loam
Wb	D	Waurika silt loam

**PRELIMINARY PLAT**  
**McPEAK 2ND ADDITION**  
 WICHITA, SEDGWICK COUNTY, KANSAS

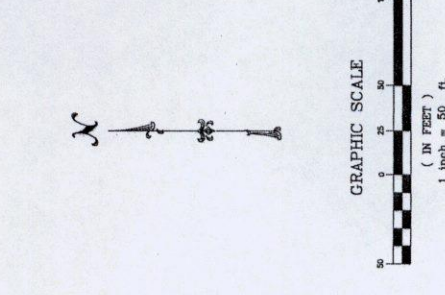
**Legal Description:**  
 Lot 2, Block A, McPeak Addition, Wichita, Sedgewick County, Kansas.  
 A tract in the SW 1/4 of Section 21, Twp. 27-S, R-1-W of the 6th P.M.,  
 Sedgewick County, Kansas, described as follows: Beginning 2382.5 feet north  
 of the S.E. Corner of the E. 1/2 of said SW 1/4, thence west 640 feet;  
 thence north 82.5 feet to the S.W. Corner of said McPeak Addition, thence  
 east 640 feet to the E. 1/2 of said SW 1/4, thence south along the east line of said SW 1/4, 82.5  
 feet to the point of beginning.

**OWNER:** and Rebecca J. McPeak  
 238 N. Sojour Dr.  
 Wichita, Kansas  
 Phone:

**GROSS SIZE OF PLAT:**  
 129,633.87 Sq. Ft.  
 2.95 Acres  
**NET SIZE OF PLAT:**  
 127,633.87 Sq. Ft.  
 2.93 Acres  
**MINIMUM LOT SIZE:**  
 15,509.41 Sq. Ft.

**ZONING:**  
 S-5 - Single Family

**COUNTY NUMBER:**  
 050002  
**CITY NUMBER:**  
 197870



**LEGEND:**  
 - - - - - Survey Old Line of Oak  
 - - - - - 1/4" = 10' Scale  
 - - - - - 1/8" = 20' Scale  
 - - - - - 1/16" = 40' Scale  
 - - - - - 1/32" = 80' Scale  
 - - - - - 1/64" = 160' Scale  
 - - - - - 1/128" = 320' Scale  
 - - - - - 1/256" = 640' Scale  
 - - - - - 1/512" = 1280' Scale  
 - - - - - 1/1024" = 2560' Scale  
 - - - - - 1/2048" = 5120' Scale  
 - - - - - 1/4096" = 10240' Scale  
 - - - - - 1/8192" = 20480' Scale  
 - - - - - 1/16384" = 40960' Scale  
 - - - - - 1/32768" = 81920' Scale  
 - - - - - 1/65536" = 163840' Scale  
 - - - - - 1/131072" = 327680' Scale  
 - - - - - 1/262144" = 655360' Scale  
 - - - - - 1/524288" = 1310720' Scale  
 - - - - - 1/1048576" = 2621440' Scale  
 - - - - - 1/2097152" = 5242880' Scale  
 - - - - - 1/4194304" = 10485760' Scale  
 - - - - - 1/8388608" = 20971520' Scale  
 - - - - - 1/16777216" = 41943040' Scale  
 - - - - - 1/33554432" = 83886080' Scale  
 - - - - - 1/67108864" = 167772160' Scale  
 - - - - - 1/134217728" = 335544320' Scale  
 - - - - - 1/268435456" = 671088640' Scale  
 - - - - - 1/536870912" = 1342177280' Scale  
 - - - - - 1/1073741824" = 2684354560' Scale  
 - - - - - 1/2147483648" = 5368709120' Scale  
 - - - - - 1/4294967296" = 10737418240' Scale  
 - - - - - 1/8589934592" = 21474836480' Scale  
 - - - - - 1/17179869184" = 42949672960' Scale  
 - - - - - 1/34359738368" = 85899345920' Scale  
 - - - - - 1/68719476736" = 171798691840' Scale  
 - - - - - 1/137438953472" = 343597383680' Scale  
 - - - - - 1/274877906944" = 687194767360' Scale  
 - - - - - 1/549755813888" = 1374389534720' Scale  
 - - - - - 1/1099511627776" = 2748779069440' Scale  
 - - - - - 1/2199023255552" = 5497558138880' Scale  
 - - - - - 1/4398046511104" = 10995116277760' Scale  
 - - - - - 1/8796093022208" = 21990232555520' Scale  
 - - - - - 1/17592186044416" = 43980465111040' Scale  
 - - - - - 1/35184372088832" = 87960930222080' Scale  
 - - - - - 1/70368744177664" = 175921860444160' Scale  
 - - - - - 1/140737488355328" = 351843720888320' Scale  
 - - - - - 1/281474976710656" = 703687441776640' Scale  
 - - - - - 1/562949953421312" = 1407374883553280' Scale  
 - - - - - 1/1125899906842624" = 2814749767106560' Scale  
 - - - - - 1/2251799813685248" = 5629499534213120' Scale  
 - - - - - 1/4503599627370496" = 11258999068426240' Scale  
 - - - - - 1/9007199254740992" = 22517998136852480' Scale  
 - - - - - 1/18014398509481984" = 45035996273704960' Scale  
 - - - - - 1/36028797018963968" = 90071992547409920' Scale  
 - - - - - 1/72057594037927936" = 180143985094819840' Scale  
 - - - - - 1/144115188075855872" = 360287970189639680' Scale  
 - - - - - 1/288230376151711744" = 720575940379279360' Scale  
 - - - - - 1/576460752303423488" = 1441151880758558720' Scale  
 - - - - - 1/1152921504606846976" = 2882303761517117440' Scale  
 - - - - - 1/2305843009213693952" = 5764607523034234880' Scale  
 - - - - - 1/4611686018427387904" = 11529215046068469760' Scale  
 - - - - - 1/9223372036854775808" = 23058430092136939520' Scale  
 - - - - - 1/18446744073709551616" = 46116860184273879040' Scale  
 - - - - - 1/36893488147419103232" = 92233720368547758080' Scale  
 - - - - - 1/73786976294838206464" = 184467440737095516160' Scale  
 - - - - - 1/147573952589676412928" = 368934881474191032320' Scale  
 - - - - - 1/295147905179352825856" = 737869762948382064640' Scale  
 - - - - - 1/590295810358705651712" = 1475739525896764129280' Scale  
 - - - - - 1/1180591620717411303424" = 2951479051793528258560' Scale  
 - - - - - 1/2361183241434822606848" = 5902958103587056517120' Scale  
 - - - - - 1/4722366482869645213696" = 11805916207174113034240' Scale  
 - - - - - 1/9444732965739290427392" = 23611832414348226068480' Scale  
 - - - - - 1/18889465931478580854784" = 47223664828696452136960' Scale  
 - - - - - 1/37778931862957161709568" = 94447329657392904273920' Scale  
 - - - - - 1/75557863725914323419136" = 188894659314785808547840' Scale  
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 - - - - - 1/29931553530595

# DRAINAGE PLAN McPEAK 2ND ADDITION WICHITA, SEDGWICK COUNTY, KANSAS

**Legal Description:**  
 Lot 2, Block A, McPeak Addition, Wichita, Sedgewick County, Kansas.  
 AND  
 A tract in the SW/4 of Section 21, Twp. 27-S, R-1-W of the 6th P.M.,  
 Sedgewick County, Kansas, described as follows: Beginning 2362.5 feet north  
 from the intersection of the center line of Woodchuck Ln. and the center line of  
 the east line of said McPeak Addition, 640 feet to the east  
 east, along the south line of said McPeak Addition, 640 feet to the east  
 line of said SW/4, thence south, along the east line of said SW/4, 82.5  
 feet to the point of beginning.

**OWNER:**  
 Craig A. and Rebecca J. McPeak  
 256 N. Sacara Dr.  
 Wichita, Kansas

**PHONE:**

**GROSS SIZE OF PLAT:**  
 12,653.67 Sq. Ft.  
 2.95 Acres

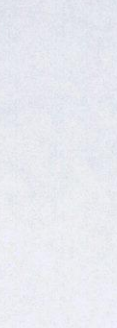
**NET SIZE OF PLAT:**  
 12,653.67 Sq. Ft.  
 2.95 Acres

**MINIMUM LOT SIZE:**  
 15,508.41 Sq. Ft.

**ZONING:**  
 S<sup>1</sup>-5 - Single Family

**CONTROL NUMBER:**  
 586942  
 197870

**BENCHMARK:** Square Cut Top of Curb  
 at Intersection of Center Line of  
 Block A, McPeak 2nd Addition  
 Elevation = 1334.95 (NAD 88)



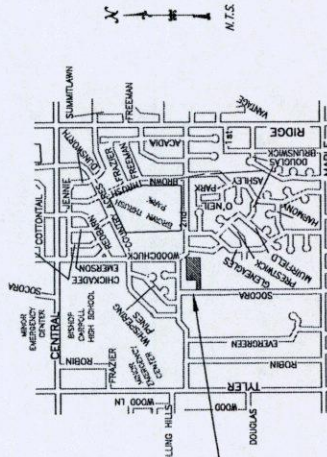
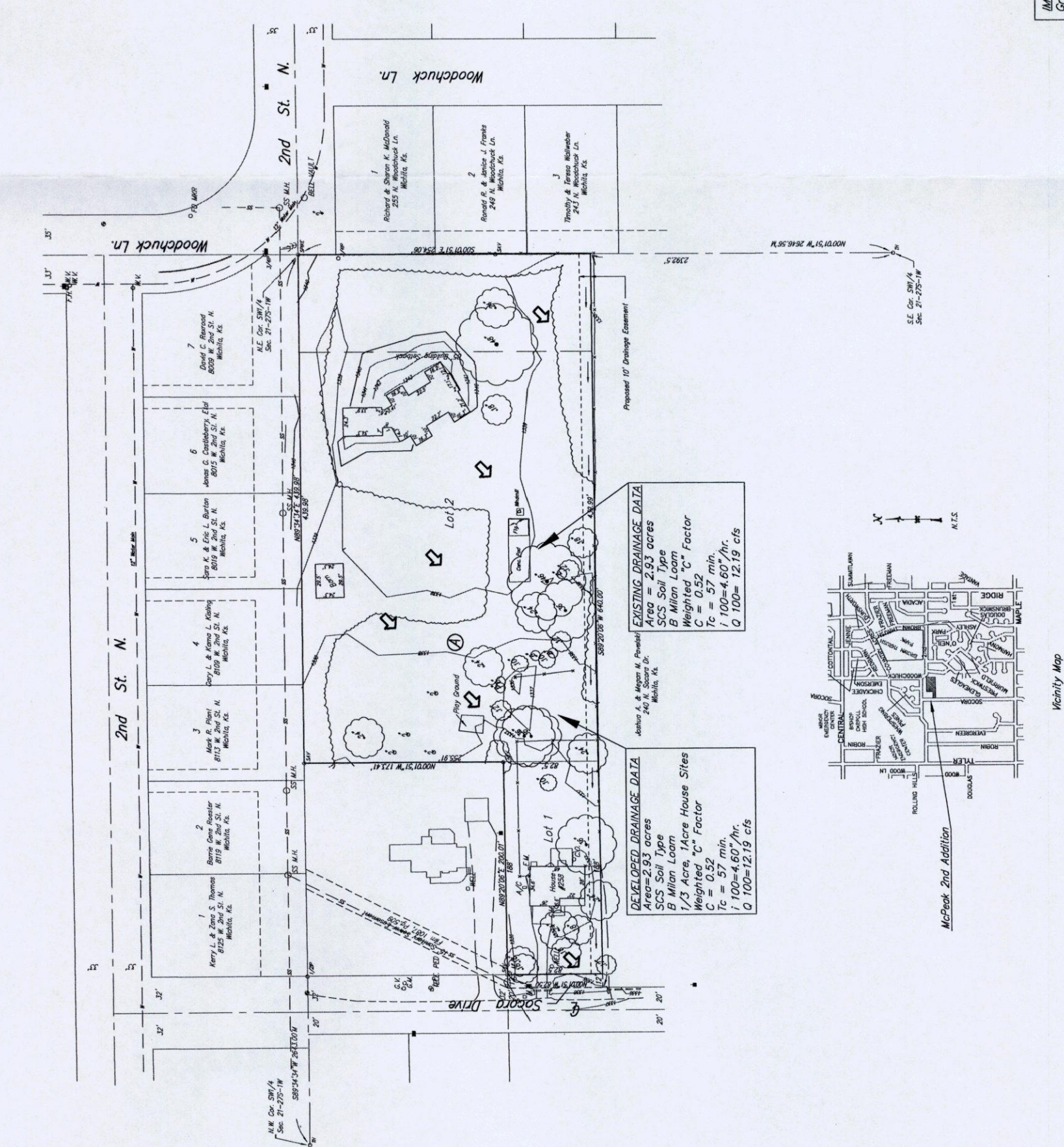
- LEADER**
- = GAS MAIN
  - = SANITARY SEWER
  - = WATER MAIN
  - = 100% POTABLE ELECTRIC
  - = 100% POTABLE TELEPHONE
  - = 100% POTABLE TELEPHONE
- SYMBOL**
- = TELEPHONE POINT
  - = FIRE HYDRANT
  - = FORD OPTIC MARKER
  - = CITY ADJUSTER
  - = GAS METER
  - = GAS VALVE
  - = HOSE LANE POLE
  - = LIGHT POLE
  - = POWER POLE
  - = WATER WELL
  - = WATER WELL
  - = WATER WELL
  - = SMARTY SEWER MANHOLE
  - = TELEPHONE WELLS

**DEVELOPED DRAINAGE DATA**

Area = 1.73 Acres, 1-Acre House Sites  
 SCS Soil Type  
 B Milan Loam  
 Weighted "C" Factor  
 C = 0.52  
 Tc = 57 min.  
 Q 100 = 4,607 cfs  
 Q 100 = 2,119 cfs

**EXISTING DRAINAGE DATA**

Area = 2.95 Acres  
 SCS Soil Type  
 B Milan Loam  
 Weighted "C" Factor  
 C = 0.52  
 Tc = 57 min.  
 Q 100 = 4,607 cfs  
 Q 100 = 2,119 cfs



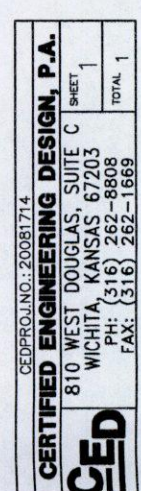
**IMPERVIOUS AREA CALCULATION**

Existing Buildings  
 ImperVIOUS Area=4,800 sq. ft. (0.11 acres)

Proposed Houses and Improvements  
 ImperVIOUS Area=9,800 sq. ft. (0.23 acres)

PerVIOUS Area to remain in Gross=17,893  
 sq. ft. (2.70 acres)

**SURVEY DISCLAIMER:**  
 TOPOGRAPHIC SURVEY AND CONTOUR MAP USED IN PREPARING  
 PLANS WAS PROVIDED BY SAVOY COMPANY, P.A., 535 S. EMPORIA,  
 SUITE 104, WICHITA, KS. ENGINEER DOES NOT GUARANTEE SURVEY  
 ELEVATIONS OR CONTOUR ELEVATIONS. ENGINEER WILL NOT BE  
 RESPONSIBLE FOR ANY DISCREPANCIES.  
 ELEVATIONS AND NOTIT ENGINEER OF ANY DISCREPANCIES.



**CERTIFIED ENGINEERING DESIGN, P.A.**  
 810 WEST DOUGLAS, SUITE C  
 WICHITA, KANSAS 67203  
 TEL: (316) 262-1688  
 FAX: (316) 262-1689

**Savooy Company, P.A.**  
 Licensed Surveyors  
 403 S. Emporia, Wichita, KS 67212-1021  
 PROJECT NO. 2070288 P  
 18 JUN 08