Professional Engineering Consultants, P.A.

AUG 11 2009

August 6, 2009

City of Wichita
Storm Sewer Management
City Hall – 7th Floor
455 N. Main
Wichita, KS 67202-1600

Attention: Mr. Scott Lindebak

Reference: Skyway Industrial Park
Drainage and Plat Submittal
PEC Project No. 35-09162-0042

Dear Mr. Lindebak:

Enclosed is the Revised Drainage Report for the proposed Skyway Industrial Park for the purposes of filing the plat. Please review for approval.

Sincerely,

PROFESSIONAL ENGINEERING CONSULTANTS, P.A.

JOSEPH E. HICKLE, JR. LICENSED 20321 KANSAS PROFESSIONAL ENGINEER

Joseph E. Hickle, Jr., P.E.
Civil Project Manager

JEH/tac

Encl: As noted

303 SOUTH TOPEKA WICHITA, KANSAS 67202 316-262-2691 FAX 316-262-3003 ■ www.pecl.com
WICHITA TOPEKA TULSA LAWRENCE PITTSBURG

Adopted: February 23, 2007

CITY OF WICHITA

Public Works, Engineering Division
Final Drainage Plan Submittal Checklist

Reviewer:_____ Date:_____

Subdivision Name: SKYWAY INDUSTRIAL PARK Location: TYLER ROAD @ K-42

Total Land Area Of Ownership:_____ Acres

Type: _____Residential __X__Commercial _____Industrial _____Recreation _____Municipal _____Other

Applicant: CITY OF WICHITA Contact: JOHN PHILBRICK Phone #: 268-4436

Engineer: P.E.C. Contact: JOE HICKLE Phone # 262-2691

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

	Applicant			Engr	
Tab 1. Project Narrative	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
A. Site Location Map, using USGS Map	✓				
B. Discussion of development, existing conditions, and proposed impacts on stormwater, wetland, riparian, and flood plain	✓				
C. Discussion of offsite conditions	✓				
D. Summary of runoff calculations (pre/post development) No increase in peak discharge for all storm series	✓				
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	✓				
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	✓				
I. CD of drainage plan in PDF format (one file) and one paper copy bound with this checklist included behind the cover	✓				

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

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J. Location of existing utilities (e.g., water, sewer, gas, electric) and easements			R		
K. Location of existing conveyance systems such as storm drains, inlets, catch basins, channels, swales, and areas of overland flow	✓				
L. Flow paths	✓				
M. Location and dimensions of existing channels, bridges or culvert crossings	✓				
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	✓				
O. Assumed pre-developed runoff curve numbers	✓				
P. Existing time of concentrations used in calculations	✓				
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.)	✓				
S. Cross-section data for open channels		✓			
T. Ground water elevations, if applicable		✓			

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

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

	Applicant			Engr	
Tab 4. Floodplain Submittal	**I**	**NA**	**Explanation / Location in Plan**	**I**	**NA**
A. Provide source of flood profile		✓			
B. Nearest base flood elevations	✓		1308		
C. Delineation of pre-developed regulatory floodplain/floodway limits		✓			
D. Delineation of post-developed regulatory floodplain and floodway limits		✓			
E. Floodplain boundary determination per elevation (project limits shown)	✓		FEMA Firmette Enclosed		
F. Provide source of floodway data table and discharges		✓			
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		✓			
H. Provide regulatory floodway and four natural profile models (10,50,100, and 500-yr) for existing and future watershed conditions		✓			
I. Location of floodplain/floodway limits and relationship of site to upstream/downstream properties (floodplain limits to be per elevation and scaled location)	✓		FEMA Firmette Enclosed		
J. Flood plains and floodways located within a Reserve, where necessary		✓			

	Applicant			Engr	
Tab 5. Federal, State and Local Permits (to be provided prior to construction unless otherwise specified)	**I/R**	**NA**	**Explanation / Location in Plan**	**I/R**	**NA**
A. US Army Corps of Engineers - Regulatory program permits (404 water quality certification)		✓			
B. Kansas Department of Agriculture - Division of Water Resources Permits (Stream Obstruction, Channel Change, Flood Plain Fill, Levee, Water Appropriations, Dam safety permit, etc.)		✓			
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.		✓			
D. Kansas Department of Transportation		✓			
E. Sedgwick County Right-of-way Permit		✓			

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Project Narrative

Skyway Industrial Park
Re-Plat
Revised Drainage Analysis Narrative

Introduction:

The Skyway Industrial Park is being re-platted. This is a future commercial area of approximately 139.5 acres on either side of Tyler Road north of K-42 and south of W 31st Street South in Wichita Kansas. A project location map is displayed on a USGS base map, enclosed. Area soils are described in the Sedgwick County Soil Survey as Blanket silt loam (Bb), Milan loam (Ma) and Tabler silty clay loam (Ta).
C B D

A drainage plan is enclosed for both the existing and probable proposed conditions. A SCS Unit Hydrograph routing calculation has been provided showing possible retention pond sizes and discharge performance. A final drainage plan will be prepared after the future developer/owner creates a site plan of how the property will be improved.

Nine natural drainage basins are within the project area, Basins A, B, C, D, E, TR-1 and TR-2. Basins A-E divide the developable property up for the existing watersheds while Basins TR-1 and TR-2 are existing roadway drainage areas of Tyler Road. Basins A, B, C, D, and E are predominately cultivated land and may include existing roadways rights-of-way. Basins TR-1 and TR-2 are roadway rights-of-way that will be incorporated into the site drainage design. Basins TR-3 and TR-4 are existing Tyler Road drainage that is not affected by this project and these areas are not incorporated into the site drainage design. An offsite drainage basin of 70.07 cultivated acres west of Maize Road flows on to the property. This existing drainage will be continued through the proposed development and has been accounted for in the drainage calculations necessary to size the detention Pond A. The size of each drainage basin is displayed in Table 1.

Table 1:

Basin Areas

Basins	Area (acres)
A	69.31
B	13.93
C	10.38
D	22.11
E	19.58
TR1	2.79
TR2	4.00
A OFFSITE	70.07

Hydrology:

Times of concentration were estimated with the accepted enclosed spreadsheet method. The large area west of Maize Road contributes to Basin A's larger time of concentration of 1.66 hours for both the pre and post development conditions. The time of concentration calculation matches a previous report filed for this property by Moehring and Associates in October 1996.

Curve Numbers for each basin were computed as a weighted average as shown in Table 2 for the various design storms. Runoff from all basins from the 2, 5, 10, 25 and 100 year precipitation events were calculated using the HEC-HMS program for the pre development condition. Table 4 displays the results. The existing condition of basins that are predominately cultivated fields will be converted to business land use in the post condition. Table 3 display curve number estimation and Tables 4 displays the runoff results for the post condition.

Table 2: **Existing Curve Numbers**

Basin	Frequency (yr) 2	5	10	25	100
A	67.25	65.79	68.89	71.69	74.25
B	68.62	67.20	69.98	72.83	75.27
C	66.25	64.75	67.75	70.85	73.50
D	66.25	64.75	67.75	70.85	73.50
E	66.25	64.75	67.75	70.85	73.50
TR-1	75.21	74.06	76.41	77.94	80.42
TR-2	73.89	70.47	75.19	76.81	79.45
A Offsite	66.25	64.75	67.75	70.85	73.50

Table 3: **Proposed Curve Numbers**

Basin	Frequency (yr) 2	5	10	25	100
A	89.23	87.18	87.53	87.29	87.29
B	89.54	87.57	87.91	87.68	87.68
C	89.00	86.90	87.25	87.00	87.00
D	89.00	86.90	87.25	87.00	87.00
E	89.00	86.90	87.25	87.00	87.00
TR-1	75.21	74.06	76.41	77.94	80.42
TR-2	73.89	72.70	75.19	76.81	79.45
A Offsite	66.25	64.75	67.75	70.85	73.50

Table 4:	Pre-Development Basin Runoff (cfs)					
		Frequency (yr.)				
		2	5	10	25	100
Basin	A	44.9	74.9	119.8	161.9	271.3
	B	12.6	20.2	30.9	40.2	67.0
	C	16.6	23.7	32.4	40.8	62.7
	D	12.4	20.8	33.7	44.4	78.0
	E	13.8	22.9	36.9	48.5	84.6
	TR-1	5.6	7.7	9.2	11.8	14.4
	TR-2	7.8	10.7	13.0	16.0	20.5
	A Offsite	22.8	40.1	54.6	75.3	108.2

Table 5:	Post-Development Basin Runoff (cfs)					
		Frequency (yr.)				
		2	5	10	25	100
Basin	A	106.4	159.0	206.4	263.7	349.2
	B	34.7	44.5	54.0	65.7	83.7
	C	31.6	40.7	48.9	59.9	76.2
	D	41.5	53.3	64.9	74.9	101.7
	E	44.9	57.6	70.1	85.7	109.6
	TR-1	5.6	7.7	9.2	11.8	14.4
	TR-2	7.8	10.7	13.0	16.0	20.5
	A Offsite	22.8	40.1	54.6	75.3	108.2

All storms would produce a higher peak runoff rate in the post development condition than the pre development condition due to an increase in impervious surface area. Retention ponds will be required.

Detention:
Four stormwater detention ponds will be incorporated as part of the final site design, limiting the discharge rate from each pond to equal or less than the pre development peak runoff rate for each design storm. Appropriate erosion control and best management practices will be employed during the construction of the project.

Basin A drains to a natural low point at which Pond A is planned. Basins B, C, TR-1 and TR-2 all drain to a natural low point at which Pond B is planned. Basin D flows to the southeast and towards Tyler Road. Pond D is planned adjacent to the roadway. Basin E drains towards the east boundary line and will convey flow to linear Pond E along the project's perimeter.

The location of each pond was investigated for the available storage of runoff volume that could be developed. Pond discharges would be to local receiving ditches. The HEC-HMS pond routing calculation results are displayed in Table 6.

Table 6: **Pre VS. Post Pond Discharge (cfs)**

		Frequency (yr.)				
		2	5	10	25	100
Pond	Pre A	67.7	115.0	174.4	237.2	379.5
	Post A	29.4	42.8	52.3	65.9	117.2
	Pre B	42.6	62.3	85.5	108.8	164.6
	Post B	33.7	48.1	54.7	70.2	88.2
	Pre D	12.4	20.8	33.7	44.4	78.0
	Post D	5.6	9.6	12.8	16.4	21.8
	Pre E	13.8	22.9	36.9	48.5	84.6
	Post E	9.6	17.5	24.7	32.6	42.1

Offsite Runoff:

The offsite runoff from the area west of Maize Road would contribute approximately a peak flow rate of 108 cfs during the 100-year 24-hour precipitation event. This flow will be conveyed within the proposed plat area through an open trapezoidal channel with grassed slopes and a Manning's n of 0.035. The channel slope is approximately 0.5% and sideslopes of 4 to 1 with a bottom width of 2 feet is planned. Normal flow depth would be approximately 2.5 feet for approximately 108.7 cfs. A 30 foot wide drainage easement would allow for one foot of freeboard.

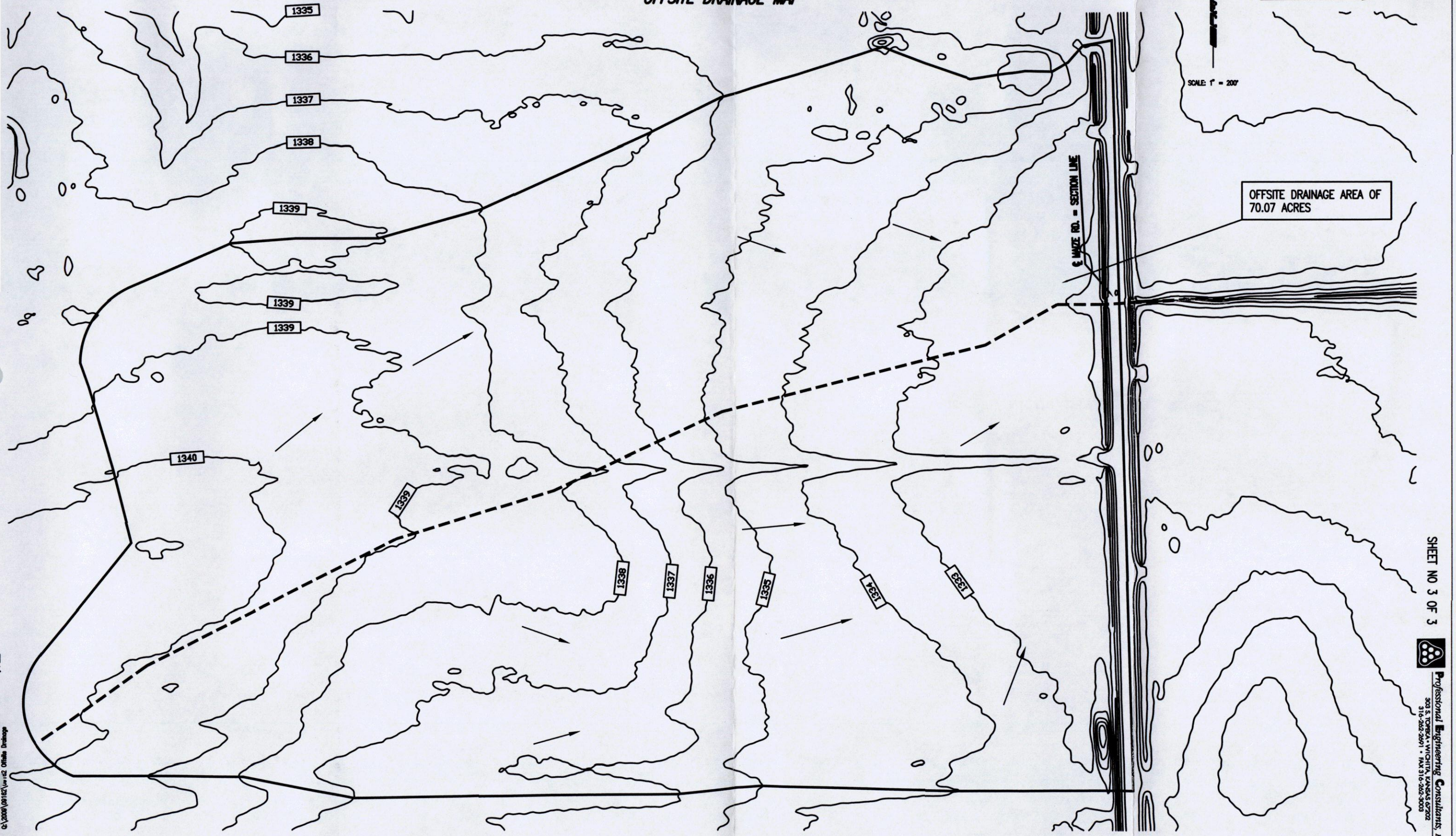
The project area is not within the 100-year floodplain.

PAWNEE AVENUE
CLEARWATER
PAWNEE PRAIRIE PARK
Creek
TYLER
WICHITA MID-CON
1" = 1000'
31ST ST SOUTH
PROJECT LOCATION
USGS MAP
OFFSITE LOCATION
WICHITA
TOPEKA
ATCHISON
CORP
BDY
SCHULTE 0.5 MI.
VIOLA 15 MI.
BAYNEVILLE 4.9 MI.
(BAYNEVILLE)
6559 III SW
R. 2 W.
R. 1 W.
27'30"
635
1338
1334
1325
1306
1328
1302
1333
1339
1340
1345
1337
1310
1300
1320
6
5
4
7
8
9
2
42
Q:\2009\09162...162 USGS MAP

SKYWAY INDUSTRIAL PARK 2ND

AN ADDITION TO WICHITA, SEDGWICK COUNTY, KANSAS

OFFSITE DRAINAGE MAP



SHEET NO 3 OF 3

Professional Engineering Consultants, P.A.
303 S. TOPEKA • WICHITA, KANSAS 67202
316-262-2691 • FAX 316-262-3003

G:\2009\09162\survey2 Offsite Drainage

Existing Conditions

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Sedgwick County, Kansas

August 3, 2009

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information. .

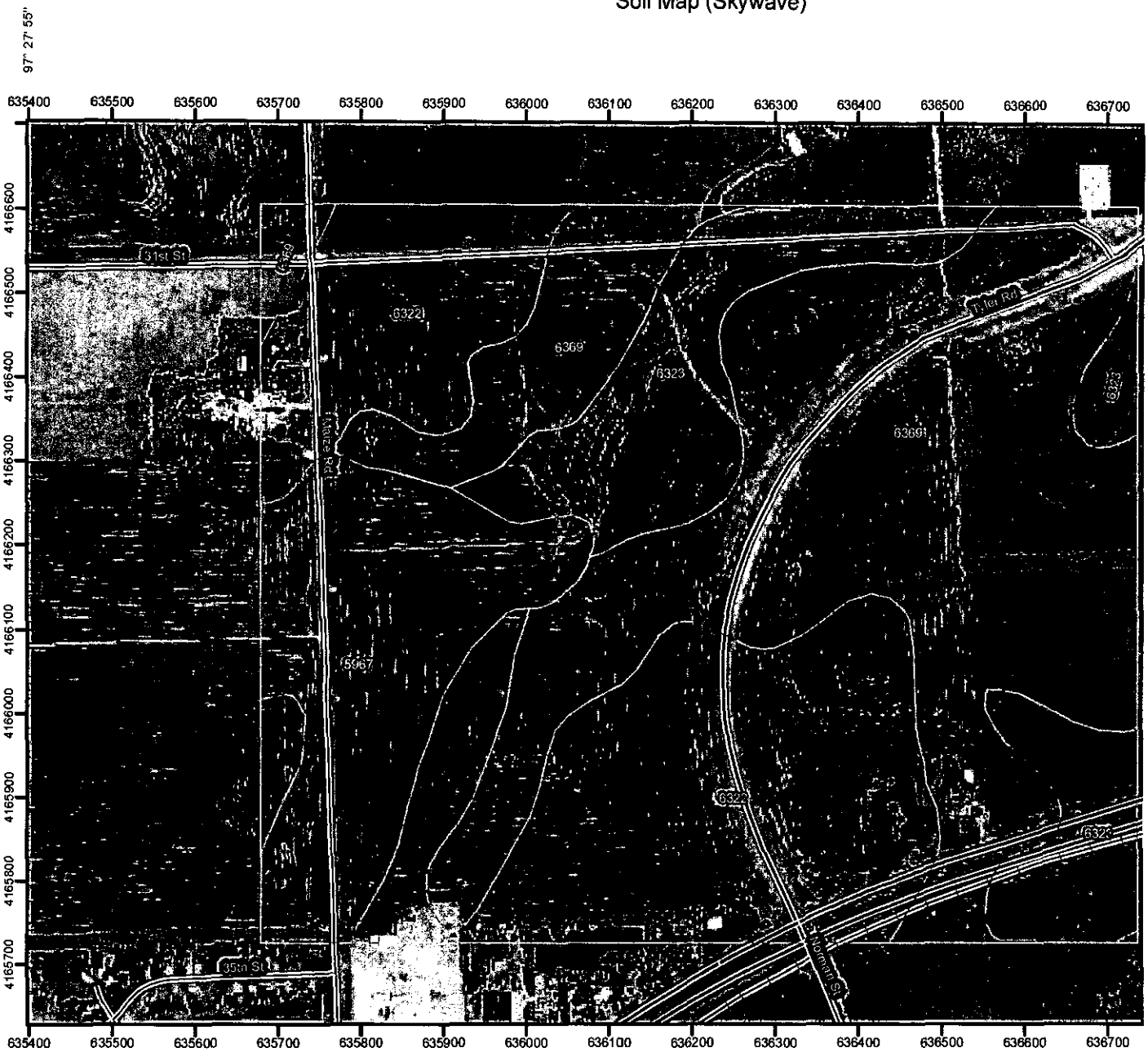
The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.


97° 27' 55"
38' 14"
635400
635500
635600
635700
635800
635900
636000
636100
636200
636300
636400
636500
636600
636700
4166600
4166500
4166400
4166300
4166200
4166100
4166000
4165900
4165800
4165700
31st St
35th St
State Rd
Tyler Rd
Solomon St
6322
6369
6323
6967
37° 37' 40"
Map Scale: 1:7,690 if printed on A size (8.5" x 11") sheet.
N
Meters
0
100
200
400
600
Feet
0
400
800
1,600
2,400

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 or swamp
- 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
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features
- Cities

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORM

Map Scale: 1:7,690 if printed on A siz

The soil surveys that comprise your A

Please rely on the bar scale on each r measurements.

Source of Map: Natural Resources
Web Soil Survey URL: http://websо
Coordinate System: UTM Zone 14N

This product is generated from the US the version date(s) listed below.

Soil Survey Area: Sedgwick County
Survey Area Data: Version 5, Dec 3

Date(s) aerial images were photograp

The orthophoto or other base map on compiled and digitized probably differs imagery displayed on these maps. As of map unit boundaries may be evider

Map Unit Legend (Skywave)

Sedgwick County, Kansas (KS173)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
5967	Tabler silty clay loam, 0 to 1 percent slopes	30.8	13.4%
6322	Blanket silt loam, 0 to 1 percent slopes	70.1	30.5%
6323	Blanket silt loam, 1 to 3 percent slopes	32.7	14.2%
6369	Milan loam, 1 to 3 percent slopes	96.3	41.9%
Totals for Area of Interest		**229.9**	**100.0%**

Map Unit Descriptions (Skywave)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that

have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Sedgwick County, Kansas

5967—Tabler silty clay loam, 0 to 1 percent slopes

Map Unit Setting

Elevation: 750 to 1,400 feet
Mean annual precipitation: 24 to 31 inches
Mean annual air temperature: 45 to 66 degrees F
Frost-free period: 195 to 225 days

Map Unit Composition

Tabler and similar soils: 100 percent
Minor components: 0 percent

Description of Tabler

Setting

Landform: Paleoterraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 2 percent
Available water capacity: High (about 9.9 inches)

Interpretive groups

Land capability (nonirrigated): 2s
Ecological site: Clay Upland (PE 25-34) (R075XY007KS)

Typical profile

0 to 9 inches: Silty clay loam
9 to 32 inches: Silty clay
32 to 60 inches: Silty clay

Minor Components

Aquolls

Percent of map unit: 0 percent
Landform: Depressions, drainageways, hillslopes
Down-slope shape: Concave
Across-slope shape: Concave

6322—Blanket silt loam, 0 to 1 percent slopes

Map Unit Setting

Elevation: 800 to 1,600 feet
Mean annual precipitation: 24 to 31 inches
Mean annual air temperature: 45 to 66 degrees F
Frost-free period: 195 to 225 days

Map Unit Composition

Blanket and similar soils: 100 percent
Minor components: 0 percent

Description of Blanket

Setting

Landform: Paleoterraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Available water capacity: High (about 9.4 inches)

Interpretive groups

Land capability (nonirrigated): 1
Ecological site: Loamy Upland (PE 17-20) (R079XY015KS)

Typical profile

0 to 14 inches: Silt loam
14 to 34 inches: Silty clay
34 to 46 inches: Silty clay
46 to 60 inches: Silty clay loam

Minor Components

Aquolls, ponded

Percent of map unit: 0 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave

Aquolls

Percent of map unit: 0 percent
Landform: Depressions, drainageways, hillslopes
Down-slope shape: Concave
Across-slope shape: Concave

6323—Blanket silt loam, 1 to 3 percent slopes

Map Unit Setting

Elevation: 800 to 1,600 feet
Mean annual precipitation: 24 to 31 inches
Mean annual air temperature: 45 to 66 degrees F
Frost-free period: 195 to 225 days

Map Unit Composition

Blanket and similar soils: 100 percent
Minor components: 0 percent

Description of Blanket

Setting

Landform: Paleoterraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Clayey alluvium

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 14 percent
Available water capacity: High (about 9.4 inches)

Interpretive groups

Land capability (nonirrigated): 2e
Ecological site: Loamy Upland (PE 17-20) (R079XY015KS)

Typical profile

0 to 14 inches: Silt loam
14 to 34 inches: Silty clay
34 to 46 inches: Silty clay
46 to 60 inches: Silty clay loam

Minor Components

Aquolls

Percent of map unit: 0 percent
Landform: Depressions, drainageways, hillslopes
Down-slope shape: Concave
Across-slope shape: Concave

Aquolls, ponded

Percent of map unit: 0 percent
Landform: Depressions
Down-slope shape: Concave
Across-slope shape: Concave

6369—Milan loam, 1 to 3 percent slopes

Map Unit Setting

Elevation: 750 to 1,500 feet
Mean annual precipitation: 24 to 31 inches
Mean annual air temperature: 45 to 66 degrees F
Frost-free period: 195 to 225 days

Map Unit Composition

Milan and similar soils: 100 percent
Minor components: 0 percent

Description of Milan

Setting

Landform: Paleoterraces
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water capacity: High (about 11.1 inches)

Interpretive groups

Land capability classification (irrigated): 2e
Land capability (nonirrigated): 2e
Ecological site: Loamy Upland (PE 24-32) (R080AY015KS)

Typical profile

0 to 11 inches: Loam
11 to 60 inches: Clay loam

Minor Components

Aquolls

Percent of map unit: 0 percent
Landform: Depressions, drainageways, hillslopes
Down-slope shape: Concave
Across-slope shape: Concave

Table 2:	Existing Curve Numbers				
	Frequency (yr)				
Basin	2	5	10	25	100
A	67.25	65.79	68.89	71.69	74.25
B	68.62	67.20	69.98	72.83	75.27
C	66.25	64.75	67.75	70.85	73.50
D	66.25	64.75	67.75	70.85	73.50
E	66.25	64.75	67.75	70.85	73.50
TR-1	75.21	74.06	76.41	77.94	80.42
TR-2	73.89	70.47	75.19	76.81	79.45
A Offsite	66.25	64.75	67.75	70.85	73.50

See Attached CD for Detailed Calculation Spreadsheets.

Table 4: **Pre-Development Basin Runoff (cfs)**

Basin	Frequency (yr.) 2	5	10	25	100
A	44.9	74.9	119.8	161.9	271.3
B	12.6	20.2	30.9	40.2	67.0
C	16.6	23.7	32.4	40.8	62.7
D	12.4	20.8	33.7	44.4	78.0
E	13.8	22.9	36.9	48.5	84.6
TR-1	5.6	7.7	9.2	11.8	14.4
TR-2	7.8	10.7	13.0	16.0	20.5
A Offsite	22.8	40.1	54.6	75.3	108.2

Time of concentration (Tc) or travel time (Tt)

A

Project : Skyway **By:** JEH **Date:** 8/6/2009
Location : Wichita, Kansas **Checked:** **Date:**

Circle One Present Developed

Circle One Tc Tt through subarea

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

Sheet flow (Applicable to Tc only)

		Segment ID			
		AB			
1. Surface description (Table 3-1)		Short Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.04			
3. Flow length, L (total L < 300 ft.)	ft	1			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	7.000			
5a. Land Elevation For Upper End Of Flow Path		1340.0			
5b. Land Elevation For Lower End Of Flow Path		1333.0			
6. Compute Tt	hr	0.00		=	0.00

Sheet flow (Applicable to Tc only)

		Segment ID			
		BC			
1. Surface description (Table 3-1)		Concrete			
2. Mannings roughness coeff., n (Table 3-1)		0.017			
3. Flow length, L (total L < 300 ft.)	ft	1			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	7.100			
5a. Land Elevation For Upper End Of Flow Path		1344.1			
5b. Land Elevation For Lower End Of Flow Path		1337.0			
6. Compute Tt	hr	0.00		=	0.00

Shallow concentrated flow

		Segment ID			
		CD			
7. Surface description (Paved or Unpaved)		Unpaved			
8. Flow length, L	ft	2356			
9. Calculated Watercourse slope, s	ft/ft	0.006			
9a. Land Elevation For Upper End Of Flow Path		1333.0			
9b. Land Elevation For Lower End Of Flow Path		1319.0			
10. Average velocity, V (Figure 3-1)	ft/s	1.24			
11. Tt = L/3600V Compute Tt	hr	0.53		=	0.53

Channel Flow

		Segment ID			
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	hr			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)				hr	0.53

Reference Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 31.6 Minutes

Time of concentration (Tc) or travel time (Tt)

A Offsite

Project : Skyway **By:** JEH **Date:** 8/6/2009
Location : Wichita, Kansas **Checked:** **Date:**

Circle One: [Present] Developed

Circle One: [Tc] Tt through subarea

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

Sheet flow (Applicable to Tc only)

Segment ID		AB			
1. Surface description (Table 3-1)		Short Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.04			
3. Flow length, L (total L < 300 ft.)	ft	2642			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	0.003			
5a. Land Elevation For Upper End Of Flow Path		1344.1			
5b. Land Elevation For Lower End Of Flow Path		1337.0			
6. Compute Tt	hr	1.66		=	1.66

Sheet flow (Applicable to Tc only)

Segment ID		BC			
1. Surface description (Table 3-1)		Concrete			
2. Mannings roughness coeff., n (Table 3-1)		0.011			
3. Flow length, L (total L < 300 ft.)	ft	1			
4. Two-yr 24-hr rainfall, P2	in	3.60			
5. Calculated Land slope, s	ft/ft	7.100			
5a. Land Elevation For Upper End Of Flow Path		1344.1			
5b. Land Elevation For Lower End Of Flow Path		1337.0			
6. Compute Tt	hr	0.00		=	0.00

Shallow concentrated flow

Segment ID		CD			
7. Surface description (Paved or Unpaved)		Unpaved			
8. Flow length, L	ft	1			
9. Calculated Watercourse slope, s	ft/ft	14.000			
9a. Land Elevation For Upper End Of Flow Path		1333.0			
9b. Land Elevation For Lower End Of Flow Path		1319.0			
10. Average velocity, V (Figure 3-1)	ft/s	60.37			
11. Tt = L/3600V Compute Tt	hr	0.00		=	0.00

Channel Flow

Segment ID					
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	hr			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)				hr	1.66

Reference: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 99.7 Minutes

Project: Skyway

Simulation Run: b1-2-24 Subbasin: Subbasin-A2 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	44.9 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:14
Total Precipitation :	3.60 (IN)	Total Direct Runoff :	0.86 (IN)
Total Loss :	2.73 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	0.87 (IN)	Discharge :	0.86 (IN)

Project: Skyway

Simulation Run: b1-5-24 Subbasin: Subbasin-A5 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	79.4 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:13
Total Precipitation :	4.56 (IN)	Total Direct Runoff :	1.40 (IN)
Total Loss :	3.16 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	1.40 (IN)	Discharge :	1.40 (IN)

Project: Skyway
Simulation Run: b1-10-24 Subbasin: Subbasin-A10 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	119.8 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:13
Total Precipitation :	5.28 (IN)	Total Direct Runoff :	2.01 (IN)
Total Loss :	3.26 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.02 (IN)	Discharge :	2.01 (IN)

Project: Skyway
Simulation Run: b1-25-24 Subbasin: Subbasin-A25 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	161.9 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	6.24 (IN)	Total Direct Runoff :	2.67 (IN)
Total Loss :	3.55 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.69 (IN)	Discharge :	2.67 (IN)

Project: Skyway
Simulation Run: b1-100-24 Subbasin: Subbasin-A100 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	271.3 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	7.68 (IN)	Total Direct Runoff :	4.32 (IN)
Total Loss :	3.34 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.34 (IN)	Discharge :	4.32 (IN)

Time of concentration (Tc) or travel time (Tt)

B

Project : Skyway **By:** JEH **Date:** 8/6/2009
Location : Wichita, Kansas **Checked:** **Date:**

Circle One Present Developed

Circle One Tc Tt through subarea

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

Sheet flow (Applicable to Tc only)

		Segment ID			
		AB			
1. Surface description (Table 3-1)		Short Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.04			
3. Flow length, L (total L < 300 ft.)	ft	360			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	0.008			
5a. Land Elevation For Upper End Of Flow Path		1330.0			
5b. Land Elevation For Lower End Of Flow Path		1327.0			
6. Compute Tt	hr	0.21		=	0.21

Sheet flow (Applicable to Tc only)

		Segment ID			
		BC			
1. Surface description (Table 3-1)		Concrete			
2. Mannings roughness coeff., n (Table 3-1)		0.017			
3. Flow length, L (total L < 300 ft.)	ft	1			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	7.100			
5a. Land Elevation For Upper End Of Flow Path		1344.1			
5b. Land Elevation For Lower End Of Flow Path		1337.0			
6. Compute Tt	hr	0.00		=	0.00

Shallow concentrated flow

		Segment ID			
		CD			
7. Surface description (Paved or Unpaved)		Unpaved			
8. Flow length, L	ft	1103			
9. Calculated Watercourse slope, s	ft/ft	0.008			
9a. Land Elevation For Upper End Of Flow Path		1327.0			
9b. Land Elevation For Lower End Of Flow Path		1318.0			
10. Average velocity, V (Figure 3-1)	ft/s	1.46			
11. Tt = L/3600V Compute Tt	hr	0.21		=	0.21

Channel Flow

		Segment ID			
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	hr			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)				hr	0.42

Reference Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 25.5 Minutes

Project: Skyway

Simulation Run: b1-2-24 Subbasin: Subbasin-B2 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	12.6 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:10
Total Precipitation :	3.60 (IN)	Total Direct Runoff :	0.99 (IN)
Total Loss :	2.61 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	0.99 (IN)	Discharge :	0.99 (IN)

Project: Skyway
Simulation Run: b1-5-24 Subbasin: Subbasin-B5 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	20.2 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:09
Total Precipitation :	4.56 (IN)	Total Direct Runoff :	1.51 (IN)
Total Loss :	3.04 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	1.52 (IN)	Discharge :	1.51 (IN)

Project: Skyway

Simulation Run: b1-10-24 Subbasin: Subbasin-B10 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	30.9 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:09
Total Precipitation :	5.28 (IN)	Total Direct Runoff :	2.24 (IN)
Total Loss :	3.04 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.24 (IN)	Discharge :	2.24 (IN)

Project: Skyway

Simulation Run: b1-25-24 Subbasin: Subbasin-B25 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	40.2 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:09
Total Precipitation :	6.24 (IN)	Total Direct Runoff :	2.88 (IN)
Total Loss :	3.35 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.89 (IN)	Discharge :	2.88 (IN)

Project: Skyway
Simulation Run: b1-100-24 Subbasin: Subbasin-B100 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	67.0 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:08
Total Precipitation :	7.68 (IN)	Total Direct Runoff :	4.77 (IN)
Total Loss :	2.90 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.78 (IN)	Discharge :	4.77 (IN)

Time of concentration (Tc) or travel time (Tt)

C

Project : Skyway **By:** JEH **Date:** 8/6/2009
Location : Wichita, Kansas **Checked:** **Date:**

Circle One Present Developed

Circle One Tc Tt through subarea

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

Sheet flow (Applicable to Tc only)

Segment ID		AB			
1. Surface description (Table 3-1)		Short Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.04			
3. Flow length, L (total L < 300 ft.)	ft	684.16			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	0.016			
5a. Land Elevation For Upper End Of Flow Path		1330.0			
5b. Land Elevation For Lower End Of Flow Path		1319.0			
6. Compute Tt	hr	0.28		=	0.28

Sheet flow (Applicable to Tc only)

Segment ID		BC			
1. Surface description (Table 3-1)		Concrete			
2. Mannings roughness coeff., n (Table 3-1)		0.017			
3. Flow length, L (total L < 300 ft.)	ft	1			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	7.100			
5a. Land Elevation For Upper End Of Flow Path		1344.1			
5b. Land Elevation For Lower End Of Flow Path		1337.0			
6. Compute Tt	hr	0.00		=	0.00

Shallow concentrated flow

Segment ID		CD			
7. Surface description (Paved or Unpaved)		Unpaved			
8. Flow length, L	ft	1			
9. Calculated Watercourse slope, s	ft/ft	9.000			
9a. Land Elevation For Upper End Of Flow Path		1337.0			
9b. Land Elevation For Lower End Of Flow Path		1328.0			
10. Average velocity, V (Figure 3-1)	ft/s	48.40			
11. Tt = L/3600V Compute Tt	hr	0.00		=	0.00

Channel Flow

Segment ID					
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	hr			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)				**hr**	0.28

Reference Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 16.5 Minutes

Project: Skyway

Simulation Run: b1-2-24 Subbasin: Subbasin-C2 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	16.6 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:04
Total Precipitation :	3.60 (IN)	Total Direct Runoff :	1.36 (IN)
Total Loss :	2.24 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	1.36 (IN)	Discharge :	1.36 (IN)

Project: Skyway

Simulation Run: b1-5-24 Subbasin: Subbasin-C5 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	23.7 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:03
Total Precipitation :	4.56 (IN)	Total Direct Runoff :	1.94 (IN)
Total Loss :	2.62 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	1.94 (IN)	Discharge :	1.94 (IN)

Project: Skyway
Simulation Run: b1-10-24 Subbasin: Subbasin-C10 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	32.4 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:03
Total Precipitation :	5.28 (IN)	Total Direct Runoff :	2.62 (IN)
Total Loss :	2.66 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.62 (IN)	Discharge :	2.62 (IN)

Project: Skyway
Simulation Run: b1-25-24 Subbasin: Subbasin-C25 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	40.8 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:03
Total Precipitation :	6.24 (IN)	Total Direct Runoff :	3.30 (IN)
Total Loss :	2.94 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.30 (IN)	Discharge :	3.30 (IN)

Project: Skyway
Simulation Run: b1-100-24 Subbasin: Subbasin-C100 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	62.7 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:03
Total Precipitation :	7.68 (IN)	Total Direct Runoff :	5.04 (IN)
Total Loss :	2.63 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	5.05 (IN)	Discharge :	5.04 (IN)

Time of concentration (Tc) or travel time (Tt)

D

Project : Skyway **By:** JEH **Date:** 8/6/2009
Location : Wichita, Kansas **Checked:** **Date:**

Circle One Present Developed

Circle One Tc Tt through subarea

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

Sheet flow (Applicable to Tc only)

Segment ID		AB		
1. Surface description (Table 3-1)		Short Grass		
2. Mannings roughness coeff., n (Table 3-1)		0.04		
3. Flow length, L (total L < 300 ft.)	ft	1265		
4. Two-yr 24-hr rainfall, P2	in	3.50		
5. Calculated Land slope, s	ft/ft	0.006		
5a. Land Elevation For Upper End Of Flow Path		1334.0		
5b. Land Elevation For Lower End Of Flow Path		1326.0		
6. Compute Tt	hr	0.65	=	0.65

Sheet flow (Applicable to Tc only)

Segment ID		BC		
1. Surface description (Table 3-1)		Concrete		
2. Mannings roughness coeff., n (Table 3-1)		0.017		
3. Flow length, L (total L < 300 ft.)	ft	1		
4. Two-yr 24-hr rainfall, P2	in	3.50		
5. Calculated Land slope, s	ft/ft	7.100		
5a. Land Elevation For Upper End Of Flow Path		1344.1		
5b. Land Elevation For Lower End Of Flow Path		1337.0		
6. Compute Tt	hr	0.00	=	0.00

Shallow concentrated flow

Segment ID		CD		
7. Surface description (Paved or Unpaved)		Unpaved		
8. Flow length, L	ft	1		
9. Calculated Watercourse slope, s	ft/ft	9.000		
9a. Land Elevation For Upper End Of Flow Path		1337.0		
9b. Land Elevation For Lower End Of Flow Path		1328.0		
10. Average velocity, V (Figure 3-1)	ft/s	48.40		
11. Tt = L/3600V Compute Tt	hr	0.00	=	0.00

Channel Flow

Segment ID				
12. Cross sectional flow area, a	sf			
13. Wetted perimeter, Pw	ft			
14. Hydraulic radius, r = a/Pw Compute r	ft			
15. Channel slope, s	ft/ft			
16. Manning's roughness coeff., n				
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s			
18. Flow length, L	ft			
19. Tt = L/3600V Compute Tt	hr		=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)			hr	0.65

Reference Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 39.3 Minutes

Project: Skyway

Simulation Run: b1-2-24 Subbasin: Subbasin-D2 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	12.4 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:19
Total Precipitation :	3.60 (IN)	Total Direct Runoff :	0.86 (IN)
Total Loss :	2.73 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	0.87 (IN)	Discharge :	0.86 (IN)

Project: Skyway

Simulation Run: b1-5-24 Subbasin: Subbasin-D5 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	20.8 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:18
Total Precipitation :	4.56 (IN)	Total Direct Runoff :	1.34 (IN)
Total Loss :	3.21 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	1.35 (IN)	Discharge :	1.34 (IN)

Project: Skyway
Simulation Run: b1-10-24 Subbasin: Subbasin-D10 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	33.7 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:17
Total Precipitation :	5.28 (IN)	Total Direct Runoff :	2.05 (IN)
Total Loss :	3.22 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.06 (IN)	Discharge :	2.05 (IN)

Project: Skyway

Simulation Run: b1-25-24 Subbasin: Subbasin-D25 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	44.4 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:17
Total Precipitation :	6.24 (IN)	Total Direct Runoff :	2.66 (IN)
Total Loss :	3.56 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.68 (IN)	Discharge :	2.66 (IN)

Project: Skyway
Simulation Run: b1-100-24 Subbasin: Subbasin-D100 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	78.0 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:16
Total Precipitation :	7.68 (IN)	Total Direct Runoff :	4.56 (IN)
Total Loss :	3.10 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.58 (IN)	Discharge :	4.56 (IN)

Time of concentration (Tc) or travel time (Tt)

E

Project : Oak Creek Office Park **By:** JEH **Date:** 8/6/2009
Location : Wichita, Kansas **Checked:** **Date:**

Circle One Present Developed

Circle One Tc Tt through subarea

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

Sheet flow (Applicable to Tc only)

Segment ID		AB			
1. Surface description (Table 3-1)		Short Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.04			
3. Flow length, L (total L < 300 ft.)	ft	967			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	0.008			
5a. Land Elevation For Upper End Of Flow Path		1334.0			
5b. Land Elevation For Lower End Of Flow Path		1326.0			
6. Compute Tt	hr	0.47		=	0.47

Sheet flow (Applicable to Tc only)

Segment ID		BC			
1. Surface description (Table 3-1)		Concrete			
2. Mannings roughness coeff., n (Table 3-1)		0.017			
3. Flow length, L (total L < 300 ft.)	ft	1			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	7.100			
5a. Land Elevation For Upper End Of Flow Path		1344.1			
5b. Land Elevation For Lower End Of Flow Path		1337.0			
6. Compute Tt	hr	0.00		=	0.00

Shallow concentrated flow

Segment ID		CD			
7. Surface description (Paved or Unpaved)		Unpaved			
8. Flow length, L	ft	1			
9. Calculated Watercourse slope, s	ft/ft	9.000			
9a. Land Elevation For Upper End Of Flow Path		1337.0			
9b. Land Elevation For Lower End Of Flow Path		1328.0			
10. Average velocity, V (Figure 3-1)	ft/s	48.40			
11. Tt = L/3600V Compute Tt	hr	0.00		=	0.00

Channel Flow

Segment ID					
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	hr			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)				**hr**	0.47

Reference Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 28.5 Minutes

Project: Skyway

Simulation Run: b1-2-24 Subbasin: Subbasin-E2 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	13.8 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	3.60 (IN)	Total Direct Runoff :	0.86 (IN)
Total Loss :	2.73 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	0.87 (IN)	Discharge :	0.86 (IN)

Project: Skyway

Simulation Run: b1-5-24 Subbasin: Subbasin-E5 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	22.9 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:11
Total Precipitation :	4.56 (IN)	Total Direct Runoff :	1.34 (IN)
Total Loss :	3.21 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	1.35 (IN)	Discharge :	1.34 (IN)

Project: Skyway
Simulation Run: b1-10-24 Subbasin: Subbasin-E10 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	36.9 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:11
Total Precipitation :	5.28 (IN)	Total Direct Runoff :	2.05 (IN)
Total Loss :	3.22 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.06 (IN)	Discharge :	2.05 (IN)

Project: Skyway
Simulation Run: b1-25-24 Subbasin: Subbasin-E25 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	48.5 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:10
Total Precipitation :	6.24 (IN)	Total Direct Runoff :	2.66 (IN)
Total Loss :	3.56 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.68 (IN)	Discharge :	2.66 (IN)

Project: Skyway
Simulation Run: b1-100-24 Subbasin: Subbasin-E100 pre

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	84.6 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:10
Total Precipitation :	7.68 (IN)	Total Direct Runoff :	4.57 (IN)
Total Loss :	3.10 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.58 (IN)	Discharge :	4.57 (IN)

Time of concentration (Tc) or travel time (Tt)

TR1

Project : Oak Creek Office Park **By:** JEH **Date:** 8/6/2009
Location : Wichita, Kansas **Checked:** **Date:**

Circle One: [Present] Developed

Circle One: [Tc] Tt through subarea

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

Sheet flow (Applicable to Tc only)

		Segment ID			
		AB			
1. Surface description (Table 3-1)		Short Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.06			
3. Flow length, L (total L < 300 ft.)	ft	1			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	6.000			
5a. Land Elevation For Upper End Of Flow Path		1327.0			
5b. Land Elevation For Lower End Of Flow Path		1321.0			
6. Compute Tt	hr	0.00		=	0.00

Sheet flow (Applicable to Tc only)

		Segment ID			
		BC			
1. Surface description (Table 3-1)		Concrete			
2. Mannings roughness coeff., n (Table 3-1)		0.011			
3. Flow length, L (total L < 300 ft.)	ft	1562.78			
4. Two-yr 24-hr rainfall, P2	in	3.60			
5. Calculated Land slope, s	ft/ft	0.005			
5a. Land Elevation For Upper End Of Flow Path		1344.1			
5b. Land Elevation For Lower End Of Flow Path		1337.0			
6. Compute Tt	hr	0.31		=	0.31

Shallow concentrated flow

		Segment ID			
		CD			
7. Surface description (Paved or Unpaved)		Unpaved			
8. Flow length, L	ft	1			
9. Calculated Watercourse slope, s	ft/ft	9.000			
9a. Land Elevation For Upper End Of Flow Path		1337.0			
9b. Land Elevation For Lower End Of Flow Path		1328.0			
10. Average velocity, V (Figure 3-1)	ft/s	48.40			
11. Tt = L/3600V Compute Tt	hr	0.00		=	0.00

Channel Flow

		Segment ID			
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	hr			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)				hr	0.31

Reference: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 18.6 Minutes

Project: Skyway
Simulation Run: b1-2-24 Subbasin: Subbasin-TR1-2

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	5.6 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	3.60 (IN)	Total Direct Runoff :	2.33 (IN)
Total Loss :	1.26 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.34 (IN)	Discharge :	2.33 (IN)

Project: Skyway

Simulation Run: b1-5-24 Subbasin: Subbasin-TR1-5

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	7.7 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	4.56 (IN)	Total Direct Runoff :	3.21 (IN)
Total Loss :	1.33 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.23 (IN)	Discharge :	3.21 (IN)

Project: Skyway
Simulation Run: b1-10-24 Subbasin: Subbasin-TR1-10

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	9.2 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	5.28 (IN)	Total Direct Runoff :	3.89 (IN)
Total Loss :	1.38 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.90 (IN)	Discharge :	3.89 (IN)

Project: Skyway
Simulation Run: b1-25-24 Subbasin: Subbasin-TR1-25

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	11.3 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	6.24 (IN)	Total Direct Runoff :	4.80 (IN)
Total Loss :	1.42 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.82 (IN)	Discharge :	4.80 (IN)

Project: Skyway

Simulation Run: b1-100-24 Subbasin: Subbasin-TR1-100

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	14.4 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:11
Total Precipitation :	7.68 (IN)	Total Direct Runoff :	6.19 (IN)
Total Loss :	1.47 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	6.21 (IN)	Discharge :	6.19 (IN)

Time of concentration (Tc) or travel time (Tt)

TR2

Project : Oak Creek Office Park **By:** JEH **Date:** 8/6/2009
Location : Wichita, Kansas **Checked:** **Date:**

Circle One: [Present] Developed

Circle One: [Tc] Tt through subarea

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

Sheet flow (Applicable to Tc only)

		Segment ID			
		AB			
1. Surface description (Table 3-1)		Short Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.06			
3. Flow length, L (total L < 300 ft.)	ft	1			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	6.000			
5a. Land Elevation For Upper End Of Flow Path		1327.0			
5b. Land Elevation For Lower End Of Flow Path		1321.0			
6. Compute Tt	hr	0.00		=	0.00

Sheet flow (Applicable to Tc only)

		Segment ID			
		BC			
1. Surface description (Table 3-1)		Concrete			
2. Mannings roughness coeff., n (Table 3-1)		0.011			
3. Flow length, L (total L < 300 ft.)	ft	1762.34			
4. Two-yr 24-hr rainfall, P2	in	3.60			
5. Calculated Land slope, s	ft/ft	0.004			
5a. Land Elevation For Upper End Of Flow Path		1344.1			
5b. Land Elevation For Lower End Of Flow Path		1337.0			
6. Compute Tt	hr	0.36		=	0.36

Shallow concentrated flow

		Segment ID			
		CD			
7. Surface description (Paved or Unpaved)		Unpaved			
8. Flow length, L	ft	1			
9. Calculated Watercourse slope, s	ft/ft	9.000			
9a. Land Elevation For Upper End Of Flow Path		1337.0			
9b. Land Elevation For Lower End Of Flow Path		1328.0			
10. Average velocity, V (Figure 3-1)	ft/s	48.40			
11. Tt = L/3600V Compute Tt	hr	0.00		=	0.00

Channel Flow

		Segment ID			
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	hr			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)				hr	0.36

Reference: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 21.5 Minutes

Project: Skyway

Simulation Run: b1-2-24 Subbasin: Subbasin-TR2-2

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	7.8 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	3.60 (IN)	Total Direct Runoff :	2.24 (IN)
Total Loss :	1.35 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.25 (IN)	Discharge :	2.24 (IN)

Project: Skyway

Simulation Run: b1-5-24 Subbasin: Subbasin-TR2-5

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	10.7 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	4.56 (IN)	Total Direct Runoff :	3.11 (IN)
Total Loss :	1.44 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.12 (IN)	Discharge :	3.11 (IN)

Project: Skyway
Simulation Run: b1-10-24 Subbasin: Subbasin-TR2-10

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	13.0 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	5.28 (IN)	Total Direct Runoff :	3.78 (IN)
Total Loss :	1.49 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.79 (IN)	Discharge :	3.78 (IN)

Project: Skyway
Simulation Run: b1-25-24 Subbasin: Subbasin-TR2-25

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	16.0 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	6.24 (IN)	Total Direct Runoff :	4.69 (IN)
Total Loss :	1.54 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.70 (IN)	Discharge :	4.69 (IN)

Project: Skyway
Simulation Run: b1-100-24 Subbasin: Subbasin-TR2-100

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	20.5 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	7.68 (IN)	Total Direct Runoff :	6.07 (IN)
Total Loss :	1.59 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	6.09 (IN)	Discharge :	6.07 (IN)

Post-Development Hydraulic Analysis

Table 3:		Proposed Curve Numbers				
		Frequency (yr)				
		2	5	10	25	100
Basin	A	89.23	87.18	87.53	87.29	87.29
	B	89.54	87.57	87.91	87.68	87.68
	C	89.00	86.90	87.25	87.00	87.00
	D	89.00	86.90	87.25	87.00	87.00
	E	89.00	86.90	87.25	87.00	87.00
	TR-1	75.21	74.06	76.41	77.94	80.42
	TR-2	73.89	72.70	75.19	76.81	79.45
	A Offsite	66.25	64.75	67.75	70.85	73.50

See Attached CD for Detailed Calculation Spreadsheets.

Table 5:	Post-Development Basin Runoff (cfs)					
		Frequency (yr.)				
		2	5	10	25	100
Basin	A	106.4	159.0	206.4	263.7	349.2
	B	34.7	44.5	54.0	65.7	83.7
	C	31.6	40.7	48.9	59.9	76.2
	D	41.5	53.3	64.9	74.9	101.7
	E	44.9	57.6	70.1	85.7	109.6
	TR-1	5.6	7.7	9.2	11.8	14.4
	TR-2	7.8	10.7	13.0	16.0	20.5
	A Offsite	22.8	40.1	54.6	75.3	108.2

Table 6:		Pre VS. Post Pond Discharge (cfs) Frequency (yr.)				
		2	5	10	25	100
Pond	Pre A	67.7	115.0	174.4	237.2	379.5
	Post A	29.4	42.8	52.3	65.9	117.2
	Pre B	42.6	62.3	85.5	108.8	164.6
	Post B	33.7	48.1	54.7	70.2	88.2
	Pre D	12.4	20.8	33.7	44.4	78.0
	Post D	5.6	9.6	12.8	16.4	21.8
	Pre E	13.8	22.9	36.9	48.5	84.6
	Post E	9.6	17.5	24.7	32.6	42.1

Time of concentration (Tc) or travel time (Tt)

A

Project : Skyway **By:** JEH **Date:** 8/6/2009
Location : Wichita, Kansas **Checked:** **Date:**

Circle One Present | Developed

Circle One Tc | Tt through subarea

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

Sheet flow (Applicable to Tc only)

Segment ID		AB			
1. Surface description (Table 3-1)		Short Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.06			
3. Flow length, L (total L < 300 ft.)	ft	1			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	7.000			
5a. Land Elevation For Upper End Of Flow Path		1340.0			
5b. Land Elevation For Lower End Of Flow Path		1333.0			
6. Compute Tt	hr	0.00		=	0.00

Sheet flow (Applicable to Tc only)

Segment ID		BC			
1. Surface description (Table 3-1)		Concrete			
2. Mannings roughness coeff., n (Table 3-1)		0.011			
3. Flow length, L (total L < 300 ft.)	ft	2356			
4. Two-yr 24-hr rainfall, P2	in	3.60			
5. Calculated Land slope, s	ft/ft	0.006			
5a. Land Elevation For Upper End Of Flow Path		1333.0			
5b. Land Elevation For Lower End Of Flow Path		1319.0			
6. Compute Tt	hr	0.39		=	0.39

Shallow concentrated flow

Segment ID		CD			
7. Surface description (Paved or Unpaved)		Unpaved			
8. Flow length, L	ft	1			
9. Calculated Watercourse slope, s	ft/ft	14.000			
9a. Land Elevation For Upper End Of Flow Path		1333.0			
9b. Land Elevation For Lower End Of Flow Path		1319.0			
10. Average velocity, V (Figure 3-1)	ft/s	60.37			
11. Tt = L/3600V Compute Tt	hr	0.00		=	0.00

Channel Flow

Segment ID					
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	hr			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)				hr	0.39

Reference Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 23.3 Minutes

Time of concentration (Tc) or travel time (Tt)

A Offsite

Project : Skyway **By:** JEH **Date:** 8/6/2009
Location : Wichita, Kansas **Checked:** **Date:**

Circle One: Present | Developed

Circle One: Tc | Tt through subarea

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

Sheet flow (Applicable to Tc only)

Segment ID		AB			
1. Surface description (Table 3-1)		Short Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.04			
3. Flow length, L (total L < 300 ft.)	ft	2642			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	0.003			
5a. Land Elevation For Upper End Of Flow Path		1344.1			
5b. Land Elevation For Lower End Of Flow Path		1337.0			
6. Compute Tt	hr	1.66		=	1.66

Sheet flow (Applicable to Tc only)

Segment ID		BC			
1. Surface description (Table 3-1)		Concrete			
2. Mannings roughness coeff., n (Table 3-1)		0.011			
3. Flow length, L (total L < 300 ft.)	ft	1			
4. Two-yr 24-hr rainfall, P2	in	3.60			
5. Calculated Land slope, s	ft/ft	7.100			
5a. Land Elevation For Upper End Of Flow Path		1344.1			
5b. Land Elevation For Lower End Of Flow Path		1337.0			
6. Compute Tt	hr	0.00		=	0.00

Shallow concentrated flow

Segment ID		CD			
7. Surface description (Paved or Unpaved)		Unpaved			
8. Flow length, L	ft	1			
9. Calculated Watercourse slope, s	ft/ft	14.000			
9a. Land Elevation For Upper End Of Flow Path		1333.0			
9b. Land Elevation For Lower End Of Flow Path		1319.0			
10. Average velocity, V (Figure 3-1)	ft/s	60.37			
11. Tt = L/3600V Compute Tt	hr	0.00		=	0.00

Channel Flow

Segment ID					
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	hr			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)				hr	1.66

Reference: Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 99.7 Minutes

Project: Skyway
Simulation Run: b1-2-24 Subbasin: Subbasin-A2 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	106.4 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:13
Total Precipitation :	3.60 (IN)	Total Direct Runoff :	1.71 (IN)
Total Loss :	1.88 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	1.72 (IN)	Discharge :	1.71 (IN)

Project: Skyway

Simulation Run: b1-5-24 Subbasin: Subbasin-A5 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	159.0 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	4.56 (IN)	Total Direct Runoff :	2.45 (IN)
Total Loss :	2.10 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.46 (IN)	Discharge :	2.45 (IN)

Project: Skyway

Simulation Run: b1-10-24 Subbasin: Subbasin-A10 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	206.4 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:12
Total Precipitation :	5.28 (IN)	Total Direct Runoff :	3.14 (IN)
Total Loss :	2.13 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.15 (IN)	Discharge :	3.14 (IN)

Project: Skyway
Simulation Run: b1-25-24 Subbasin: Subbasin-A25 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	263.7 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:11
Total Precipitation :	6.24 (IN)	Total Direct Runoff :	4.02 (IN)
Total Loss :	2.20 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.04 (IN)	Discharge :	4.02 (IN)

Project: Skyway

Simulation Run: b1-100-24 Subbasin: Subbasin-A100 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	349.2 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:11
Total Precipitation :	7.68 (IN)	Total Direct Runoff :	5.40 (IN)
Total Loss :	2.26 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	5.42 (IN)	Discharge :	5.40 (IN)

Time of concentration (Tc) or travel time (Tt)

B

Project : Skyway **By:** JEH **Date:** 8/6/2009

Location : Wichita, Kansas **Checked:** **Date:**

Circle One Present | Developed

Circle One Tc | Tt through subarea

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

Sheet flow (Applicable to Tc only)

		Segment ID			
		AB			
1. Surface description (Table 3-1)		Short Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.06			
3. Flow length, L (total L < 300 ft.)	ft	1			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	3.000			
5a. Land Elevation For Upper End Of Flow Path		1330.0			
5b. Land Elevation For Lower End Of Flow Path		1327.0			
6. Compute Tt	hr	0.00		=	0.00

Sheet flow (Applicable to Tc only)

		Segment ID			
		BC			
1. Surface description (Table 3-1)		Concrete			
2. Mannings roughness coeff., n (Table 3-1)		0.011			
3. Flow length, L (total L < 300 ft.)	ft	360			
4. Two-yr 24-hr rainfall, P2	in	3.60			
5. Calculated Land slope, s	ft/ft	0.020			
5a. Land Elevation For Upper End Of Flow Path		1344.1			
5b. Land Elevation For Lower End Of Flow Path		1337.0			
6. Compute Tt	hr	0.05		=	0.05

Shallow concentrated flow

		Segment ID			
		CD			
7. Surface description (Paved or Unpaved)		Unpaved			
8. Flow length, L	ft	1103			
9. Calculated Watercourse slope, s	ft/ft	0.008			
9a. Land Elevation For Upper End Of Flow Path		1327.0			
9b. Land Elevation For Lower End Of Flow Path		1318.0			
10. Average velocity, V (Figure 3-1)	ft/s	1.46			
11. Tt = L/3600V Compute Tt	hr	0.21		=	0.21

Channel Flow

		Segment ID			
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	hr			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)				hr	0.26

Reference Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 15.8 Minutes

Project: Skyway

Simulation Run: b1-2-24 Subbasin: Subbasin-B2 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	34.7 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:08
Total Precipitation :	3.60 (IN)	Total Direct Runoff :	2.49 (IN)
Total Loss :	1.10 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.50 (IN)	Discharge :	2.49 (IN)

Project: Skyway

Simulation Run: b1-5-24 Subbasin: Subbasin-B5 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	44.5 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:08
Total Precipitation :	4.56 (IN)	Total Direct Runoff :	3.20 (IN)
Total Loss :	1.35 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.21 (IN)	Discharge :	3.20 (IN)

Project: Skyway

Simulation Run: b1-10-24 Subbasin: Subbasin-B10 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	54.0 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:08
Total Precipitation :	5.28 (IN)	Total Direct Runoff :	3.92 (IN)
Total Loss :	1.35 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.93 (IN)	Discharge :	3.92 (IN)

Project: Skyway
Simulation Run: b1-25-24 Subbasin: Subbasin-B25 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	65.7 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:08
Total Precipitation :	6.24 (IN)	Total Direct Runoff :	4.81 (IN)
Total Loss :	1.42 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.82 (IN)	Discharge :	4.81 (IN)

Project: Skyway

Simulation Run: b1-100-24 Subbasin: Subbasin-B100 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	83.7 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:08
Total Precipitation :	7.68 (IN)	Total Direct Runoff :	6.20 (IN)
Total Loss :	1.46 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	6.22 (IN)	Discharge :	6.20 (IN)

Time of concentration (Tc) or travel time (Tt)

C

Project : Skyway **By:** JEH **Date:** 8/6/2009
Location : Wichita, Kansas **Checked:** **Date:**

Circle One Present | Developed

Circle One Tc | Tt through subarea

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

Sheet flow (Applicable to Tc only)

		Segment ID		
		AB		
1. Surface description (Table 3-1)		Short Grass		
2. Mannings roughness coeff., n (Table 3-1)		0.06		
3. Flow length, L (total L < 300 ft.)	ft	1		
4. Two-yr 24-hr rainfall, P2	in	3.50		
5. Calculated Land slope, s	ft/ft	11.000		
5a. Land Elevation For Upper End Of Flow Path		1330.0		
5b. Land Elevation For Lower End Of Flow Path		1319.0		
6. Compute Tt	hr	0.00	=	0.00

Sheet flow (Applicable to Tc only)

		Segment ID		
		BC		
1. Surface description (Table 3-1)		Concrete		
2. Mannings roughness coeff., n (Table 3-1)		0.011		
3. Flow length, L (total L < 300 ft.)	ft	1496.71		
4. Two-yr 24-hr rainfall, P2	in	3.60		
5. Calculated Land slope, s	ft/ft	0.005		
5a. Land Elevation For Upper End Of Flow Path		1344.1		
5b. Land Elevation For Lower End Of Flow Path		1337.0		
6. Compute Tt	hr	0.29	=	0.29

Shallow concentrated flow

		Segment ID		
		CD		
7. Surface description (Paved or Unpaved)		Unpaved		
8. Flow length, L	ft	1		
9. Calculated Watercourse slope, s	ft/ft	9.000		
9a. Land Elevation For Upper End Of Flow Path		1337.0		
9b. Land Elevation For Lower End Of Flow Path		1328.0		
10. Average velocity, V (Figure 3-1)	ft/s	48.40		
11. Tt = L/3600V Compute Tt	hr	0.00	=	0.00

Channel Flow

		Segment ID		
12. Cross sectional flow area, a	sf			
13. Wetted perimeter, Pw	ft			
14. Hydraulic radius, r = a/Pw Compute r	ft			
15. Channel slope, s	ft/ft			
16. Manning's roughness coeff., n				
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s			
18. Flow length, L	ft			
19. Tt = L/3600V Compute Tt	hr		=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)			hr	0.30

Reference Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 17.7 Minutes

Project: Skyway

Simulation Run: b1-2-24 Subbasin: Subbasin-C2 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	31.6 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:03
Total Precipitation :	3.60 (IN)	Total Direct Runoff :	2.49 (IN)
Total Loss :	1.11 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.49 (IN)	Discharge :	2.49 (IN)

Project: Skyway
Simulation Run: b1-5-24 Subbasin: Subbasin-C5 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	40.7 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:03
Total Precipitation :	4.56 (IN)	Total Direct Runoff :	3.24 (IN)
Total Loss :	1.32 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.24 (IN)	Discharge :	3.24 (IN)

Project: Skyway

Simulation Run: b1-10-24 Subbasin: Subbasin-C10 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	49.2 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:03
Total Precipitation :	5.28 (IN)	Total Direct Runoff :	3.94 (IN)
Total Loss :	1.33 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.95 (IN)	Discharge :	3.94 (IN)

Project: Skyway
Simulation Run: b1-25-24 Subbasin: Subbasin-C25 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	59.9 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:03
Total Precipitation :	6.24 (IN)	Total Direct Runoff :	4.84 (IN)
Total Loss :	1.40 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.84 (IN)	Discharge :	4.84 (IN)

Project: Skyway

Simulation Run: b1-100-24 Subbasin: Subbasin-C100 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	76.2 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:03
Total Precipitation :	7.68 (IN)	Total Direct Runoff :	6.23 (IN)
Total Loss :	1.45 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	6.23 (IN)	Discharge :	6.23 (IN)

Time of concentration (Tc) or travel time (Tt)

D

Project : Skyway **By:** JEH **Date:** 8/6/2009
Location : Wichita, Kansas **Checked:** **Date:**

Circle One Present | Developed

Circle One Tc | Tt through subarea

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

Sheet flow (Applicable to Tc only)

		Segment ID			
		AB			
1. Surface description (Table 3-1)		Short Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.06			
3. Flow length, L (total L < 300 ft.)	ft	1			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	8.000			
5a. Land Elevation For Upper End Of Flow Path		1334.0			
5b. Land Elevation For Lower End Of Flow Path		1326.0			
6. Compute Tt	hr	0.00		=	0.00

Sheet flow (Applicable to Tc only)

		Segment ID			
		BC			
1. Surface description (Table 3-1)		Concrete			
2. Mannings roughness coeff., n (Table 3-1)		0.011			
3. Flow length, L (total L < 300 ft.)	ft	1265			
4. Two-yr 24-hr rainfall, P2	in	3.60			
5. Calculated Land slope, s	ft/ft	0.006			
5a. Land Elevation For Upper End Of Flow Path		1344.1			
5b. Land Elevation For Lower End Of Flow Path		1337.0			
6. Compute Tt	hr	0.24		=	0.24

Shallow concentrated flow

		Segment ID			
		CD			
7. Surface description (Paved or Unpaved)		Unpaved			
8. Flow length, L	ft	1			
9. Calculated Watercourse slope, s	ft/ft	9.000			
9a. Land Elevation For Upper End Of Flow Path		1337.0			
9b. Land Elevation For Lower End Of Flow Path		1328.0			
10. Average velocity, V (Figure 3-1)	ft/s	48.40			
11. Tt = L/3600V Compute Tt	hr	0.00		=	0.00

Channel Flow

		Segment ID			
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	hr			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)				hr	0.24

Reference Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 14.5 Minutes

Project: Skyway

Simulation Run: b1-2-24 Subbasin: Subbasin-D2 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	41.5 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:16
Total Precipitation :	3.60 (IN)	Total Direct Runoff :	2.44 (IN)
Total Loss :	1.15 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.45 (IN)	Discharge :	2.44 (IN)

Project: Skyway
Simulation Run: b1-5-24 Subbasin: Subbasin-D5 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	53.3 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:16
Total Precipitation :	4.56 (IN)	Total Direct Runoff :	3.13 (IN)
Total Loss :	1.41 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.15 (IN)	Discharge :	3.13 (IN)

Project: Skyway

Simulation Run: b1-10-24 Subbasin: Subbasin-D10 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	64.9 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:15
Total Precipitation :	5.28 (IN)	Total Direct Runoff :	3.84 (IN)
Total Loss :	1.42 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.86 (IN)	Discharge :	3.84 (IN)

Project: Skyway

Simulation Run: b1-25-24 Subbasin: Subbasin-D25 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	79.4 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:15
Total Precipitation :	6.24 (IN)	Total Direct Runoff :	4.72 (IN)
Total Loss :	1.49 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.75 (IN)	Discharge :	4.72 (IN)

Project: Skyway

Simulation Run: b1-100-24 Subbasin: Subbasin-D100 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	101.7 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:15
Total Precipitation :	7.68 (IN)	Total Direct Runoff :	6.11 (IN)
Total Loss :	1.54 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	6.14 (IN)	Discharge :	6.11 (IN)

Time of concentration (Tc) or travel time (Tt)

E

Project : Oak Creek Office Park **By:** JEH **Date:** 8/6/2009
Location : Wichita, Kansas **Checked:** **Date:**

Circle One Present | Developed

Circle One Tc | Tt through subarea

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

Sheet flow (Applicable to Tc only)

Segment ID		AB			
1. Surface description (Table 3-1)		Short Grass			
2. Mannings roughness coeff., n (Table 3-1)		0.06			
3. Flow length, L (total L < 300 ft.)	ft	1			
4. Two-yr 24-hr rainfall, P2	in	3.50			
5. Calculated Land slope, s	ft/ft	8.000			
5a. Land Elevation For Upper End Of Flow Path		1334.0			
5b. Land Elevation For Lower End Of Flow Path		1326.0			
6. Compute Tt	hr	0.00		=	0.00

Sheet flow (Applicable to Tc only)

Segment ID		BC			
1. Surface description (Table 3-1)		Concrete			
2. Mannings roughness coeff., n (Table 3-1)		0.011			
3. Flow length, L (total L < 300 ft.)	ft	967			
4. Two-yr 24-hr rainfall, P2	in	3.60			
5. Calculated Land slope, s	ft/ft	0.007			
5a. Land Elevation For Upper End Of Flow Path		1344.1			
5b. Land Elevation For Lower End Of Flow Path		1337.0			
6. Compute Tt	hr	0.17		=	0.17

Shallow concentrated flow

Segment ID		CD			
7. Surface description (Paved or Unpaved)		Unpaved			
8. Flow length, L	ft	1			
9. Calculated Watercourse slope, s	ft/ft	9.000			
9a. Land Elevation For Upper End Of Flow Path		1337.0			
9b. Land Elevation For Lower End Of Flow Path		1328.0			
10. Average velocity, V (Figure 3-1)	ft/s	48.40			
11. Tt = L/3600V Compute Tt	hr	0.00		=	0.00

Channel Flow

Segment ID					
12. Cross sectional flow area, a	sf				
13. Wetted perimeter, Pw	ft				
14. Hydraulic radius, r = a/Pw Compute r	ft				
15. Channel slope, s	ft/ft				
16. Manning's roughness coeff., n					
17 V = 1.49(r^0.667)(s^0.50)/n Compute V	ft/s				
18. Flow length, L	ft				
19. Tt = L/3600V Compute Tt	hr			=	0.00
20. Watershed or subarea Tc or Tt (add Tt in steps 6,11, and 19)				**hr**	0.17

Reference Urban Hydrology for Small Watersheds
Technical Release 55, Soil Conservation Service
U.S. Department of Agriculture, June 1986

Use Time Of Concentration = 10.5 Minutes

Project: Skyway

Simulation Run: b1-2-24 Subbasin: Subbasin-E2 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	44.9 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:10
Total Precipitation :	3.60 (IN)	Total Direct Runoff :	2.44 (IN)
Total Loss :	1.15 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	2.45 (IN)	Discharge :	2.44 (IN)

Project: Skyway

Simulation Run: b1-5-24 Subbasin: Subbasin-E5 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	57.6 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:10
Total Precipitation :	4.56 (IN)	Total Direct Runoff :	3.14 (IN)
Total Loss :	1.41 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.15 (IN)	Discharge :	3.14 (IN)

Project: Skyway
Simulation Run: b1-10-24 Subbasin: Subbasin-E10 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	70.1 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:09
Total Precipitation :	5.28 (IN)	Total Direct Runoff :	3.85 (IN)
Total Loss :	1.42 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	3.86 (IN)	Discharge :	3.85 (IN)

Project: Skyway

Simulation Run: b1-25-24 Subbasin: Subbasin-E25 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	85.7 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:09
Total Precipitation :	6.24 (IN)	Total Direct Runoff :	4.73 (IN)
Total Loss :	1.49 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	4.75 (IN)	Discharge :	4.73 (IN)

Project: Skyway

Simulation Run: b1-100-24 Subbasin: Subbasin-E100 post

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Discharge :	109.6 (CFS)	Date/Time of Peak Discharge :	13Jan2009, 12:09
Total Precipitation :	7.68 (IN)	Total Direct Runoff :	6.12 (IN)
Total Loss :	1.54 (IN)	Total Baseflow :	0.00 (IN)
Total Excess :	6.14 (IN)	Discharge :	6.12 (IN)

Project: Skyway

Simulation Run: b1-2-24 Reservoir: Reservoir-a

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	170.8 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:07
Peak Outflow :	29.4 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 13:38
Total Inflow :	1.63 (IN)	Peak Storage :	8.1 (AC-FT)
Total Outflow :	1.35 (IN)	Peak Elevation :	1320.9 (FT)

Project: Skyway

Simulation Run: b1-5-24 Reservoir: Reservoir-a

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	234.8 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:07
Peak Outflow :	42.8 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 13:41
Total Inflow :	2.37 (IN)	Peak Storage :	11.9 (AC-FT)
Total Outflow :	2.05 (IN)	Peak Elevation :	1321.8 (FT)

Project: Skyway
Simulation Run: b1-10-24 Reservoir: Reservoir-a

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	284.5 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:07
Peak Outflow :	52.3 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 13:44
Total Inflow :	2.96 (IN)	Peak Storage :	15.0 (AC-FT)
Total Outflow :	2.60 (IN)	Peak Elevation :	1322.5 (FT)

Project: Skyway

Simulation Run: b1-25-24 Reservoir: Reservoir-a

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	351.5 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:07
Peak Outflow :	65.9 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 13:47
Total Inflow :	3.77 (IN)	Peak Storage :	19.5 (AC-FT)
Total Outflow :	3.36 (IN)	Peak Elevation :	1323.5 (FT)

Project: Skyway
Simulation Run: b1-100-24 Reservoir: Reservoir-a

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	452.5 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:07
Peak Outflow :	117.2 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 13:27
Total Inflow :	5.04 (IN)	Peak Storage :	24.1 (AC-FT)
Total Outflow :	4.57 (IN)	Peak Elevation :	1324.6 (FT)

Project: Skyway
Simulation Run: b1-2-24 Reservoir: Reservoir-B

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	77.0 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:03
Peak Outflow :	33.7 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:17
Total Inflow :	2.19 (IN)	Peak Storage :	1.6 (AC-FT)
Total Outflow :	2.15 (IN)	Peak Elevation :	1319.4 (FT)

Project: Skyway

Simulation Run: b1-5-24 Reservoir: Reservoir-B

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	105.9 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:03
Peak Outflow :	48.1 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:16
Total Inflow :	3.05 (IN)	Peak Storage :	2.2 (AC-FT)
Total Outflow :	3.00 (IN)	Peak Elevation :	1319.8 (FT)

Project: Skyway

Simulation Run: b1-10-24 Reservoir: Reservoir-B

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	127.7 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:03
Peak Outflow :	58.7 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:16
Total Inflow :	3.71 (IN)	Peak Storage :	2.7 (AC-FT)
Total Outflow :	3.66 (IN)	Peak Elevation :	1320.1 (FT)

Project: Skyway
Simulation Run: b1-25-24 Reservoir: Reservoir-B

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	156.9 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:03
Peak Outflow :	70.2 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:17
Total Inflow :	4.61 (IN)	Peak Storage :	3.3 (AC-FT)
Total Outflow :	4.55 (IN)	Peak Elevation :	1320.3 (FT)

Project: Skyway

Simulation Run: b1-100-24 Reservoir: Reservoir-B

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	200.7 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:03
Peak Outflow :	88.2 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:17
Total Inflow :	5.98 (IN)	Peak Storage :	4.3 (AC-FT)
Total Outflow :	5.91 (IN)	Peak Elevation :	1320.8 (FT)

Project: Skyway

Simulation Run: b1-2-24 Reservoir: Reservoir-D

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	66.6 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:02
Peak Outflow :	5.6 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:49
Total Inflow :	2.31 (IN)	Peak Storage :	2.4 (AC-FT)
Total Outflow :	1.66 (IN)	Peak Elevation :	1326.0 (FT)

Project: Skyway

Simulation Run: b1-5-24 Reservoir: Reservoir-D

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	91.0 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:02
Peak Outflow :	9.6 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:37
Total Inflow :	3.19 (IN)	Peak Storage :	3.3 (AC-FT)
Total Outflow :	2.47 (IN)	Peak Elevation :	1326.4 (FT)

Project: Skyway

Simulation Run: b1-10-24 Reservoir: Reservoir-D

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	109.4 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:02
Peak Outflow :	12.8 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:34
Total Inflow :	3.87 (IN)	Peak Storage :	4.0 (AC-FT)
Total Outflow :	3.10 (IN)	Peak Elevation :	1326.7 (FT)

Project: Skyway

Simulation Run: b1-25-24 Reservoir: Reservoir-D

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	133.8 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:02
Peak Outflow :	16.4 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:33
Total Inflow :	4.79 (IN)	Peak Storage :	4.9 (AC-FT)
Total Outflow :	3.96 (IN)	Peak Elevation :	1327.1 (FT)

Project: Skyway
Simulation Run: b1-100-24 Reservoir: Reservoir-D

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	170.3 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:02
Peak Outflow :	21.8 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:31
Total Inflow :	6.18 (IN)	Peak Storage :	6.3 (AC-FT)
Total Outflow :	5.27 (IN)	Peak Elevation :	1327.7 (FT)

Project: Skyway

Simulation Run: b1-2-24 Reservoir: Reservoir-E

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 2
Compute Time:	05Aug2009, 16:40:37	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	64.9 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 12:00
Peak Outflow :	9.6 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:22
Total Inflow :	2.31 (IN)	Peak Storage :	1.9 (AC-FT)
Total Outflow :	1.86 (IN)	Peak Elevation :	1323.3 (FT)

Project: Skyway

Simulation Run: b1-5-24 Reservoir: Reservoir-E

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 5
Compute Time:	05Aug2009, 16:47:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	88.6 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 11:59
Peak Outflow :	17.9 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:15
Total Inflow :	3.20 (IN)	Peak Storage :	2.6 (AC-FT)
Total Outflow :	2.70 (IN)	Peak Elevation :	1323.8 (FT)

Project: Skyway

Simulation Run: b1-10-24 Reservoir: Reservoir-E

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 10
Compute Time:	05Aug2009, 16:51:36	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	106.4 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 11:59
Peak Outflow :	24.7 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:13
Total Inflow :	3.88 (IN)	Peak Storage :	3.1 (AC-FT)
Total Outflow :	3.35 (IN)	Peak Elevation :	1324.2 (FT)

Project: Skyway

Simulation Run: b1-25-24 Reservoir: Reservoir-E

Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 25
Compute Time:	05Aug2009, 16:55:59	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	130.3 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 11:59
Peak Outflow :	32.6 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:12
Total Inflow :	4.79 (IN)	Peak Storage :	3.7 (AC-FT)
Total Outflow :	4.23 (IN)	Peak Elevation :	1324.6 (FT)

Project: Skyway

Simulation Run: b1-100-24 Reservoir: Reservoir-E

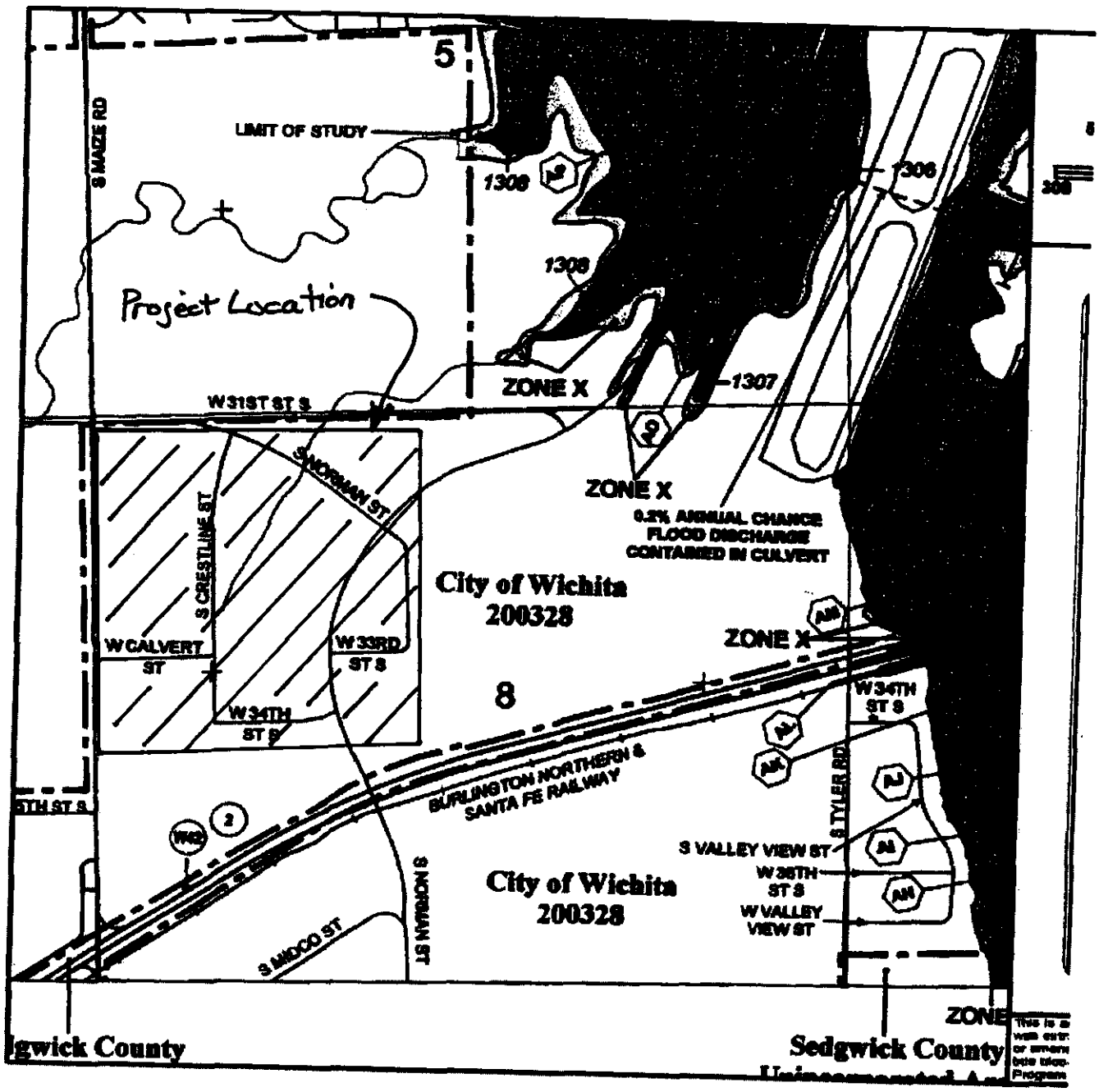
Start of Run:	13Jan2009, 00:00	Basin Model:	Basin 1
End of Run:	14Jan2009, 00:10	Meteorologic Model:	Met 100
Compute Time:	05Aug2009, 17:00:15	Control Specifications:	24 hr

Volume Units: IN

Computed Results

Peak Inflow :	165.8 (CFS)	Date/Time of Peak Inflow :	13Jan2009, 11:59
Peak Outflow :	42.1 (CFS)	Date/Time of Peak Outflow :	13Jan2009, 12:12
Total Inflow :	6.19 (IN)	Peak Storage :	4.7 (AC-FT)
Total Outflow :	5.58 (IN)	Peak Elevation :	1325.3 (FT)

Floodplain Submittal


5
S MAIZE RD
LIMIT OF STUDY
1309
1308
1306
Project Location
ZONE X
1307
W 31ST ST S
S NORMAN ST
S CRESTLINE ST
ZONE X
0.2% ANNUAL CHANCE FLOOD DISCHARGE CONTAINED IN CULVERT
City of Wichita
200328
W CALVERT ST
W 33RD ST S
W 34TH ST S
8
ZONE X
W 34TH ST S
BURLINGTON NORTHERN & SANTA FE RAILWAY
S TYLER RD
S VALLEY VIEW ST
W 35TH ST S
W VALLEY VIEW ST
City of Wichita
200328
S NORMAN ST
S MIDCO ST
Sedgwick County
Sedgwick County
ZONE